



MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Martin O'Malley, Governor • Anthony G. Brown, Lt. Governor
Beverley K. Swaim-Staley, Secretary • Ralign T. Wells, Administrator

TO: All Planholders
FROM: Maryland Transit Administration
SUBJECT: **ADDENDUM NO. 6**
Contract No.: T-1089-0240
Parking Expansion – West Baltimore MARC Station
DATE: January 27, 2012

Enclosed and effective this date is Addendum No. 6 to the subject Contract. This change does not delay the Bid Opening Date of **February 3, 2012 at 2:00 p.m., 6 St. Paul Street, Baltimore, MD 21202, Conference Room #731.**

A conformed copy of the revised specification sections is attached. A list of the changes made to this contract is attached to this Addendum. Also attached are responses to contractors' questions.

The Bidder shall acknowledge receipt of this Addendum by completing and returning this form with the bid package.

All other terms and conditions remain unchanged.

Sincerely,

Vanessa Ashe, Procurement Officer
Professional Services & Construction/Installation Section
Procurement Division

Acknowledgement of receipt of ADDENDUM # 6 to Solicitation #T-1089-0240

Vendor Name: _____

Authorized Representative's Signature

Date

PARKING EXPANSION - WEST BALTIMORE MARC STATION
CONTRACT NO. T-1089-0240
January 27, 2012

#	QUESTIONS	RESPONSES
1	There are 2 conduit crossings at W. Franklin Street; a 2 way 3" and a 2 way 5". Although the items and notes call for these to be either trenched or slotted, in special provisions page SP-510 paragraph 3.10 and page SP-577, paragraph 3.11, it states in part... conduits conduit shall be placed under existing pavement by jacking, drilling or directional boring..." Please clarify.	Proposed electrical conduits crossing the roadway are to be concrete encased and will need to be slotted.
2	On page SP-316 of Add. #3, Sec. 4.05, paragraph B., it states that this grinding item includes "Patching". Patching should not be incidental to grinding. It should be a separate item paid for by the SY (if depth is given) or by the Ton (if variable depth or unknown depth).	Full depth patching will be included as a separate pay item on this project. A detail has been added to sheet CV-24. HMA PAVEMENT 02745 has been modified to include materials, procedures and measurement/payment information for patching. Section 4.05 has been revised to remove patching as an incidental item.
3	Since an item for grinding is established, an item for "HMA for Maintenance of Traffic" also needs to be added since drop-offs at the tie-in areas created by the grinding operation need to be tapered with temp. HMA wedge until the paving is placed.	HMA for Maintenance of Traffic will not be measured and will be incidental to the lump sum Maintenance of Traffic Item. Additional language has been added to section 4.01 & 4.08 of MAINTENANCE OF TRAFFIC 01550 for further clarification.
4	On sheet EL-1, detail J shows a 2-3" CE conduit – slotted. There is no bid item for this?	Detail J on Sheet EL-1 should be 1-3" CE conduit - slotted. This will be corrected on the plan sheet.
5	Bid Item #29 is for ABANDONMENT OF EXISTING STORM DRAIN STRUCTURES and is by linear feet. However, the plans list several existing storm drain structures TO BE REMOVED and there is no bid item for removal of structures. Please clarify	Abandonment of existing storm drain structures refers to pipe or linear objects, The existing structures to be removed such as inlets shall be paid under bid item #32, Removal of Existing Masonry as indicated in the contract documents.
6	Bid Item #34 is for REMOVAL OF EXISTING PIPE. However, the plans identify several places for existing storm drain pipe TO BE ABANDONED. Please clarify	Pipes to be abandoned is paid for under bid item #29
7	At West Franklin Street and North Payson Street it appears there is one sensor in the design to be installed on the mast arm	This is correct. Installation of this sensor should be coordinated with the Baltimore City Department of Transportation Traffic Division.
8	Please provide the concrete strength requirements for the Type I & Type II Pole Base Foundations	Mix No. 3 concrete (f'c = 3,500 PSI). It was specified in the pole base general notes.
9	Please provide Soil Boring information to determine whether the drilling will be in soil or rock or a combination of both.	This information can be found in the Geotechnical Report in Appendix G

#	QUESTIONS	RESPONSES
10	in Phase 1 there was a bid item for concrete roadway removal We don't find that item in this package. Concrete removal is an entirely different operation from soil excavation and , we thick, should be bid as separate items. Please let us know how to handle this work.	Concrete removal will not be paid separatetly. The Contractor shall bid per Section C of SP 243.
11	Specification Section 02820-2.01, C PICKET says "Space between pickets shall be 2.5" on center". Is the spacing 2.5" face to face which is 3.25" center to center OR is the spacing 2.5" center to center? Also, they call out the pickets to be ¾" solid tube. Please clarify, is it a solid or a tube?	Section 2.01 C "ORNAMENTAL PICKET FENCE 02820" has been revised to show a 3.5" on center picket spacing. The pickets are solid per the spec and detail.
12	Item 29 Abandment...S.D Structures. There is not item for removal of these structures but the drawings call for this work	Removal structures are paid under item #32
13	Item 34 Removal of pipe. There is no item for abandment of pipe but this work is also called for on the drawings	Abandonment of Pipe is paid under bid item #29
14	Mounting on the mast arm as depicted would be outside the specified guidelines for sensor height and offset. Is a ped. pole (and conduit) planned to be added into the plans for this sensor? Also the specs call for a mounting height of 11.5' but the ped. poles are 10' poles. We will quote an extension bracket to get the extra height. We will also include infrared illumination as some of the corners may not have sufficient light for video based ped. detection.	A pedestal pole is not anticipated in the splitter island at the W. Franklin Street/N. Payson Street intersection. The Baltimore City Department of Transportation Traffic Division has confirmed that the use of an extension bracket to decrease or increase the proper sensor mounting height at various locations would be acceptable. The exact positioning can be finalized during construction. It should be noted that all materials necessary to mount and operate the pedestrian sensors, including extension brackets, are considered incidental to the pedestrian detection sensor item (16582), as per the specification.
15	PAGE SP-134 PARA 4.01 ENGINEERS FIELD OFFICE. WILL THE MTA PROVIDE A SITE FOR THE FIELD OFFICE ON THE PROJECT SITE AT NO COST TO THE CONTRACTOR?	There is room available within the project area to provide a site for the engineer's office at no additional cost to the contractor
16	REF SP-134 NOTE F4 SECURITY SERVICE. DOES THAT INDICATE THE CONTRACTOR IS TO PROVIDE FULL TIME SECURITY SERVICE WHEN HE IS NOT ACTIVELY WORKING ON THE PROJECT SITE? DOES THAT INDICATE AN ARMED GUARD REQUIREMENT?	SP-134 F4 states that "During other than normal working hours, the contractor should provide security measures and area protection equivalent to that used for the Contractor's work site, shop and office" therefore MTA is requesting the same level of the security protection used to secure the contractor's area which could include something as simple as pad locks or chain link fence, but the key phrase is equivalent security measures.

#	QUESTIONS	RESPONSES
17	SOIL BORINGS INDICATE THAT ROCK COULD BE ENCOUNTERED IN EXCAVATION ON THIS CONTRACT. IN ORDER TO PROTECT BOTH THE CONTRACTOR AND MTA COULD A ROCK EXCAVATION ITEM BE ADDED TO THE BID PROPOSAL?	According to the soil borings rock was encountered in most cases at depths greater than 12 feet below the surface. Therefore we do not anticipate rock concerns during excavation but an additional statement has been added to "EXCAVATION - 02315" making this item incidental to Class 1 Excavation.
18	CAN YOU PROVIDE AN INDICATION OF WHEN FLAGGERS WILL ACTUALLY BE REQUIRED ON THIS PROJECT OR WOULD YOU CONSIDER ADDING A FLAGGER BID ITEM TO THE CONTRACT PROPOSAL?	Specific flagging operations have not been identified with any contract activities, but during the course of the construction if flaggers are deemed necessary then this activity will be incidental to the Maintenance and Control of Traffic bid item as indicated on SP-177 4.10A
19	WILL THE CONTRACTOR BE REQUIRED TO PROVIDE RR PROTECTIVE INSURANCE ON THIS PROJECT AND IF SO WHAT ARE THE REQUIREMENTS FOR THE LIABILITY LIMITS?	No. See "Insurance Requirements" Section 17 of the Notice to Contractors.
20	REF BID ITEM 003. PAGE SP-94 PARA C IT APPEARS A CQC PLAN MANAGER IS REQUIRED ON THIS WORK SITE FULL TIME. THE FIXED PRICE AMOUNT OF \$80000.00 DOES NOT APPEAR ENOUGH TO COVER THE 600 CAL DAY CONTRACT.	A full time CQC manager may not be needed for the entire contract duration. This can be discussed at the Pre-construction meeting.
21	WHAT IS THE INTENT OF BID ITEM 002, MISC WORK ALLOWANCE AT A LUMP SUM PRICE OF \$560000.00?	The Miscellaneous Work Allowance is a standard set aside for MTA construction projects to cover any items not identified during the original bid. The contractor must first seek approval from MTA's resident engineer and management before utilizing this lump sum item.
22	WHAT IS THE INTENT OF PAGE SP-118 PARA C, NOISE LEVEL MONITORING ON THIS CONTRACT?	Noise levels during operating hours must adhere to the guidelines set forth in Sp 118 "d. Measurement Procedure".MTA will conduct noise measurements periodically during regular operating hours and if specified noise levels are exceeded the contractor must propose an immediate action to address the issue.
23	IT APPEARS FROM YOUR CROSS SECTIONS AND THE QUANTITIES FOR BID ITEMS 035 AND 036 THAT ALL EXCAVATED MATERIALS UNDER BID ITEM 035 GET HAULED OFF SITE AND IN AREAS WHERE FILL IS REQUIRED BELOW THE ROAD BOX, THAT FILL REQUIRED WILL BE PAID UNDER BID ITEM 036. HAS THE ENGINEER PREPARED AN EARTHWORK SUMMARY FOR THIS PROJECT THAT IS AVAILABLE TO THE CONTRACTOR?	An eartwork summary for the job will be provided to the successful bidder, but the current quantities identified for line items 035 and 036 should be utilized for the current bid estimates.

#	QUESTIONS	RESPONSES
24	CAN THE CONTRACTOR ASSUME THAT ALL PIPE EXCAVATED MATERIALS ARE SUITABLE FOR PIPE BACKFILL?	Yes for the purpose of this bid the contractor should assume that all pipe excavated materials are suitable for pipe backfill
25	Line item # 116 – 31 bollards - ? Where is the detail for the bollard.	See page 53 CV-48
26	On new sheet 19 CV-14, Sheet 21 CV-16, Sheet 24 CV-19, Sheet 25 CV-20, ? These pages shows the new pillar locations with reference back to Sheet 121B LS-3B where the detail shows the iron fence as 3’6” high but the drawings says 5’ high, Which height do they want.	The LS-3B plan sheet detail has been modified to reflect the 5 foot height fence with a slightly higher brick pillar column
27	Also, on the new Sheet 121B detail LS-3B the post size for the 3’ 6” high fence is not indicated.	The LS-3B plan sheet detail has been modified to reflect the proposed post size
28	Which inlets are to get the flowable fill? The detail mentions WR inlets but there are no WR’s on this project.	It is assumed that the question is referring to sheet DR-12, and the “Replacement of Existing WR/WRM Inlet or New WR/WRM inlet within roadways - Concrete Apron Detail. This detail is also applicable to the type ‘S’ inlets specified on this project. Flowable fill if needed, shall be incidental to the payment item “Mix 9 Concrete for Drainage Structures and Pipe Collars”. All combination grate style inlets such as the WR and Type ‘S’ shall utilize this detail.
29	Please review the insurance requirements for this project as listed in the addendum. A 10 year bodily injury/property damage policy, a \$ 50,000,000.00 builder’s risk policy, railroad protective coverage when there is no railroad work all far beyond the normal coverages for most bidders on this project, we believe.	Section 1.2 (page10) Contractor Provided Insurance and 1.3 (page 12) MTA provided insurance. In the event the OCIP is not used, the contractor will have to provide the insurance noted on the bid worksheet (gl & wc). The contractor’s insurance cost is extracted because MTA is providing the insurance. If MTA decides the OCIP will not apply, then the contractor is expected to provide the insurance noted in the bid sheet at a comparable price.
30	There is a Bid Item # 116 for bollards but we don’t find a detail on the drawings. Please address.	See Response #25.
31	There is a question pertaining to Item 210. Are we to supply “ Interconnected Thermoplastic with a Main Pattern of Offset Brick” or are we to supply “Durathern In-Laid Thermoplastic with a Main Pattern of Offset Brick “?	The contractor is responsible for providing “interconnected thermoplastic with a main pattern of offset brick”. Durathern is the name of a Baltimore City approved vendor that supplies this material, but as long as the specifications identified in Section 02766 are adhered to, an approved equal will also be acceptable.

ADDENDUM NO.: 6
DATE: 1/27/12
CONTRACT NO.: T-1089-0240

The following additions, deletions, and modifications are hereby made as part of the Contract Documents of Parking Expansion – West Baltimore MARC Station, Contract No.: T-1089-0240.

I. CONTRACT SPECIFICATIONS

UNIT PRICE SCHEDULE (Replace pages 4 thru 25)

<u>Page No.</u>	<u>Description</u>
19	INCREASED Quantity item No. 167 “HANDBOX (DPW COVER)” from 37 to 42 per EACH.
25	ADDED Item No. 229 “HOT MIX ASPHALT PATCHES” per TON with a quantity of 200.

SPECIAL PROVISIONS

<u>Page No.</u>	<u>Description</u>
243	REVISED Special Provision “02315-EXCAVATION” to include a statement identifying Rock Excavation as an incidental Class 1 Excavation item.
308 – 316B	REVISED Special Provision “02745-HOT MIX ASPHALT PAVEMENT” to include text changes and measurement / payment information for Hot Mix Asphalt Patches.
357	REVISED Special provision “02820-ORNAMENTAL PICKET FENCE” to change the picket spacing in section 2.01 C from 2.5” to 3.5” on center.
395 – 404	REVISED Special Provision “01550-MAINTENANCE OF TRAFFIC” to include text changes in sections 4.01 B and 4.08 A to further clarify that HMA for MOT is incidental to the Maintenance and Control of Traffic line item.

APPENDICES

<u>Appendix</u>	<u>Description</u>
A	REVISED Appendix A “List of Contract Drawings” to identify CV-24 and EL-1 as Addendum 6 modified plan sheets.

II. CONTRACT PLANS *

<u>Sheet No.</u>	<u>Description</u>
TITLE	ADDED the list of modified plan sheets for Addendum 6 on the Title Sheet.
29	ADDED a construction detail to CV-24 for full depth patching and modified the fence post detail height .
96	REVISED Plan Sheet EL-1 Construction Detail "J" from 2-3" CONCRETE ENCASED CONDUIT PER B.C. 824.01 - TYPE X FOR LIGHTING - SLOTTED to 1-3" CONCRETE ENCASED CONDUIT PER B.C. 824.01 - TYPE Y FOR LIGHTING – SLOTTED.
121B	REVISED plan sheet LS-3B to reflect the 5 foot fence height consistent with the rest of the project and to identify the post size.

- CD containing the Contract Plans (drawings) will be mailed by the COB today to all contractors who requested the original drawings.

Item	Section	Description	Unit	Estimate of Quantity	Unit Price	Total Price
001	01130	MOBILIZATION	LS	1	\$170,000.00	\$170,000.00
002	01210	MISCELLANEOUS WORK ALLOWANCE	LS	1	\$560,000.00	\$560,000.00
003	01450	QUALITY ASSURANCE/QUALITY CONTROL	LS	1	\$80,000.00	\$80,000.00
004	01522	ENGINEER'S OFFICE - TYPE 2	LS	1		
005	01550	ARROW PANEL	UD	450		
006	01550	DRUMS FOR MAINTENANCE OF TRAFFIC	EA	200		
007	01550	MAINTENANCE AND CONTROL OF TRAFFIC	LS	1		
008	01550	PORTABLE VARIABLE MESSAGE SIGN	UD	168		
009	01550	PROTECTION VEHICLE	UD	55		
010	01550	REFLECTIVE BARRIER MARKERS	EA	22		

011	01550	REMOVAL OF EXISTING LINE MARKINGS	LF	4,000		
012	01550	REMOVE AND RESET TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS FOR MAINTENANCE OF TRAFFIC	BBL	8		
013	01550	RESET TEMPORARY TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC	LF	800		
014	01550	TEMPORARY CONCRETE TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC	LF	600		
015	01550	TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS FOR MAINTENANCE OF TRAFFIC	BBL	8		
016	01550	TEMPORARY PAVEMENT MARKINGS (12 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	700		
017	01550	TEMPORARY PAVEMENT MARKINGS (12 INCH YELLOW NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	100		
018	01550	TEMPORARY PAVEMENT MARKINGS (24 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	50		
019	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	2,500		

020	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH WHITE REMOVABLE PREFORMED PAVEMENT LINE MARKINGS)	LF	1,000		
021	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH YELLOW NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	5,500		
022	01550	TEMPORARY PAVEMENT MARKINGS (8 INCH BLACK OUT TAPE LINES)	LF	500		
023	01550	TEMPORARY PAVEMENT MARKINGS (REMOVAL OF BLACK OUT TAPE LINES- ANY WIDTH)	LF	500		
024	01550	REMOVAL OF REMOVABLE PREFORMED PAVEMENT MARKING LINES - ANY WIDTH	LF	1,000		
025	01550	TEMPORARY PAVEMENT MARKINGS (REMOVABLE PREFORMED LETTERS, SYMBOLS, ARROWS AND NUMBERS)	EA	20		
026	01550	REMOVAL OF REMOVABLE PREFORMED LETTERS, SYMBOLS, ARROWS AND NUMBERS	EA	20		
027	01550	TEMPORARY TRAFFIC SIGNS	SF	825		
028	01550	TYPE III BARRICADE FOR MAINTENANCE OF TRAFFIC	EA	10		

029	02220	ABANDONMENT OF EXISTING STORM DRAIN STRUCTURES	LF	495		
030	02220	REMOVAL OF EXISTING CONCRETE BARRIER (ANY TYPE)	LF	4,170		
031	02220	REMOVAL OF EXISTING FENCE	LF	2,599		
032	02220	REMOVAL OF EXISTING MASONRY	CY	200		
033	02220	REMOVAL OF EXISTING RETAINING WALL	CY	126		
034	02220	REMOVAL OF EXISTING PIPE	LF	1,153		
035	02315	CLASS 1 EXCAVATION	CY	15,359		
036	02317	COMMON BORROW	CY	7,340		
037	02317	TEST PIT EXCAVATION	CY	28		
038	02370	DIVERSION FENCE	LF	400		
039	02370	INLET PROTECTION	EA	70		

040	02370	RECONSTRUCT STABILIZED CONSTRUCTION ENTRANCE	TON	550		
041	02370	SILT FENCE	LF	400		
042	02370	STABILIZED CONSTRUCTION ENTRANCE	TON	300		
043	02370	SUPER SILT FENCE	LF	2,800		
044	02370	TEMPORARY GABION OUTLET STRUCTURE	EA	2		
045	02370	TYPE A-2 EARTH DIKE	LF	222		
046	02370	TYPE B-2 EARTH DIKE	LF	140		
047	02372	TYPE A SOIL STABILIZATION MATTING	SY	300		
048	02375	CLASS 1 RIP RAP	SY	106		
049	02620	4" NON PERFORATED CIRCULAR PIPE LONGITUDINAL UNDERDRAIN	LF	120		
050	02620	6" PERFORATED CIRCULAR PIPE LONGITUDINAL UNDERDRAIN	LF	910		

051	02630	15" CLASS IV REINFORCED CONCRETE PIPE	LF	772		
052	02630	18" CLASS IV REINFORCED CONCRETE PIPE	LF	891		
053	02630	18" CLASS V REINFORCED CONCRETE PIPE	LF	155		
054	02630	19" X 30" CLASS IV REINFORCED CONCRETE PIPE	LF	13		
055	02630	21" CLASS IV REINFORCED CONCRETE PIPE	LF	430		
056	02630	21" CLASS V REINFORCED CONCRETE PIPE	LF	185		
057	02630	24" CLASS IV REINFORCED CONCRETE PIPE	LF	282		
058	02630	24" CLASS V REINFORCED CONCRETE PIPE	LF	47		
059	02630	24"X38" CLASS IV REINFORCED CONCRETE PIPE	LF	14		
060	02630	27" CLASS IV REINFORCED CONCRETE PIPE	LF	239		
061	02630	36" CLASS IV REINFORCED CONCRETE PIPE	LF	367		

062	02630	ADJUST DRAINAGE STRUCTURE TO GRADE	EA	3		
063	02630	MIX #2 CONCRETE FOR MISCELLANEOUS STRUCTURES	CY	15		
064	02630	MIX #9 CONCRETE FOR DRAINAGE STRUCTURES AND PIPE COLLARS	CY	120		
065	02630	MODIFIED TYPE 'H' CURB OPENING INLET, MINIMUM DEPTH	EA	7		
066	02630	MODIFIED TYPE 'H' CURB OPENING INLET, VERTICAL DEPTH	LF	20		
067	02630	STANDARD 48" DIA. PRECAST MANHOLE BC-383.04, MINIMUM DEPTH	EA	20		
068	02630	STANDARD 48" DIA. PRECAST MANHOLE BC-383.04, VERTICAL DEPTH	LF	99		
069	02630	STANDARD 60" DIA. PRECAST MANHOLE BC-383.05, MINIMUM DEPTH	EA	6		
070	02630	STANDARD 60" DIA. PRECAST MANHOLE BC-383.05, VERTICAL DEPTH	LF	40		
071	02630	STANDARD 84" DIA. PRECAST MANHOLE BC-383.07, MINIMUM DEPTH	EA	1		
072	02630	STANDARD 84" DIA. PRECAST MANHOLE BC-383.07, VERTICAL DEPTH	LF	5		

073	02630	STANDARD STD CHANNEL NO. 1, BC- 383.31	EA	1		
074	02630	STANDARD STD CHANNEL NO. 12, BC- 383.35	EA	3		
075	02630	STANDARD STD CHANNEL NO. 2, BC- 383.31	EA	11		
076	02630	STANDARD STD CHANNEL NO. 3, BC- 383.32	EA	13		
077	02630	STANDARD STD CHANNEL NO. 4, BC- 383.32	EA	3		
078	02630	STANDARD STD CHANNEL NO. 5, BC- 383.32	EA	3		
079	02630	STANDARD STD CHANNEL NO. 6, BC- 383.33	EA	2		
080	02630	STANDARD STD CHANNEL NO. 9, BC- 383.34	EA	1		
081	02630	STANDARD TYPE 'E' COMBINATION INLET - BC 376.24, MINIMUM DEPTH	EA	1		
082	02630	STANDARD TYPE 'E' COMBINATION INLET - BC 376.24, VERTICAL DEPTH	LF	1		
083	02630	STANDARD TYPE H COMB. INLET - BC 376.64, MINIMUM DEPTH	EA	7		

084	02630	STANDARD TYPE 'H' COMB. INLET - BC 376.64, VERTICAL DEPTH	LF	11		
085	02630	STANDARD TYPE K INLET - MD 378.11, MINIMUM DEPTH	EA	12		
086	02630	STANDARD TYPE K INLET - MD 378.11, VERTICAL DEPTH	LF	38		
087	02630	STANDARD TYPE 'S' COMBINATION INLET BC- 380.51, MINIMUM DEPTH	EA	28		
088	02630	STANDARD TYPE 'S' COMBINATION INLET BC- 380.51, VERTICAL DEPTH	LF	25		
089	02630	STANDARD TYPE 'S' DOUBLE GRATE TANDEM BC-380.21, MINIMUM DEPTH	EA	7		
090	02630	STANDARD TYPE 'S' DOUBLE GRATE TANDEM BC-380.21, VERTICAL DEPTH	LF	7		
091	02630	STANDARD TYPE 'S' SINGLE GRATE BC- 380.01, MINIMUM DEPTH	EA	2		
092	02630	STANDARD TYPE 'S' SINGLE GRATE BC- 380.01, VERTICAL DEPTH	LF	1		
093	02640	BIORETENTION SOIL MIXTURE	CY	833		
094	02640	CONCRETE SAND	CY	127		

095	02720	GRADED AGGREGATE BASE COURSE	CY	4,408		
096	02720	NUMBER 57 AGGREGATE	CY	367		
097	02720	NUMBER 7 AGGREGATE	CY	127		
098	02745	HMA SUPERPAVE 9.5MM FOR WEDGE/LEVEL PG 64-22 SURFACE COURSE, LOW ESAL	TON	105		
099	02745	HMA SUPERPAVE 9.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	1,993		
100	02745	HMA SUPERPAVE 12.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	976		
101	02745	HMA SUPERPAVE 19MM PG 64-22 BASE COURSE, LOW ESAL	TON	5,437		
102	02750	9" CONCRETE PAVEMENT	SY	3,806		
103	02765	10 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	100		
104	02765	12 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	4900		
105	02765	24 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	650		

106	02765	5 INCH GREEN PAVEMENT MARKING PAINT LINES	LF	200		
107	02765	5 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	4025		
108	02765	5 INCH WHITE PAVEMENT MARKING PAINT LINES	LF	8,900		
109	02765	5 INCH YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	7225		
110	02765	REMOVAL OF EXISTING PAVEMENT LINE MARKINGS, ANY WIDTH	LF	2,200		
111	02765	WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LEGENDS AND SYMBOLS	EA	44		
112	02769	DETECTABLE WARNING SURFACE	SF	788		
113	02770	TYPE A COMBINATION CURB AND GUTTER & TYPE A CURB	LF	9,783		
114	02775	5-INCH CONCRETE SIDEWALK	SF	24,457		
115	02775	8-INCH CONCRETE DRIVEWAY	SY	70		
116	02820	BOLLARDS	EA	31		

117	02820	5 FOOT ORNAMENTAL FENCE	LF	2,515		
118	02820	3 FOOT ORNAMENTAL FENCE	LF	318		
119	02890	REMOVE EXISTING GROUND MOUNTED SIGNS AND SUPPORTS	SF	167		
120	02890	REMOVE EXISTING OVERHEAD SIGN STRUCTURE	EA	2		
121	02890	SHEET ALUMINUM SIGNS	SF	1,060		
122	02890	SQUARE PERFORATED TUBULAR STEEL SIGN POSTS	EA	58		
123	02890	SQUARE TUBULAR STEEL ANCHOR BASES	EA	58		
124	02890	WOOD SIGN SUPPORTS 4 INCH X 4 INCH	LF	693		
125	02890	WOOD SIGN SUPPORTS 4 INCH X 6 INCH	LF	228		
126	02920	ADDITIONAL WATERING OF LANDSCAPED AREAS	MG	45		
127	02920	3" SHREDDED HARDWOOD BARK MULCH	SY	1,160		

128	02920	SODDING	SY	517		
129	02920	TEMPORARY SEEDING AND MULCHING	SY	7,000		
130	02920	TOPSOIL FURNISHED AND PLACED	CY	1,600		
131	02920	TURF SEEDING	SY	22,056		
132	02930	ACER RUBRUM 'NORTHWOOD' / RED MAPLE	EA	7		
133	02930	AMELANCHIER CANADENSIS / SERVICEBERRY	EA	47		
134	02930	CARPINUS CAROLINIANA / HORNBEAM	EA	3		
135	02930	CLADRASTIS KENTUKEA / YELLOWWOOD	EA	5		
136	02930	CLETHRA ALNIFOLIA 'PINK SPIRE' / PINK SPIRE SUMMERSWEET	EA	161		
137	02930	ILEX GLABRA 'COMPACTA' / DWARF INKBERRY	EA	24		
138	02930	LIRIOPE MUSCARI 'BIG BLUE' / BIG BLUE LILYTURF	EA	191		

139	02930	NARCISSUS 'PACIFIC RIM' / PACIFIC RIM DAFFODIL	EA	4,375		
140	02930	PANICUM VIRGATUM 'HEAVY METAL' / SWITCHGRASS	EA	841		
141	02930	QUERCUS BICOLOR / SWAMP WHITE OAK	EA	19		
142	02930	RUDBECKIA FULGIDA 'GOLDSTRUM' / BLACK EYED SUSAN	EA	456		
143	02930	SPIREAE JAPONICA 'LITTLE PRINCESS' / LITTLE PRINCESS SPIREA	EA	163		
144	02930	TILIA AMERICANA 'REDMOND' / REDMOND AMERICAN LINDEN	EA	19		
145	02930	VIBURNUM DENTATUM / ARROWWOOD VIBURNUM	EA	65		
146	03300	20' CONCRETE BARRIER NOSE DOWN TAPER	EA	2		
147	03300	34" F-SHAPE CONCRETE BARRIER (ANY TYPE)	LF	1,652		
148	05585	RUB RAIL BARRIER ATTACHMENT	EA	2		
149	05585	TYPE C END TREATMENT	EA	2		

150	05585	W-BEAM GUARD RAIL W/ 6 FOOT POST	LF	201		
151	16122	2 CONDUCTOR ELECTRICAL CABLE (NO. 6 AWG)	LF	200		
152	16122	4 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	LF	9,000		
153	16122	7 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	LF	6,000		
154	16122	(2) 1 CONDUCTOR ELECTRICAL CABLE (NO. 12 AWG)	LF	350		
155	16122	BARE COPPER GROUND WIRE, NO 6 AWG	LF	3,200		
156	16122	CABLE - 1 CONDUCTOR, NO 2 AWG, TYPE USE, 600V	LF	2,100		
157	16122	CABLE - 1 CONDUCTOR, NO 6 AWG, TYPE USE, 600V	LF	6,400		
158	16122	INTERCONNECT CABLE	LF	3,000		
159	16123	TYPE X DUCT SECTION, 2-3" I.D. - TRENCHED	LF	40		
160	16123	TYPE X DUCT SECTION, 2-4" I.D. - TRENCHED	LF	40		

161	16123	TYPE Y DUCT SECTION, 1-3 I.D. - SLOTTED	LF	100		
162	16123	TYPE Y DUCT SECTION, 1-3" I.D. - TRENCHED	LF	1,280		
163	16123	TYPE Y DUCT SECTION, 1-4" AND 1-3" I.D. - SLOTTED	LF	1,100		
164	16123	TYPE Y DUCT SECTION, 1-4" I.D. - TRENCHED	LF	60		
165	16123	TYPE X DUCT SECTION, 2-5" I.D. - TRENCHED	LF	800		
166	16123	TYPE X DUCT SECTION, 2-5" I.D. - SLOTTED	LF	200		
167	16124	HANDBOX (DPW COVER)	EA	42		
168	16124	HANDBOX (DTT COVER)	EA	25		
169	16124	CCTV HANDBOX	EA	13		
170	16124	LIGHTING ELECTRICAL HANDBOX	EA	28		
171	16440	ELECTRICAL UTILITY SERVICE 120/240 VOLTS 200 AMPS	EA	1		

172	16440	LIGHTING CONTROL CABINET, BASE MOUNT (120/240 VOLTS, 1 PHASE 3 WIRE SYSTEM)	EA	1		
173	16440	15A SINGLE POLE OUTLET PEDESTAL	EA	3		
174	16443	BACKUP UPS SYSTEM FOR TRAFFIC SIGNALS - BASE MOUNT	EA	4		
175	16443	FOUNDATION - UPS	EA	4		
176	16443	INSTALL TYPE 'A' CONTROLLER CABINET - POLE MOUNT	EA	4		
177	16520	70mA 255W LED LUMINAIRE	EA	38		
178	16521	400 WATT HPS COBRA HEAD LIGHT FIXTURE AND LAMP WITH PHOTOCELL	EA	8		
179	16525	30' PARKING LOT LIGHT POLE	EA	20		
180	16573	2 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	800		
181	16573	4 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	1,500		
182	16573	4 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	100		

183	16574	TEMPORARY STREET LIGHTING	LS	1		
184	16575	10-FOOT LIGHTING ARM	EA	8		
185	16576	REMOVE AND DISPOSE OF TRAFFIC SIGNAL AND STREET LIGHTING EQUIPMENT	LS	1		
186	16576	REMOVE AND RELOCATE ROADWAY LIGHTING STRUCTURE	EA	5		
187	16576	REMOVE AND SALVAGE TRAFFIC SIGNAL EQUIPMENT	LS	1		
188	16578	FOUNDATION - D.T.T (20" BOLT CIRCLE)	EA	14		
189	16578	FOUNDATION - D.T.T (15" BOLT CIRCLE)	EA	5		
190	16578	FOUNDATION - PEDESTAL POLE	EA	18		
191	16578	TYPE I POLE BASE AND FOUNDATION	EA	12		
192	16578	TYPE II POLE BASE AND FOUNDATION	EA	8		
193	16579	ONE-WAY, 3-SECTION ADJUSTABLE LED SIGNAL HEAD (12")	EA	28		

194	16580	AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON CENTRAL CONTROL UNIT	EA	4		
195	16580	AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON STATION AND SIGN	EA	32		
196	16581	ONE-WAY, 1-SECTION LED COUNTDOWN PEDESTRIAN SIGNAL (16"X18")	EA	32		
197	16582	ETHERNET CABLE FOR PEDESTRIAN DETECTION SENSOR	LF	4,500		
198	16582	PEDESTRIAN DETECTION SENSOR	EA	29		
199	16583	VIDEO DETECTION CAMERA	EA	10		
200	16583	VIDEO DETECTION CAMERA CABLE	LF	1,100		
201	16586	10-FOOT GALVANIZED STEEL PEDESTAL POLE	EA	18		
202	16586	21-FOOT HEAVY DUTY GALVANIZED STEEL TRAFFIC POLE	EA	6		
203	16586	28-FOOT HEAVY DUTY GALVANIZED STEEL JOINT USE TRAFFIC POLE	EA	8		
204	16586	30 FT. MAST ARM	EA	7		

205	16586	35 FT. MAST ARM	EA	1		
206	16586	40 FT. MAST ARM	EA	2		
207	16586	44 FT. MAST ARM	EA	4		
NEW ADDENDUM 1 ITEMS						
208	02640	PEA GRAVEL	SF	1,000		
209	02745	PRICE ADJUSTMENT FOR ASPHALT BINDER	EA	1	\$20,000.00	\$20,000.00
210	02766	DECORATIVE CROSSWALKS	SF	771		
211	02820	ORNAMENTAL BRICK COLUMNS	EA	12		
212	02825	SQUARE 16 FOOT SHELTER	EA	1		
213	02930	LAGERSTROEMIA X NATCHEZ	EA	8		
214	02930	MALUS SARGENTII CANDYMINT / CANDYMINT SARGENT CRABAPPLE	EA	42		
215	02930	PENNISETUM ALOPECUROIDES HAMELN / FOUNTAIN GRASS	EA	267		

216	03300	CONCRETE PEDESTALS	EA	4		
217	16122	BARE COPPER GROUND WIRE, NO 3 AWG	LF	1,100		
218	16122	BARE COPPER GROUND WIRE, NO 4 AWG	LF	1,200		
219	16122	BARE COPPER GROUND WIRE, NO 8 AWG	LF	200		
220	16122	BARE COPPER GROUND WIRE, NO 10 AWG	LF	1,300		
221	16122	CABLE - 1 CONDUCTOR, NO 4 AWG, TYPE USE, 600V	LF	2,300		
222	16122	CABLE - 1 CONDUCTOR, NO 8 AWG, TYPE USE, 600V	LF	300		
223	16122	CABLE - 1 CONDUCTOR, NO 10 AWG, TYPE USE, 600V	LF	2,600		
224	16573	1 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	400		
225	16573	1 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	1,500		
226	16573	1.5 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	1,300		

227	16573	1.5 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	900		
NEW ADDENDUM 3 ITEM						
228	02745	GRINDING HMA PAVEMENT 0 INCH TO 2 INCH	SY	7,405		
NEW ADDENDUM 5 ITEM						
229	02745	HOT MIX ASPHALT PATCHES	TON	200		

Basis of Award: Total amount of items 001 thru 229 _____ (figures)

_____ (words)

230		Insurance Premium (Contingency)	LS	LS	LS	
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This amount will only be added to the base bid in the event that the bidder is excluded from the wrap-up insurance program or the program is terminated mid-term. The Insurance Cost Worksheet must be attached to the bid.

2. Test two (2) shall be performed to the same truck mounted attenuator at a fully raised travel position.
3. All parts of the truck mounted attenuator shall be measured before test one (1), between the tests, and at the conclusion of test two (2). The truck mounted attenuator shall have failed if:
 - a. Any dimension of any part changes more than five-tenths of an inch (0.5").
 - b. There is any damage to the truck mounted attenuator which would impair its ability to function. '
 - c. Any part becomes detached.
- J. The truck mounted attenuator shall be adequately tested to insure that moisture from rain will not impede the energy absorption properties or add significantly to the weight of the truck mounted attenuator.

PART 4: MEASUREMENT AND PAYMENT

4.01 MAINTENANCE AND CONTROL OF TRAFFIC

- A. Maintenance and Control of Traffic will be measured as a lump sum.
- B. Maintenance and Control of Traffic will be paid for at the Contract unit price bid. This price shall be full compensation for all material, equipment, tools, labor and all work to address any unexpected MOT related items not already covered by the proposed line items including HMA for MOT.

4.02 BARRICADES, DANGER, WARNING, AND DETOUR SIGNS

Barricades, Danger, Warning, and Detour Signs will not be measured for payment.

4.03 DETOURS

Detours will not be measured for payment.

4.04 TEMPORARY TRAFFIC SIGNS

- A. Temporary traffic signs will be measured and paid for at the Contract Unit

Price per square foot for the pertinent Temporary Traffic Sign item. The payment will be full compensation for furnishing the signs and supports, wood posts, erection, relocation, maintenance, cleaning, replacement due to non-traffic damage or normal wear, removal and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

- B. Where signs have been set and are subsequently damaged by traffic and the Engineer determines that they are not repairable, they shall be replaced and will be measured and paid for at the Contract Unit Price.
- C. Temporary traffic signs and all associated hardware, fittings, posts, brackets and incidentals shall be removed from the project site when no longer needed and become the property of the Contractor.

4.05 PORTABLE VARIABLE MESSAGE SIGN (PVMS)

- A. The Portable Variable Message Sign will be measured and paid for at the Contract Price per unit day. A unit day shall consist of any approved usage within a twenty-four (24) hour day period. Each Portable Variable Message Sign will be paid for only once per unit day, regardless of how many times it is relocated. When a unit is used for part of a day, it will be measured as a unit day. This unit price will be the same regardless of the type of unit used.
- B. The payment will be full compensation for the installation, sign, diesel generator, all fuel and refueling, electrical. power and hook up, setup and maintenance of computer programs, changing messages, relocating as required by the Traffic Control Plan or as directed by the Engineer, and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

4.06 ARROW PANEL (AP)

- A. Arrow Panels will be measured and paid for at the Contract Price per unit day. A unit day shall consist of any approved usage within a twenty-four (24) hour calendar day period. Each Arrow Panel will be paid for only once per unit day, regardless of how many times it is relocated. When an arrow panel is used for part of a day, it will be measured and paid for as a unit day.

- B. The payment will be full compensation for all material, labor, equipment, tools, incidentals required to set up and operate at the site as required and at any relocated site as required by the Traffic Control Plan or as directed by the Engineer.

4.07 AGGREGATE FOR MAINTENANCE OF TRAFFIC

- A. When aggregate is part of any base or *pavement* course used for the Construction and maintenance of temporary detours, approaches, crossings and widenings, the item of Work will not be measured but the cost will be incidental to the maintenance of traffic line item.
- B. Aggregate for maintenance of traffic when used for temporary and permanent patching at pipe *culverts* and utilities will not be measured but the cost will be incidental to the pertinent pipe culvert or utility item.

4.08 HOT MIX ASPHALT (HMA) FOR MAINTENANCE OF TRAFFIC

- A. Hot Mix Asphalt for Maintenance of Traffic when used for temporary roadway modifications associated with MOT will not be measured and paid for and will be incidental to the lump sum Maintenance And Control Of Traffic Item from Section 4.01. This includes all tack coat, crack filler, hauling, placing, compacting, maintaining, removal, rehandling, reworking, disposal, and for all material, labor, equipment, tools, and incidentals necessary to complete all roadway and ADA work.
- B. Hot mix asphalt for maintenance of traffic when used for temporary and permanent patching at pipe culverts and utilities will not be measured but the cost will be incidental to the pertinent pipe culvert or utility item.

4.09 TEMPORARY PAVEMENT MARKINGS

- A. Payment for Removable Preformed Pavement Markings, Removal of Removable Preformed Pavement Markings, Nontoxic Lead Free Waterborne Pavement Marking Paint and the Removal of Existing Pavement Markings will be measured and paid for using one or more of the items below and as specified in the Contract Documents. '
- B. The payment will be full compensation for furnishing, placing, complete removal of lines, letters, numbers, arrows, symbols and the removal of all

residues. In addition, payment will cover maintenance and replacement during the one-hundred eighty (180) day period and for all material, labor, equipment, tools and incidentals necessary to complete the Work. Removal and replacement of temporary pavement markings required beyond the one-hundred eighty (180) day period will be measured and paid for at the Contract Unit Price for the pertinent temporary pavement marking item.

- C. Temporary markings replaced during the one-hundred eighty (180) day period as a result of plowing (as determined by the Engineer) will be paid for at the Contract Unit Price for the pertinent temporary marking item.
1. 8 Inch Black Out Tape Lines will be measured and paid for per linear foot.
 2. Removal Of Black Out Tape Lines-Any Width will be measured and paid for per linear foot.
 3. 5, 12, and 24 Inch (White or Yellow) Nontoxic Lead Free Waterborne Pavement Marking Paint will be measured and paid for per linear foot.
 4. 5 Inch White Removable Preformed Pavement Line Markings will be measured and paid for per linear foot.
 5. The Removal of Existing Line Markings will be measured and paid for per linear foot.
 6. The Removal of Removable Preformed Pavement Markings – any width will be measured and paid for per linear foot.
 7. The Removal of Preformed Letters, Symbols, Arrows and Numbers will be measured and paid for per each.
 8. The Removal of Removable Preformed Letters, Symbols, Arrows and Numbers will be measured and paid for per linear feet.

4.10 FLAGGER

- A. Flagger will not be measured but the cost will be incidental 'to the Contract Price for maintenance of traffic unless otherwise specified in the Contract Documents.
- B. When an item for flagger is specified in the, Contract Documents, the flagger will be measured and paid for at the Contract Unit Price per hour unless otherwise specified in the Contract Documents. The payment will be full compensation for clothing and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

4.11 TRAFFIC MANAGER (TM)

The traffic manager will not be measured but the cost will be incidental to the Contract Price for maintenance of traffic.

**4.12 ROADWAY SIGNALING AND CONTROL EQUIPMENT
(MAINTENANCE OF TRAFFIC)**

- A. Unless otherwise specified, maintenance of traffic will not be measured but will be paid for at the Contract lump sum price. The payment will be full compensation for relocating, turning, completely covering and uncovering or removing and resetting, maintaining in like new condition and cleaning all existing and temporary traffic signs, and any other traffic control device. Also included is the inventory of all existing pavement markings and the treatment of any other traffic control device not included in these Specifications but necessary for the fulfillment of the Contract requirements and implementation of the approved traffic control plan and for all material, labor, equipment, tools, and incidentals necessary to complete the Work. Payment of the Contract lump sum price will be prorated and paid in equal amounts on each monthly estimate. The number of months used for prorating will be the number estimated to complete the Work.
 - 1. When additional Contract pay items for maintenance of traffic are specified in the Contract Documents, measurement and payment

will conform to the pertinent pay items included in the Contract Documents.

2. Cones, reflective collars, anchoring devices, stop/slow paddles, sign flags and warning lights will not be measured but the cost will be incidental to the Contract Price for maintenance of traffic unless otherwise specified in the Contract Documents.
 3. Temporary traffic control devices, which in the Engineer's opinion need replacement, shall be replaced immediately by the Contractor. The cost to replace traffic control devices, including all material, labor, equipment and tools, will not be measured but will be incidental to the Contract Price for maintenance of traffic except when specifically set up in the Contract Documents as a separate Contract pay item.
 4. Material, equipment and labor necessary for the Construction and removal of temporary or detour roads will be measured and paid for at the Contract Unit Price for the pertinent items used.
- B. When specified in the Contract Documents, maintenance of traffic will be measured and paid for at the Contract Unit Price per unit day.
- C. When there is no item in the Contract Documents, maintenance of traffic will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

4.13 TEMPORARY TRAFFIC BARRIER END TREATMENTS

- A. Temporary Traffic Barrier End Treatments: Remove and reset temporary traffic barrier end treatments and repairing temporary traffic barrier end treatments will not be measured and the cost will be incidental to the placement and resetting of Temporary Traffic Barrier line item.

4.14 DRUMS FOR MAINTENANCE OF TRAFFIC

- A. Drums for maintenance of traffic will be measured and paid for once at the Contract Unit Price per each. The payment will include reflectorization,

setting, resetting, removing, sandbags, maintenance, cleaning of drums to like new condition and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

- B. Where drums have been set and are subsequently damaged by traffic and the Engineer determines that they are not repairable, they shall be replaced and will be measured and paid for at the Contract Unit Price.

4.15 TYPE III BARRICADES FOR MAINTENANCE OF TRAFFIC

- A. Type III Barricades will be measured and paid for at the Contract Unit Price per each for the pertinent barricade item specified in the Contract Documents and accepted by the Engineer. The payment will be full compensation for the installation, maintenance, warning lights, (when required by the traffic control plan), the maintenance and removal of any required warning lights, removal of the barricades, and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.
- B. Where barricades have been set and are subsequently damaged by traffic and the Engineer determines that they are not repairable, they shall be replaced and will be measured and paid for at the Contract Unit Price.

4.16 CONES FOR MAINTENANCE OF TRAFFIC

Cones for maintenance of traffic and cones that have to be replaced will not be measured but the cost will be incidental to the Contract Price for maintenance of traffic.

4.17 TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS (SFPB) FOR MAINTENANCE OF TRAFFIC

- A. Temporary crash cushion sand filled plastic barrels will be measured and paid for at the Contract Unit Price per barrel for one or more of the items below and specified in the Contract Documents.
 - 1. Temporary crash cushion sand filled plastic barrels for maintenance of traffic.

2. Replace temporary crash cushion sand filled plastic barrels for maintenance of Traffic.
 3. Remove and reset temporary crash cushion sand filled plastic barrels for maintenance of traffic will be measured and paid for per barrel.
- B. The payment will be full compensation for furnishing, excavation, placing, installing, cleaning, maintaining, sand, antifreeze agent, machinery, replacement, remove, reset, regarding, and removing from the project the individual weighted barrels in a manner acceptable to the Engineer and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

4.18 TEMPORARY CONCRETE TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC

- A. The payment will be full compensation for furnishing, placing, maintaining and removal from the project site as directed by the Engineer and for all material, labor, equipment, tools and incidentals necessary to complete the Work..
- B. Temporary concrete traffic barrier for maintenance of traffic and reset temporary concrete traffic barrier for maintenance of traffic will be measured and paid for at the Contract Unit Price per linear foot measured along the centerline of the top of the barrier.
2. Reflective barrier markers, vertical panels and warning lights will be incidental to the barrier placement..

4.19 RESET TEMPORARY TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC

- A. The measurement and payment to reset the temporary concrete traffic barrier for maintenance of traffic will be paid for at the Contract Unit Price per linear foot. Also include removal from its original placement, transporting and resetting it in its new temporary location and applicable portions of paragraph 4.17.A.1.

4.20 PROTECTION VEHICLE

Protection Vehicle will be measured and paid for at the Contract Price per unit day. A unit day shall consist of any approved usage within a twenty-four (24) hour Calendar Day period. If a protection vehicle is used for part of a day, it will be measured as a unit day, regardless of how many times it is relocated. The payment will be full compensation for the complete truck mounted attenuator, licensed truck operator, connecting and disconnecting the attenuator to the truck, transporting and relocating the truck mounted attenuator, and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

4.21 REFLECTIVE BARRIER MARKERS

- A. Reflective Barrier Markers will be measured per each.
- B. Reflective Barrier Markers will be paid for once at the Contract unit price bid, complete in place. This price shall be full compensation for all material, equipment, tools, labor and all work to set up, reset, maintain, and remove when no longer needed. Where drums have been set and damaged by traffic and the Engineer determines that they are not repairable, replacement will be paid for at the contract unit price.

END OF SECTION

the work. Payment will not be made for excavation of any material used for purposes other than those designated.

- C. Removal and applicable disposal of existing pavement (including asphalt, concrete & brick), sidewalk, paved ditches, curb or combination curb and gutter will be considered incidental to Class I Excavation

4.02 PRESPLITTING

- A. Pre-splitting will not be measured.
- B. Pre-splitting will not be paid for directly, but the cost will be incidental to the Contract unit price per cubic yard for Class 1 Excavation unless otherwise specified.

4.03 ROCK EXCAVATION

- A. The Contractor shall note that Rock Penetrated by Power Soil Auger (RPPSA) was encountered in the borings taken within the project limits. The locations and depths of the RPPSA are contained in the soil boring logs elsewhere in this Invitation for Bids.
- B. Rock Excavation will not be measured.
- C. Rock Excavation will not be paid for directly, but the cost will be incidental to the Contract unit price per cubic yard for Class 1 Excavation unless otherwise specified.

END OF SECTION

SECTION 02745**HOT MIX ASPHALT PAVEMENT****PART 1 - GENERAL****1.01 DESCRIPTION:**

- A. This section specifies the construction and grinding of hot mix asphalt (HMA) pavement.
- B. Repair rigid, flexible, or composite pavements by removing part or all of the section of the existing pavement and replacing the removed materials using hot mix asphalt (HMA) paving material. The locations and extent of the repairs will be as specified or as directed.
 - 1. Full depth patching consists of the removal of the full thickness of the pavement sections to the top of the aggregate base material and replacement with HMA. Construct FDP whenever more than 50 percent of the pavement thickness requires repair.
- C. Related Sections:
 - 1. Section 01300: Submittals

1.02 SUBMITTALS:

- A. Contractor shall submit to the Engineer for approval a mix design and a proposed paving plan, including production plants, location of plants with respect to the project site, equipment, and material sources. Submittals for mix design approval shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13.
- B. In accordance with SECTION 01300 SUBMITTALS, the Contractor shall submit to the engineer:
 - 1. Mix design

2. Paving plan
3. Production plants
4. Location of plants
5. Equipment
6. Source information

1.03 EQUIPMENT:

- A. All equipment, including the production plant and paving equipment, shall be subject to approval by the Engineer. The plant shall be ready for inspection by the Engineer at least 48 hours prior to the start of the construction operations.
- B. Pavers
 1. Pavers will be inspected and approved by the Engineer based upon requirements in the manufacturer's specification manual with a copy to be provided by the Contractor. The paver shall be a self-contained, power propelled unit capable of spreading the mixture true to line, grade and cross slope. The paver shall be equipped with a screed or strike off assembly, which can produce a finished surface of the required smoothness and texture without tearing, shoving or gouging the mixture. The paver shall have automatic controls for transverse slope and grade. Controls shall be capable of sensing grade from an outside reference line or ski and sensing the transverse slope of the screed to maintain the required grade and transverse slope within plus or minus 0.1 of the required slope percentage.
 2. Manual operations will be permitted in the construction of irregularly shaped and minor areas, or where directed by the Engineer.
 3. Whenever a breakdown or malfunction of any automatic control occurs, the equipment may be operated manually for the remainder of the workday as directed by the Engineer.

4. Reference lines or other suitable markings to control the horizontal alignment shall be provided by the Contractor, subject to the approval of the Engineer.
- C. Rollers: Rollers shall be self propelled, reversible, steel wheeled or pneumatic tired. Vibratory rollers may be used, except they shall not be in vibratory mode when paving on surface courses without the approval of the Engineer. Pneumatic tire rollers shall have multiple tires of equal size with smooth tread. Wheels shall be arranged to oscillate in pairs, or they may be individually sprung. Tires shall be uniformly inflated at the operating pressure approved by the Engineer. The Contractor shall furnish the Engineer a manufacturer's table showing this data. The difference in tire pressure between any two tires shall not be greater than 5 psi. The Contractor shall provide a means for checking the tire pressure on the job at all times.
- D. Grinding Equipment
1. Grinding equipment shall have a cutting mandrel with carbide tipped cutting teeth and designed specifically for grinding asphalt surfaces to close tolerances. The equipment shall accurately establish slope elevations and profile grade controls.
 2. A vacuum equipped street sweeper, capable of removing all loose material from the roadway without causing dust to escape into the air.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Hot Mix Asphalt shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13 with the following addition to the Chart in Section 20.13-4 Paragraph 1:

SIEVE SIZE	SC (Percent Passing)
¾ in.	100
½ in.	86 – 99
3/8 in.	70 – 94
No. 4	35 – 68

No. 8	24 – 52
No. 16	16 – 36
No. 30	10 – 26
No. 50	7 – 18
No. 200	2 – 9

Add to the Marshall Test Requirements:

	<u>SC</u>
Stability, min., lb	1500
Flow 0.01 in.	8 – 18
Voids, mineral aggregate, % min.	15
Voids, total mix %	3 – 5
Compaction blows used	75

- B. The Surface Course shall consist of Bituminous Concrete Band SC.

2.02 PRODUCTION PLANTS: Production Plants shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13-5.

PART 3 - EXECUTION

3.01 WEATHER:

- A. Pavement shall be placed only when the ambient air and surface temperature is at least 40° F and rising for surface course and at least 32° F and rising for base courses. The base shall be clean and dry and approved by the Engineer before HMA paving begins. HMA pavement shall not be placed on a frozen base. When weather conditions differ from these limits, material en route from the plant to the job site may be used at the Contractor's risk. If placement of the material is stopped by the Engineer, all material en route shall be wasted at the Contractor's expense.

3.02 FOUNDATION PREPARATION:

- A. Prior to placement of paving material, the foundation shall be constructed as specified in the Contract Documents and approved by the Engineer. When paving over existing pavement, all excess crack filling or patch material shall be removed and all spalls and potholes shall be cleaned, tack coated, filled and tamped with hot mix asphalt before placement.

Manholes, valve boxes, inlets, and other appurtenances within the area to be paved shall be adjusted to grade as directed by the Engineer.

- B. Curbs, Gutters, and Other Supports: Where permanent curbs, gutters, edges, and other supports are planned, they shall be constructed and backfilled prior to placing the HMA, which shall then be placed and compacted against them.

3.03 TACK COAT:

- A. Prior to application of the tack coat, the surface shall be cleaned of all loose and foreign materials. The tack coat shall be uniformly applied to the surface by full circulation spray bars that are laterally and vertically adjustable and provide triple fanning and overlapping action so that the resulting coating shall be residual asphalt applied at a rate of 0.01 to 0.05 gal/yd² as directed by the Engineer.

3.04 HOT MIX ASPHALT PLACEMENT:

- A. HMA shall be placed by the paver. Delivery of the mixture by the hauling units and placement shall be continuous. The temperature of the mixture shall not be less than 225° F at the time of placement. Broadcasting of loose mixture over the new surface will not be permitted.

3.05 COMPACTION:

- A. Immediately following placement of the HMA, the mixture shall be compacted by rolling to an in-place density of 92.0 to 97.0 percent of the maximum density. In-place compaction shall be completed before the mixture cools below 185° F, as determined by a probe type surface thermometer, supplied by the Contractor and approved by the Engineer.
- B. Rollers shall start at the sides and proceed longitudinally toward the center of the pavement. Successive trips of the roller shall overlap by at least one half the width of the roller, and alternate trips shall not end at the same point. After rolling is completed, no traffic of any kind will be permitted on the pavement until the pavement has cooled to less than 140° F or as directed by the Engineer.

3.06 JOINTS:

- A. Both longitudinal and transverse joints in successive courses shall be staggered so that one is not above the other. Transverse joints shall be staggered by the length of the paver. Longitudinal joints shall be staggered a minimum of 6 in.

- B. Joints shall be constructed to provide a continuous bond between the old and new surfaces. Joints shall be coated with tack coat as directed by the Engineer. In the case of surface course, the edge of the existing pavement shall be cut back for its full depth on transverse joints to expose a fresh surface and the surface shall be coated with tack coat material as directed by the Engineer. Before placing the mixture against curbs, gutters, headers, manholes, etc., all contact surfaces shall be coated with tack coat.

3.07 FIELD QUALITY CONTROL:

- A. Acceptance will be determined by nuclear in-place density test data. The nuclear gauge shall be calibrated in conformance with MSMT 417.

- B. The Contractor shall take a one-minute special calibration nuclear test from each lift. A special calibration nuclear test is defined as an average of two (minimum) special calibration readings taken at the same location after rotating the nuclear gauge 180 degrees.

- C. Nuclear test-in-place density data shall be expressed as percentage of the maximum specific gravity determined for each day's production. The in-place density shall be 92.0 to 97.0 percent.

3.08 HOT MIX ASPHALT PATCHING

- A. Existing Pavement
 - 1. Keep disturbance to the base material to a minimum. The faces of the remaining pavement shall be square and vertical without ragged edges. Do not use equipment that could damage the existing pavement.
 - 2. Each day complete all repairs for which excavation has been completed. Do not leave open excavated areas at the end of the work day.

- B. Removal of Pavement
 - 1. Make a perpendicular saw cut partial or full depth as needed around the perimeter and remove the existing pavement to the top of the aggregate base. Maintain square vertical faces after saw

cutting.

C. Base and Subgrade Preparation

1. The Engineer will evaluate the aggregate base of the patching area to determine if it is suitable. When it is determined to be unstable, compact it as specified in Section 3.05.
2. When no aggregate base is present, construct the subgrade foundation as specified in Embankment And Subgrade 02330 or as directed.
3. When the aggregate base or subgrade material is unsuitable, replace the material with graded aggregate base conforming to Graded Aggregate Base Course 02720. This operation is defined as the removal of unsuitable material and refill.
4. Compact the replacement aggregate material in layers no greater than 4 in. depth. Immediately remove and dispose of the existing pavement materials.
5. Protect the aggregate base or subgrade after preparation. No payment will be made for removal and replacement of subgrade that was not protected.
6. The Engineer may direct that subgrade drains be constructed in areas of wet underlying subgrade or areas where there may be a future drainage problem.

D. Emergency Filler

1. Have sufficient approved cold patch material readily available to fill the void of the repair area. Place and compact the material when directed. At the beginning of the next day's work, completely remove the material.

E. Steel Plates

1. Have readily available on site an ample supply of 12 x 14 ft by 1 in. thick steel plates to cover the emergency filler.

F. Patch Construction

1. Complete patch construction as specified in the applicable plan details. Manual operation will be permitted for placement of the HMA. Cores, control strip, and pavement profile measurements are waived. Furnish equipment and perform placement, compaction, and quality control procedures as approved.

G. Patch Placement

1. Prior to placing the HMA, thoroughly clean and tack coat the exposed vertical surface of adjacent pavement as specified in section 3.03. Spread the HMA mixture by shovel, rake, or other approved method approved. Do not place HMA on a frozen base.

2. Maintain lift thickness in conformance with the following:

HMA SUPERPAVE LIFT THICKNESS		
MIX DESIGNATION (mm)	MINIMUM (in.)	MAXIMUM (in.)
9.5	1.0	2.0
12.5	1.5	2.5
19.0	2.0	3.0

H. Testing and Acceptance

1. Acceptance will be determined by in place density gauge test data witnessed by the Engineer. Calibrate the density gauge per the manufacturer's recommendation. Take one test from each lift of each patch. Randomly select test locations within the patch.
2. In place density gauge test data shall be expressed as a percentage of the maximum specific gravity determined for each day's production. An in place density of 92.0 to 97.0 percent is required for each patch.
3. Compliance will be determined for each patch separately by averaging all density tests performed within each specific patch.

3.09 PAVEMENT GRINDING:

A. Patching

1. Perform roadway patching before the grinding operation. Additional roadway patching may be required after the grinding operation.

B. Vacuuming

1. Follow immediately behind the grinding machine with a vacuum equipped street sweeper, capable of removing all loose material from the roadway without causing dust to escape into the air.

C. Control Strip

1. Grind a control strip at least 500 ft in length with a uniformly textured surface and cross section as approved.
2. Provide a final pavement surface with a transverse pattern of 0.2

in. center to center of each strike area and with the difference between the high and low of the matted surface not exceeding 1/16 in.

D. Pavement Grinding

1. The designated area shall be ground using the same procedures, settings, and speed, and conform to the same requirements as those used in the control strip.
2. When necessary to maintain an adequate cross slope for drainage, grind the pavement adjacent to the ground pavement. Grinding will not be required on bridge decks.
3. Grind one lane at a time. If the grinding depth exceeds 2-1/2 in. on highways carrying traffic, grind the abutting lane or shoulder on the same day. Grind the abutting lane or shoulder, regardless of depth, prior to weekends or temporary shutdowns. Otherwise, if the grinding depth is 2-1/2 in. or less, the abutting lane or shoulder may be ground on alternate days. Where uneven pavement joints exist, provide adequate advance warning devices in conformance with the Contract Documents.
4. Furnish an approved 10 ft straightedge for testing the transverse and longitudinal surface after grinding operations. Correct all areas showing high spots greater than 1/8 in. within 10 ft by additional grinding at no additional cost to the Administration. Straightedge requirements apply to areas across joints and repaired cracks but are not applicable to areas outside the ground area.
5. After the grinding operation is complete, fill all depressions, potholes, and other irregularities using HMA. Construct an HMA wedge at existing water valves, meters, manhole covers, etc.

PART 4 - MEASUREMENT AND PAYMENT

4.01 HMA SUPERPAVE SURFACE COURSE & WEDGE/LEVEL 9.5MM PG 64-22:

- A. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.02 HMA SUPERPAVE SURFACE COURSE 12.5MM PG 64-22:

- A. HMA Superpave Surface Course 12.5 MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Surface Course 12.5 MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.03 HMA SUPERPAVE BASE COURSE 19MM PG 64-22:

- A. HMA Superpave Base Course 19MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Base Course 19MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.04 PRICE ADJUSTMENT FOR ASPHALT BINDER:

- A. Price Adjustment (PA) will be made to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of asphalt binder.

For adjustment purposes, the prevailing base index price will be the price specified for PG 64-22 Asphalt Binder posted at www.roads.maryland.gov (Business Center/Contracts Bids and Proposals) at time of bid opening. Cost differentials between PG 64-22 and a binder specified shall be included in the price bid per ton for Hot Mix Asphalt. A historical database will be maintained by the State Highway Administration. The base index price for PG 64-22 Asphalt Binder for November 2011 is \$591.25 per ton.

The PA will be made when the index price for the month of placement increases or decreases more than 5 percent of the prevailing base index price. Computations will be as follows:

$$\text{Percent Change} = ((P_p - P_b) / P_b) \times 100$$

$$\text{PA} = T \times Q \times (P_p - (D \times P_b))$$

Where:

- PA = Price Adjustment for the current month
- T = Design target asphalt content expressed as a decimal
- Q = Quantity of Hot Mix Asphalt placed for the current month
- Pp = Index price for PG 64-22 Asphalt Binder per ton for the month of Placement
- D = 1.05 for increases over 5 percent; 0.95 for decreases over 5 percent
- Pb = Prevailing base index price for PG 64-22 Asphalt Binder per ton

- B. PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Asphalt Binder. The item amount will be established by the Administration and shall not be revised by the Contractor. PA resulting in a decreased payment will be deducted from monies owed the Contractor.

4.05 GRINDING HMA PAVEMENT 0 INCH TO 2 INCH:

- A. Grinding HMA Pavement 0 Inch to 2 Inch will be measured and paid for at the pertinent Contract unit price per square yard. The square yard measurement will be computed from the actual width and length measurements of the area that has been ground.
- B. Grinding HMA Pavement 0 Inch to 2 Inch will be paid for with full compensation for grinding, removal and disposal of ground material, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

4.06 HOT MIX ASPHALT PATCHES

- A. Hot Mix Asphalt Patches will be measured and paid for at the Contract unit price per ton as specified. The payment will be full compensation for furnishing, hauling, placing all material, additional removal of pavement above the aggregate base, saw cutting, milling, grinding, disposal, subgrade preparation, placing all materials including tack coat, steel plates, emergency filler and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

END OF SECTION

MATERIAL		SIEVE SIZE						
		1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
Coarse Aggregate	57	100	95-100	-	25-60	-	0-10	0-5
	67	-	100	90-100	-	20-55	0-10	0-5

- 6. Maximum water cement ratio 0.50
- 7. Slump range 2 to 5 inches
- 8. Total air content 5 to 8 percent
- 9. Temperature range of mixture 70 °F with a range not to exceed 20 °F plus or minus

C. Picket – Made of hot-rolled structural steel of 3/4” square solid picket construction, 1.91 4#/ft, and having tensile strength of 50,000 psi. Tube shall be manufactured per ASTM A513. Tube shall be hot-dipped galvanized per ASTM A525-G90. Space between pickets shall be 3.5” on center.

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
¾”	Sq. Solid	1.914 lbs.	50,000 PSI

D. Rails – Made of hot-rolled structure steel, rolled into ‘U’ channel measuring 1 3/8” wide x 1 ½” deep x .120 wall thickness. Manufactured per ASTM A513 and hot-dipped galvanized per ASTM A525-G90.

E. Posts – Shall be hot-rolled structure steel 4” square. The wall thickness and weights are as follows:

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
4” Sq.	14 ga.	2.733 lbs.	45,000 PSI

Tube shall be manufactured per ASTM A513. Tube shall be hot-galvanized per ASTM A525-G90.

F. Rail Attachment Brackets – Shall be hot-rolled structure steel 2” square. The wall thickness and weights are as follows:

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
2” Sq.	14 ga.	2.733 lbs.	45,000 PSI

APPENDIX A
CONTRACT NO. T-1089-0240

LIST OF CONTRACT DRAWINGS

GENERAL DRAWINGS		
1-A6	TI-1	TITLE SHEET
2-A1	GI-1	INDEX DRAWINGS
3	GN-1	NOTES AND ADA SUMMARY
4	GN-2	ADA FACILITIES ACCESSIBILITY REQUIREMENTS
5	GN-3	ABBREVIATIONS, SYMBOLS AND LEGENDS
CIVIL		
6	CV-1	POST DEMOLITION TOPOGRAPHY
7	CV-2	POST DEMOLITION TOPOGRAPHY
8	CV-3	POST DEMOLITION TOPOGRAPHY
9	CV-4	HORIZONTAL CONTROL
10	CV-5	HORIZONTAL CONTROL
11	CV-6	HORIZONTAL CONTROL
12	CV-7	TYPICAL SECTIONS
13	CV-8	TYPICAL SECTIONS
14	CV-9	TYPICAL SECTIONS
15	CV-10	TYPICAL SECTIONS
16	CV-11	TYPICAL SECTIONS
17	CV-12	SUPER ELEVATION SHEET
18	CV-13	SITE AND PAVEMENT PLAN
19-A1	CV-14	SITE AND PAVEMENT PLAN
20-A1	CV-15	SITE AND PAVEMENT PLAN
21-A1	CV-16	SITE AND PAVEMENT PLAN
22	CV-17	SITE AND PAVEMENT PLAN
23	CV-18	SITE AND PAVEMENT PLAN
24-A1	CV-19	SITE AND PAVEMENT PLAN
25-A1	CV-20	SITE AND PAVEMENT PLAN
26	CV-21	CONCRETE PAVEMENT JOINT PATTERN (RAMP M AND RAMP J)
27	CV-22	CONCRETE PAVEMENT JOINT PATTERN - DETAILS
28	CV-23	PAVEMENT DETAILS
29-A6	CV-24	SITE PLAN DETAILS
30	CV-25	SITE PLAN DETAILS
31	CV-26	RETAINING WALL DEMOLITION PLAN
32-A1	CV-27	PLAN - W. MULBERRY ST/N. PULASKI ST - GEOMETRIC LAYOUT & TABULATION
33-A1	CV-28	PLAN - W. MULBERRY ST/RAMP J/N. PAYSON ST - GEOMETRIC LAYOUT & TABULATION
34-A1	CV-29	PLAN - W. MULBERRY ST/RAMP J - GEOMETRIC LAYOUT & TABULATION
35-A1	CV-30	PLAN - W. FRANKLIN ST/RAMP M/N. PAYSON ST - GEOMETRIC LAYOUT & TABULATION
36	CV-31	PLAN - W. FRANKLIN ST/RAMP M - GEOMETRIC LAYOUT & TABULATION
37	CV-32	PLAN - PARKING LOT B - GEOMETRIC LAYOUT & TABULATION
38-A1	CV-33	PLAN - PARKING LOT C - GEOMETRIC LAYOUT & TABULATION
39-A1	CV-34	PLAN - PARKING LOT D - GEOMETRIC LAYOUT & TABULATION
40	CV-35	PROFILE - W. FRANKLIN ST TRANSITWAY (BASELINE "A")
41	CV-36	PROFILE - W. MULBERRY ST TRANSITWAY (BASELINE "B")

42	CV-37	PROFILE - RAMP M RECONSTRUCTED (BASELINE "C")
43	CV-38	PROFILE - RAMP J RELOCATED (BASELINE "F") & N. PAYSON ST RECONNECTED (BASELINE "G")
44-A1	CV-39	GRADING PLAN
45-A1	CV-40	GRADING PLAN
46	CV-41	SIGNING AND PAVEMENT MARKING PLAN
47-A1	CV-42	SIGNING AND PAVEMENT MARKING PLAN
48	CV-43	SIGNING AND PAVEMENT MARKING PLAN
49	CV-44	SIGNING AND PAVEMENT MARKING PLAN
50	CV-45	SIGNING AND PAVEMENT MARKING PLAN
51-A1	CV-46	SIGNING AND PAVEMENT MARKING PLAN
52-A1	CV-47	SIGNING AND PAVEMENT MARKING PLAN
53	CV-48	SIGNING AND PAVEMENT MARKING PLAN - PARKING LOT A
54	CV-49	SIGNING AND PAVEMENT MARKING PLAN - PARKING LOT C
55	CV-50	SIGNING AND PAVEMENT MARKING PLAN - PARKING LOT D
56-A1	CV-51	SIGNING AND PAVEMENT MARKING QUANTITY SHEET
DRAINAGE		
57	DR-1	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
58-A1	DR-2	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
59-A1	DR-3	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
60-A1	DR-4	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
61-A1	DR-5	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
62-A1	DR-6	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
63	DR-7	STORM DRAIN PROFILES
64	DR-8	STORM DRAIN PROFILES
65	DR-9	STORM DRAIN PROFILES
66	DR-10	STORM DRAIN PROFILES
67-A1	DR-11	STORM DRAIN PROFILES
68-A1	DR-12	STORM DRAIN DETAILS
69	DR-13	STORM DRAIN DETAILS
70	DR-14	STORM DRAIN DETAILS
71	DR-15	STORM DRAIN DETAILS
72-A3	DR-16	STORM WATER MANAGEMENT DETAILS
73	DR-17	STORM WATER MANAGEMENT DETAILS
74	DR-18	STORM WATER MANAGEMENT DETAILS
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75-A1	ES-1	EROSION & SEDIMENT CONTROL DETAILS
76-A1	ES-2	EROSION & SEDIMENT CONTROL NOTES
77	ES-3	EROSION & SEDIMENT CONTROL NOTES
78	ES-4	EROSION & SEDIMENT CONTROL NOTES
79	ES-5	EROSION & SEDIMENT CONTROL NOTES
80	ES-6	EROSION & SEDIMENT CONTROL PLAN / PHASE I
81-A1	ES-7	EROSION & SEDIMENT CONTROL PLAN / PHASE I
82-A1	ES-8	EROSION & SEDIMENT CONTROL PLAN / PHASE I
83-A1	ES-9	EROSION & SEDIMENT CONTROL PLAN / PHASE I
84-A1	ES-10	EROSION & SEDIMENT CONTROL PLAN / PHASE I
85	ES-11	EROSION & SEDIMENT CONTROL PLAN / PHASE II
86-A1	ES-12	EROSION & SEDIMENT CONTROL PLAN / PHASE II
87-A1	ES-13	EROSION & SEDIMENT CONTROL PLAN / PHASE II
88-A1	ES-14	EROSION & SEDIMENT CONTROL PLAN / PHASE II
89-A1	ES-15	EROSION & SEDIMENT CONTROL PLAN / PHASE II
90	ES-16	ACCESS EROSION & SEDIMENT CONTROL PLAN

UTILITIES		
91	UT-1	EXISTING UTILITIES, TEST PITS AND SOIL BORINGS
92	UT-2	EXISTING UTILITIES, TEST PITS AND SOIL BORINGS
93	UT-3	EXISTING UTILITIES, TEST PITS AND SOIL BORINGS
94	UT-4	EXISTING UTILITIES, TEST PITS AND SOIL BORINGS
95	UT-5	EXISTING UTILITIES, TEST PITS AND SOIL BORINGS
ELECTRICAL		
96-A6	EL-1	STREET LIGHTING PLAN
97-A1	EL-2	LIGHTING PLAN - LOT C
98-A1	EL-3	LIGHTING PLAN - LOT D
99-A1	EL-4	LIGHTING FOUNDATION DETAILS
99A-A1	EL-4A	LIGHTING FOUNDATION DETAILS
100-A1	EL-5	ELECTRICAL DETAILS
MAINTENANCE OF TRAFFIC		
101	MT-1	MAINTENANCE OF TRAFFIC - GENERAL NOTES
101A-A1	MT-1A	MAINTENANCE OF TRAFFIC - PHASE I
102-A1	MT-2	MAINTENANCE OF TRAFFIC - PHASE I
103-A1	MT-3	MAINTENANCE OF TRAFFIC - PHASE I
104-A1	MT-4	MAINTENANCE OF TRAFFIC - PHASE II
105-A1	MT-5	MAINTENANCE OF TRAFFIC - PHASE II
106-A1	MT-6	MAINTENANCE OF TRAFFIC - PHASE III
107	MT-7	MAINTENANCE OF TRAFFIC - PHASE III
108	MT-8	MAINTENANCE OF TRAFFIC - PHASE IV
109	MT-9	MAINTENANCE OF TRAFFIC - PHASE IV
110	MT-10	MAINTENANCE OF TRAFFIC - PHASE IV
111	MT-11	MAINTENANCE OF TRAFFIC - PHASE IV
112	MT-12	MAINTENANCE OF TRAFFIC - PHASE V
113	MT-13	MAINTENANCE OF TRAFFIC - PHASE V
SIGNALIZATION		
114-A1	SG-1	TRAFFIC SIGNAL RECONSTRUCTION - W. MULBERRY ST AT PULASKI ST
115-A1	SG-2	TRAFFIC SIGNAL RECONSTRUCTION - W. MULBERRY ST AT PAYSON ST
116-A1	SG-3	TRAFFIC SIGNAL RECONSTRUCTION - W. FRANKLIN ST AT PULASKI ST
117-A1	SG-4	TRAFFIC SIGNAL RECONSTRUCTION - W. FRANKLIN ST AT PAYSON ST
118-A1	SG-5	TRAFFIC SIGNAL INTERCONNECT - W. FRANKLIN ST. & W. MULBERRY ST
LANDSCAPING		
119-A1	LS-1	LANDSCAPE PLAN
120-A1	LS-2	LANDSCAPE PLAN
121-A1	LS-3	LANDSCAPE DETAILS AND NOTES
121A-A1	LS-3A	LANDSCAPE DETAILS
121B-A6	LS-3B	LANDSCAPE DETAILS
122-A1	LS-4	ADA IMPROVEMENTS
123-A1	LS-5	ADA IMPROVEMENTS
124	LS-6	ADA IMPROVEMENTS
125-A1	LS-7	ADA IMPROVEMENTS
126-A1	LS-8	ADA IMPROVEMENTS
127-A1	LS-9	ADA IMPROVEMENTS
128-A1	LS-10	ADA VISUALIZATION DETAILS
CROSS SECTIONS		
129	XS-1	KEY SHEET
130	XS-2	N. PULASKI ST
131	XS-3	N. PAYSON ST
132	XS-4	W. FRANKLIN ST

133	XS-5	W. FRANKLIN ST
134	XS-6	W. FRANKLIN ST
135	XS-7	W. FRANKLIN ST
136	XS-8	W. FRANKLIN ST
137	XS-9	W. MULBERRY ST
138	XS-10	W. MULBERRY ST
139	XS-11	W. MULBERRY ST
140	XS-12	W. MULBERRY ST
141	XS-13	W. MULBERRY ST
142	XS-14	W. MULBERRY ST
143-A1	XS-15	W. MULBERRY ST
144-A1	XS-16	W. MULBERRY ST
145-A1	XS-17	W. MULBERRY ST
146-A1	XS-18	W. MULBERRY ST
147	XS-19	W. MULBERRY ST
148	XS-20	W. MULBERRY ST
149	XS-21	W. MULBERRY ST
150	XS-22	PARKING LOT C
151	XS-23	PARKING LOT C
152	XS-24	PARKING LOT C AND D
153	XS-25	PARKING LOT D
154	XS-26	PARKING LOT D



MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Martin O'Malley, Governor • Anthony G. Brown, Lt. Governor
Beverly K. Swaim-Staley, Secretary • Ralign T. Wells, Administrator

TO: All Planholders

FROM: Maryland Transit Administration

SUBJECT: **ADDENDUM NO. 5**
Contract No.: T-1089-0240
Parking Expansion – West Baltimore MARC Station

DATE: January 18, 2012

Enclosed and effective this date is Addendum No. 5 to the subject Contract. The Bid Opening will be delayed from the date of January 20, 2012 to **February 3, 2012 at 2:00 p.m., 6 St. Paul Street, Baltimore, MD 21202, Conference Room #731.**

This addendum will allow all contractors the opportunity to submit additional questions. The deadline for any additional questions will be **Friday, January 20, 2012.** **THE MTA WILL UNDER NO CIRCUMSTANCES ACCEPT QUESTIONS AFTER THIS DEADLINE.**

The Bidder shall acknowledge receipt of this Addendum by completing and returning this form with the bid package.

All other terms and conditions remain unchanged.

Sincerely,

Vanessa Ashe, Procurement Officer
Professional Services & Construction/Installation Section
Procurement Division

Acknowledgement of receipt of ADDENDUM # 5 to Solicitation #T-1089-0240

Vendor Name: _____

Authorized Representative's Signature

Date

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION

BID FORM

FOR

CONTRACT NO.: T-1089-0240

TO: MARYLAND TRANSIT ADMINISTRATION
ATTN: PROCUREMENT DIVISION
6 SAINT PAUL STREET, 7TH FLOOR
BALTIMORE, MD 21202-1614

BID OPENING DATE:

February 3, 2012

BID OPENING TIME:

2:00 PM

BID OF: _____

(Bidder's Name)

PROJECT DESCRIPTION:

This Contract is for work east of the West Baltimore MARC Station and primarily involves the construction of two new parking areas east of Pulaski Street, the relocation of the eastbound US 40 ramp and the reconnection of Payson Street. The project area is located between Franklin and Mulberry Streets from the West Baltimore MARC Station to the Fulton Avenue Bridge.

The West Baltimore MARC Station Parking Expansion Project will be constructed in phases on two blocks of Baltimore City owned property along a portion of the old Interstate 170 right-of-way. The unused mainline, ramps, abutments, retaining walls and bridge deck have been demolished under a separate contract. The construction will also involve the raising of the westbound US 40 ramp between the Monroe Street Bridge and reconnected Payson Street. A new roadway access will be required on the east side of existing parking lot B and pavement markings on Lot "A" will be reconfigured to increase the number of ADA accessible spaces.

1. This bid is hereby submitted to the Maryland Transit Administration (hereinafter sometimes called the "Administration") in response to NOTICE TO CONTRACTORS dated _____.
2. The UNDERSIGNED has thoroughly examined, acknowledges receipt of, and is familiar with the Contract Documents as well as the various instructions, information, and requirements covering the same, all as mentioned herein and in said NOTICE TO CONTRACTORS.
3. In compliance with said NOTICE TO CONTRACTORS the UNDERSIGNED hereby proposes to furnish all labor, equipment, and materials and perform all work described and in strict accordance with the provisions of the Contract Documents for the consideration of the amounts, lump sum and unit prices listed in the attached Unit Price Schedule, and agrees that, upon Notice of Award, within one hundred fifty (150) calendar days after the date of opening of bids, unless mutually extended, he will within ten (10) calendar days after receipt of the prescribed forms, execute the Contract and furnish a performance bond and payment bond (if such bonds are required by the Contract Documents) on forms furnished by the Administration with good and sufficient surety or sureties.
4. The UNDERSIGNED agrees and understands that the time of completion is as



MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Martin O'Malley, Governor • Anthony G. Brown, Lt. Governor
Beverley K. Swaim-Staley, Secretary • Ralign T. Wells, Administrator

TO: All Planholders

FROM: Maryland Transit Administration

SUBJECT: **ADDENDUM NO. 4**
Contract No.: T-1089-0240
Parking Expansion – West Baltimore MARC Station

DATE: January 12, 2012

Enclosed and effective this date is Addendum No. 4 to the subject Contract. The Bid Opening will be delayed from the date of January 13, 2012 to **January 20, 2012 at 2:00 p.m., 6 St. Paul Street, Baltimore, MD 21202, Conference Room #731.**

The Bidder shall acknowledge receipt of this Addendum by completing and returning this form with the bid package.

All other terms and conditions remain unchanged.

Sincerely,

Vanessa Ashe, Procurement Officer
Professional Services & Construction/Installation Section
Procurement Division

Acknowledgement of receipt of ADDENDUM # 4 to Solicitation #T-1089-0240

Vendor Name: _____

Authorized Representative's Signature

Date

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION

BID FORM

FOR

CONTRACT NO.: T-1089-0240

TO: MARYLAND TRANSIT ADMINISTRATION
ATTN: PROCUREMENT DIVISION
6 SAINT PAUL STREET, 7TH FLOOR
BALTIMORE, MD 21202-1614

BID OPENING DATE:

January 20, 2012

BID OPENING TIME:

2:00 PM

BID OF: _____

(Bidder's Name)

PROJECT DESCRIPTION:

This Contract is for work east of the West Baltimore MARC Station and primarily involves the construction of two new parking areas east of Pulaski Street, the relocation of the eastbound US 40 ramp and the reconnection of Payson Street. The project area is located between Franklin and Mulberry Streets from the West Baltimore MARC Station to the Fulton Avenue Bridge.

The West Baltimore MARC Station Parking Expansion Project will be constructed in phases on two blocks of Baltimore City owned property along a portion of the old Interstate 170 right-of-way. The unused mainline, ramps, abutments, retaining walls and bridge deck have been demolished under a separate contract. The construction will also involve the raising of the westbound US 40 ramp between the Monroe Street Bridge and reconnected Payson Street. A new roadway access will be required on the east side of existing parking lot B and pavement markings on Lot "A" will be reconfigured to increase the number of ADA accessible spaces.

1. This bid is hereby submitted to the Maryland Transit Administration (hereinafter sometimes called the "Administration") in response to NOTICE TO CONTRACTORS dated _____.
2. The UNDERSIGNED has thoroughly examined, acknowledges receipt of, and is familiar with the Contract Documents as well as the various instructions, information, and requirements covering the same, all as mentioned herein and in said NOTICE TO CONTRACTORS.
3. In compliance with said NOTICE TO CONTRACTORS the UNDERSIGNED hereby proposes to furnish all labor, equipment, and materials and perform all work described and in strict accordance with the provisions of the Contract Documents for the consideration of the amounts, lump sum and unit prices listed in the attached Unit Price Schedule, and agrees that, upon Notice of Award, within one hundred fifty (150) calendar days after the date of opening of bids, unless mutually extended, he will within ten (10) calendar days after receipt of the prescribed forms, execute the Contract and furnish a performance bond and payment bond (if such bonds are required by the Contract Documents) on forms furnished by the Administration with good and sufficient surety or sureties.
4. The UNDERSIGNED agrees and understands that the time of completion is as



MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Martin O'Malley, Governor • Anthony G. Brown, Lt. Governor
Beverly K. Swaim-Staley, Secretary • Ralign T. Wells, Administrator

TO: All Planholders
FROM: Maryland Transit Administration
SUBJECT: **ADDENDUM NO. 3**
Contract No.: T-1089-0240
Parking Expansion – West Baltimore MARC Station
DATE: January 4, 2012

Enclosed and effective this date is Addendum No. 3 to the subject Contract. This change delays the Bid Opening Date of January 5, 2012 to **January 13, 2012 at 2:00 p.m., 6 St. Paul Street, Baltimore, MD 21202, Conference Room #731.**

A conformed copy of the revised specification sections is attached. A list of the changes made to this contract is attached to this Addendum. Also attached are responses to questions.

The Bidder shall acknowledge receipt of this Addendum by completing and returning this form with the bid package.

All other terms and conditions remain unchanged.

Sincerely,

Vanessa Ashe, Procurement Officer
Professional Services & Construction/Installation Section
Procurement Division

Acknowledgement of receipt of ADDENDUM # 3 to Solicitation #T-1089-0240

Vendor Name: _____

Authorized Representative's Signature

Date

CONTRACT T-1089-0240
RESPONSES AND/OR CLARIFICATION

Q 1: I have noticed there is no item for milling of existing asphalt. Based on the tonnage for the 12.5 mm the milling should be around 8,793 SY. Will there be an item created?

A1: **A new bid item (228) has been added “02745 – GRINDING HMA PAVEMENT 0 INCH TO 2 INCH” with a quantity of 7405 square yards of required grinding.**

Q2: Where does the Pea Gravel go in item 208? Does not show on Storm Water Drawing Details.

A2: **Information regarding Pea Gravel location and placement can be found on plan sheet pages 119 – 121 (LS 1 thru 3). A construction note has been added to the storm water management bioretention detail sheet (DR-16) directing bidders to the proper LS sheets for pea gravel information.**

ADDENDUM NO.: 3
DATE: 1/04/12
CONTRACT NO.: T-1089-0240

The following additions, deletions, and modifications are hereby made a part of the Contract Documents of Parking Expansion – West Baltimore MARC Station, Contract No.: T-1089-0240.

I. CONTRACT SPECIFICATIONS

NOTICE TO CONTRACTORS - REPLACE IN ITS ENTIRETY

<u>Page No.</u>	<u>Description</u>
2	Section 4 – Revised Bid Opening Date.

BID FORM - REPLACE IN ITS ENTIRETY

<u>Page No.</u>	<u>Description</u>
1	Revised the Bid Opening Date.
25	Unit Price Schedule – Added Quantity Item No. 228 “GRINDING HMA PAVEMENT 0 INCH TO 2 INCH” per square yard with a quantity of 7,405.

SPECIAL PROVISIONS

<u>Page No.</u>	<u>Description</u>
308 - 316	REVISED Special Provision “02745-HOT MIX ASPHALT PAVEMENT” to include text changes and measurement / payment information for pavement grinding.

APPENDICES

<u>Appendix</u>	<u>Description</u>
A	REVISED Appendix A “List of Contract Drawings” to identify DR-16 as an Addendum 3 modified plan sheet.

II. CONTRACT PLANS

<u>Sheet No.</u>	<u>Description</u>
72	ADDED a construction note to drawing DR- 16 to identify where in the plan sheets pea gravel placement & location can be found.

**STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION
NOTICE TO CONTRACTORS**

**PARKING EXPANSION – WEST
BALTIMORE MARC STATION**

CONTRACT NO.: T-1089-0240

DATE: October 17, 2011

1. DESCRIPTION OF WORK

A. This Contract is for work east of the West Baltimore MARC Station and primarily involves the construction of two new parking areas east of Pulaski Street, the relocation of the eastbound US 40 ramp and the reconnection of Payson Street. The project area is located between Franklin and Mulberry Streets from the West Baltimore MARC Station to the Fulton Avenue Bridge.

The West Baltimore MARC Station Parking Expansion Project will be constructed in phases on two blocks of Baltimore City owned property along a portion of the old Interstate 170 right-of-way. The unused mainline, ramps, abutments, retaining walls and bridge deck have been demolished under a separate contract. The construction will also involve the raising of the westbound US 40 ramp between the Monroe Street Bridge and reconnected Payson Street. A new roadway access will be required on the east side of existing parking lot B and pavement markings on Lot "A" will be reconfigured to increase the number of ADA accessible spaces.

B. Estimated value for this work is in the range of \$5,000,001 to \$10,000,000

2. PRE-BID MEETING & SITE VISIT

A Pre-Bid meeting for the purpose of explaining the Project will be held on November 3, 2011 at 10:30 a.m., local time at the Administration Headquarters, 6 St. Paul Street, 7th Floor Conference Room(s) 731-732, Baltimore, Maryland 21202-1614.

A Site Visit will be held on November 3, 2011 immediately following the Pre-Bid Meeting.

It is strongly suggested that the person(s) responsible for the preparation of bid documents for bidders attend the Pre-Bid Meeting and the site visit. **INSTRUCTIONS CRITICAL TO THE PREPARATION OF THE CONTRACT DOCUMENTS WILL BE PRESENTED AT THE PRE-BID MEETING.**

3. **DEADLINE FOR QUESTIONS**

Questions regarding the work should be directed in writing to Ms. Vanessa Ashe at the Administration Offices or via Internet address vashe@mtamaryland.com. Facsimile messages will not be accepted unless accompanied by telephone notification at (410) 767-3353. Our fax number is (410) 333-4810. Questions directed to this office must be received no later than November 18, 2011 at the close of the business day. Questions should be submitted on company letterhead. No interpretations other than written shall be binding on the Administration.

4. **BID DUE DATE & TIME**

Sealed Bids addressed to the Maryland Transit Administration, Procurement Division, 6 St. Paul Street, Baltimore, Maryland 21202-1614, and marked "Bid for Contract No. T-1089-0240 – PARKING EXPANSION – WEST BALTIMORE MARC STATION", will be received at the above address until but not after 2:00 P.M. local time, **January 13, 2012**. At that time, the Bids will be publicly opened and read aloud at a location at the same address. Hand delivered bids should be deposited in the Bid Box located on the 7th Floor before the 2:00 P.M. deadline. Any bids received after the date and time specified shall not be considered.

5. **ELECTRONIC VERSION OF BID DOCUMENTS**

The bid documents will be available by electronic means. The Bidder acknowledges and accepts full responsibility to ensure that the Bidder has made no changes to the Administration's bid documents. In the event of a conflict between the versions of the bid documents in the bidder's possession and the version maintained by the Procurement Officer, the version maintained by the Procurement Officer shall govern.

6. **AVAILABILITY OF DOCUMENTS**

Specifications may be downloaded from the MTA web site located at www.mta.maryland.gov. Bidders will be required to register the first time specifications are downloaded and a login number will be assigned. This number should be used every time the bidder downloads the documents for this contract. Bidders must supply accurate information in order to receive notice of all subsequent addenda.

TO OBTAIN THE SPECIFICATIONS: Please visit MTA's website (www.mta.maryland.gov), follow the links for "Business" – "Procurement" – "Bids/Solicitations", and download the Specifications for this procurement.

TO OBTAIN THE DRAWINGS: e-mail Vanessa Ashe at vashe@mta.maryland.gov requesting the contract drawings and supplying the

following information: the contact person, company name, mailing address, phone # and e-mail address. The drawings (CD) will be mailed to you at no cost. You also have the option of picking up the CD containing the drawings at: 6 Saint Paul Street, 7th floor, Baltimore, MD 21202.

7. **ADDENDA**

Bidders are required to acknowledge all addenda with their bid package. Although the MTA endeavors to send out all addenda to this solicitation in a timely manner, it is the responsibility of the contractors to make sure they received all appropriate documents prior to the bid due date.

8. **EMARYLAND MARKETPLACE REGULATIONS**

Use of “e-Maryland Marketplace”

“e-Maryland Marketplace” is an electronic commerce system administered by the Maryland Department of General Services.

Registration is free and will provide a means for your business to receive e-mail notifications of upcoming contracting opportunities in specified areas of interest and expertise. This means that all such information is immediately available to subscribers to e-Maryland Marketplace. Because of the instant access afforded by e-Maryland Marketplace, it is recommended that all Bidders interested in doing business with Maryland State agencies subscribe to e-Maryland Marketplace. For more eMM registration information, visit the website: <http://ebidmarketplace.com>.

9. **BID BOND**

Each bid exceeding \$100,000 must be accompanied by a Bid Bond in the amount of five percent (5%) of the Bid Price. Bid, payment, and performance security may be in the form of: (1) a bond executed by a surety company authorized to do business in the State; (2) a bond executed by an individual surety that meets certain criteria; (3) cash; (4) another form of security required by State or federal law; or (5) another form of security satisfactory to the unit awarding the contract. Sections 13-207, 13-216, 17-104 of the State Finance and Procurement Article, Annotated Code of Maryland.

10. **PAYMENT AND PERFORMANCE BONDS**

Payment and Performance Bonds in the amount of the Contract Price will be required by the awardee. Upon receiving notification of contract award, the Contractor shall deliver the bond to the MTA no later than the time the Contractor executes the contract. Bid, payment, and performance security may be in the form of: (1) a bond executed by a surety company authorized to do business in the State; (2) a bond executed by an individual surety that meets certain criteria; (3) another form of security required by State or federal law; or (5) another form of

security satisfactory to the unit awarding the contract. Sections 13-207, 13-216, 17-104 of the State Finance and Procurement Article, Annotated Code of Maryland.

11. ELECTRONIC FUNDS TRANSFER

On every solicitation for a contract expected to exceed \$200,000, the bidder will be required to accept payments by electronic funds transfer (EFT) unless the State Comptroller's Office grants an exemption.

12. DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

A. DISADVANTAGED BUSINESS ENTERPRISES ARE ENCOURAGED TO RESPOND TO THIS SOLICITATION NOTICE.

B. The Maryland Transit Administration hereby notifies all bidders that, in regard to any Contract entered into pursuant to this advertisement, Disadvantaged Business Enterprises will be afforded full opportunity to submit Bids in response to this Notice, and will not be subjected to discrimination on the basis of political or religious opinion or affiliation, race color, creed, sex, age or national origin in consideration for an award.

C. It is the goal of the Administration that Disadvantaged Business Enterprises participate in all Contracts. Each Contract will contain goals for Disadvantaged Business Enterprise participation on a contract-to-contract basis. A subcontracting goal of twenty-five percent (25%) has been established for this procurement. All bidders must submit with their bid a fully executed copy of the Certified DBE Utilization and Fair Solicitation Affidavit (MDOT DBE FORM A) and DBE Participation Schedule (MDOT DBE FORM B). If the bidder fails to submit these completed forms with the bid as required, the procurement officer shall deem the bid non-responsive or shall determine that the offer is not reasonably susceptible of being selected for award. **ALL DBE FIRMS MUST BE CERTIFIED BY THE MARYLAND DEPARTMENT OF TRANSPORTATION. NO OTHER CERTIFICATIONS WILL BE ACCEPTED.**

D. **A contractor may count toward its DBE goal 60 percent of its expenditures for materials and supplies required under the contract and obtained from a DBE regular dealer, and 100 percent of such expenditures to a DBE manufacturer. The DBE credited supplies may not exceed 60 percent of the entire contract goal.**

E. New versions of Sections 13-103, 13-104 and 14-303 of the State Finance and Procurement Article of the Maryland Code, relating to increased bid/proposal documentation of DBE commitments, are effective as of October 1, 2004. The Contract under this solicitation will be awarded in accordance with these new requirements. As a result, new bid submission requirements, including certain revised DBE documents, are in effect for this

solicitation. These new requirements are set forth elsewhere in this solicitation.

- F. As a result of the revisions to Sections 13-103, 13-104 and 14-303, certain existing portions of the Code of Maryland Regulations (COMAR) relating to post bid/proposal submission of DBE subcontractors are inconsistent with the revised statute. To the extent the provisions of COMAR relating to post bid identification of DBE subcontractors are inconsistent with the requirements of this solicitation, the requirements of this solicitation shall control the award of a Contract. Questions or concerns regarding the DBE requirements of this solicitation must be raised prior to the opening of bids or receipt of initial proposals
- G. Effective on October 1, 2009, Minority Business Enterprise (MBE) firms may elect to be dually certification as woman-owned businesses and as members of an ethnic or racial category. For purposes of achieving any gender or ethnic/racial MBE participation subgoals in a particular contract, an MBE firm that has dual certification may participate in the contract either as a woman-owned business or as a business owned by a member of a racial or ethnic minority group, **but not both**.

WARNING – PLEASE READ:

- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with the gender category in order to be used to meet the gender subgoal.**
- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with an ethnic/racial category in order to be used to meet the ethnic/racial subgoal.**
- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with both the gender and ethnic/racial categories in order for a contractor to have the option of selecting which of those categories it will use for the firm on a State contract.**
- ◆ **Contractors should designate whether the MBE firm will be used as a woman-owned business or as a business owned by a member of a racial/ethnic group before calculating the percentage of MBE participation goals and subgoals they intend to meet.**

Maryland's MBE/DBE Directory will reflect the dual certification status beginning October 1, 2009. You can access the MBE/DBE Directory at <http://mbe.mdod.state.md.us>. Firms with dual certification will now be listed as follows:

Example:

ABC Corporation, Inc.
123 Corporate Circle
Hanover, MD 21076
Female/African American
00-000

13. AFFIRMATIVE ACTION REQUIREMENTS

Bidders on this Work will be required to comply with MTA Affirmative Action Requirements and all applicable Equal Employment Opportunity Laws and Regulations.

14. FEDERAL FUNDING

Any contract resulting from bids submitted is subject to a Financial Assistance Contract between the Administration and the U.S. Department of Transportation. Federal funds will be used to finance 80 % of the cost of this contract.

15. SUSPENSION AND DEBARMENT CERTIFICATION

All bidders will be required to certify that they are not on the GSA List of Parties Excluded from Procurement and the List of Contractors Suspended or Debarred from Contracting with the State of Maryland. All bidders must also be in good standing with the State Assessment & Taxation Department.

16. CONTRACTOR'S QUESTIONNAIRE

All Bidders shall submit a fully executed copy the Contractor's Questionnaire Pre-Award Evaluation Data Form with the bid package.

17. INSURANCE REQUIREMENTS

The Administration has chosen to provide Workers' Compensation, General Liability, Excess Liability, Builders Risk, Pollution Liability and Railroad Protective coverage on behalf of Contractors and subcontractors working on this project. This approach to project insurance is commonly called a wrap-up or owner controlled insurance program (OCIP). Specific information regarding Liability Insurance Requirements is contained in the Contract Specifications.

Please note that an Insurance Cost Worksheet must be included with each bid package.

18. USE OF BIDDER'S OWN FORCES

The bidder with his own forces shall perform not less than fifty (50%) of the work at the project site.

19. BUY AMERICA REQUIREMENTS

This contract is subject to Section 165, "Buy America", of the Surface Transportation Assistant Act of 1982, U.S. Public Law 197-424, and regulations and/or guidance implementing this statutory provision issued by the Federal

Transit Administration of the U.S. Department of Transportation. The contract is further subject to the Buy American Steel requirements of Chapter 02 of subtitle 11 of the Code of Maryland Regulations, Title 21, State Procurement Regulations.

20. CANCELLATION OR REJECTION OF BIDS

Notice to Contractors may be canceled in accordance with State Procurement Regulations.

The Administration reserves the right to reject any and all bids and/or waive technical defects if, in its judgment, the interests of the Administration so require.

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION

BID FORM

FOR

CONTRACT NO.: T-1089-0240

TO: MARYLAND TRANSIT ADMINISTRATION
ATTN: PROCUREMENT DIVISION
6 SAINT PAUL STREET, 7TH FLOOR
BALTIMORE, MD 21202-1614

BID OPENING DATE:

January 13, 2012

BID OPENING TIME:

2:00 PM

BID OF: _____
(Bidder's Name)

PROJECT DESCRIPTION:

This Contract is for work east of the West Baltimore MARC Station and primarily involves the construction of two new parking areas east of Pulaski Street, the relocation of the eastbound US 40 ramp and the reconnection of Payson Street. The project area is located between Franklin and Mulberry Streets from the West Baltimore MARC Station to the Fulton Avenue Bridge.

The West Baltimore MARC Station Parking Expansion Project will be constructed in phases on two blocks of Baltimore City owned property along a portion of the old Interstate 170 right-of-way. The unused mainline, ramps, abutments, retaining walls and bridge deck have been demolished under a separate contract. The construction will also involve the raising of the westbound US 40 ramp between the Monroe Street Bridge and reconnected Payson Street. A new roadway access will be required on the east side of existing parking lot B and pavement markings on Lot "A" will be reconfigured to increase the number of ADA accessible spaces.

1. This bid is hereby submitted to the Maryland Transit Administration (hereinafter sometimes called the "Administration") in response to NOTICE TO CONTRACTORS dated _____ .
2. The UNDERSIGNED has thoroughly examined, acknowledges receipt of, and is familiar with the Contract Documents as well as the various instructions, information, and requirements covering the same, all as mentioned herein and in said NOTICE TO CONTRACTORS.
3. In compliance with said NOTICE TO CONTRACTORS the UNDERSIGNED hereby proposes to furnish all labor, equipment, and materials and perform all work described and in strict accordance with the provisions of the Contract Documents for the consideration of the amounts, lump sum and unit prices listed in the attached Unit Price Schedule, and agrees that, upon Notice of Award, within one hundred fifty (150) calendar days after the date of opening of bids, unless mutually extended, he will within ten (10) calendar days after receipt of the prescribed forms, execute the Contract and furnish a performance bond and payment bond (if such bonds are required by the Contract Documents) on forms furnished by the Administration with good and sufficient surety or sureties.
4. The UNDERSIGNED agrees and understands that the time of completion is as

specified in the Special Provisions, unless the completion dates are extended as provided for in the Contract Documents.

5. The UNDERSIGNED agrees to pay liquidated damages in the amount specified in the Special Provisions for each and every calendar day after the completion date that the work remains incomplete unless an extension is granted as provided for in the Contract Documents.

6. The UNDERSIGNED hereby certifies that the _____ (Bidder's Name) / ____ / is, / ____ / is not (CHECK ONE) included on the GSA list of Parties Excluded from Procurement. **AND**

The UNDERSIGNED hereby certifies that the _____ (Bidder's Name) / ____ / is, / ____ / is not (CHECK ONE) included on the List of Contractors Suspended or Debarred from Contracting with the State of Maryland.

7. The UNDERSIGNED, as the Contractor, will perform on the Site, with its own organization, _____ percent (____ %) of the total amount of work to be performed under this contract.

8. PARENT COMPANY

a. The UNDERSIGNED represents that it / ____ / is, / ____ / is not, (CHECK ONE) owned or controlled by a parent company. For this purpose a parent company is defined as one which either owns or controls the activities and basic business policies of the UNDERSIGNED. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company such ownership is not required; if another company is able to formulate, determine or veto basic business policy decisions of the bidder, such other company is considered the parent of the bidder. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.

b. If UNDERSIGNED is owned or controlled by a parent company, insert in the space below the name and main office address of the parent company

Name

Address

9. ARREARAGES

By submitting a response to this solicitation, the undersigned shall be deemed to represent that it is not in arrears in the payment of any obligations due and owing the State of Maryland, including the payment of taxes and employee benefits, and that it shall not become so arrears during the term of the contract if selected for contract award.

10. CERTIFICATION OF NON-MARYLAND CORPORATION (FOREIGN CORPORATION)

a. A corporation not incorporated in the State of Maryland is considered to be a foreign corporation and, therefore, is required to be registered with the Maryland State Department of Assessment and Taxation if awarded this contract.

b. Where a foreign corporation is currently registered with the Department of Assessments and Taxation, such a bidder shall submit with his bid a copy of the department's certification of his registration or qualification acknowledgment.

c. If a foreign corporation is not currently registered, such a bidder shall submit with his bid his certification that, if notified of his apparent award of the contract, he will register with the Maryland State Department of Assessments and Taxation and provide a copy of the department's certification of his registration or qualification acknowledgment along with the executed contract.

11. The Contractor shall, prior to the time of execution of the contract, obtain all applicable licenses and comply with all applicable laws and regulations in the Annotated Code of Maryland.

12. All bidders must submit with their bid the following documents fully executed.

- a. Bid Bond in the Amount of \$ _____
Or 5% of the bid price (if applicable).
or
Individual Surety Bid Bond in the Amount of
\$ _____ Or 5% of the bid price (if applicable) and a
executed Affidavit of Individual Surety (Attachment A) & Surety Affidavit
(Attachment B).
- b. Contractor's Questionnaire Pre-Award Evaluation Data
- c. Bid/Proposal Affidavit.
- d. Buy America Certificate.
- e. Certification Regarding Lobbying.
- f. MDOT DBE Form A, "Certified DBE Utilization and Fair Solicitation Affidavit".
- g. MDOT DBE Form B, "DBE Participation Schedule".
- h. Signed copy of the Cover Letter for each Addendum issued by MTA.
- i. Completed Insurance Cost Worksheet

Item	Section	Description	Unit	Estimate of Quantity	Unit Price	Total Price
001	01130	MOBILIZATION	LS	1	\$170,000.00	\$170,000.00
002	01210	MISCELLANEOUS WORK ALLOWANCE	LS	1	\$560,000.00	\$560,000.00
003	01450	QUALITY ASSURANCE/QUALITY CONTROL	LS	1	\$80,000.00	\$80,000.00
004	01522	ENGINEER'S OFFICE - TYPE 2	LS	1		
005	01550	ARROW PANEL	UD	450		
006	01550	DRUMS FOR MAINTENANCE OF TRAFFIC	EA	200		
007	01550	MAINTENANCE AND CONTROL OF TRAFFIC	LS	1		
008	01550	PORTABLE VARIABLE MESSAGE SIGN	UD	168		
009	01550	PROTECTION VEHICLE	UD	55		
010	01550	REFLECTIVE BARRIER MARKERS	EA	22		

011	01550	REMOVAL OF EXISTING LINE MARKINGS	LF	4,000		
012	01550	REMOVE AND RESET TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS FOR MAINTENANCE OF TRAFFIC	BBL	8		
013	01550	RESET TEMPORARY TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC	LF	800		
014	01550	TEMPORARY CONCRETE TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC	LF	600		
015	01550	TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS FOR MAINTENANCE OF TRAFFIC	BBL	8		
016	01550	TEMPORARY PAVEMENT MARKINGS (12 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	700		
017	01550	TEMPORARY PAVEMENT MARKINGS (12 INCH YELLOW NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	100		
018	01550	TEMPORARY PAVEMENT MARKINGS (24 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	50		
019	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	2,500		

020	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH WHITE REMOVABLE PREFORMED PAVEMENT LINE MARKINGS)	LF	1,000		
021	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH YELLOW NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	5,500		
022	01550	TEMPORARY PAVEMENT MARKINGS (8 INCH BLACK OUT TAPE LINES)	LF	500		
023	01550	TEMPORARY PAVEMENT MARKINGS (REMOVAL OF BLACK OUT TAPE LINES- ANY WIDTH)	LF	500		
024	01550	REMOVAL OF REMOVABLE PREFORMED PAVEMENT MARKING LINES - ANY WIDTH	LF	1,000		
025	01550	TEMPORARY PAVEMENT MARKINGS (REMOVABLE PREFORMED LETTERS, SYMBOLS, ARROWS AND NUMBERS)	EA	20		
026	01550	REMOVAL OF REMOVABLE PREFORMED LETTERS, SYMBOLS, ARROWS AND NUMBERS	EA	20		
027	01550	TEMPORARY TRAFFIC SIGNS	SF	825		
028	01550	TYPE III BARRICADE FOR MAINTENANCE OF TRAFFIC	EA	10		

029	02220	ABANDONMENT OF EXISTING STORM DRAIN STRUCTURES	LF	495		
030	02220	REMOVAL OF EXISTING CONCRETE BARRIER (ANY TYPE)	LF	4,170		
031	02220	REMOVAL OF EXISTING FENCE	LF	2,599		
032	02220	REMOVAL OF EXISTING MASONRY	CY	200		
033	02220	REMOVAL OF EXISTING RETAINING WALL	CY	126		
034	02220	REMOVAL OF EXISTING PIPE	LF	1,153		
035	02315	CLASS 1 EXCAVATION	CY	15,359		
036	02317	COMMON BORROW	CY	7,340		
037	02317	TEST PIT EXCAVATION	CY	28		
038	02370	DIVERSION FENCE	LF	400		
039	02370	INLET PROTECTION	EA	70		

040	02370	RECONSTRUCT STABILIZED CONSTRUCTION ENTRANCE	TON	550		
041	02370	SILT FENCE	LF	400		
042	02370	STABILIZED CONSTRUCTION ENTRANCE	TON	300		
043	02370	SUPER SILT FENCE	LF	2,800		
044	02370	TEMPORARY GABION OUTLET STRUCTURE	EA	2		
045	02370	TYPE A-2 EARTH DIKE	LF	222		
046	02370	TYPE B-2 EARTH DIKE	LF	140		
047	02372	TYPE A SOIL STABILIZATION MATTING	SY	300		
048	02375	CLASS 1 RIP RAP	SY	106		
049	02620	4" NON PERFORATED CIRCULAR PIPE LONGITUDINAL UNDERDRAIN	LF	120		
050	02620	6" PERFORATED CIRCULAR PIPE LONGITUDINAL UNDERDRAIN	LF	910		

051	02630	15" CLASS IV REINFORCED CONCRETE PIPE	LF	772		
052	02630	18" CLASS IV REINFORCED CONCRETE PIPE	LF	891		
053	02630	18" CLASS V REINFORCED CONCRETE PIPE	LF	155		
054	02630	19" X 30" CLASS IV REINFORCED CONCRETE PIPE	LF	13		
055	02630	21" CLASS IV REINFORCED CONCRETE PIPE	LF	430		
056	02630	21" CLASS V REINFORCED CONCRETE PIPE	LF	185		
057	02630	24" CLASS IV REINFORCED CONCRETE PIPE	LF	282		
058	02630	24" CLASS V REINFORCED CONCRETE PIPE	LF	47		
059	02630	24"X38" CLASS IV REINFORCED CONCRETE PIPE	LF	14		
060	02630	27" CLASS IV REINFORCED CONCRETE PIPE	LF	239		
061	02630	36" CLASS IV REINFORCED CONCRETE PIPE	LF	367		

062	02630	ADJUST DRAINAGE STRUCTURE TO GRADE	EA	3		
063	02630	MIX #2 CONCRETE FOR MISCELLANEOUS STRUCTURES	CY	15		
064	02630	MIX #9 CONCRETE FOR DRAINAGE STRUCTURES AND PIPE COLLARS	CY	120		
065	02630	MODIFIED TYPE 'H' CURB OPENING INLET, MINIMUM DEPTH	EA	7		
066	02630	MODIFIED TYPE 'H' CURB OPENING INLET, VERTICAL DEPTH	LF	20		
067	02630	STANDARD 48" DIA. PRECAST MANHOLE BC-383.04, MINIMUM DEPTH	EA	20		
068	02630	STANDARD 48" DIA. PRECAST MANHOLE BC-383.04, VERTICAL DEPTH	LF	99		
069	02630	STANDARD 60" DIA. PRECAST MANHOLE BC-383.05, MINIMUM DEPTH	EA	6		
070	02630	STANDARD 60" DIA. PRECAST MANHOLE BC-383.05, VERTICAL DEPTH	LF	40		
071	02630	STANDARD 84" DIA. PRECAST MANHOLE BC-383.07, MINIMUM DEPTH	EA	1		
072	02630	STANDARD 84" DIA. PRECAST MANHOLE BC-383.07, VERTICAL DEPTH	LF	5		

073	02630	STANDARD STD CHANNEL NO. 1, BC- 383.31	EA	1		
074	02630	STANDARD STD CHANNEL NO. 12, BC- 383.35	EA	3		
075	02630	STANDARD STD CHANNEL NO. 2, BC- 383.31	EA	11		
076	02630	STANDARD STD CHANNEL NO. 3, BC- 383.32	EA	13		
077	02630	STANDARD STD CHANNEL NO. 4, BC- 383.32	EA	3		
078	02630	STANDARD STD CHANNEL NO. 5, BC- 383.32	EA	3		
079	02630	STANDARD STD CHANNEL NO. 6, BC- 383.33	EA	2		
080	02630	STANDARD STD CHANNEL NO. 9, BC- 383.34	EA	1		
081	02630	STANDARD TYPE 'E' COMBINATION INLET - BC 376.24, MINIMUM DEPTH	EA	1		
082	02630	STANDARD TYPE 'E' COMBINATION INLET - BC 376.24, VERTICAL DEPTH	LF	1		
083	02630	STANDARD TYPE H COMB. INLET - BC 376.64, MINIMUM DEPTH	EA	7		

084	02630	STANDARD TYPE 'H' COMB. INLET - BC 376.64, VERTICAL DEPTH	LF	11		
085	02630	STANDARD TYPE K INLET - MD 378.11, MINIMUM DEPTH	EA	12		
086	02630	STANDARD TYPE K INLET - MD 378.11, VERTICAL DEPTH	LF	38		
087	02630	STANDARD TYPE 'S' COMBINATION INLET BC- 380.51, MINIMUM DEPTH	EA	28		
088	02630	STANDARD TYPE 'S' COMBINATION INLET BC- 380.51, VERTICAL DEPTH	LF	25		
089	02630	STANDARD TYPE 'S' DOUBLE GRATE TANDEM BC-380.21, MINIMUM DEPTH	EA	7		
090	02630	STANDARD TYPE 'S' DOUBLE GRATE TANDEM BC-380.21, VERTICAL DEPTH	LF	7		
091	02630	STANDARD TYPE 'S' SINGLE GRATE BC- 380.01, MINIMUM DEPTH	EA	2		
092	02630	STANDARD TYPE 'S' SINGLE GRATE BC- 380.01, VERTICAL DEPTH	LF	1		
093	02640	BIORETENTION SOIL MIXTURE	CY	833		
094	02640	CONCRETE SAND	CY	127		

095	02720	GRADED AGGREGATE BASE COURSE	CY	4,408		
096	02720	NUMBER 57 AGGREGATE	CY	367		
097	02720	NUMBER 7 AGGREGATE	CY	127		
098	02745	HMA SUPERPAVE 9.5MM FOR WEDGE/LEVEL PG 64-22 SURFACE COURSE, LOW ESAL	TON	105		
099	02745	HMA SUPERPAVE 9.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	1,993		
100	02745	HMA SUPERPAVE 12.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	976		
101	02745	HMA SUPERPAVE 19MM PG 64-22 BASE COURSE, LOW ESAL	TON	5,437		
102	02750	9" CONCRETE PAVEMENT	SY	3,806		
103	02765	10 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	100		
104	02765	12 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	4900		
105	02765	24 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	650		

106	02765	5 INCH GREEN PAVEMENT MARKING PAINT LINES	LF	200		
107	02765	5 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	4025		
108	02765	5 INCH WHITE PAVEMENT MARKING PAINT LINES	LF	8,900		
109	02765	5 INCH YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	7225		
110	02765	REMOVAL OF EXISTING PAVEMENT LINE MARKINGS, ANY WIDTH	LF	2,200		
111	02765	WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LEGENDS AND SYMBOLS	EA	44		
112	02769	DETECTABLE WARNING SURFACE	SF	788		
113	02770	TYPE A COMBINATION CURB AND GUTTER & TYPE A CURB	LF	9,783		
114	02775	5-INCH CONCRETE SIDEWALK	SF	24,457		
115	02775	8-INCH CONCRETE DRIVEWAY	SY	70		
116	02820	BOLLARDS	EA	31		

117	02820	5 FOOT ORNAMENTAL FENCE	LF	2,515		
118	02820	3 FOOT ORNAMENTAL FENCE	LF	318		
119	02890	REMOVE EXISTING GROUND MOUNTED SIGNS AND SUPPORTS	SF	167		
120	02890	REMOVE EXISTING OVERHEAD SIGN STRUCTURE	EA	2		
121	02890	SHEET ALUMINUM SIGNS	SF	1,060		
122	02890	SQUARE PERFORATED TUBULAR STEEL SIGN POSTS	EA	58		
123	02890	SQUARE TUBULAR STEEL ANCHOR BASES	EA	58		
124	02890	WOOD SIGN SUPPORTS 4 INCH X 4 INCH	LF	693		
125	02890	WOOD SIGN SUPPORTS 4 INCH X 6 INCH	LF	228		
126	02920	ADDITIONAL WATERING OF LANDSCAPED AREAS	MG	45		
127	02920	3" SHREDDED HARDWOOD BARK MULCH	SY	1,160		

128	02920	SODDING	SY	517		
129	02920	TEMPORARY SEEDING AND MULCHING	SY	7,000		
130	02920	TOPSOIL FURNISHED AND PLACED	CY	1,600		
131	02920	TURF SEEDING	SY	22,056		
132	02930	ACER RUBRUM 'NORTHWOOD' / RED MAPLE	EA	7		
133	02930	AMELANCHIER CANADENSIS / SERVICEBERRY	EA	47		
134	02930	CARPINUS CAROLINIANA / HORNBEAM	EA	3		
135	02930	CLADRASTIS KENTUKEA / YELLOWWOOD	EA	5		
136	02930	CLETHRA ALNIFOLIA "PINK SPIRE" / PINK SPIRE SUMMERSWEET	EA	161		
137	02930	ILEX GLABRA 'COMPACTA' / DWARF INKBERRY	EA	24		
138	02930	LIRIOPE MUSCARI 'BIG BLUE' / BIG BLUE LILYTURF	EA	191		

139	02930	NARCISSUS 'PACIFIC RIM' / PACIFIC RIM DAFFODIL	EA	4,375		
140	02930	PANICUM VIRGATUM 'HEAVY METAL' / SWITCHGRASS	EA	841		
141	02930	QUERCUS BICOLOR / SWAMP WHITE OAK	EA	19		
142	02930	RUDBECKIA FULGIDA 'GOLDSTRUM' / BLACK EYED SUSAN	EA	456		
143	02930	SPIREAE JAPONICA 'LITTLE PRINCESS' / LITTLE PRINCESS SPIREA	EA	163		
144	02930	TILIA AMERICANA 'REDMOND' / REDMOND AMERICAN LINDEN	EA	19		
145	02930	VIBURNUM DENTATUM / ARROWWOOD VIBURNUM	EA	65		
146	03300	20' CONCRETE BARRIER NOSE DOWN TAPER	EA	2		
147	03300	34" F-SHAPE CONCRETE BARRIER (ANY TYPE)	LF	1,652		
148	05585	RUB RAIL BARRIER ATTACHMENT	EA	2		
149	05585	TYPE C END TREATMENT	EA	2		

150	05585	W-BEAM GUARD RAIL W/ 6 FOOT POST	LF	201		
151	16122	2 CONDUCTOR ELECTRICAL CABLE (NO. 6 AWG)	LF	200		
152	16122	4 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	LF	9,000		
153	16122	7 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	LF	6,000		
154	16122	(2) 1 CONDUCTOR ELECTRICAL CABLE (NO. 12 AWG)	LF	350		
155	16122	BARE COPPER GROUND WIRE, NO 6 AWG	LF	3,200		
156	16122	CABLE - 1 CONDUCTOR, NO 2 AWG, TYPE USE, 600V	LF	2,100		
157	16122	CABLE - 1 CONDUCTOR, NO 6 AWG, TYPE USE, 600V	LF	6,400		
158	16122	INTERCONNECT CABLE	LF	3,000		
159	16123	TYPE X DUCT SECTION, 2-3" I.D. - TRENCHED	LF	40		
160	16123	TYPE X DUCT SECTION, 2-4" I.D. - TRENCHED	LF	40		

161	16123	TYPE Y DUCT SECTION, 1-3 I.D. - SLOTTED	LF	100		
162	16123	TYPE Y DUCT SECTION, 1-3" I.D. - TRENCHED	LF	1,280		
163	16123	TYPE Y DUCT SECTION, 1-4" AND 1-3" I.D. - SLOTTED	LF	1,100		
164	16123	TYPE Y DUCT SECTION, 1-4" I.D. - TRENCHED	LF	60		
165	16123	TYPE X DUCT SECTION, 2-5" I.D. - TRENCHED	LF	800		
166	16123	TYPE X DUCT SECTION, 2-5" I.D. - SLOTTED	LF	200		
167	16124	HANDBOX (DPW COVER)	EA	37		
168	16124	HANDBOX (DTT COVER)	EA	25		
169	16124	CCTV HANDBOX	EA	13		
170	16124	LIGHTING ELECTRICAL HANDBOX	EA	28		
171	16440	ELECTRICAL UTILITY SERVICE 120/240 VOLTS 200 AMPS	EA	1		

172	16440	LIGHTING CONTROL CABINET, BASE MOUNT (120/240 VOLTS, 1 PHASE 3 WIRE SYSTEM)	EA	1		
173	16440	15A SINGLE POLE OUTLET PEDESTAL	EA	3		
174	16443	BACKUP UPS SYSTEM FOR TRAFFIC SIGNALS - BASE MOUNT	EA	4		
175	16443	FOUNDATION - UPS	EA	4		
176	16443	INSTALL TYPE 'A' CONTROLLER CABINET - POLE MOUNT	EA	4		
177	16520	70mA 255W LED LUMINAIRE	EA	38		
178	16521	400 WATT HPS COBRA HEAD LIGHT FIXTURE AND LAMP WITH PHOTOCELL	EA	8		
179	16525	30' PARKING LOT LIGHT POLE	EA	20		
180	16573	2 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	800		
181	16573	4 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	1,500		
182	16573	4 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	100		

183	16574	TEMPORARY STREET LIGHTING	LS	1		
184	16575	10-FOOT LIGHTING ARM	EA	8		
185	16576	REMOVE AND DISPOSE OF TRAFFIC SIGNAL AND STREET LIGHTING EQUIPMENT	LS	1		
186	16576	REMOVE AND RELOCATE ROADWAY LIGHTING STRUCTURE	EA	5		
187	16576	REMOVE AND SALVAGE TRAFFIC SIGNAL EQUIPMENT	LS	1		
188	16578	FOUNDATION - D.T.T (20" BOLT CIRCLE)	EA	14		
189	16578	FOUNDATION - D.T.T (15" BOLT CIRCLE)	EA	5		
190	16578	FOUNDATION - PEDESTAL POLE	EA	18		
191	16578	TYPE I POLE BASE AND FOUNDATION	EA	12		
192	16578	TYPE II POLE BASE AND FOUNDATION	EA	8		
193	16579	ONE-WAY, 3-SECTION ADJUSTABLE LED SIGNAL HEAD (12")	EA	28		

194	16580	AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON CENTRAL CONTROL UNIT	EA	4		
195	16580	AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON STATION AND SIGN	EA	32		
196	16581	ONE-WAY, 1-SECTION LED COUNTDOWN PEDESTRIAN SIGNAL (16"X18")	EA	32		
197	16582	ETHERNET CABLE FOR PEDESTRIAN DETECTION SENSOR	LF	4,500		
198	16582	PEDESTRIAN DETECTION SENSOR	EA	29		
199	16583	VIDEO DETECTION CAMERA	EA	10		
200	16583	VIDEO DETECTION CAMERA CABLE	LF	1,100		
201	16586	10-FOOT GALVANIZED STEEL PEDESTAL POLE	EA	18		
202	16586	21-FOOT HEAVY DUTY GALVANIZED STEEL TRAFFIC POLE	EA	6		
203	16586	28-FOOT HEAVY DUTY GALVANIZED STEEL JOINT USE TRAFFIC POLE	EA	8		
204	16586	30 FT. MAST ARM	EA	7		

205	16586	35 FT. MAST ARM	EA	1		
206	16586	40 FT. MAST ARM	EA	2		
207	16586	44 FT. MAST ARM	EA	4		
NEW ADDENDUM 1 ITEMS						
208	02640	PEA GRAVEL	SF	1,000		
209	02745	PRICE ADJUSTMENT FOR ASPHALT BINDER	EA	1	\$20,000.00	\$20,000.00
210	02766	DECORATIVE CROSSWALKS	SF	771		
211	02820	ORNAMENTAL BRICK COLUMNS	EA	12		
212	02825	SQUARE 16 FOOT SHELTER	EA	1		
213	02930	LAGERSTROEMIA X NATCHEZ	EA	8		
214	02930	MALUS SARGENTII CANDYMINT / CANDYMINT SARGENT CRABAPPLE	EA	42		
215	02930	PENNISETUM ALOPECUROIDES HAMELN / FOUNTAIN GRASS	EA	267		

216	03300	CONCRETE PEDESTALS	EA	4		
217	16122	BARE COPPER GROUND WIRE, NO 3 AWG	LF	1,100		
218	16122	BARE COPPER GROUND WIRE, NO 4 AWG	LF	1,200		
219	16122	BARE COPPER GROUND WIRE, NO 8 AWG	LF	200		
220	16122	BARE COPPER GROUND WIRE, NO 10 AWG	LF	1,300		
221	16122	CABLE - 1 CONDUCTOR, NO 4 AWG, TYPE USE, 600V	LF	2,300		
222	16122	CABLE - 1 CONDUCTOR, NO 8 AWG, TYPE USE, 600V	LF	300		
223	16122	CABLE - 1 CONDUCTOR, NO 10 AWG, TYPE USE, 600V	LF	2,600		
224	16573	1 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	400		
225	16573	1 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	1,500		
226	16573	1.5 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	1,300		

227	16573	1.5 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	900		
NEW ADDENDUM 3 ITEM						
228	02745	GRINDING HMA PAVEMENT 0 INCH TO 2 INCH	SY	7,405		

Basis of Award: Total amount of items 001 thru 228 _____(figures)

_____ (words)

229		Insurance Premium (Contingency)	LS	LS	LS	
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This amount will only be added to the base bid in the event that the bidder is excluded from the wrap-up insurance program or the program is terminated mid-term. The Insurance Cost Worksheet must be attached to the bid.

A. CORPORATION BID:

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST:

By:

Secretary

President or Vice President

Print Name

Print Name

B. PARTNERSHIP BID:

FEIN: _____

Name of Partnership

Business Address

Telephone Number / Fax Number

Names of each Partner:

Witness:

By:

Signature

Signature

Print Name

Print Name

BID FORM

C. INDIVIDUAL BID:

S.S. No.: _____

Name

Business Address

Telephone Number / Fax Number

Witness:

By: _____

Signature

Print Name

Print Name

D. JOINT VENTURE

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST

By: _____

Secretary

President or Vice President

Print Name

Print Names

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST:

By:

Secretary

President or Vice President

Print Name

Print Name

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST:

By:

Secretary

President or Vice President

Print Name

Print Name

A Joint Venture doing business as _____

- * Each member of the Joint Venture must execute the Bid Form. A Corporate Officer must sign for each member of the joint venture. In the event that a Corporate Officer (President or Vice President) does not sign the Bid Form, a Power of Execution or Power of Attorney, must be submitted with the Bid Forms.

SECTION 02745**HOT MIX ASPHALT PAVEMENT****PART 1 - GENERAL****1.01 DESCRIPTION:**

- A. This section specifies the construction and grinding of hot mix asphalt (HMA) pavement.
- B. Related Sections:
 - 1. Section 01300: Submittals

1.02 SUBMITTALS:

- A. Contractor shall submit to the Engineer for approval a mix design and a proposed paving plan, including production plants, location of plants with respect to the project site, equipment, and material sources. Submittals for mix design approval shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13.
- B. In accordance with SECTION 01300 SUBMITTALS, the Contractor shall submit to the engineer:
 - 1. Mix design
 - 2. Paving plan
 - 3. Production plants
 - 4. Location of plants
 - 5. Equipment
 - 6. Source information

1.03 EQUIPMENT:

- A. All equipment, including the production plant and paving equipment, shall be subject to approval by the Engineer. The plant shall be ready for inspection by the Engineer at least 48 hours prior to the start of the construction operations.
- B. Pavers
1. Pavers will be inspected and approved by the Engineer based upon requirements in the manufacturer's specification manual with a copy to be provided by the Contractor. The paver shall be a self-contained, power propelled unit capable of spreading the mixture true to line, grade and cross slope. The paver shall be equipped with a screed or strike off assembly, which can produce a finished surface of the required smoothness and texture without tearing, shoving or gouging the mixture. The paver shall have automatic controls for transverse slope and grade. Controls shall be capable of sensing grade from an outside reference line or ski and sensing the transverse slope of the screed to maintain the required grade and transverse slope within plus or minus 0.1 of the required slope percentage.
 2. Manual operations will be permitted in the construction of irregularly shaped and minor areas, or where directed by the Engineer.
 3. Whenever a breakdown or malfunction of any automatic control occurs, the equipment may be operated manually for the remainder of the workday as directed by the Engineer.
 4. Reference lines or other suitable markings to control the horizontal alignment shall be provided by the Contractor, subject to the approval of the Engineer.
- C. Rollers: Rollers shall be self propelled, reversible, steel wheeled or pneumatic tired. Vibratory rollers may be used, except they shall not be in vibratory mode when paving on surface courses without the approval of the Engineer. Pneumatic tire rollers shall have multiple tires of equal size with smooth tread. Wheels shall be arranged to oscillate in pairs, or they may be individually sprung. Tires shall be uniformly inflated at the

operating pressure approved by the Engineer. The Contractor shall furnish the Engineer a manufacturer's table showing this data. The difference in tire pressure between any two tires shall not be greater than 5 psi. The Contractor shall provide a means for checking the tire pressure on the job at all times.

D. Grinding Equipment

1. Grinding equipment shall have a cutting mandrel with carbide tipped cutting teeth and designed specifically for grinding asphalt surfaces to close tolerances. The equipment shall accurately establish slope elevations and profile grade controls.
2. A vacuum equipped street sweeper, capable of removing all loose material from the roadway without causing dust to escape into the air.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Hot Mix Asphalt shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13 with the following addition to the Chart in Section 20.13-4 Paragraph 1:

SIEVE SIZE	SC (Percent Passing)
¾ in.	100
½ in.	86 – 99
3/8 in.	70 – 94
No. 4	35 – 68
No. 8	24 – 52
No. 16	16 – 36
No. 30	10 – 26
No. 50	7 – 18
No. 200	2 – 9

Add to the Marshall Test Requirements:

	<u>SC</u>
Stability, min., lb	1500

Flow 0.01 in.	8 – 18
Voids, mineral aggregate, % min.	15
Voids, total mix %	3 – 5
Compaction blows used	75

The Surface Course shall consist of Bituminous Concrete Band SC.

2.02 PRODUCTION PLANTS: Production Plants shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13-5.

PART 3 - EXECUTION

3.01 WEATHER:

- A. Pavement shall be placed only when the ambient air and surface temperature is at least 40° F and rising for surface course and at least 32° F and rising for base courses. The base shall be clean and dry and approved by the Engineer before HMA paving begins. HMA pavement shall not be placed on a frozen base. When weather conditions differ from these limits, material en route from the plant to the job site may be used at the Contractor's risk. If placement of the material is stopped by the Engineer, all material en route shall be wasted at the Contractor's expense.

3.02 FOUNDATION PREPARATION:

- A. Prior to placement of paving material, the foundation shall be constructed as specified in the Contract Documents and approved by the Engineer. When paving over existing pavement, all excess crack filling or patch material shall be removed and all spalls and potholes shall be cleaned, tack coated, filled and tamped with hot mix asphalt before placement. Manholes, valve boxes, inlets, and other appurtenances within the area to be paved shall be adjusted to grade as directed by the Engineer.
- B. Curbs, Gutters, and Other Supports: Where permanent curbs, gutters, edges, and other supports are planned, they shall be constructed and backfilled prior to placing the HMA, which shall then be placed and compacted against them.

3.03 TACK COAT:

- A. Prior to application of the tack coat, the surface shall be cleaned of all loose and foreign materials. The tack coat shall be uniformly applied to the surface by full circulation spray bars that are laterally and vertically adjustable and provide triple fanning and overlapping action so that the resulting coating shall be residual asphalt applied at a rate of 0.01 to 0.05 gal/yd² as directed by the Engineer.

3.04 HOT MIX ASPHALT PLACEMENT:

- A. HMA shall be placed by the paver. Delivery of the mixture by the hauling units and placement shall be continuous. The temperature of the mixture shall not be less than 225° F at the time of placement. Broadcasting of loose mixture over the new surface will not be permitted.

3.05 COMPACTION:

- A. Immediately following placement of the HMA, the mixture shall be compacted by rolling to an in-place density of 92.0 to 97.0 percent of the maximum density. In-place compaction shall be completed before the mixture cools below 185° F, as determined by a probe type surface thermometer, supplied by the Contractor and approved by the Engineer.
- B. Rollers shall start at the sides and proceed longitudinally toward the center of the pavement. Successive trips of the roller shall overlap by at least one half the width of the roller, and alternate trips shall not end at the same point. After rolling is completed, no traffic of any kind will be permitted on the pavement until the pavement has cooled to less than 140° F or as directed by the Engineer.

3.06 JOINTS:

- A. Both longitudinal and transverse joints in successive courses shall be staggered so that one is not above the other. Transverse joints shall be staggered by the length of the paver. Longitudinal joints shall be staggered a minimum of 6 in.
- B. Joints shall be constructed to provide a continuous bond between the old

and new surfaces. Joints shall be coated with tack coat as directed by the Engineer. In the case of surface course, the edge of the existing pavement shall be cut back for its full depth on transverse joints to expose a fresh surface and the surface shall be coated with tack coat material as directed by the Engineer. Before placing the mixture against curbs, gutters, headers, manholes, etc., all contact surfaces shall be coated with tack coat.

3.07 FIELD QUALITY CONTROL:

- A. Acceptance will be determined by nuclear in-place density test data. The nuclear gauge shall be calibrated in conformance with MSMT 417.
- B. The Contractor shall take a one-minute special calibration nuclear test from each lift. A special calibration nuclear test is defined as an average of two (minimum) special calibration readings taken at the same location after rotating the nuclear gauge 180 degrees.
- C. Nuclear test-in-place density data shall be expressed as percentage of the maximum specific gravity determined for each day's production. The in-place density shall be 92.0 to 97.0 percent.

3.08 PAVEMENT GRINDING:

- A. Patching
 - 1. Perform roadway patching before the grinding operation. Additional roadway patching may be required after the grinding operation.
- B. Vacuuming
 - 1. Follow immediately behind the grinding machine with a vacuum equipped street sweeper, capable of removing all loose material from the roadway without causing dust to escape into the air.
- C. Control Strip
 - 1. Grind a control strip at least 500 ft in length with a uniformly textured surface and cross section as approved.

2. Provide a final pavement surface with a transverse pattern of 0.2 in. center to center of each strike area and with the difference between the high and low of the matted surface not exceeding 1/16 in.

D. Pavement Grinding

1. The designated area shall be ground using the same procedures, settings, and speed, and conform to the same requirements as those used in the control strip.
2. When necessary to maintain an adequate cross slope for drainage, grind the pavement adjacent to the ground pavement. Grinding will not be required on bridge decks.
3. Grind one lane at a time. If the grinding depth exceeds 2-1/2 in. on highways carrying traffic, grind the abutting lane or shoulder on the same day. Grind the abutting lane or shoulder, regardless of depth, prior to weekends or temporary shutdowns. Otherwise, if the grinding depth is 2-1/2 in. or less, the abutting lane or shoulder may be ground on alternate days. Where uneven pavement joints exist, provide adequate advance warning devices in conformance with the Contract Documents.
4. Furnish an approved 10 ft straightedge for testing the transverse and longitudinal surface after grinding operations. Correct all areas showing high spots greater than 1/8 in. within 10 ft by additional grinding at no additional cost to the Administration. Straightedge requirements apply to areas across joints and repaired cracks but are not applicable to areas outside the ground area.
5. After the grinding operation is complete, fill all depressions, potholes, and other irregularities using HMA. Construct an HMA wedge at existing water valves, meters, manhole covers, etc.

PART 4 - MEASUREMENT AND PAYMENT

4.01 HMA SUPERPAVE SURFACE COURSE & WEDGE/LEVEL 9.5MM PG 64-22:

- A. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be measured for at the contract unit price bid per ton.

- B. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.02 HMA SUPERPAVE SURFACE COURSE 12.5MM PG 64-22:

- A. HMA Superpave Surface Course 12.5 MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Surface Course 12.5 MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.03 HMA SUPERPAVE BASE COURSE 19MM PG 64-22:

- A. HMA Superpave Base Course 19MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Base Course 19MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.04 RICE ADJUSTMENT FOR ASPHALT BINDER:

Price Adjustment (PA) will be made to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of asphalt binder.

For adjustment purposes, the prevailing base index price will be the price specified for PG 64-22 Asphalt Binder posted at www.roads.maryland.gov (Business Center/Contracts Bids and Proposals) at time of bid opening. Cost

differentials between PG 64-22 and a binder specified shall be included in the price bid per ton for Hot Mix Asphalt. A historical database will be maintained by the State Highway Administration. The base index price for PG 64-22 Asphalt Binder for November 2011 is \$591.25 per ton.

The PA will be made when the index price for the month of placement increases or decreases more than 5 percent of the prevailing base index price. Computations will be as follows:

$$\text{Percent Change} = ((P_p - P_b) / P_b) \times 100$$

$$PA = T \times Q \times (P_p - (D \times P_b))$$

Where:

PA = Price Adjustment for the current month

T = Design target asphalt content expressed as a decimal

Q = Quantity of Hot Mix Asphalt placed for the current month

P_p = Index price for PG 64-22 Asphalt Binder per ton for the month of Placement

D = 1.05 for increases over 5 percent; 0.95 for decreases over 5 percent

P_b = Prevailing base index price for PG 64-22 Asphalt Binder per ton

PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Asphalt Binder. The item amount will be established by the Administration and shall not be revised by the Contractor. PA resulting in a decreased payment will be deducted from monies owed the Contractor.

4.05 GRINDING HMA PAVEMENT 0 INCH TO 2 INCH:

- A. Grinding HMA Pavement 0 Inch to 2 Inch will be measured and paid for at the pertinent Contract unit price per square yard. The square yard measurement will be computed from the actual width and length measurements of the area that has been ground.
- B. Grinding HMA Pavement 0 Inch to 2 Inch will be paid for with full compensation for patching, grinding, removal and disposal of ground material, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

END OF SECTION

APPENDIX A
CONTRACT NO. T-1089-0240

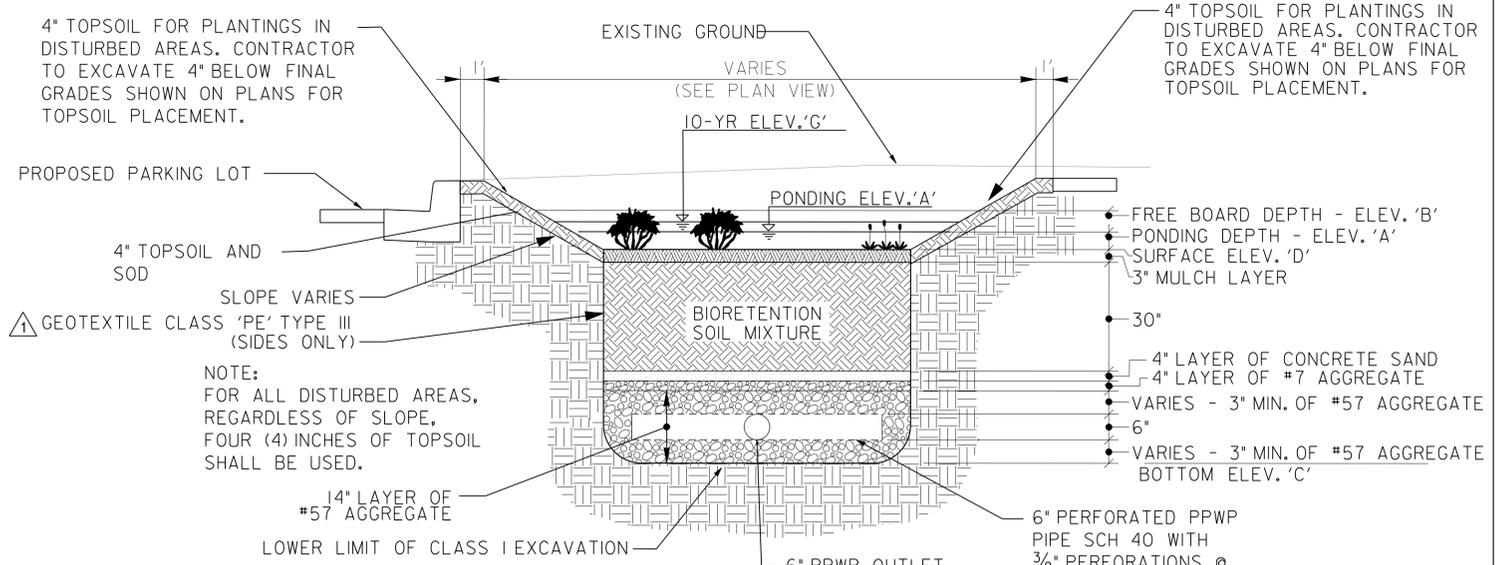
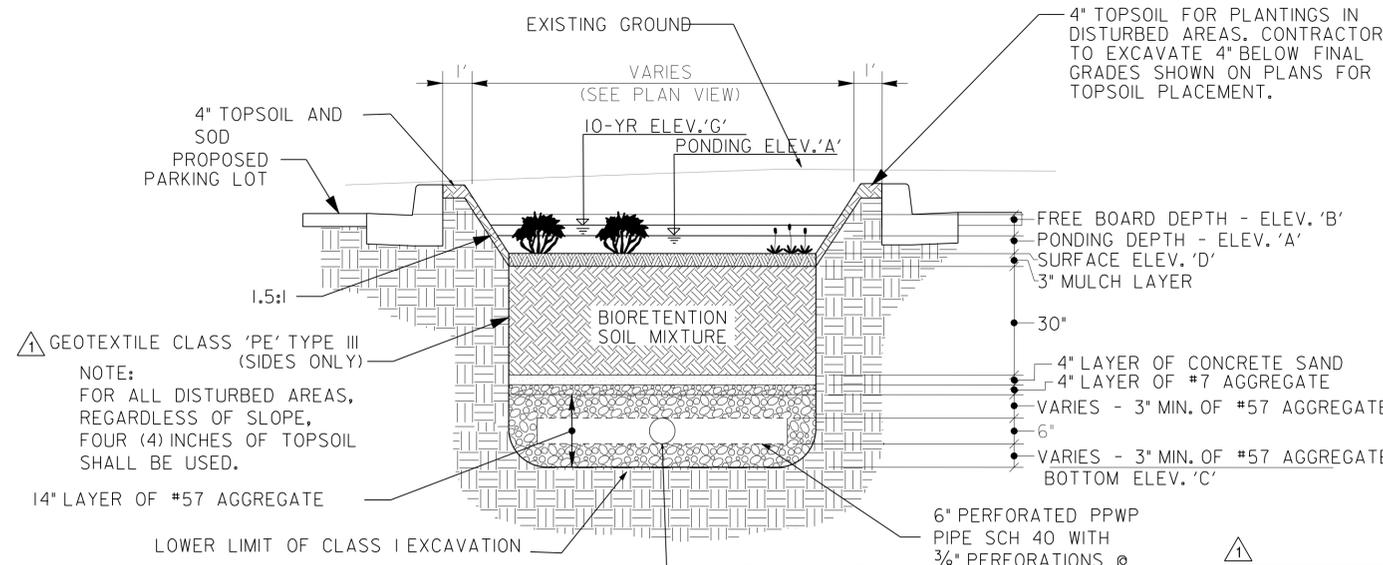
LIST OF CONTRACT DRAWINGS

GENERAL DRAWINGS		
1-A1	TI-1	TITLE SHEET
2-A1	GI-1	INDEX DRAWINGS
3	GN-1	NOTES AND ADA SUMMARY
4	GN-2	ADA FACILITIES ACCESSIBILITY REQUIREMENTS
5	GN-3	ABBREVIATIONS, SYMBOLS AND LEGENDS
CIVIL		
6	CV-1	POST DEMOLITION TOPOGRAPHY
7	CV-2	POST DEMOLITION TOPOGRAPHY
8	CV-3	POST DEMOLITION TOPOGRAPHY
9	CV-4	HORIZONTAL CONTROL
10	CV-5	HORIZONTAL CONTROL
11	CV-6	HORIZONTAL CONTROL
12	CV-7	TYPICAL SECTIONS
13	CV-8	TYPICAL SECTIONS
14	CV-9	TYPICAL SECTIONS
15	CV-10	TYPICAL SECTIONS
16	CV-11	TYPICAL SECTIONS
17	CV-12	SUPER ELEVATION SHEET
18	CV-13	SITE AND PAVEMENT PLAN
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20-A1	CV-15	SITE AND PAVEMENT PLAN
21-A1	CV-16	SITE AND PAVEMENT PLAN
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23	CV-18	SITE AND PAVEMENT PLAN
24-A1	CV-19	SITE AND PAVEMENT PLAN
25-A1	CV-20	SITE AND PAVEMENT PLAN
26	CV-21	CONCRETE PAVEMENT JOINT PATTERN (RAMP M AND RAMP J)
27	CV-22	CONCRETE PAVEMENT JOINT PATTERN - DETAILS
28	CV-23	PAVEMENT DETAILS
29	CV-24	SITE PLAN DETAILS
30	CV-25	SITE PLAN DETAILS
31	CV-26	RETAINING WALL DEMOLITION PLAN
32-A1	CV-27	PLAN - W. MULBERRY ST/N. PULASKI ST - GEOMETRIC LAYOUT & TABULATION
33-A1	CV-28	PLAN - W. MULBERRY ST/RAMP J/N. PAYSON ST - GEOMETRIC LAYOUT & TABULATION
34-A1	CV-29	PLAN - W. MULBERRY ST/RAMP J - GEOMETRIC LAYOUT & TABULATION
35-A1	CV-30	PLAN - W. FRANKLIN ST/RAMP M/N. PAYSON ST - GEOMETRIC LAYOUT & TABULATION
36	CV-31	PLAN - W. FRANKLIN ST/RAMP M - GEOMETRIC LAYOUT & TABULATION
37	CV-32	PLAN - PARKING LOT B - GEOMETRIC LAYOUT & TABULATION
38-A1	CV-33	PLAN - PARKING LOT C - GEOMETRIC LAYOUT & TABULATION
39-A1	CV-34	PLAN - PARKING LOT D - GEOMETRIC LAYOUT & TABULATION
40	CV-35	PROFILE - W. FRANKLIN ST TRANSITWAY (BASELINE "A")
41	CV-36	PROFILE - W. MULBERRY ST TRANSITWAY (BASELINE "B")

42	CV-37	PROFILE - RAMP M RECONSTRUCTED (BASELINE "C")
43	CV-38	PROFILE - RAMP J RELOCATED (BASELINE "F") & N. PAYSON ST RECONNECTED (BASELINE "G")
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45-A1	CV-40	GRADING PLAN
46	CV-41	SIGNING AND PAVEMENT MARKING PLAN
47-A1	CV-42	SIGNING AND PAVEMENT MARKING PLAN
48	CV-43	SIGNING AND PAVEMENT MARKING PLAN
49	CV-44	SIGNING AND PAVEMENT MARKING PLAN
50	CV-45	SIGNING AND PAVEMENT MARKING PLAN
51-A1	CV-46	SIGNING AND PAVEMENT MARKING PLAN
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58-A1	DR-2	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
59-A1	DR-3	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
60-A1	DR-4	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
61-A1	DR-5	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
62-A1	DR-6	STORM DRAIN PLAN AND STORM WATER MANAGEMENT PLAN
63	DR-7	STORM DRAIN PROFILES
64	DR-8	STORM DRAIN PROFILES
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66	DR-10	STORM DRAIN PROFILES
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71	DR-15	STORM DRAIN DETAILS
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73	DR-17	STORM WATER MANAGEMENT DETAILS
74	DR-18	STORM WATER MANAGEMENT DETAILS
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76-A1	ES-2	EROSION & SEDIMENT CONTROL NOTES
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79	ES-5	EROSION & SEDIMENT CONTROL NOTES
80	ES-6	EROSION & SEDIMENT CONTROL PLAN / PHASE I
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82-A1	ES-8	EROSION & SEDIMENT CONTROL PLAN / PHASE I
83-A1	ES-9	EROSION & SEDIMENT CONTROL PLAN / PHASE I
84-A1	ES-10	EROSION & SEDIMENT CONTROL PLAN / PHASE I
85	ES-11	EROSION & SEDIMENT CONTROL PLAN / PHASE II
86-A1	ES-12	EROSION & SEDIMENT CONTROL PLAN / PHASE II
87-A1	ES-13	EROSION & SEDIMENT CONTROL PLAN / PHASE II
88-A1	ES-14	EROSION & SEDIMENT CONTROL PLAN / PHASE II
89-A1	ES-15	EROSION & SEDIMENT CONTROL PLAN / PHASE II
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94	UT-4	EXISTING UTILITIES, TEST PITS AND SOIL BORINGS
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97-A1	EL-2	LIGHTING PLAN - LOT C
98-A1	EL-3	LIGHTING PLAN - LOT D
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105-A1	MT-5	MAINTENANCE OF TRAFFIC - PHASE II
106-A1	MT-6	MAINTENANCE OF TRAFFIC - PHASE III
107	MT-7	MAINTENANCE OF TRAFFIC - PHASE III
108	MT-8	MAINTENANCE OF TRAFFIC - PHASE IV
109	MT-9	MAINTENANCE OF TRAFFIC - PHASE IV
110	MT-10	MAINTENANCE OF TRAFFIC - PHASE IV
111	MT-11	MAINTENANCE OF TRAFFIC - PHASE IV
112	MT-12	MAINTENANCE OF TRAFFIC - PHASE V
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115-A1	SG-2	TRAFFIC SIGNAL RECONSTRUCTION - W. MULBERRY ST AT PAYSON ST
116-A1	SG-3	TRAFFIC SIGNAL RECONSTRUCTION - W. FRANKLIN ST AT PULASKI ST
117-A1	SG-4	TRAFFIC SIGNAL RECONSTRUCTION - W. FRANKLIN ST AT PAYSON ST
118-A1	SG-5	TRAFFIC SIGNAL INTERCONNECT - W. FRANKLIN ST. & W. MULBERRY ST
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119-A1	LS-1	LANDSCAPE PLAN
120-A1	LS-2	LANDSCAPE PLAN
121-A1	LS-3	LANDSCAPE DETAILS AND NOTES
121A-A1	LS-3A	LANDSCAPE DETAILS
121B-A1	LS-3B	LANDSCAPE DETAILS
122-A1	LS-4	ADA IMPROVEMENTS
123-A1	LS-5	ADA IMPROVEMENTS
124	LS-6	ADA IMPROVEMENTS
125-A1	LS-7	ADA IMPROVEMENTS
126-A1	LS-8	ADA IMPROVEMENTS
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130	XS-2	N. PULASKI ST
131	XS-3	N. PAYSON ST
132	XS-4	W. FRANKLIN ST

133	XS-5	W. FRANKLIN ST
134	XS-6	W. FRANKLIN ST
135	XS-7	W. FRANKLIN ST
136	XS-8	W. FRANKLIN ST
137	XS-9	W. MULBERRY ST
138	XS-10	W. MULBERRY ST
139	XS-11	W. MULBERRY ST
140	XS-12	W. MULBERRY ST
141	XS-13	W. MULBERRY ST
142	XS-14	W. MULBERRY ST
143-A1	XS-15	W. MULBERRY ST
144-A1	XS-16	W. MULBERRY ST
145-A1	XS-17	W. MULBERRY ST
146-A1	XS-18	W. MULBERRY ST
147	XS-19	W. MULBERRY ST
148	XS-20	W. MULBERRY ST
149	XS-21	W. MULBERRY ST
150	XS-22	PARKING LOT C
151	XS-23	PARKING LOT C
152	XS-24	PARKING LOT C AND D
153	XS-25	PARKING LOT D
154	XS-26	PARKING LOT D

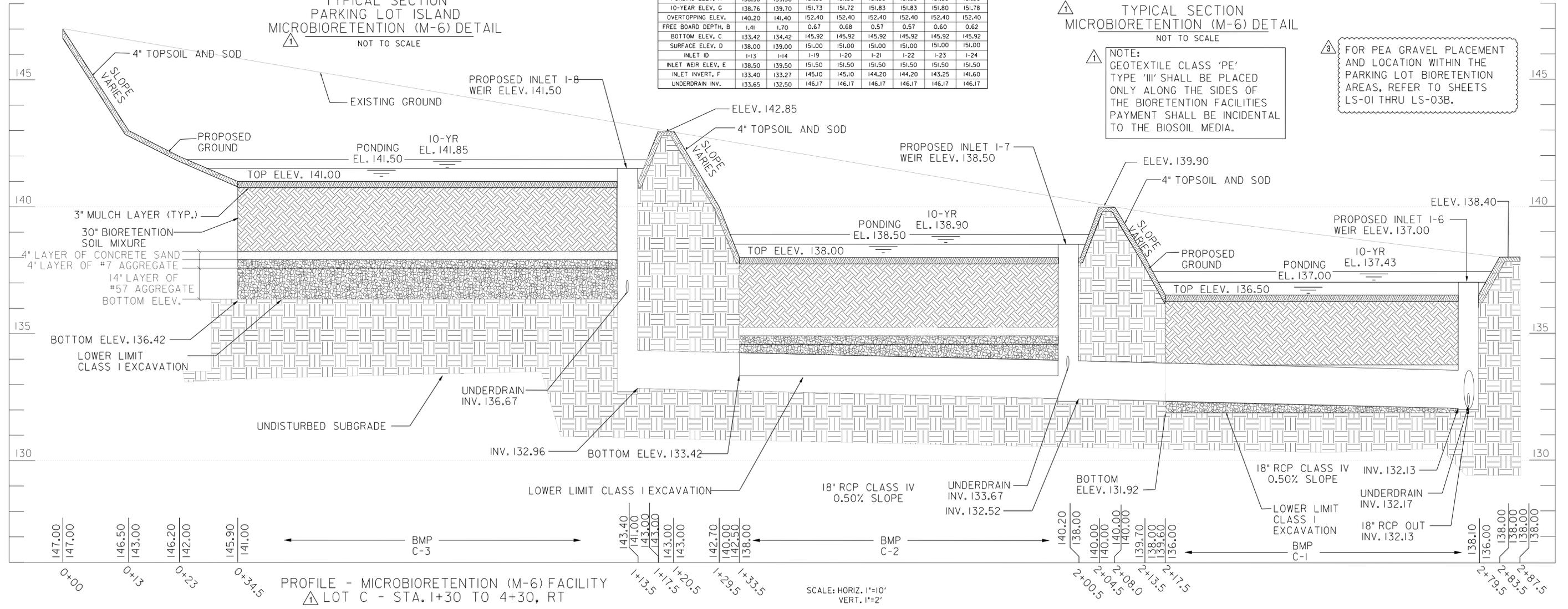


PARKING ISLAND MICROBIORETENTION (M-6) SCHEDULE

FACILITY	C-7	C-8	D-1	D-2	D-3	D-4	D-5	D-6
PONDING ELEV. A	138.50	139.50	151.50	151.50	151.50	151.50	151.50	151.50
10-YEAR ELEV. G	138.76	139.70	151.73	151.72	151.83	151.83	151.80	151.78
OVERTOPPING ELEV.	140.20	141.40	152.40	152.40	152.40	152.40	152.40	152.40
FREE BOARD DEPTH, B	1.41	1.70	0.67	0.68	0.57	0.57	0.60	0.62
BOTTOM ELEV. C	133.42	134.42	145.92	145.92	145.92	145.92	145.92	145.92
SURFACE ELEV. D	138.00	139.00	151.00	151.00	151.00	151.00	151.00	151.00
INLET ID	I-13	I-14	I-19	I-20	I-21	I-22	I-23	I-24
INLET WEIR ELEV. E	138.50	139.50	151.50	151.50	151.50	151.50	151.50	151.50
INLET INVERT, F	133.40	133.27	145.10	145.10	144.20	144.20	143.25	141.60
UNDERDRAIN INV.	133.65	132.50	146.17	146.17	146.17	146.17	146.17	146.17

TYPICAL SECTION
PARKING LOT ISLAND
MICROBIORETENTION (M-6) DETAIL
NOT TO SCALE

TYPICAL SECTION
MICROBIORETENTION (M-6) DETAIL
NOT TO SCALE



PROFILE - MICROBIORETENTION (M-6) FACILITY
LOT C - STA. 1+30 TO 4+30, RT



PROFESSIONAL CERTIFICATION
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
15553 October 2011
License No. Expiration Date



NO.	DESCRIPTION	BY	DATE
3	ADDENDUM 3 - PEA GRAVEL NOTE	WGM	12-27-11
1	ADDENDUM 1 - GEOTEXTILE 'PE' NOTE	JMH	11-22-11

REVISIONS

PARKING EXPANSION
WEST BALTIMORE MARC STATION
BALTIMORE CITY, MARYLAND
STORM WATER MANAGEMENT DETAILS
DATE: JULY 18, 2011 FULL SCALE: NA

CONTRACT NO. T-1089-0240
DRAWING NO. DR-16
SHEET NO. 72 OF 154

I:\5125 - MTA PDD\18 - West Baltimore MARC Design\Engineering\PlanSet\1089pDR015.dgn 12/23/2011



MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Martin O'Malley, Governor • Anthony G. Brown, Lt. Governor
Beverly K. Swaim-Staley, Secretary • Ralign T. Wells, Administrator

TO: All Planholders

FROM: Maryland Transit Administration

SUBJECT: **ADDENDUM NO. 2**
Contract No.: T-1089-0240
Parking Expansion – West Baltimore MARC Station

DATE: December 20, 2011

Enclosed and effective this date is Addendum No. 2 to the subject Contract. This change does not delay the Bid Opening Date of **January 5, 2012 at 2:00 p.m., 6 St. Paul Street, Baltimore, MD 21202, Conference Room #742.**

A conformed copy of the revised specification section is attached. A list of the changes made to this contract is attached to this Addendum. Also attached is revised response to question #2 per Addendum #1.

The Bidder shall acknowledge receipt of this Addendum by completing and returning this form with the bid package.

All other terms and conditions remain unchanged.

Sincerely,

Vanessa Ashe, Procurement Officer
Professional Services/Construction/Installation Section
Procurement Division

Acknowledgement of receipt of ADDENDUM # 2 to Solicitation #T-1089-0240

Vendor Name: _____

Authorized Representative's Signature

Date

**PARKING EXPANSION – WEST BALTIMORE MARC STATION
CONTRACT NO. T-1089-0240**

RESPONSES TO CONTRACTOR'S QUESTIONS

Revised the response per Addendum #1 to question #2.

Q 2: Has thought been given to establishing an escalation clause for the Hot Mix Asphalt bid item due to fluctuating oil prices?

A2: A new bid item (209) has been added “02745 – PRICE ADJUSTMENT FOR ASPHALT BINDER” which will account for fluctuations in binder prices that increase or decrease by 5% from the date of bid opening.

ADDENDUM NO.: 2
DATE: 12/20/11
CONTRACT NO.: T-1089-0240

The following additions, deletions, and modifications are hereby made a part of the Contract Documents of Parking Expansion – West Baltimore MARC Station, Contract No.: T-1089-0240.

I. CONTRACT SPECIFICATIONS

UNIT PRICE SCHEDULE

<u>Page No.</u>	<u>Description</u>
BF 13	DELETED amount of \$20,000 under “Total Price”, Quantity Item No. 103
BF 23	ADDED fixed amount of \$20,000 under “Unit Price” and “Total Price” to Quantity Item No. 209 “PRICE ADJUSTMENT FOR ASPHALT BINDER.

096	02720	NUMBER 57 AGGREGATE	CY	367		
097	02720	NUMBER 7 AGGREGATE	CY	127		
098	02745	HMA SUPERPAVE 9.5MM FOR WEDGE/LEVEL PG 64-22 SURFACE COURSE, LOW ESAL	TON	105		
099	02745	HMA SUPERPAVE 9.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	1,993		
100	02745	HMA SUPERPAVE 12.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	976		
101	02745	HMA SUPERPAVE 19MM PG 64-22 BASE COURSE, LOW ESAL	TON	5,437		
102	02750	9" CONCRETE PAVEMENT	SY	3,806		
103	02765	10 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	100		
104	02765	12 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	4900		
105	02765	24 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	650		
106	02765	5 INCH GREEN PAVEMENT MARKING PAINT LINES	LF	200		

206	16586	40 FT. MAST ARM	EA	2		
207	16586	44 FT. MAST ARM	EA	4		
NEW ADDENDUM 1 ITEMS						
208	02640	PEA GRAVEL	SF	1,000		
209	02745	PRICE ADJUSTMENT FOR ASPHALT BINDER	EA	1	\$20,000.00	\$20,000.00
210	02766	DECORATIVE CROSSWALKS	SF	771		
211	02820	ORNAMENTAL BRICK COLUMNS	EA	12		
212	02825	SQUARE 16 FOOT SHELTER	EA	1		
213	02930	LAGERSTROEMIA X NATCHEZ	EA	8		
214	02930	MALUS SARGENTII CANDYMINT / CANDYMINT SARGENT CRABAPPLE	EA	42		
215	02930	PENNISETUM ALOPECUROIDES HAMELN / FOUNTAIN GRASS	EA	267		
216	03300	CONCRETE PEDESTALS	EA	4		



MARYLAND TRANSIT ADMINISTRATION

MARYLAND DEPARTMENT OF TRANSPORTATION

Martin O'Malley, Governor • Anthony G. Brown, Lt. Governor
Beverley K. Swaim-Staley, Secretary • Ralign T. Wells, Administrator

TO: All Planholders
FROM: Maryland Transit Administration
SUBJECT: **ADDENDUM NO. 1**
Contract No.: T-1089-0240
Parking Expansion – West Baltimore MARC Station
DATE: December 13, 2011

Enclosed and effective this date is Addendum No. 1 to the subject Contract. This change delays the Bid Opening Date of December 14, 2011 to **January 5, 2012 at 2:00 p.m., 6 St. Paul Street, Baltimore, MD 21202, Conference Room #742.**

A conformed copy of the revised specification sections is attached. A list of the changes made to this contract is attached to this Addendum and also responses to contractors' questions.

The Bidder shall acknowledge receipt of this Addendum by completing and returning this form with the bid package.

All other terms and conditions remain unchanged.

Sincerely,

Vanessa Ashe, Procurement Officer
Professional Services/Construction/Installation Section
Procurement Division

Acknowledgement of receipt of ADDENDUM # 1 to Solicitation #T-1089-0240

Vendor Name: _____

Authorized Representative's Signature

Date

**PARKING EXPANSION – WEST BALTIMORE MARC STATION
CONTRACT NO. T-1089-0240**

RESPONSES TO CONTRACTOR’S QUESTIONS

Q 1: Should bid items 095 (Graded Aggregate Base Course), 096 (Number 57 Aggregate) and 097 (Number 7 Aggregate) be quantified per ton versus cubic yards?

A1: The Number 7 and 57 stone bid items are primarily used for drainage installation and stabilization which often require varying depths and therefore to accurately quantify these items cubic yards is the preferred unit type.

Graded Aggregate Base Course is required at different depths for various applications on the project and therefore is also preferred to be quantified using in place cubic yards.

Q 2: Has thought been given to establishing an escalation clause for the Hot Mix Asphalt bid item due to fluctuating oil prices?

A2: A new bid item (103) has been added “02745 – PRICE ADJUSTMENT FOR ASPHALT BINDER” which will account for fluctuations in binder prices that increase or decrease by 5% from the date of bid opening

Q 3: How can bid items 193 and 195 have a bid unit of 2 lump sums?

A 3: The quantity for bid items No. 193 “REMOVE AND DISPOSE OF TRAFFIC SIGNAL AND STREET LIGHTING EQUIPMENT” and No. 195 “REMOVE AND SALVAGE TRAFFIC SIGNAL EQUIPMENT” have decreased from 2 to 1 LS

Q 4: On drawing EL-2 shows 2-5” concrete encased conduit from BG&E service to Transformer is not on Bid Form? What bid item should this go under? Also is this conduit to be sch-80 or sch-40?

A 4: The name for this bid item has been changed from “5 INCH ENCASED CONDUIT” to “TYPE X DUCT SECTION, 2-5" I.D.”, which will be covered under the bid item Nos. 181 and 182. Utilize schedule 80 rigid PVC conduit for this installation.

Q 5: On drawing EL-2 shows 2-4” sch 40 conduits from transformer to meter to control cabinet but is not on bid form? What bid item should this go under?

A 5: The EL 2 drawing note number 15 refers to bid item No. 202 “4 INCH SCHEDULE 40 RIGID PVC CONDUIT – TRENCHED”

ADDENDUM NO.: 1
DATE: 12/13/11
CONTRACT NO.: T-1089-0240

The following additions, deletions, and modifications are hereby made a part of the Contract Documents of Parking Expansion – West Baltimore MARC Station, Contract No.: T-1089-0240.

I. CONTRACT SPECIFICATIONS

TABLE OF CONTENTS

<u>Page No.</u>	<u>Description</u>
3	ADDED Quantity Item 02766, Pre-Cut Inland Thermoplastic Decorative Crosswalk
3	ADDED Quantity Item 02825, Square 16 Foot Steel Shelter

NOTICE TO CONTRACTORS

2 Replace in its entirety. Revised the Bid Opening date.

BID FORM (Replace in its Entirety)

<u>Page No.</u>	<u>Description</u>
	BID FORM – Revised the page numbers
1	BID OPENING DATE: Revised the Bid Opening date.

UNIT PRICE SCHEDULE

7	INCREASED Quantity of Item No. 035 “CLASS 1 EXCAVATION” from 15,039 to 15,359 Cubic Yards
14	INCREASED Quantity of Item No. 112 “DETECTABLE WARNING SURFACE” from 784 to 788 Square Feet.
14	DECREASED Quantity of Item No. 113 “TYPE A COMBINATION CURB AND GUTTER & TYPE A CURB” from 9,857 to 9,783 Linear Feet.
14	INCREASED Quantity of Item No. 114 “5 INCH CONCRETE SIDEWALK” from 21,613 to 24,457 Square Feet.
14	DECREASED Quantity of Item No. 117 “5 FOOT ORNAMENTAL FENCE” from 2,579 to 2,515 Linear Feet.
15	INCREASED Quantity of Item No. 121 “SHEET ALUMINUM SIGNS” from 1,036 to 1,060 Square Feet.

UNIT PRICE SCHEDULE (continued)

<u>Page No.</u>	<u>Description</u>
15	DECREASED Quantity of Item No. 126 "ADDITIONAL WATERING OF LANDSCAPED AREAS" from 100 to 45 MG.
15	DECREASED Quantity of Item No. 127 "3" SHREDDED HARDWOOD BARK MULCH" from 1,212 to 1,160 Square Yards.
15	DECREASED Quantity of Item No. 128 "SODDING" from 4,106 to 517 Square Yards.
16	DECREASED Quantity of Item No. 130 "TOPSOIL FURNISHED AND PLACED" from 1,628 to 1,600 Cubic Yards.
16	INCREASED Quantity of Item No. 131 "TURF SEEDING" from 10,000 to 22,056 Square Yards.
16	DECREASED Quantity of Item No. 133 "AMELANCHIER CANADENSIS / SERVICEBERRY" from 50 to 47 EA.
16	DECREASED Quantity of Item No. 134 "CARPINUS CAROLINIANA / HORNBEAM" from 22 to 3 EA.
16	DECREASED Quantity of Item No. 135 "CLADRASTIS KENTUKEA / YELLOWWOOD" from 14 to 5 EA.
16	INCREASED Quantity of Item No. 136 "CLETHRA ALNIFOLIA 'PINK SPIRE' / PINK SPIRE SUMMERSWEET" from 67 to 161 EA.
16	DECREASED Quantity of Item No. 137 "ILEX GLABRA 'COMPACTA' / DWARF INKBERRY" from 266 to 24 EA.
16	INCREASED Quantity of Item No. 138 "LIRIOPE MUSCARI 'BIG BLUE' / BIG BLUE LILYTURF" from 50 to 191 EA.
16	DECREASED Quantity of Item No. 139 "NARCISSUS 'PACIFIC RIM' / PACIFIC RIM DAFFODIL" from 7,542 to 4,375 EA.
17	INCREASED Quantity of Item No. 140 "PANICUM VIRGATUM 'HEAVY METAL' / SWITCHGRASS" from 544 to 841 EA.
17	INCREASED Quantity of Item No. 141 "QUERCUS BICOLOR / SWAMP WHITE OAK" from 18 to 19 EA.
17	INCREASED Quantity of Item No. 142 "RUDBECKIA FULGIDA 'GOLDSTRUM' / BLACK EYED SUSAN" from 400 to 456 EA.

UNIT PRICE SCHEDULE (continued)

<u>Page No.</u>	<u>Description</u>
17	DECREASED Quantity of Item No. 143 "SPIREA JAPONICA 'LITTLE PRINCESS' / LITTLE PRINCESS SPIREA" from 13 to 163 EA.
17	DECREASED Quantity of Item No. 144 "TILIA AMERICANA 'REDMOND' / REDMOND AMERICAN LINDEN" from 21 to 19 EA.
17	INCREASED Quantity of Item No. 145 "VIBURNUM DENTATUM / ARROWWOOD VIBURNUM" from 20 to 65 EA.
17-18	REMOVED Items "ILEX OPACA 'JERSEY KNIGHT' / JERSEY KNIGHT AMERICAN HOLLY", "ILEX OPACA 'MISS HELEN' / MISS HELEN AMERICAN HOLLY", "LAGERSTROEMIA INDICA 'PINK VELOUR' / PINK VELOUR CREPE MYRTLE" and "ULMUS PARVIFOLIA 'DYNASTY' / DYNASTY LACEBARK ELM".
18	DECREASED Quantity of Item No. 155 "BARE COPPER GROUND WIRE, NO 6 AWG" from 8,000 to 3,200 LF.
18	DECREASED Quantity of Item No. 156 "CABLE - 1 CONDUCTOR, NO 2 AWG, TYPE USE, 600V" from 5,000 to 2,100 LF.
18	DECREASED Quantity of Item No. 157 "CABLE - 1 CONDUCTOR, NO 6 AWG, TYPE USE, 600V" from 12,500 to 6,400 LF.
19	REVISED the name of quantity items No. 165 and 166 from "5 INCH ENCASED CONDUIT – TRENCHED" to "TYPE X DUCT SECTION, 2-5" I.D. – TRENCHED" and from "5 INCH ENCASED CONDUIT – SLOTTED" to "TYPE X DUCT SECTION, 2-5" I.D. – SLOTTED" respectively.
	REVISED the section number for quantity items No. 165 and 166 from 16573 to 16123
19	DECREASED Quantity of Item No. 171 "ELECTRICAL UTILITY SERVICE 120/240 VOLTS 200 AMPS" from 2 to 1 EA.
20	DECREASED Quantity of Item No. 180 "2 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED" from 1,700 to 800 LF.

UNIT PRICE SCHEDULE (continued)

<u>Page No.</u>	<u>Description</u>
21	DECREASED Quantity of Item No. 185 "REMOVE AND DISPOSE OF TRAFFIC SIGNAL AND STREET LIGHTING EQUIPMENT" from 2 to 1 LS
21	DECREASED Quantity of Item No. 187 "REMOVE AND SALVAGE TRAFFIC SIGNAL EQUIPMENT" from 2 to 1 LS
23	ADDED Quantity Item No. 208 "PEA GRAVEL" per Square Feet with a quantity of 1,000 SF.
23	ADDED Quantity Item No. 209 "PRICE ADJUSTMENT FOR ASPHALT BINDER" per each with a fixed bid amount of \$20,000.
23	ADDED Quantity Item No. 210 "DECORATIVE CROSSWALKS" per Square Feet with a quantity of 771 SF.
23	ADDED Quantity Item No. 211 "ORNAMENTAL BRICK COLUMNS" per each with quantity of 12.
23	ADDED Quantity Item No. 212 "SQUARE 16 FOOT SHELTER" per each with a quantity of 1.
23	ADDED Quantity Item No. 213 "LAGERSTROEMIA X NATCHEZ" per each with a quantity of 8.
23	ADDED Quantity Item No. 214 "MALUS SARGENTII CANDYMINT / CANDYMINT SARGENT CRABAPPLE" per each with a quantity of 42.
23	ADDED Quantity Item No. 215 "PENNISETUM ALOPECUROIDES HAMELN / FOUNTAIN GRASS" per each with a quantity of 267.
23	ADDED Quantity Item No. 216 "CONCRETE PEDESTALS" per each with a quantity of 4.
24	ADDED Quantity Item No. 217 "BARE COPPER GROUND WIRE, NO 3 AWG" per linear feet with a quantity of 1,100.
24	ADDED Quantity Item No. 218 "BARE COPPER GROUND WIRE, NO 4 AWG" per linear feet with a quantity of 1,200.
24	ADDED Quantity Item No. 219 "BARE COPPER GROUND WIRE, NO 8 AWG" per linear feet with a quantity of 200.
24	ADDED Quantity Item No. 220 "BARE COPPER GROUND WIRE, NO 10 AWG" per linear feet with a quantity of 1,300.

UNIT PRICE SCHEDULE (continued)

<u>Page No.</u>	<u>Description</u>
24	ADDED Quantity Item No. 221 "CABLE - 1 CONDUCTOR, NO 4 AWG, TYPE USE, 600V" per linear feet with a quantity of 2,300.
24	ADDED Quantity Item No. 222 "CABLE - 1 CONDUCTOR, NO 8 AWG, TYPE USE, 600V" per linear feet with a quantity of 300.
24	ADDED Quantity Item No. 223 "CABLE - 1 CONDUCTOR, NO 10 AWG, TYPE USE, 600V" per linear feet with a quantity of 2,600.
24	ADDED Quantity Item No. 224 "1 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED" per linear feet with a quantity of 400.
24	ADDED Quantity Item No. 225 "1 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED" per linear feet with a quantity of 1,500.
24	ADDED Quantity Item No. 226 "1.5 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED" per linear feet with a quantity of 1300.
24	ADDED Quantity Item No. 227 "1.5 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED" per linear feet with a quantity of 900.

SPECIAL PROVISIONS

<u>Page No.</u>	<u>Description</u>
2 - 6	REVISED Special Provision "01110-SUMMARY OF WORK." to reflect changes in MOT plan
14	REVISED Special Provision "01110-SUMMARY OF WORK." with a modified work sequence based on the revised MOT plans
74	REVISED Special Provision "01300-SUBMITTALS" formatting error.
88	REVISED Special Provision "01420-REFERENCES CODES AND STANDARDS." by adding Baltimore City DPW as a government agency contact
109-120	REVISED Special Provision "01500-TEMPORARY FACILITIES AND CONTROL" formatting error.
124	REVISED Special Provision "01522-ENGINEER'S OFFICE TYPE 2" formatting error.
265	REVISED Special Provision "02372-SOIL STABILIZATION MATTING" formatting error.
284	REVISED Special Provision "02630-STORM DRAINAGE" formatting error.

- 295-300 REVISED Special Provision “02640-BIORETENTION FACILITY.” with additional information regarding pea gravel installation and payment.
- 338A-338K ADDED Special Provision “02766- PRE-CUT INLAID THERMOPLASTIC DECORATIVE CROSSWALK”.
- 356-362 REVISED Special Provision “02820-ORNAMENTAL PICKET FENCE” with additional information regarding ornamental brick column installation and payment.
- 362A-362L ADDED Special Provision “02825-SQUARE 16 FOOT STEEL SHELTER”.
- 465-466 REVISED Special Provision “03300- CAST-IN-PLACE CONCRETE” formatting errors
- 479 REVISED Special Provision “03300- CAST-IN-PLACE CONCRETE” with measurement and payment information for concrete pedestals
- 490-496 REVISED Special Provision “16060- GROUNDING” with name modification, text reductions and blank filler pages.
- 502-504 REVISED Special Provision “16122- TRAFFIC CONTROL - ELECTRICAL CABLE, WIRE AND CONNECTORS” formatting errors and modified the pay item for Cable Conductor and Bare Copper Ground wire
- 511 REVISED Special Provision “16123- ELECTRICAL CONDUIT AND FITTINGS” by including Type X Duct Section 2-5” I.D. trenched and slotted as an additional pay item in section 4.01.
- 516 REVISED Special Provision “16125- GENERAL ELECTRICAL WORK AND TESTING” by modifying section 3.01 to reflect new section 16060 title.
- 532-535 REMOVED Special Provision “16130- RACEWAY AND BOXES”.
- 536-537 REVISED Special Provision “16440- SWITCHBOARDS AND PANELBOARDS” with text changes for section names in (1.01 B) and a title change in (1.03) to “UL Certification”.
- 541-544 REVISED Special Provision “16440- SWITCHBOARDS AND PANELBOARDS” with the addition of an astronomic clock switch (section 2.02), modifications to the control cabinet description (2.03), updated single pole outlet model (2.04) and changed from pole to pad mounted control cabinet measurement description (4.02)
- 548-552 REVISED Special Provision “16520- EXTERIOR LUMINAIRES” with specified work modifications (section 1.01 B), pole finish color change (2.01 A6), and updated the referenced section (3.01 A9).

578 REVISED Special Provision “16573- LIGHTING – CONDUITS, FITTINGS AND BOXES” by removing Type X Duct Section 2-5” I.D. trenched and slotted as a pay item in section 4.01.

II. CONTRACT PLANS

<u>Sheet No.</u>	<u>Description</u>
19	REVISED quantity notes for Type A Curb, 5 Ft Ornamental Fence, Type A Combination Curb & Gutter, 5” Concrete Sidewalk and Detectable Warning Surfaces REVISED 5 ft fence along both N. Pulaski and Payson Streets REVISED ADA ramp design at the corner of N. Payson Street and W. Mulberry St.
20	REVISED quantity notes for 5” Concrete Sidewalk and Concrete Pedestal.
20	REVISED the landscaped median along W. Mulberry Street to include a meandering sidewalk with concrete pedestals.
21	REVISED quantity notes and length of 5 Ft Ornamental Fence
24	REVISED length of 5 Ft Ornamental Fence
25	REVISED length of 5 Ft Ornamental Fence
32	REVISED length of 5 Ft Ornamental Fence
33	REVISED Sidewalk Coordinate Points Table S1 through S18
34	REVISED Sidewalk Coordinate Points Table to reflect new sidewalk
35	REVISED length of 5 Ft Ornamental Fence
38	REVISED quantity notes and length of 5 Ft Ornamental Fence
39	REVISED quantity notes and length of 5 Ft Ornamental Fence
44	REVISED length of 5 Ft Ornamental Fence
45	REVISED grading along W. Mulberry Street to reflect the new sidewalk through the grass median area Station 918+50 through 922+65
47	REVISED length of 5 Ft Ornamental Fence
51	REVISED length of 5 Ft Ornamental Fence

CONTRACT PLANS (continued)

<u>Sheet No.</u>	<u>Description</u>
52	REVISED to reflect new sidewalk along the W. Mulberry Street grass median
56	REVISED signing and pavement marking quantity notes
58	ADDED BMP and Cleanout schedule to plan sheet
59	REVISED structure schedule
60	ADDED Cleanout schedule to plan sheet
61	ADDED Cleanout schedule to plan sheet REVISED length of 5 Ft Ornamental Fence
62	ADDED Cleanout schedule to plan sheet
67	REVISED TOG elevation at station 218+41 Baseline B
72	ADDED Geotextile Note
75	REVISED by removing the labeling text at the bottom of Detail E-8-7 both pages
76	REVISED by removing note associated with Detail E-7
81	REVISED diversion fence location
82	REVISED by labeling microbioretention areas (D-3 & D-5)
83	REVISED by adding a note for stabilization and temporary storm drain connection
84	REVISED by labeling microbioretention areas (D-2, D-4 & D-6)
86	ADDED BMP schedule to plan sheet
87	REVISED by labeling microbioretention areas (D-1, D-3 & D-5)
88	REVISED by labeling microbioretention areas (C-8)
89	REVISED by labeling microbioretention areas (D-2, D-4 & D-6)
96	REVISED length of 5 Ft Ornamental Fence
97	REVISED length of 5 Ft Ornamental Fence

CONTRACT PLANS (continued)

<u>Sheet No.</u>	<u>Description</u>
98	REVISED length of 5 Ft Ornamental Fence
99	REVISED entire sheet (replacement)
99A	ADDED new sheet
100	REVISED entire sheet (replacement)
101A	REVISED entire sheet (replacement)
102	REVISED entire sheet (replacement)
103	REVISED entire sheet (replacement)
104	REVISED entire sheet (replacement)
105	REVISED entire sheet (replacement)
106	REVISED entire sheet (replacement)
114	REVISED length of 5 Ft Ornamental Fence
115	REVISED entire sheet (replacement)
116	REVISED length of 5 Ft Ornamental Fence
117	REVISED length of 5 Ft Ornamental Fence
118	REVISED length of 5 Ft Ornamental Fence and added sidewalk to grass median area
119	REVISED entire sheet (replacement)
120	REVISED entire sheet (replacement)
121	REVISED total plant schedule quantities
121A	ADDED new sheet
121B	ADDED new sheet
122	REVISED length of 5 Ft Ornamental Fence
123	REVISED length of 5 Ft Ornamental Fence

CONTRACT PLANS (continued)

<u>Sheet No.</u>	<u>Description</u>
125	REVISED length of 5 Ft Ornamental Fence
126	REVISED length of 5 Ft Ornamental Fence REVISED ADA ramp at the intersection of W. Mulberry Street and N. Payson St.
127	REVISED to show new sidewalk in grass median area along W. Mulberry Street
128	REVISED the ADA visualization at the intersection of Payson and Mulberry Streets
143-146	REVISED cross sections to reflect new sidewalk within the W. Mulberry Street grass median area

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**PARKING EXPANSION – WEST BALTIMORE MARC STATION
 CONTRACT NO. T-1089-0240
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**STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION
NOTICE TO CONTRACTORS**

**PARKING EXPANSION – WEST
BALTIMORE MARC STATION**

CONTRACT NO.: T-1089-0240

DATE: October 17, 2011

1. DESCRIPTION OF WORK

- A. This Contract is for work east of the West Baltimore MARC Station and primarily involves the construction of two new parking areas east of Pulaski Street, the relocation of the eastbound US 40 ramp and the reconnection of Payson Street. The project area is located between Franklin and Mulberry Streets from the West Baltimore MARC Station to the Fulton Avenue Bridge.

The West Baltimore MARC Station Parking Expansion Project will be constructed in phases on two blocks of Baltimore City owned property along a portion of the old Interstate 170 right-of-way. The unused mainline, ramps, abutments, retaining walls and bridge deck have been demolished under a separate contract. The construction will also involve the raising of the westbound US 40 ramp between the Monroe Street Bridge and reconnected Payson Street. A new roadway access will be required on the east side of existing parking lot B and pavement markings on Lot "A" will be reconfigured to increase the number of ADA accessible spaces.

- B. Estimated value for this work is in the range of \$5,000,001 to \$10,000,000

2. PRE-BID MEETING & SITE VISIT

A Pre-Bid meeting for the purpose of explaining the Project will be held on November 3, 2011 at 10:30 a.m., local time at the Administration Headquarters, 6 St. Paul Street, 7th Floor Conference Room(s) 731-732, Baltimore, Maryland 21202-1614.

A Site Visit will be held on November 3, 2011 immediately following the Pre-Bid Meeting.

It is strongly suggested that the person(s) responsible for the preparation of bid documents for bidders attend the Pre-Bid Meeting and the site visit. **INSTRUCTIONS CRITICAL TO THE PREPARATION OF THE CONTRACT DOCUMENTS WILL BE PRESENTED AT THE PRE-BID MEETING.**

3. **DEADLINE FOR QUESTIONS**

Questions regarding the work should be directed in writing to Ms. Vanessa Ashe at the Administration Offices or via Internet address vashe@mtamaryland.com. Facsimile messages will not be accepted unless accompanied by telephone notification at (410) 767-3353. Our fax number is (410) 333-4810. Questions directed to this office must be received no later than November 18, 2011 at the close of the business day. Questions should be submitted on company letterhead. No interpretations other than written shall be binding on the Administration.

4. **BID DUE DATE & TIME**

Sealed Bids addressed to the Maryland Transit Administration, Procurement Division, 6 St. Paul Street, Baltimore, Maryland 21202-1614, and marked "Bid for Contract No. T-1089-0240 – PARKING EXPANSION – WEST BALTIMORE MARC STATION", will be received at the above address until but not after 2:00 P.M. local time, **January 5, 2012**. At that time, the Bids will be publicly opened and read aloud at a location at the same address. Hand delivered bids should be deposited in the Bid Box located on the 7th Floor before the 2:00 P.M. deadline. Any bids received after the date and time specified shall not be considered.

5. **ELECTRONIC VERSION OF BID DOCUMENTS**

The bid documents will be available by electronic means. The Bidder acknowledges and accepts full responsibility to ensure that the Bidder has made no changes to the Administration's bid documents. In the event of a conflict between the versions of the bid documents in the bidder's possession and the version maintained by the Procurement Officer, the version maintained by the Procurement Officer shall govern.

6. **AVAILABILITY OF DOCUMENTS**

Specifications may be downloaded from the MTA web site located at www.mta.maryland.gov. Bidders will be required to register the first time specifications are downloaded and a login number will be assigned. This number should be used every time the bidder downloads the documents for this contract. Bidders must supply accurate information in order to receive notice of all subsequent addenda.

TO OBTAIN THE SPECIFICATIONS: Please visit MTA's website (www.mta.maryland.gov), follow the links for "Business" – "Procurement" – "Bids/Solicitations", and download the Specifications for this procurement.

TO OBTAIN THE DRAWINGS: e-mail Vanessa Ashe at vashe@mta.maryland.gov requesting the contract drawings and supplying the following information: the contact person, company name, mailing address,

phone # and e-mail address. The drawings (CD) will be mailed to you at no cost. You also have the option of picking up the CD containing the drawings at: 6 Saint Paul Street, 7th floor, Baltimore, MD 21202.

7. ADDENDA

Bidders are required to acknowledge all addenda with their bid package. Although the MTA endeavors to send out all addenda to this solicitation in a timely manner, it is the responsibility of the contractors to make sure they received all appropriate documents prior to the bid due date.

8. EMARYLAND MARKETPLACE REGULATIONS

Use of “e-Maryland Marketplace”

“e-Maryland Marketplace” is an electronic commerce system administered by the Maryland Department of General Services.

Registration is free and will provide a means for your business to receive e-mail notifications of upcoming contracting opportunities in specified areas of interest and expertise. This means that all such information is immediately available to subscribers to e-Maryland Marketplace. Because of the instant access afforded by e-Maryland Marketplace, it is recommended that all Bidders interested in doing business with Maryland State agencies subscribe to e-Maryland Marketplace. For more eMM registration information, visit the website: <http://ebidmarketplace.com>.

9. BID BOND

Each bid exceeding \$100,000 must be accompanied by a Bid Bond in the amount of five percent (5%) of the Bid Price. Bid, payment, and performance security may be in the form of: (1) a bond executed by a surety company authorized to do business in the State; (2) a bond executed by an individual surety that meets certain criteria; (3) cash; (4) another form of security required by State or federal law; or (5) another form of security satisfactory to the unit awarding the contract. Sections 13-207, 13-216, 17-104 of the State Finance and Procurement Article, Annotated Code of Maryland.

10. PAYMENT AND PERFORMANCE BONDS

Payment and Performance Bonds in the amount of the Contract Price will be required by the awardee. Upon receiving notification of contract award, the Contractor shall deliver the bond to the MTA no later than the time the Contractor executes the contract. Bid, payment, and performance security may be in the form of: (1) a bond executed by a surety company authorized to do business in the State; (2) a bond executed by an individual surety that meets certain criteria; (3) another form of security required by State or federal law; or (5) another form of security satisfactory to the unit awarding the contract. Sections 13-207, 13-216,

17-104 of the State Finance and Procurement Article, Annotated Code of Maryland.

11. ELECTRONIC FUNDS TRANSFER

On every solicitation for a contract expected to exceed \$200,000, the bidder will be required to accept payments by electronic funds transfer (EFT) unless the State Comptroller's Office grants an exemption.

12. DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

A. DISADVANTAGED BUSINESS ENTERPRISES ARE ENCOURAGED TO RESPOND TO THIS SOLICITATION NOTICE.

B. The Maryland Transit Administration hereby notifies all bidders that, in regard to any Contract entered into pursuant to this advertisement, Disadvantaged Business Enterprises will be afforded full opportunity to submit Bids in response to this Notice, and will not be subjected to discrimination on the basis of political or religious opinion or affiliation, race color, creed, sex, age or national origin in consideration for an award.

C. It is the goal of the Administration that Disadvantaged Business Enterprises participate in all Contracts. Each Contract will contain goals for Disadvantaged Business Enterprise participation on a contract-to-contract basis. A subcontracting goal of twenty-five percent (25%) has been established for this procurement. All bidders must submit with their bid a fully executed copy of the Certified DBE Utilization and Fair Solicitation Affidavit (MDOT DBE FORM A) and DBE Participation Schedule (MDOT DBE FORM B). If the bidder fails to submit these completed forms with the bid as required, the procurement officer shall deem the bid non-responsive or shall determine that the offer is not reasonably susceptible of being selected for award. **ALL DBE FIRMS MUST BE CERTIFIED BY THE MARYLAND DEPARTMENT OF TRANSPORTATION. NO OTHER CERTIFICATIONS WILL BE ACCEPTED.**

D. **A contractor may count toward its DBE goal 60 percent of its expenditures for materials and supplies required under the contract and obtained from a DBE regular dealer, and 100 percent of such expenditures to a DBE manufacturer. The DBE credited supplies may not exceed 60 percent of the entire contract goal.**

E. New versions of Sections 13-103, 13-104 and 14-303 of the State Finance and Procurement Article of the Maryland Code, relating to increased bid/proposal documentation of DBE commitments, are effective as of October 1, 2004. The Contract under this solicitation will be awarded in accordance with these new requirements. As a result, new bid submission requirements, including certain revised DBE documents, are in effect for this

solicitation. These new requirements are set forth elsewhere in this solicitation.

- F. As a result of the revisions to Sections 13-103, 13-104 and 14-303, certain existing portions of the Code of Maryland Regulations (COMAR) relating to post bid/proposal submission of DBE subcontractors are inconsistent with the revised statute. To the extent the provisions of COMAR relating to post bid identification of DBE subcontractors are inconsistent with the requirements of this solicitation, the requirements of this solicitation shall control the award of a Contract. Questions or concerns regarding the DBE requirements of this solicitation must be raised prior to the opening of bids or receipt of initial proposals
- G. Effective on October 1, 2009, Minority Business Enterprise (MBE) firms may elect to be dually certification as woman-owned businesses and as members of an ethnic or racial category. For purposes of achieving any gender or ethnic/racial MBE participation subgoals in a particular contract, an MBE firm that has dual certification may participate in the contract either as a woman-owned business or as a business owned by a member of a racial or ethnic minority group, **but not both**.

WARNING – PLEASE READ:

- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with the gender category in order to be used to meet the gender subgoal.**
- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with an ethnic/racial category in order to be used to meet the ethnic/racial subgoal.**
- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with both the gender and ethnic/racial categories in order for a contractor to have the option of selecting which of those categories it will use for the firm on a State contract.**
- ◆ **Contractors should designate whether the MBE firm will be used as a woman-owned business or as a business owned by a member of a racial/ethnic group before calculating the percentage of MBE participation goals and subgoals they intend to meet.**

Maryland's MBE/DBE Directory will reflect the dual certification status beginning October 1, 2009. You can access the MBE/DBE Directory at <http://mbe.mdota.state.md.us>. Firms with dual certification will now be listed as follows:

Example:

ABC Corporation, Inc.
123 Corporate Circle
Hanover, MD 21076
Female/African American
00-000

13. AFFIRMATIVE ACTION REQUIREMENTS

Bidders on this Work will be required to comply with MTA Affirmative Action Requirements and all applicable Equal Employment Opportunity Laws and Regulations.

14. FEDERAL FUNDING

Any contract resulting from bids submitted is subject to a Financial Assistance Contract between the Administration and the U.S. Department of Transportation. Federal funds will be used to finance 80 % of the cost of this contract.

15. SUSPENSION AND DEBARMENT CERTIFICATION

All bidders will be required to certify that they are not on the GSA List of Parties Excluded from Procurement and the List of Contractors Suspended or Debarred from Contracting with the State of Maryland. All bidders must also be in good standing with the State Assessment & Taxation Department.

16. CONTRACTOR'S QUESTIONNAIRE

All Bidders shall submit a fully executed copy the Contractor's Questionnaire Pre-Award Evaluation Data Form with the bid package.

17. INSURANCE REQUIREMENTS

The Administration has chosen to provide Workers' Compensation, General Liability, Excess Liability, Builders Risk, Pollution Liability and Railroad Protective coverage on behalf of Contractors and subcontractors working on this project. This approach to project insurance is commonly called a wrap-up or owner controlled insurance program (OCIP). Specific information regarding Liability Insurance Requirements is contained in the Contract Specifications.

Please note that an Insurance Cost Worksheet must be included with each bid package.

18. USE OF BIDDER'S OWN FORCES

The bidder with his own forces shall perform not less than fifty (50) % of the work at the project site.

19. BUY AMERICA REQUIREMENTS

This contract is subject to Section 165, "Buy America", of the Surface Transportation Assistant Act of 1982, U.S. Public Law 197-424, and regulations and/or guidance implementing this statutory provision issued by the Federal Transit Administration of the U.S. Department of Transportation. The contract is

further subject to the Buy American Steel requirements of Chapter 02 of subtitle 11 of the Code of Maryland Regulations, Title 21, State Procurement Regulations.

20. CANCELLATION OR REJECTION OF BIDS

Notice to Contractors may be canceled in accordance with State Procurement Regulations.

The Administration reserves the right to reject any and all bids and/or waive technical defects if, in its judgment, the interests of the Administration so require.

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION

BID FORM

FOR

CONTRACT NO.: T-1089-0240

TO: MARYLAND TRANSIT ADMINISTRATION
ATTN: PROCUREMENT DIVISION
6 SAINT PAUL STREET, 7TH FLOOR
BALTIMORE, MD 21202-1614

BID OPENING DATE:

January 5, 2012

BID OPENING TIME:

2:00 PM

BID OF: _____
(Bidder's Name)

PROJECT DESCRIPTION:

This Contract is for work east of the West Baltimore MARC Station and primarily involves the construction of two new parking areas east of Pulaski Street, the relocation of the eastbound US 40 ramp and the reconnection of Payson Street. The project area is located between Franklin and Mulberry Streets from the West Baltimore MARC Station to the Fulton Avenue Bridge.

The West Baltimore MARC Station Parking Expansion Project will be constructed in phases on two blocks of Baltimore City owned property along a portion of the old Interstate 170 right-of-way. The unused mainline, ramps, abutments, retaining walls and bridge deck have been demolished under a separate contract. The construction will also involve the raising of the westbound US 40 ramp between the Monroe Street Bridge and reconnected Payson Street. A new roadway access will be required on the east side of existing parking lot B and pavement markings on Lot "A" will be reconfigured to increase the number of ADA accessible spaces.

1. This bid is hereby submitted to the Maryland Transit Administration (hereinafter sometimes called the "Administration") in response to NOTICE TO CONTRACTORS dated _____ .

2. The UNDERSIGNED has thoroughly examined, acknowledges receipt of, and is familiar with the Contract Documents as well as the various instructions, information, and requirements covering the same, all as mentioned herein and in said NOTICE TO CONTRACTORS.

3. In compliance with said NOTICE TO CONTRACTORS the UNDERSIGNED hereby proposes to furnish all labor, equipment, and materials and perform all work described and in strict accordance with the provisions of the Contract Documents for the consideration of the amounts, lump sum and unit prices listed in the attached Unit Price Schedule, and agrees that, upon Notice of Award, within one hundred fifty (150) calendar days after the date of opening of bids, unless mutually extended, he will within ten (10) calendar days after receipt of the prescribed forms, execute the Contract and furnish a performance bond and payment bond (if such bonds are required by the Contract Documents) on forms furnished by the Administration with good and sufficient surety or sureties.

4. The UNDERSIGNED agrees and understands that the time of completion is as

specified in the Special Provisions, unless the completion dates are extended as provided for in the Contract Documents.

5. The UNDERSIGNED agrees to pay liquidated damages in the amount specified in the Special Provisions for each and every calendar day after the completion date that the work remains incomplete unless an extension is granted as provided for in the Contract Documents.

6. The UNDERSIGNED hereby certifies that the _____
(Bidder's Name) / ___ / is, / ___ / is not (CHECK ONE) included on the GSA
list of Parties Excluded from Procurement. **AND**

The UNDERSIGNED hereby certifies that the _____
(Bidder's Name) / ___ / is, / ___ / is not (CHECK ONE) included on the List of
Contractors Suspended or Debarred from Contracting with the State of Maryland.

7. The UNDERSIGNED, as the Contractor, will perform on the Site, with its own organization, _____ percent (___ %) of the total amount of work to be performed under this contract.

8. PARENT COMPANY

a, The UNDERSIGNED represents that it / ___ / is, / ___ / is not, (CHECK ONE) owned or controlled by a parent company. For this purpose a parent company is defined as one which either owns or controls the activities and basic business policies of the UNDERSIGNED. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company such ownership is not required; if another company is able to formulate, determine or veto basic business policy decisions of the bidder, such other company is considered the parent of the bidder. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.

b. If UNDERSIGNED is owned or controlled by a parent company, insert in the space below the name and main office address of the parent company

Name

Address

9. ARREARAGES

By submitting a response to this solicitation, the undersigned shall be deemed to represent that it is not in arrears in the payment of any obligations due and owing the State of Maryland, including the payment of taxes and employee benefits, and that it shall not become so arrears during the term of the contract if selected for contract award.

10. CERTIFICATION OF NON-MARYLAND CORPORATION (FOREIGN CORPORATION)

a. A corporation not incorporated in the State of Maryland is considered to be a foreign corporation and, therefore, is required to be registered with the Maryland State Department of Assessment and Taxation if awarded this contract.

b. Where a foreign corporation is currently registered with the Department of Assessments and Taxation, such a bidder shall submit with his bid a copy of the department's certification of his registration or qualification acknowledgment.

c. If a foreign corporation is not currently registered, such a bidder shall submit with his bid his certification that, if notified of his apparent award of the contract, he will register with the Maryland State Department of Assessments and Taxation and provide a copy of the department's certification of his registration or qualification acknowledgment along with the executed contract.

11. The Contractor shall, prior to the time of execution of the contract, obtain all applicable licenses and comply with all applicable laws and regulations in the Annotated Code of Maryland.

12. All bidders must submit with their bid the following documents fully executed.

- a. Bid Bond in the Amount of \$ _____
Or 5% of the bid price (if applicable).
or
Individual Surety Bid Bond in the Amount of
\$ _____ Or 5% of the bid price (if applicable) and a
executed Affidavit of Individual Surety (Attachment A) & Surety Affidavit
(Attachment B).
- b. Contractor's Questionnaire Pre-Award Evaluation Data
- c. Bid/Proposal Affidavit.
- d. Buy America Certificate.
- e. Certification Regarding Lobbying.
- f. MDOT DBE Form A, "Certified DBE Utilization and Fair Solicitation Affidavit".
- g. MDOT DBE Form B, "DBE Participation Schedule".
- h. Signed copy of the Cover Letter for each Addendum issued by MTA.
- i. Completed Insurance Cost Worksheet

Item	Section	Description	Unit	Estimate of Quantity	Unit Price	Total Price
001	01130	MOBILIZATION	LS	1		\$170,000.00
002	01210	MISCELLANEOUS WORK ALLOWANCE	LS	1		\$560,000.00
003	01450	QUALITY ASSURANCE/QUALITY CONTROL	LS	1		\$80,000.00
004	01522	ENGINEER'S OFFICE - TYPE 2	LS	1		
005	01550	ARROW PANEL	UD	450		
006	01550	DRUMS FOR MAINTENANCE OF TRAFFIC	EA	200		
007	01550	MAINTENANCE AND CONTROL OF TRAFFIC	LS	1		
008	01550	PORTABLE VARIABLE MESSAGE SIGN	UD	168		
009	01550	PROTECTION VEHICLE	UD	55		
010	01550	REFLECTIVE BARRIER MARKERS	EA	22		

011	01550	REMOVAL OF EXISTING LINE MARKINGS	LF	4,000		
012	01550	REMOVE AND RESET TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS FOR MAINTENANCE OF TRAFFIC	BBL	8		
013	01550	RESET TEMPORARY TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC	LF	800		
014	01550	TEMPORARY CONCRETE TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC	LF	600		
015	01550	TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS FOR MAINTENANCE OF TRAFFIC	BBL	8		
016	01550	TEMPORARY PAVEMENT MARKINGS (12 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	700		
017	01550	TEMPORARY PAVEMENT MARKINGS (12 INCH YELLOW NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	100		
018	01550	TEMPORARY PAVEMENT MARKINGS (24 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	50		
019	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH WHITE NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	2,500		
020	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH WHITE REMOVABLE PREFORMED PAVEMENT LINE MARKINGS)	LF	1,000		

021	01550	TEMPORARY PAVEMENT MARKINGS (5 INCH YELLOW NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKING PAINT)	LF	5,500		
022	01550	TEMPORARY PAVEMENT MARKINGS (8 INCH BLACK OUT TAPE LINES)	LF	500		
023	01550	TEMPORARY PAVEMENT MARKINGS (REMOVAL OF BLACK OUT TAPE LINES-ANY WIDTH)	LF	500		
024	01550	REMOVAL OF REMOVABLE PREFORMED PAVEMENT MARKING LINES - ANY WIDTH	LF	1,000		
025	01550	TEMPORARY PAVEMENT MARKINGS (REMOVABLE PREFORMED LETTERS, SYMBOLS, ARROWS AND NUMBERS)	EA	20		
026	01550	REMOVAL OF REMOVABLE PREFORMED LETTERS, SYMBOLS, ARROWS AND NUMBERS	EA	20		
027	01550	TEMPORARY TRAFFIC SIGNS	SF	825		
028	01550	TYPE III BARRICADE FOR MAINTENANCE OF TRAFFIC	EA	10		
029	02220	ABANDONMENT OF EXISTING STORM DRAIN STRUCTURES	LF	495		

030	02220	REMOVAL OF EXISTING CONCRETE BARRIER (ANY TYPE)	LF	4,170		
031	02220	REMOVAL OF EXISTING FENCE	LF	2,599		
032	02220	REMOVAL OF EXISTING MASONRY	CY	200		
033	02220	REMOVAL OF EXISTING RETAINING WALL	CY	126		
034	02220	REMOVAL OF EXISTING PIPE	LF	1,153		
035	02315	CLASS 1 EXCAVATION	CY	15,359		
036	02317	COMMON BORROW	CY	7,340		
037	02317	TEST PIT EXCAVATION	CY	28		
038	02370	DIVERSION FENCE	LF	400		
039	02370	INLET PROTECTION	EA	70		
040	02370	RECONSTRUCT STABILIZED CONSTRUCTION ENTRANCE	TON	550		

041	02370	SILT FENCE	LF	400		
042	02370	STABILIZED CONSTRUCTION ENTRANCE	TON	300		
043	02370	SUPER SILT FENCE	LF	2,800		
044	02370	TEMPORARY GABION OUTLET STRUCTURE	EA	2		
045	02370	TYPE A-2 EARTH DIKE	LF	222		
046	02370	TYPE B-2 EARTH DIKE	LF	140		
047	02372	TYPE A SOIL STABILIZATION MATTING	SY	300		
048	02375	CLASS 1 RIP RAP	SY	106		
049	02620	4" NON PERFORATED CIRCULAR PIPE LONGITUDINAL UNDERDRAIN	LF	120		
050	02620	6" PERFORATED CIRCULAR PIPE LONGITUDINAL UNDERDRAIN	LF	910		
051	02630	15" CLASS IV REINFORCED CONCRETE PIPE	LF	772		

052	02630	18" CLASS IV REINFORCED CONCRETE PIPE	LF	891		
053	02630	18" CLASS V REINFORCED CONCRETE PIPE	LF	155		
054	02630	19" X 30" CLASS IV REINFORCED CONCRETE PIPE	LF	13		
055	02630	21" CLASS IV REINFORCED CONCRETE PIPE	LF	430		
056	02630	21" CLASS V REINFORCED CONCRETE PIPE	LF	185		
057	02630	24" CLASS IV REINFORCED CONCRETE PIPE	LF	282		
058	02630	24" CLASS V REINFORCED CONCRETE PIPE	LF	47		
059	02630	24"X38" CLASS IV REINFORCED CONCRETE PIPE	LF	14		
060	02630	27" CLASS IV REINFORCED CONCRETE PIPE	LF	239		
061	02630	36" CLASS IV REINFORCED CONCRETE PIPE	LF	367		
062	02630	ADJUST DRAINAGE STRUCTURE TO GRADE	EA	3		

063	02630	MIX #2 CONCRETE FOR MISCELLANEOUS STRUCTURES	CY	15		
064	02630	MIX #9 CONCRETE FOR DRAINAGE STRUCTURES AND PIPE COLLARS	CY	120		
065	02630	MODIFIED TYPE 'H' CURB OPENING INLET, MINIMUM DEPTH	EA	7		
066	02630	MODIFIED TYPE 'H' CURB OPENING INLET, VERTICAL DEPTH	LF	20		
067	02630	STANDARD 48" DIA. PRECAST MANHOLE BC-383.04, MINIMUM DEPTH	EA	20		
068	02630	STANDARD 48" DIA. PRECAST MANHOLE BC-383.04, VERTICAL DEPTH	LF	99		
069	02630	STANDARD 60" DIA. PRECAST MANHOLE BC-383.05, MINIMUM DEPTH	EA	6		
070	02630	STANDARD 60" DIA. PRECAST MANHOLE BC-383.05, VERTICAL DEPTH	LF	40		
071	02630	STANDARD 84" DIA. PRECAST MANHOLE BC-383.07, MINIMUM DEPTH	EA	1		
072	02630	STANDARD 84" DIA. PRECAST MANHOLE BC-383.07, VERTICAL DEPTH	LF	5		
073	02630	STANDARD STD CHANNEL NO. 1, BC-383.31	EA	1		

074	02630	STANDARD STD CHANNEL NO. 12, BC- 383.35	EA	3		
075	02630	STANDARD STD CHANNEL NO. 2, BC- 383.31	EA	11		
076	02630	STANDARD STD CHANNEL NO. 3, BC- 383.32	EA	13		
077	02630	STANDARD STD CHANNEL NO. 4, BC- 383.32	EA	3		
078	02630	STANDARD STD CHANNEL NO. 5, BC- 383.32	EA	3		
079	02630	STANDARD STD CHANNEL NO. 6, BC- 383.33	EA	2		
080	02630	STANDARD STD CHANNEL NO. 9, BC- 383.34	EA	1		
081	02630	STANDARD TYPE 'E' COMBINATION INLET - BC 376.24, MINIMUM DEPTH	EA	1		
082	02630	STANDARD TYPE 'E' COMBINATION INLET - BC 376.24, VERTICAL DEPTH	LF	1		
083	02630	STANDARD TYPE H COMB. INLET - BC 376.64, MINIMUM DEPTH	EA	7		
084	02630	STANDARD TYPE 'H COMB. INLET - BC 376.64, VERTICAL DEPTH	LF	11		

085	02630	STANDARD TYPE K INLET - MD 378.11, MINIMUM DEPTH	EA	12		
086	02630	STANDARD TYPE K INLET - MD 378.11, VERTICAL DEPTH	LF	38		
087	02630	STANDARD TYPE 'S' COMBINATION INLET BC-380.51, MINIMUM DEPTH	EA	28		
088	02630	STANDARD TYPE 'S' COMBINATION INLET BC-380.51, VERTICAL DEPTH	LF	25		
089	02630	STANDARD TYPE 'S' DOUBLE GRATE TANDEM BC-380.21, MINIMUM DEPTH	EA	7		
090	02630	STANDARD TYPE 'S' DOUBLE GRATE TANDEM BC-380.21, VERTICAL DEPTH	LF	7		
091	02630	STANDARD TYPE 'S' SINGLE GRATE BC-380.01, MINIMUM DEPTH	EA	2		
092	02630	STANDARD TYPE 'S' SINGLE GRATE BC-380.01, VERTICAL DEPTH	LF	1		
093	02640	BIORETENTION SOIL MIXTURE	CY	833		
094	02640	CONCRETE SAND	CY	127		
095	02720	GRADED AGGREGATE BASE COURSE	CY	4,408		

096	02720	NUMBER 57 AGGREGATE	CY	367		
097	02720	NUMBER 7 AGGREGATE	CY	127		
098	02745	HMA SUPERPAVE 9.5MM FOR WEDGE/LEVEL PG 64-22 SURFACE COURSE, LOW ESAL	TON	105		
099	02745	HMA SUPERPAVE 9.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	1,993		
100	02745	HMA SUPERPAVE 12.5MM PG 64-22 SURFACE COURSE, LOW ESAL	TON	976		
101	02745	HMA SUPERPAVE 19MM PG 64-22 BASE COURSE, LOW ESAL	TON	5,437		
102	02750	9" CONCRETE PAVEMENT	SY	3,806		
103	02765	10 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	100		\$20,000.00
104	02765	12 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	4900		
105	02765	24 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	650		
106	02765	5 INCH GREEN PAVEMENT MARKING PAINT LINES	LF	200		

107	02765	5 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	4025		
108	02765	5 INCH WHITE PAVEMENT MARKING PAINT LINES	LF	8,900		
109	02765	5 INCH YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	7225		
110	02765	REMOVAL OF EXISTING PAVEMENT LINE MARKINGS, ANY WIDTH	LF	2,200		
111	02765	WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LEGENDS AND SYMBOLS	EA	44		
112	02769	DETECTABLE WARNING SURFACE	SF	788		
113	02770	TYPE A COMBINATION CURB AND GUTTER & TYPE A CURB	LF	9,783		
114	02775	5-INCH CONCRETE SIDEWALK	SF	24,457		
115	02775	8-INCH CONCRETE DRIVEWAY	SY	70		
116	02820	BOLLARDS	EA	31		
117	02820	5 FOOT ORNAMENTAL FENCE	LF	2,515		

118	02820	3 FOOT ORNAMENTAL FENCE	LF	318		
119	02890	REMOVE EXISTING GROUND MOUNTED SIGNS AND SUPPORTS	SF	167		
120	02890	REMOVE EXISTING OVERHEAD SIGN STRUCTURE	EA	2		
121	02890	SHEET ALUMINUM SIGNS	SF	1,060		
122	02890	SQUARE PERFORATED TUBULAR STEEL SIGN POSTS	EA	58		
123	02890	SQUARE TUBULAR STEEL ANCHOR BASES	EA	58		
124	02890	WOOD SIGN SUPPORTS 4 INCH X 4 INCH	LF	693		
125	02890	WOOD SIGN SUPPORTS 4 INCH X 6 INCH	LF	228		
126	02920	ADDITIONAL WATERING OF LANDSCAPED AREAS	MG	45		
127	02920	3" SHREDDED HARDWOOD BARK MULCH	SY	1,160		
128	02920	SODDING	SY	517		

129	02920	TEMPORARY SEEDING AND MULCHING	SY	7,000		
130	02920	TOPSOIL FURNISHED AND PLACED	CY	1,600		
131	02920	TURF SEEDING	SY	22,056		
132	02930	ACER RUBRUM 'NORTHWOOD' / RED MAPLE	EA	7		
133	02930	AMELANCHIER CANADENSIS / SERVICEBERRY	EA	47		
134	02930	CARPINUS CAROLINIANA / HORNBEAM	EA	3		
135	02930	CLADRASTIS KENTUKEA / YELLOWWOOD	EA	5		
136	02930	CLETHRA ALNIFOLIA "PINK SPIRE" / PINK SPIRE SUMMERSWEET	EA	161		
137	02930	ILEX GLABRA 'COMPACTA' / DWARF INKBERRY	EA	24		
138	02930	LIRIOPE MUSCARI 'BIG BLUE' / BIG BLUE LILYTURF	EA	191		
139	02930	NARCISSUS 'PACIFIC RIM' / PACIFIC RIM DAFFODIL	EA	4,375		

140	02930	PANICUM VIRGATUM 'HEAVY METAL' / SWITCHGRASS	EA	841		
141	02930	QUERCUS BICOLOR / SWAMP WHITE OAK	EA	19		
142	02930	RUDBECKIA FULGIDA 'GOLDSTRUM' / BLACK EYED SUSAN	EA	456		
143	02930	SPIREAE JAPONICA 'LITTLE PRINCESS' / LITTLE PRINCESS SPIREA	EA	163		
144	02930	TILIA AMERICANA 'REDMOND' / REDMOND AMERICAN LINDEN	EA	19		
145	02930	VIBURNUM DENTATUM / ARROWWOOD VIBURNUM	EA	65		
146	03300	20' CONCRETE BARRIER NOSE DOWN TAPER	EA	2		
147	03300	34" F-SHAPE CONCRETE BARRIER (ANY TYPE)	LF	1,652		
148	05585	RUB RAIL BARRIER ATTACHMENT	EA	2		
149	05585	TYPE C END TREATMENT	EA	2		
150	05585	W-BEAM GUARD RAIL W/ 6 FOOT POST	LF	201		

151	16122	2 CONDUCTOR ELECTRICAL CABLE (NO. 6 AWG)	LF	200		
152	16122	4 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	LF	9,000		
153	16122	7 CONDUCTOR ELECTRICAL CABLE (NO. 14 AWG)	LF	6,000		
154	16122	(2) 1 CONDUCTOR ELECTRICAL CABLE (NO. 12 AWG)	LF	350		
155	16122	BARE COPPER GROUND WIRE, NO 6 AWG	LF	3,200		
156	16122	CABLE - 1 CONDUCTOR, NO 2 AWG, TYPE USE, 600V	LF	2,100		
157	16122	CABLE - 1 CONDUCTOR, NO 6 AWG, TYPE USE, 600V	LF	6,400		
158	16122	INTERCONNECT CABLE	LF	3,000		
159	16123	TYPE X DUCT SECTION, 2-3" I.D. - TRENCHED	LF	40		
160	16123	TYPE X DUCT SECTION, 2-4" I.D. - TRENCHED	LF	40		
161	16123	TYPE Y DUCT SECTION, 1-3 I.D. - SLOTTED	LF	100		

162	16123	TYPE Y DUCT SECTION, 1-3" I.D. - TRENCHED	LF	1,280		
163	16123	TYPE Y DUCT SECTION, 1-4" AND 1-3" I.D. - SLOTTED	LF	1,100		
164	16123	TYPE Y DUCT SECTION, 1-4" I.D. - TRENCHED	LF	60		
165	16123	TYPE X DUCT SECTION, 2-5" I.D. - TRENCHED	LF	800		
166	16123	TYPE X DUCT SECTION, 2-5" I.D. - SLOTTED	LF	200		
167	16124	HANDBOX (DPW COVER)	EA	37		
168	16124	HANDBOX (DTT COVER)	EA	25		
169	16124	CCTV HANDBOX	EA	13		
170	16124	LIGHTING ELECTRICAL HANDBOX	EA	28		
171	16440	ELECTRICAL UTILITY SERVICE 120/240 VOLTS 200 AMPS	EA	1		
172	16440	LIGHTING CONTROL CABINET, BASE MOUNT (120/240 VOLTS, 1 PHASE 3 WIRE SYSTEM)	EA	1		

173	16440	15A SINGLE POLE OUTLET PEDESTAL	EA	3		
174	16443	BACKUP UPS SYSTEM FOR TRAFFIC SIGNALS - BASE MOUNT	EA	4		
175	16443	FOUNDATION - UPS	EA	4		
176	16443	INSTALL TYPE 'A' CONTROLLER CABINET - POLE MOUNT	EA	4		
177	16520	70mA 255W LED LUMINAIRE	EA	38		
178	16521	400 WATT HPS COBRA HEAD LIGHT FIXTURE AND LAMP WITH PHOTOCELL	EA	8		
179	16525	30' PARKING LOT LIGHT POLE	EA	20		
180	16573	2 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	800		
181	16573	4 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	1,500		
182	16573	4 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	100		
183	16574	TEMPORARY STREET LIGHTING	LS	1		

184	16575	10-FOOT LIGHTING ARM	EA	8		
185	16576	REMOVE AND DISPOSE OF TRAFFIC SIGNAL AND STREET LIGHTING EQUIPMENT	LS	1		
186	16576	REMOVE AND RELOCATE ROADWAY LIGHTING STRUCTURE	EA	5		
187	16576	REMOVE AND SALVAGE TRAFFIC SIGNAL EQUIPMENT	LS	1		
188	16578	FOUNDATION - D.T.T (20" BOLT CIRCLE)	EA	14		
189	16578	FOUNDATION - D.T.T (15" BOLT CIRCLE)	EA	5		
190	16578	FOUNDATION - PEDESTAL POLE	EA	18		
191	16578	TYPE I POLE BASE AND FOUNDATION	EA	12		
192	16578	TYPE II POLE BASE AND FOUNDATION	EA	8		
193	16579	ONE-WAY, 3-SECTION ADJUSTABLE LED SIGNAL HEAD (12")	EA	28		
194	16580	AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON CENTRAL CONTROL UNIT	EA	4		

195	16580	AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON STATION AND SIGN	EA	32		
196	16581	ONE-WAY, 1-SECTION LED COUNTDOWN PEDESTRIAN SIGNAL (16"X18")	EA	32		
197	16582	ETHERNET CABLE FOR PEDESTRIAN DETECTION SENSOR	LF	4,500		
198	16582	PEDESTRIAN DETECTION SENSOR	EA	29		
199	16583	VIDEO DETECTION CAMERA	EA	10		
200	16583	VIDEO DETECTION CAMERA CABLE	LF	1,100		
201	16586	10-FOOT GALVANIZED STEEL PEDESTAL POLE	EA	18		
202	16586	21-FOOT HEAVY DUTY GALVANIZED STEEL TRAFFIC POLE	EA	6		
203	16586	28-FOOT HEAVY DUTY GALVANIZED STEEL JOINT USE TRAFFIC POLE	EA	8		
204	16586	30 FT. MAST ARM	EA	7		
205	16586	35 FT. MAST ARM	EA	1		

206	16586	40 FT. MAST ARM	EA	2		
207	16586	44 FT. MAST ARM	EA	4		
NEW ADDENDUM 1 ITEMS						
208	02640	PEA GRAVEL	SF	1,000		
209	02745	PRICE ADJUSTMENT FOR ASPHALT BINDER	EA	1		
210	02766	DECORATIVE CROSSWALKS	SF	771		
211	02820	ORNAMENTAL BRICK COLUMNS	EA	12		
212	02825	SQUARE 16 FOOT SHELTER	EA	1		
213	02930	LAGERSTROEMIA X NATCHEZ	EA	8		
214	02930	MALUS SARGENTII CANDYMINT / CANDYMINT SARGENT CRABAPPLE	EA	42		
215	02930	PENNISETUM ALOPECUROIDES HAMELN / FOUNTAIN GRASS	EA	267		
216	03300	CONCRETE PEDESTALS	EA	4		

217	16122	BARE COPPER GROUND WIRE, NO 3 AWG	LF	1,100		
218	16122	BARE COPPER GROUND WIRE, NO 4 AWG	LF	1,200		
219	16122	BARE COPPER GROUND WIRE, NO 8 AWG	LF	200		
220	16122	BARE COPPER GROUND WIRE, NO 10 AWG	LF	1,300		
221	16122	CABLE - 1 CONDUCTOR, NO 4 AWG, TYPE USE, 600V	LF	2,300		
222	16122	CABLE - 1 CONDUCTOR, NO 8 AWG, TYPE USE, 600V	LF	300		
223	16122	CABLE - 1 CONDUCTOR, NO 10 AWG, TYPE USE, 600V	LF	2,600		
224	16573	1 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	400		
225	16573	1 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	1,500		
226	16573	1.5 INCH SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED	LF	1,300		
227	16573	1.5 INCH SCHEDULE 40 RIGID PVC CONDUIT - TRENCHED	LF	900		

Basis of Award: Total amount of items 001 thru 227 _____(figures)

_____ (words)

228		Insurance Premium (Contingency)	LS	LS	LS	
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This amount will only be added to the base bid in the event that the bidder is excluded from the wrap-up insurance program or the program is terminated mid-term. The Insurance Cost Worksheet must be attached to the bid.

A. CORPORATION BID:

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST:

By:

Secretary

President or Vice President

Print Name

Print Name

B. PARTNERSHIP BID:

FEIN: _____

Name of Partnership

Business Address

Telephone Number / Fax Number

Names of each Partner:

Witness:

By:

Signature

Signature

Print Name

Print Name

BID FORM

C. INDIVIDUAL BID:

S.S. No.: _____

Name

Business Address

Telephone Number / Fax Number

Witness:

By: _____

Signature

Print Name

Print Name

D. JOINT VENTURE

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST

By: _____

Secretary

President or Vice President

Print Name

Print Names

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST:

By:

Secretary

President or Vice President

Print Name

Print Name

FEIN: _____

Name of Corporation

State in which Incorporated

Business Address

Telephone Number / Fax Number

ATTEST:

By:

Secretary

President or Vice President

Print Name

Print Name

A Joint Venture doing business as _____

- * Each member of the Joint Venture must execute the Bid Form. A Corporate Officer must sign for each member of the joint venture. In the event that a Corporate Officer (President or Vice President) does not sign the Bid Form, a Power of Execution or Power of Attorney, must be submitted with the Bid Forms.

SECTION 01110**SUMMARY OF WORK****PART 1: GENERAL****1.01 GENERAL**

- A. The Contractor's operations shall conform to all applicable State and Local regulations.
- B. Wherever these Special Provisions refer to the Administration, they shall be understood to mean the Maryland Transit Administration (MTA). Whenever reference is made to Engineer, it shall mean the Administration representative for the contract.
- C. Submittals shall be made in accordance with SECTION 01300 Submittals.

1.02 CONTRACT DOCUMENTS: The work shall be performed in accordance with the following documents:

- A. The General Provisions for Construction Contracts dated October 2001, issued by the Maryland Department of Transportation; and the Supplemental General Provisions issued by the Maryland Transit Administration; both contained in the Contract Specifications Book.
- B. The Special Provisions, Divisions 1 through 18; the Notice to Contractors; the List of Contract Drawings; and the various forms and exhibits; all contained in the Contract Specifications Book.

- C. The Liability Insurance Requirements; and the MTA Project Safety Plan; all issued by the Maryland Transit Administration of the State of Maryland Department of Transportation and contained in the Contract Specifications Book.
- D. The Contract Drawings, Standard Plates and Reference Drawings, contained in the Contract Specifications Book or bound separately in the Contract Drawings Books.

1.03 CONTRACT DESCRIPTION:

- A. This Contract is for work east of the West Baltimore MARC Station and primarily involves the construction of two new parking areas east of Pulaski Street, the relocation of the eastbound US 40 ramp and the reconnection of Payson Street. The project area is located between Franklin and Mulberry Streets from the WB MARC Station to the Fulton Avenue Bridge.

The West Baltimore MARC Station Parking Expansion Project will be constructed in phases on two blocks of Baltimore City owned property along a portion of the old Interstate 170 right-of-way. The unused mainline, ramps, abutments, retaining walls and bridge deck have been demolished under a separate contract. The construction will also involve the raising of the westbound US 40 ramp between the Monroe Street Bridge and reconnected Payson Street. A new roadway access will be required on the east side of existing parking lot B and pavement markings on Lot "A" will be reconfigured to increase the number of ADA accessible spaces.

Along Franklin Street between the Monroe Street Bridge and Pulaski Street the existing drainage trunk line will be resized and all of the cross connections will be modified accordingly. An additional green space with curb and gutter will also be constructed along the south side of Franklin Street between Monroe and Payson Streets.

B. The work involves:

Phase 1

1. Maintenance of Traffic (according to MT plan sheets)
 - a. Close W. Franklin Street between N. Monroe Street and N. Pulaski Street and install a detour along N. Fulton Street to Edmondson Avenue to N. Pulaski Street.
 - b. Install left lane closure along W. Mulberry Street prior to N. Smallwood Street
 - c. Close Ramp J west of N. Pulaski Street and detour eastbound US 40 traffic to W. Mulberry Street.
 - d. Close the sidewalk on the north side of W. Mulberry Street between N. Smallwood Street and N. Pulaski Street.
 - e. Eliminate on-street parking along N. Pulaski Street between W. Franklin Street and W. Mulberry Street and provide two 10-foot travel lanes along the west curb line.

2. Construction Entrance / Exit
 - a. Provide construction vehicle access by removing sections of the existing temporary barrier in both directions of US 40 in the vicinity of N. Monroe Street.
 - b. Access to the site can also be obtained along Pulaski Street at the existing gated entrance.
 - c. Establish a stabilized construction entrance at these locations, as appropriate.

3. Construction Fence
 - a. Modify and maintain the existing 6-foot chain link fence around the unpaved portion of the Phase 1 work area.

- b. Provide access gates where appropriate.
- 4. Environmental Control
 - a. Install erosion and sediment control measures as per the ES plan sheets.
 - 5. Project Office
 - a. Provide a safe, secure, and properly equipped Type 2 project office.
 - 6. Man Hole Connections
 - a. Make man hole drainage connections along N. Pulaski Street at the intersections of W. Franklin and W. Mulberry Street
 - b. Work must be conducted during off peak hours with the use of a Flagmen along N. Pulaski Street
 - 7. W. Franklin Street Construction
 - a. Remove pavement.
 - b. Install new curb and gutter.
 - c. Reconstruct N. Payson Street intersection with full depth pavement.
 - d. Make necessary drainage connections and modifications.
 - e. Complete traffic signal equipment installation at the intersections of W. Franklin Street at N. Payson Street and W. Franklin Street at N. Pulaski Street.
 - 8. Parking Lots C and D / N. Payson Street Construction
 - a. Begin general grading.
 - 9. N. Pulaski Street Construction (east side)
 - a. Remove existing sidewalk
 - b. Install curb and gutter

- c. Install drainage structures
- d. Install sidewalks and ADA accommodations

10. US 40 EB Ramp Drainage

- a. Make drainage connection along EB US 40 ramp into Parking Lot D
- b. Repair trenched area for temporary reopening of ramp during Phase 2 or 3

Phase 2

1. Maintenance of Traffic (according to MT plan sheets)

- a. Remove W. Franklin Street closure and associated detour.
- b. East of Martin Luther King Boulevard, close the entrance ramp from W. Franklin Street to westbound US 40.
- c. West of Martin Luther King Boulevard, close the entrance ramp from W. Franklin Street to westbound US 40.
- d. Relocate the existing temporary traffic barrier between N. Pulaski Street and N. Payson Street to provide for two 11-foot (minimum) through lanes and a left turn lane.
- e. Maintain maintenance of traffic on N. Pulaski Street between W. Franklin Street and W. Mulberry Street from previous phase.
- f. Maintain maintenance of traffic on W. Mulberry Street.

2. Ramp M Construction

- a. Remove roadway features associated with Ramp M including pavement, concrete barrier, and inlets.
- b. Take measures to protect unaffected concrete barrier all demolition and construction activities.
- c. Raise roadway profile and drainage structures to their final grade elevations.

- d. Install and make drainage connections including weep holes.
 - e. Grade roadway.
 - f. Install curb and gutter
 - g. Transition curb and gutter from the 8” curb height to the existing 34” concrete barrier on south side of ramp below the N. Monroe Street Bridge and on the north side of the ramp near N. Payson Street (see detail).
 - h. Replace concrete barrier against retaining wall #1.
 - i. Install concrete pavement according to design details.
3. Parking Lots C and D - N. Payson Street Construction
- a. Excavate for island bio-retention areas.
 - b. Install bio-retention underdrain system and connect to main system.
 - c. Re-grade and backfill bio-retention areas according to design details.
 - d. Re-grade both parking areas and N. Payson Street.
 - e. Install drainage structures.
 - f. Install curb and gutter.
 - g. Install electrical conduits and make necessary connections.
 - h. Install lighting foundation and poles where appropriate along N. Payson Street and in parking lot areas.
 - i. Install sidewalks.
 - j. Construct ADA ramps.
 - k. Pave lots and N. Payson Street.

Phase 3

1. Maintenance of Traffic (according to MT plan sheets)
 - a. Install right lane closure along W. Mulberry Street prior to N. Smallwood Street.

- b. Close W. Mulberry Street between N. Pulaski Street and N. Monroe Street and install a detour along N. Pulaski Street to W. Saratoga Street to N. Fulton Avenue.
 - c. Close the east crosswalk at W. Mulberry Street and N. Pulaski Street.
 - d. Restrict access into the new parking area at Payson and Pulaski Streets.
2. Construction Fence
- a. Utilize existing 6-foot chain link fence to help secure the Phase 3 work area.
3. Environmental Control
- a. Install erosion and sediment control measures as per the ES plan sheets.
4. Ramp J Construction
- a. Remove required pavement and roadway features within Phase 3 construction area including pavement, curbs, concrete barriers, drainage structures, etc.
 - b. Remove the retaining wall along US 40 to the appropriate limits.
 - c. Re-grade area according to plans.
4. W. Mulberry Street Construction
- a. Begin traffic signal equipment installation at the intersections of W. Mulberry Street at N. Payson Street and W. Mulberry Street at N. Pulaski Street. Complete the signal installation at the N. Pulaski Street intersection before the beginning of Phase 4.
 - b. Install curb and gutter.
 - c. Install sidewalk with ADA accommodations.
 - d. Reconstruct full depth pavement section where specified in the plans.
 - e. Install proposed drainage structures.

- f. Install guard rail end treatment.
- g. Re-grade and install portion of curb and gutter for the landscaped median.
- h. Seed and mulch exposed areas.

Phase 4

1. Maintenance of Traffic (according to MT plan sheets)
 - a. Install left lane closure along W. Mulberry Street prior to N. Smallwood Street.
 - b. Install temporary concrete barrier along the north side of W. Mulberry Street between N. Pulaski Street and N. Payson Street.
 - c. Close Ramp J west of N. Pulaski Street and detour eastbound US 40 traffic to W. Mulberry Street.
 - b. Close the sidewalk on the north side of W. Mulberry Street between N. Smallwood Street and N. Pulaski Street..
2. Environmental Control
 - a. Install erosion and sediment control measures as per the ES plan sheets.
3. Ramp J Construction
 - a. Remove required pavement and roadway features associated with Ramp J between N. Smallwood Street and the N. Monroe Street including pavement, curb, concrete barriers, drainage structures, etc.
 - b. Install curb and gutter on the north side of Ramp J and continue curb and gutter along the south side of ramp.
 - c. Transition curb and gutter from the 8 inch curb height to the existing 34 inch concrete wall on south side of ramp (see detail).
 - d. Construction cast in place F-shape barrier and connect to the existing jersey barrier near the N. Mount Street Bridge overpass.

- e. Install ornamental fence.
 - f. Excavate the areas needed for the bio-retention SWM.
 - g. Connect drainage structures including bio-retention under drain system
 - h. Re-grade area according to plans.
4. W. Mulberry Street Construction
- a. Install curb and gutter.
 - b. Remove existing sidewalk and install new sidewalk.
 - c. Install ADA ramps at both the N. Smallwood Street and N. Pulaski Street intersections.
 - d. Install ornamental fence.
 - e. Install signal foundations and equipment

Phase 5

1. Maintenance of Traffic (according to MT plan sheets)
- a. Install a right lane closure along W. Mulberry Street west of N. Smallwood Street.
 - b. Provide two 10-foot travel lanes along the east curb line along N. Pulaski Street between W. Franklin Street and W. Mulberry Street.
 - c. Open the new Ramp J to eastbound US 40.
 - d. Close sidewalk on west side of N. Pulaski Street.
 - e. Close the sidewalk on the south side of W. Mulberry Street between N. Pulaski Street and N. Payson Street.
2. W. Mulberry Street Construction
- a. Install curb and gutter west of N. Payson Street.
3. N. Pulaski Street Construction
- a. Install new access to Parking Lot B.

- b. Install new curb and gutter.
 - c. Seed and mulch disturbed turf areas.
- 4. WB US 40 Construction
 - a. Connect and install cast in place F shape barrier near the N. Mount Street Bridge overpass
 - b. Tie new wall into the existing barrier on both ends.
- 5. Final Roadway Pavement Grade
 - a. Mill and overlay in accordance with the site and pavement plans.
- 6. Construction Fence
 - a. Remove any remaining construction fence
- 7. Project Office
 - a. Complete remaining punch list items.
 - b. Close office.

1.04 COMPLETION TIME AND LIQUIDATED DAMAGES:

- A. Pursuant to General Provisions Articles GP-8.02 and GP-8.03, commence work on or before the date specified in the Notice to Proceed (NTP) and complete the specified portions of the work within 600 calendar days.
- B. In the event that the Contractor fails to complete the specified work within the specified number of days after Notice to Proceed, with the exception of extensions granted by change order, liquidated damages in the amount of \$1735.00 will be assessed pursuant to General Provisions Article GP-8.09 for each calendar day the completion of the specified work is delayed. The Contractor shall pay to the Administration the applicable amount specified and pursuant to General Provisions Article GP-8.09 as liquidated damages for every additional calendar day in excess of the number of days prescribed. The Administration may deduct the sum of

liquidated damages from any monies due or that may become due the Contractor under the Contract, or if such monies are insufficient, the Contractor or sureties thereof shall pay to the Administration any deficiency within 30 calendar days.

WORK ITEM	NUMBER OF CALENDAR DAYS	LIQUIDATED DAMAGES PER CALENDAR DAY
Completion of <u>All</u> Contract work	600	\$1735.00

1.05 COMPLETION TIME AND OTHER SCHEDULE REQUIREMENTS:

- A. Pursuant to Article GP-8.03 of the General Provisions, commence work on or before the date stipulated in the Notice to Proceed (NTP) and complete the entire work within the number of calendar days specified in 1.04 above.
- B. Other schedule requirements are given in Section 01300 Submittals.

1.06 CONTRACTOR REPRESENTATIVES:

- A. Designate in Writing within five (5) days after receiving the Notice to Proceed (NTP), the name, official mailing address and telephone number of the Contractor's representative having complete authority to represent and to act for the Contractor.

1.07 LIABILITY INSURANCE REQUIREMENTS:

- A. MTA has chosen to provide Workers' Compensation, General Liability, Excess Liability, Builders Risk, Pollution Liability and Railroad Protective coverage on behalf of contractors and subcontractors working on this project. This approach to project insurance is commonly called a wrap-up or owner controlled insurance program (OCIP). Specific information regarding Liability Insurance Requirements are contained in the Contract Specification Book. (See Table of Contents for location of this information.)
- B. Contractors and subcontractors are to **bid work for this project net of insurance (i.e. , The Cost of Workers' Compensation, General Liability, Excess Liability, Builders Risk, Pollution Liability and Railroad Protective applicable to the work site is not be to included in the bid price)**. All bidders must complete the Insurance Premium Worksheet and forward to MTA with the rest of your bid package. The Premium Worksheet is included in the bid package as form I, Exhibit A. This form should include the Contractor's work as well as the work of all subcontractors included in the initial bid. The insurance premium shown on this form, or the pro rata portion thereof, will be added to the base bid in the event you are excluded from the wrap-up program or the program is terminated mid-term.

1.08 PAYMENTS TO CONTRACTORS

By submitting a response to this solicitation, the Bidder agrees to accept payments by electronic funds transfer unless the State Comptroller's Office grants an exemption. Specific information regarding electronic funds transfer requirements and how to register for it are contained in the Contract Specification Book (See Table of Contents for location of this information.)

1.09 CONTINGENT ITEMS:

- A. Construction items for which quantities are listed in the Unit Price Schedule as "Contingent" are established for the purpose of obtaining bids on one or more pay items that may be incorporated into the project.

- B. The Engineer will have sole discretion in determining whether and to what extent these items will be incorporated into the project. The Engineer may order these items to be used at any location within the project and anytime during the work. In most cases contingent items will not be shown on the Plans. The estimated quantities specified in the Unit Price Schedule for these items are presented solely for the purpose of obtaining a representative bid price. The total of actual quantities required for the construction may be only a fraction of, or many times the estimated quantity. The requirements of GP-4.04 (Variations in Estimated Quantities) shall apply.

1.10 ELIMINATED ITEMS:

- A. Should any Contract items contained in the Unit Price Schedule be found unnecessary for the proper completion of the work contracted, the Engineer may, upon written order to the Contractor, eliminate such Contract items from the Contract.

- B. No allowance will be made for items so eliminated in making final payment to the Contractor except for material costs incurred prior to notification of the eliminated of the items.

1.11 WORK SEQUENCE:

- A. Construct work in phases to accommodate Administration's operating and occupancy requirements during the construction period; coordinate construction schedule with the Engineer.
1. Phase 1 must be completed as a stand alone phase.
 2. Phase 2 can only be completed concurrently with phase 3 and only if the US 40 EB ramp is reopened following Phase 1 .
 3. Phase 3 can only be completed concurrently with phase 2.
 4. Phase 4 must be completed as a stand alone phase.
 5. Phase 5 must be completed as a stand alone phase.

PART 2: PRODUCTS**NOT USED****PART 3: EXECUTION****NOT USED**

PART 4: MEASUREMENT AND PAYMENT**4.01 SUMMARY OF WORK:**

- A. Summary of Work will not be measured for payment.

- B. Summary of Work will not be paid for directly, but will be considered incidental to the appropriate work item.

END OF SECTION

SECTION 01300**SUBMITTALS****PART 1: GENERAL****1.01 DESCRIPTION:**

A. This Section specifies the general requirements and procedures for preparing and transmitting data to the Engineer for informational purposes or for approval. Other requirements for submittals may be specified under applicable sections of these Specifications. This Section includes:

1. Progress Schedule
2. Proposed Products List
3. Contractor's Drawings
4. Product Data
5. Sources of Supply and Samples
6. Manufacturers' Instructions
7. Manufacturers' Certificates

8. Operations and Maintenance Data

9. Progress Photographs

10. Request for Progress Payment

11. Estimated Cost Breakdown

B. Related Work Specified Elsewhere:

1. SECTION 01450 - Quality Assurance & Quality Control

2. SECTION 01780 - Contract Closeout

1.02 PROGRESS SCHEDULE (in lieu of GP-8.04.A):

A. General:

1. Careful evaluation and pricing of the schedule provisions of this Contract are important to assure compliance with the language and intent of the schedule specification. The schedule provisions are designed to provide the Contractor and the Administration with a tool for planning and controlling the work. The schedule provisions must be strictly followed to insure both timely progress payments and equitable compensation for changes and delays. The Contractor must perform work in accordance with the approved Critical Path Method (CPM) Schedule to achieve timely completion of all Contract milestones and to avoid acceleration, termination for default, and end of Contract claims for liquidated

damages. The Contractor must give the schedule provisions particular consideration and resolve any areas of uncertainty by asking appropriate questions prior to bid opening.

2. The Contractor shall provide CPM schedules as defined in the following criteria.
 - a. The purpose of the Project Schedule shall be to:
 - i. Assure adequate planning, scheduling and reporting during execution of the work by the Contractor;
 - ii. Assure coordination of the work of the Contractor and the various subcontractors and suppliers at all tiers;
 - iii. Assist the Contractor and Engineer in monitoring the progress of the work and evaluating proposed changes to the Contract and the Project Schedule; and
 - iv. Assist the Engineer in determining required dates for owner supplied materials and services.
 - v. Assist the Administration and its designated construction manager in coordinating interrelated work elements of multiple prime contractors.
 - b. The Project Schedule shall employ CPM using retained logic for the planning, scheduling and reporting of the work

to be performed under the Contract. The schedule will be produced utilizing the latest version of Primavera Project Planner (P3) software system. The type of schedule shall be Precedence Diagramming Method (PDM).

- c. The Contractor shall provide Time Scale Logic Diagrams and computer produced time reports as stipulated herein, at no additional cost to the Administration.
 - d. The Contractor shall meet with the Engineer per the Project CPM Development and Submission Table I to conduct a joint review of the Project Schedule requirements of the Contract to assure the Administration of the Contractor's understanding of the requirements of this Section.
 - e. Per the Project CPM Development and Submission Table I, there will be a formal presentation by the Contractor of its intended prosecution of the project according to its project schedule. The Contractor's General Superintendent shall conduct the formal presentation utilizing schedule graphics and charts of the approach the Contractor will take to complete the project within the contractual milestones.
3. Contractor's Scheduling Representative:
- a. Per the Project CPM Development and Submission Table I, the Contractor shall designate in writing, and submit qualifications of, a Scheduling Representative, who shall be responsible for preparation and maintenance of the Project Schedule. The Scheduling Representative may be from within the Contractor's organization or an outside consultant. The Engineer shall have the right to disapprove

the designated Scheduling Representative, in which case the Contractor must resubmit a replacement for approval. After acceptance, the Contractor may not replace the Scheduling Representative without prior written consent of the Engineer.

- b. The Scheduling Representative shall have complete authority to act on behalf of the Contractor in fulfilling the Project Schedule requirements of the Contract and such authority shall not be interrupted throughout the duration of the Contract unless approved in writing by the Engineer.
- c. The Scheduling Representative shall attend all schedule-related meetings and all monthly update meetings throughout the duration of the Contract in addition to the General Superintendent.
- d. The Contractor agrees that whenever the Engineer advises the Contractor in writing that the Scheduling Representative is not performing his/her duties to the satisfaction of the Administration, the Contractor shall replace the Scheduling Representative at no additional cost to the Administration and designate in writing, within seven (7) calendar days, a new authorized representative satisfactory to the Engineer.

B. Schedule Submission Requirements:

- 1. The Contractor will develop and submit a project CPM schedule, called Detailed Schedule #1, after issuance of a "Notice of Intent to Award" as required in Project CPM Development and Submission Table I below. This schedule will be subject to the review and

acceptance process set forth in Table I below. The times prescribed therein are of the essence.

Project CPM Development and Submission Table I:

Activity / Submission Description	Calendar Days Due From NITA
Notice of Intent to Award (NITA) Issued	0
Contractor Designates Scheduling Representative	3
Schedule Requirements Review Meeting	5
Contractor's Initial Detailed Schedule #1 Due	33
Contractor's Schedule Presentation to Engineer	34
Engineer's Review of Initial Detailed Schedule #1 Due	40
Contractors Final Detailed Schedule #1 Due	47
Engineer's Review of Final Detailed Schedule #1 Due	51
Planned Acceptance of Detailed Schedule #1	51

2. The Administration will execute the Contract and issue a “Notice to Proceed” for the project only if the Administration accepts the Contractor’s Detailed Schedule #1. If acceptance of the Detailed Schedule #1 occurs after the time specified in Table I, due to late or nonconforming submission by the Contractor, the Contract Performance Time specified elsewhere in the Contract may be reduced, at the discretion of the Administration, by the number of days of delay in acceptance of Detailed Schedule #1 caused by late or nonconforming schedule submissions.
3. A “Notice to Proceed” will be issued within the times specified elsewhere in the Contract. However, for purposes of developing Detailed Schedule #1 in accordance with Table I, the Contractor shall use a Notice to Proceed date that is ninety (90) days after the “Notice of Intent to Award” date. Within seven (7) calendar days after a “Notice to Proceed” is issued, the Contractor will resubmit the approved Detailed Schedule #1 incorporating the actual “Notice to Proceed” date and reflecting any adjustments to Contract Performance Time pursuant to paragraph 2.
4. If any Detailed Schedule #1 submission is late or, if the Administration determines that the Contractor can not reasonably complete the project within the reduced contract performance time, per paragraph 2, in addition to any other remedies available to it, the Administration may terminate the Contractor’s right to proceed with the Contract for default pursuant to General Provision: GP-8.08 – Termination for Default – Damages for Delay-Time Extensions. If the Contract is not executed for reasons unrelated to submission, review, and acceptance of Detailed Schedule #1, the Administration shall reimburse the Contractor its actual costs of developing Detailed Schedule #1.

5. Development of Detailed Schedule #2 shall follow the timing shown in Table II. Acceptance will be required before the initial progress payment is made to the Contractor.

Project CPM Development and Submission Table II:

Activity / Submission Description	Calendar Days Due From NTP
Executed Contract and Notice To Proceed (NTP) Issued	0
Contractor's Initial Detailed Schedule #2 Due	14
Engineer's Review of Initial Detailed Schedule #2 Due	21
Contractors Final Detailed Schedule #2 Due	28
Engineer's Review of Final Detail Schedule #2 Due	35
Planned Acceptance of Detailed Schedule #2	35

C. Project Schedule Requirements

1. Detailed Schedule #1:
- a. Per the Project CPM Development and Submission Table I, the Contractor shall submit a Detailed Schedule #1 showing all work to be accomplished on the project. Detailed Schedule #1 shall include, but not be limited to, the

following:

i. Procurement activities:

01. The proposed procurement activities shall include mobilization, shop drawings and sample submittals, fabrication and delivery of key and long-lead procurement elements. The schedule shall indicate intended submittal dates and realistic delivery dates for fabrication and delivery activities.
02. The Administration's review of: shop drawings, product data, samples and requested substitutions shall be identified as schedule activities. The minimum duration for these activities shall be three calendar weeks for shop drawings, product data and samples and six and a half calendar weeks for requested substitutions in accordance with Special Provisions: Shop Drawings, Product Data and Samples and Request For Substitutions.
03. All durations of procurement activities shall be shown in working days on a five-day per week basis, unless the standard workweek for the Contract is different than five days. In that case, the duration shall be adjusted accordingly.

ii. Construction activities:

01. The construction activities shall cover all physical work activities performed by the Contractor and subcontractors.
 02. The construction activities shall also cover all work to be performed by the Administration or its contractors related to the Contract to get all of the inter-project dependencies identified explicitly and in detail.
 03. The construction activities shall be described by location, phase and sequence as appropriate with the work readily identifiable so that progress can be adequately measured.
 04. The time duration assigned to each activity shall be the Contractor's best estimate of working days required to complete the activity considering the scope and resources planned for the activity and shall be limited to a maximum of fifteen (15) working days for each activity.
- iii. Milestone events as required by the Contract Documents.
 - iv. Commissioning activities:

01. The commissioning activities shall cover all training activities required by the contract prior to project or phase substantial completion; and
 02. The commissioning activities shall cover all testing activities required by the contract prior to project or phase substantial completion.
- b. Anticipated lost time due to weather shall be included in the Schedule to ensure completion of all work within the Contract time. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependant activities.

Monthly Anticipated Adverse Weather Delays

Work Days Based on 5 Day Work Week

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>
8	8	7	4	1	1
<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
2	2	2	2	4	5

These days will be eliminated from the Schedule's work calendar and spread over each month. Individual activity durations are not to be increased to include expected lost weather days.

Any temperature sensitive activities, such as asphalt paving, shall be indicated in the schedule and accepted by the Engineer as reasonable. The work calendar associated with these activities shall also be accepted by the Engineer.

- c. The following shall be depicted (on the Logic Diagram and in the subsequently generated computer schedule reports) for each activity.
 - i. A unique activity number limited to a maximum of ten (10) numerals; no letters, no spaces, no symbols; prefaced with the two (2) character member project designation.
 - ii. Concise description of the work represented by the activity (maximum forty-eight (48) characters). The work related to each activity shall be limited to one work trade and one area. Activity descriptions shall include verbs and shall quantify the work where possible.
 - iii. Performance responsibility by discipline code: MECH, ELEC, etc., or other acceptable abbreviations approved by the Engineer (maximum of six (6) characters) the first two (2) characters of the 6 character code shall be the member project designation.
 - iv. A maximum of six (6) character code with the first two characters set to the member project designation that shall identify the phase of the project in which the activity is to be performed.

- d. Each submission of Detailed Schedule #1 shall include:
- i. A computer diskette or CD-R of all electronic schedule information.
 - ii. A color coded plot of the proposed Detailed Network (Time Scale Logic Diagram) which shall be neatly organized and plotted time scaled according to Early Start of all activities from left to right on 22”X34” standard size sheets with suitable notation relating the interface points among sheets.
 - iii. Computer generated schedule reports:
 01. In Total Float order.
 02. In Early Start order.
 03. In order of activity number giving predecessors and successor activities, with number, description and duration.
 - iv. A written Narrative that shall present the construction approaches and explains the schedule logic. The Narrative shall discuss the project’s critical path, state how the Contractor plans to work the project (days/Shifts/hours), and present any weather and temperature restrictions included in the schedule. Where applicable, the narrative shall

completely discuss the interface between the contractor's work and other contractors at the level of detail sufficient to manage the various contractors, and to the satisfaction of the construction manager.

- e. If the Engineer questions the Contractor's proposed activities, logic, or durations, the Contractor shall provide a satisfactory revision, or adequate justification, to the satisfaction of the Engineer.
 - f. Failure by the Contractor to include any element of work required for performance of the Contract shall not excuse the Contractor from completing all work within the Contract time. Such omission or error, when detected by the Contractor or the Engineer, shall be corrected in the next issue of the project schedule, without increasing the project's performance time.
 - g. The available coding space within the master project schedule is a resource managed by the construction manager in the best interest of the project as a whole. Where applicable, the contractor shall develop his schedule within the member project database provided electronically by the construction manager. The contractor shall obtain advance permission from the construction manager to add project specific codes or calendars. The construction manager shall not unreasonably withhold permission.
2. Detailed Schedule #2:
- a. The format for the submission shall be the same as required

for Detailed Schedule #1.

- b. Per the Project CPM Development and Submission Table II, the Contractor will submit Detailed Schedule #2 which shall include all appropriate manpower, and if specifically requested, major equipment for the schedule activities.
- c. The manpower loading of each activity in the Network, for a fixed or unit price contract, shall be the total number of man-days of each appropriate craft, not the total number of crew-days. For a fixed price contract, the total number of man-days assigned to the Network shall correlate with the labor costs in the Schedule of Values for each subcontractor's work.
- d. The number of equipment units on each activity shall be for those equipment items specified by the Engineer.
- e. Each submission of Detailed Schedule #2 shall include:
 - i. A computer diskette or CD-R of all electronic schedule information.
 - ii. Computer-generated schedule reports
 - 01. A listing of all schedule activities showing the manpower and equipment assigned to each activity.
 - 02. For each trade included in the Network, and

in total, a manpower analysis in graphic format. One graph shall show the number of man-days of effort, by week, over the duration of the Project Schedule based on both the Early Start of all activities and the Late Start. A second graph will show the cumulative manpower usage, both Early and Late, over the project duration. These manpower-loading graphs shall be computer generated from the Contractor's schedule data.

03. For each equipment item included in the Network, a usage analysis in graphic format by Early and Late Starts.

iii. A Narrative presenting the manpower and equipment information in summary form and discussing any anticipated problems with attainment of the required levels. If there are any changes between Detailed Schedule I and Detailed Schedule II, it is subject to review by the Engineer and must be accompanied by an additional plot.

D. Engineer Reviews, Revisions and Acceptance

1. The Engineer shall review the initial submissions of Detailed Schedule #1 and Detailed Schedule #2 and shall respond with comments within the time required by the Project CPM Development and Submission Tables. Any areas which, in the opinion of the Engineer, conflict with timely completion of the Contract shall be subject to revision by the Contractor.

2. The Contractor shall revise the Schedules to reflect the Engineer's comments within the time required by the Project CPM Development and Submission Tables.
3. The Engineer shall issue an acceptance letter upon determining that the Contractor's schedules reflect a reasonable representation of expected and required project performance. Acceptance by the Engineer of the Contractor's Project Schedule does not relieve the Contractor of any responsibility whatsoever for the accuracy or feasibility of the Project Schedule, or of the Contractor's ability to meet the Contract Completion Date. Nor does such acceptance create a warranty by the Engineer expressed or implied of the activities, logic, durations or manpower and equipment loading of the Contractor's Project Schedule.
4. In the event that Detailed Schedule #1 indicates the Contractor's plan to finish prior to the Contract completion date, the Contractor and the Administration shall execute a change order adjusting the Contract completion date to coincide with the Contractor's planned finish date at no expense to the Administration. Liquidated Damages will be measured from the adjusted Contract completion date.
5. Acceptance by the Engineer of the Contractor's Detailed Schedule #2 will be a precedent for any progress payments under the Contract.

E. Project Schedule Updating:

1. The Project Schedule shall be updated on a monthly basis throughout the entire Contract time and until the Contract's

Substantial Completion. The Contractor shall meet with the Engineer each month at the Schedule Update meeting to review actual progress made through the data date of the Schedule Update, including dates activities started and/or completed, and to discuss the scheduling of future work. Revisions to the Network logic to more accurately reflect the anticipated workflow can be discussed and mutually agreed-to, as well as changes to activity durations, manning and equipment. The effective date of each Schedule Update, shall be the effective date of the Progress Payment Request. Contractor-prepared documents presented at the update meeting shall include the following:

- a. One (1) marked-up copy of the previous month's Detailed Network (Time Scaled Logic Diagram), indicating the progress on schedule activities and the revised (current) remaining durations. This marked-up copy shall be clearly legible and shall be accomplished by use of felt-tip markers and red ink.
- b. One (1) marked-up copy of the previous month's Schedule Update computer-produced reports coordinated with the requirements of the above paragraphs and indicating actual activity start and/or complete dates, revised (current) remaining durations, and percent complete with regard to activity progress.
- c. A listing of proposed activities to be added together with predecessors and successors, durations, and manpower and equipment loadings. This listing should include activities for all additional work given to the Contractor during the month through changed drawings or other direction.
- d. A listing of proposed activities to be deleted.

- e. A listing of any proposed logic, duration or manning changes that would make the schedule more accurately reflect the project's expected performance. The reasons for these changes to be described by the Contractor's Scheduling Representative and accepted by the Engineer.
2. In case of disagreements at the schedule update meeting, concerning actual progress to date, the Engineer's determination shall govern.
3. In the event a submittal is rejected or returned for correction, a new activity will be inserted into the schedule for Resubmission and another for Review of the Resubmission.
4. Upon completion of the schedule update meeting, the Contractor shall revise the Project Schedule to reflect progress as of the data date of the Schedule Update and any required revisions to the Project Schedule, and carry out a computer-produced calculation to determine the status of the Project Schedule. The Contractor shall process the schedule within three (3) calendar days and forward the update to the Engineer. The Engineer shall review the update upon receipt, and shall process the monthly request for payment based upon the accepted update.
5. Each Project Schedule Update, based upon the Contractor's input as discussed above, will be forwarded to the Engineer and will include the following information:
 - a. A written Narrative that compares the current project completion date to the contract completion date and presents the current critical path. The Narrative should also

discuss current and expected progress and current and expected manning compared to the requirements of the schedule. It should describe current and expected problems and present possible cures. It should identify any decisions or actions needed from the Administration or the Engineer. The Narrative should also include the following detailed information:

- i. A listing of activities added and deleted.
 - ii. A listing of logic changes.
 - iii. Specific future actions that will recover any existing project slippage.
- b. A computer diskette or CD-R containing the latest schedule update in electronic file format.
- c. A color-coded plot of the current Network (Time Scale Logic Diagram), organized and plotted according to Early Start of all activities.
- d. Computer generated schedule reports:
- i. By Total Float.
 - ii. By Early Start.
 - iii. Total numerical order report with predecessors and

successors.

iv. Trade manpower weekly and cumulative graphs.

v. Equipment Usage Graph (If Required).

e. Acceptance of the monthly update shall be required before the monthly progress payment is released.

F. Recovery Schedules

1. If, as a result of the monthly Schedule Update, the Project Schedule appears to no longer allows attainment of the Project completion date, the Engineer will request, and the Contractor shall submit, a revised Project Schedule that recovers the current slippage. The Contractor may improve the remaining schedule by performing sequential activities concurrently or by performing activities more quickly than planned with additional manpower or equipment. The Engineer shall make his request in writing within five (5) calendar days of receiving the monthly update. The Contractor shall submit this recovery schedule at least seven (7) calendar days before the next scheduled update meeting so that the Engineer may review and accept the revised Project Schedule for use in the next schedule update.
2. The Contractor will attach a written narrative to the recovery schedule that will describe each of the revisions to the schedule logic, durations and manning. The Contractor will issue a revised Network (Time Scaled Logic Diagram), appropriate computer reports and a computer diskette or CD-R of the electronic data.

G. Time Impact Analysis for Proposed Change Orders and Delays:

1. When the Contractor desires to obtain an extension of the project duration because of a change order or other occurrence on the project, the Contractor shall submit to the Engineer a written Time Impact Analysis illustrating the influence of the change order or occurrence on the Contract Schedule. Each Time Impact Analysis shall include a Fragmentary Network (FragNet) demonstrating how the Contractor proposes to incorporate the change order or occurrence into the Project Schedule. The Time Impact Analysis shall demonstrate the time impact based on the date the change order was given to the Contractor or the date of the occurrence; the status of construction at that point in time; and the event time computation of all affected activities. Upon approval by the Engineer, the change order or occurrence shall be included in the next Project Schedule update.

2. Two (2) copies of each Time Impact Analysis shall be submitted in accordance with the following timing along with a written proposal for any requested time extension;
 - a. Within seven (7) calendar days after receipt of a written change order.

 - b. Within ten (10) calendar days from the beginning of a delay from unforeseeable causes.

 - c. With the filing of a written notice of claim with the Procurement Officer.

3. Approval or rejection of each Time Impact Analysis by the Engineer shall be made within seven (7) calendar days after receipt of each Time Impact Analysis, unless subsequent meetings and negotiations are necessary. Upon approval, a copy of the Time

Impact Analysis signed by the Engineer shall be returned to the Contractor, and incorporated into the next Project Schedule Update.

4. The Time Impact Analysis related to a change order shall be incorporated into and attached to the applicable change order.
5. Activity delays shall not automatically mean that an extension of the Contract time is warranted or due the Contractor. It is possible that a change order or occurrence will not affect existing critical activities or cause non-critical activities to become critical. A change order or occurrence may result in only absorbing a part of the available total float that may exist within an activity chain of the Network, thereby not causing any effect on the Contract time.
6. Float is not for the exclusive use or benefit of either the Administration or the Contractor. Extension of the Contract time will be granted only to the extent the equitable time adjustments to the activity or activities affected by the change order or occurrence exceeds the total float of a critical activity (or path) and extends the Contract time.
7. In cases where the Contractor does not submit a Time Impact Analysis within the time requirements stated above, it shall be considered a waiver of any request for an extension of the Contract Performance Time. Any subsequent Time Impact Analysis submitted by the Contractor shall be dismissed by the Procurement Officer as untimely.
8. The master schedule in force at the time of the alleged delay will be used to determine the impact of the alleged general contractor delay to other general contractors.

1.03 PROPOSED PRODUCTS LIST:

- A. Within ten (10) days after date of Notice to Proceed, submit seven (7) copies of a complete list of major products proposed for use, with name of manufacturer, trade name, and model number for each product. The Engineer's approval of the products list shall not relieve the Contractor of the contract requirements or the requirement of the Contractor to submit additional detail for fabricated products or more detailed elements of the project.

- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.04 CONTRACTOR'S DRAWINGS:

- A. General:
 - 1. The Contract Drawings show the general arrangement and such details as are necessary to provide a comprehensive description of the work to be performed.

 - 2. The Contractor shall prepare such Shop and working Drawings as are necessary to adequately perform the work.

 - 3. All Shop and Working Drawings shall be on sheets measuring 22 inches by 34 inches. Each drawing shall have a blank area five inches by five inches adjacent to the title block to provide space for Contractor and Engineer review stamps. The title block shall

display the following:

- a. Contract Number and Name
 - b. Number and Title of the Drawing
 - c. Date of Drawing or revision
 - d. Name of Contractor and Subcontractor submitting drawing
 - e. Clear identification of contents and location of work
4. Drawings and design calculations for support of excavation, sheeting and shoring, decking, falsework, form work, and for other temporary work and methods of construction the Contractor proposes to use, will be required to be furnished by the Contractor. Such drawings shall be left to the Contractor who shall be responsible for the safety and successful construction of the work. Drawings and design calculations which are the responsibility of the Contractor, shall bear the seal of a structural engineer, registered in the State of Maryland.
5. A Contractor's transmittal letter shall accompany each submittal. The Contractor's transmittal letter and submittal shall be consecutively numbered and shall clearly and completely describe any variation from the contract requirements.
6. A sequential number shall be shown on each Shop or Working Drawing submission. Re-submittals will be followed by a revision letter (A, B, C, etc.) and handled in the same manner as first

submitted.

7. Submittals not conforming to the requirements of this specification shall be summarily rejected.
8. Review and Acceptance shall not relieve the Contractor from his responsibility for accuracy of submittals, for conformity of submittals to requirements of Contract Drawings and Specifications, for compatibility of the described product with contiguous products and the rest of the system, or for protection of completion of the Contract in accordance with the Contract Drawings and Specifications.
9. The Engineer's review, correction and acceptance of submittals shall not relieve the Contractor of responsibility for errors and omissions in submittals and associated calculations.
10. The Contractor's liability to the Administration, in case of deviations in the submittals from requirements of the Contract Document, is not relieved by the Engineer's review and acceptance of submittals containing deviations unless the Administration expressly approves the deviation through the issuance of a change notice.
11. Catalog cuts shall highlight the actual equipment/component proposed to be used. Generic catalog cuts will not be accepted.
12. If the material/equipment/components proposed to be used do not conform to the stipulated standards, the Contractor shall submit the copies of the conforming standards highlighting the deviations from the stipulated standards. The impact of the derivations on

cost and performance shall be brought out in the related submittal and the deviation request.

13. Schedule submittals to expedite the Project, and deliver to Engineer. Coordinate submission of related items.

14. All submittals from Subcontractors shall be reviewed and approved by the Contractor prior to submittal to the Engineer. The Contractor's review and approval shall certify that the submitted project has been reviewed by the Contractor and that based on this review, it conforms the contract requirements. Further, the Contractor's approval shall certify that the intended product is compatible with all other products, to which it must integrate and to the overall project.

B. Shop and Working Drawings:

1. Submit one (1) reproducible and five (5) legible copies plus the number of copies required by the Contractor of all Shop and Working Drawings and required specifications to the Engineer for approval. These drawings shall be complete and detailed. Shop and Working Drawings shall consist of fabrication, erection and setting drawings, schedule drawings, manufacturer's scale drawings, wiring and control drawings, cuts from entire catalogs, pamphlets, descriptive literature, and performance and test data. Working Drawings shall be accompanied by calculations or other sufficient information to completely explain the structure, machine or system described and its intended manner of use.

2. Check and coordinate drawings and schedules with the work of all trades involved before they are submitted for the approval of the

Engineer. Each drawing shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawing schedules submitted without this stamp of approval may be returned to the Contractor for resubmittal.

3. Submit all drawings and schedules sufficiently in advance of construction requirements to permit no less than twenty-one (21) days for review and appropriate action by the Engineer.
4. The approval of drawings and schedules will be general, but approval shall not be construed:
 - a. As permitting any departure from the Contract requirements.
 - b. As relieving the Contractor of the responsibility for any errors, including details, dimensions, and materials.
 - c. As approving departures from details furnished by the Engineer, except as otherwise provided herein.
 - d. As a Notice to Proceed on a change to the contract that would result in additional time or cost to the Contractor.
5. Drawings for work on utility facilities, streets, and other facilities which are constructed for owners other than the Administration shall be coordinated so that the information required by these owners is included on the Working Drawings for their facilities.
6. If drawings show variations from the Contract requirements

because of standard shop practice or for other reasons, describe such variations in the letter of transmittal. If applicable, the Engineer may approve any or all such variations, subject to a proper adjustment in the Contract. If the Contractor fails to describe such variations he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been approved.

7. If the drawings or schedules as submitted describe variations in accordance with Article 1.04.B.6 herein and show a departure from the Contract requirements, which the Engineer finds to be in the interest of the Administration and to be so minor as not to involve a change in the Contract price or time performance, the Engineer may approve the drawings.
8. If approved, or approved as noted, by the Engineer, each copy of the drawing will be identified as having received such approval by being so stamped "Approved" or "Approved As Noted" and dated.
9. Drawings stamped "Not Approved" and with the required corrections shown will be returned to the Contractor for correction and resubmittal. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct the specific attention, in writing or on resubmitted drawings, to revisions other than the corrections requested by the Engineer on previous submittals.
10. The Contractor shall make any corrections required by the Engineer. If the Contractor considers any correction indicated on the drawing to constitute a change of the Contract requirements, notice as required under the Section of the General Provisions entitled Changes shall be given to the Engineer.

11. The number of Shop and Working Drawings provided by the Contractor in excess of the number requested in Article 1.04.B.1 will be returned to the Contractor.
12. When Shop and Working Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes except upon written instructions from the Engineer.
13. Submittals which are "Approved as Noted" shall be resubmitted after compliance to the comments relating to the subjective approval. The Contractor shall supply the Engineer with the number of drawings requested in Article 1.04.B.1.
14. The Contractor shall be responsible for, and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of the work prior to the approval by the Engineer of the necessary Shop and Working drawings.

1.05 PRODUCT DATA:

- A. Submit the number of copies required in Article 1.04.B.1.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article 1.04 above and provide copies for Record Documents described in SECTION 01780 - Contract

Closeout.

1.06 SOURCE OF SUPPLY AND SAMPLES:

- A. As soon as practicable after Notice to Proceed, furnish for approval of the Engineer the proposed source of supply of materials to be utilized in the project and the samples required by the Specifications or requested by the Engineer. Unless otherwise indicated, submit not less than two identical samples of each type required. Pre-pay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in the work until approved in writing by the Engineer.
- B. Label each sample indicating:
1. Name of Project and Contract Number
 2. Name of Contractor and Subcontractor
 3. Material or equipment represented
 4. Source
 5. Name of producer and brand; include model number, style, color name, etc. if applicable.
 6. Specification Section, Article or Paragraph
 7. Location in project

- C. Samples of finished materials shall have additional markings that will identify them under the finish schedules. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for the Engineer's selection.
- D. Mail under separate cover letter in triplicate submitting each shipment of samples and containing information required in Article 1.04.B herein. Enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer.
- E. Approval of a sample shall be only for characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- F. Certain samples may be tested by the Administration as specified. Approved samples not destroyed in testing will be retained by the Engineer. Materials and equipment incorporated in the work shall match approved samples. Samples not destroyed in testing and not approved will be returned to the Contractor at his expense, if so requested at time of submission.
- G. Failure of any material to pass specified tests will be sufficient cause for refusal to consider, under the Contract, any further samples of the same brand and make of that material. The Administration reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.
- H. Samples of various material or equipment delivered on the site or in place may be taken by the Engineer for testing. Samples failing to meet Contract requirements will automatically void previous approvals of items tested.

- I. When tests are required, only one test of each sample proposed for use will be made at the expense of the Administration. Samples, which do not meet Specification requirements, will be rejected. Retesting of additional samples will be made by the Administration at the expense of the Contractor.

1.07 MANUFACTURERS' INSTRUCTIONS:

- A. When specified individual Specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.08 MANUFACTURERS' CERTIFICATES:

- A. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on Material or Product, but must be acceptable to the Engineer.

1.09 OPERATIONS AND MAINTENANCE DATA:

- A. At least ten (10) days prior to acceptance of the work, prepare and deliver to the Engineer three copies of a manual containing all information pertaining to and necessary for the operation and maintenance of all equipment provided under the Contract.
- B. Format, organization, and contents of the manual shall be as specified in the order of the Sections of the Special Provisions. [Include all information required in the individual section.]

1.10 PROGRESS PHOTOGRAPHS:

- A. After construction operations have started at the site, have an average of ten color photographs taken each month until completion of the work. The actual number and location of views to be taken each month shall be as designated by the Engineer. The negatives and three prints of each photograph shall be submitted to the Engineer within ten days after taking. If a digital camera is used, the camera must have at least 12 megapixels and in lieu of the negative, a JPG fine (1:4 compression) and a digital negative (DNG) produced using Abode's DNG converter are to be provided for each photograph.
- B. Prints shall be standard commercial quality, 8 x 10 inches, on single weight glossy paper. Identify photographs with date, time, orientation and project identification in an information box, 1 1/2 x 3 1/2 inches in the lower right hand corner, typewritten and arranged as follows:

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION

CONTRACT NAME: _____

CONTRACT NO. _____

CONTRACTOR _____

PHOTOGRAPH NO. _____ DATE _____

(Information regarding view such as location, direction of sight and significant points of interest.)

- C. Photographs shall be enclosed back-to-back in a double-faced plastic sleeve punched to fit standard three-ring binders. Enclose negatives in protective envelopes. JPG and DNG files can be provided on either CD-R or DVD media.

1.11 REQUEST FOR PROGRESS PAYMENT:

- A. In accordance with Section GP-9 of the General Provisions, submit monthly requests for progress payment, based upon work accomplished during the previous month.
- B. Support such requests by evidence that the work invoiced has been done.

1.12 ESTIMATED COST BREAKDOWN:

- A. In accordance with Supplementary General Provisions, Article SGP-9.03, furnish a breakdown of Contract lump sum prices for which it is anticipated that partial payment will be requested by the Contractor.
- B. Submit the estimated cost breakdown to the Engineer for approval at least 30 days prior to the anticipated partial payment request.

PART 2: PRODUCTS

NOT USED

PART 3: EXECUTION

NOT USED

PART 4: MEASUREMENT AND PAYMENT

4.01 SUBMITTALS:

- A. The work required under this Section will not be measured for payment.

- B. All costs in connection herewith will not be paid for directly, but will be considered incidental to the item of work to which they pertain.

END OF SECTION

SECTION 01420
REFERENCE CODES AND STANDARDS

PART 1: GENERAL

1.01 DESCRIPTION:

- A. This section provides:
 - 1. Acronyms used in Contract Documents for reference standards.
 - 2. Source of reference standards.
 - 3. Applicability of referenced standards.
 - 4. Provision of referenced standards at site

1.02 QUALITY ASSURANCE:

- A. For products or workmanship specified by trade association or government agency, comply with requirements of the standard, except when more rigid requirements are specified or are required.
- B. The latest edition of the standards and their supplements referenced as a part of any section are incorporated in that section to the extent specified therein. In any case of conflict, the requirements of the section shall prevail. The date of the standard is that in effect as of the Bid date, or date of ADMINISTRATION-CONTRACTOR Agreement when there are no bids, except when a date is specified.
- C. When required by individual specification section, obtain copy of standard. Maintain copy at job site during submittals, planning, and progress of the specific work, until Substantial Completion

1.03 TRADE ASSOCIATIONS:

- A. The following acronyms or abbreviations referenced in Contract Documents are subject to change, and are the best known at date of this book's publishing:
 - AAMA American Architectural Manufacturer's Association, 2700 River Road, Suite 118, Des Plaines, IL 60018.

AAN	American Association of Nurserymen, Inc., 1250 I Street, NW., Suite 500, Washington DC 20005.
AASHTO	American Association of State Highway and Transportation Officials, 444 North Capitol Street, NW, Washington, DC 20001.
ACI	American Concrete Institute, Box 19150, Reford Station, Detroit, MI 48219.
ACPA	American Concrete Pipe Association, 8320 Old Courthouse Rd., Vienna, VA 22180.
AGC	Associated General Contractors of America, 1957 E. Street, NW, Washington, DC 20006.
AI	Asphalt Institute, Asphalt Institute Building, College Park, MD 20740.
AIA	American Institute of Architects, 1735 New York Avenue, N.W., Washington, D.C. 20006-5292.
AISC	American Institute of Steel Construction, 400 North Michigan Ave., Chicago, IL 60611.
AISI	American Iron Standards Institute, 1133 Fifteenth St., NW Washington, DC 20005.
ANSI	American National Standards Institute, 1430 Broadway,

New York, NY 10018.

APA	American Plywood Association, P.O. Box 11700, Tacoma, WA 98411.
ASME	American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.
ASPA	American Sod Producers Association, Association Building, Ninth and Minnesota, Hastings, NE 68901.
ASTM	American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
ATSSA	American Traffic Safety Services Association, Inc., ATSSA Building, 5440 Jefferson Davis Highway, Fredericksburg, VA 22401.
AWPA	American Wood-Preservers' Association, P.O. Box 849, Stevensville, MD 21666.
AWPB	American Wood-Preservers' Bureau, P.O. Box 5283, Springfield, VA 22150.
AWS	American Welding Society, 350 Le Jeune Road, NW., Miami, FL 33125.
AWWA	American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

BIA	Brick Institute of America, 11490 Commerce Park Drive, Suite 300, Reston, VA 22091.
BOCA	Building Officials and Code Administrators, International Code Council, 5203 Leesburg Pike, Suite 600, Falls Church, VA 22041, telephone: 703-931-4533, fax 703-379-1546, http://www.iccsafe.org/
CLFMI	Chain Link Fence Manufacturers Institute, 1776 Massachusetts Avenue, N.W., Washington, DC 20036.
CRSI	Concrete Reinforcing Steel Institute, 933 Plum Grove Rd., Schaumburg, IL 60195.
CSI	The Construction Specifications Institute, 601 Madison Street, Alexandria, VA 22314-1791.
EIA	Electronic Industries Association, 2001 I Street, NW, Washington, DC 20037.
ICBO	International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, CA 90601.
ICEA	Insulated Cable Engineer's Association, P.O. Box 440, South Yarmouth, MA 02664.
IEEE	Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, New Jersey 08854-1331

IMIAC	International Masonry Industry All-Weather Council, International Masonry Institute, 823 15th Street, N.W. Washington, DC 20005.
IMSA	International Municipal Signal Association, P.O. Box 539, 1115 N. Main St., Newark, NY 14513.
IPCEA	Insulated Power Cable Engineers Association (see ICEA)
MBMA	Metal Building Manufacturer's Association, 1230 Keith Building, Cleveland, OH 44115.
NAA	National Arborist Association, 174 Rt. 101, Bedford, NH 03102.
NAAMM	National Association of Architectural Metal Manufacturers, 8 South Michigan Avenue, Suite 1000, Chicago, Illinois 60603
NEC	National Electric Code (from NFPA). NEMA National Electrical Manufacturer's Association, 2101 L Street NW, Suite 300, Washington DC 20037.
NEMA	National Electrical Manufacturers Association, 1300 N. 17th Street, Suite 1847, Rosslyn, VA, 22209.
NESC	National Electric Safety Code (obtain copies from IEEE)

N.F.P.A.	National Forest Products Association, 1250 Connecticut Avenue, N.W., Washington, DC 20036.
NFPA	National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
NSF	National Sanitation Foundation, P.O. Box 1468, 3475 Plymouth Road, Ann Arbor, MI 48106.
PCA	Portland Cement Association, 5420 Old Orchard Road, Skokie, IL 60077.
PCI	Prestressed Concrete Institute, 175 W. Jackson Blvd., Chicago, IL 60604.
PPI	Plastic Pipe Institute. A Division of the Society of The Plastics Industry, Inc., 355 Lexington Avenue, New York, N.Y. 10017.
S.D.I .	Steel Door Institute, (c/o A.P. Wherry and Assoc. Inc.) 712 Lakewood Center North, 14600 Detroit Ave, Cleveland, OH 44107.
SSPC	Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh, PA 15213.
UBC	Uniform Building Code (from ICBO). UL Underwriters'

Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062.

UL Underwriters Laboratory, 12 Laboratory Drive, Research Triangle Park, NC 27709-3995

WWPA Western Wood Products Association, 522 SW 5th Avenue, Yeon Building, Portland, OR 97204.

1.04 GOVERNMENT AGENCIES:

- A. The following acronyms or abbreviations indicate names of standards or specification producing agencies of the Federal and State Governments and are the best known at the publishing date of this document:

CS Commercial Standard (U.S. Department of Commerce), Government Printing Office, Washington DC 20402.

DNR Maryland Department of Natural Resources, 580 Taylor Avenue, Tawes State Office Building, Annapolis, MD 21401 <http://www.dnr.state.md.us/>

B.C. Baltimore City Department of Public Works, 417 East Fayette Street Baltimore, MD 21202 Specifications Materials, Highways, Bridges, Utilities and Incidental Structures 2006 or latest edition at time of bid opening

FED STD 595 Federal Color Standard 595, revision B, available from General Services Administration, 1800 F Street, NW Washington, DC 20405

- FHWA Federal Highway Administration, United States Department of Transportation, 400 Seventh St., SW, Washington, DC 20590.
- FS Federal Specification (General Services Administration), Specifications and Consumer Information, Distribution Section (WFSIS), 7th and D Street, SW, Washington, DC 20406.
- MDA Maryland Department of Agriculture, 50 Harry S. Truman Parkway, Annapolis, MD 21401
<http://www.mda.state.md.us/>
- MDE Maryland Department of the Environment, 1800 Washington Blvd., Baltimore, MD 21230
<http://www.mde.state.md.us/>
- MIL Military Standardization Documents (U.S. Dept. of Defence) Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.
- MSHA Maryland State Highway Administration, 707 North Calvert Street, Baltimore, MD 21202
<http://www.sha.state.md.us/>
- MSHA STD Maryland State Highway Standard for Highways and Incidental Structures:
<http://www.sha.state.md.us/BusinessWithSHA/bizStdsSpecs/desManualStdPub/publicationsonline/ohd/bookstd/index.asp>

MSMT	Maryland Standard Method of Test - Materials Manual, Laboratory and Field Procedures, Maryland State Highway Administration, Cashier's Office, 211 E. Madison St. Baltimore, MD 21202, Telephone: 410-545-8490
MTA	Maryland Transit Administration, 6 Saint Paul Street, Baltimore, MD 21202 www.mtamaryland.com/
NBS	National Bureau of Standards (U.S. Department of Commerce), Gaithersburg, ND 20234.
OSHA	Occupational Safety & Health Administration, 200 Constitution Avenue, NW, Washington, DC 20210
PS	Product Standard of NBS (U.S. Department of Commerce), Government Printing Office, Washington, DC 20402.
USACOE	Corps of Engineers (U.S. Dept. of the Army) Chief of Engineers Referral, Washington, DC 20314.
USDA	United States Department of Agriculture, Agricultural Research Service, Washington, DC
USPS	U.S. Postal Service, 475 L'Enfant Plaza, SW, Washington, DC 20260.

PART 2: PRODUCTS

NOT USED

PART 3: EXECUTION**NOT USED****PART 4: MEASUREMENT AND PAYMENT****4.01 REFERENCE CODES AND STANDARDS:**

- A The work required under this Section will not be measured for payment.
- B All costs in connection herewith will not be paid for directly, but will be considered incidental to the item of work to which they pertain.

END OF SECTION

SECTION 01500**TEMPORARY FACILITIES AND CONTROL****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This section specifies the general requirements for furnishing, installing, and operating temporary facilities and controls. This Section includes:
1. Temporary Utility Service
 2. Temporary Sanitary Facilities
 3. Project Identification
 4. Protection of Existing Facilities
 5. Orange Plastic Safety Fence
 6. Work and Storage Areas
 7. Community Relations
 8. Construction Operations Under Traffic

9. Safety Requirements
10. Pollution Abatement
11. Historical and Scientific Specimens
12. Salvage Material and Equipment

B. Related work specified elsewhere:

1. Section 01550: Maintenance of Traffic
2. Section 01570: Environmental Protection

1.02 TEMPORARY UTILITY SERVICE:

- A. Determine the need for such temporary utility service as may be required to prosecute the work and make arrangements with utility companies for such service. Remove all materials and equipment involved with temporary utility service as part of final cleanup. All costs incurred in obtaining permits; utility service, including connection and disconnection; and furnishing, installing, maintaining, and removing such materials as may be required shall be borne by the Contractor.

1.03 TEMPORARY SANITARY FACILITIES:

- A. The Contractor shall furnish for use of his work force the necessary toilet conveniences, secluded from public observation. Keep in a clean, sanitary condition. Comply with the requirements and regulations of the State of Maryland, Department of Health, and other agencies having jurisdiction.

1.04 PROJECT IDENTIFICATION:

- A. FTA Project Signs: The requirements for the FTA project signs are specified in Section SGP-10 of the Supplementary General Provisions
- B. Field Office Signs: provide one sign each for the Engineer's Field Office and the Contractors Field Office to indicate the location of the offices. Use 1/2 or 3/4 inch thick exterior, A-B grade plywood, cut two (2) feet by four (4) feet long. Paint the sign with one coat of primer sealer and two coats of white semi-gloss enamel. Letter each sign with black enamel paint, using block letters at least four (4) inches high, with the Contract Name, Contract Number and the words ENGINEER'S (or CONTRACTOR'S) FIELD OFFICE painted each on a separate line. Where the field office to be so identified is not readily visible from the project entrance, paint a directional arrow on the sign and locate the sign near the project entrance. The exact location of the field office signs and the proposed method of mounting shall be subject to the approval of the Engineer.
- C. Contractor's Identification Signs: The Contractor may erect his own signs to identify himself and, if he wishes, his subcontractors. The overall size of the Contractor's identification signs shall not exceed four (4) feet by eight (8) feet wide. The exact location, method of mounting and mounting height of the Contractor's identification signs will be subject to the

approval of the Engineer.

- D. **Sign Maintenance:** Maintain all signs throughout the course of construction until final acceptance, keeping them clean, in good repair, and free of obstructions. Upon final acceptance of the work, remove and dispose of all signs.

1.05 COMMUNITY RELATIONS:

- A. The Administration will establish a program of public contact for conducting effective relationships with communities and businesses in proximity to construction areas. As part of these programs the Contractor shall establish and maintain continuing liaison with persons occupying property or doing business in the immediate area of the Worksite for the purpose of minimizing inconveniences resulting from construction.
- B. The Contractor shall contact those residents or businessmen who might reasonably be expected to be affected by the construction and make known to them the name of the Contractor representative on the Worksite with responsibility for community relations and explain to them the means by which the representative can be contacted expeditiously.
- C. The Contractor shall, as part of the monthly progress status report specified in Section 01300, note and explain all community relations activities undertaken during the report period.

1.06 MAINTENANCE AND CONTROL OF TRAFFIC:

- A. Reference Section 01550 “MAINTENANCE OF TRAFFIC” for specifications and procedures associated with the project MOT.

1.07 CONSTRUCTION OPERATIONS UNDER TRAFFIC:

- A. General: Construction equipment is defined for the purpose of this article as all types of equipment, vehicles, and tools used in connection with construction work. The term workmen includes every person or firm performing work in or adjacent to public streets.

- B. Construction Equipment: When in traffic lanes, all vehicles and equipment shall be operated at normal traffic speeds. If this is not practicable, a slow moving vehicle emblem must be displayed in accordance with Article 66½ (Motor Vehicle Code), Annotated Code of the State of Maryland. Construction equipment shall not be parked in any lane intended for use by normal traffic. Equipment parked or stored at the work site shall be behind a guard rail, barrier, curb or other protective device.

- C. One-Way Traffic: No construction equipment shall be operated on traffic lanes, except in the designated direction of travel for respective lanes.

- D. Construction Operations:
 - 1. No construction work involving occupancy of traffic lanes shall be performed during adverse weather conditions or adverse road conditions except when so authorized by the Engineer and traffic shall be properly safeguarded by the use of flashers, and lights in addition to the signs and other markings prescribed herein. During these periods, no construction deliveries shall take place over a travel lane or immediately adjacent thereto.

 - 2. When traffic conditions dictate, the Engineer may require the Contractor to modify his work operation for such length of time as

required to alleviate the hazardous traffic conditions.

E. Equipment Travel:

1. No construction equipment other than that designed and used for general highway transportation shall be moved on streets during hours of darkness, periods of adverse weather conditions which reduce normal visibility, or when the roadway is covered with snow or ice.
2. Any construction equipment or material required in construction which exceeds the maximum vehicle dimensions enumerated in Article 66½ Motor Vehicle Code, shall be moved only in accordance with the established State and local regulations. No such oversized load shall be moved over streets of the local jurisdictional agency without first obtaining the approval of the appropriate agency.

F. Crossing traffic Lanes: When crossing open traffic lanes by construction equipment is necessary, such crossing shall be safeguarded with flagmen.

G. Flagmen: Provide qualified flagmen thoroughly instructed in flagging procedures as required to safeguard and maintain vehicle and pedestrian traffic. All flagmen shall perform their duties courteously and in such manner as will insure the safety and convenience of the traffic within the limits of the guarded area. Traffic shall not be flagged to a stop unless such is necessary for safety. Flagmen shall be supplied with flares for adverse weather conditions and with red flag not less than 24 inches square for slowing or directing traffic to another lane. Flagmen shall wear fluorescent orange safety vests and yellow hard hats.

- H. Removal of traffic Control Devices: All temporary signs, barricades, barrier curbs, drums, and cones used for safeguard traffic in connection with construction work shall be removed at the close of the work day, unless the state of the work is such that warning devices are still needed and are adapted for night closing. In such cases notify the Engineer reasonably in advance of the normal quitting time that he may review the status of the work and request additional safety measures as he deems necessary.
- I. Storage: No material shall be stored on any lane intended for traffic use.

1.08 WORK AND STORAGE AREAS:

- A. The Contract Drawings will show or the Special Provisions will describe work areas available to Contractor for storage of project materials and for parking of project construction equipment. These areas will be provided to the Contractor for the duration of construction without charge. Additional work and storage space, if required, shall be provided by the Contractor at his own expense. Parking facilities for Contractor's personnel shall be the Contractor's responsibility.

1.09 SAFETY REQUIREMENTS:

- A. Refer to the General Provisions Sections GP-7 for safety and health requirements.
- B. Employ and assign to the work a full-time Safety Superintendent who has the specialized training and experience in construction safety supervision, is thoroughly familiar with OSHA requirements, and is acceptable to the Engineer. Employ the Safety Superintendent exclusively for purpose of

supervising the safety of persons on or about the work and property affected thereby.

- C. First Aid Stations: At site of the work, establish and fully equip a first aid station. Maintain a qualified first aid attendant on duty in the station at all times when the work is in progress, except when on emergency calls.

1.10 POLLUTION ABATEMENT:

- A. General: Refer to General Provisions Section GP-7. Conduct operations in a manner to minimize pollution of the environment surrounding the area of work by every means possible. Apply specific controls as follows:
 - 1. Material Transport: Truck leaving the site and entering paved public streets shall be cleaned of mud and dirt clinging to body and wheels of the vehicle. Trucks arriving at and leaving the site with materials shall be loaded in a manner which will prevent dropping of materials or debris on the streets. Contractor shall maintain a suitable vehicle cleaning and inspection installation with permanent crew for this purpose. Spills of materials in public areas shall be removed immediately at no additional cost to the Administration.
 - 2. Waste Materials: No waste or erosion materials shall be allowed to enter natural or man-made water or sewage removal systems. Erosion materials from excavations, borrow areas or stockpiled fill shall be contained within the work area. Contractor shall develop methods for control of waste and erosion which shall include such means as filtration, settlement and manual removal.

3. Burning: No burning of waste will be allowed.
4. Dust Control: the Contractor shall at all times control the generation of dust by his operations. Control of dust is mandatory and shall be accomplished by water sprinkling or by other methods approved by the Engineer.
5. Noise Control:
 - a. General: Minimize noise caused by work operations, and provide working machinery and equipment fitted with efficient noise suppression devices. Employ other noise abatement measures necessary for protection of both employees and the public. In addition, restrict working hours and schedule operations in a manner that will minimize to the greatest extent feasible, disturbance to residents in the vicinity of the work. Provide protection against noise exposure for employees in accordance with GP 7.05.
 - b. Definitions:
 - i. Daytime, refers to the period from 7:00 a.m. to 10:00 p.m. local time daily except Sundays and legal holidays. Nighttime, refers to all other times including all day Sunday and legal holidays.
 - ii. Construction Limits are defined for the purpose of these noise control requirements as the Administrations right-of-way lines or property lines

as indicated on the drawings.

- iii. Zones, Special Zones and special Construction sites outside of Construction Limits shall be designated by the local agency having jurisdiction.

- c. **Monitoring:** Monitor noise levels of work operations to assure compliance with the noise limitations contained herein. Retain record of noise measurements for inspection by the Engineer. Promptly inform the Engineer of any complaints received from the public regarding noise. Describe the action proposed and the schedule for implementation and subsequently inform the Engineer of the results of the action.

- d. **Measurement Procedure:**
 - i. Except where otherwise indicated, perform all noise measurements using the A-weight network and (slow) response of an instrument complying with the criteria for Type 2 General Purpose sound level meter as described in ANSI S1.4. Measure impulsive or impact noises with an impulse sound level meter complying with the criteria of IEC 179 for impulse sound level meters. As an alternative procedure, a type 2 General Purpose sound level meter on C-weighting and (fast) response may be used to estimate peak values of impulsive or impact noises. Transient meter indications of 125 dbC (fast) or higher will be considered as indications of impulsive noise levels of 140 db or greater.

- ii. Measure noise level at buildings affected acoustically by the Contractor's operations at points between three feet and six feet from the building face to minimize the effect of reflections.
 - iii. Measure noise levels at points on the outer boundaries of Construction Limits or Special Construction Sites for noise emanating from within.
 - iv. Where more than one criteria of noise limits are applicable, use the more restrictive requirement for determining compliance.
 - e. Noise Restrictions: Noise restrictions shall be in accordance with local ordinances.
- B. Maintaining Flow of Sewers and Drains: The Contractor shall, at his own expense, provide for and maintain the flow of all sewers, drains, house or inlet connections, and all water courses which may be met during progress of the work. The Contractor shall not allow the contents of any sewer, drain, or house or inlet connection to flow into trenches. The Contractor shall, at his own expense, immediately remove from proximity of the work all offensive matter, using such precautions as are required by the Engineer.

1.11 HISTORICAL AND SCIENTIFIC SPECIMENS:

- A. All articles of historical or scientific value, including coins, fossils, and

articles of antiquity, which may be uncovered by Contractor during progress of the work, shall become the property of the Administration. Such findings shall be reported immediately to the Engineer who will determine method of removal, where necessary, and final disposition thereof.

1.12 SALVAGE MATERIALS AND EQUIPMENT:

- A. The Contractor shall maintain adequate property control records for materials and equipment specified to be salvaged. Contractor shall be responsible for the adequate storage and protection of salvaged materials and equipment. The Contractor shall replace, at no cost to the Administration, salvage materials and equipment which are broken or damaged during the salvage operations as the result of the Contractor's negligence.

- B. Salvage material not specified for reuse shall be the property of the Contractor and shall be removed from the site.

PART 2: PRODUCTS

NOT USED

PART 3: EXECUTION

NOT USED

PART 4: MEASUREMENT AND PAYMENT

4.01 TEMPORARY FACILITIES AND CONTROLS:

- A. The temporary facilities and controls work required under this Section will not be measured for payment, except as noted below.
- B. All costs in connection herewith will not be paid for directly, but will be considered incidental to the item of work to which they pertain.

4.02 MAINTENANCE AND CONTROL OF TRAFFIC:

- A. The maintenance and control of traffic will be measured as the percentage of total Contract progress.
- B. The maintenance and control of traffic will be paid for at the percentage of total Contract progress multiplied by the lump sum price for maintenance and control of traffic in the unit price schedule times

END OF SECTION

SECTION 01522**ENGINEER'S FIELD OFFICE TYPE 2****PART 1 – GENERAL****1.01 SUMMARY**

- A. The work specified in this Section includes furnishing, cleaning and maintaining in good condition a suitable office at a location approved by the Engineer. The office shall be separated from any building used by the Contractor and shall be for the exclusive use of the Administration's personnel.

- B. The office shall be served by municipal water and sewer facilities where available. If the facilities are not available, a neat sanitary toilet shall be provided services and maintained. Hand washing accommodations with a pressurized water system having a minimum pressure of 20 psi shall be provided. These facilities as described shall be for the exclusive use of State employees and shall meet the requirements of the State Department of Health and Mental Hygiene or other authorities having jurisdiction.

1.02 RELATED WORK

- A. The General Provisions of the contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

PART 2 – PRODUCTS**(NOT USED)****PART 3 – EXECUTION****3.01 ENGINEER'S FIELD OFFICE**

- A. Provide a mobile unit or a building of 700 square feet, or more, of usable floor space. The Facility shall be located near the construction site. The unit or building hereinafter called the Engineer's field office shall be complete in place as specified and ready for occupancy by the Administration 30 days after Notice To Proceed and shall remain in place and functioning until 90 days after the completion of the Contract. Provide six parking spaces for the exclusive use of the Administration and their representatives in administering the Contract.

- B. Provide the Engineer's field office with all the features specified herein conforming to the local building codes and having the specified basic features with any substitute materials subject to approval by the Administration.

- C. Maintain and service the Engineer's field office until all records pertinent to each segment of the Contract have been completed. After which time, the facility becomes the property of the Contractor and is to be removed.

- D. Obtain and apply all costs for hauling, building and connection permits to the field office. Provide the field office with new commercial quality materials. Provide other features as follows:
1. The field office may be a temporary or permanent type facility with adequate insulation, flooring, lighting, potable water, utility service, heating and air conditioning.
 2. Provide one restroom in Facility complete with water closet and hot and cold water supply. Provide a lockable door on restroom.
 3. Provide in the interior of the Facility at least two completely partitioned office rooms. These rooms shall be approximately 100 square feet with an interior doors. Provide a meeting room of approximately 250 square feet. Furnish the Administration at least three keys for each of the interior door locks.
- E. Provide and maintain as a minimum the following furniture and equipment for the Facility:
1. Two offices type desk having at least two drawers on each side and minimum top dimensions of 30 inches by 72 inches.
 2. Four desk chairs.
 3. Ten comfortable, stackable chairs
 4. One four-drawer fire resistant filing cabinet (D Label) equipped with lock.

5. One four-drawer cabinet with lock
6. One plan rack having a capacity of twelve holders for full size engineering drawing
7. Four utility tables, 30 inches high and having a top dimension not less than 30 inches by 72 inches.
8. One slant top drafting table approximately 40 inches high at the front edge and having a top dimension not less than 37 inches by 72 inches
9. One stool of proper height for drafting table
10. One closet, extending the full height from the floor to ceiling, measuring not less than 24 inches by 60 inches in plan, equipped with locks and at least two shelves
11. Utility cabinet with three adjustable shelves.
12. Two electric printing calculators with a minimum of eleven digits supplemented with an instruction manual
13. One Fire Extinguisher – dry chemical, multi-purpose ABC minimum size 10 pounds (4.54-kg), equipped with a visual air pressure gauge. The fire extinguisher shall be checked monthly for stored pressure, etc.; also checked and tagged by a licensed company annually and after each use.

14. First Aid Kit – one equivalent to 24 unit first aid kit meeting Title 29 Code of Federal Regulations 1926.50(d)2. The first aid kit shall be checked monthly and replenished to full complement

15. Office Telephones: Three office telephone lines, and four handsets with multi-line and intercom buttons, one separate fax line; one separate modem line (total of five lines), installation and monthly telephone charges shall be the responsibility of the Contractor

16. One telephone answering machine
 - a. The answering machine shall be equipped with tapes having the capability to record for a period of at least 30 minutes. These machines shall be voice-activated beeper less and shall play back recorded messages without dial tones or pauses. The answering machines shall be capable of pre-recording an answering message up to 15 seconds in length.

 - b. If the telephone answering machine becomes defective, or is stolen, or for any reason does not function as intended, it shall be replaced with equal or better replacement unit at the Contractor's expense. Any defective equipment shall be replaced within 8 hours after the Engineer notifies the Contractor

17. One telephone plain paper facsimile machine

- a. Shall meet and be compatible with CCITT Group Transmission standards (see specific line items for compatibility requirements)
- b. Shall utilize public switched telephone networks and standard two- (2) wire leased through RJ11C jacks or similar devices
- c. Shall transmit at 14,400 BPS or higher with automatic step down to compensate for phone line conditions
- d. Shall transmit standard page 8½ x 11 inch at a speed of 20 seconds or less through a clean phone line, based on CCITT # 1 test chart
- e. Shall have a minimum of two levels of resolution with contrast control:
 - i. Standard-200/96 lines
 - ii. Fine-200/96 lines
- f. Self-test capability, provide activity reports and provide page headers, time and date
- g. Shall use plain paper
- h. Shall automatic document feeder tray (se specific requirements for each transceiver class)

- i. Shall be supplied with handsets
 - j. Shall provide for automatic answer, receive and disconnect features
 - k. FCC registration number, ringer equivalence and connection circuitry shall be provided for each transceiver
 - l. Shall be equipped with speed dial feature for 20 numbers
 - m. Shall have a dedicated line separate from others
18. Cellular Telephone: Two portable cellular telephones for the exclusive use by the Administration. Provide installation and pay monthly charges for the duration of the Contract (Final Acceptance)
19. One free-standing type copier with:
- a. Automatic feed
 - b. Twenty-five (25) copies per minute or better
 - c. Separated sorting capability
 - d. Minimum of two separate paper drawers one of which is for 11" x 17"

- e. Printer paper of 20 pound weight with 84 brightness or better through life of contract in sizes 8½" x 11", 8½" x 14" and 11" x 17"
 - f. Toner cartridges recommended by the original equipment manufacturer through life of contract
20. One secretary type desk with stenotype chair
21. Microcomputer System and Accessories
- a. Laptop Computer (Notebook):
 - i. 15 inch TFT Color Display or better
 - ii. Intel Core 2 Duo – 1.66GHz or faster Processor
 - iii. 1.0 GB RAM
 - iv. Integrated video Intel DVMT
 - v. 24X CD-RW or better
 - vi. 3.5 inch Disk Drive
 - vii. 80 GB Hard Drive or better

- viii. Lithium-ion Battery and AC Pack
 - ix. USB Ports
 - x. 56 K Modem
 - xi. Carrying Case
 - xii. EZ Pad Pointing Device
- b. Two Desktop microcomputer systems
- i. Intel Core 2 Duo – 2.0 MB L2 Cache, 1.86 GHz, 1066 FSB or better
 - ii. 1 GB Dual Channel DDR2 SDRAM or better
 - iii. Integrated video Intel DVMT
 - iv. RAID level 1 array consisting of two 80 GB 7200 RPM Hard Drives (or better) and controller
 - v. Internal calendar/clock with battery backup
 - vi. A minimum of 1 parallel, 2 serial ports and 6 UBS 2.0 ports, 2 PS/2 ports

- vii. Internal 40X CD-RW or better
 - viii. 3.5 inch Disk Drive
 - ix. Microsoft ps/2 intellimouse or equivalent
 - x. Integrated 10/100/1000 Ethernet adapter
 - xi. One internal 56K fax modem including all cables and terminations
 - xii. Flat panel active-matrix LCD monitor with a minimum screen size of 17 inches and a resolution of 768 x 1024 or better
 - xiii. PS/2 keyboard or equivalent
 - xiv. Uninterruptible Power Supply (UPS) with automatic voltage regulation, surge protection up to 1000 volt amps, modem/fax surge protection, 6 outlet minimum, and software
 - xv. Digital Subscriber Line (DSL) high speed internet access
- c. Two HP (Hewlett Packard) or compatible laser printers, one with a sheet size to 8.5 x 14 inch with minimum

resolution of 1200 x 1200 dpi (dots per inch) and one with a sheet size to 11 x 17 inch with a minimum resolution of 600 x 600 dpi, 25 ppm (pages per minute) and a minimum of 64 MB of RAM

- d. One HP (Hewlett Packard) or compatible color ink jet printer with minimum resolution of 600 x 600 dpi (dots per inch), 15 ppm (pages per minute) color and a minimum of 8 MB of RAM

- e. One Scanner with a minimum resolution of 800 dpi and a minimum page size of 11 x 17 inch. Scanner shall include all cables and software necessary for the production of portable document format (PDF) files

- f. Included Software:
 - i. Windows Vista Business and NTFS installed

 - ii. Microsoft Office 2007 Professional installed

 - iii. McAfee Anti-Virus installed

 - iv. Symantec PC Anywhere installed

 - v. Adobe Acrobat Professional Version 8 installed

 - vi. Microsoft MSN premium internet software installed

Original disks containing the software and manuals shall be provided

- g. Digital camera with 6 megapixels or greater resolution, minimum 3X optical zoom, minimum of two 512 MB digital film (flashcards) for camera and all necessary software/hardware to interface with the supplied PC's
 - h. Contractor, as needed, shall supply all diskettes and CD's
- 22. Maintenance for computers, printers, facsimile machine and copiers during the life of the contract
 - 23. One "Army litter" type stretcher
 - 24. Bottled water cooler with bottled water service
 - 25. One refrigerator with a capacity of 5 cubic feet
 - 26. Automated External Defibrillator (AED)
- F. Provide maintenance, supplies and services as follows:
- 1. Clean field office, parking area and access road daily, including complete janitorial services and supplies. Make any required repairs to the field office when requested by the Administration

2. Furnish all utilities including telephone service
 3. A parking area, with sufficient space for six (6) MTA vehicles, shall be stabilized as directed by the Engineer in the area of the field office
 4. During other than normal working hours, provide security measures and area protection equivalent to that used for the Contractor's work site, shop and office
 5. Daily cleaning service
 6. Payment of all monthly service charges
- G. Remove the field office and all furniture and equipment from the site at the time specified in Subsection 3.01 A. All materials, furniture and equipment except the defibrillator (AED) and the digital camera shall become the property of the Contractor at the conclusion of the Contract.
- H. Restore the field office site to the original condition or better.

PART 4 – MEASUREMENT AND PAYMENT

4.01 ENGINEER'S FIELD OFFICE – TYPE 2

- A. The work required under this Section will not be measured for payment
- B. All costs in connection Engineer's Field Office Type 2 will be paid for at

the rate of 50 percent of the lump sum bid price for the first month and the remainder paid in equal monthly installments for the duration of the Contract.

END OF SECTION

SECTION 02372**SOIL STABILIZATION MATTING****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This work shall consist of furnishing, placing and securing matting on seeded areas, as specified in the Contract Documents or as directed by the Engineer.

PART 2: PRODUCTS**2.01 MATERIALS:**

- A. Soil Stabilization Matting:
 - 1. Type A soil stabilization matting shall consist of a machine-produced mat of degradable natural or man made fibers. Matting shall be smolder resistant. When a chemical is used, it shall be nonleaching, nontoxic to vegetation and the germination of seed, and noninjurious to the skin.
 - 2. Type A matting shall have a uniform thickness and distribution of fibers throughout. The top and bottom of the matting shall be covered with a degradable extruded plastic netting having a maximum mesh opening of 2 x 2 in. or covered on the top side with netting machine sewn or bonded on 2 in. centers along the longitudinal axis of the material. The average breaking strength of

any two strands of netting shall be 5-lb. minimum. The netting shall be entwined with the matting fibers in a matter which shall provide sufficient reinforcement against damage during handling and placement and shall resist degradation for a minimum of six months and a maximum of one year.

- B. Staples for Soil Stabilization Matting: Staples shall be U or T shaped steel wire having minimum gauges of No. 11 and No. 8 respectively. The U shaped staples shall average 1 to 1-1/2 inches wide and shall be 12 inches long. The T shapes staples shall have an 18-inch main leg, a 2-inch secondary leg, and a 4-inch head.

PART 3: CONSTRUCTION

3.01 GENERAL:

- A. When topsoil is specified for area where matting is to be placed, this work shall be completed before the soil stabilization matting operation is started.

3.02 PLACING:

- A. The matting shall be placed within 48 hours after seeding operations have been completed in the work areas. Matting shall be rolled in the direction of the water flow. Matting shall be laid smoothly and firmly upon the seeded surface, and stretching shall be avoided. Where more than one width of matting is required, the strips overlap at least 2 in. Ends shall overlap at least 6 in. The upgrade end of each strip of matting shall be turned down and buried to a depth of not less than 6 in with the soil firmly tamped against it. Overlapping shall be done with the upgrade section on

top. The Engineer may require any other edge exposed to more than normal flow of water to be buried in a similar manner. Edges of matting shall be similarly buried around the edges of catch basins and other structures.

3.03 SECURING:

- A. Matting shall be securely fastened in place with staples driven vertically into the soil and flush with the surface. Staples shall be placed 2 ft apart along the edges and center of the matting. On all overlapping edges, staples shall be placed 18 in apart. At all ends of the matting, staples shall be placed 6 in apart.

PART 4: MEASUREMENT AND PAYMENT

4.01 TYPE A SOIL STABILIZATION MATTING:

- A. Type A Soil Stabilization Matting will be measured per square yard.
- B. Type A Soil Stabilization Matting will be paid for at the contract unit price bid per square yard, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, and all work incidental to complete the item as specified.

END OF SECTION

SECTION 02630**STORM DRAINAGE****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. The work under this Section shall consist of furnishing materials for and constructing storm drain systems for surface runoff consisting of inlets, manholes, pipe, roof drains, cleanouts, end sections, headwalls, and replacement and/or modifications to existing Baltimore City storm drainage systems and structures in accordance with the City of Baltimore, Department of Public Works, "Specifications for Material, Highways, Bridges, Utilities, and Incidental Structures", and "Book of Standards", these Specifications, the Contract Drawings and/or as directed by the Engineer.

1.02 DEFINITIONS:

- A. Drainage structures include inlets, manholes, cleanouts, endwalls, end sections, headwalls, and riser structures.

1.03 QUALITY ASSURANCE:

- A. Description – City of Baltimore Specifications

1. Section 34.02-A-1

- B. Field Testing – City of Baltimore Specifications.
1. Section 34-02-A-3(b).
- C. Submittals: Section 01300, submittal procedures of these Specifications for concrete mix, pipe, manhole frames and covers, inlet frames and covers, and precast concrete structures.
1. Submit Certificate(s) of compliance stating that the item(s) supplied is in accordance with the requirements specified herein.
 2. Submit list of materials to be supplied and name of suppliers.
 3. Submit shop drawings for precast concrete structures and manhole and inlet frames, covers, and/or grates.

PART 2: PRODUCTS

2.01 NOTIFICATION:

- A. Before performing any work on or in vicinity of City of Baltimore, DPW owned or City of Baltimore Health Department owned storm drains, notify in writing, at least two weeks prior to commencement of work, Mr. Azzam Ahmad, Storm Water Engineering Office, Bureau of Water and Wastewater, Department of Public Works, City of Baltimore, 306 Abel Wolman Municipal Bldg., 200 N. Holliday Street, Baltimore, MD 21202, Telephone (410) 396-4700 and Mr. Wade Johnson, Health Department, City of Baltimore, 210 Guilford Ave., Baltimore, MD 21202, Telephone (410) 396-4002.

2.02 MATERIALS:

- A. Concrete shall meet the requirements of MSHA Section 902.10.03, Mix No. 2 or 6 as indicated on the Contract Drawings. Mix No. 1 Concrete shall meet the requirements of Baltimore City Specifications Article 20.07.
- B. Grout shall meet the requirements of MSHA Section 902.11.
- C. Castings for Frames, and Covers or Gratings shall be iron castings meeting the requirements of Baltimore City Specifications Section 20.18-12. Manhole covers shall be lettered "STORM DRAIN" per Baltimore City Book of Standards, Std. No. BC 383.13.
- D. Precast Concrete Endwalls, Inlets, and Manholes shall meet the requirements of AASHTO M 199.
- E. Reinforced Concrete Pipe shall meet the requirements of Baltimore City Specification Section 20.16-1. Class as indicated on the Contract Drawings.
- F. Connections between drain pipes and concrete storm drain manholes and stone masonry drain shall be one of the following:
 - 1. Cast-in-Place type compression gaskets such as the A-Lok or Z-Lok seals as manufactured by A-Lok Products, Inc., or equal.
 - 2. Mechanically wedged-in-place type seals such as Link-Seal as manufactured by Thunderline Corp., XP as manufactured by A-Lik Products, Inc., or Kor-N-Seal as manufactured by National

Pollution Control Systems, Inc., or equal.

3. Grouted-in-Place type connectors such as Z-Lok Repair Sleeve as manufactured by Atlantic Concrete Products, Co., Type CT adapter as manufactured by the General Engineering Co., or equal.
 4. All metal fasteners shall be Type 304 stainless steel.
- G. Manhole steps shall be Type 410 stainless steel in accordance with Baltimore City Book of Standards, St'd. No. BC 383.90 or 383.91 as appropriate.

PART 3: EXECUTION

3.01 DESCRIPTION:

- A. City of Baltimore Specifications Section 34.02-A-1.

3.02 CONSTRUCTION SEQUENCE:

- A. Pipe lengths and gradients shall be verified by the Contractor and shall be acceptable to the Engineer prior to installation.
- B. When a pipe is laid on existing ground, on fill, or under fill, the embankment shall be constructed to a height of at least 9 in., but not more than 3 ft. above the top of the proposed pipe and then a trench shall be excavated to receive the pipe.

- C. Underground drainage structures and pipe relocations shall be fully completed and made operational prior to excavations for pier construction.
- D. Underground drainage structures shall be completed before paving surface is placed. Manholes and inlets shall not be completed to final grade until the grading has been finished and all necessary arrangements have been made to insure suitable connections and tie-ins at proper grade and alignment with pavements, curbs, and gutters.

3.03 PIPE INSTALLATION:

- A. Excavation: In accordance with Baltimore City Specification Section 34.02-A-3. Subsections 1., 2., 3., and 4. except as modified herein. The width of trench shall be sufficient to permit thorough tamping of the backfill under the haunches and around the pipe. This width shall not be less than twice the outside diameter of the pipe or the outside diameter plus 18 in. on each side, whichever is less.
- B. Bedding: Storm drain pipe shall be constructed on gravel bedding in accordance with Baltimore City Book of Standards "St'd. No. BC 302.01. When unsuitable foundation material is encountered, it shall be removed and replaced with select backfill for the full width of the trench, as directed by the Engineer.
- C. Removal of Frames, Covers, Grates, Head Pieces, and Top Slabs: In accordance with Baltimore City Specifications Section 34.02-A-3 Subsection 6.
- D. Installation: In accordance with Baltimore City Specifications Section 34.02-A-3 Subsection 7.(b) except as modified herein. Pipes shall be laid with hubs up grade. A single hole through the shell of the pipe will be permitted for use with an approved lifting device. After installation, the

lay hole shall be sealed.

- E. Joints: Asphalt sealer, rubber type gaskets or resilient type material shall be used for storm drain pipe. Care shall be exercised to insure the proper application of sealer on the underside of all joints. Unless otherwise specified in the Contract Documents, these materials shall be installed as recommended by the manufacturer.

- F. Backfill: In accordance with Baltimore City Specifications Section 34.02-A-3. Subsection 5., except as modified herein. Earth for backfill shall be free from large lumps, clods, and rocks and shall be placed along the side of the pipe for the full width of the trench in layers not exceeding 6 inches in uncompacted depth. Compaction shall conform to the requirements of Section 02315. Each layer shall be compacted simultaneously on both sides of the pipe by means of an approved mechanical tamper. Special care shall be taken to compact the fill thoroughly under the haunches of the pipe.

3.04 DRAINAGE STRUCTURES:

- A. Castings: Frames for grates and covers for inlets and manholes respectively shall be set in full beds of mortar and rigidly secured in place at proper grade and alignment.

- B. Drain Connections to Storm Drain Manholes:
 - 1. Holes for installing drains in manholes and other structures shall be carefully cored, drilled, or cut in such a manner to minimize damage to the manhole, or structure. Any damage to the manhole or structure shall be promptly repaired to the satisfaction of the Engineer or the manhole or structure replaced. Reinforcing steel in precast manholes shall be cut only to the extent necessary to

accommodate the new pipe and seal system.

2. The drain pipe and connection shall be roughly centered in the hole and the pipe end set flush with the inside wall of the manhole, or structure.
 3. If the manhole connector is the type that is installed in the field, installation of the connector shall be executed in accordance with the manufacture's written instructions.
- C. Pipe Connections: Inlet and outlet pipes at drainage structures shall be set or cut flush with the inside faces of the structures and shall extend a sufficient distance beyond the outside faces of these walls to provide ample room for making proper connections. The joint around the pipe in the structure wall shall be completely and neatly closed with mortar, grout, or other approval material.
- D. Inverts: Drainage structures containing two or more pipes shall have channeled inverts conforming to Baltimore City Book of Standards, St'd. Nos. BC 383.31, 383.32, 383.33, 383.34 or 383.35 as appropriate.
- E. Precast Drainage Structures:
1. Precast Drainage Structures shall meet the requirements of AASHTO M199.
 2. The placement and consolidation of the required bedding under the precast structures shall be a minimum 6 in. of No. 57 aggregate.
- A. Cast-in-Place Drainage structures: Cast-in-Place Drainage Structures shall

meet the requirements of Baltimore City Specifications Article 34.04 except Sections 34.03-4 and 34.03-5 do not apply.

PART 4: MEASUREMENT AND PAYMENT

4.01 MIX #2 CONCRETE FOR MISCELLANEOUS STRUCTURES:

- A. Mix #2 Concrete for Miscellaneous Structures will be measured per cubic yard.
- B. Mix #2 Concrete for Miscellaneous Structures will be paid for at the contract unit price bid per cubic yard, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

4.02 MIX #9 CONCRETE FOR DRAINAGE STRUCTURES AND PIPE COLLARS

- A. Mix #9 Concrete for Drainage Structures and Pipe Collars will be measured per cubic yard.
- B. Mix #9 Concrete for Drainage Structures and Pipe Collars will be paid for at the contract unit price bid per cubic yard, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

4.03 CLASS IV & V REINFORCED CONCRETE PIPE (ANY SIZE)

- A. Class IV & V reinforced concrete pipe (any size) will be measured per linear foot for the pipe size specified.

- B. Class IV & V reinforced concrete pipe (any size) will be paid for at the contract unit price bid per linear foot for the pipe size specified, which price will be full compensation for all material, equipment, tools, labor and all work incidental and necessary to satisfactorily complete each item as specified, including excavation, furnishing and installing pipe, installing precast manhole, frame & cover making field connection, concrete, aggregate and asphalt saw cutting, utility patching, pipe hangers, backfill and compaction, restoration of concrete curb, gutter, mowing strip and paving.

4.04 STANDARD OR MODIFIED INLETS & GRATES (ANY TYPE) – MINIMUM DEPTH

- A. Standard or modified inlets & grates (any type) – minimum depth will be measured per each for the type of inlet specified.
- B. Standard or modified inlets & grates (any type) – minimum depth will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.05 STANDARD OR MODIFIED INLETS & GRATES (ANY TYPE)– VERTICAL DEPTH

- A. Standard or modified inlets & grates (any type)– vertical depth will be measured per vertical linear foot for the type of inlet specified.
- B. Standard or modified inlets & grates (any type)– vertical depth will be paid for at the contract unit price bid per vertical linear foot, complete in

place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.06 STANDARD PRECAST MANHOLES (ANY SIZE)– MINIMUM DEPTH

- A. Standard precast manholes (any size)– minimum depth will be measured per each for the type and size of manhole specified.

- B. Standard precast manholes (any size)– minimum depth will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.07 STANDARD PRECAST MANHOLES (ANY SIZE) – VERTICAL DEPTH

- A. Standard precast manholes (any size) – vertical depth will be measured per vertical linear foot for the type and size of manhole specified.

- B. Standard precast manholes (any size) – vertical depth will be paid for at the contract unit price bid per vertical linear foot, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.08 STANDARD CHANNELS (ANY TYPE)

- A. Standard Channels (any type) will be measured per each at the contract unit price specified by type.

- B. Standard Channels (any type) will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

4.09 ADJUST DRAINAGE STRUCTURE TO GRADE

- A. Adjust drainage structure to grade will be measured per each at the contract unit price.

- B. Adjust drainage structure to grade will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

END OF SECTION

SECTION 02640**BIORETENTION FACILITY****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This Section specifies the construction of bioretention facility for stormwater management consisting of inlets, pipe, underdrain, underdrain outlet, excavation, backfill, and modifications to existing storm drainage structures as shown on the contract drawings, or as directed by the Engineer.
- B. This work shall consist of supplying and installing Pea Gravel in accordance with the notes and details as shown on the landscape plans and/or as directed by the Project Engineer.

1.02 REFERENCES

- A. The following codes, regulations, reference standards and specifications apply to work included in this section:
 - 1. Maryland State Highway Administration (SHA) Standard Specifications for Construction and Materials, latest revision.
 - 2. Maryland Department of the Environment, Water Management Administration Maryland Stormwater Management Guidelines, July 2001 and Revised 2010 Stormwater ESD Guidelines.
- C. Related Sections:
 - 1. Section 02317: Excavation and Fill.
 - 2. Section 02620: Subdrainage.
 - 3. Section 02630: Storm Drainage.
 - 4. Section 02930: Tree, Shrubs and Grounder Cover.
 - 5. Section 03050: Portland Cement Concrete.

PART 2: PRODUCTS**2.01 MATERIALS:**

- A. Material Specifications - The allowable materials to be used in bioretention area are detailed in the following Table.

Material	Specification	Size	Material Notes
Plantings	n/a	n/a	plantings are site- specific
Bioretention soil [2.5' to 4' deep]	sand 35 - 60%, silt 30 - 55% clay 10 - 25%	n/a	
Mulch	shredded hardwood		aged 6 months, minimum
Pea Gravel	pea gravel: ASTM- D- 448	pea gravel: between 1/4" and 3/4"	Pea Gravel shall have smooth rounded surface and shall be a mix of blue purple and crème stones
Geotextile	Class "C" & "F" - apparent opening size (ASTM- D- 4751), grab tensile strength (ASTM- D-4632), puncture resistance(ASTM- D- 4833)	n/a	Use Geotextile class "F" on top and bottom of concrete sand and gravel layers. Use Geotextile class "C" on bottom and all sides of class I rip-rap layers and outlet protections.
underdrain gravel	AASHTO M- 43	0.25" to 0.75"	Gravel to be washed
underdrain piping	F 758, Type PS 28 or AASHTO M- 278	4" to 6" rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes
Poured in place concrete	MSHA Mix No. 3; f' c = 3500 psi @ 28 days, normal weight, air- entrained; reinforcing to meet ASTM- 615-60	n/a	on-site testing of poured- in- place concrete required: 28 day strength and slump test; all concrete design (cast- in- place or pre- cast) <i>not using previously approved State or local standards</i> requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/ 89; vertical loading [H- 10 or H- 20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Concrete Sand [4" deep]	AASHTO- M- 6 or ASTM- C- 33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

B. Bioretention Soil

1. The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the Bioretention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The bioretention soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

2. The bioretention soil shall be tested and shall meet the following criteria:

pH range	5.2 - 7.0
organic matter	1.5 - 4% (by weight)
magnesium	35 lb./ac
phosphorus (phosphate - P2 O5)	75 lb./ac
potassium (potash - K2 O)	85 lb./ac
soluble salts not to exceed	500 ppm

3. All bioretention areas shall have a minimum of one test. Each test shall consist of both the standard soil test for pH, phosphorus, and potassium and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the top soil was excavated.

4. Since different labs calibrate their testing equipment differently, all testing results shall come from the same testing facility.
Should the pH fall out of the acceptable range, it may be modified (higher) with lime or (lower) with iron sulfate plus sulfur.

C. Plant Material

1. For planting material and planting requirements see Section 02930 and the Bioretention Facility Planting Plan and Plant Schedule.

D. Storm Drainage

1. Refer to Part 1, 2, and 3 in Section 02630: Storm Drainage for Inlets and Reinforced Concrete Pipe.

E. Landscape Edging

1. Edging shall be a minimum of 3” tall.
2. Edging shall be held in place with a tapered stake no less than 8” long and spaced according to manufacturer’s instructions.
3. Contractor shall submit manufacturer’s specifications for approval prior to installation.

F. Sample

1. Contractor shall provide a sample of the Pea Gravel for approval by the landscape architect at least 30 days prior to installation.

PART 3: EXECUTION**3.01 CONSTRUCTION SEQUENCE:**

- A. Bioretention facility shall not receive stormwater runoff until the facility is completely stabilized, functional, and acceptable to the Engineer.
- B. Pipe lengths and gradients shall be verified by the Contractor and shall be acceptable to the Engineer prior to installation.
- C. Inlets shall not be completed to final grade until the grading has been finished and all necessary arrangements have been made to insure suitable connections and tie-ins at proper grade.

3.02 COMPACTION

- A. During backfillings operation the Contractor shall minimize compaction of all Bioretention Fill Material including gravel, sand bed and planting soil. When possible, use excavation hoes to remove original soil. If Bioretention areas are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires.
- B. Equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced soil infiltration rate. This will significantly contribute to design failure. This type of equipment will not be acceptable inside the basin.
- C. Excessive compaction shall be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to

reduce the effects of compaction from excavation equipment.

- D. Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the required sand layer. Pump any ponded water before preparing (rototilling) base.
- E. When backfilling the bioretention soil over the sand bed, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.
- F. When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can only be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

3.03 UNDERDRAIN INSTALLATION

- A. Underdrain pipes are to be placed on Geotextile Class C, followed by a washed gravel bedding. The exposed ends of underdrain pipes shall be capped.
- B. The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5% or as shown on plans.

3.04 MISCELLANEOUS

- A. The bioretention facility may not be constructed until all contributing drainage area has been stabilized.

3.05. INSTALLATION OF GEOTEXTILE FABRIC

- A. Following the excavation of the stream bed, geotextile shall be placed on all sides of bioretention stream, as specified in the Contract Documents. Geotextile shall be placed tightly against the excavation walls to eliminate voids beneath the geotextile. Wrinkles and folds in the geotextile shall be avoided. A minimum 6 in. overlap at the geotextile joint ends or breaks shall be maintained. Geotextile joints and overlaps shall be pinned to securely hold the geotextile in place until placement of the aggregate and BSM.
- B. Damaged geotextile shall be replaced or repaired as directed by the Project Engineer at no additional cost to the Administration.

3.06 PLACEMENT AND COMPACTION

- A. It is very important to minimize compaction of both the base of the Pea Gravel Infiltration Bed and the required backfill. Contractor shall take extreme care not to compact the subgrade or bioretention media. Pea Gravel should be placed by hand.

- B. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

3.07 LANDSCAPE EDGING INSTALLATION

- A. Landscape edging shall be installed according to the manufacturer's instructions along the first five (5) feet of pea gravel bed from the edge of the rip rap.

3.08 PEA GRAVEL INSTALLATION

- A. Pea Gravel shall be placed in conformance with the Contract Drawings. Pea Gravel installations shall be 2" above grade. The top of the adjacent mulch areas shall be at the same level as the top of the Pea Gravels.
- B. The Pea Gravel shall be placed onto the geotextile fabric by hand to produce a uniformly graded mass of stones. Placing the stones by methods that cause segregation is prohibited.

PART 4: MEASUREMENT AND PAYMENT

4.01 BIORETENTION SOIL MIXTURE AND CONCRETE SAND:

- A. Bioretention Soil Mixture and Concrete Sand will be paid for per cubic yard. Observation wells and clean outs shall be incidental to the underdrain price.
- B. The Bioretention Soil Mixture and Concrete Sand will be paid for at the cubic yard bid price, which shall be full compensation for all applicable excavation, placement, and all material, labor, equipment, tools and incidentals necessary to complete the work.

4.02 PEA GRAVEL

- A. Pea Gravel will be measured and paid for per square foot which shall be full compensation for all labor, tools and incidentals necessary to complete the work.

END OF SECTION

SECTION 02745**HOT MIX ASPHALT PAVEMENT****PART 1 - GENERAL****1.01 DESCRIPTION:**

- A. This section specifies the construction of hot mix asphalt (HMA) pavement.
- B. Related Sections:
 - 1. Section 01300: Submittals

1.02 SUBMITTALS:

- A. Contractor shall submit to the Engineer for approval a mix design and a proposed paving plan, including production plants, location of plants with respect to the project site, equipment, and material sources. Submittals for mix design approval shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13.
- B. In accordance with SECTION 01300 SUBMITTALS, the Contractor shall submit to the engineer:
 - 1. Mix design
 - 2. Paving plan
 - 3. Production plants

4. Location of plants
5. Equipment
6. Source information

1.03 EQUIPMENT:

- A. All equipment, including the production plant and paving equipment, shall be subject to approval by the Engineer. The plant shall be ready for inspection by the Engineer at least 48 hours prior to the start of the construction operations.
- B. Pavers
 1. Pavers will be inspected and approved by the Engineer based upon requirements in the manufacturer's specification manual with a copy to be provided by the Contractor. The paver shall be a self-contained, power propelled unit capable of spreading the mixture true to line, grade and cross slope. The paver shall be equipped with a screed or strike off assembly, which can produce a finished surface of the required smoothness and texture without tearing, shoving or gouging the mixture. The paver shall have automatic controls for transverse slope and grade. Controls shall be capable of sensing grade from an outside reference line or ski and sensing the transverse slope of the screed to maintain the required grade and transverse slope within plus or minus 0.1 of the required slope percentage.
 2. Manual operations will be permitted in the construction of irregularly shaped and minor areas, or where directed by the Engineer.
 3. Whenever a breakdown or malfunction of any automatic control

occurs, the equipment may be operated manually for the remainder of the workday as directed by the Engineer.

4. Reference lines or other suitable markings to control the horizontal alignment shall be provided by the Contractor, subject to the approval of the Engineer.
 - D. Rollers: Rollers shall be self propelled, reversible, steel wheeled or pneumatic tired. Vibratory rollers may be used, except they shall not be in vibratory mode when paving on surface courses without the approval of the Engineer. Pneumatic tire rollers shall have multiple tires of equal size with smooth tread. Wheels shall be arranged to oscillate in pairs, or they may be individually sprung. Tires shall be uniformly inflated at the operating pressure approved by the Engineer. The Contractor shall furnish the Engineer a manufacturer's table showing this data. The difference in tire pressure between any two tires shall not be greater than 5 psi. The Contractor shall provide a means for checking the tire pressure on the job at all times.

PART 2 - PRODUCTS

A. MATERIALS:

- A. Hot Mix Asphalt shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13 with the following addition to the Chart in Section 20.13-4 Paragraph 1:

<u>SIEVE SIZE</u>	<u>SC (Percent Passing)</u>
¾ in.	100
½ in.	86 – 99
3/8 in.	70 – 94
No. 4	35 – 68

No. 8	24 – 52
No. 16	16 – 36
No. 30	10 – 26
No. 50	7 – 18
No. 200	2 – 9

Add to the Marshall Test Requirements:

	<u>SC</u>
Stability, min., lb	1500
Flow 0.01 in.	8 – 18
Voids, mineral aggregate, % min.	15
Voids, total mix %	3 – 5
Compaction blows used	75

The Surface Course shall consist of Bituminous Concrete Band SC.

- B. **PRODUCTION PLANTS:** Production Plants shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13-5.

PART 3 - EXECUTION

3.01 WEATHER:

- A. Pavement shall be placed only when the ambient air and surface temperature is at least 40° F and rising for surface course and at least 32° F and rising for base courses. The base shall be clean and dry and approved by the Engineer before HMA paving begins. HMA pavement shall not be placed on a frozen base. When weather conditions differ from these limits,

material en route from the plant to the job site may be used at the Contractor's risk. If placement of the material is stopped by the Engineer, all material en route shall be wasted at the Contractor's expense.

3.02 FOUNDATION PREPARATION:

- A. Prior to placement of paving material, the foundation shall be constructed as specified in the Contract Documents and approved by the Engineer. When paving over existing pavement, all excess crack filling or patch material shall be removed and all spalls and potholes shall be cleaned, tack coated, filled and tamped with hot mix asphalt before placement. Manholes, valve boxes, inlets, and other appurtenances within the area to be paved shall be adjusted to grade as directed by the Engineer.
- B. Curbs, Gutters, and Other Supports: Where permanent curbs, gutters, edges, and other supports are planned, they shall be constructed and backfilled prior to placing the HMA, which shall then be placed and compacted against them.

3.03 TACK COAT:

- A. Prior to application of the tack coat, the surface shall be cleaned of all loose and foreign materials. The tack coat shall be uniformly applied to the surface by full circulation spray bars that are laterally and vertically adjustable and provide triple fanning and overlapping action so that the resulting coating shall be residual asphalt applied at a rate of 0.01 to 0.05 gal/yd² as directed by the Engineer.

3.04 HOT MIX ASPHALT PLACEMENT:

- A. HMA shall be placed by the paver. Delivery of the mixture by the hauling units and placement shall be continuous. The temperature of the mixture shall not be less than 225° F at the time of placement. Broadcasting of loose mixture over the new surface will not be permitted.

3.05 COMPACTION:

- A. Immediately following placement of the HMA, the mixture shall be compacted by rolling to an in-place density of 92.0 to 97.0 percent of the maximum density. In-place compaction shall be completed before the mixture cools below 185° F, as determined by a probe type surface thermometer, supplied by the Contractor and approved by the Engineer.
- B. Rollers shall start at the sides and proceed longitudinally toward the center of the pavement. Successive trips of the roller shall overlap by at least one half the width of the roller, and alternate trips shall not end at the same point. After rolling is completed, no traffic of any kind will be permitted on the pavement until the pavement has cooled to less than 140° F or as directed by the Engineer.

3.06 JOINTS:

- A. Both longitudinal and transverse joints in successive courses shall be staggered so that one is not above the other. Transverse joints shall be staggered by the length of the paver. Longitudinal joints shall be staggered a minimum of 6 in.
- B. Joints shall be constructed to provide a continuous bond between the old and new surfaces. Joints shall be coated with tack coat as directed by the Engineer. In the case of surface course, the edge of the existing pavement shall be cut back for its full depth on transverse joints to expose a fresh surface and the surface shall be coated with tack coat material as directed by the Engineer. Before placing the mixture against curbs, gutters, headers, manholes, etc., all contact surfaces shall be coated with tack coat.

3.07 FIELD QUALITY CONTROL:

- A. Acceptance will be determined by nuclear in-place density test data. The nuclear gauge shall be calibrated in conformance with MSMT 417.

- B. The Contractor shall take a one-minute special calibration nuclear test from each lift. A special calibration nuclear test is defined as an average of two (minimum) special calibration readings taken at the same location after rotating the nuclear gauge 180 degrees.
- C. Nuclear test-in-place density data shall be expressed as percentage of the maximum specific gravity determined for each day's production. The in-place density shall be 92.0 to 97.0 percent.

PART 4 - MEASUREMENT AND PAYMENT

4.01 HMA SUPERPAVE SURFACE COURSE & WEDGE/LEVEL 9.5MM PG 64-22:

- A. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.02 HMA SUPERPAVE SURFACE COURSE 12.5MM PG 64-22:

- A. HMA Superpave Surface Course 12.5 MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Surface Course 12.5 MM PG 64-22 will be paid per ton,

complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.03 HMA SUPERPAVE BASE COURSE 19MM PG 64-22:

- A. HMA Superpave Base Course 19MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Base Course 19MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.01 PRICE ADJUSTMENT FOR ASPHALT BINDER:

Price Adjustment (PA) will be made to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of asphalt binder.

For adjustment purposes, the prevailing base index price will be the price specified for PG 64-22 Asphalt Binder posted at www.roads.maryland.gov (Business Center/Contracts Bids and Proposals) at time of bid opening. Cost differentials between PG 64-22 and a binder specified shall be included in the price bid per ton for Hot Mix Asphalt. A historical database will be maintained by the State Highway Administration. The base index price for PG 64-22 Asphalt Binder for November 2011 is \$591.25 per ton.

The PA will be made when the index price for the month of placement increases or decreases more than 5 percent of the prevailing base index price.

Computations will be as follows:

$$\text{Percent Change} = ((P_p - P_b) / P_b) \times 100$$

$$PA = T \times Q \times (P_p - (D \times P_b))$$

Where:

PA = Price Adjustment for the current month

T = Design target asphalt content expressed as a decimal

Q = Quantity of Hot Mix Asphalt placed for the current month

P_p = Index price for PG 64-22 Asphalt Binder per ton for the month of Placement

D = 1.05 for increases over 5 percent; 0.95 for decreases over 5 percent

P_b = Prevailing base index price for PG 64-22 Asphalt Binder per ton

PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Asphalt Binder. The item amount will be established by the Administration and shall not be revised by the Contractor. PA resulting in a decreased payment will be deducted from monies owed the Contractor.

END OF SECTION

SECTION 02766**PRE-CUT INLAID THERMOPLASTIC DECORATIVE CROSSWALK****PART 1: GENERAL****1.01 DESCRIPTION**

- A. Decorative HMA pavement marking system that uses specialized pre-formed thermoplastic inlaid into HMA pavement to create the pattern and colors shown in the play set.

1.02 REFERENCES

- A. **ASTM D570** Standard Test Method for water absorption of plastics.
- B. **ASTM D36** ASTM D36-06 Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus).
- C. **AASHTO T250** Binder Content
- D. **ASTM D792** Standard Test method for density and specific gravity (relative density) and density of solid plastics.
- E. **AASHTO T250** Low Temperature Stress resistance
- F. **ASTM D 2240** Standard Test Method for Rubber property – Durometer hardness.
- G. **ASTM D256, Method A** Standard Test Method for determining the IZOD pendulum impact resistance of plastics.
- H. **ASTM D92** Test Method for Flash points.
- I. **California Skid test method 342** completed by Skidtest Enterprises, Inc. report date September 19, 2005.

PART 2: PRODUCTS**2.01 THERMOPLASTIC**

A. Thermoplastic shall be provided as pre-cut panels in sizes to conform to the specified pattern, widths and shapes. Thermoplastic shall be packaged in accordance with accepted commercial standards and if stored, placed indoors in a cool dry area.

B. Characteristics of thermoplastic:

1. The thermoplastic must consist of homogeneously mixed non-hazardous polymer resins, pigments, fillers consisting of TiO_2 and CaCO_3 , fibers, and, for applications requiring retro-reflectivity, glass beads can be added. No solvents or volatiles are used in the formulation.
2. The thermoplastic shall be supplied preformed or precut at a standard thickness of 90 mils (2.30 mm).
3. The thermoplastic must be provided as non-reflective.
4. Upon heating to application temperature, the thermoplastic must flow and preserve the integrity of its properties including its color.
5. Environmental and Chemical Resistance: thermoplastic is resistant to deterioration when exposed to sunlight, gasoline, oil, salt, water or adverse weather conditions.
6. Professional independent testing using California Skid Test Method 342 concluded that there is no reduction in the skid factor where the thermoplastic is inlaid into the HMA pavement. Refer to References Section. This report is available from Integrated Paving Concepts Inc. upon request.

7. Storage Life: thermoplastic can be able to be stored for a period of 12 months if stored indoors at room temperature (21°C +/-3°C) (70°F +/-5°F).
8. The thermoplastic must be suitable for application on high quality, stable HMA pavement both new and old. Under normal conditions, bond strength on HMA pavement surfaces shall be sufficient for the material to remain in place for a number of years.

Characteristic	Test Method	Typical Results of required thermoplastic
Water Absorption	ASTM D570	0.27%
Binder Content	AASHTO T250	20.01% with d.o. beads
Softening point	ASTM D36	240°F
Low Temp. Resistance @ 15°F	AASHTO T250	No visual cracks
Specific Gravity	ASTM D792	2.00
Indentation resistance @ 110°F for 15 sec.	ASTM D 2240 (after flaming)	43 (Shore A)
Impact Resistance	ASTM D256, Mtd A	4.9+ N-m
Flash Point	ASTM D92	500°F

PART 3: EXECUTION

3.01 GENERAL

- A. Thermoplastic shall be supplied and installed only by an **Accredited Applicator** or an applicator authorized by manufacturer, in accordance with the plans and specifications or as directed by the Owner. In any circumstance, do not begin installation without confirmation of Applicator accreditation or authorization.

3.02 EQUIPMENT

- A. The following equipment is an integral part of the proper execution of the installation process. This equipment can only be used by **Accredited applicators**.

1. **Plastic Templates** are used for imprinting the specified pattern into the HMA pavement. Templates are thicker than the thermoplastic to enable the applicator to ensure the top of the inlaid thermoplastic is slightly lower than the surrounding HMA pavement surface. Templates shall be supplied by manufacturer.
2. **Re-Heat Equipment.** Mobile equipment designed specifically to elevate the temperature of the HMA pavement without adversely affecting it shall be used. The equipment shall be able to monitor the temperature of the HMA pavement and the thermoplastic at all times during the pavement re-heating process.
3. The **Hand Held finishing tool** shall be used to complete the imprinting of the HMA pavement in areas around permanent structures such as curbs and manholes covers which may be inaccessible to the template.

- B. **Vibratory Plate Compactors** shall be used for pressing the plastic templates into the heated asphalt to create the specified pattern. Please note that Integrated Paving Concepts does not supply Vibratory Plate Compactors.

3.03 HMA PAVEMENT

A. Pre-Conditions – HMA Pavement

1. Thermoplastic shall be a pavement marking system designed so that the HMA pavement surrounding the thermoplastic absorbs the physical effects of the traffic. When installed in accordance with recommended installation guidelines by an **Accredited Applicator**, the installed thermoplastic will wear at a similar rate as the surrounding HMA pavement. Therefore the life of the pavement marking system is dependent upon using a long lasting, durable and stable HMA pavement that will not wear prematurely.
2. This Section is to be used as a guide towards achieving a high quality HMA pavement. It does not supersede other specifications pertaining to this Work, nor does it replace recommendations made by the engineer of record for this Work.

B. Pre-requisites for new HMA pavement:

1. Stable sub-grade or base over which the HMA pavement is laid.
2. Proper mix design for the traffic loads.
3. Proper placement and compaction practices.

C. Sub-grade:

1. The sub-grade must be stable and should be inspected to identify any areas of soft or yielding soil that are too weak to properly support the paving equipment. These soft spots must be over-excavated and re-compacted to meet the engineer's requirements. Prior to paving, the sub-grade and base courses must be thoroughly and uniformly compacted, properly graded and constructed in accordance with the

engineer's specifications. Please refer to the related sections for more exact requirements of this work.

D. Guidelines for HMA pavement mix design.

1. A durable, stable mix design is a pre-requisite for all long-lasting HMA pavement surfaces, especially those that will experience vehicle traffic. The application of the thermoplastic does not change this requirement. **Generally, the HMA pavement mix design for roadways as prescribed by the local jurisdiction will be sufficient for the application of the thermoplastic.** Failure to use a stable mix design may lead to premature failure of the HMA pavement such as raveling, rutting or segregation. The appropriate pavement structure is not within the scope of this specification; however, this specification can offer some general guidelines as follows:
 - a. **Stability** is a good general guide: generally, if the surface course design has a minimum Marshall Stability of 10 KN (about 2250 lbs) and design densities are achieved during compaction, the pavement should perform adequately.
 - b. The nominal aggregate size for the HMA pavement should not be less than 3/8" or greater than 5/8".
 - c. If a more stable mix design than is offered by the locally prescribed surface course is required, contact the HMA producer, the engineer of record or Integrated Paving Concepts Inc. for suggestions as to how to increase stability.

E. Placement of New HMA Pavement

1. Successful placement of HMA pavement includes compaction of the mix when it is hot and compaction of the mix to the minimum densities required for the specified air voids. Generally, the first pass of the rollers is to be done when the asphalt mixture is at minimum 230°F (110°C); the compaction process must be **completed** before the **in-place** temperature of the mixture cools to 185°F (85°C) or higher

depending on the type of asphalt and/or modifiers used. For applications that will experience vehicle traffic and wherever it is possible, compaction is to be completed using a paving machine and a self-propelled roller.

2. **Handwork**, which includes placing and spreading by hand and the use of hand operated compaction equipment, should be restricted to areas that cannot be accessed by the paving machine or the self propelled rollers. Compaction must be completed when the pavement is hot as described above. Handwork is to be done carefully and the material distributed uniformly so there will be no segregation.
3. The pavement must be smooth, without seams and graded to achieve proper drainage.

F. Pre-requisites for existing pavement

1. Depending upon the condition and age, existing HMA pavement may or may not be suitable for the successful application of the thermoplastic. The **Accredited Applicator** can advise whether the HMA pavement is suitable or not.

G. Recommended guidelines for Mill & Fill applications.

1. A tack coat must be applied to ensure proper adhesion of the new HMA material to the old pavement substrate. A durable, stable mix design is a pre-requisite for all Mill & Fill applications - especially those that will experience vehicle traffic. The application of the thermoplastic process does not change this requirement. A minimum lift thickness of two inches is recommended. Due to the thin lift thickness, it is especially critical to ensure that the HMA concrete is compacted when it is hot. It is generally recommended to not proceed with a Mill & Fill pavement application when the outside air temperature is less than 50°F (10°C).

H. Pavement Marking Removal.

1. Because the aesthetics of the final product depends largely upon the condition of the HMA pavement, use of pavement marking removal methods is likely to produce a pavement surface that is unsatisfactory for the installation of the thermoplastic. A test area may be used to check if adequate or not. The Owner shall determine if the removal of the markings is satisfactory for the application of the thermoplastic. Work shall not proceed until this approval is granted.

3.04 SURFACE PREPARATION

- A. The HMA pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.05 PATTERN LAYOUT

- A. Layout of the pattern for imprinting into the surface of the HMA pavement shall be as per the drawings and specifications and in accordance to the methods prescribed by the thermoplastic applicator in conjunction with the **Owner**.

3.06 HEATING THE HMA PAVEMENT

- A. The Applicator shall follow the latest Recommended Application Procedure Guidelines as provided by Integrated Paving Concepts Inc. Primary heating of the pavement surface is accomplished with the **SR-120** or **SR-60** reciprocating infrared heaters.

1. **Pavement temperature.** The optimal pavement temperature for imprinting the template is dependent upon mix design, modifiers used in the mix, and the age of the pavement. Typically, the surface temperature of the pavement should not exceed 325°F as determined by an infra-red thermometer.

2. In order to achieve the proper depth of imprint it is important to elevate the HMA pavement temperature to a minimum depth of 1/2 inch (12.5mm) without burning the pavement surface.

3.07 SURFACE IMPRINTING

- A. Once the HMA pavement has reached imprinting temperature, the templates shall be placed and held in position then pressed into the surface using vibratory plate compactors. Once the top of the template is level with the surrounding HMA pavement, the template can be removed. Areas that have an imprint depth less than the depth of the template shall be re-heated and re-stamped prior to installing the thermoplastic.
- B. In areas difficult to get at with the template, or areas that have light print, the hand held finishing tool may be used to complete the imprint process.

3.08 INSTALLING THERMOPLASTIC

- A. The HMA pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.
- B. The pre-cut thermoplastic panels shall be installed within the imprinted depressions, ensuring the appropriate overlap at the thermoplastic joints.
- C. Heat shall be re-applied to the HMA pavement surface using appropriate heater, slowly raising the surface temperature until the thermoplastic panels start to liquefy and flow. The temperature shall be monitored to ensure the thermoplastic is not over-heated. The thermoplastic panel must be heated to its full depth in order for the thermoplastic material to melt and create a bond with the underlying HMA pavement.
- D. The joints between the thermoplastic pieces are to be melted together creating a seamless installation.

- E. Once the thermoplastic panel has been liquefied to its full depth, the heat source shall be removed and the surface allowed to cool.
- F. For applications when the outside air temperature is low, care must be taken to ensure the thermoplastic is thoroughly heated to assure a bond between it and the underlying HMA pavement. It is generally recommended to not proceed with the installation process when the outside air temperature is below 40°F (5° C).
- G. Do not install during periods of precipitation.
- H. Do not install when there is frost in the designated area.

3.09 PROTECTION AND OPENING TO TRAFFIC

- A. The melted thermoplastic is to be protected until it cools and hardens. Do not permit any debris such as dust, water, pollen etc to come in contact with the melted thermoplastic.
- B. The road may be opened to traffic once the thermoplastic has cooled to 140°F (60° C).

PART 4: MEASUREMENT AND PAYMENT

4.01 DECORATIVE CROSSWALKS

- A. Decorative Crosswalks will be measured per square foot and the measured area is the actual area of HMA pavement that has received the thermoplastic measured in place. No deduction will be made for the area(s) occupied by manholes, inlets, drainage structures, bollards or by any public utility appurtenances within the area.

- B.** Decorative Crosswalks will be paid for at the contract unit price per square foot. The payment will be full compensation for all be full compensation for all materials, tools, labor, equipment, fuel, and incidentals necessary to complete the work as specified.

END OF SECTION

SECTION 02820**ORNAMENTAL PICKET FENCE****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This work shall consist of furnishing and installing ornamental picket fencing with concrete foundations and ground embedded installations surrounding the parking lots or as directed by the Engineer.
- B. This work shall also consist of constructing Ornamental Brick Columns and bollards as specified in the contract documents or as directed by the engineer.

PART 2: PRODUCTS**2.01 ORNAMENTAL FENCE:**

- A. The manufacturer shall furnish certification as specified in TC-1.02. In addition, a sample of the fence fabric shall be submitted with the fabric certification.
- B. Concrete shall meet the follow:
 - 1. Compressive strength at 28 days, $f'_c = 3000$ psi
 - 2. Standard deviation of 450 psi
 - 3. Critical value of 3010 psi
 - 4. Minimum cement factor of 530 LB/cu yd
 - 5. Aggregate gradation for Portland cement concrete, $f'_c = 3000$ psi

MATERIAL		SIEVE SIZE						
		1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
Coarse Aggregate	57	100	95-100	-	25-60	-	0-10	0-5
	67	-	100	90-100	-	20-55	0-10	0-5

- 6. Maximum water cement ratio 0.50
- 7. Slump range 2 to 5 inches
- 8. Total air content 5 to 8 percent
- 9. Temperature range of mixture 70 °F with a range not to exceed 20 °F plus or minus

C. Picket – Made of hot-rolled structural steel of 3/4” square solid picket construction, 1.91 4#/ft, and having tensile strength of 50,000 psi. Tube shall be manufactured per ASTM A513. Tube shall be hot-dipped galvanized per ASTM A525-G90. Space between pickets shall be 2.5” on center.

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
¾”	Sq. Solid	1.914 lbs.	50,000 PSI

D. Rails – Made of hot-rolled structure steel, rolled into ‘U’ channel measuring 1 3/8” wide x 1 ½” deep x .120 wall thickness. Manufactured per ASTM A513 and hot-dipped galvanized per ASTM A525-G90.

E. Posts – Shall be hot-rolled structure steel 4” square. The wall thickness and weights are as follows:

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
4” Sq.	14 ga.	2.733 lbs.	45,000 PSI

Tube shall be manufactured per ASTM A513. Tube shall be hot-galvanized per ASTM A525-G90.

F. Rail Attachment Brackets – Shall be hot-rolled structure steel 2” square. The wall thickness and weights are as follows:

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
2” Sq.	14 ga.	2.733 lbs.	45,000 PSI

Tube shall be manufactured per ASTM A513. Tube shall be hot-galvanized per ASTM A525-G90.

- G. Rail Attachment Brackets – Die cast of Zink (ZAMAK #3 alloy) per ASTM 886-83Z 33521. Ball and socket design capable of 30-degree swivel (up/down-left/right). Bracket to fully encapsulate rail end for complete security that is aesthetically pleasing.
- H. Finials – Cast gray iron with minimum 20,000 PSI. Hot-dipped galvanized per ASTM A525-G90,
- I. All metal surfaces to have galvanized undercoat, cleaned and phosphate treated; given non-chromated seal rinse and baked dry. Surface finish shall be polyester resin-based powder coating applied by electrostatic spray to a thickness of 2.5 mils; baked in a 450° F oven for 20 minutes. Color black.

2.02 BOLLARDS:

- A. Materials: Per the details in the plans
- B. Painting System:
 - 1. Alkyd Systems
 - a. Gloss Finish:
 - 1st Coat: S-W Kem Kromik Metal Primer, B50 Series (8 mils wet, 3 mils dry)
 - 2nd Coat: S-W Industrial Enamel, B54 Series
 - 3rd Coat: S-W Industrial Enamel, B54 Series (4 mils wet, 2 mils dry per coat)
 - 2. Silicone Alkyd Systems
 - a. Gloss Finish:
 - 1st Coat: S-W Kem Kromik Metal Primer, B50 Series (6 mils wet, 3 mils dry)
 - 2nd Coat: S-W Silicone Alkyd Enamel, B56 Series
 - 3rd Coat: S-W Silicone Alkyd Enamel, B56 Series (5 mils wet, 2 mils dry per coat)

2.03 ORNAMENTAL BRICK COLUMNS:

- A. Base Course
 - 1. Base course shall be aggregate material to conform to 2A Material
- B. Concrete
 - 1. The Concrete shall have a minimum compressive strength of 3,500 PSI. Portland cement shall conform to ASTM C 150, Type I, II or V depending on soil conditions. Aggregate shall conform to ASTM C 33.
 - 2. In freeze thaw areas, an air-entraining agent complying with ASTM C 260 shall be used in accordance with the published recommendations of the Portland Cement Association and the American Concrete

Institute. Mixing water shall be fresh, clean and potable. No admixtures containing calcium chloride are permitted.

- C. Concrete Masonry Unit
 - 1. The Concrete Masonry Unit (CMU) shall conform to the following:
 - a. ASTM C-90
 - b. Nominal Face dimensions: 8 in. x 16 in.
 - c. Linear shrinkage shall not exceed 0.065
 - d. Units shall be manufactured with aggregates conforming to ASTM C-33 and C-331.
 - e. Testing of units shall be overseen by a certified laboratory technician of an accredited testing agency.
- D. Reinforcement Steel
 - 1. #4 Epoxy Coated Steel Rebar to conform to Section 709.1
- E. Grout
 - 1. Grout shall be waterproof and non-shrink grout for concrete masonry use to conform to Section 705.7
- F. Clay Masonry Unit – Brick Veneer
 - 1. All brick specified or shown on project documents shall conform to the following:
 - a. ASTM C-216, Grade SW, Type FBS.
 - b. Dimensions (1 ½” x 3 ¾” x 8”).
 - c. Brick shall be a red brick color.
 - d. Minimum compressive strength of 12,000 psi.
 - e. Test result showing no efflorescence.
 - 2. Brick provided shall be similar in texture and physical properties to those approved samples available for inspection at the Architect/Engineer's office. In addition, brick provided shall not exceed the variation of color and texture of the approved sample.
 - 3. Bonding
 - a. Bond shall be running bond unless otherwise specified.
 - 4. Tooling and Pointing
 - a. Tool mortar joints to a concave appearance unless otherwise specified.
 - 5. Cleaning
 - a. Cleaning shall be performed per cube tag instructions.
 - 6. The work shall include all labor, forms, tools, transportation and incidentals necessary to complete the installation as per the manufacturer's recommendations. Brick shall be installed by a Licensed Concrete Contractor with at least 5 years of experience in brick veneer installation. Submit catalogue technical data to Engineer for approval.
- G. Precast Concrete Pillar Cap
 - 1. Pillar caps to be precast Portland cement concrete with sandblasted finish molded to fit on top of the monument pillars. Pillar cap is to be stained beige.

- H. In-Set Precast Plaque
 - 1. In-set plaques to be furnished by a licensed manufacturer. Plaques to be 18"x18"x3" panel supplied by artist and affixed to precast concrete inlay. Concrete in-lay to be 22"x22" with a 18"x18"x1" with 2" edge in-set for plaque. Artwork is to be provided by others. Precast Plaque shall match Concrete Pillar Cap and be stained beige.
- I. Hardware
 - 1. All wall hardware, including wall ties, anchors, washers, nuts and bolts, to be epoxy coated steel.
- J. Sample
 - 1. Contractor shall provide a sample of the brick finish and precast concrete stain finish to the landscape architect for approval at least 30 days prior to installation

PART 3: EXECUTION

B. GENERAL INSTALLATION REQUIREMENTS:

- A. The Contractor's activities and operations shall be confined to the area immediately adjacent to the fence lines and within the property except that permission may be granted by the Engineer for normal construction activities through lands owned by or under control of the Administration.
- B. All posts shall be plumbed. The posts shall be spaced as uniform as practicable to the spacing as specified in the Contract Documents with a tolerance of minus 2 feet.
- C. Terminal posts shall be installed at all ends, abrupt changes in grade and at changes in the horizontal alignment over 15 degrees.
- D. Post caps are required for all posts.
- E. Sections shall be assembled using 3 rails that are punched out to insert pickets through them. Pickets are riveted to rails using a ¼ inch industrial drive rivet #MIW381080691 through pre-punched holes.
- F. Rails are attached to posts by means of rail brackets. Rail brackets are attached to posts using a ¼ inch bolt and lock nut. Brackets are attached to the rails using ¼ inch industrial drive rivets.
- G. For the barrier attached fence the existing chain link fence shall be removed and exposed of and the new ornamental fence posts shall be secured to the top of the retaining wall either by using the existing PVC sleeve in the barrier along with an engineer approved epoxy or by using an

attachment method as recommended by the manufacturer or as directed by the Engineer.

C. CONCRETE:

- A. Concrete posts shall be centered in the concrete footings. The concrete shall be thoroughly compacted around the post by rodding or vibrating. The finished top surface shall be troweled to a smooth finish slightly above the ground line and uniformly sloped to drain away from the post. The post shall not be disturbed in any manner within 72 hours after the individual post footing is completed.
- B. Hand mixed concrete shall not be used without written permission from the Engineer. When permitted, the hand mixed batch shall not exceed ½ cubic yard.
- C. Where rock is encountered at a depth less than the specified footing depth, a hole 1 inch larger than the greatest dimension of the post shall be drilled to a depth of 12 inches or to the planned footing depth, whichever is less. After the post has been set, the remainder of the drilled hole shall be filled with grout composed of one part Portland cement and two parts mortar sand by dry loose volume. The space above the rock shall be filled with concrete.

3.03 ORNAMENTAL BRICK COLUMNS:

- A. General
 - 1. Installation shall not take place during any precipitation or upon frozen substrate. Air temperatures should remain above 40°F while concrete is poured and sets.
- B. Excavation
 - 1. Verify areas to receive ornamental brick columns are completed to final grades and elevations. Ensure property lines and legal boundaries of work are clearly established. Confirm location of underground utilities and verify that no underground utilities will be impacted.
 - 2. The excavation area shall be shored, braced or otherwise supported to assure that there is no settlement, movement or damage to adjacent areas. Excavated material shall not be placed in a manner that damages property or endangers the excavation site. All suitable backfill material shall be stored nearby. Unsuitable backfill material shall be removed and disposed in an approved disposal area.
 - 3. The elevation for the footings in the contract documents shall be considered approximate. The engineer may direct the contractor to adjust the footing elevation to accommodate site restraints or assure proper foundation. Footings shall be set on suitable foundation material. Subgrade shall be compacted to 95% compaction or as directed by the engineer.

C. Installation

1. The contractor shall follow the specifications and details shown on the Landscape Plan and Detail sheets, per manufacturer's recommendations, approved shop drawings and as directed by the engineer.
2. After proper curing time, prepare the surfaces for application of the approved concrete brick veneer. Clean the surface of the fresh concrete to remove all laitance, dirt, grease, form oils, efflorescence and any other foreign materials. Do not sand blast, however, pressure washing is acceptable once concrete is set. Brick veneer shall be installed by a Licensed Mason with at least 5 years of experience in brick installation and in accordance with the details provided.
3. Contractor shall install pre-cast concrete inlays as shown on the Landscape Plan and Detail sheets.
4. Grout and tool the finish in accordance with the manufacturer's specifications.

PART 4: MEASUREMENT AND PAYMENT**4.01 3 & 5 FOOT ORNAMENTAL FENCE:**

- A. 3 & 5 Foot Ornamental Fence will be measured per linear foot measured to centers of end posts.
- B. 3 & 5 Foot Ornamental Fence will be paid for at the contract unit price bid per linear foot, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

4.02 BOLLARDS:

- A. Bollards will be measured per each.
- B. Bollards will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, utility coordination, and all work incidental to complete the item as specified.
- C. The removal and disposal of curb stops will be incidental to the installation of bollards in Parking Lot A.

4.03 ORNAMENTAL BRICK COLUMNS

- A. Ornamental Brick Columns will be measured per each.
- B. Ornamental Brick Columns will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

END OF SECTION

SECTION 02825**SQUARE 16 FOOT STEEL SHELTER****PART 1: GENERAL****1.01 DESCRIPTION**

- A. Square Steel Shelter, sixteen (16) feet by sixteen (16) feet as shown in plan set.

- B. UPB HEIGHT: Under Perimeter Beam is the clearance height under the structure. It indicates the lowest height of a member from finish grade for clearance under the structure. This is generally the clearance under the eave fascia board. The UPB Height is 7'-6".

1.02 QUALITY ASSURANCE**A. MANUFACTURER QUALIFICATIONS:**

- 1. Minimum of 10 years in the shelter construction industry.

- 2. Full time on-staff Licensed Engineer.

- 3. Full time on-staff AWS Certified Welding Inspector.

- 4. Full time on-staff Quality Assurance Manager.

5. All welders AWS Certified.
6. Manufacturer owned and controlled finishing system to include shot blast, pretreatment, primer, and top coat.
7. Published Quality Management System.
8. Annual audit of Quality System and Plant Processes by Third Party Agency.
9. Annual audit of powder coat finish system by Third Party Agency (PCI).

B. MANUFACTURER'S CERTIFICATONS:

1. PCI 4000 S Certified, Certification thru PCI for original equipment manufacturers (OEMs) to evaluate process on entire finish system to add powder coat over steel.

1.03 MANUFACTURER WARRANTY

- A. Shelter must have a 10-year limited warranty on steel frame members.
- B. Shelter must have a 10-year limited warranty on paint system.
- C. Pass through warranty of Metal Roof manufacturer shall be provided upon request.

1.04 REFERENCES

A. REFERENCE STANDARDS:

1. AISC - American Institute of Steel Construction Manual of Steel Construction.
2. ASTM - American Society for Testing and Materials.
3. AWS - American Welding Society.
4. LEED - Leadership in Energy and Environmental Design.
5. OSHA – Occupational Safety and Health Administration Steel Erection Standard 29 CFR 1926 Subpart R-Steel Erection.
6. PCI - Powder Coating Institute.
7. SSPC - Steel Structures Painting Council.

1.05 SUBMITTALS

A. Shop Drawings. Contractor shall submit shop drawings to the Engineer or Landscape Architect for approval prior to installation. Shop Drawings shall include schedule and details.

B. Foundation Design:

1. The shelter shall be set on foundations designed by manufacturer.
2. Foundation materials shall be provided by contractor.
3. Owner shall provide manufacturer with complete information about the site including soil bearing capacity and lateral load capacity.
4. If soil data are not provided, foundations will be designed to the minimum values identified in the governing building code.

C. Calculations and Submittal drawings. **Contractor shall include, at a minimum:**

1. Calculations:

- a. References to building codes and design manuals used for calculations.
- b. Identification of lateral force resisting system.
- c. Formulas used for determining snow, wind, and seismic loads to specific project location.
- d. Three dimensional modeling input, model geometry, and analysis results.
- e. Member design results and controlling load combinations.
- f. Connection design for structural bolts, welds, plate thicknesses, and anchorage to the foundation.
- g. Foundation designs must include the required combinations of gravity and lateral loads.

2. Submittal Drawings:

- a. Anchor bolt layout.
- b. Foundation design.

- c. Three dimensional views of frame.
- d. Member sizes and locations.
- e. Structural connection details, including bolt sizes and plate thicknesses.
- f. Roof trim and connection details.

1.06 INSTALLERS STORAGE AND HANDLING

- A. Protect building products after arrival at destination from weather, sunlight, and damage.
- B. Installer shall store product elevated from soils to allow air circulation and to not introduce mold, fungi decay or insects to the product.
- C. Product must be handled with protective straps or padded forks if lifting with mechanical equipment. Use of chain or cable to lift product into place will not be accepted.

PART 2: PRODUCTS

2.01 GENERAL

- A. The pre-engineered package shall be pre-cut unless otherwise noted and pre-fabricated which will include all parts necessary to field construct the shelter. The shelter shall be shipped knocked to minimize shipping expenses. Field labor will be kept to a minimum by pre-manufactured parts. Onsite welding is not necessary.

2.02 MANUFACTURERS

- A. The product shall be designed, produced, and finished at a facility owned and directly supervised by the supplier who has a minimum of ten years under same ownership making pre-manufactured shelters.

B. Substitution Limitations:

1. Substitutions must be approved a minimum of ten (10) days before bid. All approved manufacturers shall be notified in writing before the bid date and shall not be allowed to bid without written notification.
2. Alternate suppliers must meet the qualifications and provide proof of certifications listed under Section 1.02 QUALITY ASSURANCE.
3. Staff members' cumulative experience in fabrication will not be an acceptable alternative for manufacturer's experience in the shelter construction industry.

2.03 REINFORCED CONCRETE

- A. Concrete shall have minimum 28-day compressive strength of 3,000 psi and slump of 4" (+/- 1"), unless otherwise noted on the drawings.
- B. Reinforcing shall be ASTM A615, grade 60.

2.04 STEEL COLUMNS:

- A. Hollow structural steel tube minimum ASTM A500 grade B with a minimum wall thickness of 3/16".
- B. Unless columns are direct buried, columns shall be anchored directly to concrete foundation with a minimum of four anchor rods to meet OSHA requirement 1926.755(a)(1).

2.05 STRUCTURAL FRAMING:

- A. Hollow Structural Steel tube minimum ASTM500 grade B. "I" beams, tapered columns, or open channels shall not be accepted for primary beams. Frame will have a **STANDARD POLI-5000 \ HOT DIP GALVANIZED**
- B. Color chosen from manufacturer's standard color chart: Off-white/ Almond

2.06 COMPRESSION MEMBERS:

- A. Compression rings of structural channel or welded plate minimum ASTM A36 or compression tubes or structural steel tube minimum ASTM A500 grade B shall only be used.

2.07 CONNECTION REQUIREMENTS:

- A. Anchor bolts shall be ASTM F1554 (Grade 36) unless otherwise noted.
- B. Structural fasteners shall be zinc plated ASTM A325 high strength bolts and A563 high strength nuts.
- C. All structural fasteners shall be hidden within framing members wherever possible.
- D. No field welding shall be required to construct the shelter.
- E. All welds shall be free of burrs and inconsistencies.
- F. All exposed fasteners shall be painted by manufacturer prior to shipment to match frame or roof colors as applicable.
- G. Manufacturer shall provide extra structural and roofing fasteners.

2.08 STEEL ROOF

- A. Roofing shall be 24 gauge ribbed galvalume steel sheets, with ribs 1 3/16" high and 12" on center.
- B. Roof surface shall be painted with Kynar 500 to the manufacturer's standard color: **Regal Blue**. Ceiling surface shall be a "wash coat" primer in: **Almond**.

- C. Roof panels shall be factory precut to size and angled to provide ease of one-step installation.
- D. Metal roofing trim shall match the color of the roof and shall be factory made of 26 gauge Kynar 500 painted steel.
- E. Trim shall include panel ridge caps, hip caps, eave trim, splice channels, rake trim, roof peak cap, and corner trim as applicable for model selected. Trim may need to be cut to length and notched. Reference drawings for additional information.
- F. Ridge, hip, and valley caps shall be pre-formed with a single central bend to match the roof pitch and shall be hemmed on the sides.
- G. Roof peak cap shall be pre-manufactured.
- H. Manufacturer must supply painted screws and butyl tape.

2.09 FINISHES

A. STANDARD POLI-5000 FINISH:

- 1. Steel shall be cleaned, pretreated, and finished at a facility owned and directly supervised by the manufacturer.

2. Steel shall be shot blasted to SSPC-SP10 near-white blast cleaning. SSPC-SP2 hand tool cleaning will not be an acceptable alternative.
3. Parts shall be pretreated in a 3 stage iron phosphate or equal washer.
4. Epoxy primer powder coat shall be applied to parts for superior corrosion protection.
5. Top coat of Super Durable TGIC powder coat shall be applied over the epoxy primer. Color shall be: **Almond**; as shown in plan set.
6. Finish shall not have any VOC emissions.
7. Sample production parts shall have been tested and meet the following criteria:
 8. Salt spray resistance per ASTM B 117/ ASTM D 1654 to 5,000 hours with no creep from scribe line and rating of 10.
 9. Humidity resistance per ASTM D2247-02 to 3,000 hours with no loss of adhesion or blistering.
 10. Color/UV resistance per ASTM G154-04 to 2,000 hours exposure, alternate cycles with results of no chalking, 75% color retention, color variation maximum 3.0 E variation CIE formula (before and after 2,000 hours exposure).

11. The manufacturer shall be PCI 4000 S Certified

12. Exposed fasteners for frame and ornamentation shall be powder coated to match structure.

B. HOT DIP GALVANIZED FINISH:

1. Steel members, fabrications and assemblies shall be galvanized after by the hot dip process in accordance with ASTM A123. The composition of metal in the galvanizing bath shall be no less than 98% zinc.

2. The galvanized coating shall be continuous, adherent, free from any detrimental defect.

PART 3: EXECUTION

3.01 GENERAL

- A. Install all components according to manufacturer's installation instructions and these specifications.

- B. Tolerances on steel structural members are set according to AISC construction practices, abided in the factory, and cannot be increased. No field slotting or opening of holes will be allowed. It is therefore essential that contractors conform to the tolerances specified on the installation drawings for anchor bolt or column layout details.

- C. OSHA Compliance to Steel Erection Standard 29CRF 1936 Subpart R-Steel Erection.

3.02 FOUNDATIONS

- A. The shelter shall be placed on foundations designed by an engineer retained by owner, with materials provided by others. Design approved by the Engineer of Record

3.03 INSTALLATION

- A. The contractor shall follow the specifications and details shown on the Landscape Plan and Detail sheets, per manufacturer's recommendations, approved shop drawings and as directed by the engineer.

3.04 REPAIR

- A. Do not attempt any field changes without first contacting Manufacturer.

PART 4: MEASUREMENT AND PAYMENT

4.01 SQUARE 16 FOOT SHELTER

- A. Square 16 Foot Shelter shall be measured and paid for per each complete and in place. Payment shall be full compensation for materials, accessories, submittals, construction, labor, tools, transportation and incidentals necessary to complete the work as specified.

END OF SECTION

SECTION 03300**CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.01 DESCRIPTION:**

This Section includes specifications for designing, furnishing, erecting, and removing formwork for cast-in-place concrete; constructing expansion and contraction joints and waterstops for cast-in-place concrete structures; placing, curing, protecting, and finishing cast-in-place concrete; and furnishing and placing grout.

Related Work Specified Elsewhere:

1. Section 01300 - Submittals
2. Section 03050 - Portland Cement Concrete
3. Section 03210 - Reinforcing Steel

A. DESIGN CRITERIA:

Formwork:

Design for the loads and lateral pressure outlined in ACI 301 and other loads indicated.

Design considerations and allowable stresses in accordance with ACI 301 and other requirements indicated.

Maximum deflection of facing materials reflected in concrete surfaces exposed to view shall not exceed 1/240 of the span between braces, walers, ties or other structural members.

Design forms to have sufficient strength to carry the dead weight of the concrete as a liquid, without appreciable deflection. If any such deflection occurs, it shall be sufficient cause for rejection of the work.

Where necessary to maintain the tolerances indicated, camber the formwork to compensate for anticipated deflections due to the weight and pressure of the fresh concrete and due to construction loads.

Design forms to provide the finishes specified in Article 1.05 herein.

B. QUALITY ASSURANCE:

Formwork Tolerances:

ACI 301

As specified for special concrete tolerances.

Concrete Tolerances:

Finish Tolerances:

- a. Class A: 1/8 inch maximum deviation from 10 foot long straightedge placed anywhere on the surface.
- b. Class B: 1/4 inch maximum deviation from 10 foot long straightedge placed anywhere on the surface.
- c. Class C: 1/4 inch maximum deviation from 2 foot long straight edge placed anywhere on the surface.
- d. Top concrete surface of platforms, landings, pedestrian ramps, and sidewalks: Class A.
- e. Trackside edge of station platforms: Class A.
- f. Base courses: Class C.
- g. All other surfaces: Class B.

Maximum allowable Deviation from dimensions, elevations, slopes and positions, as indicated:

- a. Footings:
 - i. Width, depth, and length: No plus limit; minus tolerance not more than 1/2 inch.

- ii. Misplacement or eccentricity: 2 inches.
 - iii. Elevation of top: Plus or minus 1/4 inch.
- b. Top of base courses to receive No. 5 finish: adjust to provide finish surface tolerance.
- c. Top of all other base courses: Plus 0, minus 3/4 inch from course profile elevation at every point and if slope is indicated, plus or minus 1/4 inch in 10 feet.
- d. Top of track slab finish course: Plus or minus 1/4 inch from finish profile grade at every point and plus or minus 1/8 inch in 10 feet for longitudinal and transverse slope.
- e. Top of station platform concrete finished surface above top of rail: Plus or minus 1/4 inch.
- f. Horizontal distance from centerline of track to edge of station platform: minus 1/8 inch, plus 1/4 inch at all points.
- g. Safety walks: Plus or minus 1/4 inch vertical and horizontal.
- h. Top elevation of slabs not otherwise specified: Plus or minus 1/2 inch at each point; and if slope is indicated, plus or minus 1/8 inch in 10 feet.

- i. Top elevation of columns, piers, walls and arrisers: As necessary to join other surfaces and not more than plus or minus 1/4 inch.
- j. Plumb of columns, piers, walls, and joints not exposed to view in public areas of finished structure: 1/4 inch in ten feet, not exceeding one inch total.
- k. Plumb of columns, piers, walls, vertical joints and grooves and other prominent vertical lines exposed to view in public areas of finished structure: 1/4 inch in 20 feet, not exceeding 1/2 total.
- l. Level and grade of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines: Plus or minus 1/4 inch in 20 feet, not exceeding plus or minus 1/2 inch in entire line.
- m. Level and grade of slab soffits, ceiling beam soffits and arrisers measured before removal of supporting shores: Plus or minus 1/4 inch in any 10 foot length; 3/8 inch in any 20 foot length; not exceeding 3/4 inch maximum for entire surface.
- n. Cross sectional dimension of columns, beams and slabs: Plus or minus 1/4 inch, except increase thickness of slabs on grade necessary to achieve specified top elevations.
- o. Thickness of walls: Minus 1/4 inch, plus 1/2 inch.
- p. Position of linear building lines not otherwise specified and

distance from related columns, walls, and partitions: Plus or minus 1/2 inch at all points and not over 1/2 inch in any 20 foot length.

- q. Rise of steps: Plus or minus 1/16 inch in consecutive steps and plus or minus 1/8 inch in total rise of flight.
- r. Tread of steps: Plus or minus 1/8 inch in consecutive steps and plus or minus 1/4 inch in total flight.
- s. Size and location of sleeves, floor openings and wall openings: Plus or minus 1/4 inch.

C. SUBMITTALS:

Working drawings: Show details of form type; methods of form construction and erection; falsework, design computations; location of form joints, form ties and construction joints, scheduled date and rate of placing, and mix designations.

Report the location in the finished work, start of placement and finish times, finish slumps for each batch of concrete placed.

D. CONCRETE FINISH DESIGNATIONS:

Slabs and Other Unformed Surfaces

No. 1: Scratched finish.

No. 2: Floated finish.

No. 3: Troweled finish.

No. 4: Broom finish.

No. 5: Non-slip (dry-shake) finish.

Formed Surfaces:

No. 6: Form finish.

No. 7: Rubbed finish.

No. 8: Textured finish.

Standard Finishes: Use the following finish when no finish is indicated:

Unformed surfaces to receive bonded cementitious applications: No. 1.

Unformed surfaces to receive roofing, waterproofing, waterproofing membranes or sand-bedded surface: No. 2.

Surfaces intended as finished floors or to receive floor covering materials:
No. 3.

Surfaces of sidewalks, ramps, and driveways No. 4.

Interior and exterior stair landings and treads: No. 5.

Formed surfaces not exposed to view: No. 6.

Exposed surfaces in work areas and stairwells: No. 7.

PART 2 - PRODUCTS

2.01 MATERIALS:

Materials for Portland Cement Concrete: Section 03050.

Concrete Reinforcement: Section 03210.

Membrane Forming Curing Compound: ASTM C309, Type 1 or Type 1-D only where indicated.

Waterproof Curing Sheet: ASTM C171, waterproof paper and polyethylene film.

Burlap Sheet: AASHTO M 182, Class 3 or 4.

Tarpaulins: FS K-P-146.

Blanket Insulation: FS HH-1-521.

Formwork:

1. Plywood: Exterior type, one surface suitable for specified finish.
2. Hardboard: Tempered, smooth-one-side, conforming to U. S. commercial Standard CS 251.
3. Steel Forms and Fiberglass Reinforced Plastic Forms: As required to form concrete surfaces to the specified tolerances and finishes, free of irregularity and concrete stain.
4. Fiber Tubular Forms: Spirally constructed of laminated piles of fiber, with wall thickness as recommended by the manufacturer to meet load requirements of the various uses and sizes; wax coated outside surface for moisture resistance, and inside surface of forms coated with bond-breaker compound and fabricated in such a manner that finish concrete surfaces will be smooth and free of spiral and seam markings.
5. Form Ties: Approved form clamps and factory fabricated, snap-off metal type ties of adequate design to minimize form deflection and preclude concrete spalling upon removal; fabricated so that set-back in the concrete is such that the portion of the tie remaining after snap-off and removal of the exterior portions is at least two inches back from the concrete surface. Spreader cones on tie wires shall not exceed 7/8 inch in diameter.
6. Bond Breaker: Non-staining liquid, which will impart a waterproof film to prevent adhesion of concrete and will not leave a paint impeding coating on the face of the concrete.
7. Chamfer Strips: Triangular fillets milled from clear, straight-grain wood, surfaced each side, or extruded vinyl type.

8. When finished surface is to be painted or to receive other surface treatment the material applied to form surfaces shall be compatible with the type of paint or surface treatment to be used.

Expansion Joints:

1. Preformed Expansion Joint Filler:
 - a. Non-extruding and resilient bituminous type: ASTM D1751.
 - b. Plain bituminous mastic type: ASTM D994
2. Sealant: FS TT-S00227E, Type 1, self-leveling, for use on horizontal surface; and Type II, nonsag, for application on vertical and sloping surfaces.

Waterstops: Rubber type, Corp of Engineers Specification CRD-C513, natural or synthetic at the Contractor's option; or extruded polyvinyl chloride, Corps of Engineers Specification CRD-C572.

Abrasive Aggregate: Aluminum oxide or silicon carbide; well graded in size from particles retained on the No. 30 sieve to those passing the No. 8 sieve.

2.02 MIXES:

- A. Portland Cement Concrete: Section 03050.

B. Grout: For surface repair and bond coat:

1. For repair, one part portland cement to two parts fine sand, and water to produce stiff mortar. For bond coat, one part portland cement to one part fine sand.
2. For rubbed finish (No. 7): one part portland cement to 1-1/2 parts fine sand, and water to produce grout having consistency of thick paint.
3. Blend white and grey portland cement to produce color matching surrounding concrete as determined by trial patch.
4. Catalytic agents for increasing bond and decreasing water requirements may be used up to one percent by weight.

C. Structural Members and Equipment Grout:

1. Prepare grout composed of portland cement, sand and water.
2. Use portland cement grout under bearing plates, in recesses, holes or surfaces under structural members and at other locations shown on drawing.
3. Do not use staining ingredients in grout exposed to view.
4. Use proportions of two parts sand and one part cement measured by volume and containing only enough water to permit placing and compact packing. Mix grout approximately 45 minutes in advance of use.

PART 3 - EXECUTION**3.01 FORMWORK:**

1. General:

- a. Do not use earth cuts as forms for vertical surfaces except where earth form is specifically indicated.
- b. Use forms of smoothness consistent with the required finish, mortar-tight, true to the required lines and grades, and of the specified strength. Remove all dirt, chips, soil, dust, nails and other foreign matter from forms before concreting.
- c. Construct formwork so as to result in concrete surfaces conforming to the tolerances of Article 1.03.B above.
- d. Provide temporary openings at the base of columns forms and wall forms, and at other points where necessary, to facilitate cleaning and observation immediately before concrete is deposited.
- e. Construct all forms for outside with stiff wales at right angles to the studs, and form clamps extending through and fastened to the wales. Anchor and brace forms to produce safety and proper alignment.

2. Coating Forms: Coat forms with bond breaker in accordance with the manufacturer's instructions before concrete or reinforcing steel is placed.

3. **Embedded Items:** Securely install in the formwork required inserts, anchors, sleeves, and other items specified under other sections or as shown on the Contract Drawings. Wherever practicable, securely fasten embedded items to reinforcing steel. Protect exposed curb angles surfaces, tread strips, and similar surfaces during placing of concrete. Close ends of conduits piping and sleeves embedded in concrete with approved removable caps or plugs.

4. **Edge forms and Screeds:** Use screeds in all single course slabs and slabs to receive abrasive course, and in the top course of all other slabs. Set edge forms and screeds to produce the indicated elevations and contours, and secure to prevent displacement during placing and consolidation of the concrete.

5. **Removal of Form, Falsework and Centering:** Unless earlier removal is approved by the Engineer, maintain forms, falsework and centering in place until the concrete has obtained the minimum percentage of specified design strength as follows:

Structural Member	Percent of Specified Design Strength
Footings; inverts; sides of beams, slabs and girders; slabs and beams on grade:	25
Free standing wall, columns and piers:	40
Cut and cover box structure exterior walls; retaining walls:	50

Cut and cover box structure roofs:	80
Stairways:	80
Soffits and beams, slabs and girders under 20 feet clear span between supports:	80
Over 20 feet clear span between supports	90
Tunnels:	40
Cantilevers:	90

3.02 INSPECTION:

- A. Inspect forms and embedded items before placement of concrete.
- B. Obtain the Engineer's approval prior to placement of concrete.

3.03 CONVEYING:

- A. Handle concrete from the mixer to the place of final deposit as rapidly as practicable by methods that will prevent segregation, undue drying or temperature rise, or loss of ingredients; and in a manner that will maintain

the required quality of concrete.

- B. Use conveying equipment of size and design to maintain a continuous flow of concrete at the delivery end and as approved by the Engineer. Do not use conveying equipment with aluminum parts, such as chutes, hoppers, or scrapers, that could come into contact with and contaminate the concrete during conveying.
- C. Use belt conveyors, which are horizontal or at slope which will cause neither segregation nor loss. Use an approved arrangement at the discharge end to prevent separation. Discharge long runs without separation into hopper. Do not allow concrete to adhere to the return belt.
- D. Use chutes, which are metal or metal-lined, and have a slope not exceeding one vertical to two horizontal and not less than one vertical to three horizontal. Chutes more than 20 feet long, and chutes not satisfying slope requirements, may be used if the chutes discharge into an approved hopper before distribution.
- E. Use pumping and pneumatic conveying equipment of a suitable kind with adequate pumping capacity. Clean equipment at the end of each operation. Control pneumatic placement so that separation is not apparent in the discharged concrete.

3.04 PLACEMENT:

- A. General:
 - 1. Placing Ground or Subcourse: Subgrade or base course shall be free from injurious material, well drained, and moist at time of concreting. Prior to placing concrete, thoroughly clean and

dampen as necessary, leaving no free water standing on base course or subgrade and no soft or muddy spots in subgrade.

2. **Placing Against Membrane:** Do not place concrete against unprotected waterproofing membrane.
 3. Deposit concrete into forms as nearly as practical to its final position, and in a manner not to cause or permit segregation. Do not use vibrators for extensive shifting of the mass of fresh concrete. The free drop of any concrete shall not exceed five feet without the use of adjustable length pipes. Place concrete for columns by means of pipes adjustable in length and not less than six inches in diameter.
- B. **Consolidation:** consolidate concrete until all voids are filled and free mortar appears on the surface. With the exception of concrete placed as pipe-culvert headwalls, slope paving and slabs, and concrete placed under water, consolidate concrete by means of approved internal vibrators.
1. Employ a sufficient number of vibrators to consolidate the incoming concrete to the proper degree within 15 minutes after depositing in forms. In all cases, maintain at least one spare vibrator available at the site of any structure during concrete placement. Do not hold vibrators against the forms and the reinforcing steel.
 2. The location, manner, and duration of the application of vibrators shall be such as to secure maximum consolidation of the concrete without causing segregation of mortar and coarse aggregate and without causing water or cement paste to flush to the surface. The thickness of the layers shall not be greater than can be satisfactorily consolidated by vibrators. Vibrators shall vertically

penetrate a few inches into the previous lift at regular intervals.

3. The use of approved external vibrators for consolidating concrete will be permitted when concrete is inaccessible for adequate consolidation, providing the forms are constructed sufficiently rigid to resist displacements and damage from external vibration.

C. Underwater Concrete Placement:

1. Deposit concrete underwater by means of either a tremie or an underwater closed bottom dump bucket. Place in a compact mass and do not disturb after placing. Do not agitate water at the point of concrete placement.
2. Use tremie consisting of a water-tight tube having a diameter of not less than 10 inches, with a hopper at the top and a baffle or deflector plate at the bottom which will discharge the concrete laterally for better distribution. The tube shall have a device that will close and prevent water from entering the discharge end while the tube is being charged with concrete. Support the tremie in a manner which will permit free movement of the discharge end over the top surface of the work, and which will permit the rapid lowering when necessary to retard or stop the flow of concrete. Keep the discharge end closed at the start of the concrete work and sealed except when the concrete is being placed. Keep the tube full of concrete, and maintain the flow continuous until the work is complete. Tremie-place concrete shall be monolithic and homogeneous.
3. Use underwater bucket having an open top and bottom doors which will open freely and outward when tripped. Fill and lower the bucket in a manner which will prevent backwash, and do not

dump until it rests on the surface upon which the concrete is to be deposited. After discharge, raise the bucket in a manner that will not disturb the placed concrete.

3.05 FINISHING:

- A. After consolidation, finish unformed surfaces with the finishes specified in Article 1.05 herein and in accordance with ACI 301, Chapter 11.
- B. For formed surfaces, finish surfaces in accordance with Article 1.05 and ACI 301, Chapter 10.
- C. Repair defective work as specified in Article 3.12 herein.

3.06 GROUTING:

- A. Proportion mixing water in accordance with grout manufacturer's recommendations for shrinkage compensating grout.
- B. Clean of all loose and foreign material that would prevent bond between the grout and the concrete surfaces contacting the grout.
- C. Thoroughly moisten concrete surfaces, to be grouted or dry-pack, prior to starting work.
- D. Completely fill all recesses and assure grout material is in complete contact with all steel and concrete surfaces.

3.07 CURING AND PROTECTION:

A. General Requirements:

1. Protect freshly placed concrete from excessively hot or cold temperatures. Maintain without drying for the period of time necessary for the hydration of the cement and the proper hardening of the concrete.
2. Keep concrete continuously under cure until the accumulated time during which the temperature of the air in direct contact with the concrete has been warmer than 55° F is at least five days for bottom slabs and footings and seven days for all other concrete.
3. Concrete used for subway structures shall be cured using the normal curing method specified herein.

B. Normal Curing: Use any one of the methods described below:

1. Ponding: Keep the surface submerged at all times for the required curing period.
2. Continuous application of water: Accomplished by sprinkling with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete is set.
3. Covering: Cover the entire area to be cured with double thickness burlap sheet, laid directly on the concrete, and keep continuously wet.

4. Covering with waterproof sheeting: Keep the entire area to be cured continuously wet by sprinkling, as specified in paragraph 2 above, for at least 18 hours and then immediately cover with the waterproof curing sheet, free of holes or tears.

C. Curing Compound Method:

1. Do not apply the curing compound to the surface of construction joints or to reinforcing steel.
2. Keep surfaces to be cured moist or wet until the curing compound is applied. Do not apply the curing compound until all patching and surface finishing has been completed.
3. Apply curing compound uniformly over the surface at a rate and thickness recommended by the manufacturer. Curing compound, which has become chilled to such an extent that, it too viscous for satisfactory application shall be warmed in accordance with the manufacturer's recommendations.
4. Should the film compound be damaged from any cause before the expiration of the curing period, immediately repair the damaged portions with additional compound.

D. Inclement Weather Protection:

1. When the mean daily temperature of the atmosphere is less than 40° F, maintain the temperature of the concrete between 50 and 70° F when placed and for the required curing period.

2. When necessary, make arrangements for heating, cooling, insulating, or housing in advance of placement, adequate to maintain the required temperature and moisture conditions without injury due to concentration of heat.
3. Do not place concrete on frozen ground nor in contact with ice within the forms. Protect concrete from freezing for a period of five days after placing.
4. Stop placing concrete when the quantity of rain falling is sufficient to wash the concrete surface.
5. Concrete shall have a minimum placing temperature that will not cause difficulty from loss of slump, flash set, or cold joints.
6. The temperature of concrete as placed shall not exceed 90° F except that the temperature of the concrete placed in walls and slabs three feet or greater in thickness shall not exceed 85° F. When the temperature of the steel is greater than 120° F, embedded items shall be sprayed with water immediately prior to placing concrete.
7. Details and methods of placing and handling concrete during inclement weather shall be in accordance with ACI 305 or ACI 306 as applicable.

3.08 CONSTRUCTION JOINTS:

- A. Construction joints shall be as indicated on the Contract Drawings. Joints not indicated shall be made and located so as not to impair the strength of the structure, and shall not impair appearance when subject to public view.

-
- B. Provide longitudinal keys or inclined dowels at least 1-1/2 inch deep at all joints in walls and between walls and slabs or footings unless otherwise indicated. Other construction joints shall be made without keys, except where keys are shown on the Contract Drawings. Where keys are indicated, keyways shall be formed to dimensions indicated on the Drawings.
- C. When indicated or permitted, obtain bond surface by the use of and approved chemical retarder which delays but does not prevent setting of the surface mortar. Remove retarded mortar within 24 hours after placing to produce a clean exposed coarse aggregate bonding surface.
- D. After the pour has been completed to the construction joint, and before placement of fresh concrete, clean reinforcing steel and the surfaces of horizontal and vertical construction joints of surface laitance, curing compound, and other materials foreign to the concrete, and expose clean coarse aggregate of at least 3/8 inch size. Clean hardened concrete surfaces by abrasive blast methods to expose coarse aggregate, after the curing period or immediately before placing concrete at the joint. Surfaces of concrete, which has been, placed not more than eight hours may be cleaned with air and water jets, if surface laitance is removed and clean coarse aggregate is exposed. Surfaces of horizontal construction joints, where expansion joint filler or bond breaking compound is to be placed as indicated, shall be cleaned of dirt, sawdust, and other loose materials. Moisten surfaces on which concrete is to be placed with water immediately before placing concrete.
- E. When it is necessary to make a construction joint because of an emergency, furnish and place additional reinforcing steel across the joint as required at no additional expense to the Administration.
- F. When new concrete is shown to be joined to existing concrete by means of bar reinforcing steel dowels grouted in holes drilled in the existing

concrete, the holes shall be drilled to the required depth, blown out, wetted and filled with portland cement grout, after which the dowel shall be inserted and left undisturbed until the grout is hardened. The grout shall consist of one part cement to two parts sand.

3.09 EXPANSION AND CONTRACTION JOINTS:

- A. No reinforcement or other fixed metal items shall be run continuous through expansion and contraction joints.
- B. Construct open joints at the locations indicated, by means of a wood strip, metal plate, or other approved material to be subsequently removed.

3.10 WATERSTOPS:

- A. The configuration and location of waterstops in construction joints and expansion joints shall be as indicated on the Contract Drawings.

3.11 PROTECTION FROM AND REMOVAL OF STAINS:

- A. Protect the concrete structure from rust staining by structural steel members and from other substances during the work.
- B. If staining does occur, remove stains and restore the concrete to its original color.

3.12 DEFECTIVE CONCRETE WORK:

- A. Porous areas, open or porous construction joints and honeycombed

concrete will be considered to indicate that the requirements for mixing, placing and handling have not been complied with and will be sufficient cause for rejection of the members of the structure thus affected.

- B. Defective work exposed upon removal of forms shall be entirely removed or repaired within forty-eight hours after forms have been removed.

- C. Repaired areas will not be accepted:
 - 1. The structural requirements have been impaired by reducing the net section of compressive members.

 - 2. The bond between the steel and concrete has been reduced.

 - 3. The area is not finished to conform in every respect to the texture, contour, and color of the surrounding concrete.

- D. If the above requirements are not satisfied, the Engineer may require that the members or unit involved be entirely removed and satisfactorily replaced at no additional expense to the Administration.

PART 4 - MEASUREMENT AND PAYMENT

4.01 34" F-SHAPE CONCRETE BARRIER (ANY TYPE)

- A. 34" F-Shape Concrete Barrier (any type) shall include furnishing and installing all formwork, reinforcing steel, concrete, expansion joints, joint sealants, finishing, and curing materials, measured per linear foot for the specified thickness.

- B. 34" F-Shape Concrete Barrier (any type) shall be paid for at the Contract unit price bid per linear foot of concrete of the specified thickness placed and accepted, which will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

4.02 20' CONCRETE BARRIER NOSE DOWN TAPER

- A. 20' Concrete Barrier Nose Down Taper shall include furnishing and installing all formwork, reinforcing steel, concrete, expansion joints, joint sealants, finishing, and curing materials, measured per each for the specified thickness.
- B. 20' Concrete Barrier Nose Down Taper shall be paid for at the Contract unit price bid per each placed and accepted, which will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

4.03 WATERSTOPS:

- A. Waterstops will not be measured separately.
- B. Waterstops will be considered incidental to the appropriate work item.

4.04 EXPANSION JOINTS:

- A. Expansion Joints will not be measured separately.
- B. Expansion Joints will be considered incidental to the appropriate work item.

4.05 ADDITIONAL CONCRETE:

- A. Additional Concrete used to replace overcut or for overbreak, or to repair or replace defective work, will not be measured.

- B. Additional Concrete will be considered incidental to the appropriate work item.

4.06 CONCRETE PEDESTALS

- A. Concrete Pedestals will be measured and paid for per each.

- B. The payment will be full compensation for all excavation, subgrade preparation, concrete, stone, mortar, grout, reinforcement, material, labor, equipment, tools, and incidentals necessary to complete the work.

END OF SECTION

SECTION 16060**GROUNDING****PART 1: GENERAL****1.01 DESCRIPTION:**

This Work shall consist of furnishing and installing grounding systems as specified in the Contract Documents or as directed by the Engineer. The grounding system shall conform to the latest editions of the National Electrical Code (NEC) and the National Electric Safety Code (NESC).

PART 2: PRODUCTS**2.01 MATERIALS:**

Ground Wire and Rods: Ground wire shall be bare medium drawn copper. Ground wire installed underground shall be of the size and configuration (solid or stranded) as shown in the Contract Documents. Ground rods shall be seventy-five-tenths inch (0.75") diameter, a minimum of ten feet (10') in length, with a steel core and copper jacket.

PART 3: EXECUTION**3.01 EQUIPMENT GROUNDING SYSTEM:**

Equipment grounding system shall consist of the ground wire, electrically continuous metallic conduit system, grounding conductors, ground rods and terminations. Every item of equipment served by the electrical system shall be bonded to the equipment grounding system.

A. GROUNDING CONDUCTORS

Grounding conductors shall be the size and type specified in the Contract Documents.

B. GROUND RODS

01. . .1.B.1 Ground rods shall be installed as specified in the Contract Documents. Maximum acceptable earth resistance value shall be twenty-five (25) ohms. Ground resistance of each rod shall be measured before connecting the rod to the grounding conductor. If the measured resistance exceeds twenty-five (25) ohms, a ten feet (10') extension rod shall be exothermically welded to the top of the first rod, then driven to its full depth. Earth resistance shall again be measured, and if it still exceeds twenty-five (25) ohms, the Engineer shall be contacted for instructions.

01. . .1.B.2 Where rock is encountered and acceptable earth grounds cannot be accomplished by driving as described above, the Engineer may direct the use of a grounding grid utilizing direct buried rods exothermically welded end to end to bond lighting standards and structures in continuous series to some point where an acceptable earth ground can be obtained.

C. CONTINUITY

Continuity of the equipment grounding system shall be maintained throughout the project.

D. TERMINATIONS

Connection to equipment grounding system shall be made with suitable lugs at all grounding bushings specified in 16123, and at the ground lugs in lighting structure access holes or in a breakaway base. Connections to ground rods shall be as specified in the Contract Documents. Connections to neutral grounding systems shall be made with lugs, as specified in 16123.

E. TESTING

Refer to 16125.

PART 4: MEASUREMENT AND PAYMENT

4.01 GROUNDING:

F. Ground Rods will be measured and paid for at the Contract Unit Price per each ten foot (10') length. The payment will be full compensation for all

rods, lugs, driving rods, welding, excavation, backfill, and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

- B. Ground Wire will be measured and paid at Contract Unit Price per linear feet.

END OF SECTION

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SECTION 16122

TRAFFIC CONTROL - ELECTRICAL CABLE, WIRE AND CONNECTORS

PART 1: GENERAL

1.01 DESCRIPTION:

This Work shall consist of furnishing and installing loop detector wires and leads, electrical cable, cable ducts, wire, micro-loop probe sets, communication cable and associated connectors of the type and at the locations specified in the Contract Documents, or as directed by the Engineer, for traffic control.

PART 2: PRODUCTS

2.01 GENERAL REQUIREMENTS:

- A. The Micro-Loop Probe shall be as approved by the Engineer.
- B. Sealer for Loop Detector. Sealing material to seal saw cuts for loop detector wires shall be either, Type A, two (2) part epoxy or Type B, one (1) part polyurethane. The manufacturer shall furnish certification, which verifies that the material and Work complies with the applicable Specifications and includes the actual test results to confirm the statement. The contents of the certification shall be on the Contractor's/vendor's/manufacturer's letterhead or approved document and shall be duly signed by a company officer. No aggregate shall be mixed with the sealer material. The sealer shall be applied in conformance with the manufacturer's recommendations. Tests shall conform to the following:

TYPE A - TWO PART EPOXY	
TEST AND METHOD	SPECIFICATION LIMITS
Viscosity, cone and plate Viscometer@ 25° C, cps max	12,000
Pot life @ 25° C, minutes minimum	10
Cure time @ 25° C, no tackiness, hr max	1
Hardness, Type A durometer, D 2240	50-60

Tensile elongation, D 638, % minimum	100
Water absorption, D 570, %/24 hr max	0.5
Oil absorption, D 471, % max	0.02
Volume resistivity @ 25° C, D 257, ohm- ern minimum	2.4 X 10 ¹⁰
TYPE B - ONE PART POLYURETHANE	
TEST AND METHOD	SPECIFICATION LIMITS
Viscosity, Brookfield RVF #6 spindle ~ 20 rpm 25° C cps max	30000
Cure time @ 25° C no tackiness hr max	24
Hardness Rex Type A minimum	50-60
Tensile strenath D 412 psi minimum	500
Tensile elonaation D 412 % minimum	300
ARC resistance D 495 sec minimum	70
Dielectric constant D 150 minimum	6 @ 50 Hz 4.25 @ 500 kHz
Nonvolatile content %	85

- C. Conduit shall conform to 10 14 15.02, Part 2.1.
- D. Electrical Cable and Wire: Electrical cable and wire shall be the standard commercial product of the manufacturer and shall have been manufactured not more than one (1) year prior to the date of the Contract.

All cable and wire shall be made of copper.

1. Direct Burial Cable: Direct burial cable shall be single conductor, stranded, with an unshielded, chemically crosslinked thermosetting polyethylene insulation, rated for six hundred (600) volts. The cable shall be suitable for direct earth burial or installation in ducts or conduit and shall conform to Underwriters' Laboratories Type USE, XHHW or THW and shall bear the applicable UL labels denoting type, size, stranding, manufacturer's name and surface marking or molded ridges for phase and neutral identification. Sizes shall be as specified in the Contract Documents.
2. Building Cable and Wire: Building cable and wire shall be six hundred (600) volt, plastic insulated, nylon jacketed and shall conform to Underwriters' Laboratories Type THWNITHHN and shall bear the applicable UL labels denoting type, size, stranding, manufacturer's name and surface marking or molded ridges for phase and neutral identification. Sizes shall be as specified in the Contract Documents.
3. Cable Duct: Cable duct shall consist of cables preinstalled in either a polyvinyl chloride (PVC) or polyethylene (PE) plastic duct conforming to NEMA TC 7 and the NEC. PVC shall conform to D 3485. PE duct shall be manufactured from black, virgin, high density PE resin conforming to D 1248, Type III, Grade P34, Class C, Category 5. Minimum inside diameter of duct shall be one and one-half inches (1 1/2"). Cable shall be rated for 600 volts.
4. Ground Wire and Rods: Ground wire shall be bare medium drawn copper. Ground wire installed underground shall be of the size (solid or stranded) configuration shown in the Contract Documents. Ground rods shall be three quarters inch (0.75") diameter, a minimum of ten feet (10') in length, with a steel core and copper jacket.
5. Traffic Signal Cable: Traffic signal cable shall conform to IMSA Specification 19-1 and shall be stranded. Conductors shall be No. 14 AWG.
6. Loop Detector Lead-In Cable: Loop detector lead-in cable shall be two (2) conductors, No. 14 AWG, PE jacketed, conforming to IMSA Specification 50-2.
7. Loop Detector Wire: Loop detector wire shall be single conductor, 600 volt, No. 14 AWG, 19-strand wire in flexible PE tubing.
8. Voice Grade Communication Cable: Self-supporting cable shall be solid No. 19 AWG and conform to IMSA 40-4. Underground cable shall conform to IMSA 60-2.
9. Electric Service Wire: Electric service wire for traffic signals,

intersection control beacons, hazard identification beacons and luminaires mounted on traffic signal structures shall have three (3) individual wires. Each wire shall be seven (7) stranded. Electric service wire color identification by spray paint, tape, heat shrink tubing or any other after manufacturing method is prohibited.

- E. Communication Cable shall conform to paragraph D 8 above.
- F. Cable and Wire Connectors shall conform to the following:
 - 10. Cable Connectors and Connector Kits: Cable connectors and connector kits for use in lighting structures, hand holes, junction or pull boxes, and for terminating underground cables in lighting structures shall be rated for a minimum of six hundred (600) volt service. Cable connectors shall be compression type, applied by means of a compression tool. Connectors shall be fabricated from high strength copper alloy. Plated connectors fabricated from metals other than copper are prohibited. Bolted type connectors shall be utilized for splicing bare ground conductors.
 - 11. Connector Kit Components: . Each cable connector kit shall be furnished with all component parts described under the various listed types. Each kit shall contain sufficient silicone compound to lubricate metal parts and the housing for each assembly along with complete installation instructions.
 - 1. All housings shall be made of water resistant synthetic rubber suitable for burial in the ground or exposure to sunlight. Each housing shall form a watertight seal around the cable at the point of disconnection and between the insert body and enveloping "Y" housing.
 - ii. All copper pins, sockets and fuse contacts shall have a minimum conductivity of ninety percent (90%). The crimpable portion shall be fully annealed while the rest of the device is maintained in its original state.
 - iii. Plastic sleeves shall be rigid, molded insulating plastic material of sufficient outside diameter to form a watertight fit with its related housing. Wall thickness shall be one-tenths inch (0.10") maximum and sleeve lengths of four inches and seven inches (4" and 7") shall be available.
 - iv. All fuses shall be rated six hundred (600) volts, one hundred thousand (100,000) amps AIC.
 - 12. Connector Types: Each cable connector kit furnished shall be one of the following types:
 - i. Type I is an unfused, quick disconnect inline connector kit

containing:

1. A copper pin crimpable to a conductor.
2. A receptacle having a centrally located, recessed locking socket constructed so that it is filled and retained by its housing and a disposable assembly pin.
3. A plug housing for retention of the copper pin.
4. A receptacle housing with disposable protective sleeve.

ii. Type II is a fused, quick disconnect inline connector kit containing:

1. A pair of spring-loaded copper fuses contacts suitable for gripping the specified cartridge fuse. One (1) contact shall be crimpable on a conductor and after insertion into its proper position within the load side plug housing, be capable of being securely retained therein. The other contact shall be preassembled for retention within the line side of the connector body.
2. A load side housing permanently marked "Load Side."
3. A disposable assembly pin.
4. A fuse of the specified amp rating.

iii. Type III is a fused, quick disconnect "Y" connector kit containing:

1. A pair of spring-loaded copper fuses contacts suitable for gripping the specified cartridge fuse. One (1) contact shall be crimpable on a conductor and after insertion into its proper position within the load
2. Side plug housing, be capable of being securely retained therein. The other contact shall be preassembled for retention within a "Y" insert body.
3. A line side "Y" housing with two (2) water seal cable ports.
4. Two (2) terminal lugs, each having a mounting hole.
5. A bolt and a self-locking nut.
6. A "Y" insert body with preassembled line side fuse

- contact and a ring tongue terminal.
- 7. A load side plug housing permanently marked "Load Side."
- 8. A disposable assembly pin.
- 9. A fuse of specified amp rating.
- iv. Type IV is an unfused, quick disconnect "Y" connector kit containing:
 - 1. A copper pin crimpable to a conductor and suitable for retention in the load side receptacle housing.
 - 2. A "Y" insert body with preassembled load side copper socket and ring tongue terminal.
 - 3. A line side "Y" housing with two (2) water seal cable ports.
 - 4. Two (2) terminal lugs, each having a mounting hole.
 - 5. A bolt and self-locking nut.
 - 6. A load side receptacle housing.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS:

- A. The Contractor shall furnish and install copper conductor wire and cable of the types and sizes and at the locations specified in the Contract Documents. No splicing will be permitted for cables unless specified in the Contract Documents. When specified, lighting cable splices and loop detector lead in cable will be permitted only in junction and pull boxes and hand holes. Cable shall not be installed until the entire related raceway, including manhole, hand hole, and foundation system is in place. A six foot (6') cable slack shall be provided neatly tied, coiled and positioned in the bottom of the hand holes, manholes and cabinets. Drip loops measuring eight inches (8") shall be provided at all overhead entrance points into structures. Insulated spade type terminal ends shall be installed upon all wiring placed on terminal blocks.

3.02 DIRECT BURIAL CABLE

- A. Direct burial cable shall be installed to the depth of cover specified in the Contract Documents.

3.03 CABLE IN CONDUITS

- A. Cable in conduits shall be installed in a manner and by methods to prevent

harmful stretching of the conductor, injury to the insulation or damage to the other protective covering. The ends of all cables shall be sealed until ready for connection. Where more than one (1) wire or cable is to be installed in a single duct or conduit, they shall be pulled into the conduits by hand or power winch with the use of cable grips or pulling eyes. Pulling tension shall be governed by recommended standard procedures for straight pulls or bends. A lubricant compatible with the cable insulation shall be used.

3.04 PREASSEMBLED CABLE DUCT

- A. Prior to installation, the cable duct shall be released out from its reel as the reel is moved alongside and parallel to the trench. Cable duct shall not be pulled off a reel located in a stationary position. The cable shall be installed using cable grip in a manner that will not stress or damage conductors, insulation or sheath wall.
- B. After backfilling the Contractor shall demonstrate that the conductors move freely within the duct by pulling the conductors out a minimum length of two feet (2'). Pulling tensions shall conform to manufacturer's recommendations. The cable shall then be pulled to its original position. Cable duct ends shall be completely sealed with a waterproof removable sealing compound, molded plastic or rubber device.

3.05 CABLE IN LIGHTING STRUCTURES

- A. The cable shall be supported at each luminaire with a suitable clamp as an integral part of the luminaire or a device approved by the Engineer for the application.

3.06 IDENTIFICATION TAGS

- A. Identification tags for circuit wiring in all hand holes, junction boxes and control cabinets shall be furnished and installed. Nonconductive identifying bands shall be nylon, self-clinching type with adequate sized tab for labeling. Each band shall be marked using 1/4 inch minimum lettering dies, engraving device or other permanent marking process approved by the Engineer. Bands shall indicate circuit number for lighting systems, terminal block position for loop detector cables and traffic signal phase for all other signal cables.

3.07 LOOP DETECTOR WIRE AND LOOP DETECTOR LEAD-IN

- A. Prior to the installation of loop wires, the saw cut area shall be dry and free of any saw cut debris. Loop detector wire cable shall be twisted five (5) turns per foot from the loop itself to the terminal point. Loop detector wire shall be installed at the bottom of the saw cut. A blunt instrument

shall be used to seat the loop detector wire at the bottom of the saw cut. Loop detector wire shall be spliced to loop detector lead-in as specified in the Contract Documents.

3.08 GROUNDING WIRE,

Refer to Section 16060, (Grounding).

3.09 CONNECTOR KITS

- A. Prior to the installation of loop wires, the saw cut area shall be dry and free of any saw cut debris. Loop detector wire cable shall be twisted five (5) turns per foot from the loop itself to the terminal point. Loop detector wire shall be installed at the bottom of the saw cut. A blunt instrument shall be used to seat the loop detector wire at the bottom of the saw cut. Loop detector wire shall be spliced to loop detector lead-in as specified in the Contract Documents

3.10 MICRO-LOOP PROBES

Micro-loop probe sets shall be installed as specified in the Contract Documents or as directed by the Engineer. All leads shall be terminated in the controller cabinet.

PART 4: MEASUREMENT AND PAYMENT

4.01 ELECTRICAL, WIRE & CONNECTIONS:

- A. The payment will be full compensation for all cable, preassembled cable ducts, wire, lubricants, splices, overhead communication cable attachments, identification tags, trench excavation and backfill, and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.
- B. Number 1, 2, 4 and 7 conductor electric cables – any size AWG will be measured and paid for at the Contract Unit Price per linear foot for the type and sizes specified in the Contract Documents.
- C. Interconnect Cable will be measured and paid for at the Contract Unit Price per linear feet.
- D. Cable – 1 conductor No. 2 and 6 type use 600V will be measured and paid for at the Contract Unit Price per linear feet. The payment will be full compensation for all sealant, PVC conduit, hole drilling, installation of lead-in cable, and for all material, labor, equipment, tools, and incidentals

necessary to complete the Work.

- E. Bare copper ground wire No. 6 AWG will be measured and paid at the Contract Unit Price per linear feet.

END OF SECTION

SECTION 16125**GENERAL ELECTRICAL WORK AND TESTING****PART 1: GENERAL****1.01 DESCRIPTION:**

This Work shall consist of furnishing, installing, and testing of all applicable electrical items referred to the Contract Documents.

PART 2: PRODUCTS**2.01 MATERIALS:**

All materials and equipment installed as part of the permanent installation shall be new, UL listed or labeled, and shall conform to NEC, NESC, NEMA, IES, and local codes applicable to the area of installation.

PART 3: EXECUTION**3.01 GENERAL REQUIREMENTS:**

All installations shall conform to NEC, NESC, local utility company requirements and State and local laws and ordinances governing the Work. All electrical Work shall be accomplished under the direct supervision of a master electrician licensed in the State of Maryland or City. All Work performed under 16060, (Grounding), 16123, (Electrical Conduit and Fittings), 16520, (Luminaires and Lamps), 16124, (Electrical Hand Holes Manholes Pull and Junction Boxes), 16578, (Signal Heads), 16579, (Traffic Control Device Cabinets and Equipment), and this Specification shall be performed by a journeyman electrician. The Contractor shall obtain and pay for all permits, licenses and inspection fees.

3.2 TESTING

A. The Contractor shall supply all personnel and equipment required to successfully perform the following tests and shall furnish four (4) certified copies of the complete test reports to the Engineer.

- B. Not less than thirty (30) days prior to the commencement of each required test, the Contractor shall submit to the Engineer the types, styles or catalog numbers of all testing equipment to be used for the tests. A written certification shall be included stating when the testing equipment was last calibrated by a City approved testing agency. The calibration date shall be within one-hundred eighty (180) days of the date when the tests are to be performed. All tests shall be performed in the presence of the Engineer.
- C. Any defects found in the completed installation shall be repaired or replaced immediately to the satisfaction of the Engineer at no additional cost to the City.
1. Ground Resistance Testing. Ground resistance testing shall be conducted using a megger ground tester, using the null balance fall of potential method. Corrected readings greater than twenty-five (25) ohms will not be accepted.
 2. Circuit Testing. A circuit test to determine insulation resistance shall be performed on all cables of every circuit except those installed in lighting structures. Cable insulation resistance shall be a minimum of ten (10) megohms at five hundred (500) volts D.C. except loop detector wire and loop detector lead shall have a minimum of one hundred (100) megohms at five hundred (500) volts D.C.
 3. The Contractor shall demonstrate in a manner acceptable to the Engineer that all conductors are continuous, free from short circuits and unspecified grounds and that all circuits are properly connected as specified in the Contract Documents.
 4. Performance Testing. A performance test using the design power source shall be conducted by the Contractor prior to acceptance. The electrical system, including automatic control equipment, shall be operated for thirty (30) consecutive days without failure. If any component fails, it shall be immediately replaced and the test shall be continued. The Contractor shall record each fault, the method

and date of correction of each and the beginning and end of the thirty (30) day test period. If more than five percent (5%) of any component fails during the test, the component shall be replaced and the thirty (30) day test cycle for the entire system shall be restarted.

5. Illumination Testing. An illumination test shall be conducted by the Contractor to determine the illumination characteristics of the roadway lighting installation. The test shall conform to procedures approved by the City.

3.3 TRAFFIC SIGNAL TESTING

- A. Testing shall be accomplished without hazard to the traveling public.
- B. The Contractor shall maintain all new materials until satisfactorily tested and their operation accepted by the Engineer.
- C. All signal heads and signs in place but not in use shall be entirely covered with opaque burlap.
- D. After completion, testing and acceptance, any new traffic signal shall be placed on flashing operation for a seventy-two (72) hour period prior to placing the signal on full color operation.
- E. Existing full color and flashing signals shall not flash, but shall be kept in operation until the new signal is completed, satisfactorily tested and approved by the Engineer.
- F. The Contractor shall remove any STOP signs at new full color signals at the end of the seventy-two (72) hour flashing period. The date and time of removal shall be logged and provided to the Engineer.
- G. All signal heads, signs, spans and mast arms, that are not to be put in use, shall be removed upon acceptance by the Engineer and placement of the new traffic control device into operation.

- H. New traffic signals, exclusive of signal system interconnect installation, may be placed into operation upon completion of the new traffic signal being satisfactorily tested and accepted by the Engineer. Upon the signal system interconnect installation completion, the signal system interconnect shall also be satisfactorily tested and approved by the Engineer.

PART 4: MEASUREMENT AND PAYMENT

4.01 GENERAL ELECTRICAL WORK AND TESTING:

General electrical Work and testing and the as built Drawings will not be measured but the cost will be incidental to the other pertinent items specified in the Contract Documents.

END OF SECTION

SECTION 16130
RACEWAYS AND BOXES
PART 1: GENERAL

1.01 DESCRIPTION:

- A. This Section specifies furnishing and installing electrical raceways and boxes as shown.

1.02 QUALITY ASSURANCE:

- A. The following Codes, Regulations, Reference Standards and Specifications apply to work included in this Section.

01. . .1.F.1 Codes and regulations of the jurisdictional authorities.

Identification of Electrical Equipment:

UL: 50, 514A, 514B, 1, 6, 514, 651, 797, 1242.

ASTM: A123, A386, A780, D256, F512.

ANSI B1.1, C-80.1, C-80.3, C-80.5.

NEMA: TC2, TC6, TC13, RN1.

NEMA VE 1.

NFPA 70 Article 370, NFPA 130.

FS: W-C-581.

Manufacturer: Select a firm regularly engaged in the manufacture of electrical raceways and boxes of the types specified herein.

1.03 SUBMITTALS:

- A. Submit the following in accordance with SUBMITTALS, Section 01300, and with the additional requirements as specified for each:
- B. Provide manufacturer's standard catalog data for all items described in this

specification indicating conformance and compliance with standards and criteria indicated.

PART 2: PRODUCTS

2.01 MANUFACTURERS:

A. Boxes Enclosures and Cabinets

1. Hoffman
2. Crouse- Hinds.
3. Hubbell Inc.
4. Thomas and Betts Corp.
5. Approved Equal.

B. Cable Tray

1. P.W. Industries Inc.
2. Mono Systems Inc.
3. B-Line Systems Inc.
4. Approved Equal.

2.02 ELECTRICAL BOXES:

- A. Include outlet, junction, terminal, device, and pull boxes.
- B. Conform to UL-50 and UL-514A and 514B.
- C. Provide the volume required by the NEC for the number and size of conductors enclosed and minimum dimensions as required by the NEC.
- D. Provide boxes of the material, finish, type and size specified and required for the location, kind of service, number of wires, and function.
- E. Provide weatherproof boxes with neoprene cover gaskets for outdoors and

for locations subject to moisture.

- F. Provide cast aluminum alloy boxes with compatible conduit fittings. Do not install aluminum boxes in contact with or embedded in concrete.
- G. Fabricate boxes with hot dipped galvanized steel in accordance with ASTM A123.
- H. Provide boxes complete with covers suitable to the purpose for which they will be used, except equip boxes in which or on which no devices or fixtures are to be installed, with flat or raised blank covers as required.
- I. Furnish covers of the same material thickness and finish as boxes, secured in position by means of brass screws. Arrange covers to be readily and conveniently removed.
- J. Galvanize junction boxes after fabrication inside and outside to prevent oxidation. Galvanize (hot-dip) junction boxes and covers in accordance with ASTM A123.
- K. Provide covers with rectangular openings of proper size and shape. Furnish special boxes and install as required to suit the kind of service for the construction requirements.
- L. Furnish brackets, supports, hangers, fittings, bonding jumpers and all other accessories required.

PART 3: EXECUTION

3.01 INSTALLATION:

- A. Boxes:
 - 1. Install boxes plumb and straight, rigidly secured in place.
 - 2. Install brackets, supports, hangers and accessories required for installation of boxes.
 - 3. Provide suitable bushings, shields, or fittings having smooth rounded edges where conductors pass through partitions and at

other locations where necessary.

4. Install bonding jumpers across all boxes from conduit to conduit, where the box terminates two or more conduits.
5. Do not obstruct access to boxes. Provide removable box covers without interference to or from other conduit boxes or equipment.
6. Clean boxes thoroughly after installation and correct any damage to boxes and to finish.
7. Ground boxes according to manufacturer's instructions.

B. Field Quality Control:

1. Grounding: Test boxes to ensure electrical continuity of bonding and grounding connections.
2. Anchorage: Test pullout resistance for toggle bolts and power-driven threaded studs for each type and size of anchorage material.
3. Furnish equipment, including jacks, jigs, fixtures, and calibrated indicating scales, required for reliable testing.

PART 4: MEASUREMENT AND PAYMENT

4.01 LIGHTING ELECTRICAL & CCTV HANDBOXES:

- A. Lighting electrical hand boxes and CCTV hand boxes will be measured per each for payment.
- B. Lighting electrical hand boxes and CCTV hand boxes will be paid for at the Contract unit price bid per each and include materials, equipment, tools, labor and all work incidental to complete the item specified.

END OF SECTION

SECTION 16440
SWITCHBOARDS AND PANELBOARDS

PART 1: GENERAL

1.01 DESCRIPTION:

- A. This section specifies furnishing and installing panelboards, circuit breakers, meter socket, disconnect, outlet pedestals and lighting controls.
- B. Related Work Specified Elsewhere:
 - 1. Section 16060: Grounding
 - 2. Section 16124: Electrical Hand Holes, Manholes, Pull and Junction Boxes
 - 3. Section 16520: Exterior Lighting

1.02 DESIGN CRITERIA:

- A. The panelboards and circuit breakers referenced herein shall be designed and manufactured according to the latest revision of the following specifications.
 - 1. NEC - Article 384
 - 2. NEMA PB 1 – Panelboards
 - 3. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
 - 4. NEMA AB 1 - Molded Case Circuit Breaker
 - 5. UL 50 - Boxes and Cabinets
 - 6. UL 67 – Panelboards
 - 7. UL 489 - Molded Case Circuit Breakers and Circuit Breaker Enclosures
 - 8. NFPA 70 - National Electrical Code (NEC)
 - 9. ASTM - American Society of Testing Materials

10. Federal Specification W-P-115B and W-C-375B/GEN

1.03 SUBMITTALS:

A. Submit the following for approval in accordance with SUBMITTALS; Section 01300 and with the additional requirements as specified for each

1. Shop Drawings:

a. Include manufacturer's product specifications, installation instructions, and mounting details

1) Panelboards and circuit breakers

2) Lighting control

3) Control cabinet

4) Concrete pad foundation

5) Circuit breaker nameplates

6) Outlet Pedestals

b. Panelboards and circuit breakers

c. Lighting control

d. Control cabinet

e. Concrete pad foundation

f. Circuit breaker nameplates

g. Outlet Pedestals

2. UL Certification

a. Panelboards and circuit breakers

b. Lighting control

c. Control cabinet

d. Concrete pad foundation

e. Circuit breaker nameplates

- f. Outlet Pedestals
- 3. Certification
 - a. Panelboards and circuit breakers
 - b. Lighting control
 - c. Control cabinet
 - d. Concrete pad foundation
 - e. Circuit breaker nameplates
 - f. Outlet Pedestals
- 4. Operation and Maintenance Manuals
 - a. Installation instructions and mounting details
 - b. Operation and maintenance manuals

1.04 QUALITY ASSURANCE:

- A. Codes, Regulations, Reference Standards and Specifications:
 - 1. Codes and Regulations of the jurisdictional authorities
 - 2. Codes and Standards, Section 01420:
 - NFPA 70, National Electrical Code (NEC).
 - NEC Article 384
 - NEMA PB1, PB1.1, AB 1
 - UL: 50, 67, 489.
 - SSPC: SP-6, SP-8, SP-10.
 - ASTM: A36, A53, A123, A153, A167, A276, A325, A507, A575, A1011, B26, B85, B137, B209, B221, D635, D1056, D1400, D2240.
- Applicable AISI, ANSI and NAAMM standards.
- Federal Specification W-P-115B, W-C-375B/GEN

PART 2: PRODUCTS

2.01 PANELBOARDS AND CIRCUIT BREAKERS:

- A. Furnish and install power distribution panelboards as specified herein and where shown on the associated contract drawings.
- B. Approval documents shall include drawings. Drawings shall contain overall panel, interior mounting, and wiring gutter dimensions. The location of the branches shall be clearly shown.
- C. Manufacturer shall be a company specializing in manufacturing of panelboard products with a minimum of fifty years documented experience.
- D. Upon delivery, contractor shall inspect and report concealed damage to carrier within their required time period. Panelboard shall be handled carefully to avoid damage to panelboard internal components, enclosure, and finish. Panelboards shall be stored in a clean, dry environment. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect enclosures from dirt, water, construction debris, and traffic.
- E. Manufacturer shall provide installation instructions and NEMA Standards Publication PB 1.1 (Operations and Maintenance Manual) with each panelboard.
- F. The interior shall be rated for 600 volts AC. Panelboard bus current rating shall be determined by heat-rise test conducted in accordance with UL 67. The panelboard bus material shall be copper and be plated. The bussing shall be fully rated allowing high ampacity breakers to be mounted in any position throughout the interior. Metal nameplates shall be secured to dead-front with rivets or screws. Sticker or foil nameplates shall not be permitted.
- G. Enclosure shall be NEMA 1 type and shall be galvanized steel constructed in accordance with UL 50 requirements. Box shall have removable blank end-walls and interior mounting studs. Maximum enclosure shall not exceed 20 inches wide and 5.75

inches deep. Trim front steel shall meet strength and rigidity requirements per UL 50 standards and shall have ANSI 49 gray enamel electro-deposited over cleaned phosphatized steel. Trim front shall be one-piece with door. Door shall have rounded corners and edges free of burrs. A clear plastic directory card holder shall be mounted on the inside of the door. Door shall have cylindrical tumbler type lock and shall be provided with two keys.

- H. Circuit breakers shall be UL listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panel schedule. Circuit breakers shall have bolt-on type bus connectors. Circuit breakers shall have an over-center toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Three pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping. There shall be two forms of visible trip indication. The breaker handle shall reside in a "TRIPPED" position between "ON" and "OFF". In addition, there shall be a VISI-TRIP indicator appearing in the clear window of the circuit breaker housing. The exposed faceplates of all branch circuit breakers shall be flush with one another. Lugs shall be UL listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90 degree C rated wire, sized according to the 75 degree C temperature rating per NEC Table 310-16.
- I. Install panelboard in accordance with manufacturer's written instructions, NEMA PB 1.1 and NEC standards. Anchor panelboards to structure and make branch circuit connections. Coordinate the panelboard bus ratings and circuit breaker coordination rating with the available fault current. Provide engraved laminated nameplates.
- J. Inspect complete installation for physical damage, proper alignment, anchorage, and grounding. Measure steady state load

currents at panelboard feeder; rearrange circuits in the panelboard to balance the phase loads within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits. Check tightness of bolted connections, and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.

- K. Panelboards shall be as manufactured by Groupe Schneider/Square D, Eaton/Cutler-Hammer/Westinghouse, Seimens, or General Electric.

2.02 LIGHTING CONTROL:

- A. Lighting control system components shall include lighting contactor, selector switch, photocell and time clock control, and key override switch. The lighting contactor, selector switch and time clock shall be located in a flush wall mounted Controls Cabinet adjacent to panelboard. Cabinet shall have same width and height, and door finish as panelboard.
- B. Lighting Control Devices
 - i. Astronomic Clock Switch: A single astronomic clock switch shall control lighting as described herein. The astronomic clock switch shall be solid-state and programmable unit with alphanumeric display complying with UL 917. The astronomic clock switch shall be capable of being adjusted based on the hours of operation of the parking lot. The astronomic clock switch shall be Intermatic model ET70415CR2 or approved equal.
 - ii. Photocell: Photocell enclosure shall be weathertight, resistant to high temperatures and equipped UV stabilized dome with movable slider/shield over sensor. Photocell shall be Tork series 2000 or approved equivalent.
 - iii. Lighting Contactors: Contactors shall be electrically operated

and mechanically held, and comply with UL 508 and NEMA ICS 2. Contactors shall have UL listing or rating consistent with type of load served, including incandescent and high-inrush fluorescent ballasts.

- C. General Exterior Lighting: The lighting contactor shall control general station exterior lighting fixtures. The lighting contactor shall be controlled by the astronomic clock switch and a photocell located on the roof of the building. The general exterior lighting circuits shall be energized by the photocell and de-energized by the astronomic clock switch. The selector switch shall provide capability to manually energize lighting circuits in the "hand" position, or de-energize lighting circuits in the "off" position.
- D. Security Lighting: Exterior lighting fixtures where noted on the drawings shall be controlled by the photocell but not the astronomic clock switch. The selector switch shall provide capability to manually energize security lighting in the "hand" position, or de-energize security lighting in the "off" position.
- E. Final control settings of the security lighting (night light) circuit shall be coordinated with the Engineer.

2.03 ELECTRICAL CONTROL CABINET:

- A. Control Cabinet shall be a stainless steel, NEMA 4X, one-door, freestanding enclosure. Enclosure size shall be as noted on Plans. Cabinet shall have one full panel and 22" equipment racks with 7 fixed shelves, mounted minimally 10" apart. Enclosure shall have heavy gauge continuous door hinges with stainless steel hinge pins and stainless steel padlocking handles. Grounding studs shall be provided in the body of the enclosure.

2.04 15A SINGLE POLE OUTLET PEDESTAL:

- A. Single Pole Outlet Pedestal shall be equipped with weatherproof, NEMA 3R, enclosure. Enclosure shall have heavy gauge

continuous door hinges with stainless steel hinge pins. Two sets of weatherproof 15A GFI, Ground Fault Interrupter, Duplex receptacles shall be installed in the enclosure. Receptacles shall be NEMA Type 5, 125 Volt, 15 Ampere Duplex devices. Pedestal shall be freestanding with at least 30" Height, 6" Width, and 3.5" Depth. Mounting of pedestal shall be direct burial with minimum of 24" depth below grade. The Single Pole Outlet Pedestal shall be ACE Manufacturing Metal model PAR-C2GG-DB or approved equal.

PART 3: EXECUTION

3.01 INSTALLATION :

- A. Install switchboards and panelboards at locations indicated on the drawings follows:
1. Mount switchboards and panelboards rigidly in place
 2. Use stainless steel fasteners. Where a metal contacts concrete or a dissimilar metal, separate contact surfaces with gasket, nonabsorptive tape or bituminous coating to prevent corrosion.
 3. Mount switchboards and panelboards plumb, level and in straight lines.
 4. Concrete foundations shall be constructed in accordance with the details on the Contract Drawings and as specified in Section 03300, Cast-in-Place Concrete.
 5. Install conductors to switchboards and panelboards leaving slack wire inside the cabinet for future modifications of the service.
 6. Install switchboards and panelboards in accordance with approved shop drawings.
- B. Ground enclosures in accordance with NEC and Section 16060.

3.02 ELECTRICAL SERVICE:

- A. Coordinate with Power Company for installation of meter and power feed.

3.03 FIELD QUALITY CONTROL:

- A. Testing:
 - 1. Furnish necessary personnel and equipment and perform tests and adjustments in the presence of the Engineer
 - 2. Test circuits for continuity and operation.
 - 3. Test equipment enclosures for continuity of grounding system.
 - 4. Check tightness of cable connections.
 - 5. Test operations of circuits, control devices and contactors.

PART 4: MEASUREMENT AND PAYMENT

4.01 15A SINGLE POLE OUTLET PEDESTAL:

- A. 15A Single Outlet Pedestal will be measured per each for payment
- B. 15A Single Outlet Pedestal will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, utility coordination and all work incidental to complete the item as specified.

4.02 LIGHTING CONTROL CABINET PAD MOUNT:

- A. The Lighting Control Cabinet Pad Mount with Panelboard will be measured per each for payment.
- B. The Lighting Control Cabinet Pad Mount with Panelboard will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, utility coordination and all work incidental to complete the item as specified.

4.03 ELECTRICAL UTILITY SERVICE EQUIPMENT:

- A. Electrical Utility Service Equipment will be measured per each.
- B. Electrical Utility Service Equipment will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full

compensation for all material, equipment, tools, labor, utility coordination, and all work incidental to complete the item as specified.

END OF SECTION

SECTION 16520**EXTERIOR LUMINAIRES****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This section specifies providing lighting fixtures at West Baltimore MARC Train Station Park and Ride Facility.
- B. Related Work Specified Elsewhere:
 - 1. Electrical Hand Holes, Manholes, Pull and Junction Boxes: Section 16124.
 - 2. Traffic Control – Electrical Cable, Wire and Connectors: Section 16122.
 - 3. Grounding : Section 16060

1.02 QUALITY ASSURANCE:

- A. The following Codes, Regulations, Reference Standards and Specifications apply to work included in this Section:
 - 1. Codes and regulations of jurisdictional authorities.
 - 2. Codes and Standards.
 - a. NFPA 70, National Electrical Code.
 - b. UL: 57, 62, 496, 508, 542, 935, 1029, 1570.
 - c. SSPC: SP-6, SP-8, SP-10.
 - d. ASTM: A36, A53, A127, A153, A167, A276, A325, A353, A386, A507, A570, A575, B26, B85, B137, B209, B221, D635, D1056, D1400, D2240.
 - e. Applicable AISI, ANSI and NAAMM standards.
 - f. AASHTO: LTS-4.
- B. Each lighting fixture: UL-labeled or listed.

1.03 SUBMITTALS:

- A. Submit the following for approval in accordance with SUBMITTALS; Section 01300 and with the additional requirements as specified for each:

1. Shop Drawings:
 - a. Include photometric curves.
2. Wiring diagrams and bill of materials.
3. Mounting details and installation instructions.
4. Samples: One of each type of fixture, as requested or directed by the Administration or the Engineer.
5. Documentation:
 - a. Verification that each fixture is in compliance with applicable codes, regulations, reference standards and specifications for the location at which it is to be used. Indicate requirements that each fixture meets.
 - b. Calculations:
 - i. Submit calculations by a professional engineer registered in the State of Maryland certifying that assemblies of foundation, anchor bolts, pole, arms and luminaire will withstand specified wind pressure, wind speed, stress, deflection, vibration and fatigue.
6. Field Testing:
 - a. Submit a detailed plan of the proposed methods of and scheduling of the required field testing at least 30 calendar days before initiating the tests.
 - b. Submit certified test reports.
7. Manufacturer's Data:
 - a. At least two weeks before start of any shop coating work, submit to the Engineer for approval two each of the following:
 - i. Complete data sheets with surface preparation and the coating materials to be used, identified by the manufacturer, brand name, and product number.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Ship each unit securely packaged and labeled for safe handling in shipment and to avoid damage or distortion.
- B. Store lighting fixtures and mounting poles in secure and dry storage facility.

1.05 WARRANTY:

- A. Lamps: Warrant the life of lamps for periods of five years.

PART 2: PRODUCTS**2.01 PRODUCTS AND MATERIALS:****A. General Requirements for Lighting Fixtures:**

1. Interchangeability: Components of same type, size, rating, functional characteristics and make are to be interchangeable.
2. Lamps:
 - a. In accordance with applicable ANSI Standards.
 - b. LED. (Light Emitting Diode):
 - i. Wattage: 255W.
 - ii. Driver Ampere: 70mA.
 - iii. Rated L₇₀: 70,000 hours. (at 25 Celsius degree)
 - iv. Distribution Type: IES Type-V
3. Electrical
 - i. Operable on 240-volt, 50 to 60 Hertz as shown or necessary, type and rating suitable for associated lamp.
 - ii. Equipped with double drivers
 - iii. Capable of starting lamp at ambient temperature range of -20°F to 115° F.
 - iv. Plug disconnects shall be listed by UL for use at 600 VAC, 15A or higher
- 4 Hardware:
 - a. Latches, catches, release mechanism, hinges, screws, bolts, studs, nuts, rivets, washers and springs. Heavy-duty stainless steel or bronze, as shown.
 - b. Latches and catches: Captive type.
 - c. Operating hardware: Self-retaining type.
- 5 Construction:
 - a. Fixture body, reflectors, wiring channels, end caps and castings formed to prevent buckling or distortion.

- b. Minimum of two wire clips provided in wiring channel to support wiring.
 - c. Seams and joints continuously welded and ground smooth.
 - d. When aluminum is in contact with dissimilar metal, separate contact surfaces with gasket, non-absorptive tape, or coating to prevent corrosion.
- 6 Finish:
- a. Color to be silver metallic
- 7 Mark each fixture and its components in accordance with applicable reference standard.

2.02 LIGHTING FIXTURES:

- A. Lighting fixture types shall be installed where shown on the drawings. The manufacturer's names and numbers as listed have been pre-approved for use on this project. Fixtures of equal characteristics and quality by other manufacturers will be not considered.

PART 3: EXECUTION

3.01 INSTALLATION:

- A. Install lighting fixtures of types indicated at locations as follows:
1. Mount fixtures rigidly in place. Use expansion anchors and machine screws for concrete surfaces and toggle bolts for hollow concrete masonry surfaces.
 2. Use stainless steel fasteners. Where a metal contacts concrete or a dissimilar metal, separate contact surfaces with gasket, nonabsorptive tape or bituminous coating to prevent corrosion.
 3. Mount fixtures plumb, level and in straight lines.
 4. Clean lamps, diffusers, globes, reflectors and exposed-to-view surfaces of fixtures after aiming and adjusting has been approved.
 5. Form concrete bases as shown. Use Finish Number 2 for exposed surfaces. Use templates for setting anchor bolts.

6. Install parking lot poles of type shown at locations shown. Use double nuts to erect poles plumb. Pack void between concrete base and pole with grout.
 7. Install conductors to parking lot poles leaving three-foot minimum lengths of conductors for fixture connections; tape or otherwise secure in place pending final connection.
 8. Install parking lot lighting fixtures in accordance with approved shop drawings.
 9. Connect wiring using connectors per Section 16122.
 10. Adjust aiming angle of the floodlight to provide approved lighting level.
- B. Install photoelectric controls and time switches as shown or in accordance with manufacturer's instructions.
- C. Ground lighting fixtures, mounting poles, time switches, photoelectric controls and lighting contractor enclosures in accordance with NEC and Section 16060.

3.02 FIELD QUALITY CONTROL:

- A. Ensure that earth foundation for mounting poles is prepared and compacted in accordance with Section 02200.
- B. Testing:
1. Furnish necessary personnel and equipment and perform tests and adjustments in the presence of the Engineer. Schedule adjustment of exterior installations to occur during hours of darkness.
 2. Test lighting circuit for continuity and operation.
 3. Test fixtures, mounting poles and equipment enclosures for continuity of grounding system.
 4. Aim and adjust fixtures to provide distribution pattern approximately as shown and as approved.
 5. Test time switches, control devices and contactor for connection in accordance with wiring diagram.
 6. Check tightness of cable connections of time switches, lighting contactors, and photoelectric controls and limit switches.
 7. Test operations of circuits, control devices and contactors.

PART 4: MEASUREMENT AND PAYMENT

4.01 70mA 255W LED LUMINAIRE:

- A. 70mA 255W LED Luminaire will be measured per each for payment.

- B. 70mA 255W LED Luminaire will be paid for at the Contract unit price bid per each and include materials, equipment, tools, labor and all work incidental to complete the item specified.

END OF SECTION

SECTION 16525**LIGHTING POLES AND STANDARDS****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This section specifies lighting poles and standards including, temporary wood poles, and art installation mounting brackets.
- B. Related Work Specified Elsewhere:
 - 1. Electrical Hand Holes, Manholes, Pull and Junction Boxes: Section 16124.
 - 2. Grounding : Section 16060
 - 3. Exterior Luminaires: Section 16520

1.02 SUMMARY:

- A. This Section includes the following poles for support of luminaries:
 - 1. Gardco – Type 6” Square Steel or approved equal.

1.03 DEFINITIONS

- A. Luminaire: Complete lighting fixture, including ballast housing if provided.
- B. Pole: Luminaire support structure, including foundation, standard, base cover, pole top and brackets.
- C. Standard: Same definition as “Pole” above.

1.04 PERFORMANCE REQUIREMENTS:

- A. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied as stated in AASHTO LTS-4.
- B. Wind Load: Pressure of wind on standard and luminaire, calculated and applied as stated in AASHTO LTS-4.

1.05 SUBMITTALS:

- A. Product Data: For each type of pole indicated, arrange in order of lighting unit designation. Include data on accessories, finishes, and the following:
- B. Materials and dimensions of poles.
- C. Means of attaching luminaries and indication that attachment is suitable for it.
- D. Bases.
- E. Shop Drawings:
 - 1. Include anchor-bolt templates keyed to specific poles and certified by manufactures.
 - 2. Include hole location template for holes for art installation mounting brackets. Engineer approved hole location template shall be provided to the pole manufacturer prior to placing order for light poles.

3. All shop drawings shall be developed by a Professional Engineer licensed in the State of Maryland.
- F. Design calculations, certified by a qualified professional engineer, indicating strength of screw foundation.
- G. Product Certificates: Signed by manufacturer of poles, certifying that products are designed for load requirements in AASHTO LTS-4 and that load imposed by luminaire has been included in design.
- H. Design calculations, certified by a qualified professional engineer, indicating strength of screw foundation.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Package steel poles for shipping according to ASTM A700.
- B. Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
- C. Retain factory-applied pole wrappings on metal poles until just before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.07 WARRANTY:

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace lighting poles and standards that fail in finish, materials, and workmanship within specified warranty period.
 1. Protection of Metal from Corrosion: Warranty against perforation or erosion of finish due to weathering.
 2. Color Retention: Warranty against fading, staining, and chalking due to effects of weather and solar radiation.
 3. Warranty Period: Manufacturer's standard, but not less than three years from date of Substantial Completion.

Part 2 : PRODUCTS

2.01 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Gardco or approved equal.

2.02 POLES, GENERAL:

- A. Description: Comply with AASHTO LTS-4 in structural design of poles.
- B. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in "Performance Requirements" Article, with a gust factor of 1.3.

- C. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- D. Luminaire Attachment: Structural supports to comply with luminaire mounting requirements.
- E. Finish: Match finish of pole and support structure on arm, bracket, and tenon mount materials.
- F. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
 - 1. Materials: Shall not cause galvanic action at contact points.
 - 2. Mountings: Correctly position luminaire attachment to provide indicated light distribution.
 - 3. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless stainless-steel items are indicated.
 - 4. Anchor-Bolt Template: Steel.
 - 5. Concrete Bases: Cast-in-place concrete. Concrete, reinforcement, and formwork are specified in Section 033000.

2.03 STEEL POLES:

- A. Poles: Seamless, extruded, 7 gauge, structural steel tube with access handhole in pole wall.
- B. Shape – 6” square, straight.
- C. Height – 30’-0”.
- D. Poles-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.
- E. Grounding and Bonding lugs: Welded 1/2 –inch threaded lug, complying with requirements in Section 16060 Section “Grounding” listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.
- F. Brackets for Luminaires:
 - 1. Type CRC mounting arm with a seamless 1” x 2” rectangular extruded aluminum tube and cast decorative scroll welded to a cast aluminum plate.
 - 2. Mounting arm shall be equipped with a 4” round by 4” high tenon for luminaire mounting.

3. The CRC plate shall be mechanically fastened using stainless steel hardware to a central pole adapter slip fitting 9" over a 4" O.D. pole

G. Prime-Coat Finish: Manufacturer's standard prime-coat finish.

H. Steel Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Color: Silver Metallic

I. Holes for art installation brackets shall be drilled in the factory by the light pole manufacturer according to the engineer approved shop drawings for the hole locations. No field drilling will be allowed. Holes shall only be drilled for the pole locations shown on the Contract Plans. Poles that shall not have art installed on them shall have the predrilled holes plugged with rubber hole plugs designated by the light pole manufacturer.

2.04 ART INSTALLATION MOUNTING BRACKET:

A. The art installation mounting brackets shall be Wagner Glass Clamp, in satin stainless steel, or approved equal.

B. Mounting brackets shall only be placed on the light poles designated in the Contract Plans.

C. Mounting bracket shall be obtained from a bracket manufacturer who specializes in the fabrication of glass mounting clamps.

D. Mounting brackets shall be ordered with the optional security pin. This security pin will be placed through predrilled holes in the glass art installation for added support.

E. The mounting brackets shall be able to accept a 12mm thick piece of glass.

F. Hardware (screws, bolts) used to attach the mounting brackets to the light poles shall be heavy-duty, stainless steel and shall be provided by the Contractor.

G. Mounting brackets shall be attached to the light poles by the Contractor after the poles have been delivered to the job site and prior to the erection of the light pole. Contractor shall not erect light poles until the glass fin manufacturer has taken adequate measurements and confirmed the proper alignment of the mounting brackets.

PART 3 : EXECUTION

3.01 ERECTION, GENERAL:

- A. Set reinforcement for anchor bolts, nuts, and washers according to anchor-bolt templates furnished by pole manufacture.
 - 1. Concrete Finish: Trowel and rub smooth.
- B. Install poles as follows:
 - 1. Use web fabric slings (not chain or cable) to raise and set poles.
 - 2. Mount pole to foundation with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
 - 3. Secure poles level, plumb, and square.
 - 4. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 - 5. Use a short piece of ½ inch diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.
- C. Contractor shall install art installation mounting brackets on the pole locations designated in the Contract Plans. Contractor shall install mounting brackets after the light poles have been delivered on site. Mounting brackets shall be installed prior to erecting the light poles.

3.02 GROUNDING

- A. Ground metal poles/support structures according to Section 16060 “Grounding”
 - 1. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.
- B. Tighten electrical connectors and terminals according to manufacturer’s published torque-tightening values. If manufacturer’s torque values are not indicated, use those specified in UL 486A and UL 486B.

PART 4 : MEASUREMENT AND PAYMENT

4.01 30’-0” PARKING LOT LIGHT POLE

- A. 30’-0” Parking Lot Light Pole will be measured per each for payment.
- B. 30’-0” Parking Lot Light Pole will be paid for at the Contract unit price bid per each and include materials, equipment, tools, labor and all work incidental to complete the item specified. Art installation mounting brackets and holes drilled into the light poles for the art installation will not be measured, but will be considered incidental to the 30’-0” Parking Lot Light Pole item.

END OF SECTION

SECTION 01420
REFERENCE CODES AND STANDARDS

PART 1: GENERAL

1.01 DESCRIPTION:

- A. This section provides:
 - 1. Acronyms used in Contract Documents for reference standards.
 - 2. Source of reference standards.
 - 3. Applicability of referenced standards.
 - 4. Provision of referenced standards at site

1.02 QUALITY ASSURANCE:

- A. For products or workmanship specified by trade association or government agency, comply with requirements of the standard, except when more rigid requirements are specified or are required.
- B. The latest edition of the standards and their supplements referenced as a part of any section are incorporated in that section to the extent specified therein. In any case of conflict, the requirements of the section shall prevail. The date of the standard is that in effect as of the Bid date, or date of ADMINISTRATION-CONTRACTOR Agreement when there are no bids, except when a date is specified.
- C. When required by individual specification section, obtain copy of standard. Maintain copy at job site during submittals, planning, and progress of the specific work, until Substantial Completion

1.03 TRADE ASSOCIATIONS:

- A. The following acronyms or abbreviations referenced in Contract Documents are subject to change, and are the best known at date of this book's publishing:
 - AAMA American Architectural Manufacturer's Association, 2700 River Road, Suite 118, Des Plaines, IL 60018.

AAN	American Association of Nurserymen, Inc., 1250 I Street, NW., Suite 500, Washington DC 20005.
AASHTO	American Association of State Highway and Transportation Officials, 444 North Capitol Street, NW, Washington, DC 20001.
ACI	American Concrete Institute, Box 19150, Reford Station, Detroit, MI 48219.
ACPA	American Concrete Pipe Association, 8320 Old Courthouse Rd., Vienna, VA 22180.
AGC	Associated General Contractors of America, 1957 E. Street, NW, Washington, DC 20006.
AI	Asphalt Institute, Asphalt Institute Building, College Park, MD 20740.
AIA	American Institute of Architects, 1735 New York Avenue, N.W., Washington, D.C. 20006-5292.
AISC	American Institute of Steel Construction, 400 North Michigan Ave., Chicago, IL 60611.
AISI	American Iron Standards Institute, 1133 Fifteenth St., NW Washington, DC 20005.
ANSI	American National Standards Institute, 1430 Broadway,

New York, NY 10018.

APA	American Plywood Association, P.O. Box 11700, Tacoma, WA 98411.
ASME	American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.
ASPA	American Sod Producers Association, Association Building, Ninth and Minnesota, Hastings, NE 68901.
ASTM	American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
ATSSA	American Traffic Safety Services Association, Inc., ATSSA Building, 5440 Jefferson Davis Highway, Fredericksburg, VA 22401.
AWPA	American Wood-Preservers' Association, P.O. Box 849, Stevensville, MD 21666.
AWPB	American Wood-Preservers' Bureau, P.O. Box 5283, Springfield, VA 22150.
AWS	American Welding Society, 350 Le Jeune Road, NW., Miami, FL 33125.
AWWA	American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

BIA	Brick Institute of America, 11490 Commerce Park Drive, Suite 300, Reston, VA 22091.
BOCA	Building Officials and Code Administrators, International Code Council, 5203 Leesburg Pike, Suite 600, Falls Church, VA 22041, telephone: 703-931-4533, fax 703-379-1546, http://www.iccsafe.org/
CLFMI	Chain Link Fence Manufacturers Institute, 1776 Massachusetts Avenue, N.W., Washington, DC 20036.
CRSI	Concrete Reinforcing Steel Institute, 933 Plum Grove Rd., Schaumburg, IL 60195.
CSI	The Construction Specifications Institute, 601 Madison Street, Alexandria, VA 22314-1791.
EIA	Electronic Industries Association, 2001 I Street, NW, Washington, DC 20037.
ICBO	International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, CA 90601.
ICEA	Insulated Cable Engineer's Association, P.O. Box 440, South Yarmouth, MA 02664.
IEEE	Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, New Jersey 08854-1331

IMIAC	International Masonry Industry All-Weather Council, International Masonry Institute, 823 15th Street, N.W. Washington, DC 20005.
IMSA	International Municipal Signal Association, P.O. Box 539, 1115 N. Main St., Newark, NY 14513.
IPCEA	Insulated Power Cable Engineers Association (see ICEA)
MBMA	Metal Building Manufacturer's Association, 1230 Keith Building, Cleveland, OH 44115.
NAA	National Arborist Association, 174 Rt. 101, Bedford, NH 03102.
NAAMM	National Association of Architectural Metal Manufacturers, 8 South Michigan Avenue, Suite 1000, Chicago, Illinois 60603
NEC	National Electric Code (from NFPA). NEMA National Electrical Manufacturer's Association, 2101 L Street NW, Suite 300, Washington DC 20037.
NEMA	National Electrical Manufacturers Association, 1300 N. 17th Street, Suite 1847, Rosslyn, VA, 22209.
NESC	National Electric Safety Code (obtain copies from IEEE)

N.F.P.A.	National Forest Products Association, 1250 Connecticut Avenue, N.W., Washington, DC 20036.
NFPA	National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
NSF	National Sanitation Foundation, P.O. Box 1468, 3475 Plymouth Road, Ann Arbor, MI 48106.
PCA	Portland Cement Association, 5420 Old Orchard Road, Skokie, IL 60077.
PCI	Prestressed Concrete Institute, 175 W. Jackson Blvd., Chicago, IL 60604.
PPI	Plastic Pipe Institute. A Division of the Society of The Plastics Industry, Inc., 355 Lexington Avenue, New York, N.Y. 10017.
S.D.I .	Steel Door Institute, (c/o A.P. Wherry and Assoc. Inc.) 712 Lakewood Center North, 14600 Detroit Ave, Cleveland, OH 44107.
SSPC	Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh, PA 15213.
UBC	Uniform Building Code (from ICBO). UL Underwriters'

Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062.

UL Underwriters Laboratory, 12 Laboratory Drive, Research Triangle Park, NC 27709-3995

WWPA Western Wood Products Association, 522 SW 5th Avenue, Yeon Building, Portland, OR 97204.

1.04 GOVERNMENT AGENCIES:

- A. The following acronyms or abbreviations indicate names of standards or specification producing agencies of the Federal and State Governments and are the best known at the publishing date of this document:

CS Commercial Standard (U.S. Department of Commerce), Government Printing Office, Washington DC 20402.

DNR Maryland Department of Natural Resources, 580 Taylor Avenue, Tawes State Office Building, Annapolis, MD 21401 <http://www.dnr.state.md.us/>

B.C. Baltimore City Department of Public Works, 417 East Fayette Street Baltimore, MD 21202 Specifications Materials, Highways, Bridges, Utilities and Incidental Structures 2006 or latest edition at time of bid opening

FED STD 595 Federal Color Standard 595, revision B, available from General Services Administration, 1800 F Street, NW Washington, DC 20405

- FHWA Federal Highway Administration, United States Department of Transportation, 400 Seventh St., SW, Washington, DC 20590.
- FS Federal Specification (General Services Administration), Specifications and Consumer Information, Distribution Section (WFSIS), 7th and D Street, SW, Washington, DC 20406.
- MDA Maryland Department of Agriculture, 50 Harry S. Truman Parkway, Annapolis, MD 21401
<http://www.mda.state.md.us/>
- MDE Maryland Department of the Environment, 1800 Washington Blvd., Baltimore, MD 21230
<http://www.mde.state.md.us/>
- MIL Military Standardization Documents (U.S. Dept. of Defence) Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.
- MSHA Maryland State Highway Administration, 707 North Calvert Street, Baltimore, MD 21202
<http://www.sha.state.md.us/>
- MSHA STD Maryland State Highway Standard for Highways and Incidental Structures:
<http://www.sha.state.md.us/BusinessWithSHA/bizStdsSpecs/desManualStdPub/publicationsonline/ohd/bookstd/index.asp>

MSMT	Maryland Standard Method of Test - Materials Manual, Laboratory and Field Procedures, Maryland State Highway Administration, Cashier's Office, 211 E. Madison St. Baltimore, MD 21202, Telephone: 410-545-8490
MTA	Maryland Transit Administration, 6 Saint Paul Street, Baltimore, MD 21202 www.mtmaryland.com/
NBS	National Bureau of Standards (U.S. Department of Commerce), Gaithersburg, ND 20234.
OSHA	Occupational Safety & Health Administration, 200 Constitution Avenue, NW, Washington, DC 20210
PS	Product Standard of NBS (U.S. Department of Commerce), Government Printing Office, Washington, DC 20402.
USACOE	Corps of Engineers (U.S. Dept. of the Army) Chief of Engineers Referral, Washington, DC 20314.
USDA	United States Department of Agriculture, Agricultural Research Service, Washington, DC
USPS	U.S. Postal Service, 475 L'Enfant Plaza, SW, Washington, DC 20260.

PART 2: PRODUCTS

NOT USED

PART 3: EXECUTION**NOT USED****PART 4: MEASUREMENT AND PAYMENT****4.01 REFERENCE CODES AND STANDARDS:**

- A The work required under this Section will not be measured for payment.
- B All costs in connection herewith will not be paid for directly, but will be considered incidental to the item of work to which they pertain.

END OF SECTION

SECTION 01500**TEMPORARY FACILITIES AND CONTROL****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This section specifies the general requirements for furnishing, installing, and operating temporary facilities and controls. This Section includes:
1. Temporary Utility Service
 2. Temporary Sanitary Facilities
 3. Project Identification
 4. Protection of Existing Facilities
 5. Orange Plastic Safety Fence
 6. Work and Storage Areas
 7. Community Relations
 8. Construction Operations Under Traffic

9. Safety Requirements
10. Pollution Abatement
11. Historical and Scientific Specimens
12. Salvage Material and Equipment

B. Related work specified elsewhere:

1. Section 01550: Maintenance of Traffic
2. Section 01570: Environmental Protection

1.02 TEMPORARY UTILITY SERVICE:

- A. Determine the need for such temporary utility service as may be required to prosecute the work and make arrangements with utility companies for such service. Remove all materials and equipment involved with temporary utility service as part of final cleanup. All costs incurred in obtaining permits; utility service, including connection and disconnection; and furnishing, installing, maintaining, and removing such materials as may be required shall be borne by the Contractor.

1.03 TEMPORARY SANITARY FACILITIES:

- A. The Contractor shall furnish for use of his work force the necessary toilet conveniences, secluded from public observation. Keep in a clean, sanitary condition. Comply with the requirements and regulations of the State of Maryland, Department of Health, and other agencies having jurisdiction.

1.04 PROJECT IDENTIFICATION:

- A. FTA Project Signs: The requirements for the FTA project signs are specified in Section SGP-10 of the Supplementary General Provisions
- B. Field Office Signs: provide one sign each for the Engineer's Field Office and the Contractors Field Office to indicate the location of the offices. Use 1/2 or 3/4 inch thick exterior, A-B grade plywood, cut two (2) feet by four (4) feet long. Paint the sign with one coat of primer sealer and two coats of white semi-gloss enamel. Letter each sign with black enamel paint, using block letters at least four (4) inches high, with the Contract Name, Contract Number and the words ENGINEER'S (or CONTRACTOR'S) FIELD OFFICE painted each on a separate line. Where the field office to be so identified is not readily visible from the project entrance, paint a directional arrow on the sign and locate the sign near the project entrance. The exact location of the field office signs and the proposed method of mounting shall be subject to the approval of the Engineer.
- C. Contractor's Identification Signs: The Contractor may erect his own signs to identify himself and, if he wishes, his subcontractors. The overall size of the Contractor's identification signs shall not exceed four (4) feet by eight (8) feet wide. The exact location, method of mounting and mounting height of the Contractor's identification signs will be subject to the

approval of the Engineer.

- D. **Sign Maintenance:** Maintain all signs throughout the course of construction until final acceptance, keeping them clean, in good repair, and free of obstructions. Upon final acceptance of the work, remove and dispose of all signs.

1.05 COMMUNITY RELATIONS:

- A. The Administration will establish a program of public contact for conducting effective relationships with communities and businesses in proximity to construction areas. As part of these programs the Contractor shall establish and maintain continuing liaison with persons occupying property or doing business in the immediate area of the Worksite for the purpose of minimizing inconveniences resulting from construction.
- B. The Contractor shall contact those residents or businessmen who might reasonably be expected to be affected by the construction and make known to them the name of the Contractor representative on the Worksite with responsibility for community relations and explain to them the means by which the representative can be contacted expeditiously.
- C. The Contractor shall, as part of the monthly progress status report specified in Section 01300, note and explain all community relations activities undertaken during the report period.

1.06 MAINTENANCE AND CONTROL OF TRAFFIC:

- A. Reference Section 01550 “MAINTENANCE OF TRAFFIC” for specifications and procedures associated with the project MOT.

1.07 CONSTRUCTION OPERATIONS UNDER TRAFFIC:

- A. General: Construction equipment is defined for the purpose of this article as all types of equipment, vehicles, and tools used in connection with construction work. The term workmen includes every person or firm performing work in or adjacent to public streets.

- B. Construction Equipment: When in traffic lanes, all vehicles and equipment shall be operated at normal traffic speeds. If this is not practicable, a slow moving vehicle emblem must be displayed in accordance with Article 66½ (Motor Vehicle Code), Annotated Code of the State of Maryland. Construction equipment shall not be parked in any lane intended for use by normal traffic. Equipment parked or stored at the work site shall be behind a guard rail, barrier, curb or other protective device.

- C. One-Way Traffic: No construction equipment shall be operated on traffic lanes, except in the designated direction of travel for respective lanes.

- D. Construction Operations:
 - 1. No construction work involving occupancy of traffic lanes shall be performed during adverse weather conditions or adverse road conditions except when so authorized by the Engineer and traffic shall be properly safeguarded by the use of flashers, and lights in addition to the signs and other markings prescribed herein. During these periods, no construction deliveries shall take place over a travel lane or immediately adjacent thereto.

 - 2. When traffic conditions dictate, the Engineer may require the Contractor to modify his work operation for such length of time as

required to alleviate the hazardous traffic conditions.

E. Equipment Travel:

1. No construction equipment other than that designed and used for general highway transportation shall be moved on streets during hours of darkness, periods of adverse weather conditions which reduce normal visibility, or when the roadway is covered with snow or ice.
2. Any construction equipment or material required in construction which exceeds the maximum vehicle dimensions enumerated in Article 66½ Motor Vehicle Code, shall be moved only in accordance with the established State and local regulations. No such oversized load shall be moved over streets of the local jurisdictional agency without first obtaining the approval of the appropriate agency.

F. Crossing traffic Lanes: When crossing open traffic lanes by construction equipment is necessary, such crossing shall be safeguarded with flagmen.

G. Flagmen: Provide qualified flagmen thoroughly instructed in flagging procedures as required to safeguard and maintain vehicle and pedestrian traffic. All flagmen shall perform their duties courteously and in such manner as will insure the safety and convenience of the traffic within the limits of the guarded area. Traffic shall not be flagged to a stop unless such is necessary for safety. Flagmen shall be supplied with flares for adverse weather conditions and with red flag not less than 24 inches square for slowing or directing traffic to another lane. Flagmen shall wear fluorescent orange safety vests and yellow hard hats.

- H. Removal of traffic Control Devices: All temporary signs, barricades, barrier curbs, drums, and cones used for safeguard traffic in connection with construction work shall be removed at the close of the work day, unless the state of the work is such that warning devices are still needed and are adapted for night closing. In such cases notify the Engineer reasonably in advance of the normal quitting time that he may review the status of the work and request additional safety measures as he deems necessary.
- I. Storage: No material shall be stored on any lane intended for traffic use.

1.08 WORK AND STORAGE AREAS:

- A. The Contract Drawings will show or the Special Provisions will describe work areas available to Contractor for storage of project materials and for parking of project construction equipment. These areas will be provided to the Contractor for the duration of construction without charge. Additional work and storage space, if required, shall be provided by the Contractor at his own expense. Parking facilities for Contractor's personnel shall be the Contractor's responsibility.

1.09 SAFETY REQUIREMENTS:

- A. Refer to the General Provisions Sections GP-7 for safety and health requirements.
- B. Employ and assign to the work a full-time Safety Superintendent who has the specialized training and experience in construction safety supervision, is thoroughly familiar with OSHA requirements, and is acceptable to the Engineer. Employ the Safety Superintendent exclusively for purpose of

supervising the safety of persons on or about the work and property affected thereby.

- C. First Aid Stations: At site of the work, establish and fully equip a first aid station. Maintain a qualified first aid attendant on duty in the station at all times when the work is in progress, except when on emergency calls.

1.10 POLLUTION ABATEMENT:

- A. General: Refer to General Provisions Section GP-7. Conduct operations in a manner to minimize pollution of the environment surrounding the area of work by every means possible. Apply specific controls as follows:
 - 1. Material Transport: Truck leaving the site and entering paved public streets shall be cleaned of mud and dirt clinging to body and wheels of the vehicle. Trucks arriving at and leaving the site with materials shall be loaded in a manner which will prevent dropping of materials or debris on the streets. Contractor shall maintain a suitable vehicle cleaning and inspection installation with permanent crew for this purpose. Spills of materials in public areas shall be removed immediately at no additional cost to the Administration.
 - 2. Waste Materials: No waste or erosion materials shall be allowed to enter natural or man-made water or sewage removal systems. Erosion materials from excavations, borrow areas or stockpiled fill shall be contained within the work area. Contractor shall develop methods for control of waste and erosion which shall include such means as filtration, settlement and manual removal.

3. Burning: No burning of waste will be allowed.
4. Dust Control: the Contractor shall at all times control the generation of dust by his operations. Control of dust is mandatory and shall be accomplished by water sprinkling or by other methods approved by the Engineer.
5. Noise Control:
 - a. General: Minimize noise caused by work operations, and provide working machinery and equipment fitted with efficient noise suppression devices. Employ other noise abatement measures necessary for protection of both employees and the public. In addition, restrict working hours and schedule operations in a manner that will minimize to the greatest extent feasible, disturbance to residents in the vicinity of the work. Provide protection against noise exposure for employees in accordance with GP 7.05.
 - b. Definitions:
 - i. Daytime, refers to the period from 7:00 a.m. to 10:00 p.m. local time daily except Sundays and legal holidays. Nighttime, refers to all other times including all day Sunday and legal holidays.
 - ii. Construction Limits are defined for the purpose of these noise control requirements as the Administrations right-of-way lines or property lines

as indicated on the drawings.

- iii. Zones, Special Zones and special Construction sites outside of Construction Limits shall be designated by the local agency having jurisdiction.

- c. **Monitoring:** Monitor noise levels of work operations to assure compliance with the noise limitations contained herein. Retain record of noise measurements for inspection by the Engineer. Promptly inform the Engineer of any complaints received from the public regarding noise. Describe the action proposed and the schedule for implementation and subsequently inform the Engineer of the results of the action.

- d. **Measurement Procedure:**
 - i. Except where otherwise indicated, perform all noise measurements using the A-weight network and (slow) response of an instrument complying with the criteria for Type 2 General Purpose sound level meter as described in ANSI S1.4. Measure impulsive or impact noises with an impulse sound level meter complying with the criteria of IEC 179 for impulse sound level meters. As an alternative procedure, a type 2 General Purpose sound level meter on C-weighting and (fast) response may be used to estimate peak values of impulsive or impact noises. Transient meter indications of 125 dB(C (fast) or higher will be considered as indications of impulsive noise levels of 140 db or greater.

- ii. Measure noise level at buildings affected acoustically by the Contractor's operations at points between three feet and six feet from the building face to minimize the effect of reflections.
 - iii. Measure noise levels at points on the outer boundaries of Construction Limits or Special Construction Sites for noise emanating from within.
 - iv. Where more than one criteria of noise limits are applicable, use the more restrictive requirement for determining compliance.
 - e. Noise Restrictions: Noise restrictions shall be in accordance with local ordinances.
- B. Maintaining Flow of Sewers and Drains: The Contractor shall, at his own expense, provide for and maintain the flow of all sewers, drains, house or inlet connections, and all water courses which may be met during progress of the work. The Contractor shall not allow the contents of any sewer, drain, or house or inlet connection to flow into trenches. The Contractor shall, at his own expense, immediately remove from proximity of the work all offensive matter, using such precautions as are required by the Engineer.

1.11 HISTORICAL AND SCIENTIFIC SPECIMENS:

- A. All articles of historical or scientific value, including coins, fossils, and

articles of antiquity, which may be uncovered by Contractor during progress of the work, shall become the property of the Administration. Such findings shall be reported immediately to the Engineer who will determine method of removal, where necessary, and final disposition thereof.

1.12 SALVAGE MATERIALS AND EQUIPMENT:

- A. The Contractor shall maintain adequate property control records for materials and equipment specified to be salvaged. Contractor shall be responsible for the adequate storage and protection of salvaged materials and equipment. The Contractor shall replace, at no cost to the Administration, salvage materials and equipment which are broken or damaged during the salvage operations as the result of the Contractor's negligence.

- B. Salvage material not specified for reuse shall be the property of the Contractor and shall be removed from the site.

PART 2: PRODUCTS

NOT USED

PART 3: EXECUTION

NOT USED

PART 4: MEASUREMENT AND PAYMENT

4.01 TEMPORARY FACILITIES AND CONTROLS:

- A. The temporary facilities and controls work required under this Section will not be measured for payment, except as noted below.
- B. All costs in connection herewith will not be paid for directly, but will be considered incidental to the item of work to which they pertain.

4.02 MAINTENANCE AND CONTROL OF TRAFFIC:

- A. The maintenance and control of traffic will be measured as the percentage of total Contract progress.
- B. The maintenance and control of traffic will be paid for at the percentage of total Contract progress multiplied by the lump sum price for maintenance and control of traffic in the unit price schedule times

END OF SECTION

SECTION 01522**ENGINEER'S FIELD OFFICE TYPE 2****PART 1 – GENERAL****1.01 SUMMARY**

- A. The work specified in this Section includes furnishing, cleaning and maintaining in good condition a suitable office at a location approved by the Engineer. The office shall be separated from any building used by the Contractor and shall be for the exclusive use of the Administration's personnel.

- B. The office shall be served by municipal water and sewer facilities where available. If the facilities are not available, a neat sanitary toilet shall be provided services and maintained. Hand washing accommodations with a pressurized water system having a minimum pressure of 20 psi shall be provided. These facilities as described shall be for the exclusive use of State employees and shall meet the requirements of the State Department of Health and Mental Hygiene or other authorities having jurisdiction.

1.02 RELATED WORK

- A. The General Provisions of the contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

PART 2 – PRODUCTS**(NOT USED)****PART 3 – EXECUTION****3.01 ENGINEER'S FIELD OFFICE**

- A. Provide a mobile unit or a building of 700 square feet, or more, of usable floor space. The Facility shall be located near the construction site. The unit or building hereinafter called the Engineer's field office shall be complete in place as specified and ready for occupancy by the Administration 30 days after Notice To Proceed and shall remain in place and functioning until 90 days after the completion of the Contract. Provide six parking spaces for the exclusive use of the Administration and their representatives in administering the Contract.

- B. Provide the Engineer's field office with all the features specified herein conforming to the local building codes and having the specified basic features with any substitute materials subject to approval by the Administration.

- C. Maintain and service the Engineer's field office until all records pertinent to each segment of the Contract have been completed. After which time, the facility becomes the property of the Contractor and is to be removed.

-
- D. Obtain and apply all costs for hauling, building and connection permits to the field office. Provide the field office with new commercial quality materials. Provide other features as follows:
1. The field office may be a temporary or permanent type facility with adequate insulation, flooring, lighting, potable water, utility service, heating and air conditioning.
 2. Provide one restroom in Facility complete with water closet and hot and cold water supply. Provide a lockable door on restroom.
 3. Provide in the interior of the Facility at least two completely partitioned office rooms. These rooms shall be approximately 100 square feet with an interior doors. Provide a meeting room of approximately 250 square feet. Furnish the Administration at least three keys for each of the interior door locks.
- E. Provide and maintain as a minimum the following furniture and equipment for the Facility:
1. Two offices type desk having at least two drawers on each side and minimum top dimensions of 30 inches by 72 inches.
 2. Four desk chairs.
 3. Ten comfortable, stackable chairs
 4. One four-drawer fire resistant filing cabinet (D Label) equipped with lock.

5. One four-drawer cabinet with lock
6. One plan rack having a capacity of twelve holders for full size engineering drawing
7. Four utility tables, 30 inches high and having a top dimension not less than 30 inches by 72 inches.
8. One slant top drafting table approximately 40 inches high at the front edge and having a top dimension not less than 37 inches by 72 inches
9. One stool of proper height for drafting table
10. One closet, extending the full height from the floor to ceiling, measuring not less than 24 inches by 60 inches in plan, equipped with locks and at least two shelves
11. Utility cabinet with three adjustable shelves.
12. Two electric printing calculators with a minimum of eleven digits supplemented with an instruction manual
13. One Fire Extinguisher – dry chemical, multi-purpose ABC minimum size 10 pounds (4.54-kg), equipped with a visual air pressure gauge. The fire extinguisher shall be checked monthly for stored pressure, etc.; also checked and tagged by a licensed company annually and after each use.

14. First Aid Kit – one equivalent to 24 unit first aid kit meeting Title 29 Code of Federal Regulations 1926.50(d)2. The first aid kit shall be checked monthly and replenished to full complement

15. Office Telephones: Three office telephone lines, and four handsets with multi-line and intercom buttons, one separate fax line; one separate modem line (total of five lines), installation and monthly telephone charges shall be the responsibility of the Contractor

16. One telephone answering machine
 - a. The answering machine shall be equipped with tapes having the capability to record for a period of at least 30 minutes. These machines shall be voice-activated beeper less and shall play back recorded messages without dial tones or pauses. The answering machines shall be capable of pre-recording an answering message up to 15 seconds in length.

 - b. If the telephone answering machine becomes defective, or is stolen, or for any reason does not function as intended, it shall be replaced with equal or better replacement unit at the Contractor's expense. Any defective equipment shall be replaced within 8 hours after the Engineer notifies the Contractor

17. One telephone plain paper facsimile machine

- a. Shall meet and be compatible with CCITT Group Transmission standards (see specific line items for compatibility requirements)
- b. Shall utilize public switched telephone networks and standard two- (2) wire leased through RJ11C jacks or similar devices
- c. Shall transmit at 14,400 BPS or higher with automatic step down to compensate for phone line conditions
- d. Shall transmit standard page 8½ x 11 inch at a speed of 20 seconds or less through a clean phone line, based on CCITT # 1 test chart
- e. Shall have a minimum of two levels of resolution with contrast control:
 - i. Standard-200/96 lines
 - ii. Fine-200/96 lines
- f. Self-test capability, provide activity reports and provide page headers, time and date
- g. Shall use plain paper
- h. Shall automatic document feeder tray (se specific requirements for each transceiver class)

- i. Shall be supplied with handsets
 - j. Shall provide for automatic answer, receive and disconnect features
 - k. FCC registration number, ringer equivalence and connection circuitry shall be provided for each transceiver
 - l. Shall be equipped with speed dial feature for 20 numbers
 - m. Shall have a dedicated line separate from others
18. Cellular Telephone: Two portable cellular telephones for the exclusive use by the Administration. Provide installation and pay monthly charges for the duration of the Contract (Final Acceptance)
19. One free-standing type copier with:
- a. Automatic feed
 - b. Twenty-five (25) copies per minute or better
 - c. Separated sorting capability
 - d. Minimum of two separate paper drawers one of which is for 11" x 17"

- e. Printer paper of 20 pound weight with 84 brightness or better through life of contract in sizes 8½" x 11", 8½" x 14" and 11" x 17"
 - f. Toner cartridges recommended by the original equipment manufacturer through life of contract
20. One secretary type desk with stenotype chair
21. Microcomputer System and Accessories
- a. Laptop Computer (Notebook):
 - i. 15 inch TFT Color Display or better
 - ii. Intel Core 2 Duo – 1.66GHz or faster Processor
 - iii. 1.0 GB RAM
 - iv. Integrated video Intel DVMT
 - v. 24X CD-RW or better
 - vi. 3.5 inch Disk Drive
 - vii. 80 GB Hard Drive or better

- viii. Lithium-ion Battery and AC Pack
 - ix. USB Ports
 - x. 56 K Modem
 - xi. Carrying Case
 - xii. EZ Pad Pointing Device
- b. Two Desktop microcomputer systems
- i. Intel Core 2 Duo – 2.0 MB L2 Cache, 1.86 GHz, 1066 FSB or better
 - ii. 1 GB Dual Channel DDR2 SDRAM or better
 - iii. Integrated video Intel DVMT
 - iv. RAID level 1 array consisting of two 80 GB 7200 RPM Hard Drives (or better) and controller
 - v. Internal calendar/clock with battery backup
 - vi. A minimum of 1 parallel, 2 serial ports and 6 UBS 2.0 ports, 2 PS/2 ports

- vii. Internal 40X CD-RW or better
 - viii. 3.5 inch Disk Drive
 - ix. Microsoft ps/2 intellimouse or equivalent
 - x. Integrated 10/100/1000 Ethernet adapter
 - xi. One internal 56K fax modem including all cables and terminations
 - xii. Flat panel active-matrix LCD monitor with a minimum screen size of 17 inches and a resolution of 768 x 1024 or better
 - xiii. PS/2 keyboard or equivalent
 - xiv. Uninterruptible Power Supply (UPS) with automatic voltage regulation, surge protection up to 1000 volt amps, modem/fax surge protection, 6 outlet minimum, and software
 - xv. Digital Subscriber Line (DSL) high speed internet access
- c. Two HP (Hewlett Packard) or compatible laser printers, one with a sheet size to 8.5 x 14 inch with minimum

resolution of 1200 x 1200 dpi (dots per inch) and one with a sheet size to 11 x 17 inch with a minimum resolution of 600 x 600 dpi, 25 ppm (pages per minute) and a minimum of 64 MB of RAM

- d. One HP (Hewlett Packard) or compatible color ink jet printer with minimum resolution of 600 x 600 dpi (dots per inch), 15 ppm (pages per minute) color and a minimum of 8 MB of RAM

- e. One Scanner with a minimum resolution of 800 dpi and a minimum page size of 11 x 17 inch. Scanner shall include all cables and software necessary for the production of portable document format (PDF) files

- f. Included Software:
 - i. Windows Vista Business and NTFS installed

 - ii. Microsoft Office 2007 Professional installed

 - iii. McAfee Anti-Virus installed

 - iv. Symantec PC Anywhere installed

 - v. Adobe Acrobat Professional Version 8 installed

 - vi. Microsoft MSN premium internet software installed

Original disks containing the software and manuals shall be provided

- g. Digital camera with 6 megapixels or greater resolution, minimum 3X optical zoom, minimum of two 512 MB digital film (flashcards) for camera and all necessary software/hardware to interface with the supplied PC's
 - h. Contractor, as needed, shall supply all diskettes and CD's
- 22. Maintenance for computers, printers, facsimile machine and copiers during the life of the contract
 - 23. One "Army litter" type stretcher
 - 24. Bottled water cooler with bottled water service
 - 25. One refrigerator with a capacity of 5 cubic feet
 - 26. Automated External Defibrillator (AED)
- F. Provide maintenance, supplies and services as follows:
- 1. Clean field office, parking area and access road daily, including complete janitorial services and supplies. Make any required repairs to the field office when requested by the Administration

2. Furnish all utilities including telephone service
 3. A parking area, with sufficient space for six (6) MTA vehicles, shall be stabilized as directed by the Engineer in the area of the field office
 4. During other than normal working hours, provide security measures and area protection equivalent to that used for the Contractor's work site, shop and office
 5. Daily cleaning service
 6. Payment of all monthly service charges
- G. Remove the field office and all furniture and equipment from the site at the time specified in Subsection 3.01 A. All materials, furniture and equipment except the defibrillator (AED) and the digital camera shall become the property of the Contractor at the conclusion of the Contract.
- H. Restore the field office site to the original condition or better.

PART 4 – MEASUREMENT AND PAYMENT

4.01 ENGINEER'S FIELD OFFICE – TYPE 2

- A. The work required under this Section will not be measured for payment
- B. All costs in connection Engineer's Field Office Type 2 will be paid for at

the rate of 50 percent of the lump sum bid price for the first month and the remainder paid in equal monthly installments for the duration of the Contract.

END OF SECTION

SECTION 02372**SOIL STABILIZATION MATTING****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This work shall consist of furnishing, placing and securing matting on seeded areas, as specified in the Contract Documents or as directed by the Engineer.

PART 2: PRODUCTS**2.01 MATERIALS:**

- A. Soil Stabilization Matting:
1. Type A soil stabilization matting shall consist of a machine-produced mat of degradable natural or man made fibers. Matting shall be smolder resistant. When a chemical is used, it shall be nonleaching, nontoxic to vegetation and the germination of seed, and noninjurious to the skin.
 2. Type A matting shall have a uniform thickness and distribution of fibers throughout. The top and bottom of the matting shall be covered with a degradable extruded plastic netting having a maximum mesh opening of 2 x 2 in. or covered on the top side with netting machine sewn or bonded on 2 in. centers along the longitudinal axis of the material. The average breaking strength of

any two strands of netting shall be 5-lb. minimum. The netting shall be entwined with the matting fibers in a manner which shall provide sufficient reinforcement against damage during handling and placement and shall resist degradation for a minimum of six months and a maximum of one year.

- B. Staples for Soil Stabilization Matting: Staples shall be U or T shaped steel wire having minimum gauges of No. 11 and No. 8 respectively. The U shaped staples shall average 1 to 1-1/2 inches wide and shall be 12 inches long. The T shapes staples shall have an 18-inch main leg, a 2-inch secondary leg, and a 4-inch head.

PART 3: CONSTRUCTION

3.01 GENERAL:

- A. When topsoil is specified for area where matting is to be placed, this work shall be completed before the soil stabilization matting operation is started.

3.02 PLACING:

- A. The matting shall be placed within 48 hours after seeding operations have been completed in the work areas. Matting shall be rolled in the direction of the water flow. Matting shall be laid smoothly and firmly upon the seeded surface, and stretching shall be avoided. Where more than one width of matting is required, the strips overlap at least 2 in. Ends shall overlap at least 6 in. The upgrade end of each strip of matting shall be turned down and buried to a depth of not less than 6 in with the soil firmly tamped against it. Overlapping shall be done with the upgrade section on

top. The Engineer may require any other edge exposed to more than normal flow of water to be buried in a similar manner. Edges of matting shall be similarly buried around the edges of catch basins and other structures.

3.03 SECURING:

- A. Matting shall be securely fastened in place with staples driven vertically into the soil and flush with the surface. Staples shall be placed 2 ft apart along the edges and center of the matting. On all overlapping edges, staples shall be placed 18 in apart. At all ends of the matting, staples shall be placed 6 in apart.

PART 4: MEASUREMENT AND PAYMENT

4.01 TYPE A SOIL STABILIZATION MATTING:

- A. Type A Soil Stabilization Matting will be measured per square yard.
- B. Type A Soil Stabilization Matting will be paid for at the contract unit price bid per square yard, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, and all work incidental to complete the item as specified.

END OF SECTION

SECTION 02630**STORM DRAINAGE****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. The work under this Section shall consist of furnishing materials for and constructing storm drain systems for surface runoff consisting of inlets, manholes, pipe, roof drains, cleanouts, end sections, headwalls, and replacement and/or modifications to existing Baltimore City storm drainage systems and structures in accordance with the City of Baltimore, Department of Public Works, "Specifications for Material, Highways, Bridges, Utilities, and Incidental Structures", and "Book of Standards", these Specifications, the Contract Drawings and/or as directed by the Engineer.

1.02 DEFINITIONS:

- A. Drainage structures include inlets, manholes, cleanouts, endwalls, end sections, headwalls, and riser structures.

1.03 QUALITY ASSURANCE:

- A. Description – City of Baltimore Specifications

1. Section 34.02-A-1

- B. Field Testing – City of Baltimore Specifications.
1. Section 34-02-A-3(b).
- C. Submittals: Section 01300, submittal procedures of these Specifications for concrete mix, pipe, manhole frames and covers, inlet frames and covers, and precast concrete structures.
1. Submit Certificate(s) of compliance stating that the item(s) supplied is in accordance with the requirements specified herein.
 2. Submit list of materials to be supplied and name of suppliers.
 3. Submit shop drawings for precast concrete structures and manhole and inlet frames, covers, and/or grates.

PART 2: PRODUCTS

2.01 NOTIFICATION:

- A. Before performing any work on or in vicinity of City of Baltimore, DPW owned or City of Baltimore Health Department owned storm drains, notify in writing, at least two weeks prior to commencement of work, Mr. Azzam Ahmad, Storm Water Engineering Office, Bureau of Water and Wastewater, Department of Public Works, City of Baltimore, 306 Abel Wolman Municipal Bldg., 200 N. Holliday Street, Baltimore, MD 21202, Telephone (410) 396-4700 and Mr. Wade Johnson, Health Department, City of Baltimore, 210 Guilford Ave., Baltimore, MD 21202, Telephone (410) 396-4002.

2.02 MATERIALS:

- A. Concrete shall meet the requirements of MSHA Section 902.10.03, Mix No. 2 or 6 as indicated on the Contract Drawings. Mix No. 1 Concrete shall meet the requirements of Baltimore City Specifications Article 20.07.
- B. Grout shall meet the requirements of MSHA Section 902.11.
- C. Castings for Frames, and Covers or Gratings shall be iron castings meeting the requirements of Baltimore City Specifications Section 20.18-12. Manhole covers shall be lettered "STORM DRAIN" per Baltimore City Book of Standards, Std. No. BC 383.13.
- D. Precast Concrete Endwalls, Inlets, and Manholes shall meet the requirements of AASHTO M 199.
- E. Reinforced Concrete Pipe shall meet the requirements of Baltimore City Specification Section 20.16-1. Class as indicated on the Contract Drawings.
- F. Connections between drain pipes and concrete storm drain manholes and stone masonry drain shall be one of the following:
 - 1. Cast-in-Place type compression gaskets such as the A-Lok or Z-Lok seals as manufactured by A-Lok Products, Inc., or equal.
 - 2. Mechanically wedged-in-place type seals such as Link-Seal as manufactured by Thunderline Corp., XP as manufactured by A-Lik Products, Inc., or Kor-N-Seal as manufactured by National

Pollution Control Systems, Inc., or equal.

3. Grouted-in-Place type connectors such as Z-Lok Repair Sleeve as manufactured by Atlantic Concrete Products, Co., Type CT adapter as manufactured by the General Engineering Co., or equal.
 4. All metal fasteners shall be Type 304 stainless steel.
- G. Manhole steps shall be Type 410 stainless steel in accordance with Baltimore City Book of Standards, St'd. No. BC 383.90 or 383.91 as appropriate.

PART 3: EXECUTION

3.01 DESCRIPTION:

- A. City of Baltimore Specifications Section 34.02-A-1.

3.02 CONSTRUCTION SEQUENCE:

- A. Pipe lengths and gradients shall be verified by the Contractor and shall be acceptable to the Engineer prior to installation.
- B. When a pipe is laid on existing ground, on fill, or under fill, the embankment shall be constructed to a height of at least 9 in., but not more than 3 ft. above the top of the proposed pipe and then a trench shall be excavated to receive the pipe.

- C. Underground drainage structures and pipe relocations shall be fully completed and made operational prior to excavations for pier construction.
- D. Underground drainage structures shall be completed before paving surface is placed. Manholes and inlets shall not be completed to final grade until the grading has been finished and all necessary arrangements have been made to insure suitable connections and tie-ins at proper grade and alignment with pavements, curbs, and gutters.

3.03 PIPE INSTALLATION:

- A. Excavation: In accordance with Baltimore City Specification Section 34.02-A-3. Subsections 1., 2., 3., and 4. except as modified herein. The width of trench shall be sufficient to permit thorough tamping of the backfill under the haunches and around the pipe. This width shall not be less than twice the outside diameter of the pipe or the outside diameter plus 18 in. on each side, whichever is less.
- B. Bedding: Storm drain pipe shall be constructed on gravel bedding in accordance with Baltimore City Book of Standards "St'd. No. BC 302.01. When unsuitable foundation material is encountered, it shall be removed and replaced with select backfill for the full width of the trench, as directed by the Engineer.
- C. Removal of Frames, Covers, Grates, Head Pieces, and Top Slabs: In accordance with Baltimore City Specifications Section 34.02-A-3 Subsection 6.
- D. Installation: In accordance with Baltimore City Specifications Section 34.02-A-3 Subsection 7.(b) except as modified herein. Pipes shall be laid with hubs up grade. A single hole through the shell of the pipe will be permitted for use with an approved lifting device. After installation, the

lay hole shall be sealed.

- E. Joints: Asphalt sealer, rubber type gaskets or resilient type material shall be used for storm drain pipe. Care shall be exercised to insure the proper application of sealer on the underside of all joints. Unless otherwise specified in the Contract Documents, these materials shall be installed as recommended by the manufacturer.

- F. Backfill: In accordance with Baltimore City Specifications Section 34.02-A-3. Subsection 5., except as modified herein. Earth for backfill shall be free from large lumps, clods, and rocks and shall be placed along the side of the pipe for the full width of the trench in layers not exceeding 6 inches in uncompacted depth. Compaction shall conform to the requirements of Section 02315. Each layer shall be compacted simultaneously on both sides of the pipe by means of an approved mechanical tamper. Special care shall be taken to compact the fill thoroughly under the haunches of the pipe.

3.04 DRAINAGE STRUCTURES:

- A. Castings: Frames for grates and covers for inlets and manholes respectively shall be set in full beds of mortar and rigidly secured in place at proper grade and alignment.

- B. Drain Connections to Storm Drain Manholes:
 - 1. Holes for installing drains in manholes and other structures shall be carefully cored, drilled, or cut in such a manner to minimize damage to the manhole, or structure. Any damage to the manhole or structure shall be promptly repaired to the satisfaction of the Engineer or the manhole or structure replaced. Reinforcing steel in precast manholes shall be cut only to the extent necessary to

accommodate the new pipe and seal system.

2. The drain pipe and connection shall be roughly centered in the hole and the pipe end set flush with the inside wall of the manhole, or structure.
 3. If the manhole connector is the type that is installed in the field, installation of the connector shall be executed in accordance with the manufacture's written instructions.
- C. Pipe Connections: Inlet and outlet pipes at drainage structures shall be set or cut flush with the inside faces of the structures and shall extend a sufficient distance beyond the outside faces of these walls to provide ample room for making proper connections. The joint around the pipe in the structure wall shall be completely and neatly closed with mortar, grout, or other approval material.
- D. Inverts: Drainage structures containing two or more pipes shall have channeled inverts conforming to Baltimore City Book of Standards, St'd. Nos. BC 383.31, 383.32, 383.33, 383.34 or 383.35 as appropriate.
- E. Precast Drainage Structures:
1. Precast Drainage Structures shall meet the requirements of AASHTO M199.
 2. The placement and consolidation of the required bedding under the precast structures shall be a minimum 6 in. of No. 57 aggregate.
- A. Cast-in-Place Drainage structures: Cast-in-Place Drainage Structures shall

meet the requirements of Baltimore City Specifications Article 34.04 except Sections 34.03-4 and 34.03-5 do not apply.

PART 4: MEASUREMENT AND PAYMENT

4.01 MIX #2 CONCRETE FOR MISCELLANEOUS STRUCTURES:

- A. Mix #2 Concrete for Miscellaneous Structures will be measured per cubic yard.
- B. Mix #2 Concrete for Miscellaneous Structures will be paid for at the contract unit price bid per cubic yard, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

4.02 MIX #9 CONCRETE FOR DRAINAGE STRUCTURES AND PIPE COLLARS

- A. Mix #9 Concrete for Drainage Structures and Pipe Collars will be measured per cubic yard.
- B. Mix #9 Concrete for Drainage Structures and Pipe Collars will be paid for at the contract unit price bid per cubic yard, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

4.03 CLASS IV & V REINFORCED CONCRETE PIPE (ANY SIZE)

- A. Class IV & V reinforced concrete pipe (any size) will be measured per linear foot for the pipe size specified.

- B. Class IV & V reinforced concrete pipe (any size) will be paid for at the contract unit price bid per linear foot for the pipe size specified, which price will be full compensation for all material, equipment, tools, labor and all work incidental and necessary to satisfactorily complete each item as specified, including excavation, furnishing and installing pipe, installing precast manhole, frame & cover making field connection, concrete, aggregate and asphalt saw cutting, utility patching, pipe hangers, backfill and compaction, restoration of concrete curb, gutter, mowing strip and paving.

4.04 STANDARD OR MODIFIED INLETS & GRATES (ANY TYPE) – MINIMUM DEPTH

- A. Standard or modified inlets & grates (any type) – minimum depth will be measured per each for the type of inlet specified.
- B. Standard or modified inlets & grates (any type) – minimum depth will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.05 STANDARD OR MODIFIED INLETS & GRATES (ANY TYPE)– VERTICAL DEPTH

- A. Standard or modified inlets & grates (any type)– vertical depth will be measured per vertical linear foot for the type of inlet specified.
- B. Standard or modified inlets & grates (any type)– vertical depth will be paid for at the contract unit price bid per vertical linear foot, complete in

place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.06 STANDARD PRECAST MANHOLES (ANY SIZE)– MINIMUM DEPTH

- A. Standard precast manholes (any size)– minimum depth will be measured per each for the type and size of manhole specified.
- B. Standard precast manholes (any size)– minimum depth will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.07 STANDARD PRECAST MANHOLES (ANY SIZE) – VERTICAL DEPTH

- A. Standard precast manholes (any size) – vertical depth will be measured per vertical linear foot for the type and size of manhole specified.
- B. Standard precast manholes (any size) – vertical depth will be paid for at the contract unit price bid per vertical linear foot, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified, including excavation, maintenance of traffic, demolition, bulkhead construction, inlet reconstruction, flowable fill, earth backfill and compaction and surface restoration.

4.08 STANDARD CHANNELS (ANY TYPE)

- A. Standard Channels (any type) will be measured per each at the contract unit price specified by type.

- B. Standard Channels (any type) will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

4.09 ADJUST DRAINAGE STRUCTURE TO GRADE

- A. Adjust drainage structure to grade will be measured per each at the contract unit price.

- B. Adjust drainage structure to grade will be paid for at the contract unit price bid per each, complete in place, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the work as specified.

END OF SECTION

SECTION 02640**BIORETENTION FACILITY****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This Section specifies the construction of bioretention facility for stormwater management consisting of inlets, pipe, underdrain, underdrain outlet, excavation, backfill, and modifications to existing storm drainage structures as shown on the contract drawings, or as directed by the Engineer.
- B. This work shall consist of supplying and installing Pea Gravel in accordance with the notes and details as shown on the landscape plans and/or as directed by the Project Engineer.

1.02 REFERENCES

- A. The following codes, regulations, reference standards and specifications apply to work included in this section:
 - 1. Maryland State Highway Administration (SHA) Standard Specifications for Construction and Materials, latest revision.
 - 2. Maryland Department of the Environment, Water Management Administration Maryland Stormwater Management Guidelines, July 2001 and Revised 2010 Stormwater ESD Guidelines.
- C. Related Sections:
 - 1. Section 02317: Excavation and Fill.
 - 2. Section 02620: Subdrainage.
 - 3. Section 02630: Storm Drainage.
 - 4. Section 02930: Tree, Shrubs and Grounder Cover.
 - 5. Section 03050: Portland Cement Concrete.

PART 2: PRODUCTS**2.01 MATERIALS:**

- A. Material Specifications - The allowable materials to be used in bioretention area are detailed in the following Table.

Material	Specification	Size	Material Notes
Plantings	n/a	n/a	plantings are site- specific
Bioretention soil [2.5' to 4' deep]	sand 35 - 60%, silt 30 - 55% clay 10 - 25%	n/a	
Mulch	shredded hardwood		aged 6 months, minimum
Pea Gravel	pea gravel: ASTM- D- 448	pea gravel: between 1/4" and 3/4"	Pea Gravel shall have smooth rounded surface and shall be a mix of blue purple and crème stones
Geotextile	Class "C" & "F" - apparent opening size (ASTM- D- 4751), grab tensile strength (ASTM- D-4632), puncture resistance(ASTM- D- 4833)	n/a	Use Geotextile class "F" on top and bottom of concrete sand and gravel layers. Use Geotextile class "C" on bottom and all sides of class I rip-rap layers and outlet protections.
underdrain gravel	AASHTO M- 43	0.25" to 0.75"	Gravel to be washed
underdrain piping	F 758, Type PS 28 or AASHTO M- 278	4" to 6" rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes
Poured in place concrete	MSHA Mix No. 3; f' c = 3500 psi @ 28 days, normal weight, air- entrained; reinforcing to meet ASTM- 615-60	n/a	on-site testing of poured- in- place concrete required: 28 day strength and slump test; all concrete design (cast- in- place or pre- cast) <i>not using previously approved State or local standards</i> requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/ 89; vertical loading [H- 10 or H- 20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Concrete Sand [4" deep]	AASHTO- M- 6 or ASTM- C- 33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

B. Bioretention Soil

1. The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the Bioretention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The bioretention soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

2. The bioretention soil shall be tested and shall meet the following criteria:

pH range	5.2 - 7.0
organic matter	1.5 - 4% (by weight)
magnesium	35 lb./ac
phosphorus (phosphate - P2 O5)	75 lb./ac
potassium (potash - K2 O)	85 lb./ac
soluble salts not to exceed	500 ppm

3. All bioretention areas shall have a minimum of one test. Each test shall consist of both the standard soil test for pH, phosphorus, and potassium and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the top soil was excavated.

4. Since different labs calibrate their testing equipment differently, all testing results shall come from the same testing facility.

Should the pH fall out of the acceptable range, it may be modified (higher) with lime or (lower) with iron sulfate plus sulfur.

C. Plant Material

1. For planting material and planting requirements see Section 02930 and the Bioretention Facility Planting Plan and Plant Schedule.

D. Storm Drainage

1. Refer to Part 1, 2, and 3 in Section 02630: Storm Drainage for Inlets and Reinforced Concrete Pipe.

E. Landscape Edging

1. Edging shall be a minimum of 3" tall.
2. Edging shall be held in place with a tapered stake no less than 8" long and spaced according to manufacturer's instructions.
3. Contractor shall submit manufacturer's specifications for approval prior to installation.

F. Sample

1. Contractor shall provide a sample of the Pea Gravel for approval by the landscape architect at least 30 days prior to installation.

PART 3: EXECUTION**3.01 CONSTRUCTION SEQUENCE:**

- A. Bioretention facility shall not receive stormwater runoff until the facility is completely stabilized, functional, and acceptable to the Engineer.
- B. Pipe lengths and gradients shall be verified by the Contractor and shall be acceptable to the Engineer prior to installation.
- C. Inlets shall not be completed to final grade until the grading has been finished and all necessary arrangements have been made to insure suitable connections and tie-ins at proper grade.

3.02 COMPACTION

- A. During backfillings operation the Contractor shall minimize compaction of all Bioretention Fill Material including gravel, sand bed and planting soil. When possible, use excavation hoes to remove original soil. If Bioretention areas are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires.
- B. Equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced soil infiltration rate. This will significantly contribute to design failure. This type of equipment will not be acceptable inside the basin.
- C. Excessive compaction shall be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to

reduce the effects of compaction from excavation equipment.

- D. Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the required sand layer. Pump any ponded water before preparing (rototilling) base.
- E. When backfilling the bioretention soil over the sand bed, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.
- F. When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can only be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

3.03 UNDERDRAIN INSTALLATION

- A. Underdrain pipes are to be placed on Geotextile Class C, followed by a washed gravel bedding. The exposed ends of underdrain pipes shall be capped.
- B. The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5% or as shown on plans.

3.04 MISCELLANEOUS

- A. The bioretention facility may not be constructed until all contributing drainage area has been stabilized.

3.05. INSTALLATION OF GEOTEXTILE FABRIC

- A. Following the excavation of the stream bed, geotextile shall be placed on all sides of bioretention stream, as specified in the Contract Documents. Geotextile shall be placed tightly against the excavation walls to eliminate voids beneath the geotextile. Wrinkles and folds in the geotextile shall be avoided. A minimum 6 in. overlap at the geotextile joint ends or breaks shall be maintained. Geotextile joints and overlaps shall be pinned to securely hold the geotextile in place until placement of the aggregate and BSM.
- B. Damaged geotextile shall be replaced or repaired as directed by the Project Engineer at no additional cost to the Administration.

3.06 PLACEMENT AND COMPACTION

- A. It is very important to minimize compaction of both the base of the Pea Gravel Infiltration Bed and the required backfill. Contractor shall take extreme care not to compact the subgrade or bioretention media. Pea Gravel should be placed by hand.

- B. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

3.07 LANDSCAPE EDGING INSTALLATION

- A. Landscape edging shall be installed according to the manufacturer's instructions along the first five (5) feet of pea gravel bed from the edge of the rip rap.

3.08 PEA GRAVEL INSTALLATION

- A. Pea Gravel shall be placed in conformance with the Contract Drawings. Pea Gravel installations shall be 2" above grade. The top of the adjacent mulch areas shall be at the same level as the top of the Pea Gravels.
- B. The Pea Gravel shall be placed onto the geotextile fabric by hand to produce a uniformly graded mass of stones. Placing the stones by methods that cause segregation is prohibited.

PART 4: MEASUREMENT AND PAYMENT

4.01 BIORETENTION SOIL MIXTURE AND CONCRETE SAND:

- A. Bioretention Soil Mixture and Concrete Sand will be paid for per cubic yard. Observation wells and clean outs shall be incidental to the underdrain price.
- B. The Bioretention Soil Mixture and Concrete Sand will be paid for at the cubic yard bid price, which shall be full compensation for all applicable excavation, placement, and all material, labor, equipment, tools and incidentals necessary to complete the work.

4.02 PEA GRAVEL

- A. Pea Gravel will be measured and paid for per square foot which shall be full compensation for all labor, tools and incidentals necessary to complete the work.

END OF SECTION

SECTION 02745**HOT MIX ASPHALT PAVEMENT****PART 1 - GENERAL****1.01 DESCRIPTION:**

- A. This section specifies the construction of hot mix asphalt (HMA) pavement.
- B. Related Sections:
 - 1. Section 01300: Submittals

1.02 SUBMITTALS:

- A. Contractor shall submit to the Engineer for approval a mix design and a proposed paving plan, including production plants, location of plants with respect to the project site, equipment, and material sources. Submittals for mix design approval shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13.
- B. In accordance with SECTION 01300 SUBMITTALS, the Contractor shall submit to the engineer:
 - 1. Mix design
 - 2. Paving plan
 - 3. Production plants

4. Location of plants
5. Equipment
6. Source information

1.03 EQUIPMENT:

- A. All equipment, including the production plant and paving equipment, shall be subject to approval by the Engineer. The plant shall be ready for inspection by the Engineer at least 48 hours prior to the start of the construction operations.
- B. Pavers
 1. Pavers will be inspected and approved by the Engineer based upon requirements in the manufacturer's specification manual with a copy to be provided by the Contractor. The paver shall be a self-contained, power propelled unit capable of spreading the mixture true to line, grade and cross slope. The paver shall be equipped with a screed or strike off assembly, which can produce a finished surface of the required smoothness and texture without tearing, shoving or gouging the mixture. The paver shall have automatic controls for transverse slope and grade. Controls shall be capable of sensing grade from an outside reference line or ski and sensing the transverse slope of the screed to maintain the required grade and transverse slope within plus or minus 0.1 of the required slope percentage.
 2. Manual operations will be permitted in the construction of irregularly shaped and minor areas, or where directed by the Engineer.
 3. Whenever a breakdown or malfunction of any automatic control

occurs, the equipment may be operated manually for the remainder of the workday as directed by the Engineer.

4. Reference lines or other suitable markings to control the horizontal alignment shall be provided by the Contractor, subject to the approval of the Engineer.
 - D. Rollers: Rollers shall be self propelled, reversible, steel wheeled or pneumatic tired. Vibratory rollers may be used, except they shall not be in vibratory mode when paving on surface courses without the approval of the Engineer. Pneumatic tire rollers shall have multiple tires of equal size with smooth tread. Wheels shall be arranged to oscillate in pairs, or they may be individually sprung. Tires shall be uniformly inflated at the operating pressure approved by the Engineer. The Contractor shall furnish the Engineer a manufacturer's table showing this data. The difference in tire pressure between any two tires shall not be greater than 5 psi. The Contractor shall provide a means for checking the tire pressure on the job at all times.

PART 2 - PRODUCTS

A. MATERIALS:

- A. Hot Mix Asphalt shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13 with the following addition to the Chart in Section 20.13-4 Paragraph 1:

<u>SIEVE SIZE</u>	<u>SC (Percent Passing)</u>
¾ in.	100
½ in.	86 – 99
3/8 in.	70 – 94
No. 4	35 – 68

No. 8	24 – 52
No. 16	16 – 36
No. 30	10 – 26
No. 50	7 – 18
No. 200	2 – 9

Add to the Marshall Test Requirements:

	<u>SC</u>
Stability, min., lb	1500
Flow 0.01 in.	8 – 18
Voids, mineral aggregate, % min.	15
Voids, total mix %	3 – 5
Compaction blows used	75

The Surface Course shall consist of Bituminous Concrete Band SC.

- B. **PRODUCTION PLANTS:** Production Plants shall meet the requirements of City of Baltimore Department of Public Works Specifications Section 20.13-5.

PART 3 - EXECUTION

3.01 WEATHER:

- A. Pavement shall be placed only when the ambient air and surface temperature is at least 40° F and rising for surface course and at least 32° F and rising for base courses. The base shall be clean and dry and approved by the Engineer before HMA paving begins. HMA pavement shall not be placed on a frozen base. When weather conditions differ from these limits,

material en route from the plant to the job site may be used at the Contractor's risk. If placement of the material is stopped by the Engineer, all material en route shall be wasted at the Contractor's expense.

3.02 FOUNDATION PREPARATION:

- A. Prior to placement of paving material, the foundation shall be constructed as specified in the Contract Documents and approved by the Engineer. When paving over existing pavement, all excess crack filling or patch material shall be removed and all spalls and potholes shall be cleaned, tack coated, filled and tamped with hot mix asphalt before placement. Manholes, valve boxes, inlets, and other appurtenances within the area to be paved shall be adjusted to grade as directed by the Engineer.
- B. Curbs, Gutters, and Other Supports: Where permanent curbs, gutters, edges, and other supports are planned, they shall be constructed and backfilled prior to placing the HMA, which shall then be placed and compacted against them.

3.03 TACK COAT:

- A. Prior to application of the tack coat, the surface shall be cleaned of all loose and foreign materials. The tack coat shall be uniformly applied to the surface by full circulation spray bars that are laterally and vertically adjustable and provide triple fanning and overlapping action so that the resulting coating shall be residual asphalt applied at a rate of 0.01 to 0.05 gal/yd² as directed by the Engineer.

3.04 HOT MIX ASPHALT PLACEMENT:

- A. HMA shall be placed by the paver. Delivery of the mixture by the hauling units and placement shall be continuous. The temperature of the mixture shall not be less than 225° F at the time of placement. Broadcasting of loose mixture over the new surface will not be permitted.

3.05 COMPACTION:

- A. Immediately following placement of the HMA, the mixture shall be compacted by rolling to an in-place density of 92.0 to 97.0 percent of the maximum density. In-place compaction shall be completed before the mixture cools below 185° F, as determined by a probe type surface thermometer, supplied by the Contractor and approved by the Engineer.
- B. Rollers shall start at the sides and proceed longitudinally toward the center of the pavement. Successive trips of the roller shall overlap by at least one half the width of the roller, and alternate trips shall not end at the same point. After rolling is completed, no traffic of any kind will be permitted on the pavement until the pavement has cooled to less than 140° F or as directed by the Engineer.

3.06 JOINTS:

- A. Both longitudinal and transverse joints in successive courses shall be staggered so that one is not above the other. Transverse joints shall be staggered by the length of the paver. Longitudinal joints shall be staggered a minimum of 6 in.
- B. Joints shall be constructed to provide a continuous bond between the old and new surfaces. Joints shall be coated with tack coat as directed by the Engineer. In the case of surface course, the edge of the existing pavement shall be cut back for its full depth on transverse joints to expose a fresh surface and the surface shall be coated with tack coat material as directed by the Engineer. Before placing the mixture against curbs, gutters, headers, manholes, etc., all contact surfaces shall be coated with tack coat.

3.07 FIELD QUALITY CONTROL:

- A. Acceptance will be determined by nuclear in-place density test data. The nuclear gauge shall be calibrated in conformance with MSMT 417.

- B. The Contractor shall take a one-minute special calibration nuclear test from each lift. A special calibration nuclear test is defined as an average of two (minimum) special calibration readings taken at the same location after rotating the nuclear gauge 180 degrees.
- C. Nuclear test-in-place density data shall be expressed as percentage of the maximum specific gravity determined for each day's production. The in-place density shall be 92.0 to 97.0 percent.

PART 4 - MEASUREMENT AND PAYMENT

4.01 HMA SUPERPAVE SURFACE COURSE & WEDGE/LEVEL 9.5MM PG 64-22:

- A. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Surface Course & Wedge/Level 9.5MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.02 HMA SUPERPAVE SURFACE COURSE 12.5MM PG 64-22:

- A. HMA Superpave Surface Course 12.5 MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Surface Course 12.5 MM PG 64-22 will be paid per ton,

complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.03 HMA SUPERPAVE BASE COURSE 19MM PG 64-22:

- A. HMA Superpave Base Course 19MM PG 64-22 will be measured for at the contract unit price bid per ton.
- B. HMA Superpave Base Course 19MM PG 64-22 will be paid per ton, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, impacts due to weather, foundation preparation, tack coat, compaction, joints, field quality control, maintenance and all work incidental to complete the item as specified.

4.01 PRICE ADJUSTMENT FOR ASPHALT BINDER:

Price Adjustment (PA) will be made to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of asphalt binder.

For adjustment purposes, the prevailing base index price will be the price specified for PG 64-22 Asphalt Binder posted at www.roads.maryland.gov (Business Center/Contracts Bids and Proposals) at time of bid opening. Cost differentials between PG 64-22 and a binder specified shall be included in the price bid per ton for Hot Mix Asphalt. A historical database will be maintained by the State Highway Administration. The base index price for PG 64-22 Asphalt Binder for November 2011 is \$591.25 per ton.

The PA will be made when the index price for the month of placement increases or decreases more than 5 percent of the prevailing base index price.

Computations will be as follows:

$$\text{Percent Change} = ((P_p - P_b) / P_b) \times 100$$

$$PA = T \times Q \times (P_p - (D \times P_b))$$

Where:

PA = Price Adjustment for the current month

T = Design target asphalt content expressed as a decimal

Q = Quantity of Hot Mix Asphalt placed for the current month

P_p = Index price for PG 64-22 Asphalt Binder per ton for the month of Placement

D = 1.05 for increases over 5 percent; 0.95 for decreases over 5 percent

P_b = Prevailing base index price for PG 64-22 Asphalt Binder per ton

PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Asphalt Binder. The item amount will be established by the Administration and shall not be revised by the Contractor. PA resulting in a decreased payment will be deducted from monies owed the Contractor.

END OF SECTION

SECTION 02766**PRE-CUT INLAID THERMOPLASTIC DECORATIVE CROSSWALK****PART 1: GENERAL****1.01 DESCRIPTION**

- A. Decorative HMA pavement marking system that uses specialized pre-formed thermoplastic inlaid into HMA pavement to create the pattern and colors shown in the play set.

1.02 REFERENCES

- A. **ASTM D570** Standard Test Method for water absorption of plastics.
- B. **ASTM D36** ASTM D36-06 Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus).
- C. **AASHTO T250** Binder Content
- D. **ASTM D792** Standard Test method for density and specific gravity (relative density) and density of solid plastics.
- E. **AASHTO T250** Low Temperature Stress resistance
- F. **ASTM D 2240** Standard Test Method for Rubber property – Durometer hardness.
- G. **ASTM D256, Method A** Standard Test Method for determining the IZOD pendulum impact resistance of plastics.
- H. **ASTM D92** Test Method for Flash points.
- I. **California Skid test method 342** completed by Skidtest Enterprises, Inc. report date September 19, 2005.

PART 2: PRODUCTS**2.01 THERMOPLASTIC**

A. Thermoplastic shall be provided as pre-cut panels in sizes to conform to the specified pattern, widths and shapes. Thermoplastic shall be packaged in accordance with accepted commercial standards and if stored, placed indoors in a cool dry area.

B. Characteristics of thermoplastic:

1. The thermoplastic must consist of homogeneously mixed non-hazardous polymer resins, pigments, fillers consisting of TiO_2 and CaCO_3 , fibers, and, for applications requiring retro-reflectivity, glass beads can be added. No solvents or volatiles are used in the formulation.
2. The thermoplastic shall be supplied preformed or precut at a standard thickness of 90 mils (2.30 mm).
3. The thermoplastic must be provided as non-reflective.
4. Upon heating to application temperature, the thermoplastic must flow and preserve the integrity of its properties including its color.
5. Environmental and Chemical Resistance: thermoplastic is resistant to deterioration when exposed to sunlight, gasoline, oil, salt, water or adverse weather conditions.
6. Professional independent testing using California Skid Test Method 342 concluded that there is no reduction in the skid factor where the thermoplastic is inlaid into the HMA pavement. Refer to References Section. This report is available from Integrated Paving Concepts Inc. upon request.

7. Storage Life: thermoplastic can be able to be stored for a period of 12 months if stored indoors at room temperature (21°C +/-3°C) (70°F +/-5°F).
8. The thermoplastic must be suitable for application on high quality, stable HMA pavement both new and old. Under normal conditions, bond strength on HMA pavement surfaces shall be sufficient for the material to remain in place for a number of years.

Characteristic	Test Method	Typical Results of required thermoplastic
Water Absorption	ASTM D570	0.27%
Binder Content	AASHTO T250	20.01% with d.o. beads
Softening point	ASTM D36	240°F
Low Temp. Resistance @ 15°F	AASHTO T250	No visual cracks
Specific Gravity	ASTM D792	2.00
Indentation resistance @ 110°F for 15 sec.	ASTM D 2240 (after flaming)	43 (Shore A)
Impact Resistance	ASTM D256, Mtd A	4.9+ N-m
Flash Point	ASTM D92	500°F

PART 3: EXECUTION

3.01 GENERAL

- A. Thermoplastic shall be supplied and installed only by an **Accredited Applicator** or an applicator authorized by manufacturer, in accordance with the plans and specifications or as directed by the Owner. In any circumstance, do not begin installation without confirmation of Applicator accreditation or authorization.

3.02 EQUIPMENT

- A. The following equipment is an integral part of the proper execution of the installation process. This equipment can only be used by **Accredited applicators**.

1. **Plastic Templates** are used for imprinting the specified pattern into the HMA pavement. Templates are thicker than the thermoplastic to enable the applicator to ensure the top of the inlaid thermoplastic is slightly lower than the surrounding HMA pavement surface. Templates shall be supplied by manufacturer.
2. **Re-Heat Equipment.** Mobile equipment designed specifically to elevate the temperature of the HMA pavement without adversely affecting it shall be used. The equipment shall be able to monitor the temperature of the HMA pavement and the thermoplastic at all times during the pavement re-heating process.
3. The **Hand Held finishing tool** shall be used to complete the imprinting of the HMA pavement in areas around permanent structures such as curbs and manholes covers which may be inaccessible to the template.

- B. **Vibratory Plate Compactors** shall be used for pressing the plastic templates into the heated asphalt to create the specified pattern. Please note that Integrated Paving Concepts does not supply Vibratory Plate Compactors.

3.03 HMA PAVEMENT

A. Pre-Conditions – HMA Pavement

1. Thermoplastic shall be a pavement marking system designed so that the HMA pavement surrounding the thermoplastic absorbs the physical effects of the traffic. When installed in accordance with recommended installation guidelines by an **Accredited Applicator**, the installed thermoplastic will wear at a similar rate as the surrounding HMA pavement. Therefore the life of the pavement marking system is dependent upon using a long lasting, durable and stable HMA pavement that will not wear prematurely.
2. This Section is to be used as a guide towards achieving a high quality HMA pavement. It does not supersede other specifications pertaining to this Work, nor does it replace recommendations made by the engineer of record for this Work.

B. Pre-requisites for new HMA pavement:

1. Stable sub-grade or base over which the HMA pavement is laid.
2. Proper mix design for the traffic loads.
3. Proper placement and compaction practices.

C. Sub-grade:

1. The sub-grade must be stable and should be inspected to identify any areas of soft or yielding soil that are too weak to properly support the paving equipment. These soft spots must be over-excavated and re-compacted to meet the engineer's requirements. Prior to paving, the sub-grade and base courses must be thoroughly and uniformly compacted, properly graded and constructed in accordance with the

engineer's specifications. Please refer to the related sections for more exact requirements of this work.

D. Guidelines for HMA pavement mix design.

1. A durable, stable mix design is a pre-requisite for all long-lasting HMA pavement surfaces, especially those that will experience vehicle traffic. The application of the thermoplastic does not change this requirement. **Generally, the HMA pavement mix design for roadways as prescribed by the local jurisdiction will be sufficient for the application of the thermoplastic.** Failure to use a stable mix design may lead to premature failure of the HMA pavement such as raveling, rutting or segregation. The appropriate pavement structure is not within the scope of this specification; however, this specification can offer some general guidelines as follows:
 - a. **Stability** is a good general guide: generally, if the surface course design has a minimum Marshall Stability of 10 KN (about 2250 lbs) and design densities are achieved during compaction, the pavement should perform adequately.
 - b. The nominal aggregate size for the HMA pavement should not be less than 3/8" or greater than 5/8".
 - c. If a more stable mix design than is offered by the locally prescribed surface course is required, contact the HMA producer, the engineer of record or Integrated Paving Concepts Inc. for suggestions as to how to increase stability.

E. Placement of New HMA Pavement

1. Successful placement of HMA pavement includes compaction of the mix when it is hot and compaction of the mix to the minimum densities required for the specified air voids. Generally, the first pass of the rollers is to be done when the asphalt mixture is at minimum 230°F (110°C); the compaction process must be **completed** before the **in-place** temperature of the mixture cools to 185°F (85°C) or higher

depending on the type of asphalt and/or modifiers used. For applications that will experience vehicle traffic and wherever it is possible, compaction is to be completed using a paving machine and a self-propelled roller.

2. **Handwork**, which includes placing and spreading by hand and the use of hand operated compaction equipment, should be restricted to areas that cannot be accessed by the paving machine or the self propelled rollers. Compaction must be completed when the pavement is hot as described above. Handwork is to be done carefully and the material distributed uniformly so there will be no segregation.
3. The pavement must be smooth, without seams and graded to achieve proper drainage.

F. Pre-requisites for existing pavement

1. Depending upon the condition and age, existing HMA pavement may or may not be suitable for the successful application of the thermoplastic. The **Accredited Applicator** can advise whether the HMA pavement is suitable or not.

G. Recommended guidelines for Mill & Fill applications.

1. A tack coat must be applied to ensure proper adhesion of the new HMA material to the old pavement substrate. A durable, stable mix design is a pre-requisite for all Mill & Fill applications - especially those that will experience vehicle traffic. The application of the thermoplastic process does not change this requirement. A minimum lift thickness of two inches is recommended. Due to the thin lift thickness, it is especially critical to ensure that the HMA concrete is compacted when it is hot. It is generally recommended to not proceed with a Mill & Fill pavement application when the outside air temperature is less than 50°F (10°C).

H. Pavement Marking Removal.

1. Because the aesthetics of the final product depends largely upon the condition of the HMA pavement, use of pavement marking removal methods is likely to produce a pavement surface that is unsatisfactory for the installation of the thermoplastic. A test area may be used to check if adequate or not. The Owner shall determine if the removal of the markings is satisfactory for the application of the thermoplastic. Work shall not proceed until this approval is granted.

3.04 SURFACE PREPARATION

- A. The HMA pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.05 PATTERN LAYOUT

- A. Layout of the pattern for imprinting into the surface of the HMA pavement shall be as per the drawings and specifications and in accordance to the methods prescribed by the thermoplastic applicator in conjunction with the **Owner**.

3.06 HEATING THE HMA PAVEMENT

- A. The Applicator shall follow the latest Recommended Application Procedure Guidelines as provided by Integrated Paving Concepts Inc. Primary heating of the pavement surface is accomplished with the **SR-120** or **SR-60** reciprocating infrared heaters.

1. **Pavement temperature.** The optimal pavement temperature for imprinting the template is dependent upon mix design, modifiers used in the mix, and the age of the pavement. Typically, the surface temperature of the pavement should not exceed 325°F as determined by an infra-red thermometer.

2. In order to achieve the proper depth of imprint it is important to elevate the HMA pavement temperature to a minimum depth of 1/2 inch (12.5mm) without burning the pavement surface.

3.07 SURFACE IMPRINTING

- A. Once the HMA pavement has reached imprinting temperature, the templates shall be placed and held in position then pressed into the surface using vibratory plate compactors. Once the top of the template is level with the surrounding HMA pavement, the template can be removed. Areas that have an imprint depth less than the depth of the template shall be re-heated and re-stamped prior to installing the thermoplastic.
- B. In areas difficult to get at with the template, or areas that have light print, the hand held finishing tool may be used to complete the imprint process.

3.08 INSTALLING THERMOPLASTIC

- A. The HMA pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.
- B. The pre-cut thermoplastic panels shall be installed within the imprinted depressions, ensuring the appropriate overlap at the thermoplastic joints.
- C. Heat shall be re-applied to the HMA pavement surface using appropriate heater, slowly raising the surface temperature until the thermoplastic panels start to liquefy and flow. The temperature shall be monitored to ensure the thermoplastic is not over-heated. The thermoplastic panel must be heated to its full depth in order for the thermoplastic material to melt and create a bond with the underlying HMA pavement.
- D. The joints between the thermoplastic pieces are to be melted together creating a seamless installation.

- E. Once the thermoplastic panel has been liquefied to its full depth, the heat source shall be removed and the surface allowed to cool.
- F. For applications when the outside air temperature is low, care must be taken to ensure the thermoplastic is thoroughly heated to assure a bond between it and the underlying HMA pavement. It is generally recommended to not proceed with the installation process when the outside air temperature is below 40°F (5° C).
- G. Do not install during periods of precipitation.
- H. Do not install when there is frost in the designated area.

3.09 PROTECTION AND OPENING TO TRAFFIC

- A. The melted thermoplastic is to be protected until it cools and hardens. Do not permit any debris such as dust, water, pollen etc to come in contact with the melted thermoplastic.
- B. The road may be opened to traffic once the thermoplastic has cooled to 140°F (60° C).

PART 4: MEASUREMENT AND PAYMENT

4.01 DECORATIVE CROSSWALKS

- A. Decorative Crosswalks will be measured per square foot and the measured area is the actual area of HMA pavement that has received the thermoplastic measured in place. No deduction will be made for the area(s) occupied by manholes, inlets, drainage structures, bollards or by any public utility appurtenances within the area.

- B.** Decorative Crosswalks will be paid for at the contract unit price per square foot. The payment will be full compensation for all be full compensation for all materials, tools, labor, equipment, fuel, and incidentals necessary to complete the work as specified.

END OF SECTION

SECTION 02820**ORNAMENTAL PICKET FENCE****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This work shall consist of furnishing and installing ornamental picket fencing with concrete foundations and ground embedded installations surrounding the parking lots or as directed by the Engineer.
- B. This work shall also consist of constructing Ornamental Brick Columns and bollards as specified in the contract documents or as directed by the engineer.

PART 2: PRODUCTS**2.01 ORNAMENTAL FENCE:**

- A. The manufacturer shall furnish certification as specified in TC-1.02. In addition, a sample of the fence fabric shall be submitted with the fabric certification.
- B. Concrete shall meet the follow:
 - 1. Compressive strength at 28 days, $f'_c = 3000$ psi
 - 2. Standard deviation of 450 psi
 - 3. Critical value of 3010 psi
 - 4. Minimum cement factor of 530 LB/cu yd
 - 5. Aggregate gradation for Portland cement concrete, $f'_c = 3000$ psi

MATERIAL		SIEVE SIZE						
		1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
Coarse Aggregate	57	100	95-100	-	25-60	-	0-10	0-5
	67	-	100	90-100	-	20-55	0-10	0-5

- 6. Maximum water cement ratio 0.50
- 7. Slump range 2 to 5 inches
- 8. Total air content 5 to 8 percent
- 9. Temperature range of mixture 70 °F with a range not to exceed 20 °F plus or minus

C. Picket – Made of hot-rolled structural steel of 3/4” square solid picket construction, 1.91 4#/ft, and having tensile strength of 50,000 psi. Tube shall be manufactured per ASTM A513. Tube shall be hot-dipped galvanized per ASTM A525-G90. Space between pickets shall be 2.5” on center.

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
¾”	Sq. Solid	1.914 lbs.	50,000 PSI

D. Rails – Made of hot-rolled structure steel, rolled into ‘U’ channel measuring 1 3/8” wide x 1 ½” deep x .120 wall thickness. Manufactured per ASTM A513 and hot-dipped galvanized per ASTM A525-G90.

E. Posts – Shall be hot-rolled structure steel 4” square. The wall thickness and weights are as follows:

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
4” Sq.	14 ga.	2.733 lbs.	45,000 PSI

Tube shall be manufactured per ASTM A513. Tube shall be hot-galvanized per ASTM A525-G90.

F. Rail Attachment Brackets – Shall be hot-rolled structure steel 2” square. The wall thickness and weights are as follows:

<u>Size</u>	<u>Wall Thickness</u>	<u>Wgt. Per Ft.</u>	<u>Tensile Strength</u>
2” Sq.	14 ga.	2.733 lbs.	45,000 PSI

Tube shall be manufactured per ASTM A513. Tube shall be hot-galvanized per ASTM A525-G90.

- G. Rail Attachment Brackets – Die cast of Zink (ZAMAK #3 alloy) per ASTM 886-83Z 33521. Ball and socket design capable of 30-degree swivel (up/down-left/right). Bracket to fully encapsulate rail end for complete security that is aesthetically pleasing.
- H. Finials – Cast gray iron with minimum 20,000 PSI. Hot-dipped galvanized per ASTM A525-G90,
- I. All metal surfaces to have galvanized undercoat, cleaned and phosphate treated; given non-chromated seal rinse and baked dry. Surface finish shall be polyester resin-based powder coating applied by electrostatic spray to a thickness of 2.5 mils; baked in a 450° F oven for 20 minutes. Color black.

2.02 BOLLARDS:

- A. Materials: Per the details in the plans
- B. Painting System:
 - 1. Alkyd Systems
 - a. Gloss Finish:
 - 1st Coat: S-W Kem Kromik Metal Primer, B50 Series (8 mils wet, 3 mils dry)
 - 2nd Coat: S-W Industrial Enamel, B54 Series
 - 3rd Coat: S-W Industrial Enamel, B54 Series (4 mils wet, 2 mils dry per coat)
 - 2. Silicone Alkyd Systems
 - a. Gloss Finish:
 - 1st Coat: S-W Kem Kromik Metal Primer, B50 Series (6 mils wet, 3 mils dry)
 - 2nd Coat: S-W Silicone Alkyd Enamel, B56 Series
 - 3rd Coat: S-W Silicone Alkyd Enamel, B56 Series (5 mils wet, 2 mils dry per coat)

2.03 ORNAMENTAL BRICK COLUMNS:

- A. Base Course
 - 1. Base course shall be aggregate material to conform to 2A Material
- B. Concrete
 - 1. The Concrete shall have a minimum compressive strength of 3,500 PSI. Portland cement shall conform to ASTM C 150, Type I, II or V depending on soil conditions. Aggregate shall conform to ASTM C 33.
 - 2. In freeze thaw areas, an air-entraining agent complying with ASTM C 260 shall be used in accordance with the published recommendations of the Portland Cement Association and the American Concrete

Institute. Mixing water shall be fresh, clean and potable. No admixtures containing calcium chloride are permitted.

- C. Concrete Masonry Unit
 - 1. The Concrete Masonry Unit (CMU) shall conform to the following:
 - a. ASTM C-90
 - b. Nominal Face dimensions: 8 in. x 16 in.
 - c. Linear shrinkage shall not exceed 0.065
 - d. Units shall be manufactured with aggregates conforming to ASTM C-33 and C-331.
 - e. Testing of units shall be overseen by a certified laboratory technician of an accredited testing agency.
- D. Reinforcement Steel
 - 1. #4 Epoxy Coated Steel Rebar to conform to Section 709.1
- E. Grout
 - 1. Grout shall be waterproof and non-shrink grout for concrete masonry use to conform to Section 705.7
- F. Clay Masonry Unit – Brick Veneer
 - 1. All brick specified or shown on project documents shall conform to the following:
 - a. ASTM C-216, Grade SW, Type FBS.
 - b. Dimensions (1 ½” x 3 ¾” x 8”).
 - c. Brick shall be a red brick color.
 - d. Minimum compressive strength of 12,000 psi.
 - e. Test result showing no efflorescence.
 - 2. Brick provided shall be similar in texture and physical properties to those approved samples available for inspection at the Architect/Engineer's office. In addition, brick provided shall not exceed the variation of color and texture of the approved sample.
 - 3. Bonding
 - a. Bond shall be running bond unless otherwise specified.
 - 4. Tooling and Pointing
 - a. Tool mortar joints to a concave appearance unless otherwise specified.
 - 5. Cleaning
 - a. Cleaning shall be performed per cube tag instructions.
 - 6. The work shall include all labor, forms, tools, transportation and incidentals necessary to complete the installation as per the manufacturer's recommendations. Brick shall be installed by a Licensed Concrete Contractor with at least 5 years of experience in brick veneer installation. Submit catalogue technical data to Engineer for approval.
- G. Precast Concrete Pillar Cap
 - 1. Pillar caps to be precast Portland cement concrete with sandblasted finish molded to fit on top of the monument pillars. Pillar cap is to be stained beige.

- H. In-Set Precast Plaque
 - 1. In-set plaques to be furnished by a licensed manufacturer. Plaques to be 18"x18"x3" panel supplied by artist and affixed to precast concrete inlay. Concrete in-lay to be 22"x22" with a 18"x18"x1" with 2" edge in-set for plaque. Artwork is to be provided by others. Precast Plaque shall match Concrete Pillar Cap and be stained beige.
- I. Hardware
 - 1. All wall hardware, including wall ties, anchors, washers, nuts and bolts, to be epoxy coated steel.
- J. Sample
 - 1. Contractor shall provide a sample of the brick finish and precast concrete stain finish to the landscape architect for approval at least 30 days prior to installation

PART 3: EXECUTION

B. GENERAL INSTALLATION REQUIREMENTS:

- A. The Contractor's activities and operations shall be confined to the area immediately adjacent to the fence lines and within the property except that permission may be granted by the Engineer for normal construction activities through lands owned by or under control of the Administration.
- B. All posts shall be plumbed. The posts shall be spaced as uniform as practicable to the spacing as specified in the Contract Documents with a tolerance of minus 2 feet.
- C. Terminal posts shall be installed at all ends, abrupt changes in grade and at changes in the horizontal alignment over 15 degrees.
- D. Post caps are required for all posts.
- E. Sections shall be assembled using 3 rails that are punched out to insert pickets through them. Pickets are riveted to rails using a ¼ inch industrial drive rivet #MIW381080691 through pre-punched holes.
- F. Rails are attached to posts by means of rail brackets. Rail brackets are attached to posts using a ¼ inch bolt and lock nut. Brackets are attached to the rails using ¼ inch industrial drive rivets.
- G. For the barrier attached fence the existing chain link fence shall be removed and exposed of and the new ornamental fence posts shall be secured to the top of the retaining wall either by using the existing PVC sleeve in the barrier along with an engineer approved epoxy or by using an

attachment method as recommended by the manufacturer or as directed by the Engineer.

C. CONCRETE:

- A. Concrete posts shall be centered in the concrete footings. The concrete shall be thoroughly compacted around the post by rodding or vibrating. The finished top surface shall be troweled to a smooth finish slightly above the ground line and uniformly sloped to drain away from the post. The post shall not be disturbed in any manner within 72 hours after the individual post footing is completed.
- B. Hand mixed concrete shall not be used without written permission from the Engineer. When permitted, the hand mixed batch shall not exceed ½ cubic yard.
- C. Where rock is encountered at a depth less than the specified footing depth, a hole 1 inch larger than the greatest dimension of the post shall be drilled to a depth of 12 inches or to the planned footing depth, whichever is less. After the post has been set, the remainder of the drilled hole shall be filled with grout composed of one part Portland cement and two parts mortar sand by dry loose volume. The space above the rock shall be filled with concrete.

3.03 ORNAMENTAL BRICK COLUMNS:

- A. General
 - 1. Installation shall not take place during any precipitation or upon frozen substrate. Air temperatures should remain above 40°F while concrete is poured and sets.
- B. Excavation
 - 1. Verify areas to receive ornamental brick columns are completed to final grades and elevations. Ensure property lines and legal boundaries of work are clearly established. Confirm location of underground utilities and verify that no underground utilities will be impacted.
 - 2. The excavation area shall be shored, braced or otherwise supported to assure that there is no settlement, movement or damage to adjacent areas. Excavated material shall not be placed in a manner that damages property or endangers the excavation site. All suitable backfill material shall be stored nearby. Unsuitable backfill material shall be removed and disposed in an approved disposal area.
 - 3. The elevation for the footings in the contract documents shall be considered approximate. The engineer may direct the contractor to adjust the footing elevation to accommodate site restraints or assure proper foundation. Footings shall be set on suitable foundation material. Subgrade shall be compacted to 95% compaction or as directed by the engineer.

C. Installation

1. The contractor shall follow the specifications and details shown on the Landscape Plan and Detail sheets, per manufacturer's recommendations, approved shop drawings and as directed by the engineer.
2. After proper curing time, prepare the surfaces for application of the approved concrete brick veneer. Clean the surface of the fresh concrete to remove all laitance, dirt, grease, form oils, efflorescence and any other foreign materials. Do not sand blast, however, pressure washing is acceptable once concrete is set. Brick veneer shall be installed by a Licensed Mason with at least 5 years of experience in brick installation and in accordance with the details provided.
3. Contractor shall install pre-cast concrete inlays as shown on the Landscape Plan and Detail sheets.
4. Grout and tool the finish in accordance with the manufacturer's specifications.

PART 4: MEASUREMENT AND PAYMENT**4.01 3 & 5 FOOT ORNAMENTAL FENCE:**

- A. 3 & 5 Foot Ornamental Fence will be measured per linear foot measured to centers of end posts.
- B. 3 & 5 Foot Ornamental Fence will be paid for at the contract unit price bid per linear foot, complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

4.02 BOLLARDS:

- A. Bollards will be measured per each.
- B. Bollards will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, utility coordination, and all work incidental to complete the item as specified.
- C. The removal and disposal of curb stops will be incidental to the installation of bollards in Parking Lot A.

4.03 ORNAMENTAL BRICK COLUMNS

- A. Ornamental Brick Columns will be measured per each.
- B. Ornamental Brick Columns will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

END OF SECTION

SECTION 02825**SQUARE 16 FOOT STEEL SHELTER****PART 1: GENERAL****1.01 DESCRIPTION**

- A. Square Steel Shelter, sixteen (16) feet by sixteen (16) feet as shown in plan set.

- B. UPB HEIGHT: Under Perimeter Beam is the clearance height under the structure. It indicates the lowest height of a member from finish grade for clearance under the structure. This is generally the clearance under the eave fascia board. The UPB Height is 7'-6".

1.02 QUALITY ASSURANCE**A. MANUFACTURER QUALIFICATIONS:**

- 1. Minimum of 10 years in the shelter construction industry.

- 2. Full time on-staff Licensed Engineer.

- 3. Full time on-staff AWS Certified Welding Inspector.

- 4. Full time on-staff Quality Assurance Manager.

5. All welders AWS Certified.
6. Manufacturer owned and controlled finishing system to include shot blast, pretreatment, primer, and top coat.
7. Published Quality Management System.
8. Annual audit of Quality System and Plant Processes by Third Party Agency.
9. Annual audit of powder coat finish system by Third Party Agency (PCI).

B. MANUFACTURER'S CERTIFICATONS:

1. PCI 4000 S Certified, Certification thru PCI for original equipment manufacturers (OEMs) to evaluate process on entire finish system to add powder coat over steel.

1.03 MANUFACTURER WARRANTY

- A. Shelter must have a 10-year limited warranty on steel frame members.
- B. Shelter must have a 10-year limited warranty on paint system.
- C. Pass through warranty of Metal Roof manufacturer shall be provided upon request.

1.04 REFERENCES

A. REFERENCE STANDARDS:

1. AISC - American Institute of Steel Construction Manual of Steel Construction.
2. ASTM - American Society for Testing and Materials.
3. AWS - American Welding Society.
4. LEED - Leadership in Energy and Environmental Design.
5. OSHA – Occupational Safety and Health Administration Steel Erection Standard 29 CFR 1926 Subpart R-Steel Erection.
6. PCI - Powder Coating Institute.
7. SSPC - Steel Structures Painting Council.

1.05 SUBMITTALS

A. Shop Drawings. Contractor shall submit shop drawings to the Engineer or Landscape Architect for approval prior to installation. Shop Drawings shall include schedule and details.

B. Foundation Design:

1. The shelter shall be set on foundations designed by manufacturer.
2. Foundation materials shall be provided by contractor.
3. Owner shall provide manufacturer with complete information about the site including soil bearing capacity and lateral load capacity.
4. If soil data are not provided, foundations will be designed to the minimum values identified in the governing building code.

C. Calculations and Submittal drawings. **Contractor shall include, at a minimum:**

1. Calculations:

- a. References to building codes and design manuals used for calculations.
- b. Identification of lateral force resisting system.
- c. Formulas used for determining snow, wind, and seismic loads to specific project location.
- d. Three dimensional modeling input, model geometry, and analysis results.
- e. Member design results and controlling load combinations.
- f. Connection design for structural bolts, welds, plate thicknesses, and anchorage to the foundation.
- g. Foundation designs must include the required combinations of gravity and lateral loads.

2. Submittal Drawings:

- a. Anchor bolt layout.
- b. Foundation design.

- c. Three dimensional views of frame.
- d. Member sizes and locations.
- e. Structural connection details, including bolt sizes and plate thicknesses.
- f. Roof trim and connection details.

1.06 INSTALLERS STORAGE AND HANDLING

- A. Protect building products after arrival at destination from weather, sunlight, and damage.
- B. Installer shall store product elevated from soils to allow air circulation and to not introduce mold, fungi decay or insects to the product.
- C. Product must be handled with protective straps or padded forks if lifting with mechanical equipment. Use of chain or cable to lift product into place will not be accepted.

PART 2: PRODUCTS

2.01 GENERAL

- A. The pre-engineered package shall be pre-cut unless otherwise noted and pre-fabricated which will include all parts necessary to field construct the shelter. The shelter shall be shipped knocked to minimize shipping expenses. Field labor will be kept to a minimum by pre-manufactured parts. Onsite welding is not necessary.

2.02 MANUFACTURERS

- A. The product shall be designed, produced, and finished at a facility owned and directly supervised by the supplier who has a minimum of ten years under same ownership making pre-manufactured shelters.

B. Substitution Limitations:

1. Substitutions must be approved a minimum of ten (10) days before bid. All approved manufacturers shall be notified in writing before the bid date and shall not be allowed to bid without written notification.
2. Alternate suppliers must meet the qualifications and provide proof of certifications listed under Section 1.02 QUALITY ASSURANCE.
3. Staff members' cumulative experience in fabrication will not be an acceptable alternative for manufacturer's experience in the shelter construction industry.

2.03 REINFORCED CONCRETE

- A. Concrete shall have minimum 28-day compressive strength of 3,000 psi and slump of 4" (+/- 1"), unless otherwise noted on the drawings.
- B. Reinforcing shall be ASTM A615, grade 60.

2.04 STEEL COLUMNS:

- A. Hollow structural steel tube minimum ASTM A500 grade B with a minimum wall thickness of 3/16".
- B. Unless columns are direct buried, columns shall be anchored directly to concrete foundation with a minimum of four anchor rods to meet OSHA requirement 1926.755(a)(1).

2.05 STRUCTURAL FRAMING:

- A. Hollow Structural Steel tube minimum ASTM500 grade B. "I" beams, tapered columns, or open channels shall not be accepted for primary beams. Frame will have a **STANDARD POLI-5000 \ HOT DIP GALVANIZED**
- B. Color chosen from manufacturer's standard color chart: Off-white/ Almond

2.06 COMPRESSION MEMBERS:

- A. Compression rings of structural channel or welded plate minimum ASTM A36 or compression tubes or structural steel tube minimum ASTM A500 grade B shall only be used.

2.07 CONNECTION REQUIREMENTS:

- A. Anchor bolts shall be ASTM F1554 (Grade 36) unless otherwise noted.
- B. Structural fasteners shall be zinc plated ASTM A325 high strength bolts and A563 high strength nuts.
- C. All structural fasteners shall be hidden within framing members wherever possible.
- D. No field welding shall be required to construct the shelter.
- E. All welds shall be free of burrs and inconsistencies.
- F. All exposed fasteners shall be painted by manufacturer prior to shipment to match frame or roof colors as applicable.
- G. Manufacturer shall provide extra structural and roofing fasteners.

2.08 STEEL ROOF

- A. Roofing shall be 24 gauge ribbed galvalume steel sheets, with ribs 1 3/16" high and 12" on center.
- B. Roof surface shall be painted with Kynar 500 to the manufacturer's standard color: **Regal Blue**. Ceiling surface shall be a "wash coat" primer in: **Almond**.

- C. Roof panels shall be factory precut to size and angled to provide ease of one-step installation.
- D. Metal roofing trim shall match the color of the roof and shall be factory made of 26 gauge Kynar 500 painted steel.
- E. Trim shall include panel ridge caps, hip caps, eave trim, splice channels, rake trim, roof peak cap, and corner trim as applicable for model selected. Trim may need to be cut to length and notched. Reference drawings for additional information.
- F. Ridge, hip, and valley caps shall be pre-formed with a single central bend to match the roof pitch and shall be hemmed on the sides.
- G. Roof peak cap shall be pre-manufactured.
- H. Manufacturer must supply painted screws and butyl tape.

2.09 FINISHES

A. STANDARD POLI-5000 FINISH:

- 1. Steel shall be cleaned, pretreated, and finished at a facility owned and directly supervised by the manufacturer.

2. Steel shall be shot blasted to SSPC-SP10 near-white blast cleaning. SSPC-SP2 hand tool cleaning will not be an acceptable alternative.
3. Parts shall be pretreated in a 3 stage iron phosphate or equal washer.
4. Epoxy primer powder coat shall be applied to parts for superior corrosion protection.
5. Top coat of Super Durable TGIC powder coat shall be applied over the epoxy primer. Color shall be: **Almond**; as shown in plan set.
6. Finish shall not have any VOC emissions.
7. Sample production parts shall have been tested and meet the following criteria:
 8. Salt spray resistance per ASTM B 117/ ASTM D 1654 to 5,000 hours with no creep from scribe line and rating of 10.
 9. Humidity resistance per ASTM D2247-02 to 3,000 hours with no loss of adhesion or blistering.
 10. Color/UV resistance per ASTM G154-04 to 2,000 hours exposure, alternate cycles with results of no chalking, 75% color retention, color variation maximum 3.0 E variation CIE formula (before and after 2,000 hours exposure).

11. The manufacturer shall be PCI 4000 S Certified

12. Exposed fasteners for frame and ornamentation shall be powder coated to match structure.

B. HOT DIP GALVANIZED FINISH:

1. Steel members, fabrications and assemblies shall be galvanized after by the hot dip process in accordance with ASTM A123. The composition of metal in the galvanizing bath shall be no less than 98% zinc.

2. The galvanized coating shall be continuous, adherent, free from any detrimental defect.

PART 3: EXECUTION

3.01 GENERAL

- A. Install all components according to manufacturer's installation instructions and these specifications.

- B. Tolerances on steel structural members are set according to AISC construction practices, abided in the factory, and cannot be increased. No field slotting or opening of holes will be allowed. It is therefore essential that contractors conform to the tolerances specified on the installation drawings for anchor bolt or column layout details.

- C. OSHA Compliance to Steel Erection Standard 29CRF 1936 Subpart R-Steel Erection.

3.02 FOUNDATIONS

- A. The shelter shall be placed on foundations designed by an engineer retained by owner, with materials provided by others. Design approved by the Engineer of Record

3.03 INSTALLATION

- A. The contractor shall follow the specifications and details shown on the Landscape Plan and Detail sheets, per manufacturer's recommendations, approved shop drawings and as directed by the engineer.

3.04 REPAIR

- A. Do not attempt any field changes without first contacting Manufacturer.

PART 4: MEASUREMENT AND PAYMENT

4.01 SQUARE 16 FOOT SHELTER

- A. Square 16 Foot Shelter shall be measured and paid for per each complete and in place. Payment shall be full compensation for materials, accessories, submittals, construction, labor, tools, transportation and incidentals necessary to complete the work as specified.

END OF SECTION

SECTION 03300**CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.01 DESCRIPTION:**

This Section includes specifications for designing, furnishing, erecting, and removing formwork for cast-in-place concrete; constructing expansion and contraction joints and waterstops for cast-in-place concrete structures; placing, curing, protecting, and finishing cast-in-place concrete; and furnishing and placing grout.

Related Work Specified Elsewhere:

1. Section 01300 - Submittals
2. Section 03050 - Portland Cement Concrete
3. Section 03210 - Reinforcing Steel

A. DESIGN CRITERIA:

Formwork:

Design for the loads and lateral pressure outlined in ACI 301 and other loads indicated.

Design considerations and allowable stresses in accordance with ACI 301 and other requirements indicated.

Maximum deflection of facing materials reflected in concrete surfaces exposed to view shall not exceed 1/240 of the span between braces, walers, ties or other structural members.

Design forms to have sufficient strength to carry the dead weight of the concrete as a liquid, without appreciable deflection. If any such deflection occurs, it shall be sufficient cause for rejection of the work.

Where necessary to maintain the tolerances indicated, camber the formwork to compensate for anticipated deflections due to the weight and pressure of the fresh concrete and due to construction loads.

Design forms to provide the finishes specified in Article 1.05 herein.

B. QUALITY ASSURANCE:

Formwork Tolerances:

ACI 301

As specified for special concrete tolerances.

Concrete Tolerances:

Finish Tolerances:

- a. Class A: 1/8 inch maximum deviation from 10 foot long straightedge placed anywhere on the surface.
- b. Class B: 1/4 inch maximum deviation from 10 foot long straightedge placed anywhere on the surface.
- c. Class C: 1/4 inch maximum deviation from 2 foot long straight edge placed anywhere on the surface.
- d. Top concrete surface of platforms, landings, pedestrian ramps, and sidewalks: Class A.
- e. Trackside edge of station platforms: Class A.
- f. Base courses: Class C.
- g. All other surfaces: Class B.

Maximum allowable Deviation from dimensions, elevations, slopes and positions, as indicated:

- a. Footings:
 - i. Width, depth, and length: No plus limit; minus tolerance not more than 1/2 inch.

- ii. Misplacement or eccentricity: 2 inches.
 - iii. Elevation of top: Plus or minus 1/4 inch.
-
- b. Top of base courses to receive No. 5 finish: adjust to provide finish surface tolerance.
 - c. Top of all other base courses: Plus 0, minus 3/4 inch from course profile elevation at every point and if slope is indicated, plus or minus 1/4 inch in 10 feet.
 - d. Top of track slab finish course: Plus or minus 1/4 inch from finish profile grade at every point and plus or minus 1/8 inch in 10 feet for longitudinal and transverse slope.
 - e. Top of station platform concrete finished surface above top of rail: Plus or minus 1/4 inch.
 - f. Horizontal distance from centerline of track to edge of station platform: minus 1/8 inch, plus 1/4 inch at all points.
 - g. Safety walks: Plus or minus 1/4 inch vertical and horizontal.
 - h. Top elevation of slabs not otherwise specified: Plus or minus 1/2 inch at each point; and if slope is indicated, plus or minus 1/8 inch in 10 feet.

- i. Top elevation of columns, piers, walls and arrisers: As necessary to join other surfaces and not more than plus or minus 1/4 inch.
- j. Plumb of columns, piers, walls, and joints not exposed to view in public areas of finished structure: 1/4 inch in ten feet, not exceeding one inch total.
- k. Plumb of columns, piers, walls, vertical joints and grooves and other prominent vertical lines exposed to view in public areas of finished structure: 1/4 inch in 20 feet, not exceeding 1/2 total.
- l. Level and grade of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines: Plus or minus 1/4 inch in 20 feet, not exceeding plus or minus 1/2 inch in entire line.
- m. Level and grade of slab soffits, ceiling beam soffits and arrisers measured before removal of supporting shores: Plus or minus 1/4 inch in any 10 foot length; 3/8 inch in any 20 foot length; not exceeding 3/4 inch maximum for entire surface.
- n. Cross sectional dimension of columns, beams and slabs: Plus or minus 1/4 inch, except increase thickness of slabs on grade necessary to achieve specified top elevations.
- o. Thickness of walls: Minus 1/4 inch, plus 1/2 inch.
- p. Position of linear building lines not otherwise specified and

distance from related columns, walls, and partitions: Plus or minus 1/2 inch at all points and not over 1/2 inch in any 20 foot length.

- q. Rise of steps: Plus or minus 1/16 inch in consecutive steps and plus or minus 1/8 inch in total rise of flight.
- r. Tread of steps: Plus or minus 1/8 inch in consecutive steps and plus or minus 1/4 inch in total flight.
- s. Size and location of sleeves, floor openings and wall openings: Plus or minus 1/4 inch.

C. SUBMITTALS:

Working drawings: Show details of form type; methods of form construction and erection; falsework, design computations; location of form joints, form ties and construction joints, scheduled date and rate of placing, and mix designations.

Report the location in the finished work, start of placement and finish times, finish slumps for each batch of concrete placed.

D. CONCRETE FINISH DESIGNATIONS:

Slabs and Other Unformed Surfaces

No. 1: Scratched finish.

No. 2: Floated finish.

No. 3: Troweled finish.

No. 4: Broom finish.

No. 5: Non-slip (dry-shake) finish.

Formed Surfaces:

No. 6: Form finish.

No. 7: Rubbed finish.

No. 8: Textured finish.

Standard Finishes: Use the following finish when no finish is indicated:

Unformed surfaces to receive bonded cementitious applications: No. 1.

Unformed surfaces to receive roofing, waterproofing, waterproofing membranes or sand-bedded surface: No. 2.

Surfaces intended as finished floors or to receive floor covering materials:
No. 3.

Surfaces of sidewalks, ramps, and driveways No. 4.

Interior and exterior stair landings and treads: No. 5.

Formed surfaces not exposed to view: No. 6.

Exposed surfaces in work areas and stairwells: No. 7.

PART 2 - PRODUCTS

2.01 MATERIALS:

Materials for Portland Cement Concrete: Section 03050.

Concrete Reinforcement: Section 03210.

Membrane Forming Curing Compound: ASTM C309, Type 1 or Type 1-D only where indicated.

Waterproof Curing Sheet: ASTM C171, waterproof paper and polyethylene film.

Burlap Sheet: AASHTO M 182, Class 3 or 4.

Tarpaulins: FS K-P-146.

Blanket Insulation: FS HH-1-521.

Formwork:

1. Plywood: Exterior type, one surface suitable for specified finish.
2. Hardboard: Tempered, smooth-one-side, conforming to U. S. commercial Standard CS 251.
3. Steel Forms and Fiberglass Reinforced Plastic Forms: As required to form concrete surfaces to the specified tolerances and finishes, free of irregularity and concrete stain.
4. Fiber Tubular Forms: Spirally constructed of laminated piles of fiber, with wall thickness as recommended by the manufacturer to meet load requirements of the various uses and sizes; wax coated outside surface for moisture resistance, and inside surface of forms coated with bond-breaker compound and fabricated in such a manner that finish concrete surfaces will be smooth and free of spiral and seam markings.
5. Form Ties: Approved form clamps and factory fabricated, snap-off metal type ties of adequate design to minimize form deflection and preclude concrete spalling upon removal; fabricated so that set-back in the concrete is such that the portion of the tie remaining after snap-off and removal of the exterior portions is at least two inches back from the concrete surface. Spreader cones on tie wires shall not exceed 7/8 inch in diameter.
6. Bond Breaker: Non-staining liquid, which will impart a waterproof film to prevent adhesion of concrete and will not leave a paint impeding coating on the face of the concrete.
7. Chamfer Strips: Triangular fillets milled from clear, straight-grain wood, surfaced each side, or extruded vinyl type.

8. When finished surface is to be painted or to receive other surface treatment the material applied to form surfaces shall be compatible with the type of paint or surface treatment to be used.

Expansion Joints:

1. Preformed Expansion Joint Filler:
 - a. Non-extruding and resilient bituminous type: ASTM D1751.
 - b. Plain bituminous mastic type: ASTM D994
2. Sealant: FS TT-S00227E, Type 1, self-leveling, for use on horizontal surface; and Type II, nonsag, for application on vertical and sloping surfaces.

Waterstops: Rubber type, Corp of Engineers Specification CRD-C513, natural or synthetic at the Contractor's option; or extruded polyvinyl chloride, Corps of Engineers Specification CRD-C572.

Abrasive Aggregate: Aluminum oxide or silicon carbide; well graded in size from particles retained on the No. 30 sieve to those passing the No. 8 sieve.

2.02 MIXES:

- A. Portland Cement Concrete: Section 03050.

B. Grout: For surface repair and bond coat:

1. For repair, one part portland cement to two parts fine sand, and water to produce stiff mortar. For bond coat, one part portland cement to one part fine sand.
2. For rubbed finish (No. 7): one part portland cement to 1-1/2 parts fine sand, and water to produce grout having consistency of thick paint.
3. Blend white and grey portland cement to produce color matching surrounding concrete as determined by trial patch.
4. Catalytic agents for increasing bond and decreasing water requirements may be used up to one percent by weight.

C. Structural Members and Equipment Grout:

1. Prepare grout composed of portland cement, sand and water.
2. Use portland cement grout under bearing plates, in recesses, holes or surfaces under structural members and at other locations shown on drawing.
3. Do not use staining ingredients in grout exposed to view.
4. Use proportions of two parts sand and one part cement measured by volume and containing only enough water to permit placing and compact packing. Mix grout approximately 45 minutes in advance of use.

PART 3 - EXECUTION**3.01 FORMWORK:**

1. General:

- a. Do not use earth cuts as forms for vertical surfaces except where earth form is specifically indicated.
- b. Use forms of smoothness consistent with the required finish, mortar-tight, true to the required lines and grades, and of the specified strength. Remove all dirt, chips, soil, dust, nails and other foreign matter from forms before concreting.
- c. Construct formwork so as to result in concrete surfaces conforming to the tolerances of Article 1.03.B above.
- d. Provide temporary openings at the base of columns forms and wall forms, and at other points where necessary, to facilitate cleaning and observation immediately before concrete is deposited.
- e. Construct all forms for outside with stiff wales at right angles to the studs, and form clamps extending through and fastened to the wales. Anchor and brace forms to produce safety and proper alignment.

2. Coating Forms: Coat forms with bond breaker in accordance with the manufacturer's instructions before concrete or reinforcing steel is placed.

3. **Embedded Items:** Securely install in the formwork required inserts, anchors, sleeves, and other items specified under other sections or as shown on the Contract Drawings. Wherever practicable, securely fasten embedded items to reinforcing steel. Protect exposed curb angles surfaces, tread strips, and similar surfaces during placing of concrete. Close ends of conduits piping and sleeves embedded in concrete with approved removable caps or plugs.

4. **Edge forms and Screeds:** Use screeds in all single course slabs and slabs to receive abrasive course, and in the top course of all other slabs. Set edge forms and screeds to produce the indicated elevations and contours, and secure to prevent displacement during placing and consolidation of the concrete.

5. **Removal of Form, Falsework and Centering:** Unless earlier removal is approved by the Engineer, maintain forms, falsework and centering in place until the concrete has obtained the minimum percentage of specified design strength as follows:

Structural Member	Percent of Specified Design Strength
Footings; inverts; sides of beams, slabs and girders; slabs and beams on grade:	25
Free standing wall, columns and piers:	40
Cut and cover box structure exterior walls; retaining walls:	50

Cut and cover box structure roofs:	80
Stairways:	80
Soffits and beams, slabs and girders under 20 feet clear span between supports:	80
Over 20 feet clear span between supports	90
Tunnels:	40
Cantilevers:	90

3.02 INSPECTION:

- A. Inspect forms and embedded items before placement of concrete.
- B. Obtain the Engineer's approval prior to placement of concrete.

3.03 CONVEYING:

- A. Handle concrete from the mixer to the place of final deposit as rapidly as practicable by methods that will prevent segregation, undue drying or temperature rise, or loss of ingredients; and in a manner that will maintain

the required quality of concrete.

- B. Use conveying equipment of size and design to maintain a continuous flow of concrete at the delivery end and as approved by the Engineer. Do not use conveying equipment with aluminum parts, such as chutes, hoppers, or scrapers, that could come into contact with and contaminate the concrete during conveying.
- C. Use belt conveyors, which are horizontal or at slope which will cause neither segregation nor loss. Use an approved arrangement at the discharge end to prevent separation. Discharge long runs without separation into hopper. Do not allow concrete to adhere to the return belt.
- D. Use chutes, which are metal or metal-lined, and have a slope not exceeding one vertical to two horizontal and not less than one vertical to three horizontal. Chutes more than 20 feet long, and chutes not satisfying slope requirements, may be used if the chutes discharge into an approved hopper before distribution.
- E. Use pumping and pneumatic conveying equipment of a suitable kind with adequate pumping capacity. Clean equipment at the end of each operation. Control pneumatic placement so that separation is not apparent in the discharged concrete.

3.04 PLACEMENT:

- A. General:
 - 1. Placing Ground or Subcourse: Subgrade or base course shall be free from injurious material, well drained, and moist at time of concreting. Prior to placing concrete, thoroughly clean and

dampen as necessary, leaving no free water standing on base course or subgrade and no soft or muddy spots in subgrade.

2. **Placing Against Membrane:** Do not place concrete against unprotected waterproofing membrane.
 3. Deposit concrete into forms as nearly as practical to its final position, and in a manner not to cause or permit segregation. Do not use vibrators for extensive shifting of the mass of fresh concrete. The free drop of any concrete shall not exceed five feet without the use of adjustable length pipes. Place concrete for columns by means of pipes adjustable in length and not less than six inches in diameter.
- B. **Consolidation:** consolidate concrete until all voids are filled and free mortar appears on the surface. With the exception of concrete placed as pipe-culvert headwalls, slope paving and slabs, and concrete placed under water, consolidate concrete by means of approved internal vibrators.
1. Employ a sufficient number of vibrators to consolidate the incoming concrete to the proper degree within 15 minutes after depositing in forms. In all cases, maintain at least one spare vibrator available at the site of any structure during concrete placement. Do not hold vibrators against the forms and the reinforcing steel.
 2. The location, manner, and duration of the application of vibrators shall be such as to secure maximum consolidation of the concrete without causing segregation of mortar and coarse aggregate and without causing water or cement paste to flush to the surface. The thickness of the layers shall not be greater than can be satisfactorily consolidated by vibrators. Vibrators shall vertically

penetrate a few inches into the previous lift at regular intervals.

3. The use of approved external vibrators for consolidating concrete will be permitted when concrete is inaccessible for adequate consolidation, providing the forms are constructed sufficiently rigid to resist displacements and damage from external vibration.

C. Underwater Concrete Placement:

1. Deposit concrete underwater by means of either a tremie or an underwater closed bottom dump bucket. Place in a compact mass and do not disturb after placing. Do not agitate water at the point of concrete placement.
2. Use tremie consisting of a water-tight tube having a diameter of not less than 10 inches, with a hopper at the top and a baffle or deflector plate at the bottom which will discharge the concrete laterally for better distribution. The tube shall have a device that will close and prevent water from entering the discharge end while the tube is being charged with concrete. Support the tremie in a manner which will permit free movement of the discharge end over the top surface of the work, and which will permit the rapid lowering when necessary to retard or stop the flow of concrete. Keep the discharge end closed at the start of the concrete work and sealed except when the concrete is being placed. Keep the tube full of concrete, and maintain the flow continuous until the work is complete. Tremie-place concrete shall be monolithic and homogeneous.
3. Use underwater bucket having an open top and bottom doors which will open freely and outward when tripped. Fill and lower the bucket in a manner which will prevent backwash, and do not

dump until it rests on the surface upon which the concrete is to be deposited. After discharge, raise the bucket in a manner that will not disturb the placed concrete.

3.05 FINISHING:

- A. After consolidation, finish unformed surfaces with the finishes specified in Article 1.05 herein and in accordance with ACI 301, Chapter 11.
- B. For formed surfaces, finish surfaces in accordance with Article 1.05 and ACI 301, Chapter 10.
- C. Repair defective work as specified in Article 3.12 herein.

3.06 GROUTING:

- A. Proportion mixing water in accordance with grout manufacturer's recommendations for shrinkage compensating grout.
- B. Clean of all loose and foreign material that would prevent bond between the grout and the concrete surfaces contacting the grout.
- C. Thoroughly moisten concrete surfaces, to be grouted or dry-pack, prior to starting work.
- D. Completely fill all recesses and assure grout material is in complete contact with all steel and concrete surfaces.

3.07 CURING AND PROTECTION:

A. General Requirements:

1. Protect freshly placed concrete from excessively hot or cold temperatures. Maintain without drying for the period of time necessary for the hydration of the cement and the proper hardening of the concrete.
2. Keep concrete continuously under cure until the accumulated time during which the temperature of the air in direct contact with the concrete has been warmer than 55° F is at least five days for bottom slabs and footings and seven days for all other concrete.
3. Concrete used for subway structures shall be cured using the normal curing method specified herein.

B. Normal Curing: Use any one of the methods described below:

1. Ponding: Keep the surface submerged at all times for the required curing period.
2. Continuous application of water: Accomplished by sprinkling with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete is set.
3. Covering: Cover the entire area to be cured with double thickness burlap sheet, laid directly on the concrete, and keep continuously wet.

4. Covering with waterproof sheeting: Keep the entire area to be cured continuously wet by sprinkling, as specified in paragraph 2 above, for at least 18 hours and then immediately cover with the waterproof curing sheet, free of holes or tears.

C. Curing Compound Method:

1. Do not apply the curing compound to the surface of construction joints or to reinforcing steel.
2. Keep surfaces to be cured moist or wet until the curing compound is applied. Do not apply the curing compound until all patching and surface finishing has been completed.
3. Apply curing compound uniformly over the surface at a rate and thickness recommended by the manufacturer. Curing compound, which has become chilled to such an extent that, it too viscous for satisfactory application shall be warmed in accordance with the manufacturer's recommendations.
4. Should the film compound be damaged from any cause before the expiration of the curing period, immediately repair the damaged portions with additional compound.

D. Inclement Weather Protection:

1. When the mean daily temperature of the atmosphere is less than 40° F, maintain the temperature of the concrete between 50 and 70° F when placed and for the required curing period.

2. When necessary, make arrangements for heating, cooling, insulating, or housing in advance of placement, adequate to maintain the required temperature and moisture conditions without injury due to concentration of heat.
3. Do not place concrete on frozen ground nor in contact with ice within the forms. Protect concrete from freezing for a period of five days after placing.
4. Stop placing concrete when the quantity of rain falling is sufficient to wash the concrete surface.
5. Concrete shall have a minimum placing temperature that will not cause difficulty from loss of slump, flash set, or cold joints.
6. The temperature of concrete as placed shall not exceed 90° F except that the temperature of the concrete placed in walls and slabs three feet or greater in thickness shall not exceed 85° F. When the temperature of the steel is greater than 120° F, embedded items shall be sprayed with water immediately prior to placing concrete.
7. Details and methods of placing and handling concrete during inclement weather shall be in accordance with ACI 305 or ACI 306 as applicable.

3.08 CONSTRUCTION JOINTS:

- A. Construction joints shall be as indicated on the Contract Drawings. Joints not indicated shall be made and located so as not to impair the strength of the structure, and shall not impair appearance when subject to public view.

-
- B. Provide longitudinal keys or inclined dowels at least 1-1/2 inch deep at all joints in walls and between walls and slabs or footings unless otherwise indicated. Other construction joints shall be made without keys, except where keys are shown on the Contract Drawings. Where keys are indicated, keyways shall be formed to dimensions indicated on the Drawings.
- C. When indicated or permitted, obtain bond surface by the use of and approved chemical retarder which delays but does not prevent setting of the surface mortar. Remove retarded mortar within 24 hours after placing to produce a clean exposed coarse aggregate bonding surface.
- D. After the pour has been completed to the construction joint, and before placement of fresh concrete, clean reinforcing steel and the surfaces of horizontal and vertical construction joints of surface laitance, curing compound, and other materials foreign to the concrete, and expose clean coarse aggregate of at least 3/8 inch size. Clean hardened concrete surfaces by abrasive blast methods to expose coarse aggregate, after the curing period or immediately before placing concrete at the joint. Surfaces of concrete, which has been, placed not more than eight hours may be cleaned with air and water jets, if surface laitance is removed and clean coarse aggregate is exposed. Surfaces of horizontal construction joints, where expansion joint filler or bond breaking compound is to be placed as indicated, shall be cleaned of dirt, sawdust, and other loose materials. Moisten surfaces on which concrete is to be placed with water immediately before placing concrete.
- E. When it is necessary to make a construction joint because of an emergency, furnish and place additional reinforcing steel across the joint as required at no additional expense to the Administration.
- F. When new concrete is shown to be joined to existing concrete by means of bar reinforcing steel dowels grouted in holes drilled in the existing

concrete, the holes shall be drilled to the required depth, blown out, wetted and filled with portland cement grout, after which the dowel shall be inserted and left undisturbed until the grout is hardened. The grout shall consist of one part cement to two parts sand.

3.09 EXPANSION AND CONTRACTION JOINTS:

- A. No reinforcement or other fixed metal items shall be run continuous through expansion and contraction joints.
- B. Construct open joints at the locations indicated, by means of a wood strip, metal plate, or other approved material to be subsequently removed.

3.10 WATERSTOPS:

- A. The configuration and location of waterstops in construction joints and expansion joints shall be as indicated on the Contract Drawings.

3.11 PROTECTION FROM AND REMOVAL OF STAINS:

- A. Protect the concrete structure from rust staining by structural steel members and from other substances during the work.
- B. If staining does occur, remove stains and restore the concrete to its original color.

3.12 DEFECTIVE CONCRETE WORK:

- A. Porous areas, open or porous construction joints and honeycombed

concrete will be considered to indicate that the requirements for mixing, placing and handling have not been complied with and will be sufficient cause for rejection of the members of the structure thus affected.

- B. Defective work exposed upon removal of forms shall be entirely removed or repaired within forty-eight hours after forms have been removed.

- C. Repaired areas will not be accepted:
 - 1. The structural requirements have been impaired by reducing the net section of compressive members.

 - 2. The bond between the steel and concrete has been reduced.

 - 3. The area is not finished to conform in every respect to the texture, contour, and color of the surrounding concrete.

- D. If the above requirements are not satisfied, the Engineer may require that the members or unit involved be entirely removed and satisfactorily replaced at no additional expense to the Administration.

PART 4 - MEASUREMENT AND PAYMENT

4.01 34" F-SHAPE CONCRETE BARRIER (ANY TYPE)

- A. 34" F-Shape Concrete Barrier (any type) shall include furnishing and installing all formwork, reinforcing steel, concrete, expansion joints, joint sealants, finishing, and curing materials, measured per linear foot for the specified thickness.

- B. 34" F-Shape Concrete Barrier (any type) shall be paid for at the Contract unit price bid per linear foot of concrete of the specified thickness placed and accepted, which will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

4.02 20' CONCRETE BARRIER NOSE DOWN TAPER

- A. 20' Concrete Barrier Nose Down Taper shall include furnishing and installing all formwork, reinforcing steel, concrete, expansion joints, joint sealants, finishing, and curing materials, measured per each for the specified thickness.
- B. 20' Concrete Barrier Nose Down Taper shall be paid for at the Contract unit price bid per each placed and accepted, which will be full compensation for all material, equipment, tools, labor and all work incidental to complete the item as specified.

4.03 WATERSTOPS:

- A. Waterstops will not be measured separately.
- B. Waterstops will be considered incidental to the appropriate work item.

4.04 EXPANSION JOINTS:

- A. Expansion Joints will not be measured separately.
- B. Expansion Joints will be considered incidental to the appropriate work item.

4.05 ADDITIONAL CONCRETE:

- A. Additional Concrete used to replace overcut or for overbreak, or to repair or replace defective work, will not be measured.

- B. Additional Concrete will be considered incidental to the appropriate work item.

4.06 CONCRETE PEDESTALS

- A. Concrete Pedestals will be measured and paid for per each.

- B. The payment will be full compensation for all excavation, subgrade preparation, concrete, stone, mortar, grout, reinforcement, material, labor, equipment, tools, and incidentals necessary to complete the work.

END OF SECTION

SECTION 16060**GROUNDING****PART 1: GENERAL****1.01 DESCRIPTION:**

This Work shall consist of furnishing and installing grounding systems as specified in the Contract Documents or as directed by the Engineer. The grounding system shall conform to the latest editions of the National Electrical Code (NEC) and the National Electric Safety Code (NESC).

PART 2: PRODUCTS**2.01 MATERIALS:**

Ground Wire and Rods: Ground wire shall be bare medium drawn copper. Ground wire installed underground shall be of the size and configuration (solid or stranded) as shown in the Contract Documents. Ground rods shall be seventy-five-tenths inch (0.75") diameter, a minimum of ten feet (10') in length, with a steel core and copper jacket.

PART 3: EXECUTION**3.01 EQUIPMENT GROUNDING SYSTEM:**

Equipment grounding system shall consist of the ground wire, electrically continuous metallic conduit system, grounding conductors, ground rods and terminations. Every item of equipment served by the electrical system shall be bonded to the equipment grounding system.

A. GROUNDING CONDUCTORS

Grounding conductors shall be the size and type specified in the Contract Documents.

B. GROUND RODS

1. Ground rods shall be installed as specified in the Contract Documents. Maximum acceptable earth resistance value shall be twenty-five (25) ohms. Ground resistance of each rod shall be measured before connecting the rod to the grounding conductor. If the measured resistance exceeds twenty-five (25) ohms, a ten feet (10') extension rod shall be exothermically welded to the top of the first rod, then driven to its full depth. Earth resistance shall again be measured, and if it still exceeds twenty-five (25) ohms, the Engineer shall be contacted for instructions.
2. Where rock is encountered and acceptable earth grounds cannot be accomplished by driving as described above, the Engineer may direct the use of a grounding grid utilizing direct buried rods exothermically welded end to end to bond lighting standards and structures in continuous series to some point where an acceptable earth ground can be obtained.

C. CONTINUITY

Continuity of the equipment grounding system shall be maintained throughout the project.

D. TERMINATIONS

Connection to equipment grounding system shall be made with suitable lugs at all grounding bushings specified in 16123, and at the ground lugs in lighting structure access holes or in a breakaway base. Connections to ground rods shall be as specified in the Contract Documents. Connections to neutral grounding systems shall be made with lugs, as specified in 16123.

E. TESTING

Refer to 16125.

PART 4: MEASUREMENT AND PAYMENT

4.01 GROUNDING:

- A. Ground Rods will be measured and paid for at the Contract Unit Price per each ten foot (10') length. The payment will be full compensation for all

rods, lugs, driving rods, welding, excavation, backfill, and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

- B. Ground Wire will be measured and paid at Contract Unit Price per linear feet.

END OF SECTION

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SECTION 16122

TRAFFIC CONTROL - ELECTRICAL CABLE, WIRE AND CONNECTORS

PART 1: GENERAL

1.01 DESCRIPTION:

This Work shall consist of furnishing and installing loop detector wires and leads, electrical cable, cable ducts, wire, micro-loop probe sets, communication cable and associated connectors of the type and at the locations specified in the Contract Documents, or as directed by the Engineer, for traffic control.

PART 2: PRODUCTS

2.01 GENERAL REQUIREMENTS:

- A. The Micro-Loop Probe shall be as approved by the Engineer.
- B. Sealer for Loop Detector. Sealing material to seal saw cuts for loop detector wires shall be either, Type A, two (2) part epoxy or Type B, one (1) part polyurethane. The manufacturer shall furnish certification, which verifies that the material and Work complies with the applicable Specifications and includes the actual test results to confirm the statement. The contents of the certification shall be on the Contractor's/vendor's/manufacturer's letterhead or approved document and shall be duly signed by a company officer. No aggregate shall be mixed with the sealer material. The sealer shall be applied in conformance with the manufacturer's recommendations. Tests shall conform to the following:

TYPE A - TWO PART EPOXY	
TEST AND METHOD	SPECIFICATION LIMITS
Viscosity, cone and plate Viscometer@ 25° C, cps max	12,000
Pot life @ 25° C, minutes minimum	10
Cure time @ 25° C, no tackiness, hr max	1
Hardness, Type A durometer, D 2240	50-60

Tensile elongation, D 638, % minimum	100
Water absorption, D 570, %/24 hr max	0.5
Oil absorption, D 471, % max	0.02
Volume resistivity @ 25° C, D 257, ohm- ern minimum	2.4 X 10 ¹⁰
TYPE B - ONE PART POLYURETHANE	
TEST AND METHOD	SPECIFICATION LIMITS
Viscosity, Brookfield RVF #6 spindle ~ 20 rpm 25° C cps max	30000
Cure time @ 25° C no tackiness hr max	24
Hardness Rex Type A minimum	50-60
Tensile strenath D 412 psi minimum	500
Tensile elonaation D 412 % minimum	300
ARC resistance D 495 sec minimum	70
Dielectric constant D 150 minimum	6 @ 50 Hz 4.25 @ 500 kHz
Nonvolatile content %	85

- C. Conduit shall conform to 10 14 15.02, Part 2.1.
- D. Electrical Cable and Wire: Electrical cable and wire shall be the standard commercial product of the manufacturer and shall have been manufactured not more than one (1) year prior to the date of the Contract.

All cable and wire shall be made of copper.

1. Direct Burial Cable: Direct burial cable shall be single conductor, stranded, with an unshielded, chemically crosslinked thermosetting polyethylene insulation, rated for six hundred (600) volts. The cable shall be suitable for direct earth burial or installation in ducts or conduit and shall conform to Underwriters' Laboratories Type USE, XHHW or THW and shall bear the applicable UL labels denoting type, size, stranding, manufacturer's name and surface marking or molded ridges for phase and neutral identification. Sizes shall be as specified in the Contract Documents.
2. Building Cable and Wire: Building cable and wire shall be six hundred (600) volt, plastic insulated, nylon jacketed and shall conform to Underwriters' Laboratories Type THWNITHHN and shall bear the applicable UL labels denoting type, size, stranding, manufacturer's name and surface marking or molded ridges for phase and neutral identification. Sizes shall be as specified in the Contract Documents.
3. Cable Duct: Cable duct shall consist of cables preinstalled in either a polyvinyl chloride (PVC) or polyethylene (PE) plastic duct conforming to NEMA TC 7 and the NEC. PVC shall conform to D 3485. PE duct shall be manufactured from black, virgin, high density PE resin conforming to D 1248, Type III, Grade P34, Class C, Category 5. Minimum inside diameter of duct shall be one and one-half inches (1 1/2"). Cable shall be rated for 600 volts.
4. Ground Wire and Rods: Ground wire shall be bare medium drawn copper. Ground wire installed underground shall be of the size (solid or stranded) configuration shown in the Contract Documents. Ground rods shall be three quarters inch (0.75") diameter, a minimum of ten feet (10') in length, with a steel core and copper jacket.
5. Traffic Signal Cable: Traffic signal cable shall conform to IMSA Specification 19-1 and shall be stranded. Conductors shall be No. 14 AWG.
6. Loop Detector Lead-In Cable: Loop detector lead-in cable shall be two (2) conductors, No. 14 AWG, PE jacketed, conforming to IMSA Specification 50-2.
7. Loop Detector Wire: Loop detector wire shall be single conductor, 600 volt, No. 14 AWG, 19-strand wire in flexible PE tubing.
8. Voice Grade Communication Cable: Self-supporting cable shall be solid No. 19 AWG and conform to IMSA 40-4. Underground cable shall conform to IMSA 60-2.
9. Electric Service Wire: Electric service wire for traffic signals,

intersection control beacons, hazard identification beacons and luminaires mounted on traffic signal structures shall have three (3) individual wires. Each wire shall be seven (7) stranded. Electric service wire color identification by spray paint, tape, heat shrink tubing or any other after manufacturing method is prohibited.

- E. Communication Cable shall conform to paragraph D 8 above.
- F. Cable and Wire Connectors shall conform to the following:
 - 10. Cable Connectors and Connector Kits: Cable connectors and connector kits for use in lighting structures, hand holes, junction or pull boxes, and for terminating underground cables in lighting structures shall be rated for a minimum of six hundred (600) volt service. Cable connectors shall be compression type, applied by means of a compression tool. Connectors shall be fabricated from high strength copper alloy. Plated connectors fabricated from metals other than copper are prohibited. Bolted type connectors shall be utilized for splicing bare ground conductors.
 - 11. Connector Kit Components: . Each cable connector kit shall be furnished with all component parts described under the various listed types. Each kit shall contain sufficient silicone compound to lubricate metal parts and the housing for each assembly along with complete installation instructions.
 - 1. All housings shall be made of water resistant synthetic rubber suitable for burial in the ground or exposure to sunlight. Each housing shall form a watertight seal around the cable at the point of disconnection and between the insert body and enveloping "Y" housing.
 - ii. All copper pins, sockets and fuse contacts shall have a minimum conductivity of ninety percent (90%). The crimpable portion shall be fully annealed while the rest of the device is maintained in its original state.
 - iii. Plastic sleeves shall be rigid, molded insulating plastic material of sufficient outside diameter to form a watertight fit with its related housing. Wall thickness shall be one-tenths inch (0.10") maximum and sleeve lengths of four inches and seven inches (4" and 7") shall be available.
 - iv. All fuses shall be rated six hundred (600) volts, one hundred thousand (100,000) amps AIC.
 - 12. Connector Types: Each cable connector kit furnished shall be one of the following types:
 - i. Type I is an unfused, quick disconnect inline connector kit

containing:

1. A copper pin crimpable to a conductor.
2. A receptacle having a centrally located, recessed locking socket constructed so that it is filled and retained by its housing and a disposable assembly pin.
3. A plug housing for retention of the copper pin.
4. A receptacle housing with disposable protective sleeve.

ii. Type II is a fused, quick disconnect inline connector kit containing:

1. A pair of spring-loaded copper fuses contacts suitable for gripping the specified cartridge fuse. One (1) contact shall be crimpable on a conductor and after insertion into its proper position within the load side plug housing, be capable of being securely retained therein. The other contact shall be preassembled for retention within the line side of the connector body.
2. A load side housing permanently marked "Load Side."
3. A disposable assembly pin.
4. A fuse of the specified amp rating.

iii. Type III is a fused, quick disconnect "Y" connector kit containing:

1. A pair of spring-loaded copper fuses contacts suitable for gripping the specified cartridge fuse. One (1) contact shall be crimpable on a conductor and after insertion into its proper position within the load
2. Side plug housing, be capable of being securely retained therein. The other contact shall be preassembled for retention within a "Y" insert body.
3. A line side "Y" housing with two (2) water seal cable ports.
4. Two (2) terminal lugs, each having a mounting hole.
5. A bolt and a self-locking nut.
6. A "Y" insert body with preassembled line side fuse

contact and a ring tongue terminal.

7. A load side plug housing permanently marked "Load Side."
 8. A disposable assembly pin.
 9. A fuse of specified amp rating.
- iv. Type IV is an unfused, quick disconnect "Y" connector kit containing:
1. A copper pin crimpable to a conductor and suitable for retention in the load side receptacle housing.
 2. A "Y" insert body with preassembled load side copper socket and ring tongue terminal.
 3. A line side "Y" housing with two (2) water seal cable ports.
 4. Two (2) terminal lugs, each having a mounting hole.
 5. A bolt and self-locking nut.
 6. A load side receptacle housing.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS:

- A. The Contractor shall furnish and install copper conductor wire and cable of the types and sizes and at the locations specified in the Contract Documents. No splicing will be permitted for cables unless specified in the Contract Documents. When specified, lighting cable splices and loop detector lead in cable will be permitted only in junction and pull boxes and hand holes. Cable shall not be installed until the entire related raceway, including manhole, hand hole, and foundation system is in place. A six foot (6') cable slack shall be provided neatly tied, coiled and positioned in the bottom of the hand holes, manholes and cabinets. Drip loops measuring eight inches (8") shall be provided at all overhead entrance points into structures. Insulated spade type terminal ends shall be installed upon all wiring placed on terminal blocks.

3.02 DIRECT BURIAL CABLE

- A. Direct burial cable shall be installed to the depth of cover specified in the Contract Documents.

3.03 CABLE IN CONDUITS

- A. Cable in conduits shall be installed in a manner and by methods to prevent

harmful stretching of the conductor, injury to the insulation or damage to the other protective covering. The ends of all cables shall be sealed until ready for connection. Where more than one (1) wire or cable is to be installed in a single duct or conduit, they shall be pulled into the conduits by hand or power winch with the use of cable grips or pulling eyes. Pulling tension shall be governed by recommended standard procedures for straight pulls or bends. A lubricant compatible with the cable insulation shall be used.

3.04 PREASSEMBLED CABLE DUCT

- A. Prior to installation, the cable duct shall be released out from its reel as the reel is moved alongside and parallel to the trench. Cable duct shall not be pulled off a reel located in a stationary position. The cable shall be installed using cable grip in a manner that will not stress or damage conductors, insulation or sheath wall.
- B. After backfilling the Contractor shall demonstrate that the conductors move freely within the duct by pulling the conductors out a minimum length of two feet (2'). Pulling tensions shall conform to manufacturer's recommendations. The cable shall then be pulled to its original position. Cable duct ends shall be completely sealed with a waterproof removable sealing compound, molded plastic or rubber device.

3.05 CABLE IN LIGHTING STRUCTURES

- A. The cable shall be supported at each luminaire with a suitable clamp as an integral part of the luminaire or a device approved by the Engineer for the application.

3.06 IDENTIFICATION TAGS

- A. Identification tags for circuit wiring in all hand holes, junction boxes and control cabinets shall be furnished and installed. Nonconductive identifying bands shall be nylon, self-clinching type with adequate sized tab for labeling. Each band shall be marked using 1/4 inch minimum lettering dies, engraving device or other permanent marking process approved by the Engineer. Bands shall indicate circuit number for lighting systems, terminal block position for loop detector cables and traffic signal phase for all other signal cables.

3.07 LOOP DETECTOR WIRE AND LOOP DETECTOR LEAD-IN

- A. Prior to the installation of loop wires, the saw cut area shall be dry and free of any saw cut debris. Loop detector wire cable shall be twisted five (5) turns per foot from the loop itself to the terminal point. Loop detector wire shall be installed at the bottom of the saw cut. A blunt instrument

shall be used to seat the loop detector wire at the bottom of the saw cut. Loop detector wire shall be spliced to loop detector lead-in as specified in the Contract Documents.

3.08 GROUNDING WIRE,

Refer to Section 16060, (Grounding).

3.09 CONNECTOR KITS

- A. Prior to the installation of loop wires, the saw cut area shall be dry and free of any saw cut debris. Loop detector wire cable shall be twisted five (5) turns per foot from the loop itself to the terminal point. Loop detector wire shall be installed at the bottom of the saw cut. A blunt instrument shall be used to seat the loop detector wire at the bottom of the saw cut. Loop detector wire shall be spliced to loop detector lead-in as specified in the Contract Documents

3.10 MICRO-LOOP PROBES

Micro-loop probe sets shall be installed as specified in the Contract Documents or as directed by the Engineer. All leads shall be terminated in the controller cabinet.

PART 4: MEASUREMENT AND PAYMENT

4.01 ELECTRICAL, WIRE & CONNECTIONS:

- A. The payment will be full compensation for all cable, preassembled cable ducts, wire, lubricants, splices, overhead communication cable attachments, identification tags, trench excavation and backfill, and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.
- B. Number 1, 2, 4 and 7 conductor electric cables – any size AWG will be measured and paid for at the Contract Unit Price per linear foot for the type and sizes specified in the Contract Documents.
- C. Interconnect Cable will be measured and paid for at the Contract Unit Price per linear feet.
- D. Cable – 1 conductor No. 2, 4, 6, 8 and 10 type use 600V will be measured and paid for at the Contract Unit Price per linear feet. The payment will be full compensation for all sealant, PVC conduit, hole drilling, installation of lead-in cable, and for all material, labor, equipment, tools, and

incidentals necessary to complete the Work.

- E. Bare copper ground wire No. 3, 4, 6, 8 & 10 AWG will be measured and paid at the Contract Unit Price per linear feet.

END OF SECTION

SECTION 16123
ELECTRICAL CONDUIT AND FITTINGS

PART 1: GENERAL

1.01 DESCRIPTION:

- A. This Work shall consist of furnishing and installing electrical conduit and fittings as specified in the Contract Documents or as directed by the Engineer. The requirements of 16125, (General Electrical Work and Testing) shall be a part of this Specification.

PART 2: PRODUCTS

2.01 MATERIALS:

- A. Concrete shall conform to 03050, (Portland Cement Concrete Structures) Part 2.
- B. Metallic Conduit and Fittings shall conform to the Table A.

Table A

MATERIAL	SPECIFICATION
Electrical Metallic Tubing	UL 797
Intermediate Metal Conduit	UL 1242
Rigid Metal Conduit	UL6
Rigid Steel Conduit, Zinc Coated	ANSI C80.1
Metallic Outlet Boxes	UL 514A
Fittings for Conduit and Outlet Boxes	UL 514B

C. Nonmetallic Conduit and Fittings. The manufacturer shall furnish certification, which verifies that the material and Work complies with the applicable Specifications and includes the actual test results to confirm the statement. The contents of the certification shall be on the contractor's/vendor's/manufacturer's letterhead or approved document and shall be duly signed by a company officer. Each length shall be stamped or embossed with the grade or type and applicable UL or NEMA designation.

D. Flexible Conduit and Fittings shall conform to the Table B,

Table B

MATERIAL	SPECIFICATION
Schedule 40 and 80 Rigid Polyvinyl Chloride (PVC) Conduit	UL 651
Electrical Plastic Tubing (EPT) and Electrical Plastic Conduit (EPC 40 and EPC 80)	NEMATC 2
Nonmetallic Outlet Boxes, Flush Device Boxes and Covers	UL 514C
Electrical Nonmetallic Conduit (ENC)	NEMA TC 13
PVC Fittings for Use with Rigid PVC Conduit and Tubing	NEMA TC 3
Flexible PVC Coated Conduit	UL 360
Liquid Tight Flexible Nonmetallic Conduit for Detector Sleeves	UL 1660

- E. PVC Coated Metallic Conduit and Fittings shall conform to Table C. Unless otherwise specified in the Special Provisions, all conduit and fittings shall be DB 120, shall be rated for wire temperatures of ninety degrees Centigrade (90 C) and shall be encased in a concrete envelope.

Table C

MATERIAL	SPECIFICATION
PVC Externally Coated, Galvanized, Rigid Steel Conduit and Electrical Metallic Tubing	NEMA RN 1

PART 3: EXECUTION

3.01 BENDS:

- A. Unless otherwise specified in the Contract Documents, changes in direction of conduit shall be accomplished by use of manufactured bends or by field bends. Changes in the direction of conduit shall have an eighteen inch (18") trade radius.

3.2 CONNECTIONS

- A. Conduit runs shall be made with as few couplings as standard length will permit. Rigid steel conduit connections shall be threaded. Field cut threads of galvanized conduit shall be painted with approved galvanizing repair paint prior to assembly. Nonmetallic conduit shall be connected by a solvent welding process. Fittings for electrical metallic tubing (EMT) conduit shall be watertight cast ferrous compression type.

3.3 CONDUIT TERMINATIONS

- A. Pull boxes or conduit bodies shall be used at conduit terminations. Conduits terminating in cast iron junction boxes shall be threaded into hubs with bonding screws furnished and installed on the interior of the box. Conduits terminating in junction boxes without hubs shall be secured with two (2) lock nuts with an insulated grounding bushing furnished and installed. Conduits terminating at concrete foundations and manholes or hand holes shall be secured as specified in the Contract Documents. All ends of unused conduit shall be capped.

3.4 CLEANING AND CAPPING

- A. Prior to installation of conductors in any run, the conduit shall be checked for cleanliness and all obstructions removed. Each conduit run and all fittings shall be cleaned of all debris by a pull through mandrel type device inserted in the presence of the Engineer. All ends of conduits shall be capped by use of a manufactured cap or plug. Prior to the installation of wiring, manufactured caps or plugs shall be removed and an insulated bonding bushing for galvanized rigid conduit or bell end fittings for PVC conduit installed.

3.5 PULL ROPE

- A. After installation, all conduits, which will be left empty, shall have a pull rope installed. Pull rope shall be made of one-quarter inch (1/4") nylon material with a minimum tensile strength of four hundred pounds (400 lb.).

3.6 EXPOSED CONDUIT

- A. Exposed conduit runs shall be parallel to, or at right angles to, walls, slabs, girders, etc. Conduit shall be located to minimize accumulation of dirt and to provide accessibility for painting. Conduit shall be attached to steel, concrete, masonry or timber by straps; clamps or hangers of an approved type made of stainless steel or galvanized malleable iron. Spacing of attachments shall be as specified or as directed by the Engineer. When specified, all exposed rigid steel conduit surfaces shall be painted to match

the color of adjacent material. All galvanized surfaces shall be prepared as specified in 09 97 13.23, before the application of paint approved by the Engineer.

3.7 EXPANSION JOINTS

- A. Where conduits cross expansion joints in the structure, or where otherwise specified, expansion fittings shall be of the type that assures electrical continuity across the joint.

3.8 BURIED CONDUIT (TRENCHED)

- A. Conduit shall have a minimum cover of twenty-four inches (24") and shall slope to drain. All underground ductwork shall have magnetically detectable plastic warning tape installed twelve inches (12") above the duct for the entire length of the duct. Warning tape shall be red for electrical ductwork. The tape shall be three inch (3") minimum width with warning and identification imprinted in bold black letters "Caution Buried Electrical Line Below" or similar with printed side up. Tape must be unaffected by moisture and other substances contained in the trench or backfill.

3.9 ENCASED CONDUIT (SLOTTED OR TRENCHED)

- A. Conduit to be encased in concrete shall be accurately placed and rigidly held in position so that line and grade are maintained when concrete is placed.

3.10 CONDUIT INSTALLATION UNDER EXISTING PAVED AREAS (BORED)

- A. All conduit placed under existing pavement shall be installed with no disturbance to the existing roadway.

PART 4: MEASUREMENT AND PAYMENT**4.01 CONDUIT & FITTINGS:**

- A. The payment will be full compensation for all excavation, backfill, conduit encasing concrete, hot mix asphalt, attachments, hangers, paint, bends, connections, fittings, mandrelling, pull ropes and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.
- B. Type X & Y Duct sections any size trenched or slotted will be measured and paid for at the Contract Unit Price per linear foot measured along the centerline of the conduit from end to end.
- C. Type X Duct Section 2-5" I.D. trenched and slotted shall be measured and paid for per linear foot.
- D. Electrical conduit and fittings and junction boxes to be constructed into concrete structures will not be measured but the cost will be incidental to the pertinent Concrete Traffic Barrier, Concrete Parapet, or other pertinent Concrete items specified in the Contract Documents.

END OF SECTION

SECTION 16125**GENERAL ELECTRICAL WORK AND TESTING****PART 1: GENERAL****1.01 DESCRIPTION:**

This Work shall consist of furnishing, installing, and testing of all applicable electrical items referred to the Contract Documents.

PART 2: PRODUCTS**2.01 MATERIALS:**

All materials and equipment installed as part of the permanent installation shall be new, UL listed or labeled, and shall conform to NEC, NESC, NEMA, IES, and local codes applicable to the area of installation.

PART 3: EXECUTION**3.01 GENERAL REQUIREMENTS:**

All installations shall conform to NEC, NESC, local utility company requirements and State and local laws and ordinances governing the Work. All electrical Work shall be accomplished under the direct supervision of a master electrician licensed in the State of Maryland or City. All Work performed under 16060, (Grounding), 16123, (Electrical Conduit and Fittings), 16520, (Luminaires and Lamps), 16124, (Electrical Hand Holes Manholes Pull and Junction Boxes), 16578, (Signal Heads), 16579, (Traffic Control Device Cabinets and Equipment), and this Specification shall be performed by a journeyman electrician. The Contractor shall obtain and pay for all permits, licenses and inspection fees.

3.2 TESTING

A. The Contractor shall supply all personnel and equipment required to successfully perform the following tests and shall furnish four (4) certified copies of the complete test reports to the Engineer.

- B. Not less than thirty (30) days prior to the commencement of each required test, the Contractor shall submit to the Engineer the types, styles or catalog numbers of all testing equipment to be used for the tests. A written certification shall be included stating when the testing equipment was last calibrated by a City approved testing agency. The calibration date shall be within one-hundred eighty (180) days of the date when the tests are to be performed. All tests shall be performed in the presence of the Engineer.
- C. Any defects found in the completed installation shall be repaired or replaced immediately to the satisfaction of the Engineer at no additional cost to the City.
1. Ground Resistance Testing. Ground resistance testing shall be conducted using a megger ground tester, using the null balance fall of potential method. Corrected readings greater than twenty-five (25) ohms will not be accepted.
 2. Circuit Testing. A circuit test to determine insulation resistance shall be performed on all cables of every circuit except those installed in lighting structures. Cable insulation resistance shall be a minimum of ten (10) megohms at five hundred (500) volts D.C. except loop detector wire and loop detector lead shall have a minimum of one hundred (100) megohms at five hundred (500) volts D.C.
 3. The Contractor shall demonstrate in a manner acceptable to the Engineer that all conductors are continuous, free from short circuits and unspecified grounds and that all circuits are properly connected as specified in the Contract Documents.
 4. Performance Testing. A performance test using the design power source shall be conducted by the Contractor prior to acceptance. The electrical system, including automatic control equipment, shall be operated for thirty (30) consecutive days without failure. If any component fails, it shall be immediately replaced and the test shall be continued. The Contractor shall record each fault, the method

and date of correction of each and the beginning and end of the thirty (30) day test period. If more than five percent (5%) of any component fails during the test, the component shall be replaced and the thirty (30) day test cycle for the entire system shall be restarted.

5. Illumination Testing. An illumination test shall be conducted by the Contractor to determine the illumination characteristics of the roadway lighting installation. The test shall conform to procedures approved by the City.

3.3 TRAFFIC SIGNAL TESTING

- A. Testing shall be accomplished without hazard to the traveling public.
- B. The Contractor shall maintain all new materials until satisfactorily tested and their operation accepted by the Engineer.
- C. All signal heads and signs in place but not in use shall be entirely covered with opaque burlap.
- D. After completion, testing and acceptance, any new traffic signal shall be placed on flashing operation for a seventy-two (72) hour period prior to placing the signal on full color operation.
- E. Existing full color and flashing signals shall not flash, but shall be kept in operation until the new signal is completed, satisfactorily tested and approved by the Engineer.
- F. The Contractor shall remove any STOP signs at new full color signals at the end of the seventy-two (72) hour flashing period. The date and time of removal shall be logged and provided to the Engineer.
- G. All signal heads, signs, spans and mast arms, that are not to be put in use, shall be removed upon acceptance by the Engineer and placement of the new traffic control device into operation.

- H. New traffic signals, exclusive of signal system interconnect installation, may be placed into operation upon completion of the new traffic signal being satisfactorily tested and accepted by the Engineer. Upon the signal system interconnect installation completion, the signal system interconnect shall also be satisfactorily tested and approved by the Engineer.

PART 4: MEASUREMENT AND PAYMENT

4.01 GENERAL ELECTRICAL WORK AND TESTING:

General electrical Work and testing and the as built Drawings will not be measured but the cost will be incidental to the other pertinent items specified in the Contract Documents.

END OF SECTION

SECTION 16130
RACEWAYS AND BOXES

THIS SECTION HAS BEEN INTENTIONALLY REMOVED

END OF SECTION

SECTION 16440
SWITCHBOARDS AND PANELBOARDS

PART 1: GENERAL

1.01 DESCRIPTION:

- A. This section specifies furnishing and installing panelboards, circuit breakers, meter socket, disconnect, outlet pedestals and lighting controls.
- B. Related Work Specified Elsewhere:
 - 1. Section 16060: Grounding
 - 2. Section 16124: Electrical Hand Holes, Manholes, Pull and Junction Boxes
 - 3. Section 16520: Exterior Lighting

1.02 DESIGN CRITERIA:

- A. The panelboards and circuit breakers referenced herein shall be designed and manufactured according to the latest revision of the following specifications.
 - 1. NEC - Article 384
 - 2. NEMA PB 1 – Panelboards
 - 3. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
 - 4. NEMA AB 1 - Molded Case Circuit Breaker
 - 5. UL 50 - Boxes and Cabinets
 - 6. UL 67 – Panelboards
 - 7. UL 489 - Molded Case Circuit Breakers and Circuit Breaker Enclosures
 - 8. NFPA 70 - National Electrical Code (NEC)
 - 9. ASTM - American Society of Testing Materials

10. Federal Specification W-P-115B and W-C-375B/GEN

1.03 SUBMITTALS:

A. Submit the following for approval in accordance with SUBMITTALS; Section 01300 and with the additional requirements as specified for each

1. Shop Drawings:

a. Include manufacturer's product specifications, installation instructions, and mounting details

1) Panelboards and circuit breakers

2) Lighting control

3) Control cabinet

4) Concrete pad foundation

5) Circuit breaker nameplates

6) Outlet Pedestals

b. Panelboards and circuit breakers

c. Lighting control

d. Control cabinet

e. Concrete pad foundation

f. Circuit breaker nameplates

g. Outlet Pedestals

2. UL Certification

a. Panelboards and circuit breakers

b. Lighting control

c. Control cabinet

d. Concrete pad foundation

e. Circuit breaker nameplates

- f. Outlet Pedestals
- 3. Certification
 - a. Panelboards and circuit breakers
 - b. Lighting control
 - c. Control cabinet
 - d. Concrete pad foundation
 - e. Circuit breaker nameplates
 - f. Outlet Pedestals
- 4. Operation and Maintenance Manuals
 - a. Installation instructions and mounting details
 - b. Operation and maintenance manuals

1.04 QUALITY ASSURANCE:

- A. Codes, Regulations, Reference Standards and Specifications:
 - 1. Codes and Regulations of the jurisdictional authorities
 - 2. Codes and Standards, Section 01420:
 - NFPA 70, National Electrical Code (NEC).
 - NEC Article 384
 - NEMA PB1, PB1.1, AB 1
 - UL: 50, 67, 489.
 - SSPC: SP-6, SP-8, SP-10.
 - ASTM: A36, A53, A123, A153, A167, A276, A325, A507, A575, A1011, B26, B85, B137, B209, B221, D635, D1056, D1400, D2240.
- Applicable AISI, ANSI and NAAMM standards.
- Federal Specification W-P-115B, W-C-375B/GEN

PART 2: PRODUCTS

2.01 PANELBOARDS AND CIRCUIT BREAKERS:

- A. Furnish and install power distribution panelboards as specified herein and where shown on the associated contract drawings.
- B. Approval documents shall include drawings. Drawings shall contain overall panel, interior mounting, and wiring gutter dimensions. The location of the branches shall be clearly shown.
- C. Manufacturer shall be a company specializing in manufacturing of panelboard products with a minimum of fifty years documented experience.
- D. Upon delivery, contractor shall inspect and report concealed damage to carrier within their required time period. Panelboard shall be handled carefully to avoid damage to panelboard internal components, enclosure, and finish. Panelboards shall be stored in a clean, dry environment. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect enclosures from dirt, water, construction debris, and traffic.
- E. Manufacturer shall provide installation instructions and NEMA Standards Publication PB 1.1 (Operations and Maintenance Manual) with each panelboard.
- F. The interior shall be rated for 600 volts AC. Panelboard bus current rating shall be determined by heat-rise test conducted in accordance with UL 67. The panelboard bus material shall be copper and be plated. The bussing shall be fully rated allowing high ampacity breakers to be mounted in any position throughout the interior. Metal nameplates shall be secured to dead-front with rivets or screws. Sticker or foil nameplates shall not be permitted.
- G. Enclosure shall be NEMA 1 type and shall be galvanized steel constructed in accordance with UL 50 requirements. Box shall have removable blank end-walls and interior mounting studs. Maximum enclosure shall not exceed 20 inches wide and 5.75

inches deep. Trim front steel shall meet strength and rigidity requirements per UL 50 standards and shall have ANSI 49 gray enamel electro-deposited over cleaned phosphatized steel. Trim front shall be one-piece with door. Door shall have rounded corners and edges free of burrs. A clear plastic directory card holder shall be mounted on the inside of the door. Door shall have cylindrical tumbler type lock and shall be provided with two keys.

- H. Circuit breakers shall be UL listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panel schedule. Circuit breakers shall have bolt-on type bus connectors. Circuit breakers shall have an over-center toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Three pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping. There shall be two forms of visible trip indication. The breaker handle shall reside in a "TRIPPED" position between "ON" and "OFF". In addition, there shall be a VISI-TRIP indicator appearing in the clear window of the circuit breaker housing. The exposed faceplates of all branch circuit breakers shall be flush with one another. Lugs shall be UL listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90 degree C rated wire, sized according to the 75 degree C temperature rating per NEC Table 310-16.
- I. Install panelboard in accordance with manufacturer's written instructions, NEMA PB 1.1 and NEC standards. Anchor panelboards to structure and make branch circuit connections. Coordinate the panelboard bus ratings and circuit breaker coordination rating with the available fault current. Provide engraved laminated nameplates.
- J. Inspect complete installation for physical damage, proper alignment, anchorage, and grounding. Measure steady state load

currents at panelboard feeder; rearrange circuits in the panelboard to balance the phase loads within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits. Check tightness of bolted connections, and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.

- K. Panelboards shall be as manufactured by Groupe Schneider/Square D, Eaton/Cutler-Hammer/Westinghouse, Seimens, or General Electric.

2.02 LIGHTING CONTROL:

- A. Lighting control system components shall include lighting contactor, selector switch, photocell and time clock control, and key override switch. The lighting contactor, selector switch and time clock shall be located in a flush wall mounted Controls Cabinet adjacent to panelboard. Cabinet shall have same width and height, and door finish as panelboard.
- B. Lighting Control Devices
 - i. Astronomic Clock Switch: A single astronomic clock switch shall control lighting as described herein. The astronomic clock switch shall be solid-state and programmable unit with alphanumeric display complying with UL 917. The astronomic clock switch shall be capable of being adjusted based on the hours of operation of the parking lot. The astronomic clock switch shall be Intermatic model ET70415CR2 or approved equal.
 - ii. Photocell: Photocell enclosure shall be weathertight, resistant to high temperatures and equipped UV stabilized dome with movable slider/shield over sensor. Photocell shall be Tork series 2000 or approved equivalent.
 - iii. Lighting Contactors: Contactors shall be electrically operated

and mechanically held, and comply with UL 508 and NEMA ICS 2. Contactors shall have UL listing or rating consistent with type of load served, including incandescent and high-inrush fluorescent ballasts.

- C. General Exterior Lighting: The lighting contactor shall control general station exterior lighting fixtures. The lighting contactor shall be controlled by the astronomic clock switch and a photocell located on the roof of the building. The general exterior lighting circuits shall be energized by the photocell and de-energized by the astronomic clock switch. The selector switch shall provide capability to manually energize lighting circuits in the "hand" position, or de-energize lighting circuits in the "off" position.
- D. Security Lighting: Exterior lighting fixtures where noted on the drawings shall be controlled by the photocell but not the astronomic clock switch. The selector switch shall provide capability to manually energize security lighting in the "hand" position, or de-energize security lighting in the "off" position.
- E. Final control settings of the security lighting (night light) circuit shall be coordinated with the Engineer.

2.03 ELECTRICAL CONTROL CABINET:

- A. Control Cabinet shall be a stainless steel, NEMA 4X, one-door, freestanding enclosure. Enclosure size shall be as noted on Plans. Cabinet shall have one full panel and 22" equipment racks with 7 fixed shelves, mounted minimally 10" apart. Enclosure shall have heavy gauge continuous door hinges with stainless steel hinge pins and stainless steel padlocking handles. Grounding studs shall be provided in the body of the enclosure.

2.04 15A SINGLE POLE OUTLET PEDESTAL:

- A. Single Pole Outlet Pedestal shall be equipped with weatherproof, NEMA 3R, enclosure. Enclosure shall have heavy gauge

continuous door hinges with stainless steel hinge pins. Two sets of weatherproof 15A GFI, Ground Fault Interrupter, Duplex receptacles shall be installed in the enclosure. Receptacles shall be NEMA Type 5, 125 Volt, 15 Ampere Duplex devices. Pedestal shall be freestanding with at least 30" Height, 6" Width, and 3.5" Depth. Mounting of pedestal shall be direct burial with minimum of 24" depth below grade. The Single Pole Outlet Pedestal shall be ACE Manufacturing Metal model PAR-C2GG-DB or approved equal.

PART 3: EXECUTION

3.01 INSTALLATION :

- A. Install switchboards and panelboards at locations indicated on the drawings follows:
1. Mount switchboards and panelboards rigidly in place
 2. Use stainless steel fasteners. Where a metal contacts concrete or a dissimilar metal, separate contact surfaces with gasket, nonabsorptive tape or bituminous coating to prevent corrosion.
 3. Mount switchboards and panelboards plumb, level and in straight lines.
 4. Concrete foundations shall be constructed in accordance with the details on the Contract Drawings and as specified in Section 03300, Cast-in-Place Concrete.
 5. Install conductors to switchboards and panelboards leaving slack wire inside the cabinet for future modifications of the service.
 6. Install switchboards and panelboards in accordance with approved shop drawings.
- B. Ground enclosures in accordance with NEC and Section 16060.

3.02 ELECTRICAL SERVICE:

- A. Coordinate with Power Company for installation of meter and power feed.

3.03 FIELD QUALITY CONTROL:

- A. Testing:
1. Furnish necessary personnel and equipment and perform tests and adjustments in the presence of the Engineer
 2. Test circuits for continuity and operation.
 3. Test equipment enclosures for continuity of grounding system.
 4. Check tightness of cable connections.
 5. Test operations of circuits, control devices and contactors.

PART 4: MEASUREMENT AND PAYMENT

4.01 15A SINGLE POLE OUTLET PEDESTAL:

- A. 15A Single Outlet Pedestal will be measured per each for payment
- B. 15A Single Outlet Pedestal will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, utility coordination and all work incidental to complete the item as specified.

4.02 LIGHTING CONTROL CABINET PAD MOUNT:

- A. The Lighting Control Cabinet Pad Mount with Panelboard will be measured per each for payment.
- B. The Lighting Control Cabinet Pad Mount with Panelboard will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full compensation for all material, equipment, tools, labor, utility coordination and all work incidental to complete the item as specified.

4.03 ELECTRICAL UTILITY SERVICE EQUIPMENT:

- A. Electrical Utility Service Equipment will be measured per each.
- B. Electrical Utility Service Equipment will be paid for at the contract unit price bid per each complete in place, accepted, which price will be full

compensation for all material, equipment, tools, labor, utility coordination, and all work incidental to complete the item as specified.

END OF SECTION

SECTION 16520**EXTERIOR LUMINAIRES****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This section specifies providing lighting fixtures at West Baltimore MARC Train Station Park and Ride Facility.
- B. Related Work Specified Elsewhere:
 - 1. Electrical Hand Holes, Manholes, Pull and Junction Boxes: Section 16124.
 - 2. Traffic Control – Electrical Cable, Wire and Connectors: Section 16122.
 - 3. Grounding : Section 16060

1.02 QUALITY ASSURANCE:

- A. The following Codes, Regulations, Reference Standards and Specifications apply to work included in this Section:
 - 1. Codes and regulations of jurisdictional authorities.
 - 2. Codes and Standards.
 - a. NFPA 70, National Electrical Code.
 - b. UL: 57, 62, 496, 508, 542, 935, 1029, 1570.
 - c. SSPC: SP-6, SP-8, SP-10.
 - d. ASTM: A36, A53, A127, A153, A167, A276, A325, A353, A386, A507, A570, A575, B26, B85, B137, B209, B221, D635, D1056, D1400, D2240.
 - e. Applicable AISI, ANSI and NAAMM standards.
 - f. AASHTO: LTS-4.
- B. Each lighting fixture: UL-labeled or listed.

1.03 SUBMITTALS:

- A. Submit the following for approval in accordance with SUBMITTALS; Section 01300 and with the additional requirements as specified for each:

1. Shop Drawings:
 - a. Include photometric curves.
2. Wiring diagrams and bill of materials.
3. Mounting details and installation instructions.
4. Samples: One of each type of fixture, as requested or directed by the Administration or the Engineer.
5. Documentation:
 - a. Verification that each fixture is in compliance with applicable codes, regulations, reference standards and specifications for the location at which it is to be used. Indicate requirements that each fixture meets.
 - b. Calculations:
 - i. Submit calculations by a professional engineer registered in the State of Maryland certifying that assemblies of foundation, anchor bolts, pole, arms and luminaire will withstand specified wind pressure, wind speed, stress, deflection, vibration and fatigue.
6. Field Testing:
 - a. Submit a detailed plan of the proposed methods of and scheduling of the required field testing at least 30 calendar days before initiating the tests.
 - b. Submit certified test reports.
7. Manufacturer's Data:
 - a. At least two weeks before start of any shop coating work, submit to the Engineer for approval two each of the following:
 - i. Complete data sheets with surface preparation and the coating materials to be used, identified by the manufacturer, brand name, and product number.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Ship each unit securely packaged and labeled for safe handling in shipment and to avoid damage or distortion.
- B. Store lighting fixtures and mounting poles in secure and dry storage facility.

1.05 WARRANTY:

- A. Lamps: Warrant the life of lamps for periods of five years.

PART 2: PRODUCTS**2.01 PRODUCTS AND MATERIALS:**

A. General Requirements for Lighting Fixtures:

1. Interchangeability: Components of same type, size, rating, functional characteristics and make are to be interchangeable.
2. Lamps:
 - a. In accordance with applicable ANSI Standards.
 - b. LED. (Light Emitting Diode):
 - i. Wattage: 255W.
 - ii. Driver Ampere: 70mA.
 - iii. Rated L₇₀: 70,000 hours. (at 25 Celsius degree)
 - iv. Distribution Type: IES Type-V
3. Electrical
 - i. Operable on 240-volt, 50 to 60 Hertz as shown or necessary, type and rating suitable for associated lamp.
 - ii. Equipped with double drivers
 - iii. Capable of starting lamp at ambient temperature range of -20°F to 115° F.
 - iv. Plug disconnects shall be listed by UL for use at 600 VAC, 15A or higher
4. Hardware:
 - a. Latches, catches, release mechanism, hinges, screws, bolts, studs, nuts, rivets, washers and springs. Heavy-duty stainless steel or bronze, as shown.
 - b. Latches and catches: Captive type.
 - c. Operating hardware: Self-retaining type.
5. Construction:
 - a. Fixture body, reflectors, wiring channels, end caps and castings formed to prevent buckling or distortion.

- b. Minimum of two wire clips provided in wiring channel to support wiring.
 - c. Seams and joints continuously welded and ground smooth.
 - d. When aluminum is in contact with dissimilar metal, separate contact surfaces with gasket, non-absorptive tape, or coating to prevent corrosion.
- 6 Finish:
- a. Color to be silver metallic
- 7 Mark each fixture and its components in accordance with applicable reference standard.

2.02 LIGHTING FIXTURES:

- A. Lighting fixture types shall be installed where shown on the drawings. The manufacturer's names and numbers as listed have been pre-approved for use on this project. Fixtures of equal characteristics and quality by other manufacturers will be not considered.

PART 3: EXECUTION

3.01 INSTALLATION:

- A. Install lighting fixtures of types indicated at locations as follows:
- 1. Mount fixtures rigidly in place. Use expansion anchors and machine screws for concrete surfaces and toggle bolts for hollow concrete masonry surfaces.
 - 2. Use stainless steel fasteners. Where a metal contacts concrete or a dissimilar metal, separate contact surfaces with gasket, nonabsorptive tape or bituminous coating to prevent corrosion.
 - 3. Mount fixtures plumb, level and in straight lines.
 - 4. Clean lamps, diffusers, globes, reflectors and exposed-to-view surfaces of fixtures after aiming and adjusting has been approved.
 - 5. Form concrete bases as shown. Use Finish Number 2 for exposed surfaces. Use templates for setting anchor bolts.

6. Install parking lot poles of type shown at locations shown. Use double nuts to erect poles plumb. Pack void between concrete base and pole with grout.
 7. Install conductors to parking lot poles leaving three-foot minimum lengths of conductors for fixture connections; tape or otherwise secure in place pending final connection.
 8. Install parking lot lighting fixtures in accordance with approved shop drawings.
 9. Connect wiring using connectors per Section 16122.
 10. Adjust aiming angle of the floodlight to provide approved lighting level.
- B. Install photoelectric controls and time switches as shown or in accordance with manufacturer's instructions.
- C. Ground lighting fixtures, mounting poles, time switches, photoelectric controls and lighting contractor enclosures in accordance with NEC and Section 16060.

3.02 FIELD QUALITY CONTROL:

- A. Ensure that earth foundation for mounting poles is prepared and compacted in accordance with Section 02200.
- B. Testing:
1. Furnish necessary personnel and equipment and perform tests and adjustments in the presence of the Engineer. Schedule adjustment of exterior installations to occur during hours of darkness.
 2. Test lighting circuit for continuity and operation.
 3. Test fixtures, mounting poles and equipment enclosures for continuity of grounding system.
 4. Aim and adjust fixtures to provide distribution pattern approximately as shown and as approved.
 5. Test time switches, control devices and contactor for connection in accordance with wiring diagram.
 6. Check tightness of cable connections of time switches, lighting contactors, and photoelectric controls and limit switches.
 7. Test operations of circuits, control devices and contactors.

PART 4: MEASUREMENT AND PAYMENT

4.01 70mA 255W LED LUMINAIRE:

- A. 70mA 255W LED Luminaire will be measured per each for payment.

- B. 70mA 255W LED Luminaire will be paid for at the Contract unit price bid per each and include materials, equipment, tools, labor and all work incidental to complete the item specified.

END OF SECTION

SECTION 16525**LIGHTING POLES AND STANDARDS****PART 1: GENERAL****1.01 DESCRIPTION:**

- A. This section specifies lighting poles and standards including, temporary wood poles, and art installation mounting brackets.
- B. Related Work Specified Elsewhere:
 - 1. Electrical Hand Holes, Manholes, Pull and Junction Boxes: Section 16124.
 - 2. Grounding : Section 16060
 - 3. Exterior Luminaires: Section 16520

1.02 SUMMARY:

- A. This Section includes the following poles for support of luminaries:
 - 1. Gardco – Type 6” Square Steel or approved equal.

1.03 DEFINITIONS

- A. Luminaire: Complete lighting fixture, including ballast housing if provided.
- B. Pole: Luminaire support structure, including foundation, standard, base cover, pole top and brackets.
- C. Standard: Same definition as “Pole” above.

1.04 PERFORMANCE REQUIREMENTS:

- A. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied as stated in AASHTO LTS-4.
- B. Wind Load: Pressure of wind on standard and luminaire, calculated and applied as stated in AASHTO LTS-4.

1.05 SUBMITTALS:

- A. Product Data: For each type of pole indicated, arrange in order of lighting unit designation. Include data on accessories, finishes, and the following:
- B. Materials and dimensions of poles.
- C. Means of attaching luminaries and indication that attachment is suitable for it.
- D. Bases.
- E. Shop Drawings:
 - 1. Include anchor-bolt templates keyed to specific poles and certified by manufactures.
 - 2. Include hole location template for holes for art installation mounting brackets. Engineer approved hole location template shall be provided to the pole manufacturer prior to placing order for light poles.

3. All shop drawings shall be developed by a Professional Engineer licensed in the State of Maryland.
- F. Design calculations, certified by a qualified professional engineer, indicating strength of screw foundation.
- G. Product Certificates: Signed by manufacturer of poles, certifying that products are designed for load requirements in AASHTO LTS-4 and that load imposed by luminaire has been included in design.
- H. Design calculations, certified by a qualified professional engineer, indicating strength of screw foundation.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Package steel poles for shipping according to ASTM A700.
- B. Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
- C. Retain factory-applied pole wrappings on metal poles until just before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.07 WARRANTY:

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace lighting poles and standards that fail in finish, materials, and workmanship within specified warranty period.
 1. Protection of Metal from Corrosion: Warranty against perforation or erosion of finish due to weathering.
 2. Color Retention: Warranty against fading, staining, and chalking due to effects of weather and solar radiation.
 3. Warranty Period: Manufacturer's standard, but not less than three years from date of Substantial Completion.

Part 2 : PRODUCTS

2.01 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Gardco or approved equal.

2.02 POLES, GENERAL:

- A. Description: Comply with AASHTO LTS-4 in structural design of poles.
- B. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in "Performance Requirements" Article, with a gust factor of 1.3.

- C. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- D. Luminaire Attachment: Structural supports to comply with luminaire mounting requirements.
- E. Finish: Match finish of pole and support structure on arm, bracket, and tenon mount materials.
- F. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
 - 1. Materials: Shall not cause galvanic action at contact points.
 - 2. Mountings: Correctly position luminaire attachment to provide indicated light distribution.
 - 3. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless stainless-steel items are indicated.
 - 4. Anchor-Bolt Template: Steel.
 - 5. Concrete Bases: Cast-in-place concrete. Concrete, reinforcement, and formwork are specified in Section 033000.

2.03 STEEL POLES:

- A. Poles: Seamless, extruded, 7 gauge, structural steel tube with access handhole in pole wall.
- B. Shape – 6” square, straight.
- C. Height – 30’-0”.
- D. Poles-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.
- E. Grounding and Bonding lugs: Welded 1/2 –inch threaded lug, complying with requirements in Section 16060 Section “Grounding” listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.
- F. Brackets for Luminaires:
 - 1. Type CRC mounting arm with a seamless 1” x 2” rectangular extruded aluminum tube and cast decorative scroll welded to a cast aluminum plate.
 - 2. Mounting arm shall be equipped with a 4” round by 4” high tenon for luminaire mounting.

3. The CRC plate shall be mechanically fastened using stainless steel hardware to a central pole adapter slip fitting 9" over a 4" O.D. pole
- G. Prime-Coat Finish: Manufacturer's standard prime-coat finish.
- H. Steel Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 1. Color: Silver Metallic
- I. Holes for art installation brackets shall be drilled in the factory by the light pole manufacturer according to the engineer approved shop drawings for the hole locations. No field drilling will be allowed. Holes shall only be drilled for the pole locations shown on the Contract Plans. Poles that shall not have art installed on them shall have the predrilled holes plugged with rubber hole plugs designated by the light pole manufacturer.

2.04 ART INSTALLATION MOUNTING BRACKET:

- A. The art installation mounting brackets shall be Wagner Glass Clamp, in satin stainless steel, or approved equal.
- B. Mounting brackets shall only be placed on the light poles designated in the Contract Plans.
- C. Mounting bracket shall be obtained from a bracket manufacturer who specializes in the fabrication of glass mounting clamps.
- D. Mounting brackets shall be ordered with the optional security pin. This security pin will be placed through predrilled holes in the glass art installation for added support.
- E. The mounting brackets shall be able to accept a 12mm thick piece of glass.
- F. Hardware (screws, bolts) used to attach the mounting brackets to the light poles shall be heavy-duty, stainless steel and shall be provided by the Contractor.
- G. Mounting brackets shall be attached to the light poles by the Contractor after the poles have been delivered to the job site and prior to the erection of the light pole. Contractor shall not erect light poles until the glass fin manufacturer has taken adequate measurements and confirmed the proper alignment of the mounting brackets.

PART 3 : EXECUTION

3.01 ERECTION, GENERAL:

- A. Set reinforcement for anchor bolts, nuts, and washers according to anchor-bolt templates furnished by pole manufacture.
 - 1. Concrete Finish: Trowel and rub smooth.
- B. Install poles as follows:
 - 1. Use web fabric slings (not chain or cable) to raise and set poles.
 - 2. Mount pole to foundation with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
 - 3. Secure poles level, plumb, and square.
 - 4. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 - 5. Use a short piece of ½ inch diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.
- C. Contractor shall install art installation mounting brackets on the pole locations designated in the Contract Plans. Contractor shall install mounting brackets after the light poles have been delivered on site. Mounting brackets shall be installed prior to erecting the light poles.

3.02 GROUNDING

- A. Ground metal poles/support structures according to Section 16060 “Grounding”
 - 1. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.
- B. Tighten electrical connectors and terminals according to manufacturer’s published torque-tightening values. If manufacturer’s torque values are not indicated, use those specified in UL 486A and UL 486B.

PART 4 : MEASUREMENT AND PAYMENT

4.01 30’-0” PARKING LOT LIGHT POLE

- A. 30’-0” Parking Lot Light Pole will be measured per each for payment.
- B. 30’-0” Parking Lot Light Pole will be paid for at the Contract unit price bid per each and include materials, equipment, tools, labor and all work incidental to complete the item specified. Art installation mounting brackets and holes drilled into the light poles for the art installation will not be measured, but will be considered incidental to the 30’-0” Parking Lot Light Pole item.

END OF SECTION

SECTION 16573**LIGHTING – CONDUITS, FITTINGS AND BOXES****PART 1: GENERAL****1.01 DESCRIPTION:**

This Work shall consist of furnishing and installing electrical conduit and fittings necessary to provide for future lighting or operation of structures, as specified in the Contract Documents or as directed by the Engineer.

PART 2: PRODUCTS**2.01 MATERIALS:**

- A. Materials for conduits, fittings and boxes and installation of same shall conform to the requirements of the following:
1. Metallic Conduits: National Electrical Code and UL.
 2. PVC Conduits: National Electrical Code and UL.
 3. Junction Boxes: National Electrical Code and UL.

PART 3: EXECUTION**3.01 FITTINGS**

- A. All conduit fittings shall be galvanized steel. Couplings shall be securely tightened to provide a good electrical and mechanical connection throughout the entire length of the conduit run. When a standard coupling cannot be used, a threaded union coupling approved by the Engineer shall be used. Conduits, fittings and boxes shall be stored under cover and above ground.

3.02. BENDS

- A. Unless otherwise specified in the Contract Documents, changes in direction of conduit shall be accomplished by use of manufactured bends or by field bends. Conduit shall be bent without crimping or flattening and shall have a radius of not less than ten (10) times the inside diameter of the conduit.

3.03 CONNECTIONS

- A. Conduit runs shall be made with as few couplings as standard length will permit. Rigid steel conduit connections shall be threaded. Field cut threads of galvanized conduit shall be painted with approved galvanizing repair paint prior to assembly. Nonmetallic conduit shall be connected by a solvent welding process. Fittings for electrical metallic tubing (EMT) conduit shall be watertight cast ferrous compression type.

3.04 CONDUIT TERMINATIONS

- A. Pull boxes or conduit bodies shall be used at conduit terminations. Conduits terminating in cast iron junction boxes shall be threaded into hubs with bonding screws furnished and installed on the interior of the box. Conduits terminating in junction boxes without hubs shall be secured with two (2) lock nuts with an insulated grounding bushing furnished and installed. Conduits terminating at concrete foundations and manholes or hand holes shall be secured as specified in the Contract Documents. All ends of unused conduit shall be capped. Spare conduit stubs from foundations shall extend at least six inches (6") from the face and at least fourteen inches (14") below the top of foundation and shall be capped on each end. The ends of all conduits, whether shop or field cut, shall be reamed to remove burrs and rough edges. Cuts shall be made so that the ends will come together for the full circumference thereof. Slip joints or running threads shall not be used for coupling conduits.

3.05 CLEANING AND CAPPING

- A. Prior to installation of conductors in any run, the conduit shall be checked for cleanliness and all obstructions removed. Each conduit run and all fittings shall be cleaned of all debris by a pull through mandrel type device inserted in the presence of the Engineer. All ends of conduits shall be capped by use of a manufactured cap or plug. Prior to the installation of wiring, manufactured caps or plugs shall be removed and an insulated bonding bushing for galvanized rigid conduit, or bell end fittings for PVC conduit installed. Backfilling shall be completed in two (2) layers with the first layer being placed simultaneously with the drain, holding the drain flush against the side of the pavement. Backfill material shall be compacted using a vibratory shoe compactor.

3.06 PULL ROPE

- A. After installation, all conduits, which will be left empty, shall have a one-quarter inch (*1/4"*) nylon pull rope with a minimum tensile strength of four hundred pounds (400 lbs.) installed. At least two feet (2') of pull rope shall be extended beyond each end of the conduit runs and secured. All conduit ends shall be capped until the pulling of conductors is started. When caps are removed, the ends of metallic type conduit shall be provided with threaded conduit bushings.

3.07 EXPOSED CONDUIT

- A. Exposed conduit runs shall be parallel to, or at right angles to, walls, slabs, girders, etc. Conduit shall be located to minimize accumulation of dirt and to provide accessibility for painting. Conduit shall be attached to steel, concrete, masonry or timber by straps; clamps or hangers of an approved type made of stainless steel or galvanized malleable iron. Spacing of attachments shall not be more than five feet (5') apart or as specified or as directed by the Engineer. When specified, all exposed rigid steel conduit surfaces shall be painted to match the color of adjacent material. All galvanized surfaces shall be prepared before the application of paint approved by the Engineer.

3.08 EXPANSION JOINTS

- A. Where conduits cross expansion joints in the structure, or where otherwise specified, expansion fittings shall be of the type that assures electrical continuity across the joint. Each expansion fitting shall be provided with a NO.8 AWG copper bonding jumper.

3.09 BURIED CONDUIT (TRENCHED)

- A. Conduit shall be placed to a depth of not less than thirty inches (30") nor more than sixty inches (60") below the flowline grade, except that conduit placed behind a curb shall not be less than fourteen inches (14") nor more than thirty-six inches (36") below top of curb and conduit placed under railroad tracks shall not be less than thirty-six inches (36") nor more than sixty inches (60") below bottom of ties. Buried conduit shall slope to drain and shall be placed directly behind the curb. However, when there are obstructions such as foundations, pull boxes, water meter vaults, etc., the conduit may be placed further behind the curb. In no case shall the conduit be placed more than thirty-six inches (36") behind the curb unless otherwise approved by the Engineer. Conduit may be laid on top of the existing pavement within curbed medians being constructed on top of said pavement. Conduit laid in open trenches shall not be covered nor shall any trench or inspection hole be backfilled until the Engineer has approved the installation. Detector, telephone interconnections or street lighting conduit shall be one inch (1") nominal size unless otherwise specified. Direct interconnection, utility service or traffic signal conduits shall be two inch (2") nominal size unless otherwise specified. The Contractor may, at its expense, use conduit of a larger size than that shown or specified, provided the larger size is used for the entire length of the run. Reducing couplings shall not be used. All conduits installed underground shall have a Class "C" Concrete, reference 02750, (Plain and Reinforced Portland Cement Concrete Pavements) envelope providing cover as indicated by the dimensions shown on the standard plates for standard duct sections.

3.10. ENCASED CONDUIT (SLOTTED OR TRENCHED)

- A. Conduit to be encased in concrete shall be accurately placed and rigidly held in position so that line and grade are maintained when concrete is placed.

3.11 CONDUIT INSTALLATION UNDER EXISTING PAVED AREAS (BORED)

- A. Conduit shall be placed under existing pavement by jacking, drilling, or directional boring methods. Pavement shall not be disturbed without permission from the Engineer, except at potholes, to expose utility lines in the street. Jacking or drilling pits shall be kept two feet (2') clear of the edge of any type of pavement wherever possible.. Excessive use of water, such that pavement might be undermined or softened, will not be permitted. In no case shall any water used in the Work, be allowed to enter any storm drain system. Jacking pits adjacent to railroad tracks shall be constructed not less than twelve feet (12') from the centerline of track. When the jacking pit is left overnight, it shall be covered with substantial planking.

3.12. POLYVINYL CHLORIDE (PVC) CONDUIT AND FITTINGS,

- A. Conduit shall be cut with a saw and all ends shall be accurately tapered or otherwise finished depending on type of coupling specified. Tools recommended for this Work by the conduit manufacturer shall be used and finished ends shall be equal to those supplied by the manufacturer. All ends shall be smoothed of burrs and fins. Standard bends shall be used wherever possible and special bends shall preferably have a radius not less than, that of standard bends. All special conduits shall be accurately dimensioned and manufactured. All joints shall be sealed with waterproof joint sealing compound recommended by the conduit manufacturer and approved by the Engineer. All joints thus treated shall be waterproof. An expansion joint shall consist of a break in the conduit run with a space between ends of conduit as indicated on the Plans. A conduit sleeve not less than eighteen inches (18") long, unless otherwise indicated, shall cover the break. The sleeve shall be rigidly anchored to the structure.

PART 4: MEASUREMENT AND PAYMENT**4.01 LIGHTING, CONDUITS, FITTINGS, AND BOXES:**

- A. The payment will be full compensation for all excavation, backfill, conduit encasing concrete, hot mix asphalt, attachments, hangers, paint, bends, connections, fittings, mandrelling, pull ropes and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.
- B. Schedule 40 & 80 Rigid PVC Conduit in trenches – any size shall be measured and paid for per linear foot.
- C. Type X Duct Section 2-5” I.D. trenched and slotted shall be measured and paid for per linear foot.
- D. Conduit not monolithically incorporated into structure Construction shall be paid for at the Contract Unit Price per linear foot.
- E. Conduit monolithically incorporated into structure Construction shall be paid for as a part of lump sum for the appropriate structure item.

END OF SECTION

**WEST BALTIMORE MARC STATION
PARKING EXPANSION**

MTA CONTRACT: T – 1089 - 0240

APPENDIX A:

LIST OF CONTRACT DRAWINGS

APPENDIX A
CONTRACT NO. T-1089-0240

LIST OF CONTRACT DRAWINGS

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**WEST BALTIMORE MARC STATION
PARKING EXPANSION**

MTA CONTRACT: T – 1089 - 0240

APPENDIX E:

PERMITS / WAIVERS



Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

September 12, 2011

Mr. Dan Reagle
Maryland Transit Administration
6 Saint Paul Street
Baltimore, MD 21202

RE: West Baltimore MARC Parking Expansion
FCA File # C09-20.1

Dear Mr. Reagle:

This is to inform you that the amendment to the Forest Conservation Plan for the West Baltimore MARC Parking Expansion project located in Baltimore City, Maryland, has been reviewed. The Forest Conservation Plan has been determined to be complete and is approved.

Please attach a copy of the enclosed approval stamp to the original mylar of the forest conservation plan. A copy of the stamped plan must be available at the construction site prior to any pre-construction inspection. Inspections shall occur before any construction activity begins to determine that the forest protection measures have been installed correctly and forest conservation areas are clearly marked on site.

The Department of Natural Resources considers conservation plan public information under the Ma seeking to exempt documents submitted to the Dep written request to the Department detailing how exemption under Annotated Code of Maryland, St Department will notify the applicant of its dete disclosable under the PIA.

If you have any further questions, please contact me

Sincerely,

Tod Ericson
Urban & Community Forester

Cc: Marian Honeczy, State Forest Conservation

APPROVED
Forest Conservation Plan

R. Tod Ericson
(authorization)

9-12-2011
(date)

State of Maryland
Forest Conservation Program

FCA # C09-20.1
West Baltimore MARC
Station Expansion

RIGHT OF ENTRY PERMIT

This Right of Entry Permit is made this 12th day of DECEMBER, 2010 (the "Effective Date") by and between The Mayor and City Council of Baltimore, a municipal corporation of the State of Maryland, (Grantor) and Maryland Transit Administration, a modal agency of the Maryland Department of Transportation, (Grantee).

Recitals

Grantor is the owner of a certain parcel of land identified as an area bounded by Pulaski Street to the west, Franklin Street to the north, Monroe Street to the east, and Mulberry Street to the south. Grantee desires to enter said parcel of land, as shown thusly on attached plat hereby made a part of this agreement, for the purposes of performing soil sample borings, pavement corings and utility test pits (collectively, the "Test Work") adjacent to the existing MARC West Baltimore Station Park and Ride Lot for a period of thirty (30) months after the Effective Date. Grantee has agreed to same under terms and conditions set forth below.

Witnesseth: Grantor does hereby grant, permit, license and give to Grantee, its employees, agents, and contractors the authorization, right and power to enter upon Grantors' land above described, for the purpose or purposes set forth in the above Recitals and in accordance with the following:

(1) Upon completion of the Test Work, the property will be restored to the condition it was in as of the Effective Date.

(2) This Right of Entry Permit shall terminate upon the earlier to occur of (a) completion of the Test Work, and (b) the date that is thirty (30) months after the Effective Date.

(3) Grantee shall, to the extent permitted by State law, indemnify, defend, and save harmless, Grantor and Grantor's agents and employees from any and all losses and expenses incurred by Grantor and arising out of or being the direct result of the acts, omissions, negligence or misconduct of Grantee, its contractors, employees, and agents in connection with the Test Work.

In Witness Whereof, this Right of Entry Permit is executed on the date and year first above written.

ATTEST:

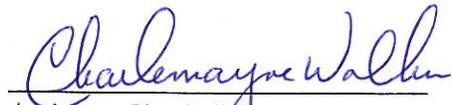


Mayor and City Council
Of Baltimore



BY: _____ (Seal)
Khalil Zaied, Director
Department of Transportation

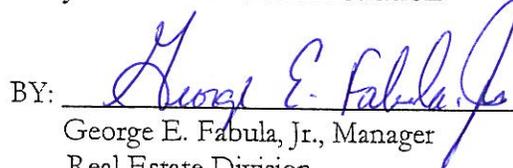
Approved as to form and legal sufficiency
This 3rd day of November, 2010


Assistant City Solicitor

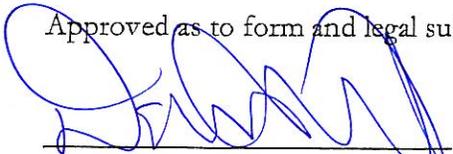
ATTEST:



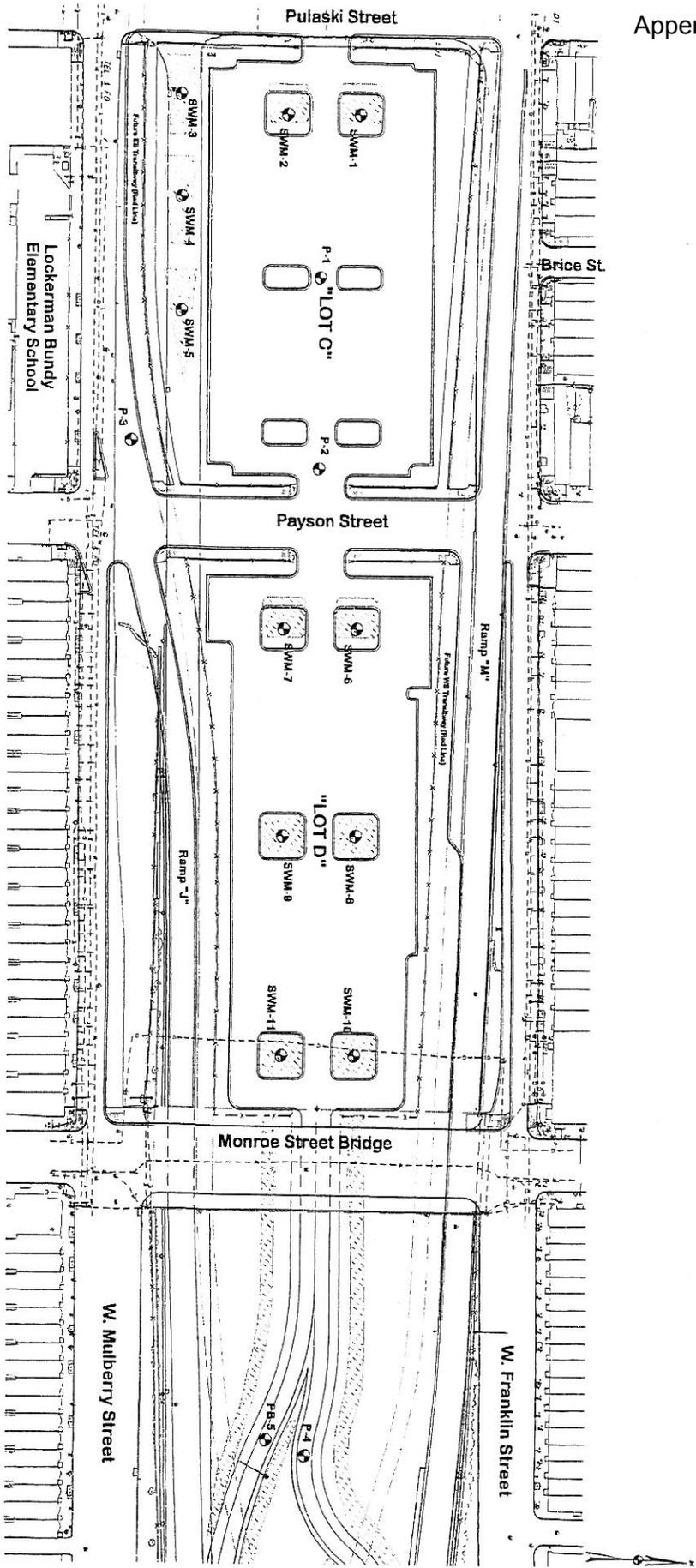
Maryland Transit Administration

BY:  (Seal)
George E. Fabula, Jr., Manager
Real Estate Division

Approved as to form and legal sufficiency.


Assistant Attorney General

12/17/10
Date



Boring ID	Nothing	Existing Elevation	Demo Elevation	Boring Depth
SWM-1	592,622.85	1,411,370.86	152.30	23
SWM-2	592,562.92	1,411,373.74	139.64	22
SWM-3	592,482.43	1,411,363.40	139.32	11
SWM-4	592,486.95	1,411,442.35	141.24	11
SWM-5	592,491.52	1,411,530.53	144.56	11
SWM-6	592,543.52	1,411,790.52	152.48	14
SWM-7	592,543.52	1,411,790.52	152.48	14
SWM-8	592,551.78	1,411,927.22	155.43	12
SWM-9	592,551.86	1,411,930.33	154.23	11
SWM-10	592,560.60	1,412,068.98	154.11	12
SWM-11	592,560.67	1,412,100.10	152.83	11
P-1	592,589.67	1,411,488.67	153.30	24
P-2	592,604.63	1,411,648.14	156.20	15
P-3	592,455.48	1,411,631.15	153.90	14
P-4	592,639.14	1,412,407.48	149.07	14
P-5	592,608.83	1,412,398.88	150.37	11

MARYLAND DEPARTMENT OF TRANSPORTATION
 MARYLAND TRANSIT ADMINISTRATION
MTA
 Maryland

McCormick
 Engineers & Planners
 Since 1916
 Taylor

NO.	DESCRIPTION	REVISIONS	BY	DATE	APPR.	CHECK	DRAM.	DESIGN

PARKING EXPANSION
 WEST BALTIMORE MARC STATION
 BALTIMORE CITY, MARYLAND
 SOIL BORING PLAN

DATE: JULY, 2010
 SCALE: AS SHOWN

CONTRACT NO.
 Pending
 DRAWING NO.
 SHEET NO.
 OF 61

SEDIMENT CONTROL / STORMWATER
MANAGEMENT PLAN APPROVAL IS
CURRENTLY UNDER REVIEW BY THE
MARYLAND DEPARTMENT OF THE
ENVIRONMENT (MDE) WATER
MANAGEMENT PLAN REVIEW DIVISION AND
IS ANTICIPATED TO RECEIVE CONCURRENCE
BEFORE THE END OF THE YEAR (2011)