MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS (DTPW)

ADDENDUM NO. 1
October 16, 2025

PROJECT:	Roadway Improvements to NE 151st Street - Phase 1 Project No. 20240269-R Capital Project
BID DUE DATE:	10-22-2025; 02:00 P.M.
FROM:	Miami-Dade County DTPW Capital Improvements Section 111 NW First Street, 14th Floor Miami, FL 33128 305.375.2930
TO:	Prospective Bidders and Interested Parties

This Addendum forms part of the project solicitation documents and will be incorporated into the Contract Documents, as applicable. Insofar as the Original Contract Documents, Drawings and Specifications are inconsistent, this Addendum shall govern. Please acknowledge receipt of this Addendum, at the time of bid submittal to Miami-Dade County, in the space provided on the "Acknowledgement of Addenda Form" provided with the project solicitation documents. Failure to acknowledge receipt of all addenda may be cause for disqualification.

A. ADVERTISEMENT FOR BIDS – CONTRACT BASE ESTIMATE:

I. Delete Contract Base Estimate of $4,448,339.93 and replace it with $4,433,286.92. Additional pay items have been added, and current Pay Items have been adjusted. Please see attachment.

B. CHANGES TO BID FORM:

I. Delete the bid form dated 09/09/2025 and replace it with the attached bid form dated 10/15/2025 for Addendum No.1. Changes to the Bid Form are as follows: (*See Revised Bid Form, attached below*)

   a. The Following Pay Items have been added:

      - 425-2-63, MANHOLE TYPE 8T (PARTIAL) (TOP ONLY)
      - 522-2(1), CONCRETE SIDEWALK (6" THICK) (INCLUDING PEDESTRIAN RAMP)
      - 526-1-1A, PAVERS, ARCHITECTURAL (ROADWAY)(BRICK)

   b. The Following Pay Items have been modified:

      - 327-70-12, MILLING EXISTING ASPHALT PAVEMENT (1-1/4" AVG. DEPTH) has been changed from 6,653 to 6,479 Square Yards.
      - 337-7-82, ASPHALT CONCRETE FRICTION COURSE, TRAFFIC C, FC-9.5, PG 76-22 has been changed from 469 to 457 Tons.

- 425-1-351, INLETS (CURB) TYPE P-5 (<10') has been changed from 4 to 5 units.
- 425-1-908, SPECIAL STRUCTURE W/WEIR AND BAFFLE (>10') has been changed from 6 to 5 units.
- 425-4(2), INLETS, ADJUST has been changed from 1 to 2 units.
- 430-171-118, 18" PIPE CULVERT (STORM SEWER) has been changed from 166 to 202 Linear Feet.
- 520-2-4A, CONCRETE CURB, TYPE D has been changed from 69 to 42 Linear Feet.
- 700-1-11B, SINGLE POST SIGN, F&I GROUND MOUNT, UP TO 12 SF has been changed from 17 to 15 (AS).
- 710-11-121, PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID, 6" has been changed from 3,791 to 4,401 Linear Feet.
- 710-11-125, PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID FOR STOP LINE OR CROSSWALK, 24" has been changed from 505 to 483 Linear Feet.
- 710-11-141B, PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SKIP, 10-30 OR 3-9 SKIP, 6" WIDE has been changed from 4,040 to 4,032 Linear Feet.
- 710-11-221, PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, SOLID, 6" has been changed from 3,823 to 3,746 Linear Feet.
- 711-11-125, THERMOPLASTIC, STANDARD, WHITE, SOLID, 24" FOR STOP LINE AND CROSSWALK has been changed from 505 to 483 Linear Feet.
- 711-16-101A, THERMOPLASTIC, STANDARD, OTHER SURFACES, WHITE, SOLID, 6" has been changed from 3,791 to 4,401 Linear Feet.
- 711-16-131A, THERMOPLASTIC, STANDARD, OTHER SURFACES, WHITE, SKIP, 10-30 OR 3-9 SKIP, 6" WIDE has been changed from 4,040 to 4,032 Linear Feet.
- 711-16-201A, THERMOPLASTIC, STANDARD, OTHER SURFACES, YELLOW, SOLID, 6" has been changed from 3,823 to 3,746 Linear Feet.

c. The Following Pay Items have been deleted:

- 425-2-92A, MANHOLE TYPE J-8T (ANY DIMENSION, MAXIMUM DEPTH 15')
- WS-1060-11-423A, FURNISH & INSTALL DUCTILE IRON PIPE (4.0-5.9")
- WS-1050-11-427A, FURNISH & INSTALL DUCTILE IRON PIPE (12.0 -13.9")

C. CHANGES TO CONSTRUCTION SPECIFICATIONS:

I. Delete Construction Specifications in its entirely and replace with the attached Construction Specifications for Addendum No. 1. (*See attachment below*)

D. CHANGES / ADDING TO ENGINEERING DRAWING & PLANS:

I. Attached below; the Department has highlighted the "Inline CDS, Standard Details."

II. Attached Revised Plans, dated 10/14/2025, for Addendum No.1 - All changes have been identified in the plans. (*See attachment below*)

E. For informational purposes:

POST-BID PUBLIC MEETING INFORMATION:

A public meeting will be held after the bid opening to provide general project information and updates. Please note that this meeting is strictly informational and will have no bearing on the bidding process, evaluation, or award. Participation in or attendance at this meeting is not required and will not influence bid consideration in any way.

I. Public Meeting: Maintenance of Traffic (MOT) for the NE 151st Street Project
   A. Date: Tuesday, November 4th, 2025.
   B. Time: 1:00 PM-2:00 PM.
   C. Location (*In-person*): Stephen P. Clark Government Center (SPCC), 111 NW 1st Street, Floor#14, Miami, FL 33128, Conference Room (*Rear*)
   D. Invitation to TEAMS:
      Join the meeting now:
      Meeting ID: 253 274 353 399 3
      Passcode: Xs3eq9Pz.
      Dial in by phone:
      +1 786-628-2782,,410779436# United States, Miami
      Find a local number
      Phone conference ID: 410 779 436#

END OF ADDENDUM NO. 1

Marco Movilla

On behalf of Mrs. Tiondra Wright, Chief Division, DTPW

Marco Movilla, Engineer II

Capital Improvements Division

Department of Transportation and Public Works (DTPW)

ADDENDUM NO. 1
October 16, 2025

cc: Tiondra Wright, DTPW
Leandro Ona, P.E., DTPW
Alejandro Sauleda, DTPW
Keidy Guzman, P.E., DTPW
Katherine Fernandez, DTPW
Barbara Mesa Valdes, DTPW
Maylin Torres, SPD
Project File
Laurie Johnson, SPD
Caesar Suarez, SPD
Eric Perez, SPD
Star Sheriff, DTPW
Clerk of the Board

DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

Roadway Improvements to NE 151st Street - Phase 1

RPQ NO. 20240269-R

ADDENDUM NO.1

BID FORM (REVISED)

Revised Bid Form for Addendum No.1

Bid Form

PROJECT TITLE: Roadway Improvements to NE 151 Street - Phase 1 **PROJECT NO:** 20240269-R

IF THIS PROPOSAL IS ACCEPTED, THE UNDERSIGNED AGREES TO COMPLETE ALL WORK UNDER THIS CONTRACT WITHIN THREE HUNDRED FIVE (305) CALENDAR DAYS AFTER THE EFFECTIVE DATE ESTABLISHED IN THE *NOTICE TO PROCEED WITH CONTRACT WORK*.

Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
101-1-A	1.0	L.S.	Mobilization			
102-1A	1.0	L.S.	MAINTENANCE OF TRAFFIC			
102-30-13	1.0	L.S.	TEMPORARY HIGHWAY LIGHTING (Illuminating Roadway)			
102-120-B	1.0	L.S.	TEMPORARY DRAINAGE			
104-10-1	15.0	EA.	BALED HAY			
104-13-1	2,178.0	L.F.	Staked Silt Fence			
104-18	4.0	EA.	Inlet Protection System			
110-1-1-1-1	3.0	AC.	CLEARING AND GRUBBING (Includes removal of existing sidewalk, flexible pavement, curb and gutter, drainage structures, vegetation, trees and any debris to be disposed of in legal areas provided by the contractor			
120-1	536.0	C.Y.	REGULAR EXCAVATION			
120-6	4,147.0	C.Y.	EMBANKMENT (This item is contingent upon field conditions and may be increased, decreased or eliminated by the Engineer)			
160-4B	11,601.0	S.Y.	TYPE "B" STABILIZATION (12" Thick)			
200-1-10	10,365.0	S.Y.	LIMEROCK BASE (8" Thick, Primed)			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
285-709	524.0	S.Y.	BASE OPTIONAL (Base group 9)			
327-70-12	6,479.0	S.Y.	MILLING EXISTING ASPHALT (1 1/4" AVERAGE)			
334-1-13	72.0	TON	SUPERPAVE ASPHALTIC CONCRETE (Traffic C)			
334-2-13-2	1,067.0	TON	Hot Mix Asphalt, Traffic C, SP-12.5			
337-7-82	457.0	TON	ASPHALT CONCRETE FRICTION COURSE,TRAFFIC C, FC-9.5, PG 76-22			
400-0-11	241.0	C.Y.	CONCRETE CLASS NS, GRAVITY WALL.			
425-1-351	5.0	EA.	INLET CURB (TYPE P-5)< 10 '			
425-1-361	2.0	EA.	INLET, CURB (Type P-6)< 10'			
425-1-908	5.0	EA.	SPECIAL STRUCTURE w/weir and baffle (>10')			
425-1-362A	1.0	EA.	INLET (Curb Type P-6) (>10')			
425-1-352 OPT	2.0	EA.	INLET (CURB) (TYPE P-5) >10'			
425-2-63	1.0	EA.	MANHOLES (P-8)(partial)			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
425-4(2)	2.0	EA.	ADJUSTING INLETS			
425-6	4.0	EA.	ADJUST EXISTING VALVE BOXES (MIAMI-DADE COUNTY ONLY) (This item is contingent upon field conditions and may be increased, decreased or eliminated by the Engineer)			
425-73	2.0	EA.	ADJUST AND/OR RELOCATE EXISTING FIRE HYDRANTS (Dade County-owned Only)			
425-82-01	35.0	L.F.	Trench Drain			
430-171-115	19.0	L.F.	Pipe Culvert 15" Diameter (Round)			
430-171-118	202.0	L.F.	Pipe Culvert 18" Diameter (Round)			
430-171-124	331.0	L.F.	Pipe Culvert 24" Diameter (Round)			
430-171-136	284.0	L.F.	Pipe Culvert 36" Diameter (Round)			
430-171-224	43.0	L.F.	Pipe Culvert 24" Diameter (Elliptical/Arch)			
430-171-236	215.0	L.F.	Pipe Culvert 36" Diameter (Elliptical/Arch)			
444-1A	1.0	L.S.	Relocate Continuous Deflective Separation Structure (C.D.S.)			
444-70-11	450.0	L.F.	Deep Well - Open Hole, 24"			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
444-71-11	345.0	L.F.	Deep Well Casing, 24"			
515-1-2A	919.0	L.F.	PIPE HANDRAIL - GUIDERAIL (Aluminum)			
520-1-10	2,816.0	L.F.	CONCRETE CURB & GUTTER (Type F) (6" Curb, 18" Gutter) (Includes cost of limerock base and subgrade)			
520-2-4A	42.0	L.F.	CONCRETE CURB (Type "D")			
520-5-4	157.0	L.F.	CONCRETE TRAFFIC SEPARATOR (TYPE IV) 4' WIDE			
520-3D	78.0	L.F.	VALLEY GUTTER, CONCRETE			
522-1	1,468.0	S.Y.	CONCRETE SIDEWALK (4" Thick restoration and new, Class I Concrete, 3000 P.S.I) (including pedestrian ramps and sidewalk curbs)			
522-2(1)	48.0	S.Y.	CONCRETE SIDEWALK (6" THICK) (Includes driveways)			
522-4E	27.0	S.Y.	Bus Shelter Pad-Concrete			
523-1-3	260.0	S.Y.	PATTERNED PAVEMENT, VEHICULAR AREAS-GREEN BIKE LANE			
526-1-1A	38.0	S.Y.	PAVERS, ARCHITECTURAL (Roadway)			
527-2	100.0	S.F.	DETECTABLE WARNING ON WALKING SURFACE			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
550-60-225	1.0	EA	Fence Gate, Type B, Double, 20.1-24' Opening			
550-60-400	1.0	EA	Fence Gate, Reset Existing Gate			
575-1-1A	1,335.0	S.Y.	SODDING (Pensacola Bahia or match existing) (Includes watering and maintenance). (This item is contingent upon field conditions and may be increased, decreased or eliminated by the Engineer).			
580-322-4	5.0	EA.	TREE REMOVAL AND REPLACEMENT [(Including watering) (12"-24" Diameter)]			
580-322-2A	35.0	EA.	TREE REMOVAL AND DISPOSAL (6" to 12" Dia.)			
580-322-4A	32.0	EA	TREE REMOVAL AND DISPOSAL (12" TO 24")			
580-322-5A	1.0	EA	TREE REMOVAL AND DISPOSAL (24" to 36" Dia.)			
620-1-1	220.0	L.F.	GROUNDING ELECTRODE			
630-2-11	1,831.0	L.F.	CONDUIT, Furnish & Install, Open Trench			
630-2-12	1,392.0	L.F.	CONDUIT, Furnish & Install, Directional Bore			
632-7-6	1.0	P.I.	SIGNAL CABLE, REMOVE- INTERSECTION			
632-7-1C	1.0	P.I.	SIGNALS-CABLE (F & I)			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
635-2-11	36.0	EA.	PULL & SPLICE BOX, Furnish & Install, 13" x 24" COVER SIZE			
639-1-111	1.0	AS.	ELECTRICAL POWER SERVICE, (Furnish & Install, Overhead, Meter Furnished by Power Company			
639-1-610	1.0	AS.	Electrical Power Service, Remove Overhead			
639-2-16	51.0	L.F.	ELECTRICAL SERVICE WIRE			
641-2-12	1.0	EA.	PRESTRESSED CONCRETE POLES (Furnish & Install) (Type P-II Service Pole)			
646-1-11	4.0	EA.	ALUMINUM SIGNALS POLE, (Furnish & Install) (Pedestal)			
646-1-60	2.0	EA	Aluminum Signals Pole, Remove			
649-21-6	1.0	EA.	Steel Mast Arm Assembly, (F&I), Single Arm 50'			
649-21-15	2.0	EA.	Steel Mast Arm Assembly, Furnish & Install, Single Arm 70'			
649-26-3	3.0	EA.	Steel Mast Arm Assembly, Remove, Shallow Foundation-Bolt on Attachment			
650-1-14	8.0	AS.	TRAFFIC SIGNAL, FURNISH & INSTALL, ALUMINUM, 3 SECTION, 1 WAY			
650-1-18	5.0	AS.	TRAFFIC SIGNAL, FURNISH & INSTALL, ALUMINUM, 5 SECTION STRAIGHT, 1 WAY			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
650-1-60	1.0	AS.	TRAFFIC SIGNAL, Remove- Poles to Remain)			
653-1-11	6.0	AS.	PEDESTRIAN SIGNAL, FURNISH & INSTALL, LED COUNTDOWN, 1 WAY			
653-1-12	1.0	AS.	PEDESTRIAN SIGNAL, FURNISH & INSTALL, LED COUNTDOWN, 2 WAYS			
660-4-11	1.0	EA.	Vehicle Detection System- Video, F&I Cabinet Equipment			
660-4-12	7.0	EA.	Vehicle Detection System- Video, F&I Above Ground Equipment			
665-1-11	8.0	EA.	PEDESTRIAN DETECTOR, FURNISH & INSTALL, STANDARD			
670-5-140	1.0	AS.	TRAFFIC CONTROLLER ASSEMBLY (Furnish & Install) (Model 2070)			
670-5-600	1.0	AS.	Traffic Controller Assembly, Remove controller with cabinet			
684-6-11	1.0	EA	Wireless Communication Device, Furnish & Install Ethernet Access Point			
690-100	1.0	P.I.	REMOVE MISCELLANEOUS SIGNAL EQUIPMENT			
700-1-50	4.0	AS.	Single Post Sign, Relocate			
700-1-60	13.0	AS.	SINGLE POST SIGN, REMOVE			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
700-1-11B	15.0	AS.	SINGLE POST SIGN, F&I Ground Mount, Up to 12 SF			
700-1-12C	1.0	AS.	SINGLE POST SIGN, Furnish & Install Ground Mount, 12-20 SF			
700-3-201	3.0	EA.	SIGN PANEL, FURNISH & INSTALL, OVERHEAD MOUNT, UP TO 12 SF			
700-3-601	2.0	EA	SIGN PANEL, REMOVE, UP TO 12 SF			
700-5-22	3.0	EA	Internally Illuminated Sign, Furnish & Install, Overhead Mount, 12-18 SF			
706-3	367.0	EA	REFLECTIVE PAVEMENT MARKER (See plan sheet for details)			
710-11-121	4,401.0	L.F.	PAINTED PAVEMENT MARKINGS (Standard, White, solid, 6")			
710-11-123	1,264.0	L.F.	PAINTED PAVEMENT MARKINGS,STANDARD,WHITE,SOLID, 12"			
710-11-124	84.0	L.F.	PAINTED PAVEMENT MARKINGS (Standard, White, solid, 18")			
710-11-125	483.0	L.F.	PAINTED PAVEMENT MARKINGS (Standard, White, solid, 24")			
710-11-133	79.0	L.F.	Painted Pavement Markings, Standard, White, 3-9 Dotted Drop Line, 12"			
710-11-160	5.0	EA.	PAINTED PAVEMENT MARKINGS (Standard)(White)(Message)			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
710-11-170	20.0	EA	PAINTED PAVEMENT MARKING (Standard) (White) (Arrows)			
710-11-221	3,746.0	L.F.	PAINTED PAVEMENT MARKINGS (Standard, Yellow, solid, 6")			
710-11-224	143.0	L.F.	PAINTED PAVEMENT MARKINGS,STANDARD,YELLOW,SOLID, 18"			
710-11-251	388.0	L.F.	PAINTED PAVEMENT MARKINGS, Standard, Yellow, Dotted/Guideline/6-10 Gap Extension, 6"			
710-11-290	30.0	S.F.	PAINTED PAVEMENT MARKINGS (Standard) (Yellow) (Island Nose)			
710-11-102A	720.0	L.F.	PAINTED PAVEMENT MARKINGS, Standard, White, Solid for Interchange and Urban Island, 8"			
710-11-141B	4,032.0	L.F.	PAINTED PAVEMENT MARKINGS (Standard) (White) (Skip) (6") (10/30)			
710-11-141C	1,521.0	L.F.	PAINTED PAVEMENT MARKINGS (Standard) (White) (2-4 Dotted Guideline / 6-10 Dotted Extension) (6")			
711-11-123	1,264.0	L.F.	THERMOPLASTIC (White) (Solid) (12")			
711-11-124	84.0	L.F.	THERMOPLASTIC (White) (Solid) (18")			
711-11-125	483.0	L.F.	THERMOPLASTIC (White) (Solid) (24")			
711-11-151	1,521.0	L.F.	THERMOPLASTIC (White) (Dotted/Guideline) (6")			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
711-11-160	5.0	EA.	THERMOPLASTIC (White) (Message)			
711-11-170	20.0	EA	THERMOPLASTIC (White) (Arrows)			
711-11-224	143.0	L.F.	THERMOPLASTIC (Yellow) (Solid) (18")			
711-11-251	388.0	L.F.	THERMOPLASTIC (Yellow) (Dotted/Guideline) (6")			
711-14-125	1,331.0	L.F.	THERMOPLASTIC, Preformed, White, Solid, 24" for Crosswalk			
711-14-160	9.0	EA.	Thermoplastic, Preformed, White, Message			
711-14-170	9.0	EA	Thermoplastic, Preformed, White, Arrows			
711-16-103	720.0	L.F.	THERMOPLASTIC, Standard-other Surfaces, White, Solid, 8"			
711-16-101A	4,401.0	L.F.	THERMOPLASTIC, Standard, Other Surfaces, White, Solid, 6"			
711-16-131A	4,032.0	L.F.	THERMOPLASTIC, other Surfaces, White, Skip, 6",10-30 Skip or 3-9			
711-16-133A	79.0	L.F.	THERMOPLASTIC, Standard-other Surfaces, White, Skip, 12", 3-9 Dotted Drop Line			
711-16-201A	3,746.0	L.F.	THERMOPLASTIC, Standard-other Surfaces, Yellow, Solid, 6"			

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Item No	Quantity	Unit	Description	Written Unit Amount	Unit Price	Total
715-1-12	7,885.0	L.F.	LIGHTING - CONDUCTORS (F & I) (No. 8 to No. 6)			
715-1-13	980.0	L.F.	LIGHTING - CONDUCTORS (F&I) (No. 4 to No. 2)			
715-4-70	8.0	EA	LIGHT POLE COMPLETE, Remove Pole and Foundation			
715-4-400	1.0	EA.	LIGHT POLE COMPLETE (Relocate)			
715-4-111A	7.0	EA.	Light Pole Complete, F&I, Wind Speed 150, Pole Height 40'			
715-7-11G	1.0	EA.	Load Center, F&I, Secondary Voltage			
715-500-11	7.0	EA.	Pole Cable Distribution System, MG Square, F&I			
721-75-4	1.0	EA.	Relocate or Reset Bus Stop Bench (any type, includes reattaching to concrete if necessary)			
751-35-42	2.0	EA.	Architectural Bus Shelter, Relocate, 50 to 100 SF			

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Total:_____

The bidder understands and agrees that the above total is inclusive of all work necessary to complete the job as described in the plans and specifications.
Quantities are established and are included only for the purpose of facilitating the uniform comparison of bids submitted. The County shall not be held responsible if the quantities are not accurate and all computations for compensation shall be based upon the actual work performed, whether greater or less than estimated quantities.

Tax Identification Number: _____

D.C. Certificate of competency No: _____

Bidder's Name: _____

Bidder's telephone Number: _____

Bidder's address: _____

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Bid Form

PROJECT TITLE: Roadway Improvements to NE 151 Street - Phase 1 **PROJECT NO:** 20240269-R

IF THIS PROPOSAL IS ACCEPTED, THE UNDERSIGNED AGREES TO COMPLETE ALL WORK UNDER THIS CONTRACT WITHIN THREE HUNDRED FIVE (305) CALENDAR DAYS AFTER THE EFFECTIVE DATE ESTABLISHED IN THE *NOTICE TO PROCEED WITH CONTRACT WORK*.

BIDDER ACKNOWLEDGES THAT INCLUDED IN THE VARIOUS ITEMS OF THE PROPOSAL AND IN THE TOTAL BID PRICE ARE COSTS FOR COMPLYING WITH THE FLORIDA TRENCH SAFETY ACT (90-96), LAWS OF FLA. EFFECTIVE OCTOBER 1st, 1990. THE BIDDER FURTHER IDENTIFIES THE COSTS TO BE SUMMARIZED BELOW:

	Trench Safety Measure (Description)	Units of Measure (LF, SY)	Unit (Quantity)	Unit Cost	Extended Cost
A.					
B.					
C.					
D.					

FAILURE TO COMPLETE THE ABOVE MAY RESULT IN THE BID BEING DECLARED NON-RESPONSIVE

DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

Roadway Improvements to NE 151st Street - Phase 1

RPQ NO. 20240269-R

ADDENDUM NO.1

CONSTRUCTION SPECIFICATIONS

(REVISED)

SPECIFICATIONS

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DIVISION 100 GENERAL CONSTRUCTION OPERATIONS

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101-1-A	Mobilization	Lump sum

101 MOBILIZATION (REV. 03-12-2013)

A. Description.

1. Perform preparatory work and operations in mobilizing for beginning work on the Project, including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site(s) and for the establishment of temporary offices, buildings, safety equipment and first aid supplies, and sanitary and other facilities.
2. Include the costs of bonds and any required insurance and any other preconstruction expense necessary for the start of the work, excluding the cost of construction materials.

B. Basis of Payment.

1. When No Separate Item for Mobilization is Included in the Contract:
   a. All work and incidental costs specified as being covered under this Article will be included for payment under the several scheduled items of the overall Contract, and no separate payment will be made, therefore.
2. When a Separate Pay Item for Mobilization is Included in the Contract:
   a. The work and incidental costs specified as being covered under this Article will be paid for at the Contract lump sum price for the Mobilization pay item, after an executed Notice to Proceed has been issued, by partial payments made in accordance with the following:
      1) For contracts of 120 contract days duration or less, partial payment will be made at 50% of the bid price per month for the first two months. For contracts in excess of 120 contract days duration, partial payment will be made at 25% of the bid price per month for the first four months. In no event shall more than 50% of the bid price be paid prior to commencing construction on the project site.
      2) Total partial payments for Mobilization on any project, including when more than one project or job is included in the Contract, will be limited to 10% of the original Contract amount for that project. Any remaining amount will be paid upon completion of all work on the Contract.
      3) Retainage, as specified in the Contract Documents, will be applied to all partial payments.
      4) Partial payments made on this Sub article will in no way act to preclude or limit any of the provisions for partial payments otherwise provided for by the Contract.
3. Basis of Payment:
   a. Payment will be made under:

102 MAINTENANCE OF TRAFFIC (REV. 12-15-2015)

A. Description.

1. General:
   a. Maintain, for the duration of the construction period including any temporary suspensions of the Work, all traffic including pedestrian traffic within the limits of the Project starting the day work begins on the Project or the first day Contract time is charged, or on the day work begins on the work order, whichever is earlier .
   b. Construct and maintain detours.
   c. Provide facilities for access to residences, businesses, etc., along the Project.
   d. Furnish, install and maintain traffic control and safety devices during construction in accordance with FDOT Index 600 Series of the FDOT Design Standards, or as directed by Engineer. MOT includes all facilities, devices and operations as required for safety and convenience of the public within the work zone. Provide pickup, removal and disposal of litter and mow turf or vegetation within the MOT limits as required by Article 107.
   e. Furnish and install work zone pavement markings for maintenance of traffic (MOT) in construction areas.
   f. Provide any other special requirements for safe and expeditious movement of traffic specified in the Plans or directed by Engineer.
2. Unless otherwise directed by Engineer or required by the Contract Documents, do not maintain traffic over those portions of the Project where no work is to be accomplished or where construction operations will not affect existing roads including sidewalks.
3. Do not obstruct or create a hazard to any traffic during the performance of the Work, and repair any damage to existing pavement open to traffic.
4. Traffic may be detoured only upon approval by the County Engineer. Contractor must submit for review and approval an updated MOT plan prior to closure of any roads.
5. The Department may temporarily suspend all activities, except traffic, erosion control and such other activities that are necessary for project maintenance and safety, for failure to comply with these provisions.
6. Due to traffic congestion, work hours other than normal established hours may be required by the Engineer. In the case of extreme traffic or weather conditions, Contractor may be required to remove their operation from the roadway and/or right of way, at the discretion of the Engineer or the Traffic Control Officer at no additional compensation.

B. Materials.

1. Meet the following requirements:

Bituminous Adhesive	FDOT Section 970
Temporary Retroreflective Pavement Markers	FDOT Section 990
Paint	FDOT Section 971
Removable Tape	FDOT Section 990
Glass Spheres	FDOT Section 971
Temporary Traffic Control Device Materials	FDOT Section 990
Retroreflective and Nonreflective Sheeting for Temporary Traffic Control Devices	FDOT Section 994

2. Temporary Traffic Control Devices: Use only the materials meeting the requirements of FDOT Section 990, FDOT Section 994, FDOT Design Standards and the Manual on Uniform Traffic Control Devices (MUTCD).
3. Detour: Provide all materials for the construction and maintenance of all detours.
4. Commercial Materials for Driveway Maintenance: Provide materials of the type typically used by FDOT for roadway base construction, including reclaimed asphalt pavement material, and having stability and drainage properties that will provide a firm surface under wet conditions.

C. Worksite Traffic Supervisor.

1. Provide a worksite traffic supervisor meeting the requirements of Article 105. Provide the worksite traffic supervisor with all equipment and materials needed to set up, take down, maintain traffic control, and handle traffic-related situations.
2. Ensure that the worksite traffic supervisor performs the following duties:
   a. On site direction of all traffic control on the Project.
   b. Is on site during all MOT set up and take down, and performs a drive through inspection immediately after set up.
   c. Is on site during all nighttime operations to ensure proper MOT.
   d. Immediately corrects all safety deficiencies and does not permit minor deficiencies that are not immediate safety hazards to remain uncorrected for more than 24 hours.
   e. Is available on a 24 hour per day basis and present within 45 minutes after notification of an emergency situation and is prepared to positively respond to repair the work zone traffic control or to provide alternate traffic arrangements.
   f. Conducts daily daytime and weekly nighttime inspections of projects with predominately daytime work activities, and daily nighttime and weekly daytime inspections of projects with predominantly nighttime work activities of all traffic control devices, traffic flow, pedestrian, bicyclist, and business accommodations. Advise Engineer and the Project personnel of the schedule of these inspections and give them the opportunity to join in the inspection as is deemed necessary.
3. The Department may disqualify and remove from the Project a worksite traffic supervisor who fails to comply with the provisions of this Article.

D. Submittals

1. Traffic Control Plan
   a. Submit at Contractor's own expense a Traffic Control Plan (TCP) for approval by the County. Sequence the Work in a manner that will minimize disruption of vehicular and pedestrian access through and around the Project's construction area(s).
   b. The TCP must detail procedures and protective measures proposed by Contractor to provide for protection and control of traffic affected by the Work consistent with the following applicable standards:
      1) The Contract Documents;
      2) "Manual on Uniform Traffic Control Devices for Streets and Highways" (MUTCD) and subsequent revisions and addendums, as published by the U.S. Department of Transportation, Federal Highway Administration;
      3) The 600 Series indices of the FDOT Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System; and
      4) The Miami-Dade County Public Works Manual.
   c. All references to the respective agencies in the above referenced standards shall be construed to also include more stringent requirements of the jurisdictional municipality as applicable for this Work.
   d. The TCP must be signed and sealed by a Professional Engineer registered in the state of Florida and shall include proposed locations and time durations of the following, as applicable:
      1) Pedestrian and public vehicular traffic routing.
      2) Lane and sidewalk closures, other traffic blockage and lane restrictions and reductions anticipated to be caused by construction operations. Show and describe the proposed location, dates, hours and duration of closure, vehicular and pedestrian traffic routing and management, traffic control devices for implementing pedestrian and vehicular movement around the closures, and details of barricades.
      3) Location, type and method of shoring to provide lateral support to the side of an excavation or embankment parallel to an open travel-way.
      4) Allowable on-street parking within the immediate vicinity of worksite.
      5) Access to buildings immediately adjacent to worksite.
      6) Driveways blocked by construction operations.
      7) Temporary traffic control devices, temporary pavement striping and marking of streets and sidewalks affected by construction
      8) Temporary commercial and industrial loading and unloading zones.

9) Construction vehicle reroutes, travel times, staging locations, and number and size of vehicles involved.

e. Obtain and submit prior to erection, or otherwise impacting traffic, all required permits from all authorities having jurisdiction, including the Department, if applicable.

2. Alternative Traffic Control Plan.

a. Where a TCP is provided by the County with the Contract Documents, Contractor may still propose an alternative TCP to the plan presented in the Contract Documents. Prepare the TCP in conformance with the requirements stipulated in this Specification and in the form outlined in the current version of FDOT's Plans Preparation Manual. Indicate in the plan a TCP for each phase of activities. Have Contractor's Engineer of Record sign and seal the alternative plan. Take responsibility for identifying and assessing any potential impacts to a utility that may be caused by the alternate TCP proposed by Contractor, and notify the Department in writing of any such potential impacts to utilities.

b. Engineer's approval of the alternate TCP does not relieve Contractor of sole responsibility for all utility impacts, costs, delays or damages, whether direct or indirect, resulting from Contractor initiated changes in the design or construction activities from those in the original Contract Specifications, Design Plans (including TCPs) or other Contract Documents and which effect a change in utility work different from that shown in the Utility Plans, joint project agreements or utility relocation schedules.

c. The Department reserves the right to reject any alternative TCP. Obtain Engineer's written approval before beginning work using an alternate TCP. Engineer's written approval is required for all modifications to the TCP. Engineer will only allow changes to the TCP in an emergency without the proper documentation.

3. Comprehensive Weekly Report:

a. Submit to Engineer a comprehensive weekly report of the daily inspections performed and detailing the condition of all traffic control devices (including pavement markings) being used.

b. Include assurances in the report that pedestrians are accommodated with a safe, accessible travel path around work sites separated from mainline traffic in compliance with the Americans with Disabilities Act (ADA) Standards for Transportation Facilities, that existing or detoured bicyclist paths are being maintained satisfactorily throughout the Project limits, and that existing businesses in work areas are being provided with adequate entrances for vehicular and pedestrian traffic during business hours.

c. When deficiencies are found, the worksite traffic supervisor is to note such deficiencies and include the proposed or implemented corrective actions, including the date corrected.

d. Have the worksite traffic supervisor sign the report and certify that all of the above issues are being handled in accordance with the Contract Documents.

E. Traffic Control.

1. Standards: FDOT Design Standards are the minimum standards for the use in the development of all TCPs. The MUTCD, Part VI is the minimum national standard for traffic control for highway construction, maintenance, and utility operations. Follow the basic principles and minimum standards contained in these documents for the design, application, installation, maintenance, and removal of all traffic control devices, warning devices and barriers which are necessary to protect the public and workers from hazards within the Project limits.

2. Maintenance of Roadway Surfaces:

a. Maintain all lanes that are being used for the MOT, including those on detours and temporary facilities, under all weather conditions. Keep the lanes reasonably free of dust, potholes and rutting. Provide the lanes with the drainage facilities necessary to maintain a smooth riding surface under all weather conditions.

3. Number of Traffic Lanes:

a. Maintain one lane of traffic in each direction.

b. Maintain two lanes of traffic in each direction at existing four (or more) lane cross roads, where necessary to avoid undue traffic congestion.

c. Construct each lane used for MOT at least as wide as the traffic lanes existing in the area before commencement of construction.

d. Do not allow traffic control and warning devices to encroach on lanes used for MOT.

e. Engineer may allow Contractor to restrict traffic to one-way operation for short periods of time provided that Contractor employs adequate means of traffic control and does not unreasonably delay traffic. When a construction activity requires restricting traffic to one-way operations, locate the flaggers within view of each other when possible. When visual contact between flaggers is not possible, equip them with 2-way radios, official, or pilot vehicles, or use traffic signals.

4. Crossings and Intersections:

a. Provide and maintain adequate accommodations for intersecting and crossing traffic. Do not block or unduly restrict any road or street crossing the Project unless approved by Engineer. Before beginning any construction, provide Engineer the names and phone numbers of persons that can be contacted when signal operation malfunctions.

5. Access for Residences and Businesses: Provide continuous access to all residences and all places of business.

6. Protection of the Work from Injury by Traffic: Where traffic would be injurious to a base, surface course, or structure constructed as a part of the work, maintain all traffic outside the limits of such areas until the potential for injury no longer exists.

7. Flagger: Provide trained flaggers in accordance with Article 105.

8. Conflicting Pavement Markings:

a. Where the lane use or where normal vehicle or pedestrian paths are altered during construction, remove all pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) that will conflict with the adjusted vehicle or pedestrian paths. Use of paint to cover conflicting pavement markings is prohibited. Remove conflicting pavement markings using a method that will not damage the surface texture of the pavement and which will eliminate the previous marking pattern regardless of weather and light conditions.

b. Remove all pavement markings that will be in conflict with "next phase of operation" vehicle pedestrian paths as described above, before opening to vehicle traffic or use by pedestrians.

c. Cost for removing conflicting pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) to be included in the Project costs for Maintenance of Traffic (General).

9. Vehicle and Equipment Visibility:

a. Equip all pickups and automobiles used on the Project with a minimum of one Class 2 amber or white warning light that meets the Society of Automotive Engineers Recommended Practice SAE J595, dated November 1, 2008, or SAE J845, dated December 1, 2007, and incorporated herein by reference. Existing lights that meet SAE J845, dated March, 1992, or SAE J1318, dated April, 1986, may be used to its end of service life. Warning lights shall be a high intensity amber or white rotating, flashing, oscillating or strobe light. Lights should be unobstructed by ancillary vehicle equipment such as ladders, racks or booms. If the light is obstructed, additional lights will be required. The lights shall be operating when a vehicle is in a work area where a potential hazard exists, when operating the vehicle at less than the average speed for the facility while performing work activities, making frequent stops or called for in the Plans or FDOT Design Standards.

b. Equip all other vehicles and equipment with a minimum of 4 square feet of retroreflective sheeting or flashing lights.

c. To avoid distraction to motorists, do not operate the lights on the vehicles or equipment when the vehicles are outside the clear zone or behind a barrier.

10. No Waiver of Liability: Conduct operations in such a manner that no undue hazard results due to the requirements of this Article. The procedures and policies described herein in no way acts as a waiver of any terms of the liability of Contractor or his surety.

F. Detours.

1. General: Construct and maintain detour facilities wherever it becomes necessary to divert traffic from any existing roadway or bridge, or wherever construction operations block the flow of traffic.

2. Construction: Plan, construct, and maintain detours for the safe passage of traffic in all conditions of weather. Provide the detour with all facilities necessary to meet this requirement. Where pedestrian facilities are detoured, blocked or closed during the work, provide safe alternate accessible routes through or around the work zone meeting the requirements of the ADA Standards for Transportation Facilities.

3. Construction Methods: Select and use construction methods and materials that provide a stable and safe detour facility. Construct the detour facility to have sufficient durability to remain in good condition, supplemented by maintenance, for the entire period that the detour is required.

4. Removal of Detours: Remove detours when they are no longer needed and before the Contract is completed. Take ownership of all materials from the detour and dispose of them, except for the materials on loan from the Department with the stipulation that they are returned.

5. Detours Over Existing Roads and Streets: When the Department specifies that traffic be detoured over roads or streets outside the Project area, do not maintain such roads or streets. However, maintain all signs and other devices placed for the purpose of the detour.

6. Operation of Existing Movable Bridges:

a. At the pre-construction meeting, the Engineer and the Contractor will select a date for the County to turn over the bridge maintenance and operations responsibilities. In the event that this date is not discussed, the Contractor will take full responsibility at the NTP date.

b. In addition to bridge maintenance responsibilities during the duration of the project, Contractor is responsible for having qualified and sufficient number of bridge operators to be able to operate the bridge in accordance USCG regulations – specifically, Title 33-Navigation and Navigable Waters, Chapter I - U.S. Coast Guard, Department of Homeland Security, Subchapter J-Bridges, Part 117--Drawbridge Operation Regulations, Subpart B--Specific Requirements § 117.5.

c. County's bridge operators are scheduled as follows:

1st Shift: 12am to 8am

2nd Shift: 8am to 4pm

3rd Shift: 4pm to 12am

d. This allows the bridge to be operational on a 7 days/week, 365 days per year basis.

e. When removing bridges: Once the bridge is removed Contractor is relieved of this responsibility; however, upon completion of the construction of the new bridge and until the new bridge is officially returned to the County, the contractor is obligated to operate the bridge in accordance with the established USCG regulation.

f. Make immediate repairs of any damage to such structures caused by use or operations related to the work at no expense to the County, but do not provide routine repairs or maintenance. In the event that use or operations result in damage to a bridge requiring repairs, give such repairs top priority to any equipment, material, or labor available.

G. Traffic Control Officer.

1. Provide uniformed law enforcement officers, including marked law enforcement vehicles, to assist in controlling

and directing traffic in the work zone as required by Engineer and when the following types of work is necessary on projects:

a. Directing traffic/overriding the signal in a signalized intersection.
b. When FDOT Design Standards, Index No. 655 Traffic Pacing for overhead work is called for in the Plans or approved by Engineer.
c. When pulling conductor/cable above an open traffic lane on limited access facilities, when called for in the Plans or approved by Engineer.
d. When FDOT Design Standards, Index No. 625 Temporary Road Closure 5 Minutes or Less is used.

H. Driveway Maintenance.

1. General: Ensure that each residence and business has safe, stable, and reasonable access.
2. Construction Methods:
   a. Place, level, manipulate, compact, and maintain the material, to the extent appropriate for the intended use.
   b. As permanent driveway construction is accomplished at a particular location, Contractor may salvage and reuse previously placed materials that are suitable for reuse on other driveways.

I. Temporary Traffic Control Devices.

1. Installation and Maintenance:
   a. Install and maintain temporary traffic control devices as detailed in the Plans, Index 600 of the FDOT Design Standards and when applicable, in accordance with the approved vendor drawings, as provided on FDOT's Approved Products List (APL) and the TSSQPL. Erect the required temporary traffic control devices to prevent any hazardous conditions and in conjunction with any necessary traffic re-routing to protect the traveling public, workers, and to safeguard the work area. Use only those devices that are on the FDOT APL and the TSSQPL. Immediately remove or cover any devices that do not apply to existing conditions.
   b. All temporary traffic control devices must meet the requirements of National Cooperative Highway Research Program Report 350 (NCHRP 350) or the Manual for Assessing Safety Hardware 2009 (MASH) and current FHWA directives.
   c. For devices requiring field assembly or special site preparation, vendor drawings shall include all field assembly details and technical information necessary for proper application and installation and must be signed and sealed by a Professional Engineer registered in the State of Florida.
   d. Ensure that the FDOT APL number is permanently marked on the device at a readily visible location. Sheeting used on devices is exempt from this marking requirement.
   e. Notify Engineer of any scheduled operation which will affect traffic patterns or safety sufficiently in advance of commencing such operation to permit his review of the plan for the proposed installation of temporary traffic control devices.
   f. Ensure an employee is assigned the responsibility of maintaining the position and condition of all temporary traffic control devices throughout the duration of the Contract. Keep Engineer advised at all times of the identification and means of contacting this employee on a 24 hour basis.
   g. Keep temporary traffic control devices in the correct position, properly directed, clearly visible and clean, at all times. Ensure that all traffic control devices meet acceptable standards as outlined in American Traffic Safety Services Association (ATSSA) "Quality Guidelines for Temporary Traffic Control Devices and Features". Immediately repair, replace or clean damaged, defaced or dirty devices. Traffic control devices shall not be cleaned while installed/used. Use of warning lights on any temporary traffic control device is prohibited.
2. Work Zone Signs:
   a. Furnish, install, maintain, remove and relocate signs in accordance with the Plans and FDOT Design Standards, Index No. 600. Use signs that meet the material and process requirements of FDOT Section 994. Use Type IV sheeting for fluorescent orange work zone signs. Roll-up signs must meet the requirements of Type VI sheeting. Use Type IV or Type XI sheeting for all other work zone signs. Attach the sign to the sign support using hardware meeting the manufacturer's recommendations on the FDOT APL vendor drawings or as specified in the FDOT Design Standards.
      1) Post Mounted Signs:
         a) Meet the requirements of FDOT Section 990-8.
      2) Portable Signs:
         a) Use only approved systems, which includes sign stands and attachment hardware (nuts, bolts, clamps, brackets, braces, etc.), meeting the vendor requirements specified on the FDOT APL drawings.
         b) Provide Federal Highway Administration's (FHWA) accepted sign substrate for use with accepted sign stands on the National Highway System (NHS) under the provisions of the NCHRP Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."
      3) Barrier Mounted Signs:
         a) When post mounting criteria cannot be achieved in accordance with FDOT Design Standards, Index No. 600 and a barrier or traffic railing exists, use temporary sign criteria provided in FDOT Design Standards, Index No. 11871.
3. Business Signs:
   a. Provide and place signs in accordance with the Plans and FDOT Design Standards, Index No. 600 series. Furnish signs having retroreflective sheeting meeting the requirements of FDOT Section 990.
4. High Intensity Flashing Lights:

a. Furnish Type B lights in accordance with the Plans and FDOT Design Standards.

5. Warning/Channelizing Devices:

a. Furnish warning/channelizing devices in accordance with the Plans and FDOT Design Standards.

b. Retroreflective Collars for Traffic Cones:

1) Use collars for traffic cones listed on the FDOT APL that meets the requirements of FDOT Section 990. Use cone collars at night designed to properly fit the taper of the cone when installed. Place the upper 6 inch collar a uniform 3-1/2 inches distance from the top of the cone and the lower 4 inch collar a uniform 2 inches distance below the bottom of the upper 6 inch collar. Ensure that the collars are capable of being removed for temporary use or attached permanently to the cone in accordance with the manufacturer's recommendations. Provide a white sheeting having a smooth outer surface and that has the property of a retroreflector over its entire surface.

c. Barrier Wall (Temporary):

1) Furnish, install, maintain, remove and relocate a temporary barrier wall in accordance with the Plans. Ensure that temporary concrete barrier wall for use on roadway sections, complies with FDOT Design Standards, Index Nos. 412, 415 or 414 as specified in the Plans. Ensure that temporary concrete barrier wall for use on bridge and wall sections, complies with FDOT Design Standards, Index No 414 as specified in the Plans.

2) Ensure that temporary water filled barrier wall used on roadway sections meets the NCHRP Report 350 criteria or the MASH and is listed on the FDOT APL. Barriers meeting the requirements of FDOT Design Standards, Index Nos. 412, 415 or temporary water filled barriers on the FDOT APL will not be accepted as an alternate to barriers meeting the requirements of FDOT Design Standards, Index No. 414.

3) Trailer mounted barriers listed on the FDOT APL may be used at the option of the Contractor. Trailer mounted barriers listed on the FDOT APL must have an FHWA eligibility letter and be successfully crash tested in accordance with MASH TL-3 criteria. All trailer mounted barriers must be equipped with an FDOT APL listed truck mounted attenuator, an FDOT APL listed vehicle mounted arrow board and vehicle warning lights in accordance with this Article

4) Temporary Barrier Wall Meeting the Requirements of Design Standards, Index Nos. 412 and 414:

a) Ensure the marking requirements of the respective Index are met.

5) Proprietary Precast Temporary Barrier Wall Fabricated prior to 2005:

a) Contractor must submit a certification stating that all unmarked barrier wall units meet the requirements of the Specifications and the FDOT Design Standards. Certifications will be project specific and non-transferable

6) Proprietary Precast Temporary Barrier Wall Fabricated in 2005 or later:

a) Ensure each wall unit has permanent clear markings, showing the manufacture date, serial number, manufacturer's name or symbol, and the FDOT APL number. Label the markings on a plate, plaque, or cast in the unit. Proprietary barrier wall fabricated prior to 2016 and marked with the "INDX 521" in lieu of the FDOT APL number will be permitted.

7) Glare Screen (Temporary):

a) Use temporary glare screens listed on the FDOT APL that meet the requirements of FDOT Section 990. Furnish, install, maintain, remove and relocate glare screen systems in conjunction with temporary barrier wall at locations identified in the Plans.

b) Ensure the anchorage of the glare screen to the barrier is capable of safely resisting an equivalent tensile load of 600 pounds per foot of glare screen, with a requirement to use a minimum of three fasteners per barrier section.

c) When glare screen is utilized on temporary barrier wall, warning lights will not be required.

8) Longitudinal Channelizing Devices (LCDs):

a) Furnish LCDs in accordance with the Plans and FDOT Design Standards. LCDs are categorized as vehicular or pedestrian and shall be interlocked. For LCDs requiring internal ballasting, an indicator that clearly identifies the proper ballast level will be required.

b) Use alternating orange and white pattern for solid color vehicular LCDs. Vehicular LCDs may be substituted for drums, vertical panels, or barricades.

6. Temporary Crash Cushion (Redirective/Gating):

a. Furnish, install, maintain and subsequently remove temporary crash cushions in accordance with the details and notes shown in the Plans, the FDOT Design Standards, and requirements of the pre-approved alternatives listed on the FDOT APL.

b. Maintain the crash cushions until their authorized removal. Repair all attachment scars to permanent structures and pavements after crash cushion removal. Make necessary repairs due to defective material, work, or Contractor operations at no cost to the Department.

c. Restore crash cushions damaged by the traveling public within 24 hours after notification as authorized by Engineer.

7. Guardrail (Temporary):

a. Furnish guardrail (temporary) in accordance with the Plans and Design Standards. Meet the requirements of Article 536.

8. Arrow Board:

a. Furnish arrow boards that meet the requirements of FDOT Section 990 as required by the Plans and Design

Standards to advise approaching traffic of lane closures or shoulder work.

b. Type B arrow boards may be used on low to intermediate speed (0 mph to 50 mph) facilities or for maintenance or moving operations on any speed facility.

c. Type C arrow boards shall be used for all other operations on high-speed (50 mph and greater) facilities and may be substituted for Type B arrow boards on any speed facility.

9. Portable Changeable Message Sign (PCMS):

a. Furnish PCMSs or truck mounted changeable message signs that meet the requirements of FDOT Section 990 as required by the Plans and FDOT Design Standards to supplement other temporary traffic control devices used in work zones.

10. Portable Regulatory Signs (PRS):

a. Furnish PRSs that meet the requirements of FDOT Section 990 as required by the Plans and FDOT Design Standards.

b. Activate portable regulatory signs only during active work activities and deactivate when no work is being performed.

11. Radar Speed Display Unit (RSDU):

a. Furnish RSDUs that meet the requirements of FDOT Section 990 as required by the Plans and FDOT Design Standards to inform motorists of the posted speed and their actual speed.

b. Activate the radar speed display unit only during active work activities and deactivate when no work is being performed.

12. Temporary Signalization and Maintenance:

a. Provide temporary signalization and maintenance at existing, temporary, and new intersections including but not limited to the following:

1) Installation of temporary poles and span wire assemblies as shown in the Plans,

2) Temporary portable traffic signals as shown in the Plans,

3) Adding or shifting signal heads,

4) Trouble calls,

5) Maintaining intersection and coordination timing and preemption devices.

b. Restore any loss of operation within 12 hours after notification.

c. Provide traffic signal equipment that meets the requirements of Article 603 of FDOT Design Standards. Engineer may approve used signal equipment if it is in acceptable condition. Replacement components for traffic signal cabinet assemblies will be provided by the maintaining agency.

13. Temporary Traffic Detection and Maintenance:

a. Provide temporary traffic detection and maintenance at existing, temporary, and new signalized intersections. Provide temporary traffic detection equipment listed on the FDOT APL. Restore any loss of detection within 12 hours. Ensure 90% accuracy per signal phase, measured at the initial installation and after any lane shifts, by comparing sample data collected from the detection system with ground truth data collected by human observation. Collect the sample and ground truth data for a minimum of five minutes during a peak and five minutes during an off-peak period with a minimum three detections for each signal phase. Perform the test in the presence of Engineer.

14. Truck Mounted Attenuators and Trailer Mounted Attenuators:

a. Furnish, install and maintain only those attenuators that meet the requirements of NCHRP 350 or the MASH.

b. Use truck mounted attenuators or trailer mounted attenuators, when called for in the FDOT Design Standards. Use attenuators listed on the FDOT APL.

c. When attenuators are called for, use either a truck mounted attenuator or a trailer mounted attenuator system designed and installed in accordance with the manufacturers recommendations.

d. Equip the attenuator cartridge with lights and reflectors in compliance with applicable Florida motor vehicle laws, including turn signals, dual tail lights, and brake lights. Ensure that lights are visible in both the raised and lowered positions if the unit is capable of being raised.

e. Install either alternating black with yellow or white with orange sheeting on the rear of trailer mounted attenuators and on truck mounted attenuators, in both the operating and raised position. Use Type III (work zone) or Type IV sheeting consisting of 4 or 6 inch wide stripes installed to form chevrons that point upward. All sheeting except black shall be retroreflective.

f. Attenuators will not be paid for separately. Include the cost of the truck with either a truck mounted attenuator or a trailer mounted attenuator under Maintenance of Traffic (General). Payment includes all costs, including furnishing, maintaining and removal when no longer required, and all materials, labor, tools, equipment and incidentals required for attenuator maintenance.

15. Temporary Raised Rumble Strip Sets:

a. When called for in the Plans, furnish, install, maintain, remove, and reinstall temporary raised rumble strip sets.

b. Install the temporary raised rumble strip sets per the manufacturer's recommendations and in accordance with FDOT Design Standards, Index No. 603.

c. The temporary raised rumble strip may be either a removable polymer striping tape or a molded engineered polymer material.

16. Automated Flagger Assistance Devices (AFAD):

a. Furnish, install, maintain, remove and relocate AFADs in accordance with the Plans and FDOT Design Standards. Position AFADs where they are clearly visible to oncoming traffic and out of the lane of traffic. The devices may be operated either by a single flagger at one end of the traffic control zone, from a central location, or by a separate flagger near each device's location.

b. AFADs may be either a remotely controlled Stop/Slow AFAD mounted on either a trailer or a movable cart system, or a remotely controlled Red/Yellow Lens AFAD.

c. AFADs will not be paid for separately. AFADs may be used as a supplement or an alternate to flaggers in accordance with FDOT Index 603. Include the cost for AFADs in Maintenance of Traffic (General).

17. Temporary Lane Separator:

a. Furnish, install, maintain, remove and relocate temporary lane separator in accordance with the Plans and FDOT Design Standards, Index No 600.

b. Anchor the portable temporary lane separator with a removable anchor bolt. Use epoxy on bridge decks where anchoring is not allowed. Remove the epoxy from the bridge deck by hydroblasting or other method approved by Engineer.

J. Work Zone Pavement Marking.

1. Description:

a. Furnish and install work zone pavement markings for MOT in construction areas and in close conformity with the lines and details shown in the Plans and FDOT Design Standards.

b. Centerlines, lane lines, edge lines, stop bars and turn arrows will be required in work zones prior to opening the road to traffic.

c. The most common types of work zone pavement markings are painted pavement markings and removable tape. Other types of work zone pavement markings may be identified in the Plans.

2. Painted Pavement Markings:

a. General: Use painted pavement markings meeting the requirements of Article 710. Use standard waterborne paint unless otherwise identified in the Plans or approved by Engineer.

3. Removable Tape:

a. General: Use removable tape listed on the FDOT APL and meeting the requirements of FDOT 990-4.

b. Application: Apply removable tape with a mechanical applicator to provide pavement lines that are neat, accurate and uniform. Equip the mechanical applicator with a film cut-off device and with measuring devices that automatically and accumulatively measure the length of each line placed within an accuracy tolerance of plus or minus 2%. Ensure removable tape adheres to the road surface. Removable tape may be placed by hand on short sections, 500 feet or less, if it is done in a neat accurate manner.

c. Retroreflectivity: Apply white and yellow traffic stripes and markings that will attain an initial retroreflectivity of not less than 300 mcd/lx·m2 for white and contrast markings and not less than 250 mcd/lx·m2 for yellow markings. Black portions of contrast tapes and black masking tapes must be non-reflective and have a reflectance of less than 5 mcd/lx m2. At the end of the six month service life, the retroreflectance of white and yellow removable tape shall not be less than 150 mcd/lx·m2.

d. Removability: Provide removable tape capable of being removed from bituminous concrete and portland cement concrete pavement intact or in substantially large strips, either manually or by a mechanical roll-up device, at temperatures above 40ºF, without the use of heat, solvents, grinding or blasting.

4. Temporary Retroreflective Pavement Markers (RPM's): Use markers listed on the FDOT APL and meeting the requirements of FDOT 990-5. Apply all markers in accordance with the FDOT Design Standards, Index Nos. 600 and 17352, prior to opening the road to traffic. Replace markers any time after installation when more than three consecutive markers fail or are missing, at no expense to the Department, in a timely manner, as directed by Engineer.

K. Method of Measurement.

1. General:

a. Devices installed/used on the Project on any calendar day or portion thereof, within the allowable Contract Time, including time extensions which may be granted, will be paid for at the Contract unit price for the applicable pay item, except those paid for as Maintenance of Traffic (General).

b. One or more of the following items may appear in a contract in addition to a direct payment item for Maintenance of Traffic (Lump Sum). Unless otherwise stipulated in the Contract Documents, only those items with an Awarded Unit Price will be considered for direct payment.

2. Traffic Control Officers:

a. The County will reimburse Contractor for the services of uniformed law enforcement officers authorized to serve as traffic control officers for the purpose of controlling or directing traffic in the work zone as part of the County approved Traffic Control Plan and Maintenance of Traffic provided by Contractor pursuant to the Contract Documents.

b. The quantity to be paid for will be the invoice unit price per hour for the actual number of officers certified to be on the project site, including any law enforcement vehicles and all other direct and indirect costs.

c. Payment will be made at invoice cost from an appropriate dedicated allowance established by the County.

d. Payment will be made only for those Traffic Control Officers specified in the Plans and authorized by the Engineer. The necessary invoices and documentation must be submitted to the Engineer along with the payment request.

3. Special Detours:

a. When a detour facility is specifically detailed in the Plans, or is otherwise described or detailed as a special item, and an item for separate payment is included in the proposal, the work of constructing, maintaining, and subsequently removing such detour facilities will be paid for separately. Traffic control devices, warning

devices, barriers, signing, and pavement markings for special detours will also be paid for separately.

b. When the Plans show more than one detour, each detour will be paid for separately, at the Contract lump sum price for each.

c. Where a separate item for a specific detour facility is included in the proposal, payment will be made under special detour.

4. Commercial Material for Driveway Maintenance:

a. The quantity to be paid for will be the certified volume, in cubic yards, of all materials authorized by the Engineer, acceptably placed, compacted and maintained for driveway maintenance. The volume, which is authorized to be reused, and which is acceptably salvaged, placed, compacted and maintained in other designated driveways will be included again for payment.

b. Arrow Board: The quantity to be paid at the contract unit price will be for the number of arrow boards certified as installed/used on the project on any calendar day or portion thereof within the contract time.

5. Work Zone Signs:

a. The number of temporary post-mounted signs (temporary regulatory, warning and guide) certified as installed/used on the project will be paid for at the Contract unit price for work zone signs. When multiple signs are located on single or multiple posts, each sign panel will be paid individually. Signs greater than 20 square feet and detailed in the Plans will be paid for under Maintenance of Traffic (General).

b. Temporary portable signs (excluding mesh signs) and vehicular mounted signs will be included for payment under work zone signs, only if used in accordance with the FDOT Design Standards.

c. The number of temporary barrier mounted signs (temporary regulatory, warning and guide) certified as installed/used on the project will be paid for at the Contract unit price for barrier mounted work zone signs.

6. Business Signs:

a. The number of business signs certified as installed/used on the project will be paid for at the Contract unit price for business signs.

7. High Intensity Flashing Lights:

a. The number of high intensity flashing lights (Type B) certified as installed/used on the project will be paid for at the Contract unit price for high intensity flashing lights (temporary - Type B).

8. Channelizing Devices:

a. The number of drums, vertical panels, pedestrian LCDs, and Type I, Type II, Type III, or direction indicator barricades, certified as installed/used on the project meeting the requirements of FDOT Design Standards, Index No. 600 and have been properly maintained will be paid for at the Contract unit prices for channelizing device.

b. Payment for vehicular LCDs will be paid as the length in feet installed divided by the device spacing for barricades, vertical panels, and drums and certified as installed/used on the project meeting the requirements of FDOT Design Standards, Index No. 600 and have been properly maintained will be paid for at the Contract unit price for channelizing device.

c. Payment will not be made for channelizing devices unsatisfactorily maintained, as determined by the Engineer.

d. Payment will be made for each channelizing device that is used to delineate trailer mounted devices.

e. Payment will be made for channelizing devices delineating portable changeable message signs during the period beginning 14 working days before Contract Time begins as authorized by the Engineer.

9. Barrier Wall (Temporary):

a. The Contract unit price for barrier wall (temporary) will be full compensation for furnishing, installing, maintaining, and removing the barrier wall. When called for, the Contract unit price for barrier wall (temporary/relocate) will be full compensation for relocating the barrier. The certified quantity to be paid for will be determined by the number of sections times the nominal length of each section.

10. Barrier Delineators:

a. The number of barrier delineators, installed on top of barrier wall, used on the project, meeting the requirements of FDOT Design Standards and Article 705.

11. Lights, Temporary, Barrier Wall Mount:

a. The number of Type C steady burn lights, mounted on barrier wall, certified as installed/used on the project, meeting the requirements of the Design Standards and have been properly maintained will be paid for at the Contract unit price for lights temporary, barrier wall mount.

12. Glare Screen (Temporary):

a. The certified quantity to be paid for will be determined by the number of sections times the nominal length of each section.

13. Temporary Crash Cushions:

a. Redirective:

1) The quantity to be paid for will be the number of temporary crash cushions (redirective) certified as installed/used and maintained on the project, including object marker.

b. Gating:

1) The quantity to be paid for will be the number of temporary crash cushions (gating) certified as installed/used and maintained on the project, including object marker.

14. Temporary Guardrail:

a. The quantity to be paid for will be the length, in feet, of temporary guardrail constructed and certified as installed/used on the project. The length of a run of guardrail will be determined as a multiple of the nominal panel lengths.

15. Arrow Board:

a. The quantity to be paid at the Contract unit price will be for the number of arrow boards certified as installed/used on the project on any calendar day or portion thereof within the Contract time.

16. Portable Changeable Message Sign:

a. The quantity to be paid at the Contract unit price will be for the number of portable changeable message signs or truck mounted changeable message signs certified as installed/used on the project on any calendar day or portion thereof within the Contract time.

b. Payment will be made for each portable changeable message sign that is used during the period beginning fourteen working days before Contract Time begins as authorized by Engineer.

17. Portable Regulatory Signs:

a. The quantity to be paid for will be the number of portable regulatory signs certified as installed/used on the project on any calendar day or portion thereof within the Contract time, will be paid for the Contract unit price for portable regulatory sign.

18. Radar Speed Display Unit:

a. The quantity to be paid for will be the number of radar speed display units certified as installed/used on the project on any calendar day or portion thereof within the Contract Time, will be paid for the Contract unit price for radar speed display unit.

19. Temporary Signalization and Maintenance:

a. For existing intersections, the quantity to be paid for will be the number of signalized intersections per day for the full duration of the Contract. For temporary intersections, the quantity to be paid for will be the number of signalized intersections per day for the duration of the temporary intersection. No separate payment will be made for temporary signalization and maintenance at new intersections.

20. Temporary Traffic Detection and Maintenance:

a. For existing intersections, the quantity to be paid for will be the number of signalized intersections per day beginning the day Contract Time begins and ending the day the permanent detection is operational and the final lane configuration is in place. For temporary and new intersections, the quantity to be paid for will be the number of signalized intersections per day beginning the day the temporary detection is functional and ending the day the permanent detection is operational and the final lane configuration is in place for a new intersection; or, when the detection is removed for a temporary intersection.

21. Work Zone Pavement Markings:

a. The quantities, furnished and installed, to be paid for will be the length of skip and solid pavement markings, and the area of pavement markings placed as follows:

1) The total transverse distance, in feet, of skip pavement marking authorized and acceptably applied. The length of actual applied line will depend on the skip ratio of the material used. Measurement will be the distance from the beginning of the first stripe to the end of the last stripe with proper deductions made for unpainted intervals as determined by plan dimensions or stations, subject to the requirements of the Contract Documents.

2) The net length, in feet, of solid pavement marking authorized and acceptably applied.

3) The number of directional arrows or pavement messages authorized and acceptably applied.

4) The number of temporary RPM's authorized and acceptably applied.

22. Temporary Raised Rumble Strips:

a. The quantity to be paid for will be the number of temporary raised rumble strip sets certified as installed/used on the project on any calendar day or portion thereof within the Contract Time.

b. The number of strips used must meet the requirements of FDOT Design Standards, Index No. 603. No adjustment will be made to the per day measurement for the number of strips or sets used, or for the number of times the sets are relocated.

23. Temporary Lane Separator:

a. The quantity of temporary lane separator to be paid for will be plan quantity, in feet, including drainage gaps, completed and accepted.

L. Submittals.

1. Submittal Instructions:

a. Prepare a certification of quantities for certified MOT payment items for each project in the Contract. Submit the certification of quantities to Engineer. The Department will not pay for any disputed items until Engineer approves the certification of quantities.

2. Contractor's Certification of Quantities:

a. Request payment by submitting a certification of quantities as directed by Engineer, based on the amount of work done or completed. Ensure the certification consists of the following:

b. Contract Number, Certification Date and the period that the certification represents.

c. The basis for arriving at the amount of the progress certification, less payments previously made and less an amount previously retained or withheld. The basis will include a detail breakdown provided on the certification of items of payment in accordance with 102-M. After the initial setup of the MOT items and counts, the interval for recording the counts will be made weekly on the certification sheet unless there is a change. This change will be documented on the day of occurrence. Some items may necessitate a daily interval of recording the counts.

M. Basis of Payment.

1. Maintenance of Traffic (General):

a. No Direct Payment Provided: When no item for direct payment of Maintenance of Traffic (Lump Sum) is provided by the Contract, the costs for performing all work and requirements specified under this Article, except as may be specifically covered for payment under other items, will be included among the various scheduled items of the Contract.

b. Direct Payment Provided: When direct payment for Maintenance of Traffic (Lump Sum) is provided in the Contract, the quantity to be paid all work and costs specified under this Article, except as may be specifically covered for payment under other items, will be the lump sum Contract Price.

2. Additional items of Direct Payment. Only those items with an Awarded Unit Price will be considered for direct payment.

a. Traffic Control Officers:

1) Price and payment will be full compensation for the services of the traffic control officers at invoice cost as specified under subarticle 102.K.2 above.

b. Special Detours:

1) Price and payment will be full compensation for providing all detour facilities shown in the Plans and all costs incurred in carrying out all requirements of this Article for general MOT within the limits of the detour, as shown in the Plans.

c. Commercial Materials for Driveway Maintenance:

1) Price and payment will be full compensation for all work and materials specified for this item, including specifically all required shaping and maintaining of driveways.

d. Work Zone Signs:

1) Price and payment will be full compensation for all work and materials for furnishing signs, supports and necessary hardware, installation, relocating, maintaining and removing signs.

e. Business Signs:

1) Price and payment will be full compensation for all materials and labor required for furnishing, installing, relocating, maintaining, and removing the signs as well as the cost of installing any logos provided by business owners.

f. High Intensity Warning Lights:

1) Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing high intensity flashing lights (Type B).

g. Channelizing Devices:

1) Prices and payment will be full compensation for furnishing, installing, relocating, maintaining and removing the channelizing devices, including the costs associated with attached warning lights as required.

h. Barrier Wall (Temporary):

1) Price and payment will be full compensation for furnishing, installing, maintaining, and removing the barrier. When called for, barrier wall (temporary) (relocate) will be full compensation for relocating the barrier.

i. Lights, Temporary, Barrier Wall Mount:

1) Price and payment will be full compensation for all work and materials for furnishing, installing and maintaining the warning lights mounted on barrier wall. Payment will not be made for lights that are improperly placed or are not working.

j. Barrier Delineators:

1) No separate payment will be made for barrier delineators installed on top of temporary barrier wall. The cost of furnishing, installing and maintaining the barrier delineators will be included in the cost of the temporary barrier wall.

k. Glare Screen (Temporary):

1) Price and payment will be full compensation for furnishing, installing, maintaining, and removing the glare screen certified as installed/used on the project. When called for, glare screen (relocate) will be full compensation for relocating the glare screen.

l. Temporary Crash Cushion (Redirective/Gating):

1) Price and payment will be full compensation for furnishing, installing, maintaining and subsequently removing such crash cushions. Payment for restoring damaged crash cushions will be the manufacturer's/distributor's invoice price for the new materials/parts plus 20% markup. The 20% markup is compensation for all necessary work including; but not limited to, labor, equipment, supplies and profit, as authorized by Engineer. Additional MOT required for the repair of the crash cushion will be paid for under the appropriate MOT pay item.

m. Temporary Guardrail:

1) Price and payment will be full compensation for furnishing all materials required for a complete installation, including end anchorage assemblies and any end connections to other structures and for installing, maintaining and removing guardrail.

n. Arrow Board:

1) Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing arrow boards.

o. Portable Changeable Message Sign:

1) Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing portable changeable message signs.

p. Portable Regulatory Signs:

1) Price and payment will be full compensation for furnishing, installing, relocating, maintaining and removing a completely functioning system as described in these Specifications portable

regulatory signs. Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing portable regulatory signs.

2) Payment will include all labor, materials, incidentals, repairs and any actions necessary to operate and maintain the unit at all times that work is being performed or traffic is being affected by construction and/or MOT operations.

q. Radar Speed Display Unit:

1) Price and payment will be made only for a completely functioning system as described in these specifications. Payment will include all labor, hardware, accessories, signs, and incidental items necessary for a complete system.

2) Payment will include any measurements needed to insure that the unit conforms to all specification requirements.

3) Payment will include all labor, materials, incidentals, repairs and any actions necessary to operate and maintain the unit at all times that work is being performed or traffic is being affected by construction and/or MOT operations. Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing radar speed display unit.

r. Temporary Signalization and Maintenance:

1) Price and payment will constitute full compensation for furnishing, installing, operating, maintaining and removing temporary traffic control signals including all equipment and components necessary to provide an operable traffic signal. Payment will be withheld for each day at each intersection where the temporary signalization is not operational within 12 hours after notification.

s. Temporary Traffic Detection and Maintenance:

1) Price and payment will constitute full compensation for furnishing, installing, operating, maintaining and removing temporary traffic detection including all equipment and components necessary to provide an acceptable signalized intersection. Take ownership of all equipment and components. Payment will be withheld for each day at each intersection where the temporary detection is not operational within 12 hours after notification.

t. Temporary Raised Rumble Strips:

1) Price and payment will be full compensation for all work and materials described in this Article, including all cleaning and preparing of surfaces, disposal of all debris, furnishing of all materials, application, curing, removal, reinstalling and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work.

u. Work Zone Pavement Markings:

1) Price and payment will be full compensation for all work specified including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

2) Removable tape may be substituted for work zone paint at no additional cost to the Department.

3) Payment for temporary RPMs used to supplement line markings will be paid for under temporary retroreflective pavement markers. Install these markers as detailed in the Design Standards.

v. Temporary Lane Separator:

1) Price and payment will be full compensation for all work specified in this Article.

3. Payment Items: Payment will be made under:

Item No.	Description	Unit
102- 1A	Maintenance of Traffic	LS
102- 30-13	Temporary highway lighting (Illuminating roadway)	LS
102-120-B	Temporary Drainage	LS

104 PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION (REV. 01-09-12)

A. Description.

1. Provide erosion control measures on the Project and in areas outside the right-of-way where work is accomplished in conjunction with the Project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the Project right-of-way, and damage to work on the Project.

2. Construct and maintain temporary erosion control features and, as required, construct and maintain permanent erosion control features as shown in the Plans or as may be directed by Engineer.

B. General.

1. Coordinate the installation of temporary erosion control features with the construction of the permanent erosion control features to the extent necessary to ensure economical, effective, and continuous control of erosion and water pollution throughout the life of the Contract.

2. Maintain, at the work site, copies of all documents referenced by this Specification including: the Departmental Stormwater Pollution Prevention Plan (if provided); the approved contractor Erosion Control Plan; and applicable inspection reports, permits and certifications. Document compliance with all requirements pertaining to the aforementioned documents and this Specification.

3. Engineer may direct, when warranted by unforeseen conditions, the use of control features or methods other than those included in the original Contract. In such event, the Department will pay for this additional work as unforeseeable work.

C. Control of Contractor's Operations Which May Result in Water Pollution.

1. Prevent pollution of streams, canals, lakes, reservoirs, and other water impoundments with fuels, oils, bitumens, calcium chloride, or other harmful materials.
2. Conduct and schedule operations to avoid or otherwise minimize pollution or siltation of such water impoundments, and to avoid interference with movement of migratory fish. Do not dump any residue from dust collectors or washers into any water body.
3. Restrict construction operations in rivers, streams, lakes, tidal waters, reservoirs, canals, and other water impoundments to those areas where it is necessary to perform filling or excavation to accomplish the work shown in the Plans and to those areas which must be entered to construct temporary or permanent structures. As soon as conditions permit, promptly clear rivers, streams, and impoundments of all obstructions placed therein or caused by construction operations.
4. Do not frequently ford live streams with construction equipment. Wherever an appreciable number of stream crossings are necessary at any one location, use a temporary bridge or other structure.
5. Except as necessary and authorized for Project construction, do not deposit excavated material in rivers, streams, canals, or impoundments, or in a position close enough thereto, to be washed away by high water or runoff.
6. Where pumps are authorized for use in removing highly turbid waters from enclosed construction areas such as cofferdams or forms, treat the water by one or more of the following methods prior to discharge into State waters:
   a. Pumping into grassed swales or appropriate vegetated areas or sediment basins.
   b. Confined by an appropriate enclosure such as turbidity barriers when other methods are not considered appropriate.
7. Do not disturb lands or waters outside the limits of construction as staked, except as authorized by Engineer.
8. Obtain Engineer's approval for the location of, and method of operation in, borrow pits, material pits, and disposal areas furnished for waste material from the project (other than commercially operated sources) such that erosion during and after completion of the work will not result in probability of detrimental siltation or water pollution.

D. Materials for Temporary Erosion Control.

1. Engineer will not require testing of materials used in construction of temporary erosion control features other than as provided for geotextile fabric in FDOT 985-3 unless such material is to be incorporated into the completed Project.
2. When no testing is required, Engineer will base acceptance on visual inspection.
3. Contractor may use new or used materials, subject to Engineer's approval, for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed Project.

E. Erosion Control Plan.

1. Prepare the Erosion Control Plan (ECP) in a format acceptable to the Department and in accordance with the planned sequence of operations.
2. At the Preconstruction Conference, submit to the Department an ECP that:
   a. Meets the requirements or conditions of all permits authorizing construction of the Project. Where no permits are required or the approved permits do not contain conditions that specifically addresses erosion and water pollution, the requirements of the ECP will be governed by the Contract Documents and all applicable laws, rules, or regulations.
   b. Accompanies the Department's Stormwater Pollution Prevention Plan (SWPPP) when a SWPPP is provided for the Project.
   c. Includes and describes for each phase of construction operations or activities the following:
      1) Locations of all erosion control devices
      2) Types of all erosion control devices
      3) Estimated time erosion control devices will be in operation
      4) Monitoring schedules for maintenance of erosion control devices
      5) Methods of maintaining erosion control devices
      6) Containment or removal methods for pollutants or hazardous wastes
      7) The name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.
   d. Includes procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-stormwater discharges.
   e. Describes all phases of operations, the prevention, control, and abatement of erosion and water pollution items or activities necessary for the Project, to include:
      1) Types and locations of all erosion control devices
      2) Estimated time erosion control devices will be in operation
      3) Monitoring schedules for maintenance of erosion control devices
      4) Methods for maintaining erosion control devices
      5) Containment or removal methods for pollution or hazardous wastes
      6) Name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.

3. Contractor must obtain Engineer's written approval of the ECP prior to commencing any construction activities.
4. For project requiring a Florida Department of Environmental Protection (FDEP) Generic Permit for Stormwater Discharge from Large and Small Construction Activities (Generic Permit):
   a. Failure to sign any documents or certification statements required by the FDEP Generic Permit will be considered a default of the Contract.
   b. Any soil disturbing activities performed without the required signed documents or certifications statements may be considered a violation of the FDEP Generic Permit.

F. Construction Requirements.

1. Limitation of Exposure of Erodible Earth:
   a. Engineer may limit the surface areas of unprotected erodible earth exposed by the construction operation and may direct Contractor to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments or to prevent detrimental effects on property outside the Project right-of-way or damage to the Project.
   b. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, turf, sod, and other such permanent erosion control measures current in accordance with the accepted schedule.
   c. Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 square feet without specific prior approval by Engineer. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.
   d. Engineer may increase or decrease the amount of surface area the Contractor may expose at any one time.
2. Incorporation of Erosion and Sediment Control Features:
   a. Incorporate permanent erosion control features into the project at the earliest practical time. Use temporary erosion and sediment control features found in the State of Florida Erosion and Sediment Control Designer and Reviewer Manual (E&SC Manual) to correct conditions that develop during construction which were not foreseen at the time of design, to control erosion and sediment prior to the time it is practical to construct permanent control features, or to provide immediate temporary control of erosion and sediment that develops during normal construction operations, which are not associated with permanent erosion control features on the project. An electronic version of the E&SC Manual can be found at the following URL: http://www.dot.state.fl.us/specificationsoffice/Implemented/URLinSpecs/Files/FLErosionSedimentManual060709.pdf
   b. Install all sediment control devices in a timely manner to ensure the control of sediment and the protection of lakes, streams, gulf or ocean waters, or any wetlands associated therewith and to any adjacent property outside the right-of-way as required.
   c. At sites where exposure to such sensitive areas is prevalent, complete the installation of any sediment control device prior to the commencement of any earthwork.
   d. After installation of sediment control devices, repair portions of any devices damaged at no expense to the Department. Engineer may authorize temporary erosion and sediment control features when finished soil layer is specified in the Contract and the limited availability of that material from the grading operations will prevent scheduled progress of the work or damage the permanent erosion control features.
3. Scheduling of Successive Operations:
   a. Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposure of uncompleted construction to the elements is as short as practicable.
   b. Schedule and perform clearing and grubbing so that grading operations can follow immediately thereafter. Schedule and perform grading operations so that permanent erosion control features can follow immediately thereafter if conditions on the project permit.
4. Details for Temporary Erosion and Sediment Control Features:
   a. General: Use temporary erosion, sediment and water pollution control features found in the E&SC Manual. These features consist of, but are not limited to, temporary turf, rolled erosion control products, sediment containment systems, runoff control structures, sediment barriers, inlet protection systems, silt fences, and turbidity barriers. For design details for some of these items, refer to the Plans, the FDOT Design Standards and E&SC Manual.
   b. Temporary Sod: Engineer may designate certain areas of sod constructed in accordance with the Specifications as temporary erosion control features. For areas not defined as sod, constructing temporary turf by seeding only is not an option for temporary erosion control under this Article. Engineer may waive the turf establishment requirements of the Specifications for areas with temporary sod that will not be a part of the permanent construction. The work of placing temporary sod, approved as a temporary erosion control feature where directed by Engineer and in accordance with these Specifications, will be paid for as unforeseeable work.
   c. Runoff Control Structures: Construct runoff control structures in accordance with the details shown in the Plans, the E&SC Manual, or as may be approved as suitable to adequately perform the intended function.
   d. Sediment Containment Systems: Construct sediment containment systems in accordance with the details shown in the Plans, the E&SC Manual, or as may be approved as suitable to adequately perform the intended function. Clean out sediment containment systems as necessary in accordance with the Plans or as directed.

e. Sediment Barriers: Provide and install sediment barriers according to details shown in the Plans, as directed by Engineer, or as shown in the E&SC Manual to protect against downstream accumulation of sediment. Sediment Barriers include, but are not limited to synthetic bales, silt fence, fiber logs and geosynthetic barriers. Reusable barriers that have had sediment deposits removed may be reinstalled on the Project as approved by Engineer.

f. Silt Fence:

1) General: Furnish, install, maintain, and remove silt fences, in accordance with the manufacturer's directions, these Specifications, the details as shown on the Plans, the FDOT Design Standards, and the E&SC Manual.

2) Materials and Installation: Use a geotextile fabric made from woven or nonwoven fabric, meeting the physical requirements of FDOT Section 985 according to those applications for erosion control. Choose the type and size of posts, wire mesh reinforcement (if required), and method of installation. Do not use products which have a separate layer of plastic mesh or netting. Provide a durable and effective silt fence that controls sediment comparable to the FDOT Design Standards and the E&SC Manual. Erect silt fence at upland locations, across ditch lines and at temporary locations shown on the plans or approved by Engineer where continuous construction activities change the natural contour and drainage runoff. Do not attach silt fence to existing trees unless approved by Engineer.

3) Inspection and Maintenance: Inspect all silt fences immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct any deficiencies. In addition, make a daily review of the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, install additional silt fences as directed by Engineer. Remove sediment deposits when the deposit reaches approximately 1/2 of the volume capacity of the silt fence or as directed by Engineer. Dress any sediment deposits remaining in place after the silt fence is no longer required to conform with the finished grade, and prepare them in accordance with the Contract Documents and as directed by Engineer.

g. Floating Turbidity Barriers and Staked Turbidity Barriers:

1) Install, maintain, and remove turbidity barriers to contain turbidity that may occur as the result of dredging, filling, or other construction activities which may cause turbidity to occur in the waters of the State. Contractor may need to deploy turbidity barriers around isolated areas of concern such as seagrass beds, coral communities, etc. both within as well as outside the right-of-way limits. Engineer will identify such areas. Place the barriers prior to the commencement of any work that could impact the area of concern. Install the barriers in accordance with the details shown in the Plans or as approved by Engineer. Ensure that the type barrier used and the deployment and maintenance of the barrier will minimize dispersion of turbid waters from the construction site. Engineer may approve alternate methods or materials.

2) Operate turbidity barriers in such a manner to avoid or minimize the degradation of the water quality of the surrounding waters and minimize damage to areas where floating barriers installed.

h. Inlet Protection System: Furnish and install inlet protection systems as shown in the Plans, FDOT Design Standards and the E&SC Manual.

i. Rolled Erosion Control Products (RECPs):

1) General: Install RECPs in locations where temporary protection from erosion is needed. Two situations occur that require artificial coverings each having differing material requirements.

a) Temporary pauses in construction: Use RECPs composed of natural or synthetic fiber mats, plastic sheeting, or netting as protection against erosion, when directed by Engineer, during temporary pauses in construction caused by inclement weather or other circumstances. Remove the material when construction resumes.

b) Facilitating plant growth: Use RECPs as erosion control blankets, at locations shown in the plans, to facilitate plant growth while permanent grassing is being established. For the purpose described, use non-toxic, biodegradable, natural or synthetic woven fiber mats. Install erosion control blankets capable of sustaining a maximum design velocity of 6.5 ft/sec as determined from tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the Department. Furnish to Engineer, two certified copies of manufacturers test reports showing that the erosion control blankets meet the requirements of this Specification. Certification must be attested, by a person having legal authority to bind the manufacturing company. Also, furnish two 4 by 8 inch samples for product identification. The manufacturers test records shall be made available to the Department upon request. Leave the material in place, as installed, to biodegrade.

5. Removal of Temporary Erosion Control Features: In general, remove or incorporate into the soil any temporary erosion control features existing at the time of construction of the permanent erosion control features in an area of the Project in such a manner that no detrimental effect will result. Engineer may direct that temporary features be left in place.

G. Maintenance of Erosion and Sediment Control Features.

1. General: Provide routine maintenance of permanent and temporary erosion and sediment control features, at no expense to the Department, until the Project is complete and accepted. If reconstruction of such erosion and

sediment control features is necessary due to Contractor's negligence or carelessness or, in the case of temporary erosion and sediment control features, failure by the Contractor to install permanent erosion control features as scheduled, Contractor must replace such erosion control features at no expense to the Department. If reconstruction of permanent or temporary erosion and sediment control features is necessary due to factors beyond the control of Contractor, the Department will pay for replacement under the appropriate Contract pay item or items.

2. Inspect all erosion and sediment control features at least once every seven calendar days and within 24 hours of the end of a storm of 0.50 inches or greater. Maintain all erosion control features as required in the SWPPP, Contractor's ECP, the E&SC Manual, and as specified in the State of Florida Department of Environmental Protection Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

H. Protection During Suspension of Contract Time.

1. If it is necessary to suspend the construction operations for any appreciable length of time, shape the top of the earthwork in such a manner to permit runoff of rainwater, and construct earth berms along the top edges of embankments to intercept runoff water. Provide temporary slope drains to carry runoff from cuts and embankments that are in the vicinity of rivers, streams, canals, lakes, and impoundments. Locate slope drains at intervals of approximately 500 feet, and stabilize them by paving or by covering with waterproof materials. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation. Engineer may direct Contractor to perform, during such suspensions of operations, any other erosion and sediment control work deemed necessary.

I. Method of Measurement.

1. Direct Payment Provided:

   a. When separate items for temporary erosion control features are included in the Contract and have awarded Contract prices, the quantities to be paid for will be the:

      1) Area, in square yards, of Rolled Erosion Control Products.

      2) Length, in feet, of Runoff Control Structures, measured along the surface of the work constructed.

      3) Number of Sediment Containment Systems constructed and accepted.

      4) Number of Sediment Containment System Cleanouts accomplished and accepted.

      5) Length, in feet, of Sediment Barriers.

      6) Length, in feet, of Floating Turbidity Barrier.

      7) Length, in feet, of Staked Turbidity Barrier.

      8) Number of inlet protection systems.

   b. Upon acceptance by the Engineer, the quantity of floating turbidity barriers, sediment barriers, staked turbidity barriers, and inlet protection devices will be paid for regardless of whether materials are new, used, or relocated from a previous approved installation on the Project.

2. No Direct Payment Provided: Unless otherwise specified, when no item for direct payment of temporary erosion control features is provided by the Contract, the costs for performing all work and meeting the requirements of this Article will be included among the various scheduled items of the Contract.

J. Basis of Payment.

1. Prices and payments will be full compensation for all work specified in this Article, including construction and routine maintenance of temporary erosion control features.

2. Any additional costs resulting from compliance with the requirements of this Article, other than construction, routine maintenance, and removal of temporary erosion control features, will be included in the Contract unit prices for the item or items to which such costs are related.

3. Separate payment will not be made for the cost of constructing temporary earth berms along the edges of the roadways to prevent erosion during grading and subsequent operations. Contractor must include these costs in the Contract prices for earthwork items.

4. Additional temporary erosion control features constructed as directed by Engineer will be paid for as unforeseeable work.

5. In case of repeated failure on the part of Contractor to control erosion, pollution, or siltation, Engineer reserves the right to employ outside assistance or to use the Department's own forces to provide the necessary corrective measures. Any such costs incurred, including engineering costs, will be charged to Contractor and appropriate deductions made from the monthly progress estimate.

6. Payment will be made under:

Item No.	Description	Unit
Item No. 104-10-1	Baled Hay	EA
Item No. 104-13-1	Staked Silt Fence (Type III)	LF
Item No. 104-18	Inlet Protection System	EA

105 CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV. 08-23-12)

A. General.

1. Submit to Engineer a meeting the requirements stipulated in this Article and that addresses the transportation, storage, placement, sampling, inspection of Contract materials and related construction operations;

and to ensure that all work and material incorporated into the Project meet the requirements of the Contract Documents.

2. Comply with all personnel qualification requirements stipulated in this Article and elsewhere in the Contract Documents.

B. Guidelines for Development of the CQCP

1. Use the following guidelines for developing the CQCP and include other additional items as necessary.

a. General. Provide detailed policies, methods and procedures to ensure the specified quality of all applicable materials and related production and field operations.

b. Process control testing. List the material to be tested by pay item, tests to be conducted, the location of sampling, and the frequency of testing.

c. Inspection/control procedures. Address each of the following subjects in each phase of construction:

1) Preparatory phase.

a) Review all Contract requirements.

b) Ensure compliance of component material to the Contract requirements.

c) Coordinate all submittals including certifications.

d) Ensure capability of equipment and personnel to comply with the Contract requirements.

e) Ensure preliminary testing is accomplished.

f) Coordinate surveying and staking of the work.

2) Start-up phase.

a) Review the Contract requirements with personnel performing the work.

b) Inspect start-up of work.

c) Establish standards of workmanship.

d) Provide training as necessary.

e) Establish detailed testing schedule based on the production schedule.

3) Production phase.

a) Conduct intermittent or continuous inspection during construction to identify and correct deficiencies.

b) Inspect completed work before requesting Engineer inspection acceptance.

c) Provide feedback and system changes to prevent repeated deficiencies.

d. Description of records. List the records to be maintained.

e. Personnel qualifications.

1) Identify the primary contact that will communicate with the Department. Identify roles and responsibilities of the personnel involved in the Quality Control (QC) process. Document the name, authority, relevant experience, and qualifications of person with overall responsibility for the inspection system.

2) Document the names, authority, and relevant experience of all personnel directly responsible for inspection and testing.

3) Submit the Training Identification Numbers (TINs) or any other information which will be traceable to the certification agency's training location and dates for all technicians performing sampling, testing and inspection for both field and laboratory tests. Provide the names of the Florida Department of Transportation's Construction Training and Qualification Program (CTQP) certifications and other pertinent certifications held and the expiration dates for each certification for each technician. Include employed and subcontracted technicians.

f. Subcontractors.

1) Include the work of all subcontractors.

2) If a subcontractor is to perform work subject to the requirements of this Article, detail how that subcontractor will interface with Contractor's and other subcontractor's organizations.

g. Raw Materials:

1) Source: Identify the sources of raw materials. Provide locations and plant or mine numbers when applicable. Include the mailing address, physical address including county of the plant, telephone and fax numbers, E-mail address, primary contact at the plant, responsible person in charge, facility number provided by the FDOT, Owner information and Vendor Number and other information as required.

2) Certification: Describe methods of verifying compliance of certification with the Specifications.

3) Disposition of Failing Materials: Describe the system for controlling non-conforming materials, including procedures for identification, isolation and disposition.

4) Storage Facilities for Raw Materials: Describe measures and methods, including bedding details, for preventing segregation, contamination and degradation.

5) Describe methods of identifying individual materials. Where applicable, submit a site plan showing the locations of various materials.

h. Production Equipment: Describe calibration frequencies, maintenance schedule and procedures for production equipment.

i. Other Requirements:

1) Copy of Certification: Attach certifications issued by the plant/Contractor for the products approved by the FDOT that will be used in the Project.

2) Statement of Compliance: Include a statement of compliance with all quality requirements set forth by the Department in the Contract Documents.

3) Information on Producers with Accepted FDOT Quality Control Programs: All producers of materials listed herein in Subarticle 105-G.1 must have FDOT accepted QC Programs and be listed

on the FDOT's List of Producers with Accepted QC Programs. Identify the Producers of materials for the Project and include the FDOT's Facility Id number as part of the identification.

4) Describing Documentation Procedure: Identify location of document storage to enable Department review. Include QC charts, qualification/accreditation records, inspection reports, and other pertinent/supporting documents for an approved CQCP.

j. Final Manufactured Product - Plant Operations: Describe inspection schedule and methods for identifying defects and non-compliance with the specifications. Describe corrective actions and methods to resolve them.

1) Storage: When storage of the produced materials is required and it is not defined in the Contract Documents, describe the methods and duration for storage. Include measures and methods for preventing segregation, contamination and degradation during storage.

2) Disposition of Failing Materials: When not described in the specifications, describe the methods and measures for identifying and controlling the failing materials. Include preventive and corrective measures. Describe disposition of failing materials.

k. Final Manufactured Product - Field Operations:

1) Transportation: Describe the method of delivery from the point of production/storage to the point of placement.

2) Storage: When storage of the produced materials is required and it is not defined in the Contract Documents, describe the methods and duration for storage. Include measures and methods for preventing segregation, contamination and degradation during storage.

3) Placement: Describe the methods and identify the type of equipment used in incorporation of the materials into the project.

4) Disposition of Failing Materials: When not described in the specifications, describe the methods and measures for identifying and controlling the failing materials. Include preventive and corrective measures. Describe disposition of failing materials.

C. Quality Control Plan Submittal.

1. Submit the CQCP to Engineer for approval within 21 days after the Contract Award or at the Preconstruction Conference, whichever is sooner. Do not incorporate materials into the Project or begin any work subject to the CQCP prior to Engineer's acceptance of the CQCP.

2. Modifications or additions may be required to any part of the CQCP that is not adequately covered. Acceptance of the CQCP will be based on the inclusion of the required information. Acceptance does not imply any warranty by the County that the CQCP will result in consistent contract compliance. It remains the responsibility of Contractor to demonstrate such compliance.

3. If at any time Contractor is not in compliance with the approved CQCP, or a part thereof, affected portions of the CQCP will be disapproved. Cease work in the affected operation(s) and submit a revision to Engineer. If the CQCP, or a part thereof, must be revised, submit the revision to Engineer. Engineer will review the revision and respond within seven calendar days of receipt.

4. Continue to work on operations that are still in compliance with the approved sections of the CQCP.

5. As work progresses, submit to Engineer for acceptance supplementary documentation to the CQCP whenever quality control or quality control personnel changes are necessary.

D. Quality Control Documentation.

1. Maintain complete testing and inspection records by pay item number and make them accessible to Engineer. When or where required, submit the record and certification within one working day of the work being performed. If the record is incomplete, in error, or otherwise misleading, a copy of the record will be returned with corrections noted. When chronic errors or omissions occur, correct the procedures by which the records are produced.

2. Submission of Materials Certification and Reporting Test Results: Provide certifications prior to placement of materials. Report test results at completion of the test and meet the requirements of the applicable Specifications.

3. Worksheets: Make available to the Department, when requested, worksheets used for collecting test information. Ensure the worksheets at a minimum contain the following:

a. Project Identification Number,
b. Time and Date,
c. Laboratory Identification and Name,
d. Training Identification Numbers (TIN) and initials,
e. Record details as specified within the test method.

4. Inspections to Assure Compliance with Acceptance Criteria.

a. General: The Department is not obligated to make an inspection of materials at the source of supply, manufacture, or fabrication.

b. Quality Control Inspection: Provide all necessary inspection to assure effective Quality Control of the operations related to materials acceptance. This includes but is not limited to sampling and testing, production, storage, delivery, construction and placement. Ensure that the equipment used in the production and testing of the materials provides accurate and precise measurements in accordance with the applicable Specifications. Maintain a record of all inspections, including but not limited to, date of inspection, results of inspection, and any subsequent corrective actions taken. Make available to the Department the inspection records, when requested.

c. Notification of Placing Order:

1) Order materials sufficiently in advance of their incorporation in the work to allow time for sampling,

testing and inspection. Notify Engineer, prior to placing orders for materials.

2) Submit to Engineer a fabrication schedule for all items requiring commercial inspection, before or at the preconstruction meeting. These items include, but are not limited to steel bridge components, overhead cantilevered sign supports with cantilevered arms exceeding 41 feet, moveable bridge components or any other item identified as an item requiring commercial inspection in the Contract Documents.

3) Notify Engineer at least 30 days before beginning any production and include a production schedule.

E. Contractor Certification of Compliance.

1. Provide Engineer with a notarized monthly certification of compliance with the requirements of this Article, to accompany each progress estimate, on a form acceptable by Engineer. The Department may not authorize payment of any progress estimate not accompanied by an executed certification document.
2. Final payment will not be made until a final notarized certification summarizing all QC exceptions has been submitted.

F. Personnel Qualifications.

1. General:
   a. Provide qualified personnel for sampling, testing and inspection of materials and construction activities. Ensure that qualifications are maintained during the course of sampling, testing and inspection.
   b. Construction operations that require a qualified technician must not begin until Engineer verifies that the technician is on the FDOT CTQP list of qualified technicians.
2. QC Manager:
   a. Designate a QC Manager who has full authority to act as Contractor's agent to institute any and all actions necessary for the successful implementation of the CQCP. The QC Manager must speak and understand English. The QC Manager must be on-site at the Project on a daily basis or always available upon four hours notice to administer the CQCP. This includes administering, implementing, monitoring, and as necessary, adjusting the processes to ensure compliance with the Contract Documents. Ensure that the QC Manager is qualified as such through the FDOT CTQP.
   b. Under the direction of the QC Manager, and using standard forms approved by Engineer, summarize the daily QC activities including testing and material sampling. Since erasures are strictly prohibited on all reports and forms, use blue or colored ink. Do not use black ink. If manual corrections to original data are necessary, strike through, correct, and date the entry, including the initials of the person making the correction. Make copies of the completed forms available for the Department to review daily unless otherwise required in the specifications. Maintain all QC related reports and documentation for a period of three years from final acceptance of the Project. Make copies available for review by the Department upon request.
3. Worksite Traffic Supervisor:
   a. Provide a Worksite Traffic Supervisor who is responsible for initiating, installing, and maintaining all traffic control devices as described in Article 102 (Maintenance of Traffic) and in the Contract Documents. Ensure that the Worksite Traffic Supervisor is certified in the advanced training category by a FDOT approved training Provider. Approved Providers will be posted on the FDOT's website at the following URL address:
      1) http://www.dot.state.fl.us/rddesign/MOT/MOT.shtm
   b. Use approved alternate Worksite Traffic Supervisors when necessary.
4. Flagger: Provide trained flaggers to direct traffic where one-way operation in a single lane is in effect and in other situations as required. The Worksite Traffic Supervisor or others as approved by the Department will provide training for flaggers.
5. Earthwork Quality Control Personnel:
   a. Earthwork Level I: Ensure the technician who samples soil and earthwork materials from the roadway project, takes earthwork moisture and density readings, and records those data in the Density Log Book holds a CTQP Earthwork Construction Inspection Level I qualification.
   b. Earthwork Level II: Ensure the technician responsible for determining the disposition of soil and earthwork materials on the roadway, and for interpreting and meeting Contract Document requirements holds a CTQP Earthwork Construction Inspection Level II qualification.
6. Asphalt Quality Control Personnel:
   a. Plant Technicians: For asphalt plant operations, provide a QC technician, qualified as a CTQP Asphalt Plant Level II technician, available at the asphalt plant at all times when producing mix for the Department. Perform all asphalt plant related testing with a CTQP Asphalt Plant Level I technician. As an exception, measurements of temperature may be performed by someone under the supervision of a CTQP Plant Level II technician.
   b. Paving Technicians: For paving operations (with the exception of miscellaneous or temporary asphalt), keep a qualified CTQP Asphalt Paving Level II technician on the roadway at all times when placing asphalt mix for the Department, and perform all testing with a CTQP Asphalt Paving Level I technician. As an exception, measurements of cross-slope, temperature, and yield (spread rate) can be performed by someone under the supervision of a CTQP Paving Level II technician at the roadway.
   c. Mix Designer: Ensure all mix designs are developed by individuals who are CTQP qualified as an Asphalt Hot Mix Designer.
   d. Documentation: Document all QC procedures, inspection, and all test results and make them available

for review by Engineer throughout the life of the Contract. Identify in the asphalt producer's Quality Control Plan the Quality Control Manager(s) and/or Asphalt Plant Level II technician(s) responsible for the decision to resume production after a quality control failure.

7. Concrete QC Personnel:

   a. Concrete Field Technician - Level I: Ensure technicians performing plastic property testing on concrete for materials acceptance are qualified CTQP Concrete Field Technicians Level I. Plastic property testing will include but not be limited to slump, temperature, air content, water-to-cementitious materials ratio calculation, and making and curing concrete cylinders. Duties will include initial sampling and testing to confirm specification compliance prior to beginning concrete placements, ensuring timely placement of initial cure and providing for the transport of compressive strength samples to the designated laboratories.

   b. Concrete Field Inspector - Level II: Ensure field inspectors responsible for the quality of concrete being placed on major bridge projects are qualified CTQP Concrete Field Inspectors Level II. A Level II Inspector must be present on the jobsite during all concrete placements. Prior to the placement of concrete, the inspector will inspect the element to be cast to ensure compliance with Contract Documents. A Level II Inspector's duties may include ensuring that concrete testing, inspection, and curing in the field are performed in accordance with the Contract Documents. The QC Inspector will inform the Verification Inspector of anticipated concrete placements and LOT sizes.

   c. Concrete Laboratory Technician:

      1) Concrete Laboratory Technician - Level I: Ensure technicians testing cylinders and recording concrete strength for material acceptance are qualified CTQP Concrete Laboratory Technicians Level I. Duties include final curing, compressive strength testing, and the recording/reporting of all test data.

      2) Concrete Laboratory Technician – Level II: Ensure that laboratories providing hardened property test results to the Department are under the supervision of a CTQP Concrete Laboratory Technician - Level II. This person is responsible to ensure that the tests are performed in accordance with Standard Test Methods, project specifications and other contract documents.

8. Supervisory Personnel – Post-Tensioned and Movable Bridge Structures:

   a. General: Provide supervisory personnel meeting the qualification requirements only for the post-tensioned and movable bridge types detailed in this Article. Submit qualifications to Engineer at the pre-construction conference. Do not begin construction until the qualifications of supervisory personnel have been approved by Engineer.

   b. Proof of License or Certification:

      1) Submit a copy of the Professional Engineer license current and in force issued by the state in which registration is held. The license must be for the field of engineering that the construction work involves such as Civil, Electrical or Mechanical. Under certain circumstances Florida registration may be required.

      2) Submit a copy of the license issued by the State of Florida for tradesmen that require a license indicating that the license is in force and is current. Submit a copy of the certification issued by the Instrumentation, Systems and Automation Society of America for each Certified Control Systems Technician.

   c. Experience Record: Submit the following information for supervisory personnel to substantiate their experience record. The supervisor (project engineer, superintendent/manager or foreman) seeking approval must provide a notarized certification statement attesting to the completeness and accuracy of the information submitted. Provide the following experience information for each individual seeking approval as a supervisor:

      1) Project owner's name and telephone number of an owner's representative, project identification number, state, city, county, highway number and feature intersected.

      2) Provide a detailed description of each bridge construction experience, and the level of supervisory authority during that experience. Report the duration in weeks, as well as begin and end dates, for each experience period.

      3) Provide the name, address and telephone number of an individual that can verify that the experience being reported is accurate. This individual should have been an immediate supervisor unless the supervisor cannot be contacted in which case another individual with direct knowledge of the experience is acceptable.

   d. Concrete Post-Tensioned Segmental Box Girder Construction: Ensure the individuals filling the following positions meet the minimum requirements as follows:

      1) Project Engineer-New Construction: Ensure the Project Engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure a minimum of three years of experience is in Segmental Box Girder Construction Engineering and includes a minimum of one year in segmental casting yard operations and related surveying, one year in segment erection and related surveying, including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Engineer in responsible charge of Segmental Box Girder Construction Engineering. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

      2) Project Engineer-Repair and Rehabilitation: Ensure the Project Engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure a minimum of three years of experience is in Segmental Box Girder Construction Engineering and includes one year of post-tensioning and grouting of longitudinal tendons and

a minimum of one year as the Project Engineer in responsible charge of Segmental Box Girder rehabilitation engineering or Segmental Box Girder new construction engineering.

3) Project Superintendent/Manager - New Construction:

   a) Ensure the Project Superintendent/Manager has a minimum of ten years of bridge construction experience or is a registered Professional Engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in Segmental Box Girder construction operations and includes a minimum of one year in the casting yard operations and related surveying, one year in segment erection and related surveying including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project

   b) Superintendent/Manager in responsible charge of Segmental Box Girder construction operations. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

4) Project Superintendent/Manager-Repair and Rehabilitation: Ensure the Project Superintendent/Manager has a minimum of five years of bridge construction experience or is a registered Professional Engineer with three years of bridge construction experience. Ensure that a minimum of two years of experience is in Segmental Box Girder construction operations and includes a minimum of one year experience performing post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Superintendent/Manager in responsible charge of Segmental Box Girder rehabilitation operations or Segmental Box Girder new construction operations.

5) Foreman-New Construction: Ensure that the Foreman has a minimum of five years of bridge construction experience with two years of experience in Segmental Box Girder Operations and a minimum of one year as the foreman in responsible charge of Segmental Box Girder new construction Operations. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

6) Foreman-Repair and Rehabilitation: Ensure the Foremen has a minimum of five years of bridge construction experience with two years of experience in Segmental Box Girder Operations and a minimum of one year as the foreman in responsible charge of Segmental Box Girder rehabilitation operations or Segmental Box Girder new construction operations.

7) Geometry Control Engineer/Manager:

   a) Ensure that the Geometry Control Engineer/Manager for construction of cast-in-place box segments is a registered Professional Engineer with one year of experience, a non-registered Engineer with three years of experience or a Registered Professional Land Surveyor with three years of experience in geometry control for casting and erection of cast-in-place box segments. Credit for experience in cast-in-place box girder geometry control will be given for experience in precast box girder geometry control but not vice versa.

   b) Ensure that the Geometry Control Engineer/Manager for precast box segments is a registered Professional Engineer with one year of experience or non-registered with three years of experience in casting yard geometry control of concrete box segments.

   c) The Geometry Control Engineer/Manager must be responsible for and experienced at implementing the method for establishing and maintaining geometry control for segment casting yard operations and segment erection operations and must be experienced with the use of computer programs for monitoring and adjusting theoretical segment casting curves and geometry. This individual must be experienced at establishing procedures for assuring accurate segment form setup, post-tensioning duct and rebar alignment and effective concrete placement and curing operations as well as for verifying that casting and erection field survey data has been properly gathered and recorded. Ensure this individual is present at the site of construction, at all times while cast-in-place segmental box girder construction is in progress or until casting yard operations and segment erection is complete.

8) Surveyor: Ensure that the Surveyor in charge of geometry control surveying for box segment casting and/or box segment erection has a minimum of one year of bridge construction surveying experience. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

e. Movable Bridge Construction: Ensure the individual filling the following positions meet the minimum requirements as follows:

   1) Electrical Journeyman: Ensure the Electrical Journeyman holds, an active journeyman electrician's license and has at least five years experience in industrial electrical work, or is a Certified Control Systems Technician. A Certified Control Systems Technician will not be permitted to perform electrical power work including, but not limited to, conduit and wire-way installation or power conductor connection. Ensure the electrical journeyman has successfully completed the installation of one similar movable bridge electrical system during the last three years.

   2) Control Systems Engineer and Mechanical Systems Engineer: Ensure the Control Systems Engineer and Mechanical Systems Engineer are both registered Professional Engineers with a minimum of 10 years supervisory experience each in movable bridge construction. Ensure the engineers have working knowledge of the movable

bridge leaf motion control techniques, mechanical equipment and arrangements specified for this project. Ensure that each Engineer has been in responsible control of the design and implementation of at least three movable bridge electrical control and machinery systems within the past 10 years of which, at least one of the three bridges was within the last three years. Ensure that a minimum of one of the three bridge designs incorporated the same type of leaf motion control and machinery systems specified for this project.

f. Concrete Post-Tensioned Other Than Segmental Box Girder Construction: Ensure the individual filling the following positions meet the minimum requirements as follows:

1) Project Engineer: Ensure the Project Engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in concrete post-tensioned construction. Ensure that the three years of experience includes experience in girder erection, safe use of cranes, stabilization of girders; design of false work for temporary girder support, post-tensioning and grouting operations, and a minimum of one year as the Project Engineer in responsible charge of post-tensioning related engineering responsibilities.

2) Project Superintendent/Manager: Ensure the Project Superintendent/Manager has a minimum of ten years of bridge construction experience or is a registered Professional Engineer with five years of bridge construction experience and has a minimum of three years of supervisory experience in girder erection, safe use of cranes, stabilization of girders; design of falsework for temporary girder support post-tensioning, grouting operations and a minimum of one year as the Project Superintendent/Manager in responsible charge of post-tensioning related operations.

3) Foreman: Ensure the Foremen has a minimum of five years of bridge construction experience with two years of experience in post-tensioning related operations and a minimum of one year as the foreman in responsible charge of post-tensioning related operations.

g. Post-Tensioning (PT) and Grouting Personnel Qualifications: Perform all stressing and grouting operations in the presence of Engineer and with personnel meeting the qualifications of this article. Coordinate and schedule all PT and grouting activities to facilitate inspection by Engineer.

1) Post-Tensioning: Perform all PT field operations under the direct supervision of a Level II CTQP Qualified PT Technician who must be present at the site of the post-tensioning work during the entire duration of the operation. For the superstructures of bridges having concrete post-tensioned box or I girder construction, provide at least two CTQP qualified PT technicians, Level I or II, on the work crew. The supervisor of the work crew, who must be a Level II CTQP Qualified PT Technician, may also be a work crew member, in which case, the supervisor shall count as one of the two CTQP qualified work crew members. For PT operations other than the superstructures of post-tensioned box or I girder construction, perform all PT operations under the direct supervision of a Level II CTQP Qualified PT Technician who must be present at the site of the PT work during the entire duration of the operation. Work crew members are not required to be CTQP qualified.

2) Grouting:

a) Perform all grouting field operations under the direct supervision of a Level II CTQP Qualified Grouting Technician who must be present at the site of the grouting work during the entire duration of the operation. For the superstructures of bridges having concrete post-tensioned box or I girder construction, provide at least two CTQP qualified grouting technicians, Level I or II, on the work crew. The supervisor of the work crew, who must be a Level II CTQP Qualified Grouting Technician, may also be a work crew member, in which case, the supervisor shall count as one of two CTQP qualified work crew members.

b) For grouting operations other than the superstructures of post-tensioned box or I girder construction, perform all grouting operations under the direct supervision of a Level II CTQP Qualified Grouting Technician who must be present at the site of the grouting work during the entire duration of the operation. Work crew members are not required to be CTQP qualified.

c) Perform all vacuum grouting operations under the direct supervision of a crew foreman who has been trained and has experience in the use of vacuum grouting equipment and procedures. Submit the crew foreman's training and experience records to Engineer prior to performing any vacuum grouting operation.

h. Failure to Comply with Bridge Qualification Requirements:

1) Make an immediate effort to reestablish compliance. If an immediate effort is not put forth as determined by Engineer, payment for the bridge construction operations requiring supervisors to be qualified under this Specification will be withheld up to 60 days. Cease all bridge construction and related activities (casting yard, etc.) if compliance is not met within 60 days, regardless of how much effort is put forth. Resume bridge construction operations only after written approval from Engineer stating that compliance is reestablished.

9. Prestressed Concrete Plant Quality Control Personnel:

a. Ensure each prestressed concrete plant has an onsite production manager, an onsite Plant Quality Control Manager, a Plant engineer, and adequate onsite QC inspectors/technicians to provide complete QC inspections and testing.

b. Ensure the Plant Manager for QC has at least five years of related experience and a current PCI QC personnel Level III certification and a certificate of completion of FDOT Section 450 Specification examination. Ensure that the QC inspector/technician has current PCI QC

Technician/Inspector Level II certification and a certificate of completion of FDOT Section 450 Specification examination.

c. Ensure that the batch plant operators of the ready mixed concrete batch plants meet the requirements of Section 9.2 of the FDOT Materials Manual. Ensure that the batch plant operators of the onsite centrally mixed concrete plants meet the training requirements of Subarticle 105-F.11.b.4) b) below.

10. Signal Installation Inspector:

a. Provide an inspector trained and certified by the International Municipal Signal Association (IMSA) as a Traffic Signal Inspector to perform all signal installation inspections. Use only Department approved signal inspection report forms during the signal inspection activities.

b. Ensure all equipment, materials, and hardware is in compliance with Department Specifications and verify that all equipment requiring certification is listed on the PWWM Traffic Signals And Signs Qualified Products List (TSSQPL) http://www.miamidade.gov/qpl/.

c. Provide the completed signal inspection report form(s), certified by the IMSA Traffic Signal Inspector to Engineer. Sample forms are available at the FDOT webpage address: http://www.dot.state.fl.us/trafficoperations

11. Pipe and Precast Concrete Products Manufacturing Facilities Quality Control Personnel:

a. General: Obtain personnel certifications from FDOT accredited training providers. The list of FDOT approved courses and their accredited providers is available on the State Materials Office website.

b. Precast Concrete Drainage Structures, Precast Concrete Box Culvert, Precast Concrete Pipe, Incidental Precast Concrete, and Flexible Pipe Manufacturing Facilities Quality Control Personnel:

1) Level I Quality Control Inspectors: Ensure that the Level I Inspectors have completed a minimum of a 12-hour, Department approved, Level I QC Inspector training course in the respective work area. As an exception to this, ensure Flexible Pipe Level I QC Inspectors have completed a minimum of an 8-hour, Department approved, Level I QC Flexible Pipe Inspector training course. For Incidental Precast Concrete, as an alternative to the completion of the 12-hour training course, the Department will accept QC personnel meeting the requirements of Subarticle 105-F.11.b.4)a) below and CTQP Concrete Field Technician level I certification or Precast/Prestressed Concrete Institute (PCI) Quality Control Technician/Inspector Level II certification.

2) Level II Quality Control Inspectors: Ensure that Level II Inspectors have completed FDOT approved Level I QC Inspector training and a minimum of a 5-hour, FDOT approved, Level II QC Inspector training course in the respective work areas. For Incidental Precast Concrete, as an alternative to the completion of the 5-hour training course, the Department will accept CTQP Concrete Field Technician Level II or PCI Quality Control Level III certifications.

3) Plant Quality Control Manager: Ensure that QC Manager has completed FDOT approved Level II QC Inspector training and has a minimum of 2 years construction related experience in the specific work area.

4) Additional Requirements for Quality Control Personnel of Precast Concrete Drainage, Precast Concrete Box Culvert, and Incidental Precast Concrete Manufacturing Facilities:

a) Testing Personnel: Ensure the personnel performing plastic property tests have ACI Concrete Field Testing Technician-Grade I certification. Ensure the personnel performing laboratory compressive strength testing have ACI Concrete Laboratory Testing Technician-Grade 1 certification or ACI Concrete Strength Testing Technician certification.

b) Batch Plant Operator: Ensure the concrete batch plant operator is qualified as a CTQP Concrete Batch Plant Operator. As an alternative to CTQP qualification, the Department will accept the completion of a minimum of a 6-hour, FDOT approved, Batch Plant Operator training course.

12. Structural Steel and Miscellaneous Metals Fabrication Facility Quality Control Personnel:

a. Ensure each fabrication facility has an onsite production manager, an onsite facility manager for QC, a plant engineer, and on site QC inspectors/technicians to provide complete QC inspections and testing.

b. Ensure that the Facility Manager for QC and QC inspectors/technicians meet the certification requirements set forth in the latest version of AASHTO/NSBA Steel Bridge Collaboration S 4.1, Steel Bridge Fabrication QC/QA Guide Specification, including the years of experience required in Table 105-1 below. The Facility Manager for QC must meet the requirements of Table 105-1 for every Structural Steel Member Type produced by a plant with QC being managed by the Facility Manager for QC. The Facility Manager for QC will report directly to the plant manager or plant engineer and must not be the plant production manager nor report to or be the subordinate of the plant production manager. QC inspectors/technicians must be the employees of, and must report directly to the Facility Manager for QC.

TABLE 105-1
Experience Requirements for QC Inspectors/Technicians And Facility Manager for Quality Control

Structural Steel Member Type	Minimum Years of Experience Required	
	QC Inspector/Technician	Facility Manager for QC
Rolled beam bridges	1 year	3 years
Welded plate girders (I	2 years	4 years

sections, box sections, etc.)		
Complex structures, such as trusses, arches, cable stayed bridges, and moveable bridges	3 years	5 years
Fracture critical (FC) members	3 years	5 years

G. FDOT Quality Control Program.

1. Producers for the following materials must have an accepted FDOT Quality Control Program during the production of materials to be used on Department projects and be currently listed in the FDOT Materials/Producer Listings and must meet and maintain the approved FDOT Quality Control Program requirements at all times while producing materials that will be incorporated into the Project (http://www.dot.state.fl.us/statematerialsoffice/quality/programs/qualitycontrol/materialslistings/postjuly2002.shtm):
   a. Aggregate
   b. Asphalt Mix
   c. Cementitious Material
   d. Drainage Products
   e. Earthwork
   f. Galvanize Metal Products
   g. Portland Cement Concrete (Structural)
   h. Prestress/Precast Concrete Products
   i. Steel and Miscellaneous Metal
   j. Timber
2. When accreditation or certification is required, make supporting documents from the two previous inspections performed by the accrediting or certifying agency available to the Department upon request.
3. Prestressed Concrete Quality Control Program: Ensure that prestressed concrete plants participating in the FDOT's Acceptance Program are qualified. Obtaining qualification requires a current certification from a FDOT approved precast prestressed concrete plant certification agency and a FDOT approved Quality Control Plan. The list of FDOT approved certification agencies is available on the website of the FDOT State Materials Office.
4. Steel and Miscellaneous Metals Quality Control Program:
   a. Ensure that the fabricators of Steel and miscellaneous metal products participating in the FDOT's Quality Control Acceptance Program are qualified. Obtaining qualification requires an accepted FDOT Quality Control Plan. A current American Institute for Steel Construction (AISC) certification is a requirement for the Quality Control Acceptance Program of the steel and miscellaneous metal fabricators, provided that AISC certification program is available for the category of the fabrication products.
   b. Steel and Miscellaneous Metal products, including aluminum, are defined as the metal components of bridges, including pedestrian and moveable bridges, overhead and cantilevered sign supports, ladders and platforms, bearings, end wall grates, roadway gratings, drainage items, expansion joints, roadway decking, shear connectors, handrails, galvanized products, fencing, guardrail, light poles, high mast light poles, standard mast arm assemblies and Monotube assemblies, stay in-place forms, casing pipe, strain poles, fasteners, connectors and other hardware.

107 LITTER REMOVAL AND MOWING (REV. 11-25-2015)

H. Description.

1. Contractor to be responsible for the work below in areas where the County or the property owner has restricted or limited access to maintain the property.
   a. Provide pickup, removal and disposal of litter within the project limits from the outside edge of travel way to the right of way line. Include the median on divided highways, from the inside edge of travel way to the inside edge of travel way. Litter includes; but is not limited to, bottles, cans, paper, tires, tire pieces, lumber, vehicle parts, metal junk, and brush debris. Exclude any inaccessible areas or areas identified in the Plans as new landscaping in accordance with the Contract Documents.
   b. Mow turf or vegetation within the project limits. Turf consists of grasses planted in accordance with FDOT Section 570. Vegetation consists of planted and natural grasses, weeds, and other natural vegetation that have been previously mowed. Exclude any areas identified in the Plans as new landscaping in accordance with the Contract Documents.

I. Operation.

1. Frequency:
   a. Remove litter daily from the beginning of the project until final completion, unless otherwise directed by the Engineer. Continue litter removal until final acceptance.
   b. Begin mowing when directed by the Engineer and continue per the frequency agreed, (every month or less depending of the weather season) unless otherwise directed by the Engineer. Mow all areas to obtain a uniform height of 6 inches. Maintain turf and vegetation height between 6 inches and 12 inches. Do not include seed stalk or wildflowers when measuring height. Continue mowing until final acceptance. After final acceptance perform litter removal and mowing until new turf is established in accordance with FDOT 570-4 at no cost to the County.
   c. Perform litter removal prior to and in conjunction with mowing; however, the Engineer may direct litter pickups in addition to those performed in conjunction with mowing. Do not mow new turf until a healthy root system is established. In designated wildflower areas, avoid cutting wildflowers when in bloom and when re-seeding.

2. General:

   a. Mow shoulders and medians concurrently so that not more than one mile will be left partially mowed at the conclusion of the working day. Mow turf and vegetation on slopes or around appurtenances concurrent with the mowing operation. In areas saturated with standing water, mow or cut to the surface of the water using hand labor or other specialized equipment when standard equipment will cause damage. Do not remove turf or other vegetation cuttings from the right-of-way, or rake or pick up the cuttings unless the cuttings are in the traveled ways, bike lanes, or sidewalk; are obstructing drainage structures; or are the result of cleaning the equipment.

3. Limitations:

   a. Maintain traffic in accordance with Article 102-Maintenance of Traffic. When mowing within four feet of a travel lane, operate the equipment in the same direction of traffic, unless the adjacent lane is closed to traffic due to construction operations. Perform all work during daylight hours.

4. Disposal of Litter and Debris:

   a. During each litter removal cycle, bag and remove all litter or piles at the end of each working day. Dispose of litter in accordance with applicable local and state laws. Do not store or stockpile litter within the project limits.

J. Method of Measurement.

1. No measure is included for litter removal or mowing.

K. Basis of Payment.

1. All work and incidental costs specified as being covered under this Article will be included for payment under the several scheduled items of the overall Contract, and no separate payment will be made.

110 CLEARING AND GRUBBING (REV. 05-16-11)

A. General.

1. Perform all Clearing and Grubbing required by the Contract Documents or necessary to prepare the Project site for the proposed construction.

2. Remove and dispose of all structures, material, product and debris not required to be salvaged or not required to complete the construction.

3. Trim trees and shrubs within the Project right-of-way that are required by the Contract Documents or necessary for the construction of the Project.

4. Perform the work and meet all the requirements for the miscellaneous operations described in Subarticle B.6 herein.

5. Protect and do not displace structures which are to remain in place.

B. Clearing and Grubbing:

1. Standard Clearing and Grubbing.

   a. Perform Standard Clearing and Grubbing within:

      1) Right-of-way of the roadway to be constructed.

      2) All Project areas, whether or not shown in the Plans, that require Clearing and Grubbing including:

         a) Areas where excavation is to be done.

         b) Areas where roadway embankments will be constructed.

         c) Areas where structures will be constructed or installed.

   b. Work includes complete removal and disposal of:

      1) All buildings, structures, appurtenances, existing pavement, trees, plants, vegetation, timber, brush, stumps, roots, rubbish, debris, and all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas.

      2) All other structures and obstructions necessary to be removed and for which other items of the Contract do not specify the removal thereof.

      3) Any boulders encountered in the roadway excavation or found on the surface of the ground unless otherwise permitted by the Contract Documents

   c. Depths of Removal of Roots, Stumps, and Other Debris:

      1) Completely remove and dispose of all stumps found within the roadway right-of-way.

      2) Remove roots and other debris from all excavated material to be used in the construction of roadway embankment.

      3) In all areas where excavation is to be performed or roadway embankments are to be constructed, plow the surface to a depth of at least 6 inches, and remove roots and other debris to a depth of 12 inches below the ground surface.

      4) Remove all roots and other debris protruding through or appearing on the surface of the completed excavation within the roadway area and for structures, to a depth of at least 12 inches below the finished excavation surface.

      5) In borrow pits, material pits, and lateral ditches, remove or cut off all stumps, roots, etc. below the surface of the completed excavation. Do not perform any clearing or grubbing within 3 feet inside the right-of-way line in borrow and material pits.

      6) Within all other areas where Standard Clearing and Grubbing is to be performed, remove roots and other debris projecting through or appearing on the surface of the original ground to a depth of 12 inches below the surface, but do not plow or harrow these areas.

   d. Trees to Remain:

1) As an exception to the above provisions, where so directed by the Engineer, trim, protect, and leave standing desirable trees within the Project area.

2) Trim branches of trees extending over the area occupied by the roadway as directed, to give a clear height of 16 feet above the roadway.

2. Selective Clearing and Grubbing.

a. Perform Selective Clearing and Grubbing only in areas so designated in the Plans or where directed by the Engineer.

b. Completely remove and dispose of stumps and remove and dispose of all vegetation, obstructions, etc., as required for Standard Clearing and Grubbing except that, where so elected, the Contractor may cut roots flush with the ground surface.

c. Entirely remove undergrowth except in specific areas designated by the Engineer to remain for aesthetic purposes.

d. Trim, protect, and leave standing desirable trees, with the exception of such trees as the Engineer may designate to be removed in order to facilitate right-of-way maintenance. Remove undesirable or damaged trees as so designated by the Engineer.

3. Removal of Buildings.

a. Completely remove all parts of the buildings, including utilities, plumbing, foundations, floors, basements, steps, connecting concrete sidewalks or other pavement, septic tanks, and any other appurtenances, by any practical manner which is not detrimental to other property and improvements. Remove utilities to the point of connection to the utility authority's cut-in.

b. After removing the sewer connections to the point of cut-in, construct a concrete plug at the cut-in point, as directed by the Engineer, except where the utility owners may elect to perform their own plugging. Contact the appropriate utility companies prior to removal of any part of the building to ensure disconnection of services.

c. Removal by Others: Where buildings within the area to be cleared and grubbed are so specified to be removed by others, remove and dispose of any foundations, curtain walls, concrete floors, basements or other foundation parts which might be left in place after such removal of buildings by others.

4. Removal of Existing Structures.

a. Structures to be removed include:

1) Structures, or portions of structures, shown in the Plans to be removed;

2) Structures, or portions of structures, found within the areas requiring Clearing and Grubbing, and directed by the Engineer to be removed;

3) Structures, or portion of structures, which are necessary to be removed in order to construct new structures; and

4) All other appurtenances or obstructions which may be designated in the Contract Documents as to be included for removal under this Article.

b. Removal Requirements:

1) General:

a) Remove and dispose of all materials from existing structures required to be removed.

b) Remove the structures in a neat manner so as to leave no obstructions to any proposed new structures, construction, or to any waterways.

c) Pull, cut off, or break off pilings to the requirements of the permit or other Contract Documents, whichever requires the deepest removal, but not less than 2 feet below the finish ground line.

d) If Plans indicate channel excavation to be done by others, consider the finish ground line as the limits of such excavation.

e) For materials which are to remain the property of the Department or are to be salvaged for use in temporary structures, avoid damage to such materials, and entirely remove all bolts, nails, etc. from timbers to be so salvaged.

f) Mark structural steel members for identification as directed.

2) Removal of Steel Members With Hazardous Coatings:

a) Provide to the Engineer for approval, a copy of the "Contractor's Lead in Construction Compliance Program" from the firm actually removing and disposing of these steel members before any members are disturbed.

b) Vacuum power tool clean any coated steel member to bare metal as defined by SSPC-SP11 a minimum of 4 inches either side of any area to be heated (torch cutting, sawing, grinding, etc.) in accordance with 29 CFR 1926.354. Abrasive blasting is prohibited.

c) Provide air supplied respirators in accordance with 29 CFR 1926.62 and 29 CFR 1910.134.

c. Partial Removal of Bridges:

1) For all demolition methods, submit for review and approval of the Engineer, a demolition plan that describes the method of removal, equipment to be used, types of rebar splices or couplers, and method of straightening or cutting rebars. In addition, for hydro-demolition, describe the method for control of water or slurry runoff and measures for safe containment of concrete fragments that are thrown out by the hydro-demolition machine.

2) Where concrete is to be removed to neat lines, use concrete saws or hydro-demolition methods capable of providing a reasonably uniform cleavage face. If the equipment used will not provide a uniform cut without surface spalling, first score the outlines of the work with small trenches or grooves.

3) On concrete bridges to be partially removed and widened, remove concrete by manually or mechanically operated pavement breakers, by concrete saws, by chipping hammers, or by hydro-demolition methods. Do not use explosives.

d. Authority of U.S. Coast Guard: For structures in navigable waters, when constructing the project under authority of a U.S. Coast Guard permit, the U.S. Coast Guard may inspect and approve the work to remove any existing structures involved therein, prior to acceptance by the Department.

e. Asbestos Containing Materials (ACM) Not Identified Prior to the Work:

1) When encountering or exposing any condition indicating the presence of asbestos, cease operations immediately in the vicinity and notify the Engineer.

2) Make every effort to minimize the disturbance of the ACM. Immediately provide for the health and safety of all workers at the job site and make provisions necessary for the health and safety of the public that may be exposed to any potentially hazardous conditions. Provisions shall meet all applicable laws, rules or regulations covering hazardous conditions and will be in a manner commensurate with the gravity of the conditions.

3) The Engineer will direct the Prime Contractor when operations may resume in the affected area.

5. Removal of Existing Concrete Pavement.

a. Remove and dispose of existing rigid portland cement concrete pavement, sidewalk, slope pavement, ditch pavement, curb, and curb and gutter etc., where shown in the plans or ordered by the Engineer to be removed or where required because of the construction operations.

b. The work under Removal of Existing Concrete Pavement does not include the removal of retaining walls, drainage structures and flexible asphalt pavement.

6. Miscellaneous Operations.

a. Water Wells Required to be Plugged:

1) Fill or plug all water wells within the right-of-way, including areas of borrow pits and lateral ditches that are not to remain in service, in accordance with applicable Water Management District rules or the Department of Environmental Protection regulations.

2) Cut off the casing of cased wells at least 12 inches below the ground line or 12 inches below the elevation of the finished excavation surface, whichever is lower. Water wells, as referred to herein, are defined either as artesian or non-artesian, as follows:

a) An artesian well is an artificial hole in the ground from which water supplies may be obtained and which penetrates any water-bearing rock, the water in which is raised to the surface by natural flow or which rises to an elevation above the top of the water-bearing bed. Artesian wells are further defined to include all holes drilled as a source of water that penetrate any water-bearing beds that are a part of the artesian water system of Florida, as determined by representatives of the applicable Water Management District.

b) A non-artesian (water-table) well is a well in which the source of water is an unconfined aquifer. The water in a non-artesian well does not rise above the source bed.

b. Landscape Areas: When certain areas of the right-of-way, outside of the limits of construction, are shown in the plans or designated by the Engineer to be landscaped, either under the construction Contract or at a later time, remove undesirable trees, stumps, undergrowth, and vegetation, as directed, and preserve and trim natural growth and trees as directed by the Engineer.

c. Leveling Terrain: Within the areas between the limits of construction and the outer limits of clearing and grubbing, fill all holes and other depressions, and cut down all mounds and ridges. Make the area of a sufficient uniform contour so that the Department's subsequent mowing and cutting operations are not hindered by irregularity of terrain. Perform this work regardless of whether the irregularities were the result of construction operations or existed originally.

d. Mailboxes: When the Contract Documents require furnishing and installing mailboxes, permit each owner to remove the existing mailbox. Work with the Local Postmaster to develop a method of temporary mail service for the period between removal and installation of the new mailboxes. Install the mailboxes in accordance with the Design Standards.

C. Ownership of Materials.

1. Except as may be otherwise specified in the Contract Documents, the Contractor shall take ownership of all buildings, structures, appurtenances, and other materials removed by him and shall dispose of them in accordance with subarticle D below.

D. Disposal of Materials.

1. General:

a. Dispose of all debris, timber, stumps, brush, roots, rubbish, and other waste material resulting from clearing and grubbing in areas and by methods meeting the applicable requirements of all Local, State and Federal regulations.

2. Disposal of Treated Wood:

a. Treated wood, including that which comes from bridge channel fender systems, must be handled and disposed of properly during removal.

b. Treated wood should not be cut or otherwise mechanically altered in a manner that would generate dust or particles without proper respiratory and dermal protection.

c. Treated wood must be disposed of in at least a lined solid waste facility or through recycling/reuse.

d. Treated wood shall not be disposed by burning or placement in a construction and demolition (C&D) debris landfill.

e. All compensation for the cost of removal and disposal of treated wood will be included in the Cost of Removal of Existing Structures when an item for direct payment

is provided in the Contract. If an item of direct payment is not provided in the Contract, the aforementioned cost is included in the cost for Clearing and Grubbing or among the other items of work in the Contract.

3. Hazardous Materials/Waste:

a. General:

1) Handle, transport and dispose of hazardous materials in accordance with all Local, State and Federal requirements including the following:

a) SSPC Guide 7

b) Federal Water Pollution Control Act, and

c) Resource Conservation and Recovery Act (RCRA).

2) Accept responsibility for the collection, sampling, classification, packaging, labeling, accumulation time, storage, manifesting, transportation, treatment and disposal of hazardous waste, both solid and liquid. Separate all solid and liquid waste and collect all liquids used at hygiene stations and handle as hazardous materials/waste. Obtain written approval from the Engineer and required agencies for all hazardous materials/waste stabilization methods before implementation.

3) Obtain an EPA/FDEP Hazardous Waste Identification Number (EPA/FDEP ID Number) before transporting and/or disposal of any hazardous materials/waste.

4) List the Department as the generator of all hazardous materials/waste.

5) Submit the following for the Engineers' approval before transporting, treatment or disposal of any hazardous materials/waste:

a) Name, address and qualifications of the transporter,

b) Name, address and qualifications of the treatment facility,

c) Proposed treatment and/or disposal of all Hazardous Materials/Waste.

6) Transport all hazardous materials/waste in accordance with applicable 40 CFR 263 Standards. Provide a copy of all completed Hazardous Materials/Waste manifest/bills of lading to the Engineer within 21 days of each shipment.

b. Steel Members With Hazardous Coating:

1) Unless otherwise required by the Contract Documents, dispose of steel members with hazardous coating in one of the following manners:

a) Deliver the steel members and other hazardous waste to a licensed recycling or treatment facility capable of processing steel members with hazardous coating.

b) Deliver any other hazardous materials/waste to a licensed hazardous materials/waste recycling treatment facility.

2) Dismantle and/or cut steel members to meet the required dimensions of the recycling facility, treatment facility or other regulatory agency.

3) All compensation for the cost of removal and disposal of hazardous materials/waste will be included in the Cost of Removal of Existing Structures when an item for direct payment is provided in the Contract. If an item of direct payment is not provided in the Contract, the aforementioned cost is included in the cost for Clearing and Grubbing or among the other items of work in the Contract.

c. Certification of Compliance:

1) Furnish two copies of Certification of Compliance from the firm actually removing and disposing of the hazardous materials/waste stipulating, the hazardous materials/waste has been handled, transported and disposed of in accordance with this Specification.

2) The Certification of Compliance shall be attested to by a person having legal authority to bind the company.

d. Maintain all records required by this Specification and ensure they are available to the Department upon request.

E. Method of Measurement.

1. Clearing and Grubbing:

a. No Direct Payment Provided: When no item for direct payment of Clearing and Grubbing is provided by the Contract, the costs for performing all work and meeting the requirements of this Article will be included among the various scheduled items of the Contract.

b. Direct Payment Provided: When direct payment for Clearing and Grubbing is provided in the Contract, the quantity to be paid for will be the lump sum quantity.

2. One or more of the following items may appear in a contract where no direct payment item for Clearing and Grubbing is provided. Only those items with an Awarded Unit Price will be considered for direct payment. All other work of Clearing and Grubbing is included among the various scheduled items of the Contract.

a. Removal of Existing Structures: When a separate item for the Removal of Existing Structures is provided for direct payment in the Contract, the quantity to be paid for will be the lump sum quantity or actual quantities for the specific structures removed, as stipulated in the Contract Documents.

b. Removal of Existing Concrete Pavement: When a separate item for Removal of Existing Concrete Pavement is provided for direct payment in the Contract, the quantity to be paid for will be the number of square yards of existing pavement of the types listed in subarticle B.5 herein, acceptably removed and disposed of, as specified. The quantity will be determined by actual measurement along the surface of the pavement before its removal. Measurements for appurtenances which have irregular surface configurations, such as curb and gutter, steps, and

ditch pavement, will be the area as projected to an approximate horizontal plane. Where the removal of pavement areas is necessary only for the construction of box culverts, pipe culverts, storm sewers, french drains, inlets, manholes, etc., these areas will not be included in the measurements.

c. Removal of Trees: When separate items for the Removal of Trees are provided for direct payment in the Contract, trees that are greater than 6 inches in diameter, will be paid on a per each basis by actual count by the Engineer of such trees under the appropriate item provided in the Contract. The diameter of a tree shall be obtained by measuring its circumference at 4.5 feet above the ground using a flexible tape measure and dividing the circumference by 3.14. If the tree is growing on a slope, the circumference is measured at 4.5 feet from the center of the slope. If the tree begins to branch below 4.5 feet, measure at the smallest circumference below the first branch.

d. Plugging Water Wells: When a separate item for Plugging of Water Wells is provided for direct payment in the Contract, the quantity to be paid for will be the number of water wells plugged, for each type of well (artesian or non-artesian).

e. Mailboxes: When a separate item is provided in the Contract for furnishing and installing mailboxes, the quantity to be paid for will be the number of mailboxes acceptably furnished and installed.

f. Delivery of Salvageable Material to the Department: When a separate item is provided in the Contract for the delivery of salvageable material to the Department, the quantity to be paid for will be the Lump Sum quantity for delivery of salvageable materials to the Department as indicated in the Plans or as directed by the Engineer.

F. Basis of Payment.

1. Clearing and Grubbing:

a. No Direct Payment Provided: When direct payment for Clearing and Grubbing is not provided in the Contract, the cost of any work of clearing and grubbing necessary for the proper construction of the Project and meeting all requirements of this Article, is included in the Contract price for the structure or other item of work for which such clearing and grubbing is required.

b. Direct Payment Provided:

1) Price and payment will be full compensation for all clearing and grubbing indicated or required for the construction of the entire Project, including all necessary hauling, furnishing equipment, equipment operation, furnishing any areas required for disposal of debris, leveling of terrain and the landscaping work of trimming, etc., as specified herein, except for any areas designated to be paid for separately or to be specifically included in the costs of other work under the Contract.

2) Unless otherwise provided by the Contract, price and payment will be full compensation for all work required by this Article including Removal of Existing Structures, Removal of Existing Concrete Pavement, Removal of Trees, Plugging of Water Wells, Mailboxes, and Delivery of Salvageable Material to the Department.

3) Where construction easements are specified in the Plans and the limits of clearing and grubbing for such easements are dependent upon the final construction requirements, no adjustment will be made in the lump sum price and payment, either over or under, for variations from the limits of the easement defined on the Plans.

c. The Contractor shall include the cost of all clearing and grubbing which might be necessary in pits or areas from which base material is obtained in the Contract price for the base in which such material is used.

d. The clearing and grubbing of areas for obtaining stabilizing materials, where required only for the purpose of obtaining materials for stabilizing, will not be paid for separately.

2. Removal of Existing Structures:

a. Price and payment will be full compensation for all work of removal and disposal of the designated structures.

b. When direct payment for the removal of existing structures is not provided in the Contract, the cost of removing all structures is included in the Contract price for Clearing and Grubbing or, if no item of Clearing and Grubbing is included, in the compensation for the other items covering the new structure being constructed.

3. Removal of Existing Concrete Pavement:

a. Price and payment will be full compensation for performing and completing all the work of removal and satisfactory disposal including any saw cutting required.

b. When direct payment for the removal of existing concrete pavement is not provided in the Contract and no applicable item of excavation or embankment covering such work is included in the Contract, the Contractor shall include the costs of this work in the Contract price for the item of Clearing and Grubbing or, if no item of Clearing and Grubbing is included in the Contract, in any work, pipe or other structure for which the concrete pavement removal is required.

4. Removal of Trees:

a. Price and payment will be full compensation for complete removal and disposal of each tree counted by the Engineer pursuant to these specifications.

b. When direct payment for the removal of trees is not provided in the Contract, the cost of removing all trees is included in the Contract price for Clearing and Grubbing or, if no item of Clearing and Grubbing is included in the Contract, in the compensation for all other items in the Contract.

5. Plugging Water Wells:

a. Price and payment will be full compensation for each type of well acceptably plugged.

b. When direct payment for plugging water wells is not provided in the Contract, the cost plugging water wells is included in the Contract price for Clearing and Grubbing or, if no item of Clearing and Grubbing is

included in the Contract, in the compensation for all other items in the Contract.

6. Mailboxes:

   a. Price and payment will be full compensation for all work and materials required, including supports and numbers.

   b. When direct payment for mailboxes is not provided in the Contract, the cost for all work and materials required, including supports and numbers, is included in the Contract price for Clearing and Grubbing or, if no item of Clearing and Grubbing is included in the Contract, in the compensation for all other items in the Contract.

7. Delivery of Salvageable Material to the Department:

   a. Price and payment will be full compensation for all work required for delivery of the materials to the Department.

   b. When the Contract does not provide direct payment for the Delivery of Salvageable Material that is to be delivered to the County, the cost of Delivery of Salvageable Material is included in the Contract price for Clearing and Grubbing or, where no item for Clearing and Grubbing is included in the Contract, in the compensation for all other items in the Contract.

8. Payment Items: Payment will be made under:

Item No.	Description	Unit
110- 1-1-1-1	Clearing and Grubbing	AC

120 EARTHWORK AND RELATED OPERATIONS

A. Description.

1. General:

   a. Earthwork and Related Operations consists of excavation for the construction of the roadway, excavation for structures and pipe, constructing backfill around structures and pipe, and constructing embankments as required for the roadway, ditches, and channel changes.

   b. Perform Earthwork and Related Operations based on the type of work specified in the Contract Documents.

   c. Meet the applicable requirements for materials, equipment and construction as specified in the Contract Documents.

B. Classes of Excavation.

1. Excavation of Unsuitable Material: Excavation of unsuitable material consists of the removal of muck, clay, rock or any other material that is unsuitable in its original position and that is excavated below the finished grading template. For stabilized bases and sand bituminous road mixes, the finished grading template is the top of the finished base, shoulders and slopes. For all other bases and rigid pavement, the finished grading template is the finished shoulder and slope lines and bottom of completed base or rigid pavement.

2. Lateral Ditch Excavation: Lateral Ditch Excavation consists of all excavation of inlet and outlet ditches to structures and roadway, changes in channels of streams, and ditches parallel to the roadway right-of-way.

3. Channel Excavation: Channel Excavation consists of the excavation and satisfactory disposal of all materials from the limits of the channel as shown in the Plans.

4. Excavation for Structures and Pipe: Excavation for Structures consists of the excavation for bridge foundations, box culverts, pipe culverts, storm sewers and all other pipe lines, retaining walls, headwalls for pipe culverts and drains, catch basins, drop inlets, manholes, and similar structures.

C. Excavation Requirements.

1. Excavation and Replacement of Unsuitable Materials: Where rock, muck, clay, or other material within the limits of the roadway is unsuitable in its original position, excavate such material to the cross-sections shown in the Plans or indicated by the Engineer, and backfill with suitable material. Shape backfill materials to the required cross-sections. Where the removal of plastic soils below the finished earthwork grade is required, meet a construction tolerance of ± 0.2 foot in depth and ± 6 inches (each side) in width.

2. Lateral Ditch Excavation: Excavate inlet and outlet ditches to structures and roadway, changes in channels of streams and ditches parallel to the roadway. Dress lateral ditches to the grade and cross-section shown in the Plans.

3. Channel Excavation: Excavate and dispose of all materials from the limits of the channel as shown in the Plans. Excavate for bridge foundations, box culverts, pipe culverts, storm sewers and all other pipe lines, retaining walls, headwalls for pipe culverts and drains, catch basins, drop inlets, manholes, and similar structures.

4. Excavation for Structures and Pipe.

   a. General: Excavate foundation pits to permit the placing of the full widths and lengths of footings shown in the Plans, with full horizontal beds. Do not round or undercut corners or edges of footings. Perform all excavation to foundation materials, satisfactory to the Engineer, regardless of the elevation shown on the Plans. Perform all excavation in stream beds to a depth at least 4 feet below the permanent bed of the stream, unless a firm footing can be established on solid rock before such depth is reached, and excavate to such additional depth as may be necessary to eliminate any danger of undermining. Wherever rock bottom is secured, excavate in such manner as to allow the solid rock to be exposed and prepared in horizontal beds for receiving the masonry. Remove all loose and disintegrated rock or thin strata. Have the Engineer inspect and approve all foundation excavations prior to placing masonry.

   b. Earth Excavation:

      1) Foundation Material other than the Rock: When masonry is to rest on an excavated surface other than rock, take special care to avoid disturbing the bottom of the excavation, and do not remove the

final foundation material to grade until just before placing the masonry. In case the foundation material is soft or mucky, the Engineer may require excavation to a greater depth and to backfill to grade with approved material.

2) Foundation Piles: Where foundation piles are used, complete the excavation of each pit before driving the piles. After the driving is completed, remove all loose and displaced material, leaving a smooth, solid, and level bed to receive the masonry.

3) Removal of Obstructions: Remove boulders, logs, or any unforeseen obstacles encountered in excavating.

c. Rock Excavation: Clean all rock and other hard foundation material, remove all loose material, and cut all rock to a firm surface. Either level, step vertically and horizontally, or serrate the rock, as may be directed by the Engineer. Clean out all seams, and fill them with concrete or mortar.

d. Pipe Trench Excavation:

1) Excavate trenches for pipe culverts and storm sewers to the elevation of the bottom of the pipe and to a width sufficient to provide adequate working room. Remove soil not meeting the classification specified herein for suitable backfill material for backfilling around pipe to a depth of 4 inches below the bottom of the pipe elevation. Remove rock, boulders or other hard lumpy or unyielding material to a depth of 12 inches below the bottom of the pipe elevation. Remove muck or other soft material to a depth necessary to establish a firm foundation. Where the soils permit, ensure that the trench sides are vertical up to at least the mid-point of the pipe.

2) For pipe lines placed above the natural ground line, place and compact the embankment, prior to excavation of the trench, to an elevation at least 2 feet above the top of the pipe and to a width equal to four pipe diameters, and then excavate the trench to the required grade.

D. Disposal of Surplus and Unsuitable Material.

1. Ownership of Excavated Materials: Dispose of surplus and excavated materials as shown in the Plans or, if the Plans do not indicate the method of disposal, take ownership of the materials and dispose of them in an authorized and lawful manner.

2. Disposal of Muck on Side Slopes: As an exception to the provisions herein for Ownership of Excavated Materials, when approved by the Engineer, muck (A-8 material) may be placed on the slopes, or stored alongside the roadway, provided there is a clear distance of at least 6 feet between the roadway grading limits and the muck, and the muck is dressed to present a neat appearance. In addition, this material may also be disposed of by placing it on the slopes where, in the opinion of the Engineer, this will result in an aesthetically pleasing appearance and will have no detrimental effect on the adjacent developments. Where the Engineer permits the disposal of muck or other unsuitable material inside the right-of-way limits, do not place such material in a manner which will impede the inflow or outfall of any channel or of side ditches. The Engineer will determine the limits adjacent to channels within which such materials may be disposed.

3. Disposal of Paving Materials: Unless otherwise noted, take ownership of paving materials, such as paving brick, asphalt block, concrete slab, sidewalk, curb and gutter, etc., excavated in the removal of existing pavements, and dispose of them outside the right-of-way. If the materials are to remain the property of the Agency, place them in neat piles as directed. Existing limerock base that is removed may be incorporated in the stabilized portion of the subgrade. If the construction sequence will allow, incorporate all existing limerock base into the project as allowed by the Contract Documents.

4. Disposal Areas:

a. Where the Contract Documents require disposal of excavated materials outside the right-of-way, and the disposal area is not indicated in the Contract Documents, furnish the disposal area without additional compensation.

E. Materials for Embankment.

1. General Requirements for Embankment Materials:

a. Construct embankments using suitable materials excavated from the roadway or delivered to the jobsite from authorized borrow pits.

b. Construct the embankment using maximum particle sizes (in any dimension) as follows:

1) In top 12 inches: 3 1/2 inches (in any dimension).

2) 12 to 24 inches: 6 inches (in any dimension).

3) In the depth below 24 inches: not to exceed 12 inches (in any dimension) or the compacted thickness of the layer being placed, whichever is less.

c. Spread all material so that the larger particles are separated from each other to minimize voids between them during compaction. Compact around these rocks in accordance with the requirements herein for Compaction of Embankments.

d. When and where approved by the Engineer, larger rocks (not to exceed 18 inches in any dimension) may be placed outside the one to two slope and at least 4 feet or more below the bottom of the base. Compact around these rocks to a firmness equal to that of the supporting soil. Where constructing embankments adjacent to bridge end bents or abutments, do not place rock larger than 3 1/2 inches in diameter within 3 feet of the location of any end-bent piling.

2. Use of Materials Excavated From the Roadway and Appurtenances: Assume responsibility for determining the suitability of excavated material for use on the project in accordance with the applicable Contract Documents. Consider the sequence of work and maintenance of traffic phasing in the determination of the availability of this material.

3. Authorization for Use of Borrow: Use borrow only when sufficient quantities of suitable material are not available from roadway and drainage excavation, to properly

construct the embankment, subgrade, and shoulders, and to complete the backfilling of structures and pipe. Do not use borrow material until authorized by the Engineer, and then only use material from approved borrow pits.

a. Haul Routes for Borrow Pits:

1) Provide and maintain, at no expense to the County, all necessary roads for hauling the borrow material. Where borrow area haul roads or trails are used by others, do not cause such roads or trails to deteriorate in condition.

2) Arrange for the use of all non-public haul routes crossing the property of any railroad. Incur any expense for the use of such haul routes. Establish haul routes which will direct construction vehicles away from developed areas when feasible, and keep noise from hauling operations to a minimum. Advise the Engineer in writing of all proposed haul routes.

b. Borrow Material for Shoulder Build-up: When so indicated in the Plans, furnish borrow material with a specific minimum bearing value, for building up of existing shoulders. Blend materials as necessary to achieve this specified minimum bearing value prior to placing the materials on the shoulders. Take samples of this borrow material at the pit or blended stockpile.

4. Materials Used at Pipes, Culverts, etc.: Construct embankments over and around pipes, culverts, and bridge foundations with selected materials.

F. Embankment Construction.

1. General: Construct embankments in sections of not less than 300 feet in length or for the full length of the embankment.

2. Dry Fill Method:

a. General:

1) Construct embankments to meet the requirements of subarticle G (Compaction Requirements) and in accordance with the Acceptance Program requirements herein. Restrict the compacted thickness of the last embankment lift to 6 inches maximum.

2) As far as practicable, distribute traffic over the work during the construction of embankments so as to cover the maximum area of the surface of each layer.

3) Construct embankment in the dry whenever normal dewatering equipment and methods can accomplish the needed dewatering.

a) For A-3 and A-2-4 Materials with up to 15% fines: Construct the embankment in successive layers with lifts up to a maximum compacted thickness of 12 inches. Ensure the percentage of fines passing the No. 200 US Standard sieve in the A 2 4 material does not exceed 15%.

b) For A-1 Plastic materials (As designated in FDOT Design Standard Index 505) and A-2-4 Materials with greater than 15% fines: Construct the embankment in successive layers with lifts up to a maximum compacted thickness of 6 inches.

c) Equipment and Methods: Provide normal dewatering equipment including, but not limited to, surface pumps, sump pumps and trenching/digging machinery. Provide normal dewatering methods including, but not limited to, constructing shallow surface drainage trenches/ditches, using sand blankets, sumps and siphons.

4) When normal dewatering does not adequately remove the water, the Engineer may require the embankment material to be placed in the water or in low swampy ground in accordance with the requirements herein for Compaction Where Plastic Material Has Been Removed.

b. Placing in Unstable Areas: Where depositing the material in water, or in low swampy ground that will not support the weight of hauling equipment, construct the embankment by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers. Once sufficient material has been placed so that the hauling equipment can be supported, construct the remaining portion of the embankment in layers in accordance with the applicable provisions herein for Compaction Where Plastic Material Has Been Removed and for Compaction of Grassed Shoulder Areas.

c. Placing on Steep Slopes: When constructing an embankment on a hillside sloping more than 20 degrees from the horizontal, before starting the fill, deeply plow or cut into steps the surface of the original ground on which the embankment is to be placed.

d. Placing Outside Standard Minimum Slope: Where material that is unsuitable for normal embankment construction is to be used in the embankment outside the standard minimum slope (approximately one to two), place such material in layers of not more than 18 inches in thickness, measured loose. The Contractor may also place material which is suitable for normal embankment, outside such standard minimum slope, in 18 inch layers. Maintain a constant thickness for suitable material placed within and outside the standard minimum slope, unless placing in a separate operation.

3. Hydraulic Method:

a. Method of Placing: When the hydraulic method is used, as far as practicable, place all dredged material in its final position in the embankment by such method. Place and compact any dredged material that is rehandled, or moved and placed in its final position by any other method, as specified herein for Compaction of Embankments. The Contractor may use baffles or any form of construction he may select, provided the slopes of the embankments are not steeper than indicated in the Plans. Remove all timber used for temporary bulkheads or baffles from the embankment, and fill and thoroughly compact the holes thus formed. When placing fill on submerged land, construct dikes prior to beginning of dredging, and maintain the dikes throughout the dredging operation.

b. Excess Material: Do not use excess material placed outside the prescribed slopes, below the normal high-water level, to raise the fill. Remove only the portion of this material required for dressing the slopes.

c. Protection of Openings in Embankment: Leave openings in the embankments at the bridge sites. Remove any material which invades these openings or existing channels without additional compensation to provide the same depth of channel as existed before the construction of the embankment. Do not excavate or dredge any material within 200 feet of the toe of the proposed embankment.

G. Compaction Requirements.

1. Moisture Content: Compact the materials at a moisture content such that the specified density can be attained. If necessary to attain the specified density, add water to the material, or lower the moisture content by manipulating the material or allowing it to dry, as is appropriate.

2. Compaction of Embankments:

a. Density requirements for earthwork and related operations associated with the construction of sidewalks and bike paths along with any drainage structures associated with these facilities; and for earthwork and related operations associated with the construction of turn lanes and other non-mainline traffic lanes, widening, roadway shoulders, concrete box culverts, retaining walls, and other drainage structures on the non-mainline pavement:

1) Reduce the minimum required density from 100% to 95% of AASHTO T99 Method C for all earthwork items requiring densities.

b. Density Requirements for earthwork and related operations associated with the construction of new mainline pavement, along with concrete box culverts, retaining walls, and other drainage structures on the mainline pavement:

1) Except for embankments constructed by the hydraulic method as specified herein, and for the material placed outside the standard minimum slope as specified herein for Placing Outside Standard Minimum Slope, and for other areas specifically excluded herein, compact each layer of the material used in the formation of embankments to a density of at least 100% of the maximum density as required by AASHTO T 99, Method C.

2) Uniformly compact each layer using equipment that will achieve the required density, and as compaction operations progress, shape and manipulate each layer as necessary to ensure uniform density throughout the embankment.

c. Compaction Over Unstable Foundations: Where the embankment material is deposited in water or on low swampy ground, and in a layer thicker than 12 inches (as provided herein under the requirements for Placing in Unstable Areas), compact the top 6 inches (compacted thickness) of such layer to the density as specified in the Acceptance Criteria herein.

d. Compaction Where Plastic Material Has Been Removed: Where unsuitable material is removed and the remaining surface is of the A 4, A 5, A 6, or A 7 Soil Groups, as determined by the Engineer, compact the surface of the excavated area by rolling with a sheepsfoot roller exerting a compression of at least 250 psi on the tamper feet, for the full width of the roadbed (subgrade and shoulders). Perform rolling before beginning any backfill, and continue until the roller feet do not penetrate the surface more than 1 inch. Do not perform such rolling where the remaining surface is below the normal water table and covered with water. Vary the procedure and equipment required for this operation at the discretion of the Engineer.

e. Compaction of Material to Be Used In Base, Pavement, or Stabilized Areas: Do not compact embankment material which will be incorporated into a pavement, base course, or stabilized subgrade, to be constructed as a part of the same Contract.

f. Compaction of Grassed Shoulder Areas: For the upper 6 inch layer of all shoulders which are to be grassed, since no specific density is required, compact only to the extent directed.

g. Compaction of Grassed Embankment Areas: For the outer layer of all embankments where plant growth will be established, do not compact. Leave this layer in a loose condition to a minimum depth of 6 inches for the subsequent seeding or planting operations.

3. Compaction of Subgrade:

a. If the Plans do not provide for stabilizing, compact the subgrade in both cuts and fills to the density specified in the Acceptance Criteria herein. For undisturbed soils, do not apply density requirements where constructing narrow widening strips or paved shoulders 5 feet or less in width.

b. Where trenches for widening strips are not of sufficient width to permit the use of standard compaction equipment, perform compaction using vibratory rollers, trench rollers, or other type compaction equipment approved by the Engineer.

c. Maintain the required density until the base or pavement is placed on the subgrade.

H. Backfilling Around Structures and Pipe.

1. Backfill Materials:

a. Backfill to the original ground surface or subgrade surface of openings made for structures, with a sufficient allowance for settlement. The Engineer may require that the material used for this backfill be obtained from a source entirely apart from the structure.

b. Do not allow heavy construction equipment to cross over culvert or storm sewer pipes until placing and compacting backfill material to the finished earthwork grade or to an elevation at least 4 feet above the crown of the pipe.

c. Use of A-7 Material: In the backfilling of trenches, A 7 material may be used from a point 12 inches above the top of the pipe up to the elevation shown on the FDOT Design Standards as the elevation for undercutting of A 7 material.

d. Time of Placing Backfill: Do not place backfill against any masonry or concrete abutment, wingwall, or culvert

until the Engineer has given permission to do so, and in no case until the masonry or concrete has been in place seven days or until the specified 28 day compressive strength occurs.

e. Placement and Compaction:

1) Place the material in horizontal layers not exceeding 6 inches compacted thickness, in depth above water level, behind abutments, wingwalls and end bents or end rest piers, and around box culverts and all structures including pipe culverts. When the backfill material is deposited in water, compact per the requirements herein for Compaction Under Wet Conditions and Backfill Under Wet Conditions.

2) The Contractor may elect to place material in thicker lifts of no more than 12 inches compacted thickness outside the soil envelope if he can demonstrate with a successful test section that density can be achieved. Notify the Engineer prior to beginning construction of a test section. Construct a test section of 500 feet in length. Perform five tests at random locations within the test section. All five tests must meet the density required by the Compaction of Embankments specified herein. Identify the test section with the compaction effort and soil classification in the Agency Logbook. In case of a change in compaction effort or soil classification, construct a new test section. When a test fails the Compaction Requirements specified herein, construct a new test section. The Contractor may elect to place material in 6 inches compacted thickness at any time.

2. Additional Requirements for Structures Other than Pipe:

a. Density: Where the backfill material is deposited in water, obtain a 12 inch layer of comparatively dry material, thoroughly compacted by tamping, before verifying the layer and density requirements. Meet the requirements of the density Acceptance Criteria.

b. Box Culverts: For box culverts over which pavement is to be constructed, compact around the structure to an elevation not less than 12 inches above the top of the structure, using rapid-striking mechanical tampers.

c. Other Limited Areas: Compact in other limited areas using mechanical tampers or approved hand tampers, until the cover over the structure is at least 12 inches thick. When hand tampers are used, deposit the materials in layers not more than 4 inches thick using hand tampers suitable for this purpose with a face area of not more than 100 in^2. Take special precautions to prevent any wedging action against the masonry, and step or terrace the slope bounding the excavation for abutments and wingwalls if required by the Engineer.

d. Culverts and Piers: Backfill around culverts and piers on both sides simultaneously to approximately the same elevation.

e. Compaction Under Wet Conditions: Where wet conditions do not permit the use of mechanical tampers, compact using hand tampers. Use only A 3 material for the hand tamped portions of the backfill. When the backfill has reached an elevation and condition such as to make the use of the mechanical tampers practical, perform mechanical tamping in such manner and to such extent as to transfer the compaction force into the sections previously tamped by hand.

3. Additional Requirements for Pipe 15 Inches Inside Diameter or Greater:

a. General: Trenches for pipe may have up to four zones that must be backfilled.

1) Lowest Zone: The lowest zone is backfilled for deep undercuts up to within 4 inches of the bottom of the pipe.

2) Bedding Zone: The zone above the Lowest Zone is the Bedding Zone. Usually it will be the backfill which is the 4 inches of soil below the bottom of the pipe. When rock or other hard material has been removed to place the pipe, the Bedding Zone will be the 12 inches of soil below the bottom of the pipe.

3) Cover Zone: The next zone is backfill that is placed after the pipe has been laid and will be called the Cover Zone. This zone extends to 12 inches above the top of the pipe. The Cover Zone and the Bedding Zone are considered the Soil Envelope for the pipe.

4) Top Zone: The Top Zone extends from 12 inches above the top of the pipe to the base or final grade.

b. Material:

1) Lowest Zone: Backfill areas undercut below the Bedding Zone of a pipe with coarse sand, or other suitable granular material, obtained from the grading operations on the project, or a commercial material if no suitable material is available.

2) Soil Envelope: In both the Bedding Zone and the Cover Zone of the pipe, backfill with materials classified as A 1, A 2, or A 3. Material classified as A-4 may be used if the pipe is concrete pipe.

3) Top Zone: Backfill the area of the trench above the soil envelope of the pipe with materials allowed on Design Standard, Index No. 505.

c. Compaction:

1) Lowest Zone: Compact the soil in the Lowest Zone to approximately match the density of the soil in which the trench was cut.

2) Bedding Zone:

a) If the trench was not undercut below the bottom of the pipe, loosen the soil in the bottom of the trench immediately below the approximate middle third of the outside diameter of the pipe.

b) If the trench was undercut, place the bedding material and leave it in a loose condition below the middle third of the outside diameter of the pipe. Compact the outer portions to meet the density requirements of the Acceptance Criteria. Place the material in lifts no greater than 6 inches (compacted thickness).

3) Cover Zone: Place the material in 6 inches layers (compacted thickness), evenly deposited on both sides of the pipe, and compact with mechanical tampers suitable for this purpose. Hand tamp

material below the pipe haunch that cannot be reached by mechanical tampers. Meet the requirements of the density Acceptance Criteria.

4) Top Zone: Place the material in layers not to exceed 12 inches in compacted thickness. Meet the requirements of the density Acceptance Criteria.

5) Backfill Under Wet Conditions:

a) Where wet conditions are such that dewatering by normal pumping methods would not be effective, the procedure outlined below may be used when specifically authorized by the Engineer in writing.

b) Granular material may be used below the elevation at which mechanical tampers would be effective, but only material classified as A 3. Place and compact the material using timbers or hand tampers until the backfill reaches an elevation such that its moisture content will permit the use of mechanical tampers. When the backfill has reached such elevation, use normally acceptable backfill material. Compact the material using mechanical tampers in such manner and to such extent as to transfer the compacting force into the material previously tamped by hand.

I. Acceptance Program.

1. Density over 105%: When a computed dry density results in a value greater than 105% of the applicable Proctor maximum dry density, perform a second density test within 5 feet. If the second density results in a value greater than 105%, investigate the compaction methods, examine the applicable Maximum Density and material description. If necessary, test an additional sample for acceptance in accordance with AASHTO T 99, Method C.

2. Maximum Density Determination: Determine the maximum density and optimum moisture content by sampling and testing the material in accordance with the specified test method listed below for Density Testing Requirements.

3. Density Testing Requirements: Ensure compliance, with the requirements of the Acceptance Criteria herein, by Nuclear Density testing in accordance with FDOT Florida Method FM 1 T 238. Determine the in-place moisture content for each density test. Use Florida Method FM 1 T 238, FM 5 507 (Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester), or ASTM D 4643 (Laboratory Determination of Moisture Content of Granular Soils By Use of a Microwave Oven) for moisture determination.

4. Soil Classification: Perform soil classification tests in accordance with AASHTO T 88. Classify soils in accordance with AASHTO M–145 in order to determine compliance with embankment utilization requirements.

5. Acceptance Criteria: Obtain a minimum density in accordance with the requirements herein for Compaction of Embankments with the following exceptions:

a. Embankment constructed by the Hydraulic Method as specified herein;

b. Material placed outside the standard minimum slope as specified in the requirements herein for Placing Outside Standard Minimum Slope;

c. Other areas specifically excluded herein.

6. Frequency: Conduct sampling and testing at a minimum frequency listed in the table below.

Test Name	Frequency
Maximum Density	One per soil type
Density	1 per 500’ RDWY (Alt Lift)
Soil Classification	One per Maximum Density

J. Maintenance and Protection of Work.

1. While construction is in progress, maintain adequate drainage for the roadbed at all times. Maintain a shoulder at least 3 feet wide adjacent to all pavement or base construction in order to provide support for the edges.

2. Maintain and protect all earthwork construction throughout the life of the Contract, and take all reasonable precautions to prevent loss of material from the roadway due to the action of wind or water. Repair any slides, washouts, settlement, subsidence, or other mishap which may occur prior to final acceptance of the work. Maintain all channels excavated as a part of the Contract work against natural shoaling or other encroachments to the lines, grades, and cross-sections shown in the Plans, until final acceptance of the Project.

K. Construction.

1. Construction Tolerances:

a. Shape the surface of the earthwork to conform to the lines, grades, and cross-sections shown in the Plans. In final shaping of the surface of earthwork, maintain a tolerance of 0.3 foot above or below the plan cross-section with the following exceptions:

1) Shape the surface of shoulders to within 0.1 foot of the plan cross-section.

2) Shape the earthwork to match adjacent pavement, curb, sidewalk, structures, etc.

3) Shape the bottom of ditches so that the ditch impounds no water.

4) When the work does not include construction of base or pavement, shape the entire roadbed (shoulder point to shoulder point) to within 0.1 foot above or below the plan cross-section.

b. Ensure that the shoulder lines do not vary horizontally more than 0.3 foot from the true lines shown in the Plans.

2. Operations Adjacent to Pavement:

a. Carefully dress areas adjacent to pavement areas to avoid damage to such pavement.

b. Complete grassing of shoulder areas prior to placing the final wearing course. Do not manipulate any embankment material on a pavement surface.

c. When shoulder dressing is underway adjacent to a pavement lane being used to maintain traffic, exercise extreme care to avoid interference with the safe movement of traffic.

L. Method of Measurement.

1. Excavation: Excavation will be paid for by volume, in cubic yards, calculated by the method of average end areas, unless the Engineer determines that another method of calculation will provide a more accurate result. The material will be measured in its original position by field survey or by photogrammetric means as designated by the Engineer. Measurement for payment will include the excavation and disposal of unsuitable material, lateral ditch excavation, channel excavation, and excavation for structures and pipe. Payment will not be made for excavation or embankment beyond the limits shown in the Plans or authorized by the Engineer. Shrinkage or swell factors are Contractor's responsibility. When shown on the plans, factors are for informational purposes only.

2. Embankment:

a. Will be paid for in cubic yards, as accepted by Engineer, calculated by the method of average end areas, unless Engineer determines that another method of calculation will provide a more accurate result. Embankment will be measured in its final position by field survey or by photogrammetric means as designated by Engineer.

b. The measurement will include only material actually placed and compacted above the original ground line, within the lines and grades indicated in the Plans or directed by the Engineer. The length used in the computations will be the station-to-station length actually constructed. The original ground line used in the computations will be as determined prior to placing of embankment and no allowance will be made for subsidence of material below the surface of the original ground.

c. Deduct any quantity beyond the limits shown in the Plans or authorized by Engineer. No payment will be made for additional material required to obtain compaction, material placed by Contractor outside the limits of the typical cross section, or material placed to correct for settlement of the embankment. Shrinkage or swell factors are Contractor's responsibility. When shown on the plans, factors are for informational purposes only.

M. Basis of Payment.

1. When No Direct Payment is Provided:

a. When no item for Excavation or Embankment is included in the list of Contract Unit Prices, the cost of any excavation or embankment necessary for the proper construction of the Project is included in the Contract Prices for the work requiring excavation or embankment.

b. Where the Work includes structures including pipe culvert and french drain, all earthwork costs for the installation of these items are included in their associated Contract Price.

2. When Direct Payment for Excavation or Embankment is Provided in the Contract:

a. Prices and payments for the work items included in this Section will be full compensation for all work described herein, including excavating, dredging, hauling, placing, and compacting; dressing the surface of the earthwork; and maintaining and protecting the complete earthwork.

b. Excavation:

1) The total quantity of all excavation specified under this Section will be paid for at the Contract unit price for Excavation.

2) No payment will be made for the excavation of any materials which are used for purposes other than those shown in the Plans or designated by the Engineer.

3) No payment will be made for materials excavated outside the lines and grades given by the Engineer, unless specifically authorized by the Engineer.

c. Embankment:

1) The total quantity of embankment specified in this Section will be paid for at the Contract unit price for embankment.

2) No payment will be made for materials which are used for purposes other than those shown in the Plans or designated by the Engineer.

3) No payment will be made for materials placed outside the lines and grades given by the Engineer.

3. Payment will be made under:

Item No.	Description	Unit
120-1	Regular Excavation	CY
120-6	Embankment	CY

121 FLOWABLE FILL

A. Description.

1. When approved by the Engineer, furnish and place Flowable Fill per FDOT Design Standard Index 307, as an alternative to compacted soil, where compaction cannot be achieved through normal mechanical methods. Applications for this material include beddings, encasements, closures for tanks, pipes, general backfill for trenches, and other uses specified in the Plans.

B. Materials.

1. Meet the following requirements:

Fine Aggregate*	Section 902
Portland Cement (Types I, II, or III)	Section 921

Water	Section 923
Admixtures**	Section 924
Fly Ash, Slag and other Pozzolanic Materials	Section 929
*Any clean fine aggregate with 100% passing a 3/8 inch mesh sieve and not more than 15% passing a No. 200 sieve may be used. **High air generators or foaming agents may be used in lieu of conventional air entraining admixtures and may be added at jobsite and mixed in accordance with manufacturer's recommendation.	

C. Mix Design.

1. Flowable Fill is a mixture of portland cement, fly ash, fine aggregate, air entraining admixture and water. Flowable fill contains a low cementitious content for reduced strength development.
2. Submit mix designs to the Engineer for approval. The following are suggested mix guides for excavatable and non-excavatable flowable fill:

	Excavatable	Non-Excavatable
Cement Type 1	75-100 lb/yd3	75-150 lb/yd3
Fly Ash	None	150-600 lb/yd3
Water	*	*
Air**	5-35%	5-15%
28 Day Compressive Strength**	Maximum 100 psi	Minimum 125 psi**
Unit Weight (Wet)***	90-110 lb/ft3	100-125 lb/ft3
Fine Aggregate shall be proportioned to yield 1 yd3.		
*Mix designs shall produce a consistency that will result in a flowable self-leveling product at time of placement. **Minimum 300 psi where approved by the Engineer for use above pipe culverts having less than two feet of cover measured to top of rock base. ***The requirements for percent air, compressive strength and unit weight are for laboratory designs only and are not intended for jobsite acceptance requirements.		

D. Production and Placing.

1. Use flowable fill manufactured at a production facility that meets the requirements of FDOT 347-3.
2. Deliver flowable fill using concrete construction equipment. Revolution counter are waived. Place flowable fill by chute, pumping or other methods approved by the Engineer. Tremie flowable fill through water.

E. Construction Requirements.

1. Use straps, soil anchors or other approved means of restraint to ensure correct alignment when flowable fill is used as backfill for pipe or where flotation or misalignment may occur.
2. Place flowable fill to the designated fill line without vibration or other means of compaction. Do not place flowable fill during inclement weather, e.g. rain or ambient temperatures below 40ºF. Protect flowable fill from freezing for a period of 36 hours after placement.
3. Take all necessary precautions to prevent any damages caused by the hydraulic pressure of the fill during placement prior to hardening. Provide the means to confine the material within the designated space.

F. Acceptance.

1. Acceptance of flowable fill will be based on the following documentation and a minimum temperature of flowable fill at the point of delivery of 50ºF.
2. Furnish a delivery ticket to the Engineer for each load of flowable fill delivered to the worksite. Ensure that each ticket contains the following information:
   a. Project designation,
   b. Date,
   c. Time,
   d. Class and quantity of flowable fill,
   e. Actual batch proportions,
   f. Free moisture content of aggregates,
   g. Quantity of water withheld.
3. Leave the fill undisturbed until the material obtains sufficient strength. Sufficient strength, unless otherwise required by the Engineer, is 35 psi penetration resistance as measured using a hand held penetrometer in accordance with ASTM C-403. Provide a hand held penetrometer to measure the penetration resistance of the hardened flowable fill.

G. Method of Measurement

1. Flowable fill will be measured for payment in cubic yards in place, as accepted by the Engineer, when shown as a pay item in the Contract. When flowable fill is not shown as a pay item, include the cost of the work in the bid price for the appropriate item.

H. Basis of Payment.

1. When the item of flowable fill is included in the Contract, payment will be made at the Contract unit price per cubic yard. Such price and payment will include all cost of the mixture, in place and accepted, determined as specified above. No measurement and payment will be made for material placed outside the neat line limits or outside the adjusted limits, or for unused or wasted material.

2. Payment will be made under:

   a. <<No separate item for Flowable Fill will be provided under this contract.>>

Item No.	Description	Unit

160 TYPE “B” STABILIZATION (SECTION 160)

A. Page 188, Section 160 - Stabilizing:

1. Delete the words "bearing value" or "Limerock Bearing Ratio Method" where they occur throughout this section and substitute the words "California Bearing Ratio."
2. Delete all contrary references to density requirements and substitute with the following:
   a. Compaction - The density requirements for all embankment and subgrade involved in this Section shall be a minimum ninety five (95) percent for non-roadway areas and ninety eight (98) percent for roadway areas, of maximum density as determined by AASHTO T-180.
3. Delete all mention of Bearing Value requirements entirely and substitute with the following:
   a. California Bearing Ratio Requirements: Suitability of the soil to be compacted shall be determined by the California Bearing Ratio Test as outlined in ASTM D 1883-87. Tests shall be made on each separate course, generally before the materials have been compacted. Any areas where the materials have a C.B.R. value of less than thirty (30) at ninety five (95) percent of the maximum density as determined by AASHTO T-180 shall be stabilized (or further stabilized) as specified herein.

B. Page 189, Subarticle 160-4.1- Commercial and Local Materials – Add the following:

1. Except that the limerock used for stabilization shall have a minimum of at least fifty (50) percent carbonates of calcium and magnesium.

C. Page 192, Subarticle 160-7.2.1.2- Undertolerances In…; is deleted in its entirety and replaced with the following:

1. There shall be no undertolerances in the C.B.R. permitted.

D. Page 195, Article 160-9- Basis of Payment; Is deleted in its entirety and replaced with the following:

1. Payment for stabilizing including all labor and materials shall be made at the Contract Unit Price Bid as indicated in the Bid Form of the Proposal.
2. Such price and payments shall constitute full compensation for all work specified in this Section for Type "B" Stabilization, including furnishing, spreading and mixing of all stabilizing material required and any reprocessing of stabilization areas necessary to attain the specified bearing value.

200 LIMEROCK BASE (REV. 08-23-12)

A. Description.

1. Construct a base composed of limerock material. Perform work in accordance with an approved Quality Control Plan meeting the requirements of Article 105 of these Specifications.

B. Materials.

1. Limerock base:
   a. Meet the requirements of FDOT Section 911.
   b. Produced and obtained from an FDOT approved source listed on the current FDOT Approved Aggregate Products from Mines or Terminals Listings.
2. More than one source of base rock on a single Contract may be used provided that a single source is used throughout the entire width and depth of a section of base. Obtain approval from Engineer before placing material from more than one source. Place material to ensure total thickness single source integrity at any station location of the base.
3. Intermittent placement or “Blending” of sources is not permitted.
4. Do not use any of the existing base that is removed to construct the new base.
5. Limerock is referred to hereinafter as “rock”.

C. Equipment.

1. Use mechanical rock spreaders, equipped with a device that strikes off the rock uniformly to laying thickness, capable of producing even distribution. For crossovers, intersections and ramp areas; roadway widths of 20 feet or less; the main roadway area when forms are used and any other areas where the use of a mechanical spreader is not practicable; Contractor may spread the rock using bulldozers or blade graders.

D. Transporting Rock.

1. Transport the rock to its point of use, over rock previously placed if practicable, and dump it on the end of the preceding spread. Hauling and dumping on the subgrade will be permitted only when, in Engineer’s opinion, these operations will not be detrimental to the subgrade.

E. Spreading Rock.

1. Method of Spreading:
   a. Spread the rock uniformly.
   b. Remove all segregated areas of fine or coarse rock and replace them with properly graded rock.
2. Number of Courses:
   a. When the specified compacted thickness of the base is greater than 6 inches, construct the base in multiple courses of equal thickness. Individual courses shall not be less than 3 inches. The thickness of the first course may be increased to bear the weight of the construction equipment without disturbing the subgrade.
3. Approval requirements for thicker lifts.
   a. If, through field tests, Contractor can demonstrate that the compaction equipment can achieve density for the full depth of a thicker lift, and if approved by Engineer, the base may be constructed in successive courses of not more than 8 inches compacted thickness. Engineer will base approval on results of a test section constructed using Contractor’s specified compaction effort as follows:
      1) Notify Engineer prior to beginning construction of a test section.
      2) Construct a test section of the length of one LOT. Perform five QC density tests at random locations within the test section. At each test site, test the bottom 6 inches in addition to the entire course thickness. All QC tests and a Department Verification test must meet the density required by the Acceptance Criteria in this Article.
      3) Identify the test section with the compaction effort and thickness in the Logbook. Remove the materials above the bottom 6 inches, at no expense to the Department. The minimum density required on the thicker lift will be the average of the five results obtained on the thick lift in the passing test section.
      4) Maintain the exposed surface as close to “undisturbed” as possible; no further compaction will be permitted during the test preparation. If unable to achieve the required density, remove and replace or repair the test section to comply with the specifications at no additional expense to the Department. Contractor may elect to place material in 6 inches compacted thickness at any time.
      5) Once approved, a change in the source of base material will require the construction of a new test section. Do not change the compaction effort once the test section is approved. Engineer will periodically verify the density of the bottom 6 inches during thick lift operations.
      6) Engineer may terminate the use of thick lift construction and instruct Contractor to revert to the 6 inches maximum lift thickness if Contractor fails to achieve satisfactory results or meet applicable specifications.
4. Rock Base for Shoulder Pavement: Unless otherwise permitted, complete all rock base shoulder construction at any particular location before placing the final course of pavement on the traveled roadway. When dumping material for the construction of a rock base on the shoulders, do not allow material capable of scarring or contaminating the pavement surface on the adjacent pavement. Immediately sweep off any rock material that is deposited on the surface course.

F. Compacting and Finishing Base.

1. General:
   a. Perform work in accordance with an approved Quality Control Plan meeting the requirements of Article 105 of these Specifications and the Acceptance Criteria herein below.
   b. Construct mainline pavement lanes, turn lanes, ramps, parking lots, concrete box culverts and retaining wall systems in sections of not less than 300 feet in length or for the full length of the rock base. For these, a LOT is defined as a single lift of finished embankment not to exceed 500 feet.
   c. Construct shoulder-only areas, bike/shared use paths, and sidewalks in sections of not less than 300 feet in length or for the full length of the rock base. For these, a LOT is defined as 1,000 feet or one Day's Production, whichever is greater. Shoulders compacted separately shall be considered separate LOTs.
2. Single Course Base: After spreading, scarify the entire surface. Shape the base to produce the required grade and cross-section, free of scabs and laminations, after compaction.
3. Multiple Course Base: Clean the first course of foreign material, then blade and bring it to a surface cross-section approximately parallel to the finished base. Before spreading any material for the upper courses, allow Engineer to make density tests for the lower courses to determine that the required compaction has been obtained. After spreading the material for the top course, scarify finish and shape its surface to produce the required grade and cross-section, free of scabs and laminations, after compaction.
4. Moisture Content: When the material does not have the proper moisture content to ensure the required density, wet or dry it as required. When adding water, uniformly mix it in to the full depth of the course that is being compacted. During wetting or drying operations, manipulate, as a unit, the entire width and depth of the course that is being compacted.
5. Thickness Requirements: Within the entire limits of the length and width of the finished base, meet the specified plan thickness in accordance with the Quality Control requirements specified in Depth and Surface Testing Requirements subarticle herein below.
6. Correction of Defects:
   a. Contamination of Base Material: If, at any time, the subgrade material becomes mixed with the base course material, dig out and remove the mixture, and reshape and compact the subgrade. Then replace the materials removed with clean base material, and shape and compact as specified above. Perform this work at no expense to the Department.
   b. Cracks and Checks: If cracks or checks appear in the base, either before or after priming, which, in the opinion of Engineer, would impair the structural efficiency of the base, remove the cracks or checks by rescarifying, reshaping, adding base material where necessary, and recompacting.
7. Compaction of Widening Strips:
   a. Where base construction consists of widening strips and the trench width is not sufficient to permit use of standard base compaction equipment, compact the base using vibratory compactors, trench rollers or other special equipment which will achieve the density requirements specified herein.
   b. When multiple course base construction is required, compact each course prior to spreading material for the overlaying course.

G. Acceptance Criteria:

1. Density: Within the entire limits of the width and depth of the base, obtain a minimum density in any LOT of 98% of modified Proctor maximum density as determined by FM 1-T 180, Method D. For shoulder only areas and bike/shared use paths, obtain a minimum density of 95% of the modified Proctor maximum density as determined by FM 1-T 180, Method D.
2. Frequency: Conduct QC sampling and testing at a minimum frequency listed in the table below. Engineer will perform Verification sampling and tests at a minimum frequency listed in the tables below.

Mainline Pavement Lanes, Turn Lanes, Ramps, Parking Lots, Concrete Box Culverts and Retaining Wall Systems		
Test Name	Quality Control	Verification
Modified Proctor Maximum Density	One per eight consecutive LOTs	One per 16 consecutive LOTs
Density	One per LOT	One per four LOTs
Roadway Surface	Ten per LOT	Witness
Roadway Thickness	Three per LOT	Witness

Shoulder-Only, Bike/Shared Use Path and Sidewalk Construction		
Test Name	Quality Control	Verification
Modified Proctor Maximum Density	One per two LOTs	One per four LOTs
Density	One per LOT	One per two LOTs
Surface	Five per 500 feet	Witness
Thickness	Three per 600 consecutive feet	Witness

3. Initial Equipment Comparison:
   a. Before initial production, perform a comparison test using the Quality Control, Verifications and Independent Assurance gauges. Unless Engineer instructs, do not perform the initial equipment comparison more than once per project. When comparing the computed dry density of one nuclear gauge to a second gauge, ensure that the difference between the two computed dry densities does not

exceed 2 lb/ft^3 between gauges from the same manufacturer, and 3 lb/ft^3 between gauges from different manufacturers. Repair or replace any Quality Control gauge that does not compare favorably with the Independent Assurance gauge.

b. Perform a comparison analysis between the Quality Control nuclear gauge and the Verification nuclear gauge any time a nuclear gauge or repaired nuclear gauge is first brought to the project. Repair and replace any Quality Control gauge that does not compare favorably with the Verification gauge at any time during the remainder of the project. Calibrate all Quality Control gauges annually.

4. Initial Production Lot:

a. Before construction of any other LOT, prepare a 500-foot initial control section consisting of one full LOT in accordance with the approved Quality Control Plan for the Project.

b. Notify Engineer at least 24 hours prior to production of the initial control section. Perform all QC tests required herein below. When the initial Quality Control test results pass specifications, Engineer will perform a Verification test to verify compliance with the specifications.

c. Do not begin constructing another LOT until successfully completing the initial production LOT. Engineer will notify Contractor of the initial production lot approval within three working days after receiving Contractor's Quality Control data when test results meet the following conditions:

1) Quality Control tests must meet the specifications.

2) Verification test must meet the specifications.

3) Difference between Quality Control and Verification computed Dry Density results shall meet the requirements provided above for Initial Equipment Comparison.

4) If Verification test result fails the density requirements of the Acceptance Critera, correct the areas of non-compliance. The Quality Control and Verification tests will then be repeated. Engineer will reject Contractor's Quality Control Plan after three unsuccessful Verification attempts. Submit a revised Quality Control Plan to Engineer for approval.

5. Density over 105%:

a. When a QC computed dry density results in a value greater than 105% of the applicable Proctor maximum dry density, Engineer will perform an Independent Verification density test within 5 feet.

b. If the Independent Verification density results in a value greater than 105%, Engineer will investigate the compaction methods, examine the applicable Standard Proctor Maximum Density and material description.

c. Engineer may collect and test an Independent Verification Standard Proctor Maximum Density sample for acceptance in accordance with the Acceptance Criteria.

6. Quality Control Tests:

a. Standard Proctor Maximum Density Determination: Determine the Quality Control standard Proctor maximum density and optimum moisture content by sampling and testing the material in accordance with the specified test method listed in the Acceptance Criteria.

b. Density Testing Requirements: Ensure compliance to the requirements of the Acceptance Criteria by Nuclear Density testing in accordance with FM 1-T 238. Determine the in-place moisture content for each density test. Use Florida Method FM 1-T 238, FM 5-507 (Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester), or ASTM D-4643 (Laboratory Determination of Moisture Content of Granular Soils By Use of a Microwave Oven) for moisture determination.

c. Soil Classification: Perform soil classification tests on the sample collected for the Standard Proctor Maximum Density Determination above, in accordance with AASHTO T-88. Classify soils in accordance with AASHTO M–145 in order to determine compliance with embankment utilization requirements. Unless required by Engineer, do not test or classify materials for stabilized subgrade or base.

7. Department Verification:

a. Engineer will conduct a Verification test(s) in order to accept all materials and work associated with the Quality Control Tests. Engineer will verify the Quality Control results if they meet the Verification Comparison Criteria, otherwise Engineer will implement Resolution procedures.

b. Engineer will select test locations, including Station, Offset, and Lift, using a Random Number generator based on the Lots under consideration. Each Verification test evaluates all work represented by the Quality Control testing completed in those LOTs.

c. In addition to the Verification testing, Engineer may perform additional Independent Verification (IV) testing. Engineer will evaluate and act upon the IV test results in the same manner as Verification test results.

d. When the project requires less than four Quality Control tests per material type, Engineer reserves the right to accept the materials and work through visual inspection.

8. Reduced Testing Frequency: When no Resolution testing is required for 12 consecutive verified LOTs, or if required, the QC test data was upheld, reduce the QC density testing to one test every two LOTs by identifying the substantiating tests in the Density Log Book and notifying Engineer in writing prior to starting reduced frequency of testing. Generate random numbers based on the two LOTs under consideration. When Quality Control test frequency is reduced to one every two LOTs, obtain Engineer's approval to place more than one LOT over an untested LOT. Assure similar compaction efforts for the untested LOTs. If the Verification test fails, and Quality Control test data is not upheld by Resolution testing, the Quality Control testing will revert to the original frequency of one Quality Control test per LOT. Do not apply reduced testing frequency in construction of shoulder-only areas, bike/shared use paths and sidewalks.

9. Quality Control Testing:

   a. Modified Proctor Maximum Density Requirement: Collect enough material to split and create three separate samples and retain two for Engineer's Verification and Resolution testing until Engineer accepts the 16 LOTs represented by the samples.

   b. Depth and Surface Testing Requirements:

      1) Notify Engineer a minimum of 24 hours before checking base depths and surface checking. Determine test locations including Stations and Offsets, using the Random Number generator approved by the Department. Do not perform depth and surface checks until Engineer is present to witness. Perform thickness check on the finished base or granular subbase component of a composite base. Provide traffic control, coring/boring equipment, and an operator for the coring/boring equipment. Traffic control is to be provided in accordance with the standard maintenance of traffic requirements of the Contract.

      2) The thickness is considered deficient, if the measured depth is over 1/2 inch less than the specified thickness. Correct all deficient areas of the completed base by scarifying and adding additional base material. As an exception, if authorized by the Department, such areas may be left in place without correction and with no payment.

      3) Check the finished surface of the base course with a template cut to the required crown and with a 15 foot straightedge laid parallel to the centerline of the road. Correct all irregularities greater than 1/4 inch to the satisfaction of the Engineer by scarifying and removing or adding rock as required, and recompact the entire area as specified hereinbefore.

   c. Surface & Thickness Reduced Testing Frequency: When no Resolution testing is required for 12 consecutive verified LOTs, or if required, the QC test data was upheld, reduce the QC surface and/or thickness checks to one half the minimum requirements as stated in the frequency requirements above (e.g. Reduce frequency from ten per LOT to ten per two LOTs) by identifying the substantiating tests and notifying Engineer in writing prior to starting reduced frequency of testing. If the Verification test fails, and Quality Control test data is not upheld by Resolution testing the Quality Control testing will revert to the original frequency required by the Acceptance Criteria above. The results of the Independent Verification testing will not affect the frequency of the Quality Control testing.

10. Department Verification Tests:

   a. Maximum Density: Engineer will randomly select one of the remaining two split samples and test in accordance with FM 1-T 180, Method D.

   b. Thickness and Surface Testing Requirements: The Department will witness the base depth and surface checks to ensure compliance with the Depth and Surface Testing Requirements above. If the QC test results are not deficient as defined therein, the LOT or 500-foot section will be accepted. If the QC test results are deficient, resolve deficiencies in accordance with the Depth and Surface Testing Requirements. Repeat acceptance testing. Provide traffic control, coring/boring equipment, and an operator for the coring/boring equipment.

   c. Verification Comparison Criteria and Resolution Procedures:

      1) Modified Proctor Maximum Density: Engineer will compare the Verification test results for Maximum Density to the corresponding Quality Control test results. If the test result is within 4.5 lb/ft3 of the QC test result, the LOTs will be verified. Otherwise, Engineer will collect the Resolution split sample corresponding to the Verification sample tested. The State Materials Office or an AASHTO accredited laboratory designated by the State Materials Office will perform Resolution testing. The material will be sampled and tested in accordance with FM 1-T 180, Method D.

      2) Engineer will compare the Resolution Test results with the Quality Control test results. If the Resolution Test result is within 4.5 lb/ft^3 of the corresponding Quality Control test result, Engineer will use the Quality Control test results for material acceptance purposes for each corresponding set of LOTs. If the Resolution test result is not within 4.5 lb/ft^3 of the corresponding Quality Control test, Engineer will collect the remaining Verification split sample for testing. Verification Test results will be used for material acceptance purposes for the LOTs in question.

      3) Density: When a Verification or Independent Verification density test does not meet the requirements of the Acceptance Criteria, retest at a site within a 5 feet radius of the Verification test location and observe the following:

         a) If the Quality Control retest meets the Acceptance Criteria and compares favorably with the Verification or Independent Verification test, Engineer will accept the LOTs in question.

         b) If the Quality Control retest does not meet the Acceptance Criteria and compares favorably with the Verification or Independent Verification test, rework and retest the material in that LOT. Engineer will re-verify the LOTs in question.

         c) If the Quality Control retest and the Verification or Independent Verification test do not compare favorably, complete a new Equipment-Comparison Analysis. Once acceptable comparison is achieved, retest the LOTs. Engineer will perform new verification testing. Acceptance testing will not begin on a new LOT until Contractor has a gauge that meets the comparison requirements.

      4) Thickness and Surface Testing Requirements: Resolve deficiencies in accordance with the Depth and Surface Testing Requirements above.

H. Priming and Maintaining.

1. Priming: Apply the prime coat only when the base meets the specified density requirements and when the

moisture content in the top half of the base does not exceed the optimum moisture of the base material. At the time of priming, ensure that the base is firm, unyielding and in such condition that no undue distortion will occur.

2. Maintaining: Maintain the true crown and template, with no rutting or other distortion, while applying the surface course.

I. Thickness of Base.

1. Engineer will determine, as follows, the average thickness of the compacted limerock base for use in the measurements specified in the Method of Measurement:
   a. Average thickness will be calculated per typical cross-section for the entire job as a unit.
   b. Any measured thickness that is more than 1/2 inch greater than the design thickness shown on the typical cross-section in the Plans or, when no plans exist, the thickness specified in the description of the Contract pay item, will be considered as the design or specified thickness plus 1/2 inch.
   c. Any areas of existing base left in place will not be included in the calculations.

J. Method of Measurement.

1. The quantity to be paid for will be the pay area in square yards of limerock base constructed pursuant to these specifications that is measured, adjusted as specified below, and accepted by Engineer.
   a. Normal Thickness Base: The surface area of specified normal thickness base to be adjusted will be the measured quantity as specified above, omitting any areas not accepted for payment under Subarticle 200-J.2 below, and omitting areas which are to be included for payment under the Method of Measurement for Variable Thickness Base Authorized by Engineer. The pay area is determined by adjusting the aforementioned surface area using the formula below limited to a maximum for the final pay area of 105 percent of the surface area.
      1) Pay Area = Surface Area × ((Calculated Average Thickness per these Specifications)/(Plan or Specified Thickness))
   b. Variable Thickness Base Authorized by Engineer: Where the base is constructed to an authorized compacted thickness other than the normal thickness as shown on the typical section in the Plans, as specified on the Plans, the thickness specified in the description of the Contract pay item, or ordered as by Engineer for providing additional depths at culverts or bridges, or for providing transitions to connecting pavements; the volume of such authorized variable thickness compacted base will be calculated from authorized lines and grades, or by other methods selected by Engineer, and converted to equivalent square yards of normal thickness base for payment.
2. Additional areas that will not be included in the above measurements for payment include:
   a. Areas of existing base left in place;
   b. Areas where under-thickness is in excess of the allowable tolerance as specified in Subarticle 200-G.9; and
   c. Areas where the work under other Contract pay item(s) includes the construction or restoration of a limerock base.

K. Basis of Payment.

1. Price and payment will be full compensation for all the work specified in this Article, including correcting all defective surface and deficient thickness, removing cracks and checks as provided above in Crack and Checks, prime coat application meeting the requirements of FDOT Section 300, and the additional rock required for crack elimination.
2. Payment will be made under the item(s) below that are provided in the Contract having awarded Contract unit price(s):

Item No.	Description	Unit
200-1-10	Limerock Base (8”) (Primed)	SY

327 MILLING OF EXISTING ASPHALT PAVEMENT (REV. 05-14-12)

A. Description.

1. At the locations and to the average depth of cut specified by the Contract Documents or Work Order, remove existing asphalt concrete pavement by milling to improve the rideability and cross slope of the finished pavement, to lower the finished grade adjacent to existing curb prior to resurfacing, or to completely remove existing pavement.
2. Take ownership of milled material.

B. Equipment.

1. Provide a milling machine capable of maintaining a depth of cut and cross slope that will achieve the results specified in the Contract Documents or Engineer. Use a machine with a minimum overall length (out to out measurement excluding the conveyor) of 18 feet and a minimum cutting width of 6 feet.
2. Equip the milling machine with a built-in automatic grade control system that can control the transverse slope and the longitudinal profile to produce the specified results.
3. To start the project, Engineer will approve any commercially manufactured milling machine that meets the above requirements. If it becomes evident after starting milling that the milling machine cannot consistently produce the specified results, Engineer will reject the milling machine for further use.
4. Contractor may use a smaller milling machine when milling to lower the grade adjacent to existing curb or other areas where it is impractical to use the above described equipment.
5. Equip the milling machine with means to effectively limit the amount of dust escaping during the removal operation.
6. For complete pavement removal, Engineer may approve the use of alternate removal and crushing equipment in lieu of the equipment specified above.

C. Construction.

1. General:
   a. Remove the existing raised reflective pavement markers prior to milling. Include the cost of removing existing pavement markers in the price for milling.
   b. When milling to improve rideability or cross slope, remove the existing pavement to the average depth specified by the Contract Documents or Work Order, in a manner that will restore the pavement surface to a uniform cross-section and longitudinal profile. Engineer may require the use of a stringline to ensure maintaining the proper alignment.
   c. Establish the longitudinal profile of the milled surface in accordance with the milling plans. Ensure that the final cross slope of the milled surface parallels the surface cross slope shown on the Plans or as directed by Engineer. Establish the cross slope of the milled surface by a second sensing device near the outside edge of the cut or by an automatic cross slope control mechanism. The Plans may waive the requirement of automatic grade or cross slope controls where the situation warrants such action.
   d. Operate the milling machine to minimize the amount of dust being emitted. Engineer may require prewetting of the pavement.
   e. Provide positive drainage of the milled surface and the adjacent pavement. Perform this operation on the same day as milling. Repave all milled surfaces no later than the day after the surface was milled unless otherwise stated in the plans.
   f. If traffic is to be maintained on the milled surface prior to the placement of the new asphalt concrete, provide suitable transitions between areas of varying thickness to create a smooth longitudinal riding surface. Produce a pattern of striations that will provide an acceptable riding surface. Engineer will require the control the traveling speed of the milling machine to produce a texture that will provide an acceptable riding surface.
   g. Prior to opening an area which has been milled to traffic, sweep the pavement with a power broom or other approved equipment to remove, to the greatest extent practicable, fine material which will create dust under traffic. Sweep in a manner that will minimize the potential for creation of a traffic hazard and to minimize air pollution.
   h. Sweep the milled surface with a power broom prior to placing asphalt concrete.
   i. In urban and other sensitive areas, use a street sweeper or other equipment capable of removing excess milled materials and controlling dust. Obtain Engineer's approval of such equipment, contingent upon its demonstrated ability to do the work.
   j. Perform the sweeping operation immediately after the milling operations or as directed by Engineer.
2. Quality Control Requirements:
   a. Furnish an electronic level with a length of 4 feet and an accuracy of plus or minus 0.1 degree approved by Engineer for the control of cross slope. Make this electronic level available at the jobsite at all times during milling operations. Calibrate and compare electronic levels at a minimum frequency of once per day before any milling operation, and at any time as directed by Engineer. If the comparison between the QC and Verification levels is within the comparison tolerance of plus or minus 0.2%, the QC level is considered to compare favorably and can be used for measurement and acceptance of cross slopes. If the levels do not compare favorably, perform a second comparison using another calibrated electronic level (PWWM or Contractor) for resolution. If this resolution level compares favorably with the QC level, the QC level is considered to be verified. If the second level does not compare favorably with the QC level, discontinue the use of the QC electronic level and

obtain another approved electronic level that meets the requirements of this specification. Regardless of the comparison analysis outcome, Contractor assumes all risk associated with placing the pavement at the correct cross slope.

b. Multiple cuts may be made to achieve the required pavement configuration or depth of cut. Measure the cross slope of the milled surface by placing the level at the center location of a lane and perpendicular to the roadway centerline. Record all the measurements to the nearest 0.1% on an approved form and submit to Engineer for documentation.

   1) Tangent Sections: Measure the cross slope per lane at a minimum frequency of one measurement every 100 feet. Calculate the absolute deviation of cross slope at each measurement and then average the absolute deviation of ten consecutive cross slope measurements. The absolute deviation is the positive value of a deviation. When the average absolute deviation cross slope is consistently within the acceptance tolerance as shown in Table 327-1 and upon approval by Engineer, the frequency of the cross slope measurements can be reduced to one measurement every 200 feet during milling operations.

   2) Superelevated Sections: Measure the cross slope every 100 feet per lane within the length of full superelevation. Calculate the absolute deviation of each measurement and then average the absolute deviation of ten consecutive cross slope measurements. For every transition section, measure the cross slope at control points identified in the plans or, if not shown in the plans, at a control point at a location of 0.0% cross slope. For curves where the length of the fully superelevated section is less than 250 feet, measure the cross slope at the beginning point, midpoint and ending point of the fully superelevated section, calculate the absolute deviation and average. When the number of measurements is less than ten and the length of full superelevation is greater than 250 feet, average the absolute deviation of all measurements.

c. If the average absolute deviation of the cross slope measurements falls outside the acceptance tolerance shown in Table 327-1, stop the milling operations and make adjustments until the problem is resolved to the satisfaction of Engineer. If an individual cross slope deviation falls outside the acceptance tolerance as shown in Table 327-1, make corrections only in the deficient area to the satisfaction of Engineer at no cost to the Department. For pavement with multiple cuts, the deficient areas not caused by the final cut may be left in place upon approval of Engineer. All milling corrections shall be completed before placement of the asphalt course unless stated otherwise in the plans or as determined by Engineer.

d. The limits of deficient areas requiring correction may be verified and adjusted with more accurate measurement methods, including survey instruments, upon approval by Engineer at no cost to the Department. Should Contractor wish to have any corrections waived, submit a request to Engineer for approval. Engineer may waive the corrections at no reduction in payment if an engineering determination indicates that the deficiencies are sufficiently separated so as not to significantly affect the final cross slope or project grade.

e. For intersections, tapers, crossovers, transitions at the beginning and end of the project, bridge approaches and similar areas, adjust the cross slope to match the actual site conditions, or as directed by Engineer.

TABLE 327-1
Cross Slope Milling Acceptance Tolerance

Roadway Feature	Individual Absolute Deviation	Average Absolute Deviation
Tangent section (including turn lanes)	0.4%	0.2%
Superelevated curve	0.4%	0.2%
Shoulder	0.5%	0.5%

D. Milled Surface.

1. Provide a milled surface with a reasonably uniform texture, within 1/4 inch of a true profile grade, and with no deviation in excess of 1/4 inch from a straightedge applied to the pavement perpendicular to the centerline. Ensure that the variation of the longitudinal joint between multiple cut areas does not exceed 1/4 inch. Engineer may accept areas varying from a true surface in excess of the above stated tolerance without correction if Engineer determines that they were caused by a pre-existing condition which could not have reasonably been corrected by the milling operations. Correct any unsuitable texture or profile, as determined by Engineer, at no additional expense to the Department.
2. Engineer may require remilling of any area where a surface lamination causes a non-uniform texture to occur.

E. Method of Measurement.

1. The quantity to be paid for will be the area, in square yards, over which milling is completed and accepted by Engineer.

F. Basis of Payment.

1. Price and payment will be full compensation for all work specified in this Article, including hauling off and stockpiling or otherwise disposing of the milled material.
2. Payment will be made under:

Item No.	Description	Unit
327- 70-12	Milling Existing Asphalt Pavement (1-1/4" Avg. Depth)	SY

334 HOT MIX ASPHALT (REV. 01-29-15)

A. Description.

1. General.

   a. Construct plant mixed Hot Mix Asphalt (HMA) pavements based on the type of mixture specified in the Contract Documents and for the Asphalt Work Categories defined below.

   b. Meet all applicable requirements for plants, material, equipment, and construction specified herein.

2. Asphalt Work Categories.

   a. Asphalt Work Category 1: Includes the construction of shared use paths and miscellaneous asphalt.

   b. Asphalt Work Category 2: Includes the construction of new asphalt turn lanes, paved shoulders and other non-mainline pavement locations.

   c. Asphalt Work Category 3: Includes the construction of new mainline asphalt pavement l, milling and resurfacing.

3. Mix Types.

   a. Use a HMA mix that meets the requirements of this specification.

   b. In the event a mix type is not identified in the Contract Documents use, subject to Engineer's approval, the appropriate HMA mix from Table 1 below.

   c. Mixtures are based on the design traffic level of the project, expressed in 18,000 pounds Equivalent Single Axle Loads (ESAL's).

   d. A Type SP or FC mix one traffic level higher than the traffic level specified in the Contract may be substituted, at no additional cost.

Table 1
HMA Fine Mix Types

Asphalt Work Category	Mix Types	Traffic Level(2)
1	Type SP-9.5(1)	A
2	Structural Mixes: Types SP-9.5 or SP-12.5(1) Friction Mixes: Types FC-9.5 or FC-12.5(1)	B or C
3	Structural Mixes: Types SP-9.5 or SP-12.5 Friction Mixes: Types FC-9.5 or FC-12.5	C
(1) Equivalent mixes may be approved as determined by the Engineer.		
(2) Traffic Level (1x106 ESAL's): A is <0.3; B is 0.3 to <3; and C is 3 to <10		

4. Gradation Classification.

   a. Use only fine HMA mixes meeting the requirements of subarticle C.2.b below. The equivalent AASHTO nominal maximum aggregate size Superpave mixes are as follows:

      1) Type SP-9.5, FC-9.5 ……. 9.5 mm (3/8")

      2) Type SP-12.5, FC-12.5 …….. 12.5 mm (1/2")

5. Total Pavement Thickness.

   a. The total pavement thickness of the HMA Pavement will be based on a specified spread rate or plan thickness as shown in the Contract Documents. Before paving, propose a spread rate or thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan spread rate or thickness.

   b. When the total pavement thickness is specified as plan thickness, the plan thickness and individual layer thickness will be converted to spread rate using the following equation:

      1) Spread rate (lbs/yd^2) = t x G_{mm} x 43.3 where:

         a) t = Thickness (in.) (Plan thickness or individual layer thickness)

         b) G_{mm} = Maximum specific gravity from the mix design

         c) For target purposes only, spread rate calculations shall be rounded to the nearest whole number.

   c. Plan quantities are based on a G_{mm} of 2.540, corresponding to a spread rate of 110 lbs. per square yard per inch. Pay quantities will be based on the actual maximum specific gravity of the mix being used.

6. Layer Thicknesses.

   a. Structural Course Layer(s):

      1) Unless otherwise called for in the Contract Documents, the allowable layer thicknesses for fine Type SP HMA mixes are as follows:

         a) Type SP-9.5……...1 - 1 1/2 inches

         b) Type SP-12.5……...1 1/2 - 2 1/2 inches

      2) Fine Type SP-9.5 mixes are limited to the top two structural layers, two layers maximum.

   b. Friction Course Layer (FC-12.5 and FC-9.5):

      1) The thickness of the friction course layer will be the plan thickness as shown in the Contract Document or as directed in writing by the Engineer. For construction purposes, the plan thickness will be converted to spread rate as defined in Subarticle A.5 above.

7. Additional Requirements.

   a. Type SP HMA fine mixtures:

      1) When construction includes the paving of adjacent shoulders (≤5 feet wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless otherwise called for in the Contract Documents.

2) For overbuild layers, use the minimum and maximum layer thicknesses as specified above unless called for differently in the Contract Documents. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch, and the maximum allowable thickness may be increased by 1/2 inch, unless called for differently in the Contract Documents.

8. Weight of Mixture.

a. The weight of the mixture shall be determined as provided in FDOT 320-2.2 (Electronic Weigh Systems).

B. Materials.

1. General Requirements: Meet the material requirements specified in FDOT Division III (Materials). Specific references as follows:

Superpave PG Asphalt Binder	FDOT 916-1
Recycling Agents	FDOT 916-2
Course Aggregate	FDOT Section 901
Fine Aggregate	FDOT Section 902

2. Asphalt Binder:

a. For Type SP Mixtures:

1) Unless specified elsewhere in the Contract Documents, use a PG 67-22 asphalt binder from the FDOT's Approved Products List (APL).

2) Meet the requirements of FDOT Section 916 and Subarticle B.4 below.

b. For Type FC Mixtures:

1) Use an ARB-5 asphalt rubber binder meeting the requirements of FDOT Section 336 and any additional requirements or modifications specified herein for the various mixtures.

2) If called for in the Contract Documents, use a PG 76-22 asphalt binder meeting the requirements of FDOT 916-1.

3) For projects with a total quantity of FC-9.5 or FC-12.5 less than 500 tons, the Contractor may elect to substitute for the ARB-5, a PG 76-22 Asphalt Binder that meets the requirements of FDOT 916-1.

3. Aggregate:

a. Provide certification from the aggregate supplier that the material meets all requirements for construction aggregates stipulated in the Contract Documents.

b. Aggregates and sources used must be identified in the FDOT "Approved Aggregate Products from Mines or Terminals" current listings.

c. For Type FC mixes:

1) Use an aggregate blend that consists of crushed granite, crushed Oolitic limestone, other crushed materials (as approved by FDOT for friction courses per Rule 14-103.005, Florida Administrative Code), or a combination of the above. Crushed limestone from the Oolitic formation may be used if it contains a minimum of 12% silica material as determined by FDOT Test Method FM 5-510 and FDOT grants approval of the source prior to its use. As an exception, mixes that contain a minimum of 60% crushed granite may either contain:

a) Up to 40% fine aggregate from other sources, or

b) A combination of up to 15% Reclaimed Asphalt Pavement (RAP) Material and the remaining fine aggregate from other sources.

c) A list of aggregates approved for use in friction courses may be available on the FDOT's website. The URL for obtaining this information, if available, is: https://mac.fdot.gov/smoreports

4. Reclaimed Asphalt Pavement (RAP) use in Type SP asphalt mixture:

a. General requirements: RAP may be used as a component of the Type SP asphalt mixture, if approved by the Engineer. Usage of RAP is subject to the following requirements:

1) Limit the amount of RAP material used in the mix to a maximum of 50 percent by weight of total aggregate.

2) When using a PG 76-22 Asphalt Binder, limit the amount of RAP material used in the mix to a maximum of 20 percent by weight of total aggregate.

3) Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles which are soft or conglomerates of fines.

4) Provide RAP material having a minimum average asphalt content of 4.0 percent by weight of total mix. The Engineer may sample the stockpile to verify that this requirement is met.

5) Use a grizzly or grid over the RAP cold bin, in-line roller crusher, screen, or other suitable means to prevent oversized RAP material from showing up in the completed recycle mixture. If oversized RAP material appears in the completed recycle mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

b. Material Characterization: Assume responsibility for establishing the asphalt binder content, gradation, viscosity and bulk specific gravity (Gsb) of the RAP material based on a representative sampling of the material.

c. Asphalt Binder for Mixes with RAP:

1) Select the appropriate asphalt binder grade based on Table 2 below.

2) The Engineer reserves the right to change the asphalt binder type and grade at design based on the characteristics of the RAP asphalt binder, and reserves the right to make changes during production.

3) Maintain the viscosity of the recycled mixture within the range of 5,000 to 15,000 poises.

Table 2 Asphalt Binder Grade for Mixes Containing RAP	
Percent RAP	Asphalt Binder Grade
<20	PG 67-22
20 – 29	PG 64-22
≥ 30	Recycling Agent

C. Composition of Mixture.

1. General: Compose the asphalt mixture using a combination of aggregates, mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

2. Mix Design:

   a. General: Design the asphalt mixture in accordance with AASHTO R35 04, except as noted herein. Submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. Prior to the production of any asphalt mixture, obtain the Engineer's conditional approval of the mix design. If required by the Engineer, send representative samples of all component materials, including asphalt binder to a laboratory designated by the Engineer for verification. The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and at his discretion, the Engineer may no longer allow the use of the mix design.

   b. Mixture Gradation Requirements: Combine the aggregates in proportions that will produce an asphalt mixture meeting all of the requirements defined in this specification and conform to the gradation requirements at design as defined in AASHTO M323 04, Table 3. Aggregates from various sources may be combined.

      1) Mixture Gradation Classification: Plot the combined mixture gradation on an FHWA 0.45 Power Gradation Chart. Include the Control Points from AASHTO M323 04, Table 3, as well as the Primary Control Sieve (PCS) Control Point from AASHTO M323 04, Table 4. Fine mixes are defined as having a gradation that passes above or through the primary control sieve control point. Use only fine mixes.

   c. Gyratory Compaction: Compact the design mixture in accordance with AASHTO T312 04. Use the number of gyrations as defined in AASHTO R35 04, Table 1.

   d. Design Criteria: Meet the requirements for nominal maximum aggregate size as defined in AASHTO M323 04, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in AASHTO M323 04, Table 6.

   e. Moisture Susceptibility:

      1) Test 4 inch specimens in accordance with FM 1 T 283. Provide a mixture having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (unconditioned) of 100 psi. If necessary, add a liquid anti-stripping agent from the FDOT's Qualified Products List, or hydrated lime in order to meet these criteria.

      2) In lieu of moisture susceptibility testing, add a liquid anti-stripping agent from the FDOT's Qualified Products List. Add 0.5% liquid anti-stripping agent by weight of binder.

   f. Additional Information: In addition to the requirements listed above, provide the following information on each mix design:

      1) The design traffic level and the design number of gyrations (N_{design}).

      2) The source and description of the materials to be used.

      3) The FDOT source number and the FDOT product code of the aggregate components furnished from an FDOT approved source.

      4) The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation caused by handling and processing as necessary.

      5) A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly material passing the No. 200 sieve) should be accounted for and identified.

      6) The bulk specific gravity (G_{sb}) value for each individual aggregate and RAP component.

      7) A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1 percent.

      8) A target temperature at which the mixture is to be discharged from the plant and a target roadway temperature. Do not exceed a target temperature of 330°F for modified asphalts and 315°F for unmodified asphalts.

      9) Provide the physical properties achieved at four different asphalt binder contents. One shall be at the optimum asphalt content, and must conform to all specified physical requirements.

      10) The name of the Mix Designer.

      11) The ignition oven calibration factor.

D. Contractor Quality Control.

1. Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and Project site for quality control purposes.

2. Acceptance of any automatic delivery ticket printout, electronic weight delivery ticket, or other evidence of

weight of the materials or approval of any particular type of materials or production methods will not constitute agreement by the County that such matters are in accordance with the Contract Documents and it shall be the Contractor's responsibility to ensure that the materials delivered to the project are in accordance with the Contract Documents.

E. General Construction Requirements.

1. Weather Limitations: Do not transport asphalt mix from the plant to the roadway unless all weather conditions are suitable for the laying operations.
2. Limitations of Laying Operations:
   a. General: Spread the mixture only when the surface upon which it is to be placed has been previously prepared, is intact, firm, and properly cured, and is dry.
   b. Air Temperature: Spread the mixture only when the air temperature in the shade and away from artificial heat is at least 40ºF for layers greater than 1 inch (100 lb/yd2) in thickness and at least 45ºF for layers 1 inch (100 lb/yd2) or less in thickness (this includes leveling courses). The minimum temperature requirement for leveling courses with a spread rate of 50 lb/yd2 or less is 50ºF.
3. Mix Temperature: Heat and combine the ingredients of the mix in such a manner as to produce a mixture with a temperature at the plant and at the roadway, within a range of ±30ºF from the target temperature as shown on the mix design. Reject all loads outside of this range.
4. Transportation of the Mixture: Transport the mixture in vehicles previously cleaned of all foreign material. After cleaning, thinly coat the inside surface of the truck bodies with soapy water or an asphalt release agent as needed to prevent the mixture from adhering to the beds. Do not allow excess liquid to pond in the truck body. Do not use diesel fuel or any other hazardous or environmentally detrimental material as a coating for the inside surface of the truck body. Cover each load at all times.
5. Preparation of Surfaces Prior to Paving:
   a. Cleaning: Clean the surface of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.
   b. Patching and Leveling Courses: Where the HMA is to be placed on an existing pavement which is irregular, wherever the plans indicate, or if directed by the Engineer, bring the existing surface to proper grade and cross-section by the application of patching or leveling courses.
   c. Application over Surface Treatment: Where an asphalt mix is to be placed over a surface treatment, sweep and dispose of all loose material from the paving area.
   d. Tack Coat: Apply a tack coat on existing pavement structures that are to be overlaid with an asphalt mix and between successive layers of all asphalt mixes, unless directed otherwise by the Engineer. Use a tack coat product meeting FDOT Section 300 (Prime and Tack Coats for Base Courses). Use an emulsified tack coat spread rate of 0.02 to 0.08 gal/sy or as specified by the Engineer.
6. Paving:
   a. Alignment of Edges: With the exception of pavements placed adjacent to curb and gutter or other true edges, place all pavements by the stringline method to obtain an accurate, uniform alignment of the pavement edge. Control the unsupported pavement edge to ensure that it will not deviate more than ± 1.5 inches from the stringline.
   b. Rain and Surface Conditions: Immediately cease transportation of asphalt mixtures from the plant when rain begins at the roadway. Do not place asphalt mixtures while rain is falling, or when there is water on the surface to be covered. Once the rain has stopped and water has been removed from the tacked surface to the satisfaction of the Engineer and the temperature of the mixture caught in transit still meets the requirements as specified in subarticle E.3 above, the Contractor may then place the mixture caught in transit.
   c. Checking Depth of Layer: Check the depth of each layer at frequent intervals, and make adjustments when the thickness exceeds the allowable tolerance of 1/4". Address any material outside of this tolerance per the direction of the Engineer. When making an adjustment, allow the paving machine to travel a minimum distance of 32 feet to stabilize before the second check is made to determine the effects of the adjustment.
   d. Hand Spreading: In limited areas where the use of the spreader is impossible or impracticable, spread and finish the mixture by hand.
   e. Spreading and Finishing: Upon arrival, dump the mixture in the approved paver, and immediately spread and strike-off the mixture to the full width required, and to such loose depth for each course that, when the work is completed, the required weight of mixture per square yard, or the specified thickness, is secured. Carry a uniform amount of mixture ahead of the screed at all times.
   f. Thickness of Layers: Construct each course of Type SP mixtures in layers of thickness pursuant to subarticle A.6.a above.
7. Leveling Courses:
   a. Patching Depressions: Before spreading any leveling course, fill all depressions in the existing surface more than 1 inch deep by spot patching with leveling course mixture, and compact thoroughly.
   b. Spreading Leveling Courses: Place all courses of leveling with an asphalt paver or by the use of two motor graders, one being equipped with a spreader box. Other types of leveling devices may be used upon approval by the Engineer.
   c. Rate of Application: When using Type SP-9.5 (fine graded) for leveling, do not allow the average spread of a layer to be less than 50 lb/yd2 or more than 75 lb/yd2. The quantity of mix for leveling shown in the plans represents the average for the entire project; however, the Contractor may vary the rate of application throughout the project as directed by the Engineer. When leveling in connection with base widening, the Engineer may require placing all the leveling mix prior to the widening operation.
8. Compaction:

a. For each paving or leveling train in operation, furnish a separate set of rollers, with their operators.

b. When density testing for acceptance is required (Asphalt Work Category 3), select equipment, sequence, and coverage of rolling to meet the specified density requirement. Regardless of the rolling procedure used, complete the final rolling before the surface temperature of the pavement drops to the extent that effective compaction may not be achieved or the rollers begin to damage the pavement.

c. When density testing for acceptance is not required (Asphalt Work Categories 1 and 2), use a rolling pattern approved by the Engineer.

d. Use hand tamps or other satisfactory means to compact areas which are inaccessible to a roller, such as areas adjacent to curbs, headers, gutters, bridges, manholes, etc.

9. Joints.

a. Transverse Joints: Construct smooth transverse joints, which are within 3/16 inch of a true longitudinal profile when measured with a 15 foot manual straightedge.

b. Longitudinal Joints: For all layers of pavement except the leveling course, place each layer so that longitudinal construction joints are offset 6 to 12 inches laterally between successive layers. Do not construct longitudinal joints in the wheelpaths. The Engineer may waive these requirement where offsetting is not feasible due to the sequence of construction.

10. Surface Requirements: Construct a smooth pavement with good surface texture and the proper cross-slope.

a. Texture of the Finished Surface of Paving Layers: Produce a finished surface of uniform texture and compaction with no pulled, torn, raveled, crushed or loosened portions and free of segregation, bleeding, flushing, sand streaks, sand spots, or ripples. Correct any area of the surface that does not meet the foregoing requirements in accordance with the requirements below for Correcting Unacceptable Pavement.

b. Cross Slope: Construct a pavement surface with cross slopes in compliance with the requirements of the Contract Documents.

c. Pavement Smoothness: Construct a smooth pavement meeting the requirements of this Specification. Furnish a 15 foot manual and a 15 foot rolling straightedge meeting the requirements of FM 5-509. Make them available at the job site at all times during paving operations for Asphalt Work Category 3 and make them available upon request of the Engineer for Asphalt Work Categories 1 and 2.

1) Asphalt Work Category 3:

a) Acceptance Testing: Using a rolling straightedge, test the final Type SP structural layer and the Type FC layer, where a friction course is called for in the Contract Documents. Test all pavement lanes where the width is constant using a rolling straightedge and document all deficiencies on a form approved by the Engineer. Notify the Engineer of the location and time of all straightedge testing a minimum of 48 hours before beginning testing.

b) Rolling Straightedge Exceptions: Testing with the rolling straightedge will not be required in the following areas: intersections, tapers, crossovers, parking lots and similar areas. In addition, testing with the rolling straightedge will not be performed on the following areas when they are less than 50 feet in length: turn lanes, acceleration/deceleration lanes and side streets. However, correct any individual surface irregularity in these areas that deviates from the plan grade in excess of 3/8 inch as determined by a 15 foot manual straightedge, and that the Engineer deems to be objectionable, in accordance with the requirement below for Correcting Unacceptable Pavement. The Engineer may waive or modify straightedging requirements if no milling, leveling, overbuild or underlying structural layer was placed on the project and the underlying layer was determined to be exceptionally irregular.

c) Final Type SP Structural Layer: Straightedge the final Type SP structural layer with a rolling straightedge behind the final roller of the paving train or as a separate operation. Address all deficiencies in excess of 3/16 inch in accordance with the requirements below for Correcting Unacceptable Pavement (structural layer). If the Type SP layer is to be the final surface, corrections may be waived by the Engineer. Retest the corrected areas.

d) Friction Course Layer: Where a friction course is called for in the Contract, at the completion of all paving operations, straightedge the friction course either behind the final roller of the paving train or as a separate operation. Address all deficiencies in excess of 3/16 inch in accordance with the requirements below for Correcting Unacceptable Pavement (friction course), unless waived by the Engineer. Retest all corrected areas.

2) Asphalt Work Categories 1 and 2: If required by the Engineer, straightedge the final structural layer with a rolling straightedge, either behind the final roller of the paving train or as a separate operation. Correct all deficiencies in excess of 5/16 inch in accordance with the requirements below for Correcting Unacceptable Pavement (structural layer). Retest all corrected areas. If the Engineer determines that the deficiencies on a bicycle path are due to field geometrical conditions, the Engineer will waive corrections with no deduction to the pay item quantity.

d. Correcting Unacceptable Pavement:

1) General: Correct all areas of unacceptable pavement at no additional cost.

2) Structural Layers: Correct deficiencies in the Type SP structural layer by one of the following methods:

a) Remove and replace the full depth of the layer, extending a minimum of 50 feet on both sides of

the defective area for the full width of the paving lane.

b) Mill the pavement surface to a depth and width that is adequate to remove the deficiency. (This option only applies if the structural layer is not the final surface layer.)

3) Friction Course: Correct deficiencies in the friction course layer by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides of the defective area for the full width of the paving lane.

F. Acceptance of the Mixture.

1. General: The asphalt mixture will be accepted based on the Asphalt Work Category as defined below:

   a. Asphalt Work Category 1 – Certification by the Contractor as defined below.

   b. Asphalt Work Category 2 – Certification and quality control testing by the Contractor as defined below.

   c. Asphalt Work Category 3 – Quality control testing by the Contractor and acceptance testing by the Engineer as defined below.

2. Certification by the Contractor: On Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project was in substantial compliance with the Specifications. The Engineer may run independent tests to determine the acceptability of the material.

3. Certification and Quality Control Testing by the Contractor: On Asphalt Work Category 2 construction, submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project was in substantial compliance with the Specifications, along with supporting test data documenting all quality control testing as described in the Quality Control Sampling and Testing Requirements (subarticle F.3.a. below). If so required by the Contract, utilize an Independent Laboratory as approved by the Engineer for the quality control testing. The mix will also require visual acceptance by the Engineer. In addition, the Engineer may run independent tests to determine the acceptability of the material.

   a. Quality Control Sampling and Testing Requirements:

      1) Perform quality control testing at a frequency of once per day. Obtain the samples in accordance with FDOT Method FM 1 T 168.

      2) Test the mixture at the plant for gradation (P-8 and P-200) and asphalt binder content (Pb).

      3) Test the mixture on the roadway for density using six-inch diameter roadway cores obtained at a frequency of three cores per day.

      4) Determine the asphalt content of the mixture in accordance with FM 5 563.

      5) Determine the gradation of the recovered aggregate in accordance with FM 1 T 030.

      6) Determine the roadway density in accordance with FM 1 T 166. The minimum roadway density will be based on the percent of the maximum specific gravity (Gmm) from the approved mix design. If the Contractor or Engineer suspects that the mix design Gmm is no longer representative of the asphalt mixture being produced, then a new Gmm value will be determined from plant-produced mix with the approval of the Engineer. Roadway density testing will not be required in certain situations as described in the Acceptance Testing Exceptions (subarticle F.4.a below).

      7) Assure that the asphalt content, gradation and density test results meet the criteria in Table 3 below.

Table 3 Quality Control and Acceptance Values	
Characteristic	Tolerance
Asphalt Binder Content (percent)	Target ± 0.55
Passing No. 8 Sieve (percent)	Target ± 6.00
Passing No. 200 Sieve (percent)	Target ± 2.00
Roadway Density (average of three cores)	91.5% G_{mm}
Roadway Density (any single core)	90.0 % G_{mm}

4. Quality Control Testing by the Contractor and Acceptance Testing by the Engineer: On Asphalt Work Category 3, perform quality control testing as described in the Quality Control Sampling and Testing Requirements (subarticle F.3.a above). In addition, the Engineer will accept the mixture at the plant with respect to gradation (P-8 and P-200) and asphalt binder content (Pb). The mixture will be accepted on the roadway with respect to density. The Engineer will sample and test the material as described in subarticle F.3.a above. The Engineer will randomly obtain at least one set of samples per day. Assure that the asphalt content, gradation and density test results meet the criteria in Table 3 above. Material failing to meet these acceptance criteria will be addressed as directed by the Engineer.

   a. Acceptance Testing Exceptions:

      1) When the total quantity of any mix type in the Project is less than 500 tons, or on Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. The Engineer may run independent tests to determine the acceptability of the material.

      2) Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, variable thickness overbuild courses, leveling courses, first lift of asphalt base course placed on subgrade, miscellaneous asphalt pavement, or any course with a specified thickness less than 1 inch or a specified spread rate less than 100 lbs/sy. In addition, density testing for acceptance will not be performed on the following areas when they are less than 1,000 feet in length:

crossovers, intersections, turning lanes, acceleration lanes, deceleration lanes, or ramps. Compact these courses in accordance with a standard rolling procedure approved by the Engineer. In the event that the rolling procedure deviates from the approved procedure, placement of the mix will be stopped.

G. Method of Measurement.

1. For the work specified under this Article, the quantity to be paid for will be the weight of the mixture, in tons.
2. The bid price for the asphalt mix will include the cost of the liquid asphalt or the asphalt recycling agent and the tack coat application as specified herein.

H. Basis of Payment.

1. General: Price and payment will be full compensation for all the work specified under this Article.

Item No.	Description	Unit
334-1-13	Superpave Asphaltic Concrete (Traffic C)	Ton
334-2-13-2	Hot Mix Asphalt, Traffic C, SP-12.5	Ton
337-7-82	Asphalt Concrete Friction Course, Traffic C, FC-9.5, Pg 76-22	Ton

335 DRIVEWAY TRANSITIONS (REV. 06-23-11)

A. Description

1. General: Where required by the Contract Documents or directed by the Engineer, transition the driveway to meet the elevation of a newly constructed and abutting sidewalk or roadway.

B. Materials

1. Meet the following requirements:
   a. Limerock (FDOT Section 911)
   b. Concrete (FDOT Section 347; minimum compressive strength of 3,000 p.s.i. at 28 days)
   c. Hot Mix Asphalt; refer to HMA Specifications in these Contract Documents.
   d. Expansion Joints (FDOT 932-1.1)

C. Preparation and Construction

1. Full-depth saw cut a neat line along the entire width of the driveway where it abuts the new sidewalk or roadway and remove existing concrete or asphalt to provide for a maximum transition slope of 2” per foot.
2. Concrete Driveways:
   a. Remove or add any additional subgrade material necessary to meet final elevation requirements.
   b. Add the necessary amount of limerock to rework the rock base and compact to a minimum of 95% of AASHTO T 99 density.
   c. Construct a 6” thick concrete pavement.
   d. Form a ½ inch expansion joint between the sidewalk and the driveway or at fixed objects and driveway intersections.
   e. Finish surface of concrete to match existing driveway.
3. Asphalt Driveways:
   a. Remove or add any additional subgrade necessary to meet final elevation for a new 6” thick limerock base and a 1” thick Hot Mix Asphalt (HMA) pavement layer.
   b. Provide and compact new limerock base to obtain a minimum density of 98% of modified Proctor maximum density as determined by FM 1-T 180, Method D.
   c. Construct a minimum 1” thick HMA pavement layer (Type SP-9.5).
4. Dispose of all excess materials and debris properly.

D. Method of Measurement

1. The quantity to be paid for will be the area, in square yards, of approved HMA or concrete pavement transition, measured and accepted by the Engineer.

E. Basis of Payment

1. Price and payment will be full compensation for all work and materials specified in this Article.
2. Payment will be made at the Contract unit prices for the quantities completed and accepted by the Engineer under the following item(s) as applicable.
3. <<No separate pay item(s) for Miscellaneous Asphalt Pavement will be provided under this contract.>>

Item No.	Description	Unit

339 MISCELLANEOUS ASPHALT PAVEMENT (REV. 08-25-11)

A. Description.

1. Construct asphalt pavement in areas where vehicular traffic does not travel, such as pavement under guardrail, bicycle paths, median pavement, sidewalks, etc.
2. Chemically treat the underlying soil to prevent plant growth.

B. Materials.

1. Use a plant-mixed hot bituminous mixture, other than an open-graded friction course (FC-5), meeting the requirements of a mix design approved by Engineer. For bicycle paths, use a mixture that produces a finished pavement which will not distort or mar under bicycle or commercial riding mower wheel loads.

C. Foundation.

1. Shape the soil in areas where pavement is to be constructed to a surface true to the lines, grades and typical cross-sections shown in the Plans.
2. Compact the soil to a firm unyielding state.

D. Soil Treatment.

1. Immediately before placing the pavement, uniformly apply a pre-emergent herbicide to the foundation soil meeting the following requirements:
   a. Use only products approved by the Florida Department of Agriculture for the State of Florida found on www.flpesticide.us/ website.
   b. Ensure that the herbicide carries an approved label for use under paved surfaces, and that herbicide is applied in accordance with directions on the label.
   c. Do not use any products in the sulfonylurea family of chemicals.
2. Herbicide application by broadcast spraying is not allowed.
3. Prevent damage to any adjacent vegetation during herbicide application. Replace, at no expense to the Department, any plants damaged as the result of soil treatment outside designated areas.
4. Ensure that all employees applying insecticides and herbicides possess a current Florida Department of Agriculture Commercial Applicator license with the categories of licensure in Right-of-Way Pest Control and Aquatic Pest Control. Ensure that employees who work with herbicides comply with all applicable Federal, State, and local regulations. If application of synthetic organo-auxin herbicides is necessary, meet the requirements of Chapter 5E-2, Florida Administrative Code.

E. Placing Mixture.

1. Uniformly place the hot bituminous mixture by machine or hand methods at the rate of spread or dimensions indicated in the plans or as otherwise directed by Engineer.
2. If posts are to be constructed within the pavement area, the Contractor may cut holes for installation through the completed pavement.
3. After completing installation of posts and compaction of the backfill material, patch the area around each post with fresh hot bituminous mixture.
4. If directed by the Engineer, place miscellaneous asphalt pavement prior to placement of the final surface course.

F. Compacting Mixture.

1. Uniformly compact the hot bituminous mixture with lightweight rollers or vibratory compactors as directed by Engineer. The Contractor may use hand tamps for compaction in areas which are inaccessible to other compaction equipment.

G. Surface Requirements.

1. Provide a finished surface that is reasonably smooth, of uniform texture, and shaped so as to drain without ponding of water.
2. Upon completion of the pavement, shape the surface of the adjacent earth to match the pavement edges.

H. Method of Measurement.

1. The quantity to be paid for will be the weight, in tons, determined by an electronic weighing system as described in FDOT 320-2.2. The pay quantity will be based on the average spread rate of the area shown on the Plans or authorized by the Engineer.
2. For calculation, a weight of 100 lbs/yd2 per inch thickness of asphalt will be used.
3. Prepare a Certification of Quantities for the miscellaneous asphalt pavement pay item, based on the quantity of asphalt accepted by the Engineer. The certification must be provided monthly with each payment request and include the Contract Number, Certification Number, Certification Date, period represented by Certification, and the tons of miscellaneous asphalt pavement for the period.

I. Basis of Payment.

1. Price and payment will be full compensation for all work specified in this Article, including shaping and compacting the foundation, soil sterilization treatment, furnishing of the bituminous material used in the mixture, and shaping of adjacent earth surfaces.
2. <<No separate pay item(s) for Miscellaneous Asphalt Pavement will be provided under this contract.>>
3. Payment will be made under:

Item No.	Description	Unit

344 PORTLAND CEMENT CONCRETE (REV. 10-26-11)

A. Description.

1. Use concrete composed of a mixture of Portland cement, aggregates, and water, with or without chemical or mineral admixtures. Construct Concrete based on the type of work as described in the Contract Documents and the Concrete Work Categories below.
   a. Concrete Work Category 1: Includes the construction of sidewalks, curb and gutter, ditch and slope pavement, or other non-reinforced cast-in- place or precast elements.
   b. Concrete Work Category 2: Includes the construction of precast concrete including concrete barriers, traffic railing barriers, parapets, sound barriers, inlets, manholes, junction boxes, pipe culverts, storm sewers, box culverts, prestressed concrete poles, concrete bases for light poles, highway sign foundations,

retaining wall systems, traffic separators or other structural precast elements.

c. Concrete Work Category 3: Includes the work associated with the placement and/or construction of structural cast-in-place concrete requiring a class of concrete specified in FDOT Section 346.

B. Materials.

1. General: Certify that all materials used in concrete meet the following requirements:

Portland Cement:	FDOT Section 921 except Portland cements meeting the requirements of AASHTO M-85 or ASTM C-150 are allowed for nonstructural concrete.
Coarse Aggregate:	FDOT Section 901
Fine Aggregate:	FDOT Section 902
Water:	FDOT Section 923
Chemical Admixtures:	FDOT Section 924
Pozzolans and Slag:	FDOT Section 929

2. Admixture Requirements: Chemical admixtures may be added at the dosage rates recommended by the manufacturer.

3. Material Storage: Use a concrete production facility that meets the following requirements.

a. Cementitious Materials Storage: Provide a separate and clearly labeled weatherproof facility to store each brand or type of cementitious material without mixing or contamination. Different brands of cement, cement of the same brand from different facilities, or different types of cement must be stored separately and must not be mixed. Provide a suitable, safe and convenient means of collecting cementitious material samples at each storage facility.

b. Aggregate Storage: Provide suitable bins, stockpiles or silos to store and identify aggregates without mixing, segregating or contaminating different grades or types of materials. Identify aggregate type/gradation. Handle the aggregates in a manner to minimize segregation and meet the specification requirements when recovered from storage. Continuously and uniformly sprinkle coarse aggregate with water, for 24 hours preceding introduction into the concrete mix. Timers may be used to facilitate the sprinkling of aggregate stockpiles using an alternating on/off method. However, in no event shall the top surface of the stockpile be permitted to become dry prior to batching of concrete. Moisture probes may be used to determine the moisture content of the aggregate. Ensure that the accuracy of the probe is certified annually and verified weekly. Maintain stored aggregates in a well-drained condition to minimize free water content. Provide access for the Engineer to sample the aggregates from the recovery side of the storage facility.

C. Production, Mixing and Delivery of Concrete.

1. Concrete Production Requirements:

a. Use concrete production facilities certified by the National Ready-Mixed Concrete Association (NRMCA) and approved by the FDOT.

b. Produce concrete utilizing equipment that is in good operating condition and operated in a manner to ensure a consistent product. When moisture probes are not used, ensure that the concrete production facility determines the free moisture for the coarse and fine aggregates within two hours prior to each day's batching. On concrete placements expected to exceed three hours, perform an additional moisture test approximately half way through the batching operations and adjust batch proportions accordingly.

c. Ensure that the calibration of the measuring devices of the concrete production facilities meets the requirements of Chapter 531 of the Florida Statutes, and are in accordance with Chapter 9.2 of the FDOT Materials Manual. At least quarterly, ensure that all scales, meters and other weighing or measuring devices are checked for accuracy by a qualified representative of a scale company registered with the Bureau of Weights and Measures of the Florida Department of Agriculture. As an alternative, the producer may have this frequency identified in an FDOT approved QC plan. The accuracy of admixture measuring dispensers will be certified annually by the admixture supplier.

d. When Volumetric Mixers are used for Category I applications, deliver concrete in accordance with the requirements of Volumetric Mixer Manufacturers Bureau (VMMB) and ensure that the vehicle has a VMMB registered rating plate.

2. Classes of Concrete: Classes of concrete to be used on the Project will be as specified in the Contract Documents or FDOT Section 346 when applicable.

3. Contractors Quality Control: Provide Engineer for approval a Quality Control (QC) plan to identity to the Department how quality will be ensured at the project site. During random inspections Engineer will use this document to verify that the construction of the Project is in agreement with the QC plan and the Contract Documents.

4. Concrete Mix Design:

a. Before producing any concrete, submit the proposed mix design to Engineer on a form provided by the Department. Otherwise, the Department may accept applicable mix designs previously described in an FDOT approved QC plan. In any event, use only concrete mix designs having prior approval of the Engineer.

b. Materials may be adjusted provided that the theoretical yield requirement of the approved mix design is met. Show all required original approved design mix data and batch adjustments and substituted material on a Department approved concrete delivery ticket. Engineer may disqualify any concrete production

facility for non-compliance with specification requirements.

5. Delivery:

   a. For cast-in-place applications, the maximum allowable mixing and agitation time of concrete is 90 minutes.

   b. Furnish a delivery ticket on a form approved by the Department with each batch of concrete before unloading at the placement site. The delivery ticket shall be printed. Record material quantities incorporated into the mix on the delivery ticket. Ensure that the Batcher responsible for producing the concrete certifies that the batch was produced in accordance with these Specifications and signs the delivery ticket. Contractor must sign the delivery ticket certifying that the concrete was batched, delivered and placed in accordance with these Specifications.

   c. The Contractor is responsible for rejecting loads of concrete that do not meet the plastic properties of the approved mix design or the minimum compressive strength requirements.

   d. At the sole option of the Department, the Engineer may accept concrete at a reduced pay when it is determined that the concrete will serve its intended function.

6. Placing Concrete:

   a. Concreting in Cold Weather:

      1) Do not place concrete when the temperature of the concrete at placement is below 45°F.

      2) Meet the air temperature requirements for mixing and placing concrete in cold weather as specified in FDOT Section 346. During the curing period, if NOAA predicts the ambient temperature to fall below 35°F for 12 hours or more or to fall below 30°F for more than 4 hours, enclose the structure in such a way that the concrete and air within the enclosure can be kept above 60°F for a period of 3 days after placing the concrete or until the concrete reaches a minimum compressive strength of 1,500 psi.

      3) Assume all risks connected with the placing and curing of concrete. Although Engineer may give permission to place concrete, Contractor is responsible for satisfactory results. If the placed concrete is determined to be unsatisfactory, remove, dispose of, and replace the concrete at no expense to the County.

   b. Concreting in Hot Weather:

      1) Meet the temperature requirements and special measures for mixing and placing concrete in hot weather as specified in FDOT Section 346.

      2) When the temperature of the concrete as placed exceeds 75°F, incorporate in the concrete mix a water-reducing retarder or water reducer if allowed by FDOT Section 346.

   c. Spray reinforcing steel and metal forms with cool fresh water just prior to placing the concrete in a method approved by the Engineer.

   d. Assume all risks connected with the placing and curing of concrete. Although Engineer may give permission to place concrete, Contractor is responsible for satisfactory results. If the placed concrete is determined to be unsatisfactory, remove, dispose of, and replace the concrete at no expense to the County.

7. Mixers: Ensure that mixers are capable of combining the components of concrete into thoroughly mixed and uniform mass, free from balls or lumps of cementitious materials, and capable of discharging the concrete uniformly. Operate concrete mixers at speeds per the manufacturer's design. Do not exceed the manufacturer's rated capacity for the volume of mixed concrete in the mixer, mixing drum, or container.

8. Small Quantities of Concrete: With approval of the Engineer, small quantities of concrete, less than 3 yd3 placed in one day and less than 0.5 yd3 placed in a single placement may be accepted using a pre-bagged mixture. The Department may verify that the pre-bagged mixture is prepared in accordance with the manufacturer's recommendations and will meet the requirements of this Specification.

9. Sampling and Testing:

   a. Category 1: Engineer may sample and test the concrete at his discretion to verify its quality. The minimum 28 day compressive strength requirement for this concrete is 3,000 psi.

   b. Category 2: Provide a statement of certification from the manufacturer of the precast element that the element meets the quality control and inspection testing requirements of the Contract Documents.

   c. Category 3: The Department will randomly select a sample from each 200 yd3 or one day's production to determine plastic properties and to make three 4 x 8 inch cylinders for testing by the Department at 28 days to ensure that the design compressive strength has been met. The Department may, at its discretion, test additional concrete samples to ensure compliance with the Specifications.

10. Records: Maintain the following records for review for at least 3 years after final acceptance of the Project:

    a. Approved concrete mix designs.

    b. Materials source (delivery tickets, certifications, certified mill test reports).

    c. A copy of the scale company or testing agency report showing the observed deviations from quantities checked during calibration of the scales and meters.

    d. A copy of the documentation certifying the admixture weighing/measuring devices.

    e. For non structural concrete, the Department will accept recent NRMCA, VMMB or FDOT inspection records certifying the plant or truck can produce concrete. In addition, documentation will be available at the plant or in the truck showing that action has been taken to correct deficiencies noted during the inspections.

D. Acceptance of the Work.

1. Category 1 Work: Category 1 work will be accepted based upon compliance with Production, Mixing and Delivery Requirements specified in herein.

2. Category 2 Work: Precast elements will be accepted based upon certification from the Contractor that the elements were produced by a production facility on the FDOT's current approved plant list. In addition, the producers QC stamp will be displayed on the element.
3. Category 3 Work: Category 3 work shall be in full compliance with this Specification, and with current FDOT Specifications, FDOT Section 346 and associated Contractor Quality Control (QC) specifications governing cast-in-place concrete. In addition, a Delivery Ticket as described in Subarticle 344-B.5 will be required for acceptance of the material at the Project site.

E. Method of Measurement.

1. The quantities to be paid for will be the concrete items having awarded Contract Prices that are completed and accepted by Engineer.

F. Basis of Payment.

1. Prices and payments will be full compensation for all work and materials specified in this Article and the Articles applicable to the items of work having awarded Contract Prices measured and approved for payment.

425 INLETS, MANHOLES AND JUNCTION BOXES (SECTION 425)

A. Page 417, Subarticle 425-6.6 - Placing Pipe; The third sentence of this sub-article is modified to read:

1. When catch basins are called for, the inlet and outlet pipe may extend into the structure not to exceed 4 inches beyond the interior face of the wall.

B. Page 417, Subarticle 425-6.7 Backfilling; is modified to include the following:

1. Select material shall be used for backfill adjacent to catch basins and riser inlets, as detailed in the Plans. It shall consist of well-graded limerock or limerock and sand fill. Sand or fill having a high proportion of sand will not be accepted as select fill. All select fill shall be approved by the Engineer prior to placing. No separate payment will be made for select fill, but shall be included in the unit bid price for each particular item as indicated in the Bid Form of the Proposal.

C. Page 417, Subarticle 425-8.2 - Adjusted Structures; is expanded to include the following:

1. Upon completion of the work, and prior to acceptance and final payment, all such structures will be inspected by the Engineer to ensure that they are free of all debris and thoroughly cleaned. All drainage structures within the project limits shall be cleaned thoroughly and made free of all debris prior to final acceptance by the County. The Contractor shall include within the scheduled items listed on the Contract's Bid Form, the cost of all work necessary for cleaning and debris removal.

D. Page 418, Subarticle 425-8.3 – Payment Items; is expanded to include the following:

1. When a separate item is listed on the Bid Form for cleaning of structures, said item shall only be used when indicated on the Engineering Plans or as directed by the Engineer, and only for the cleaning of drainage structures that were not impacted by construction activities.
2. Payment will be made under:

Item No.	Description	Unit
425- 1- 351	Inlets (Curb)(Type P-5) <10'	EA
425- 1- 361	Inlets (Curb)(Type P-6) <10'	EA
425- 1- 352 OPT	Inlets (Curb)(Type P-5) >10'	EA
425- 1- 362A	Inlets (Curb)(Type P-6) >10'	EA
425-1-908	Special Structure w/Weir and Baffle (>10')	EA
425-4(2)	Inlets, Adjust	EA
425-2-63	Manhole Type 8T (Partial) (Top Only)	EA

425A ADJUSTMENT OR RELOCATION OF VALVE, METER AND JUNCTION BOXES

1. The work under these pay items includes any adjustments (raising or lowering) of existing boxes or fire hydrants. When relocation of the box is required, the Contractor shall make all necessary arrangements with the utility companies, as the utility companies are responsible to relocate the valves and meters and valve and meter boxes.
2. Payment shall be made under the following:

Item Number	Description	Unit
425-6	Adjust Existing Valve Boxes (Miami-Dade County Only)	EA
425-73	Adjust And / Or Relocate Existing Fire Hydrants (Miami-Dade County Only)	EA
425-82-01	Trench Drain (12")	LF

430 PIPE CULVERTS (REV. 01-12-16)

A. Description.

1. Furnish and install drainage pipe and end sections at the locations called for in the Plans or as directed by Engineer. Furnish and construct joints and connections to existing pipes, catch basins, inlets, manholes, walls, etc., as may be required to complete the work.
2. Construct structural plate pipe culverts or underdrains in accordance with FDOT Sections 435 and 440.
3. Obtain pipe culverts from a Producer currently on the FDOT's list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of FDOT 105-3.
4. When the producer's FDOT Quality Control Program is suspended, accept responsibility of either obtaining drainage products from another producer with an accepted FDOT Quality Control Program or await re-approval of the producer's FDOT Quality Control Program. Engineer will not allow changes in Contract Time or completion dates as a result of the producer's FDOT Quality Control Program suspension. Accept responsibility for all delay costs or other costs associated with the producer's FDOT Quality Control Program suspension.

B. Materials.

1. Pipe: Meet the following requirements:

Concrete Pipe	FDOT Section 449
Round Rubber Gaskets	FDOT Section 942
Corrugated Steel Pipe and Pipe Arch	FDOT Section 943
Corrugated Aluminum Pipe and Pipe Arch	FDOT Section 945

Corrugated Polyethylene Pipe	FDOT Section 948
Polyvinyl Chloride (PVC) Pipe	FDOT Section 948

2. Joint Materials: Use joint materials specified in this Article according to type of pipe and conditions of usage.
3. Mortar: Use mortar composed of one part portland cement and two parts of clean, sharp sand, to which mixture Contractor may add hydrated lime in an amount not to exceed 15% of the cement content. Use mortar within 30 minutes after its preparation.

C. Type of Pipe to Be Used.

1. When the Plans designate a type (or types) of pipe, use only the type (or choose from the types) designated.
2. If the Plans do not designate a type (or types) of pipe, Contractor, subject to Engineer's approval, may use either a minimum Class I concrete pipe, corrugated steel pipe, corrugated aluminum pipe, corrugated polyethylene pipe or PVC pipe. If one of the metal types is chosen, use the minimum gage specified in FDOT Section 943 for steel pipe or FDOT Section 945 for aluminum pipe.
3. Class I corrugated Polyethylene Pipe may be used on local (non-arterial or non-collector) roads only.

D. Laying Pipe.

1. General:
   a. Lay all pipe, true to the lines and grades given, with hubs upgrade and tongue end fully entered into the hub. When pipe with quadrant reinforcement or circular pipe with elliptical reinforcement is used, install the pipe in a position such that the manufacturer's marks designating "top" and "bottom" of the pipe are not more than five degrees from the vertical plane through the longitudinal axis of the pipe. Do not allow departure from and return to plan alignment and grade to exceed 1/16 inch per foot of nominal pipe length, with a total of not more than 1 inch departure from theoretical line and grade. Take up and relay any pipe that is not in true alignment or which shows any settlement after laying at no additional expense to the Department.
   b. Do not use concrete pipe with lift holes except round pipe which has an inside diameter in excess of 54 inches or any elliptical pipe.
   c. Repair lift holes, if present, by use of a hand-placed, stiff, non-shrink, 1-to-1 mortar of cement and fine sand, after first washing out the hole with water. Completely fill the void created by the lift hole with mortar. Cover the repaired area with a 24 by 24 inches piece of filter fabric secured to the pipe. Use a Type D-3 filter fabric meeting the requirements shown on FDOT Design Standards, Index 199 and the Contract Documents.
   d. Secure the filter fabric to the pipe using a method that holds the fabric in place until the backfill is placed and compacted. Use a grout mixtures, mastics, or strapping devices to secure the fabric to the pipe.
   e. When installing pipes in structures, construct inlet and outlet pipes of the same size and kind as the connecting pipe shown in the Plans. Extend the pipes through the walls for a distance beyond the outside surface sufficient for the intended connections, and construct the concrete around them neatly to prevent leakage along their outer surface as shown on the FDOT Design Standards, Index 201. Keep the inlet and outlet pipes flush with the inside of the wall. Resilient connectors as specified in FDOT 942-3 may be used in lieu of a masonry seal.
   f. Furnish and install a filter fabric jacket around all pipe joints and the joint between the pipe and the structure in accordance with FDOT Design Standards, Index Nos. 201 and 280. Use fabric meeting the physical requirements of Type D-3 specified on the FDOT Design Standards, Index 199 and the Contract Documents. The fabric shall extend a minimum of 12 inches beyond each side of the joint or both edges of the coupling band, if a coupling band is used. The fabric shall have a minimum width of 24 inches, and a length sufficient to provide a minimum overlap of 24 inches. Secure the filter fabric jacket against the outside of the pipe by metal or plastic strapping or by other methods approved by Engineer.
   g. Meet the following minimum joint standards:

Pipe Application	Minimum Standard
Storm and Cross Drains	Water-tight
Gutter Drain	Water-tight
Side Drains	Soil-tight

   h. When rubber gaskets are to be installed in the pipe joint, the gasket shall be the sole element relied on to maintain a tight joint. Soil tight joints must be watertight to 2 psi. Water-tight joints must be water-tight to 5 psi unless a higher pressure rating is required in the Plans.
2. Trench Excavation: Excavate the trench for storm and cross drains, and side drains as specified in the Contract Documents.
3. Foundation: Provide a suitable foundation, where the foundation material is of inadequate supporting value, as determined by Engineer. Remove the unsuitable material and replace it with suitable material, as specified in Article 120 (Earthwork and Related Operations) of these Specifications. Where in Engineer's opinion, the removal and replacement of unsuitable material is not practicable, he may direct alternates in the design of the pipe line, as required to provide adequate support. Minor changes in the grade or alignment will not be considered as an adequate basis for extra compensation. Do not lay pipe on blocks or timbers, or on other unyielding material, except where the use of such devices is called for in the Plans.
4. Backfilling: Backfill around the pipe as specified in Article 120 (Earthwork and Related Operations) of these Specifications unless specific backfilling procedures are described in the Contract Documents.
5. Plugging Pipe:
   a. When existing pipe culverts are to be permanently placed out of service, fill them with flowable fill that is non-excavatable, contains a minimum 350 lbs/cy of

cementious material and meets the requirements Article 121 (Flowable Fill) and/or plug them with masonry plugs as required by the Contract Documents. Install masonry plugs that are a minimum of 8 inches in thickness, in accordance with FDOT Design Standards Index 280.

b. When proposed or existing pipe culverts are to be temporarily placed out of service, plug them with prefabricated plugs as shown in the Plans. Install prefabricated plugs in accordance with the manufacturer's recommendations. Do not fill, or construct masonry plugs in, any pipe culverts intended for current or future service.

6. End Treatment:

a. Place an end treatment at each storm and cross drain, and side drain as shown in the Plans. Refer to the FDOT Design Standards for types of end treatment details.

b. As an exception to the above, when concrete mitered end sections are permitted, Contractor may use reinforced concrete U-endwalls, if shop drawings are submitted to Engineer for approval prior to use.

c. Provide end treatments for corrugated polyethylene pipe and PVC pipe as specified in FDOT Section 948, or as detailed in the Plans.

7. Metal Pipe Protection:

a. Apply a bituminous coating to the surface area of the pipe within and 12 inches beyond the concrete or mortar seal prior to sealing, to protect corrugated steel or aluminum pipe embedded in a concrete structure, such as an inlet, manhole, junction box, endwall, or concrete jacket.

b. Ensure that the surface preparation, application methods (dry film thickness and conditions during application), and equipment used are in accordance with the coating manufacturers' published specifications.

c. Obtain Engineer's approval of the coating products used.

8. Final Pipe Inspection:

a. Pipe must be lay under direct supervision of Engineer at all times. In the event that a specific job site requires a video inspection, and it is approved by Engineer, pipe must be inspected as per FDOT Article 430-4.8. County will pay for the cost of inspection and report.

E. Removing Existing Pipe.

1. If the Plans indicate that existing pipe is to remain the property of the Department, collect and stack along the right-of-way all existing pipe or pipe arch so indicated in the Plans to be removed, or that does not conform to the lines and grades of the proposed work and that is not to be re-laid, as directed by Engineer. Take care to prevent damage to salvageable pipe during removal and stacking operations.

F. Placing Pipe Under Railroad.

1. General: Construct pipe culverts under railroad tracks in accordance with the requirements of the railroad company. Perform all the shoring under the tracks, and sheeting and bracing of the trench, required by the railroad company or deemed necessary by Engineer in order to ensure safe and uninterrupted movement of the railroad equipment, at no expense to the Department.

2. Requirements of the Railroad Company:

a. Install pipe using methods required by the railroad company and shown in the Contract Documents.

b. When the general method of installation required by the railroad company is indicated in the Plans, do not alter such method, or any other specific details of the installation which might be indicated in the Plans, without receiving approval or direction from the railroad, followed by written approval from Engineer.

3. Notification to Railroad Company: Notify the railroad company and Engineer at least ten days prior to the date on which pipe is to be placed under the railroad tracks.

4. Placing Pipe by Jacking: Obtain Engineer's and the railroad company's approval of the details of the jacking method to be used, when placing pipe through the railroad embankment, before the work is started.

5. Use of Tunnel Liner: When the railroad company requires that a tunnel liner be used for placing the pipe in lieu of the jacking method, the Department will pay for the tunnel liner material separately in cases where the Contract Documents do not require the use of a tunnel liner. For these cases the Department will reimburse Contractor for the actual cost of the liner, delivered at the site. The Department will base such cost on a liner having the minimum gage acceptable to the railroad.

G. Specific Requirements for Concrete Pipe.

1. Sealing Joints: Seal the pipe joints with round rubber or profile gaskets meeting the requirements of FDOT Section 449. Ensure that the gasket and the surface of the pipe joint, including the gasket recess, are clean and free from grit, dirt and other foreign matter, at the time the joints are made. In order to facilitate closure of the joint, application of a vegetable soap lubricant immediately before closing of the joint will be permitted. Prelubricated gaskets may be used in lieu of a vegetable soap lubricant when the lubricating material is certified to be inert with respect to the rubber material.

2. Laying Requirements for Concrete Pipe with Rubber Gasket Joints: Do not allow the gap between sections of pipe to exceed 5/8 inch for pipe diameters of 12 inches through 18 inches, 7/8 inch for pipe diameters of 24 through 66 inches, and 1 inch for pipe diameters 72 inches and larger. Where minor imperfections in the manufacture of the pipe create an apparent gap in excess of the tabulated gap, Engineer will accept the joint provided that the imperfection does not exceed 1/3 the circumference of the pipe, and the rubber gasket is 1/4 inch or more past the pipe joint entrance taper. Where concrete pipes are outside of these tolerances, replace them at no expense to the Department. Do not apply mortar, joint compound, or other filler to the gap which would restrict the flexibility of the joint.

3. Field Joints for Elliptical Concrete Pipe: Use either a preformed plastic gasket material or an approved rubber gasket to make a field joint.

   a. Plastic Gasket. For field joints that are made from preformed plastic gasket material; install field joints in accordance with the manufacturer's instructions and the following:

      1) Material: Meet the requirements of FDOT 942-2.

      2) Joint Design: Ensure that the pipe manufacturer furnishes Engineer with details regarding configuration of the joint and the amount of gasket material required to affect a satisfactory seal. Do not brush or wipe joint surfaces which are to be in contact with the gasket material with a cement slurry. Fill minor voids with cement slurry.

      3) Primer: Apply a primer of the type recommended by the manufacturer of the gasket material to all joint surfaces which are to be in contact with the gasket material, prior to application of the gasket material. Thoroughly clean and dry the surface to be primed.

      4) Application of Gasket: Apply gasket material to form a continuous gasket around the entire circumference of the leading edge of the tongue and the groove joint, in accordance with the detail shown on the Design Standards, Index No. 280. Do not remove the paper wrapper on the exterior surface of the gasket material until immediately prior to joining of sections. Apply plastic gasket material only to surfaces which are dry. When the atmospheric temperature is below 60ºF, either store plastic joint seal gaskets in an area above 70ºF, or artificially warm the gaskets to 70ºF in a manner satisfactory to Engineer.

      5) Installation of Pipe: Remove and reposition or replace any displaced or contaminated gasket as directed by Engineer. Install the pipe in a dry trench. Carefully shape the bottom of the trench to minimize the need for realignment of sections of pipe after they are placed in the trench. Hold to a minimum any realignment of a joint after the gaskets come into contact. Prior to joining the pipes, fill the entire joint with gasket material and ensure that when the pipes are joined there is evidence of squeeze-out of gasket material for the entire internal and external circumference of the joint. Trim excess material on the interior of the pipe to provide a smooth interior surface. If a joint is defective, remove the leading section of pipe and reseal the joint.

   b. Rubber Gasket. For field joints that are made with profile rubber gaskets; install field joints in accordance with the manufacturer's instructions and the following:

      1) Material: Meet the requirements of FDOT 942-4.

      2) Joint Design: Ensure that the pipe manufacturer furnishes Engineer with details regarding configuration of the joint and gasket required to effect a satisfactory seal. Do not apply mortar, joint compound, or other filler which would restrict the flexibility of the gasket joint.

4. Requirements for Concrete Radius Pipe:

   a. Design: Construct concrete radius pipe in segments not longer than 4 feet (along the pipe centerline), except where another length is called for in the Contract Documents. Join each segment using round rubber gaskets. Ensure that the pipe manufacturer submits details of the proposed joint, segment length and shape for approval by Engineer, prior to manufacture.

   b. Pre-Assembly: Ensure that the manufacturer pre-assembles the entire radius section in his yard, in the presence of Engineer, to ensure a proper fit for all parts. At the option of the manufacturer, Contractor may assemble the pipe without gaskets. Consecutively number the joints on both the interior and exterior surfaces of each joint, and make match marks showing proper position of joints. Install the pipe at the project site in the same order as pre-assembly.

H. Specific Requirements for Corrugated Metal Pipe.

1. Field Joints:

   a. General:

      1) Make a field joint with locking bands, as specified in Article 9 of AASHTO M 36 and AASHTO M 196M for aluminum pipe. For aluminum pipe, fabricate bands from the same alloy as the culvert sheeting.

      2) When existing pipe to be extended is helically fabricated, make a field joint between the existing pipe and the new pipe using one of the following methods:

         a) Cut the new pipe to remove one of the re-rolled annular end sections required in FDOT Sections 943 or 945, or fabricate the pipe so that the re-rolled annular section is fabricated only on one end. Use either a spiral (helical) band with a gasket or a flat band with gaskets as required by Subarticle 430-H.1.b.1) b) to join the pipe sections.

         b) Contractor may construct a concrete jacket as shown on the FDOT Design Standards, Index No. 280, provided that the minimum cover required by the FDOT Design Standards, Index No. 205 can be obtained.

   b. Side Drain, Storm and Cross Drain, and Gutter Drains: Where corrugated metal pipe is used as side drain, storm and cross drain, or gutter drain, use a rubber or neoprene gasket of a design shown to provide a joint as specified in Subarticle 430-D.

      1) Use a gasket of one of the following dimensions:

         a) For annular joints with 1/2 inch depth corrugation: either a single gasket a minimum of 7 inches by 3/8 inch or two gaskets a minimum of 3 1/2 inches by 3/8 inch; and for annular joints with 1 inch depth corrugations: either a single gasket a minimum of 7 inches by 7/8 inch or two gaskets a minimum of 3 1/2 inches by 7/8 inch.

         b) For helical joints with 1/2 inch depth corrugation: either a single gasket a minimum of 5 inches by 1 inch or two gaskets a minimum of 3 1/2 inches by 1 inch; and for helical joints with 1 inch depth corrugations: either a single gasket a minimum of

5 inches by 1 1/2 inches or two gaskets a minimum of 3 1/2 inches by 1 1/2 inches.

c) Such other gasket designs as may be approved by Engineer.

2) If, in lieu of a single gasket spanning the joint, two gaskets are used, place these individual gaskets approximately 2 inches from each pipe end at the joint. When two gaskets are used, seal the overlapping area on the coupling band between the gaskets consistent with the joint performance specified. Contractor may tuck a strip of preformed gasket material over the bottom lip of the band for this purpose. Use coupling bands that provide a minimum circumferential overlap of 3 inches. As the end connections on the coupling band are tightened, ensure that there is no local bending of the band or the connection. Use precurved coupling bands on pipe diameters of 24 inches or less.

3) Use flat gaskets meeting the requirements of ASTM D-1056, designation 2C2 or 2B3. In placing flat gaskets on pipe prior to placing the coupling band, do not stretch the gasket more than 15% of its original circumference. Use circular gaskets meeting the requirements of ASTM C-361. Do not stretch the circular gasket more than 20% of its original circumference in placing the gasket on pipe. Use preformed plastic gasket material meeting the composition requirements of FDOT 942-2.2.

4) Apply an approved vegetable soap lubricant, as specified for concrete pipe in Subarticle 430-G.1.

c. Alternate Joint: In lieu of the above-specified combination of locking bands and flat gaskets, Contractor may make field joints for these pipe installations by the following combinations:

1) Use the metal bands as specified in Article 9 of AASHTO M 36M that are at least 10 1/2 inches wide and consist of a flat central section with a corrugated section near each end, designed to match the annular corrugation in the pipe with which they are to be used. Connect the bands in a manner approved by Engineer, with a suitable fastening device such as the use of two galvanized 1/2 inch diameter bolts through a galvanized bar and galvanized strap, suitably welded to the band. Use a strap that is the same gage as the band.

2) Where helically corrugated pipe is to be jointed by this alternate combination, ensure that at least the last two corrugations of each pipe section are annular, and designed such that the band will engage each pipe end with the next-to-outside annular corrugation.

3) For these bands, use a rubber gasket with a circular cross-section of the “O-ring” type conforming to ASTM C-361. Use gaskets having the following cross-sectional diameter for the given size of pipe:

Pipe Size	Gasket Diameter
12 inches through 36 inches (with 1/2 inch depth corrugations)	13/16 inch
42 inches through 96 inches (with 1/2 inch depth corrugations)	7/8 inch
36 inches through 120 inches (with 1 inch depth corrugations)	1 3/8 inches

4) Use preformed gasket material to seal the overlapping area on the coupling band between gaskets.

5) Use channel band couplers in helical pipe with ends which have been reformed and flanged specifically to receive these bands. Use channel band couplers that are of a two piece design, are fabricated from galvanized steel stock conforming to AASHTO M 36, have 2 by 2 by 3/16 inch angles fastened to the band ends to allow for proper tightening, and meet the following:

Band Thickness	Pipe Wall Thickness
0.079 inch	0.109 inch or lighter
0.109 inch	0.138 inch or heavier
3/4 inch wide	0.109 inch or lighter
1 inch wide	0.138 inch or heavier

6) Furnish two 1/2 inch diameter connection bolts with each band, that conform to ASTM A-307, Grade A and are electroplated in accordance with ASTM B-633.

7) Use a gasket with the joint that is a hydrocarbon blend of butyl rubber meeting the chemical composition and physical properties of FDOT 942-2.2. Use a 3/8 by 3/4 inch gasket for pipe fabricated from 0.109 inch or lighter material and a 3/8 by 1 inch gasket for pipe fabricated from 0.138 inch and heavier material.

8) Contractor may use a flange band coupler without the gasket for all applications other than side drain, storm and cross drain, and gutter drain.

9) Do not use the flange band coupler to join dissimilar types of pipe.

10) Contractor may join reformed flanged helical pipe to existing annular or reformed pipe having annular ends. On non-gasketed installations, use either an annular band or an alternate joint described in Subarticle 430-H.1.c. On gasketed installations, use an annular band, minimum of five corrugations in width, in conjunction with two O-ring gaskets as specified in Subarticle 430-H.1.c. Use mastic material to seal the area of band overlap.

11) The minimum joint performance standards specified in Subarticle 430-D.1 applies.

2. Laying and Shape Requirements for Corrugated Metal Pipe: Install pipe using either a trench or open ditch procedure.

a. Check pipe shape regularly during backfilling to verify acceptability of the construction method used. Pipe deflected 5% or more of the certified actual mean diameter of the pipe shall be replaced at no cost to the

Department. Deflection measurements are taken at the point of smallest diameter on the corrugations.

I. Specific Requirements for Corrugated Polyethylene Pipe and Polyvinyl Chloride (PVC) Pipe.

1. Field Joints: Use gasketed joints to seal side drain, and storm and cross drain. Use gaskets meeting the requirements of FDOT Section 449. Ensure that the pipe manufacturer provides a joint design approved by Engineer before use.
2. Installation Requirements Including Trenching, Foundation and Backfilling Operations: Check structure shape regularly during backfilling to verify acceptability of the construction method used.
3. Pipe deflected 5% or more of the certified actual mean diameter of the pipe shall be replaced at no cost to the Department.

J. Desilting Pipe Culverts, Box Culverts, and Inlet Structures.

1. Description. Completely remove and dispose of silt, debris, vegetation, soil, rock, and any type of blockage inside existing pipe culvert(s), box culvert(s) or inlet structure(s) specified in the Contract Documents or directed by Engineer.
2. General.
   a. Access to the pipe or box culvert may require temporary removal of fence, signs, guardrail, grates or manhole covers.
   b. Clean the existing pipe or box culvert by completely removing all of the silt, debris, vegetation, soil, rock, and any type of blockage to restore the hydraulic conveyance design capacity of the pipe or box culvert.
   c. Clean the existing inlet structure by completely removing all of the silt, debris, vegetation, soil, rock, and any type of blockage.
   d. Perform desilting operations in a manner not to damage the pipe culverts, box culverts, and inlet structures or surrounding area.
   e. Meet the requirements of Federal, State and local environmental standards and laws when performing all activities.
   f. Meet the requirements of Article 104 of these Specifications (Prevention, Control, and Abatement of Erosion and Water Pollution).
   g. Identify and report to Engineer necessary repairs to the pipes or box culverts and structures exposed during the desilting operation.
   h. Pipe or Box Culverts:
      1) Replace according to Department standards at the completion of the desilting operation or each day, as appropriate for safety.
      2) Align infall and outfall ditches 50 feet from the pipe or box culvert to meet the existing line and grade. If the Right-of-Way line is less than 50 feet from the pipe or box culvert, align infall and outfall ditches to the Right-of-Way line. Grade and sod any disturbed areas caused by the desilting operation.
      3) Dispose of all silt and debris removed in the desilting operations in areas meeting Federal, State and local rules and regulations.
      4) Repair or replace damage to turf, pavement, signs or structures, etc. due to negligence to the satisfaction of Engineer at no additional cost to the Department. Complete repairs prior to submission of the invoice for work accomplished.
3. Inspection.
   a. When directed by Engineer, de-water the pipe or box culvert to facilitate inspection.
   b. Re-clean culverts and structures determined to be unacceptable by Engineer within the time directed at no additional cost to the Department.

K. Method of Measurement.

1. General:
   a. The quantity to be paid for will be the number completed pursuant to these specifications that is measured and accepted by Engineer.
   b. Only items of work required by this Article that have a Contract Unit Price will be measured by Engineer for payment. All other work described in this Article that is required by the Contract Documents but does not have a Contract Unit Price is considered incidental to the Work and its costs are included among the various scheduled items of the Contract.
2. New Pipe: The quantities of storm and cross drain pipe, storm drain trench, side drain pipe and gutter drain pipe to be paid for will be quantity, measured in place and accepted by Engineer. The quantity of pipe will be measured from the inside wall of the structure, along the centerline of the pipe.
3. Mitered End Section: The quantity to be paid for will be the number completed and accepted.
4. Desilting Pipe Culverts, Box Culverts, and Inlet Structures:
   a. General:
      1) The cost of temporary removal and subsequent replacement of fence, signs, guardrail, grates or manhole covers will be included in the contract unit price for the related item.
      2) Infall and outfall ditch alignment, grading and sodding will be included in the contract unit price of the related item.
      3) Pipes or structures that are impacted by the Work must be cleaned at no cost to the County and will not be measured for payment.
   b. Desilting Pipe Culverts: The quantities for payment will be the length in feet of existing pipe desilted and accepted by Engineer.
   c. Desilting Box Culverts: The quantities for payment will be the volume in cubic yard of material removed from the existing box culvert as measured and accepted by Engineer.

d. Desilting Structures: The quantities for payment will be the number of existing Inlet Structures desilted and cleaned as counted and accepted by Engineer.

L. Basis of Payment.

1. General:

a. Prices and payments will be full compensation for all work specified in this Article including:

1) All excavation except the volume included in the items for the grading work on the Project, and except for other items specified for separate payment in Article 120 (Earthwork And Related Operations) of these Specifications;

2) All backfilling material and compaction; disposal of surplus material; and

3) All clearing and grubbing outside of the required limits of clearing and grubbing as shown in the Plans.

2. Removing Existing Pipe: When existing pipe is removed and replaced with new pipe approximately at the same location, the cost of excavating and removing the old pipe and of its disposal will be included in the Contract unit price for clearing and grubbing.

3. Site Restoration: The cost of completely restoring the areas of the Project Site that is disturbed for the purpose of constructing pipe culvert is included in the Contract unit price for the pipe culvert, unless designated specifically to be paid for under other items.

4. Plugging Pipes:

a. The cost of temporarily plugging a pipe culvert, either proposed or existing, will be incidental to the contract unit price for new pipe culvert.

b. The cost of filling and/or plugging an existing pipe culvert that is to be permanently placed out of service will be paid for at the contract unit price for filling and plugging pipe, per cubic yard. Price and payment will be full compensation for flowable fill, masonry, concrete, mortar, and all labor and materials necessary to complete the work.

5. Desilting Pipe Culverts, Box Culverts, and Drainage Structures: Price and payment will be full compensation for furnishing all equipment, tools, labor, removal and disposal of silt, debris, vegetation, soil, rock, and any type of blockage, de-watering, erosion and water pollution control, clean up and all incidentals necessary for the satisfactory performance of the work.

6. Flared End Sections: Price and payment will be full compensation for all work and materials required.

7. Mitered End Sections: Price and payment will be full compensation for all pipe, grates when required, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bands, and all work required.

8. Railroad Requirements:

a. Where pipe culvert is constructed under railroad tracks, the Contract unit price for the pipe culvert will include the costs of any jacking operations and the operation of placing the pipe by use of a tunnel liner, (except as specified for unanticipated tunnel liner, in Subarticle 430-F.5, where reimbursement is to be made for such unanticipated liner), and all other work necessary to meet the requirements of the railroad company, excluding the costs of watchman or flagman services provided by the railroad company, except as provided below.

b. The Department will reimburse Contractor for the actual costs of any trestle bridge work which is performed by the railroad's forces, as billed to him by the railroad, less the value of any salvage materials derived there from, whether such salvage materials are retained by the railroad company or by Contractor. When the work of shoring and bracing is to be performed by the railroad, such fact will be stipulated in the Contract Documents and Contractor will be required to pay to the railroad the amount of such costs, which amount will be reimbursed to him by the Department. The Contract unit price for the pipe culvert shall include the costs of all other work of shoring and bracing.

9. Payment Items:

a. Payment will be made under the items below having an awarded Contract Unit Price.

Item No.	Description	Unit
430-171-115	Pipe Culvert 15" Diameter (Round)	LF
430-171-118	Pipe Culvert 18" Diameter (Round)	LF
430-171-124	Pipe Culvert 24" Diameter (Round)	LF
430-171-136	Pipe Culvert 36" Diameter (Round)	LF
430-171-224	Pipe Culvert 24" Diameter (Elliptical/Arch)	LF
430-171-236	Pipe Culvert 36" Diameter (Elliptical/Arch)	LF

443 FRENCH DRAINS

A. Description.

1. Construct french drains, utilizing one of the authorized types of pipes listed below, with coarse aggregate, and plastic filter fabric (geotextile). Construct in accordance with FDOT Design Standards, Index No. 285 as modified by or otherwise specified in the Contract Documents.

B. Materials.

1. Pipe: Unless a particular type is specified in the Contract Documents, pipe furnished may be any of the following types:

a. Concrete Pipe (Bell & Spigot): Slotted or perforated concrete pipe may be used.

1) Meet the requirements of FDOT 449 for concrete pipe. Use the class of pipe specified on the FDOT Design Standards, Index No. 205. Do not use gaskets. Fully insert the spigot in the bell, and bring home. Conform to FDOT Design Standards, Index No. 285 for slotted pipe. Use perforated pipe having perforations equally located 360 degrees around the pipe.

2) Furnish pipe having not less than 30 round perforations, 3/8 inch each, per square foot of inside pipe surface. Extend perforations to within 6 inches of the bell or spigot area. The Engineer will permit other perforations not less than 5/16 inch nor more than 3/8 inch in the least dimension if they provide an opening area not less than 3.31 in2/ft2 of pipe surface.

b. Corrugated Aluminum Alloy Culvert Perforated Pipe:

1) Meet the requirements of FDOT 945. Use perforated pipe having perforations equally located 360 degrees around the pipe. Locate perforations either on the inside crests or on the neutral axis of all corrugations except that perforations are not required within 4 inches of each end of each length of pipe or in a corrugation where seams are located.

2) Furnish pipe having not less than 30 round perforations, 3/8 inch each, per square foot of pipe surface. The Engineer will permit other perforations not less than 5/16 inch nor more than 3/8 inch in the least dimension if they provide an opening area not less than 3.31 in2/ft2 of pipe surface.

c. Corrugated Steel Perforated Pipe: Meet the requirements of FDOT 943. Space the perforations and meet the requirements as specified in b. 2) above.

d. Bituminous Coated Corrugated Steel Perforated Pipe: Meet the requirements of FDOT 943. Space the perforations and meet the requirements as specified in b. 2) above. Place the perforations prior to the bituminous coating. The Engineer will accept the minimum opening of not less than 3.31 in2/ft2 of pipe if 50% of the opening area is maintained after coating.

e. Corrugated Polyethylene Pipe:

1) Meet the requirements of FDOT 948-2.3 except that Class I corrugated Polyethylene Pipe may only be used on local roads (non-arterial or non-collector).

2) Space the perforations and meet the requirements as specified in b. 2) above.

f. Polyvinyl Chloride (PVC) Pipe: Meet the requirements of FDOT 948-1.7. Space the perforations and meet the requirements as specified in b. 2) above.

2. Coarse Aggregate: No. 4 limestone aggregate meeting the requirements of FDOT 901. Aggregates must be an approved product from an approved source listed on the current FDOT Approved Aggregate Products from Mines or Terminals Listings.

3. Select Fill: Use select fill meeting the requirements of either FDOT 911, 913, 913A or 915.

C. Excavating Trench.

1. Excavate the trench in accordance with the Contract specifications for Earthwork and Related Operations (hereinafter referred to as Earthwork specifications) unless specific trench excavation procedures are described in the Plans.

2. Carefully excavate the trench to such depths as required to permit the filter fabric, coarse aggregate and the pipe to be placed in accordance with the details shown on the Plans.

D. Laying Pipe.

1. Lay all pipe conforming with the lines and grades specified in the plans and in accordance with these Specifications. Unless otherwise specified in the Plans or directed by the Engineer, set the pipe with a minimum cover of 30 inches in paved areas (24 inches for non-paved areas) and a maximum cover of 66 inches.

E. Placing Coarse Aggregate and Backfilling.

1. After placing the pipe and without disturbing the pipe, carefully place the coarse aggregate around the pipe to a depth shown in the plans. Fold the filter fabric over the coarse aggregate. Backfill and compact as described below.

a. French Drains Under Pavement: Fill the area above the coarse aggregate with select fill material meeting the requirements of this Section. Place and compact the select fill according to the requirements for pipe as specified in the Earthwork specifications. The Department will allow use of additional coarse aggregate over the top of the pipe instead of select fill material. In this case, the filter fabric shall be extended to wrap the additional course aggregate. The top of the coarse aggregate shall not be higher than the bottom of the base, unless shown in the plans. The Department will not pay additional costs associated with substituting coarse aggregate for select fill.

b. French Drains not Under Pavement: Fill and compact the area above the coarse aggregate according to the requirements for pipe in the Earthwork specifications, unless specific procedures are described in the Plans as specified in the Earthwork specifications.

F. Method of Measurement.

1. Quantity of french drains to be paid for under this Article shall be the length in linear feet completed in accordance with Plans and specifications; measured in place and accepted by the Engineer subject to the following conditions:

a. French drain lengths having a depth of trench less than 10 feet below land surface (BLS) will not be accepted for payment by the Engineer.

b. For french drains with specified depth of trench of 15 feet BLS or greater, any length not meeting the specified depth for reasons approved by the Engineer will have the payment quantity calculated as:

1) Quantity for Payment (LF) = Quantity Measured by the Engineer (LF) x Engineer Approved Depth

Rounded to the Lowest Whole Foot (ft) / Specified Depth (ft)

G. Basis of Payment.

1. The quantities determined as provided above will be paid for at the Contract unit price for french drains. Such prices and payments will be full compensation for all work, labor, equipment and material necessary for construction of the french drains as specified in these Contract Documents including excavation, sheeting or shoring if required, the disposal of surplus material, providing plastic filter fabric, pipe, course aggregate, select backfill, tamping, and final dressing.
2. Price and payment shall also include all clearing and grubbing; and pavement, sidewalk, curb, and gutter restoration unless these items are specifically provided for under separate payment items in this Contract.
3. <<No separate pay item(s) for French Drains will be provided under this contract.>>
4. Payment will be made under:

Item No.	Description	Unit

514 GEOTEXTILE (REV. 11-04-11)

A. Description.

1. Install a geotextile (plastic filter) fabric.

B. Material.

1. Meet the plastic filter fabric requirements as specified in FDOT 985.
2. Geotextile used in the Drainage class (type D-3) applications listed in FDOT Design Standards Index 199 shall be woven monofilament geotextiles only. No Slit Film geotextiles are allowed.

C. Construction Methods.

1. General:
   a. Place the fabric in the manner and locations as shown on the construction drawings, in accordance with the manufacturer's directions, and as specified in these Specifications.
   b. Place the fabric on areas with a uniform slope that are reasonably smooth, free from mounds and windrows, and free of any debris or projections which might damage the fabric.
   c. Loosely lay the material. Do not stretch the material.
   d. Replace or repair any fabric damaged or displaced before or during placement of overlying layers to the satisfaction of the Engineer and at no expense to the Department.
   e. When overlapping is necessary, the Contractor may sew the seams to reduce overlaps as specified in FDOT 985-3.
   f. Schedule work so that covering the fabric with the specified material does not exceed the manufacturer's recommendations for exposure to ultraviolet light or five days, whichever is less. If the Engineer determines the exposure time was exceeded, the Contractor shall replace the fabric at no expense to the Department.
2. Subsurface Drainage: When indicated in the plans, place the fabric with the long dimension parallel to the trench. Place the fabric to provide a minimum 12 inch overlap for each joint. Do not drop the filter material from heights greater than 3 feet.
3. Stabilization and Reinforcement: Overlap adjacent strips of fabric a minimum of 2 feet.
4. Riprap Filter:
   a. Overlap adjacent strips of fabric a minimum of 24 inches, and anchor them with securing pins (as recommended by the manufacturer) inserted through both strips of fabric along a line through the midpoint of the overlap and to the extent necessary to prevent displacement of the fabric.
   b. Place the fabric so that the upstream (upper) strip of fabric overlaps the downstream (lower) strip.
   c. Stagger vertical laps a minimum of 5 feet. Use full rolls of fabric whenever possible in order to reduce the number of vertical laps.
   d. Do not drop bedding stone or riprap from heights greater than 3 feet onto the fabric.

D. Method of Measurement.

1. No separate payment for furnishing and placing the geotextile fabric is contained in the Contract Documents.

E. Basis of Payment.

1. All costs for the work specified herein, including furnishing, placing, and sewing or overlapping the fabric is included in the Contract price for the item or items to which the geotextile fabric is incidental.

519 DRIVEWAY PAVEMENT (REV. 08-23-12)

A. Description

1. Pursuant to the Contract Documents or as otherwise directed by the Engineer:
   a. Construct new asphalt concrete driveway approaches on public right-of-way.
   b. Restore existing asphalt or cement concrete driveways and approaches that have been authorized to be disturbed by the performance of the Work; and provide all other required labor, material and equipment necessary for complete restoration of the disturbed area.

B. Materials

1. Meet the following requirements:

Limerock	FDOT Section 911
Concrete	FDOT Section 350; Class I (Pavement)
Hot Mix Asphalt (HMA)	Per Article 334 of these Specifications
Joint Seal	FDOT Section 932

C. Preparation and Construction

1. General:
   a. Conform to applicable surface slope requirements of FDOT Index No. 304.
   b. Meet all applicable requirements of the Miami-Dade County Public Works Manual.
   c. Perform any required clearing and grubbing under Article 110 of these Specifications.
   d. Remove or add any additional subgrade material necessary to meet final surface elevation requirements after construction of a new limerock base and pavement of the thicknesses specified below.
   e. Provide a new six inch limerock base; or greater if needed to match existing. Build up in layers not to

exceed three inches and compact each layer to obtain a minimum density of 98% of modified Proctor maximum density as determined by FM 1-T 180, Method D.

f. Maintain the area of excavation in a safe condition and level with the surrounding pavement until work is complete.

g. Furnish and place all materials; construct all forms, joints, bracing, expansion joint materials, and accessories; apply required surface finishes; and all required clearing and grubbing, excavation and backfilling.

h. Remove all remaining excess material, dirt, and other debris from the roadways immediately after all construction or restoration of pavement under this Article has been completed.

2. Cement Concrete Pavement:

a. Concrete pavement for driveways, driveway aprons and sidewalk across driveways must be a minimum thickness of six inches. Materials and construction must conform to the requirements of FDOT Section 350.

b. Form a ½ inch expansion joint between the sidewalk and the driveway or at fixed objects and driveway intersections.

c. Finish surface of concrete to match existing pavement.

3. Asphalt Concrete Pavement:

a. Construct a minimum one inch thick HMA pavement layer (Type SP-9.5) meeting the material and construction requirements of Article 334 of these Specifications.

4. Additional Requirements for Restoration of Pavement:

a. Full-depth saw cut a smooth, straight, neat and square line along the entire width of damaged pavement that is to be restored. Immediately dispose of all excess debris properly.

b. Restore sidewalks across driveways, cut or damaged by construction, in full sections concrete curb or gutter to the existing height and cross section in full sections or lengths between joints.

D. Method of Measurement

1. The quantity to be paid for will be the area, in square yards, of approved driveway pavement constructed or restored in accordance with this Article, as measured and accepted by the Engineer.

E. Basis of Payment

1. Price and payment will be full compensation for all work and materials specified in this Article.

2. Payment will be made at the Contract unit prices for the quantities completed, measured, and accepted by the Engineer under the following item(s) as applicable:

Item Number	Description	Unit
334-1-13	Superpave Asphaltic Concrete (Traffic C)	TON
334-2-13-2	Hot Mix Asphalt, Traffic Level C, SP-12.5 (2")	TON
337-7-82	Asphalt Concrete Friction Course, Traffic C, FC-9.5, Pg 76-22	TON

520 CONCRETE GUTTER, CURB ELEMENTS, AND TRAFFIC SEPARATOR (SECTION 520)

A. Page 583, Article 520-1, Description: Is expanded to include the following:

1. The work specified under this section includes any type of curb and /or gutter in accordance with FDOT Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System 2008 and the Public Works Manual of Metropolitan Dade County (Standard Road Details R.14.1 and R.14.2) curb with or without gutter, driveway curbs, Type "C" median curb and Type "A" median curb, including the necessary preparation and compaction of the subgrade in both cut and fill areas, as well as backfilling, grading, excavation and final dressing required as directed by the Engineer.

B. Page 583, Article 520-2, Materials: Is amended as follows:

1. Class I Concrete shall have a minimum compressive strength of 3,000 p.s.i. at 28 days.

C. Page 591 Article 520-12, Basis of Payment: Is deleted in its entirety and replaced with the following:

1. The quantity of curb or curb and gutter, shall be paid for at the Contract unit price for the quantities completed and accepted by the Engineer and does not include ramp and sidewalk curb. Such price and payment shall be full compensation for all work specified under this Section, including the necessary preparation, limerock or suitable material and compaction of the subgrade in both, cut and fill areas, as well as backfilling, grading, excavation and final dressing required as directed by the Engineer.

2. Payment will be made at the Contract unit prices for the quantities completed and accepted by the Engineer under the following item(s) as applicable:

Item No.	Description	Unit
520-1-10	Concrete Curb and Gutter (Type "F") Includes cost of Lime rock	LF
520-2-4A	Concrete Curb, Type D	LF
520-3D	Concrete Valley Gutter	LF
520-5-4	Concrete Traffic Separator, Type IV, 4' Wide.	LF

522 CONCRETE SIDEWALK (SECTION 522)

A. Page 589, Article 522-1, Description: Is expanded to include the following:

1. The work specified under this Section consists of the forming, furnishing, placement, and finishing of concrete for the construction of concrete sidewalks, pedestrian ramps and sidewalk curbs (back of sidewalk) utilizing Class I Concrete. The width, thickness and type shall be as shown and noted in the Plans. All work will be in accordance with this Section except as modified herein.

B. Page 589, Article 522-2, Materials; is amended as follows:

1. Class I Concrete shall have a minimum compressive strength of 3,000 p.s.i. at 28 days.

C. Page 591 Article 522-9, Method of Measurement; is expanded to include the following:

1. The quantity to be paid for under this Article shall be the area in square yards of concrete sidewalk and pedestrian ramps, measured in place, complete and accepted. Measurement shall be the final dimensions measured along the surface of the completed work within the neat lines shown on the Plans or designated by the Engineer. No deduction will be made for the area occupied by trees left within the area of sidewalks or for any area occupied by manholes, inlets or other drainage or public utility appurtenances within the sidewalk area.

D. Page 591 Article 522-10, Basis of Payment; is deleted in its entirety and replaced with the following:

1. The quantity, determined as provided above, shall be paid for at the Contract unit price for the quantities completed and accepted by the Engineer. Such price and payment shall be full compensation for all work specified under this Section.
2. When curb and gutter is required for the construction of pedestrian ramps and no specific pay item has been included for the construction of the curb and gutter, such payment shall be included in the pay item for Sidewalk (including pedestrian ramps and sidewalk curbs).
3. No separate payment shall be made for the removal of forms or the filling of excavated area left by removal of forms. Contractor shall be responsible for any vandalized sidewalk until it is finally accepted by the Engineer.
4. Payment will be made at the Contract unit prices for the quantities completed and accepted by the Engineer under the following item(s) as applicable:

Item No.	Description	Unit
522-1	CONCRETE SIDEWALK (4" Thick) (Including Pedestrian Ramp)	S.Y.
522-2(1)	CONCRETE SIDEWALK (6" THICK) (Including Pedestrian Ramp)	S.Y.
522-4E	Bus Shelter Pad-Concrete	S.Y.

523 PATTERNED PAVEMENT (REV. 01-06-2015)

A. Description

1. Install patterned pavement on asphalt or concrete pavement areas at locations and with the color and pattern as specified in the Plans. Use products listed on the FDOT Approved Product List (APL), as approved for use in areas subject to vehicular traffic or non-vehicular traffic, respectively, as specified herein. Install products in accordance with manufacturer's recommendations.
2. For the purpose of this Specification, patterned pavements are defined as a post applied surface marking overlay to either the pavement surface or to an imprinted pavement surface. Vehicular traffic areas are defined as those subject to vehicles within the traveled way, shoulders and auxiliary lanes. Non-vehicular travel areas include medians, islands, curb extensions, sidewalks, borders, plazas and other areas typically subject to foot traffic only.
3. Install overlay products in areas subject to vehicular traffic to a thickness not exceeding 180 mils. Do not use products requiring removal of pavement or requiring blockouts or trenches below the top of pavement.
4. Variations within a pattern shall comply with ADA requirements.

B. Materials

1. General:
   a. Use only patterned pavement products approved for use in vehicular and non-vehicular areas, as appropriate, and listed on the APL. Meet manufacturer's specifications for all patterns, textures, templates, sealers, coatings and coloring materials.
   b. Material coatings used to achieve the pattern and color shall produce an adherent, weather resistant, skid resistant, wear resistant surface under service conditions. Color shall be integral and consistent throughout the installation. The composition of materials is intended to be left to the discretion of the manufacturer.
   c. Materials shall be characterized as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA), Subpart C, Table 1 of 40 CFR 261.24 "Toxicity Characteristic". Materials shall not exude fumes which are hazardous, toxic or detrimental to persons or property.
2. Approved Product List (APL):
   a. Manufacturers seeking evaluation of their product shall submit an application to FDOT in accordance with FDOT Section 6 along with the following documentation:
      1) Manufacturer's recommendations for applicability of use on concrete or asphalt surfaces.
      2) Manufacturer's recommendation for applicability of use in vehicular or non-vehicular travel areas.
      3) Manufacturer's specifications and procedures for materials and installation for each use above.

4) For products proposed for use in vehicular traffic areas, independent test data verifying the material meets the requirements of this Section including verification that the product, installed in accordance with the manufacturer's specifications and procedures, has been tested in accordance with either:

a) ASTM E-274, Skid Resistance of Paved Surfaces using a standard ribbed full scale tire at a speed of 40 mph (FN40R), and has a minimum FN40R value of 35, or

b) ASTM E-1911, Measuring Paved Surface Frictional Properties Using the Dynamic Friction Tester (DFT), at a speed of 40 mph (DFT40), and has a minimum DFT40 value of 40.

5) For products proposed for use in non-vehicular traffic areas, independent test data verifying the material meets the requirements of this Section including verification that the product, installed in accordance with the manufacturer's specifications and procedures, has been tested in accordance with ASTM E-303 using the British Pendulum Tester and has a British Pendulum Number (BPN) of at least 40.

6) For products proposed for use as a bike lane application, independent testing verifying that the material can meet the color as identified in the April 15, 2011, Interim Approval for Optional use of Green Colored Pavement for Bike Lanes, Interim Approval (IA-14) Memorandum Valid Under the 2009 MUTCD (http://mutcd.fhwa.dot.gov/resources/interim_approval/ia14/ia14grnpmbiketlanes.pdf).

3. Performance Requirements for Products in Vehicular Travel Areas:

a. In addition to the submittal requirements of B.2 above, APL approval will be contingent on a field service test demonstrating that the patterned pavement product meets the following performance measures at the end of three years from opening to traffic:

1) The average thickness shall be a minimum of 50% of the original thickness.

2) Wearing of the material coating shall not expose more than 15% of the underlying surface area as measured within the traveled way.

3) Friction performance of patterned/textured pavement materials shall meet or exceed one of the following test method values:

a) FN40R value of 35 in accordance with ASTM E-274; or,

b) DFT40 value of 40 in accordance with ASTM E-1911.

c) Manufacturers shall provide a field service test installation of each product within a marked crosswalk on a roadway with an ADT of 6,000 to 12,000 vehicles per day per lane, on a site approved by the Department. The test installation shall be a minimum six feet wide and extend from pavement edge to pavement edge across all traffic lanes and shoulder pavement at the crosswalk location. The test installation shall be tested by the manufacturer in accordance with FM 5-592.

C. Construction

1. Product Submittals: Prior to installation, submit pattern and color samples to the Engineer for confirmation that the product meets the pattern and color specified in the Plans. Do not begin installation until acceptance by the Engineer.

2. Pavement Cuts: Complete all utility, traffic loop detector, and other items requiring a cut and installation under the finished surface, prior to product installation.

3. Surface Protection: Protect treated surfaces from traffic and environmental effects until the product is completely installed, including drying and curing according to the manufacturer's instructions.

4. Installation Acceptance:

a. For installation on new asphalt roadways, apply patterned pavement a minimum of 14 days after placement of the adjacent pavement.

b. Upon completion of the installation, the Engineer will check the area at random locations for geometric accuracy. If any of the chosen areas are found to be deficient, correct the entire patterned area at no additional cost to the Department.

c. Provide certification that the patterned pavement was installed in accordance with the manufacturer's requirements.

D. Method of Measurement.

1. The quantity to be paid will be the installed quantities in square yards of patterned pavement, completed and accepted. No deduction will be made for areas occupied by landscaping, manholes, inlets, drainage structures, or by any public utility appurtenances within the area.

E. Basis of Payment.

1. Price and payment will be full compensation for all work specified in this Article.

2. Payment will be made under:

Item	Description	Unit
523-1-3	Patterned Pavement, Vehicular Areas-Green Bike Lane	SY

527 DETECTABLE WARNINGS ON WALKING SURFACES (REV. 12-20-16)

A. Description.

1. Furnish and install Safety Yellow Colored Detectable Warning devices on newly constructed and/or existing concrete or asphalt walking surfaces (curb ramps, sidewalks, shared-use paths, etc.) constructed in accordance with the FDOT Design Standards Index No.

304 and these specifications, where indicated on the Plans or directed by the Engineer.

B. Materials.

1. General:

   a. Provide Detectable Warnings in accordance with the Americans with Disabilities Act Standards for Transportation Facilities, Section 705.

   b. Provide only embedded Detectable Warning devices, set in wet concrete, for all construction except where retrofit applications of surface applied detectable warnings have been approved in writing by the Engineer.

   c. Use Detectable Warnings consisting of materials intended for exterior use subject to routine pedestrian traffic and occasional vehicular traffic.

   d. Use Detectable Warnings with size and pattern shown in the plans comprised of truncated domes aligned in parallel rows in accordance with the FDOT Design Standards, Index No. 304. Do not use detectable warnings with a diagonal pattern.

   e. Concrete stamping, field-formed materials, or methods or products used to form Detectable Warnings in wet concrete are not permitted.

2. Material Properties:

   a. Provide Detectable Warnings that meet the following minimum material property requirements when tested in accordance with the indicated Standard appropriate to the material.

PROPERTY	STANDARD	TEST VALUE
Slip Resistance	FM 3-C 1028	Dry Coefficient of Friction – 0.8 min. Wet Coefficient of Friction – 0.65 min. (include recessed areas between truncated domes)
Wear Resistance	FM 5-594	Average Volume Loss: no more than 0.06 cm3
Water Absorption*	ASTM D-570	Not to exceed 5%.
Adhesion/Bond Strength**	FM 5-589	150 psi min. tensile adhesion strength
Non-Hazardous Classification	Submit Material Safety Data Sheet (MSDS)	Non-Hazardous, per RCRA Subtitle C
* Applies only to plastic materials. ** Applies only to surface-applied materials.		

3. Color/Contrast: Use Safety Yellow colored Detectable Warnings on concrete or asphalt walking surfaces. Acceptable Detectable Warnings must maintain a Light Reflectance Value (LRV) CAP Y of 25 – 45, as measured with a spectrophotometer, for a minimum duration of three years.

4. Approved Products List:

   a. Use Detectable Warnings listed on the FDOT Approved Products List (APL) and that have been further evaluated and found acceptable by the Department. At the option of the Contractor, an “or equal” product evaluation request, for an equivalent FDOT APL approved product that meets or exceeds the specification stipulated herein, may be submitted in writing to the Engineer for review and acceptance.

   b. The following products, subject to continued listing on the FDOT APL, have been evaluated by the Department for use on Department projects:

SURFACE APPLIED DETECTABLE WARNING DEVICES		
Manufacturer	**Product**	**APL Number**
Engineered Plastics, Inc.	Armor-Tile Surface Applied Inline Dome	527-000-006
TufTile	TufTile Polymer (Surface Applied)	527-000-045
TufTile	TufTile Polymer (Surface Applied) Radius	527-000-045-RW
EMBEDDED DETECTABLE WARNING DEVICES		
Manufacturer	**Product**	**APL Number**
ADA Solutions, Inc.	Cast-In-Place Composite Tactile	527-000-003
ADA Solutions, Inc.	Replaceable Wet Set Composite	527-000-018
Engineered Plastics, Inc	Armor-Tile Replaceable Cast in Place	527-000-026
Engineered Plastics, Inc.	Armor-Tile Cast-In-Place Inline Dome Tile	527-000-027
Cape Fear Systems, LLC	AlertCast (Replaceable) Cast-In-Place	527-000-029
Access Products, Inc.	Access Tile Replaceable Cast in Place	527-000-033
StrongGo Industries	TekWay Dome Tile	527-000-035
TufTile, Inc	TufTile Cast Iron (Wet-set) Replaceable	527-000-044
TufTile	TufTile Polymer (Wet Set) Replaceable	527-000-046
TufTile	TufTile Polymer (Wet Set) Radius	527-000-046-RW

A. Installation Procedures.

1. Surface Preparation and Installation: Prepare the surface in accordance with the manufacturer's recommendations. Use only products and materials appropriate for the surface on which they will be applied. Install in accordance with the manufacturer's instructions, using materials and equipment recommended and approved by the manufacturer. For surface-applied tiles or mats, use adhesives applied over the entire surface and mechanical fasteners.

B. Method of Measurement.

1. The quantity to be paid for will be the area, in square feet, of Detectable Warnings furnished and installed pursuant to these specifications, measured in place and accepted by the Engineer.

C. Basis of Payment.

1. Price and payment will be full compensation for all work specified in this Article, including all labor, surface preparation, materials and incidentals necessary to complete the work for installation of Detectable Warnings on walking surfaces.
2. Payment will be made under:

Item No.	Description	Unit
527-2	Detectable Warning on Walking Surface/Curb Ramp Detectable Warning Surface.	SF

528 RIPRAP FOR DRAINAGE STRUCTURES

A. General

1. This Article is for sand-cement riprap used to fill the void space adjacent to proposed inlet structures placed in existing slab-covered trenches, FDOT Section 530 is modified as follows:
2. Page 600, Section 530-2.1 – Materials/Sand-Cement; expand this Subarticle to include:
   a. Sand-Cement riprap to be placed in existing slab-covered trenches may consist of commercially available pre-bagged sand-cement mixes subject to the following:
      1) Prior to use, submit the manufacturer's product specifications and information for the proposed sand-cement product to the Engineer for approval.
      2) The sand-cement mix shall consist only of Portland Cement and sand meeting the requirements of FDOT Section 921 and 902-3.3 respectively.
      3) Sacks (bags) shall be permeable and absorptive enough to permit passage of water to provide for hydration of the cement.
      4) Ensure that sacks are free from holes and strong enough to withstand handling without ripping or splitting.
      5) Use only one type and size of pre-bagged sand-cement mix at any one structure.
3. Page 603, Section 530-3.1 – Construction Methods/Sand-Cement; delete this Subarticle and substitute the following:
   a. Place sand-cement sacks as shown in the engineering plans or as directed by the Engineer. Sacks are placed without ripping or splitting with its shorter dimension (width) abutting the structure. Lay the sacks in a regular pattern and pack against each other so as to form a close and molded contact after the sand and cement mixture has set up. Remove and replace sacks ripped or torn in placing with sound, unbroken sacks. Then, thoroughly saturate all sacks with water. Grouting, if required by the Engineer, shall be in accordance with FDOT 530-3.1.4.
   b. If mixing and filling sacks at the job site, the mixing and filling requirements of FDOT 530-3.1.1 (Mixing Materials) and FDOT 530-3.1.2 (Filling Sacks) shall also apply.
4. Page 603, Section 530-4.1 – Method of Measurements/Sand-Cement; Delete this Subarticle and substitute the following when using commercially available pre-bagged sand-cement mixes:
   a. The pay quantity for the work specified under this Section shall be the number of cubic yards of sand-cement mixture, placed in sacks or used in the grout, actually placed and accepted. For payment purposes, 1 cubic yard of sand-cement riprap shall constitute either 36 (60 lb) bags of sand-cement mixture or 27 (80 lb) bags of sand-cement mixture.
5. <<No separate pay item(s) for Riprap is be provided under this contract.>>

536 GUARDRAIL

A. Description.

1. Perform work, pursuant to the Contract Documents and the FDOT Design Standards, to include:
   a. Construction of metal guardrail on posts of timber or steel
   b. Removal of existing guardrail
   c. Construction of guardrail anchorages
   d. Replacement of guardrail posts

B. Materials.

1. Guardrail:

a. Construct guardrail of the standard W-beam or thrie beam type. Use materials for the rail and rail elements meeting the steel requirements of FDOT 967-1.

2. Posts:

a. General:

1) Unless the Contract Documents or Engineer designate a particular type of post, the Contractor may choose the type of material of post to use.

2) Use posts of either timber, or steel, and of the sizes and dimensions specified in the Contract Documents. Use the particular type selected throughout a run of rail, except where special steel posts are required.

b. Timber Posts:

1) Meet the requirements of the latest edition of the Southern Pine Inspection Bureau's Standard Grading Rules for Southern Pine Lumber, for No.1 grade timber, and treat the posts in accordance with the requirements for posts in FDOT 955-5.3. Ensure that penetration of preservative is in accordance with requirements for round piles and fence posts in FDOT 955-6.2. Shape and drill the posts prior to treatment, and ensure that they do not vary more than 1 inch from the specified length. Dress all timber posts on all four sides (S4S).

c. Steel Posts:

1) Use steel posts meeting the requirements of ASTM A36 steel. Galvanize the posts in accordance with the requirements of ASTM A 123, with 2 oz/ft2 of zinc coating. Drill the posts prior to galvanizing. Ensure that the manufacturer furnishes certification showing physical and chemical properties of each heat, the amount of spelter coating, and conformance to ASTM A 123.

2) The Contractor may use steel guardrail posts of either a rolled section or a welded structural shape with nominal dimensions as shown in the FDOT Design Standards.

3) For welded structural shapes, meet the following requirements:

a) Ensure that the design properties of the shape meet or exceed the design properties for a W 6 x 9 shape as contained in the AISC Manual of Steel Construction.

b) Weld in accordance with the requirements of ASTM A 769.

c) After cutting posts to length, place a weld to seal the spaces between the web plate and flange plates.

d) Galvanize as specified above after completing all drilling and welding.

3. Anchor Blocks:

a. Use anchor blocks of Class I concrete, and construct and place them in accordance with the requirements shown in the Plans or as directed by the Engineer.

4. Offset Blocks:

a. Use guardrail offset blocks of either timber, steel, recycled plastic, or rubber, and of the sizes specified in the FDOT Design Standards.

b. Treat timber blocks in accordance with the requirements for posts in FDOT 955-5.3. Ensure that penetration of preservative is in accordance with requirements for round piles and fence posts in FDOT 955-6.2. For timber offset blocks, meet the requirements of the latest edition of the Southern Pine Inspection Bureau's Standard Grading Rules for Southern Pine Lumber, for No.1 grade timber. Dress all timber offset blocks on all four sides (S4S). Ensure that timber offset blocks do not vary more than 0.25 inch from the specified length

c. Use rubber blocks that have a minimum Durometer hardness of 50 (ASTM D 2240), show no cracking at the end of an ozone exposure of 100 ±10 pphm for 15 hours at 100ºF (ASTM D 1149 mounting type A), do not exceed 15 points change in Durometer hardness in oven ageing for 70 hours at 158ºF (ASTM D 573), and show no cutting or tearing under a 6,500 lb load applied through a guardrail section. Ensure that the blocks present a neat appearance and have plane surfaces. Provide rubber blocks that are 6 inches wide, 8 inches deep and 14 inches high. Allow dimensional tolerances of ±5/8 inch in height, ±3/8 inch in width, and ±3/8 inch in depth.

d. For Recycled Plastic offset blocks, meet the requirements of FDOT Section 972.

5. Reflector Elements:

a. Provide reflectors that meet the requirements of FDOT 993-5.

b. Mount reflectors onto the guardrail in accordance with the details shown in the Plans and the FDOT Design Standards.

6. Certification:

a. Provide the Engineer, at least ten days prior to guardrail construction, a certification from the manufacturer confirming that all materials (timber or steel posts, anchor and offset blocks, reflector elements, and all other accessories) meet the requirements of the Contract Documents and the FDOT Design Standards.

b. Furnish the Engineer a Certificate of Compliance certifying that the guardrail system, materials and construction practices, comply with applicable FDOT Design Standards and Contract Specifications.

c. Acceptance of furnished material will be based on the Certificate of Compliance, material certification and visual inspection by the Engineer.

C. Setting Posts.

1. Set standard length posts vertically to the depth shown in the FDOT Design Standards. Set special length posts vertically to the depth shown in the plans. Align and realign posts as necessary, until final acceptance. Where the posts are not set in concrete or mounted on structures, backfill the post holes with suitable thoroughly tamped material. As an alternate method, the Contractor may use a post-driving machine, meeting the approval of

the Engineer and capable of driving the posts without damaging them.

2. For guardrail post replacement, backfill and compact the existing hole prior to setting the new post.
3. If driving timber posts, the Contractor may either block out holes in the asphalt for the posts during the asphalt paving operation or cut holes through the asphalt mat prior to the post installation. Blocked out holes or cut holes in the asphalt pavement shall be at least 50% larger than the sectional area of the timber post. After completing driving of the posts patch the area of asphalt around each post with fresh hot bituminous mixture.
4. If driving steel posts, drive the post directly through the asphalt mat. Fill depressions or cracks with fresh, hot bituminous mixture in a manner meeting the approval of the Engineer.
5. For either timber or steel post locations, in which rock, concrete or asphalt thicker than 2 inches exist, remove such material and backfill with suitable material, thoroughly tamped as detailed in the FDOT Design Standards.

D. Erection of Rail

1. Erect the guardrail panels, supports, anchors, etc., as shown in the FDOT Design Standards.

E. Existing Guardrail.

1. Stockpile guardrail, so specified, within the right-of-way at a location approved by the Engineer. Dispose of all remaining guardrail not specified for stockpiling.

F. Method of Measurement.

1. Guardrail:
   a. The quantity to be paid for will be the length, in feet, constructed, in place and accepted.
2. Miscellaneous items as provided by the Contract Documents:
   a. End Anchorage Assemblies:
      1) The quantity to be paid for will be the number of each type constructed, in place and accepted.
   b. Special Guardrail Posts:
      1) The quantity to be paid for will be the number of each, constructed, in place and accepted.
      2) The designation “Special Guardrail Posts” will include only such posts as require special fabrication, for installation at locations where the normal setting would conflict with concrete structures, such as approach slabs, culvert slabs, footings, inlets, etc. Special posts, however, will not include posts for double-face median guardrail, regardless of whether they are embedded in or attached to concrete.
   c. Bridge Anchorage Assemblies:
      1) The quantity to be paid for will be the number of each, constructed, in place and accepted.
   d. Guardrail Anchorage (Concrete Barrier Wall):
      1) The quantity to be paid for will be the number of each, constructed, in place and accepted.
   e. Guardrail Post Replacement:
      1) The quantity to be paid for will be the number of each, replaced.
   f. Removal of Existing Guardrail:
      1) The quantity to be paid for will be the length, in feet, measured prior to removal.
   g. Special Steel Guardrail Posts:
      1) The quantity to be paid for will be the number of each, constructed, in place and accepted.

G. Basis of Payment.

1. Guardrail:
   a. Price and payment will be full compensation for all work specified under this Article, including the furnishing and installing of the acrylic plastic reflectors and all other materials as specified. Payment will be made under the items as follows:
      1) Where the Contractor furnishes all materials for the guardrail, and the Engineer does not require shop-bent rails, payment will be made under the basic item of Guardrail.
      2) Where the radius of the guardrail installation is such as to require shop bending of the guardrail panels, payment will be made under the item of Guardrail (Shop-bent Panels).
   b. All component parts of the complete guardrail installation will be included in the price per foot for the above items except, when the Contract Documents provides for the separate payments to be made under the special items listed below.
      1) End Anchorage Assemblies:
         a) Price and payment will include all components specified in the Contract Documents and FDOT Design Standards.
      2) Special Guardrail Posts:
         a) Price and payment will include all costs for furnishing and installing the special posts that are over and above the costs for the normal posts, which are replaced by such special posts.
      3) Bridge Anchorage Assemblies:
         a) When the Contract Documents provide for direct payment for Bridge Anchorage Assemblies, price and payment will include furnishing and installing the special End Shoes, Wood Blocks or Retrofit Wing Posts, Concrete Anchor Posts and necessary hardware.
         b) When the Contract Documents do not provide for direct payment for Bridge Anchorage Assemblies, the Contractor shall include the cost

for the assemblies in the Contract price per foot for the guardrail.

4) Guardrail Anchorage (Concrete Barrier Wall):

a) Price and payment will include installing connections to concrete barrier walls, as shown on the FDOT Design Standards, Index Nos. 400 and 410.

5) Guardrail Post Replacement:

a) Price and payment will include all labor, materials, and equipment required for removal and disposal of existing posts in areas provided by the Contractor, backfilling and compacting existing holes, and replacement with new posts.

6) Removal of Existing Guardrail:

a) Price and payment will include all labor and equipment required for removal and disposition of the existing guardrail, as specified in the Contract Documents. No additional payment will be made for the removal of the back rail on double face guardrail, thrie beam guardrail, nested rail, safety pipe rail, rub rail or end anchorages.

7) Special Steel Guardrail Posts with Accessories:

a) Price and payment will include all components specified in the Contract Documents and the FDOT Design Standards.

2. <<No separate pay item(s) for Guardrail will be provided under this contract.>>

3. Payment Items: Payment will be made under the items listed below that are required by the Contract Documents for performance of the Work and with awarded Contract unit prices:

Item No.	Description	Unit

538 RESETTING GUARDRAIL

A. Description.

1. Remove the existing guardrail, and reset the salvaged guardrail with new materials. Reset the guardrail, at locations shown in the Plans or designated by the Engineer, in accordance with the FDOT design standards for guardrail construction, as modified by the Contract Documents.

B. Materials.

1. Prevent damage to reusable materials when removing existing guardrail.

2. Furnish all new materials necessary to complete the reset guardrail installation.

3. Provide only new offset blocks.

4. Meet the requirements specified in the Contract Documents for Guardrail.

C. Construction Methods.

1. Set posts in accordance with the requirements of the Contract Documents.

2. Erect guardrail panels, anchors, and hardware in accordance with the FDOT design standards for guardrail construction, as modified by the Contract Documents.

3. Replace any salvageable materials damaged by operations at no expense to the Department.

4. Use a consistent type of post throughout a run of guardrail.

D. Method of Measurement.

1. The quantities to be paid for will be as measured and accepted by the Engineer in feet of reset guardrail.

2. Additionally and where provided by the Contract Documents, the quantities of the following items to be paid for will be as measured and accepted by the Engineer:

a. number of end anchorage assemblies of each type as designated,

b. number of special posts, and

c. number of bridge anchorage assemblies.

E. Basis of Payment.

1. Prices and payments for resetting guardrail will be full compensation for all work specified in this Article, including furnishing all required new hardware and posts, all new offset blocks, and replacement of any material damaged by the Contractor except as specified below.

2. Price and payment for end anchorage assemblies, special guardrail posts, and bridge anchorage assemblies will be as specified in the Contract Documents for Guardrail.

3. Payment for new guardrail panels furnished to replace such items determined to be non-salvageable, excluding any items damaged by the Contractor, will be paid for at the actual invoiced cost for the panels including transportation charges, to which cost will be added an amount equal to 25% of the total invoice amount.

4. <<No separate pay item(s) for Resetting Guardrail will be provided under this contract>>

5. Payment will be made under:

Item No.	Description	Unit

550 FENCING TYPE "B" (SECTION 550)

Page 626, Section 550-6 - Basis of Payment:

1. Subarticle 6.1 is expanded to include:

The Contract price per linear foot for the Item of Fencing, measured as specified in 550-5.2, shall be full compensation for all work and materials specified in this Section and necessary for the complete installation, including line posts, corner, end, and pull posts and the assemblies therefore, as provided below, and not including the payment stipulated for extra length posts. Such price and payment shall include, but not be limited to, the following specific incidental work:

a. Any work required to level and prepare the terrain along the line of the fence.

b. Any additional clearing incidental to construction of the fence.

c. All preparation for post holes, in whatever type of material, as specified herein, including the Class I Concrete for the placement and setting of all posts.

d.Any furnishing and installing of electrical grounds.

e.Any additional work or materials required for special construction over irregular terrain, or terrain of inadequate support for the posts, including the additional barbed wire, but not including the extra lengths of posts ordered by the Engineer.

f.Any costs of erection and removal of any temporary fencing, which might be necessary for maintaining security of livestock, etc., on adjacent property during construction of the new fence.

2. Subarticle 6.2: Delete in its entirety.

3. Basis of Payment:

Payment for removal and relocation of existing fences as directed by the Engineer will be included under:

Item	Description	Unit
550-60-225	Fence Gate, Type B, Double, 20.1 – 24' Opening.	EA
550-60-400	Fence Gate, Reset Existing Gate.	EA

546 RUMBLE STRIPS (REV. 08-02-2022)

A. Description

1. Construct rumble strips in accordance with the details shown in the Plans and FDOT Standard Plans, Index 546-001.

B. Materials for Raised Rumble Strips

1. Permanent Raised Rumble Strips: Construct permanent raised rumble strips using one of the following:

a. Preformed Thermoplastic: Use only materials listed on the FDOT's Approved Product List (APL), meeting the following requirements:

1) Preformed Thermoplastic from FDOT Standard Specifications 971-1 and 971-6. Ensure that the material used can be restored to its original dimensions by using a self-bonding overlay meeting these requirements.

b. Asphalt: Any plant-mixed hot bituminous asphalt mixture meeting the requirements of a job-mix formula issued by FDOT, except open-graded friction course.

c. Short-Term Raised Rumble Strips: Construct short-term raised rumble strips meeting the requirements of this Article, or by using removable polymer striping tape meeting FDOT requirements of 990-9.
.

C. Application:

1. Permanent Raised Rumble Strips:

a. Notify the Engineer before the placement of raised rumble strips. Apply raised rumble strips having well defined edges. Remove and replace any raised rumble strips not meeting the requirements of the Contract Documents at no additional cost to the Department.

b. Before applying raised rumble strips, remove any material that would adversely affect the bond of the raised rumble strips by a method approved by the Engineer.

c. Apply raised rumble strips only to dry surfaces, and only when the ambient air and surface temperature is at least 55ºF and rising.

d. Before applying thermoplastic materials on portland cement concrete surfaces, apply a primer sealer recommended by the manufacturer.

e. Prior to the application of any plant-mixed hot bituminous material, apply a tack coat meeting the requirements of FDOT Section 300, Prime and Tack Coats.

f. The mixture will be accepted on the basis of visual inspection by the Engineer with no further testing required.

2. Short-Term Raised Rumble Strips:

a. Install short-term raised rumble strips before opening to traffic, and in accordance with this Article. Maintain and remove short-term raised rumble strips until permanent raised rumble strips are installed.

3. Ground-In Rumble Strip:

a. General:

1) Grind rumble strips that have well-defined edges and smooth interiors without tearing the finished pavement.

2) On a daily basis, before opening the adjacent lane to traffic, ensure that all debris generated by the grinding process is removed and disposed of by vacuum or a method approved by the Engineer. Do not dispose of the debris within the right of way. Do

not use the debris generated by the grinding process in recycled asphalt (RAP).

3) Restore any pavement to the satisfaction of the Engineer, at no additional cost to the Department, when ground-in rumble strips do not meet the requirements of the Contract Documents.

4. Inspections:

a. For limited access roadways, measure depth every one mile. For arterial and collector roadways, measure depth every 500 feet. Measure depth as distance from pavement grade to top of ground-in grooves at the transverse and longitudinal centerline of the grinding prior to the placement of longitudinal thermoplastic pavement markings. Measure, record, certify and submit to the Engineer.

D. Method of Measurement.

1. The quantity of raised rumble strip sets to be paid for under this Section will be the quantity per each, constructed and accepted.

2. The quantity of ground-in rumble strips to be paid for under this Section will be the quantity in gross miles, constructed and accepted. No deduction will be made when the skip array is used

E. Basis of Payment.

1. Price and payment will be full compensation for all work specified in this Section, including all surface cleaning and preparation, all debris disposal, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines, labor, and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

2. <<No separate pay item(s) for Resetting Guardrail will be provided under this contract>>

3. Payment will be made under:

Item	Description	Unit

575 SODDING

A. Description.

1. Establish a stand of grass within the specified areas, by furnishing and placing sod, and rolling, watering, and maintaining the sodded areas to ensure a healthy stand of grass.

B. Materials. Meet the following requirements:

1. Sod FDOT 981-2

2. Water FDOT Section 983

C. Construction Methods.

1. Preparation of Ground: Scarify or loosen the areas requiring sod to a depth of 6 inches. On areas where the soil is sufficiently loose, particularly on shoulders and fill slopes, the Engineer may authorize the elimination of the ground preparation. Limit preparation to those areas that can be sodded within 72 hours after preparation. Prior to sodding, thoroughly water areas and allow water to percolate into the soil. Allow surface moisture to dry before sodding to prevent a muddy soil condition.

2. Placing Sod: Place sod immediately after ground preparation. Do not use sod which has been cut for more than 72 hours. Stack all sod that is not planted within 24 hours after cutting and maintain proper moist condition.

a. Do not sod when weather and soil conditions are unsuitable for proper results. Pre-wet the area prior to placing sod. Do not place sod on eroded or washed out sites.

b. Place the sod on the prepared surface, with edges in close contact, and embed it firmly and smoothly by light tamping with appropriate tools.

c. Place the sod to the edge of all the paving and shrub areas and 1 inch below adjoining pavement with an even surface and edge. Place rolled sod parallel with the roadway and cut any exposed netting even with the sod edge.

d. Roll using a lightweight turf roller. Provide a true and even surface without any displacement of the sod or deformation.

e. Where sodding in drainage ditches, stagger the setting of the sod pieces to avoid a continuous seam along the line of flow. Ensure that the offsets of individual strips do not exceed 6 inches. Tamp the outer pieces of sod to produce a featheredge effect.

f. Peg sod at locations where the sod may slide. Drive pegs through sod blocks into firm earth, at intervals approved by the Engineer.

g. Remove any sod as directed by the Engineer.

3. Watering: Thoroughly water the sod immediately after placing. Do not water in excess of 1 inch per week for establishment. The contractor shall water and maintain newly sodded areas as needed and adhere to the following minimum frequencies until final acceptance of the Project by the County unless otherwise approved by the Engineer:

a. Minimum Watering Schedule (3/4” to 1” per watering)

1) Every day for the first 14 days after placement, followed by

2) Three times per week for next 14 days, followed by

3) Two times per week until final acceptance of the project.

b. Mowing Schedule

1) Minimum bi-weekly after established, and

2) Immediately prior to final acceptance.

D. Maintenance.

1. Maintain the sodded areas in a satisfactory condition until final acceptance of the project. Include in such

maintenance the filling, leveling, and repairing of any washed or eroded areas, as may be necessary. The Department will pay for resodding necessary due to factors determined by the Engineer to be beyond the control of the Contractor.

2. Monitor placed sod for growth of pest plants and noxious weeds. If pest plants and/or noxious weeds manifest themselves within 30 days of placement of the sod, treat affected areas by means acceptable to the Department at no expense to the Department. If pest plants and/or noxious weeds manifest themselves after 30 days from date of placement of sod, the Engineer, at his sole option, will determine if treatment is required and whether or not the Contractor will be compensated for such treatment. If compensation is provided, payment approved by the Engineer will be made as unforeseeable work.
3. Maintenance of sodded areas is required for no less than thirty (30) days after placement or until the sodded area is determined to be established and satisfactory by the Engineer, whichever is greater.

E. Method of Measurement.

1. The quantities to be paid for will be the area of sodding measured and accepted by the Engineer.
2. Measurement for payment shall include only areas of sodding that have established a satisfactory root system (i.e. leaf blades break before sod can be pulled from the soil by hand).

F. Basis of Payment.

1. Prices and payments for Sodding will be full compensation for all work, water, and materials required to perform the work as specified in this Article, the satisfactory disposal of excavated material, and the furnishing and application of the water.
2. The costs for watering, mowing, and maintaining the sod in a moist condition for a period of at least two weeks, shall be included in the Contract unit price for Sodding.
3. Payment will be made under:

Item	Description	Unit
575-1-1A	Sodding (Pensacola, Bahia or Match existing) (includes watering & maintenance)	SY

575 RELOCATION OF TREES OR PALMS; AND PROTECTION OF EXISTING LANDSCAPE

A. Relocation of trees or palms

1. General
   a. Work consists of relocating trees and/or palms within the existing right of way, within a one (1) mile radius, in locations indicated in the drawings or as directed by the Engineer. Where drainage work is required, minor adjustments to the system may be necessary to minimize relocations.
   b. The Contractor shall be cognizant of and comply with the Miami-Dade County Ordinance regulating the removal and/or relocation of all trees. Permits required for tree removal and/or relocation shall be the responsibility of the Contractor.
2. Material
   a. Water: provide water by a method approved by the Engineer meeting the requirements of FDOT Section 983.
   b. Backfill Material: the existing material excavated from the planting pit is to be used as backfill.
3. Pruning
   a. Trees
      1) Prior to root pruning, prune tree canopy to ISA Standards and conform to ANSI A300. The extent of pruning shall be the minimum needed to reduce shock resulting from severing of roots.
      2) No more than 30 percent of total canopy branches greater than one inch in diameter may be removed. Interior sucker growth and dead wood shall be removed first, followed by selective pruning of branches and limbs. Limbs that run through the tree crown shall be removed before other limbs are removed. Pruning shall not destroy the form of the tree. All cuts shall be made outside of the branch collar.
      3) Trees shall be root pruned six (6) weeks prior to relocation. No backhoes or trenchers shall be used in the process. Backfill trench within 24 hours after root pruning with coarse sand.
      4) Where required by the Engineer or the designated County arborist, brace and guy the root pruned tree to support and maintain the tree in a stable vertical position until relocation.
4. Replanting
   a. Trees
      1) The planting pit shall be a minimum of 24” wider than the diameter of the rootball unless otherwise directed by the Engineer. The depth of the pit shall be adjusted so that the top of the rootball will be at the same elevation or slightly above the existing ground level. All plants shall be centered in the hole. Trees shall be watered in during the planting process to eliminate air pockets in the backfill.
      2) Size of the trees will be the trunk diameter measured at breast height (54 inches above grade).
      3) All trees are to be fertilized at the time of planting with Atlantic Florida East Coast Fertilizer Mixture (No. 5231) 12-06-08 slow-release fertilizer or approved equal. This fertilizer is to be spread evenly over the top of the planting pit after backfilling. The application rate is 2 lbs/tree.
   b. Palms
      1) The planting pit shall be a minimum of 24” wider than the diameter of the rootball unless otherwise directed by the Engineer. The depth of the pit shall be adjusted so that the top of the rootball will be at

the same elevation or slightly above the existing ground level. All plants shall be centered in the hole. Burlap is to be untied and pulled away from the top of the ball, unless specified in writing by the Engineer. Plants are to be watered-in during the planting process to eliminate all air pockets in the backfill material.

2) Size of the palm will be determined by measuring ground level to the topmost portion of the palm.

3) All palms are to be fertilized at time of planting with Atlantic Florida East Coast Fertilizer Mixture 08-04-12 slow-release improved palm special fertilizer or equal. This fertilizer is to be spread evenly over the top of the planting pit after backfilling. The application rate of 3 lbs/palm.

5. Mulching:

a. A planting saucer will be established, the same size as the diameter of the planting pit and the rim shall be no higher than 4 inches. The mulch is to be Forestry Research Products Florimulch (Melaleuca mulch) free of viable seed and burrowing nematodes and certified by the Florida Department of Agriculture, or equal, and is to be spread evenly inside the saucer to a depth of 3 inches.

b. Remove saucer prior to Project completion or as directed by the Engineer.

6. Staking and Guying:

a. This work shall be performed in accordance with the standard planting detail for trees and/or palms.

b. Palms shall be staked using the Arborlock Staking System or equal (with the approval of County representative).

c. Trees shall be guyed using Arbor Tie (a flat woven polypropylene material with 900 lbs. Break strength) manufactured by Deep Root Partners, L.P., or equal.

d. Six (6) month after planting, the Contractor shall return to the site and remove all materials used for staking and guying. At the discretion of the Engineer, the period for staking and guying may be extended beyond six (6) months but for no longer than one (1) year.

7. Watering Schedule:

a. After replanting trees and palms, they are to be watered as follows:

1) for the first 4 weeks 3 times/week

2) for the second 4 weeks 2 times/week

3) for the third 4 weeks 1 time/week

b. Application Rate:

1) Trees and slender trunk palms 6 gal/watering

2) Moderate and heavy trunk palms10 gal/watering

8. Guarantee of Relocated Trees and Palms

a. All trees and palms that are relocated shall be guaranteed for a period of one year after relocation.

B. Protection of Existing Landscaping

1. Description:

a. Install tree protection barricades when called for in the Contract Documents or by the Engineer to protect existing trees and landscape from damage during project construction. Place barricades, as directed by the Engineer, at the drip line of the landscape foliage or as far from the base of the tree trunk as possible. Barricades shall consist of Heavy-Duty Construction (Orange) Barrier Fence (Minimum 4-feet high) attached to 2-inch by 4-inch by 6-foot long vertical wooden posts per FDOT Index No. 544 except that 2-inch by 4-inch horizontal wooden top bars with a maximum 8-foot spacing between posts shall be used. Barricades shall be able to withstand bumps by heavy equipment and trucks. Maintain barricades in good condition.

b. All trees, shrubbery, and landscaping (on the R/W or adjacent property) irreparably damaged or destroyed by the Contractor during construction, as determined by the Engineer, shall be replaced by and at the Contractor's expense. Trees and shrubbery shall be replaced with like-sized plants; except for trees or shrubs removed pursuant to the requirements of the Contract Documents or at the specific direction of the Engineer. Replacement plant size shall be determined by calculating the total diameter at breast height (DBH) of affected trees, palms, and/or shrubbery, or the total averaged height of affected trees, palms, and/or shrubs. All replacement material must be Florida #1 Grade or better.

C. Method of Measurement:

1. The quantity to be paid for relocation of trees or palms will be the quantities measured, completed and accepted by the Engineer, under the items shown in the Contract Document.

2. The quantity to be paid for protection of existing landscape will be the quantity in linear feet of barricade, completed and accepted, measured by the Engineer.

D. Basis of Payment:

1. Price and payment shall be full compensation for all work specified in this Section inclusive of all labor, material, and equipment necessary for the proper relocation of trees or palms and protection of existing landscape as required by the Contract Documents.

2. Payment will be under:

Item No.	Description	Unit
580-322-2A	Tree Removal and Disposal (6" to 12" Dia.)	EA
580-322-4	Tree Removal and Replacement [(Including watering) (12"-24" Diameter)]	EA
580-322-4A	Tree Removal and Disposal (12" to 24")	EA
580-322-5A	Tree Removal and Disposal (24" to 36")	EA

580 LANDSCAPE INSTALLATION

A. Description.

1. Plant trees and shrubs of the species, size, and quality indicated in the plans.
2. The Engineer reserves the right to adjust the number and location of any of the designated types and species to be used at any of the locations shown, in order to provide for any unanticipated effects which might become apparent after the substantial completion of other phases of the Project, or for other causes.

B. Materials.

1. Plants:
   a. Authority for Nomenclature; Species, etc.: For the designated authority in the identification of all plant material, refer to two publications of L.H. Bailey: “Hortus III” and “Manual of Cultivated Plants,” and ensure that all specimens are true to type, name, etc., as described therein. For the standard nomenclature, refer to the publication of the American Joint Committee on Horticultural Nomenclature, “Standardized Plant Names.”
   b. Grade Standards and Conformity with Type and Species: Only use nursery grown plant material except where specified as Collected Material. Use nursery grown plant material that complies with all required inspection, grading standards, and plant regulations in accordance with the latest edition of the Florida Department of Agriculture’s “Grades and Standards for Nursery Plants”.
      1) Except where a lesser grade might be specifically specified in the plans, ensure that the minimum grade for all trees and shrubs is Florida No. 1. Ensure that all plants are the proper size and grade at the time of delivery to the site, throughout the project construction period and during any designated plant establishment period.
      2) Ensure that plant materials are true to type and species and that any plant materials not specifically covered in Florida Department of Agriculture’s “Grades and Standards for Nursery Plants” conform in type and species with the standards and designations in general acceptance by Florida nurseries.
      3) Ensure that plant materials are shipped with tags stating the botanical and common name of the plant.
   c. Inspection and Transporting: Move nursery stock in accordance with all Federal and State regulations and accompany each shipment with the required inspection certificates for filing with the Engineer.
2. Water: Water used in landscaping operations may be obtained from any approved source. Ensure that water is free of any substance which might be detrimental to plant growth. The use of effluent water is subject to approval and must meet all Federal, State and Local requirements.

C. Specific Requirements for the Various Plant Designations.

1. Balled-and-Burlapped Plants (B&B), and Wired Balled-and-Burlapped (WB & B):
   a. General: Properly protect the root ball of these plants until planting them. The Engineer may reject any plant which shows evidence of having been mishandled.
      1) Set the B&B and WB&B plants then remove the top 2/3 of all wire, rope, and binding surrounding the plant. Remove the burlap from the top 4 inches [100 mm] of the root ball. Do not disturb the root ball in any way. Bare root material is not allowed for substitution.
      2) At least 90 days before digging out B & B and WB & B plants, root-prune those 1 1/2 inches [38 mm] or greater in diameter and certify such fact on accompanying invoices.
   b. Provisions for Wiring: For plants grown in soil of a loose texture, which does not readily adhere to the root system (and especially in the case of large plants or trees), the Engineer may require WB & B plants. For WB & B plants, before removing the plant from the excavated hole, place sound hog wire around the burlapped ball, and loop and tension it until the tightened wire netting substantially packages the burlapped ball such as to prevent disturbing of the loose soil around the roots during handling.
2. Container-Grown Plants (CG): The Engineer will not accept any CG plants with roots which have become pot-bound or for which the top system is too large for the size of the container. Fully cut and open all containers in a manner that will not damage the root system. Do not remove CG plants from the container until immediately before planting to prevent damage to the root system.
3. Collected Plants (Trees and Shrubs) (C): Use C plants which have a root ball according to “Florida Grades and Standards for Nursery Plants”. Do not plant any C plant before the Engineer’s inspection and acceptance at the planting site.
4. Collected Plants (Herbaceous) (HC): The root mass and vegetative portions of collected herbaceous plants shall be as large as the specified container-grown equivalent. Do not plant any collected plant before inspection and acceptance by the Engineer.
5. Specimen Plants (Special Grade): When Specimen (or Special Grade) plants are required, label them as such on the plant list, and tag the plant to be furnished.
6. Palms: Wrap the roots of all plants of the palm species before transporting, except if they are CG plants and ensure that they have an adequate root ball structure and mass for healthy transplantation as defined in “Florida Grades and Standards for Nursery Plants”.
   a. The Engineer will not require burlapping if the palm is carefully dug from marl or heavy soil that adheres to the roots and retains its shape without crumbling. During transporting and after arrival, carefully protect root balls of palms from wind and exposure to the sun. Muck grown palms are not allowed. After delivery to the job site, if not planting the palm within 24 hours, cover the

root ball with a moist material. Plant all palms within 48 hours of delivery to the site.

b. Move sabal and coconut palms in accordance with the "Florida Grades and Standards for Nursery Plants."

7. Substitution of Container-Grown (CG) Plants: With the Engineer's approval, the Contractor may substitute CG plants for any other root classification types, if he has met all other requirements of the Contract Documents.

D. Planting Requirements.

1. Layout: Prior to any excavation or planting, mark all planting beds and individual locations of palms, trees, large shrubs and proposed art and architectural structures, as shown in the plans, on the ground with a common bright orange colored spray paint, or with other approved methods, within the project limits. Obtain the Engineer's approval and make necessary utility clearance requests.

2. Excavation of Plant Holes: Excavate plant holes after an area around the plant three times the size of the root ball has been tilled to a depth of the root ball. Ensure that the plant hole is made in the center of the tilled area only to the depth of the plant root ball.

   a. Where excess material has been excavated from the plant hole, use the excavated material to backfill to proper level.

3. Setting of Plants: Center plants in the hole. Lower the plant into the hole so that it rests on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth and so oriented such as to present the best appearance.

   a. Backfill with native soil, unless otherwise specified on the plans. Firmly rod and water-in the backfill so that no air pockets remain. Apply a sufficient quantity of water immediately upon planting to thoroughly moisten all of the backfilled earth. Keep plants in a moistened condition for the duration of the planting period.

   b. When so directed, form a water ring 6 inches [150 mm] in width to make a water collecting basin with an inside diameter equal to the diameter of the excavated hole. Maintain the water ring in an acceptable condition.

4. Special Bed Preparation: Where multiple or mass plantings are to be made in extended bedding areas, and the plans specify Special Bed Preparation, prepare the planting beds as follows:

   a. Remove all vegetation from within the area of the planting bed and excavate the surface soil to a depth of 6 inches [150 mm]. Backfill the excavated area with peat, sand, finish soil layer material or other material to the elevation of the original surface. Till the entire area to provide a loose, friable mixture to a depth of at least 8 inches [200 mm]. Level the bed only slightly above the adjacent ground level. Then mulch the entire bedding area, in accordance with 580 8.

E. Staking and Guying.

1. General: When specified in the plans, or as directed by the Engineer, stake plants in accordance with the following.

   a. Use wide plastic, rubber or other flexible strapping materials to support the tree to stakes or ground anchors that will give as the tree moves in any direction up to 30 degrees. Do not use rope or wire through a hose. Use guy chords, hose or any other thin bracing or anchorage material which has a minimum 12 inches [300 mm] length of high visibility flagging tape secured to guys, midway between the tree and stakes for safety.

   b. Stake trees larger than 1 inch [25 mm] diameter and smaller than 2 inches [50 mm] diameter with a 2 by 2 inch [50 by 50 mm] stake, set at least 2 feet [0.6 m] in the ground and extending to the crown of the plant. Firmly fasten the plant to the stake with flexible strapping materials as noted above.

2. Trees of 2 to 3 1/2 inches [50 to 90 mm] Caliper: Stake all trees, other than palm trees, larger than 2 inches [50 mm] caliper and smaller than 3 1/2 inches [90 mm] caliper with two 2 by 4 inch [50 by 100 mm] stakes, 8 feet [2.4 m] long, set 2 feet [0.6 m] in the ground. Place the tree midway between the stakes and hold it firmly in place by flexible strapping materials as noted above.

3. Large Trees: Guy all trees, other than palm trees, larger than 3 1/2 inches [90 mm] caliper, from at least three points, with flexible strapping materials as noted above.

   a. Anchor flexible strapping to 2 by 4 by 24 inch [50 by 100 by 600 mm] stakes, driven into the ground such that the top of the stake is at least 3 inches [75 mm] below the finished ground.

4. Special Requirements for Palm Trees: Brace palms which are to be staked with three 2 by 4 inch [50 by 100 mm] wood braces, toe-nailed to cleats which are securely banded at two points to the palm, at a point one third the height of the trunk. Pad the trunk with five layers of burlap under the cleats. Place braces approximately 120 degrees apart and secure them underground by 2 by 4 by 12 inch [50 by 100 by 300 mm] stake pads.

F. Tree Protection and Root Barriers.

1. Install tree barricades when called for in the Contract Documents or by the Engineer to protect existing trees from damage during project construction. Place barricades at the drip line of the tree foliage or as far from the base of the tree trunk as possible. Barricades shall be able to withstand bumps by heavy equipment and trucks. Maintain barricades in good condition.

2. When called for in the Contract Documents, install root barriers or fabrics in accordance with the details shown.

G. Pruning.

1. Prune all broken or damaged roots and limbs in accordance with established arboriculture practices. When pruning is completed ensure that all remaining wood is alive. Do not reduce the size or quality of the plant below the minimum specified.

H. Mulching.

1. Uniformly apply mulch material, consisting of wood chips (no Cypress Mulch is allowed), pine straw, compost, or other suitable material approved by the Engineer, to a minimum loose thickness of 3 inches [75 mm] over the entire area of the backfilled hole or bed within two days after the planting. Maintain the mulch continuously in place until the time of final inspection.

I. Disposal of Surplus Materials and Debris.

1. Dispose of surplus excavated material from plant holes by scattering or otherwise as might be directed so that it is not readily visible or conspicuous to the passing motorist or pedestrian. Remove all debris and other objectionable material from the site and clean up the entire area and leave it in neat condition.

J. Contractor's Responsibility for Condition of the Plantings.

1. Ensure that the plants are kept watered, that the staking and guying is kept adjusted as necessary, that all planting areas and beds are kept free of weeds and undesirable plant growth and that the plants are maintained so that they are healthy, vigorous, and undamaged at the time of acceptance.

K. Plant Establishment Period.

1. If the Contract Documents designate a Plant Establishment Period, assume responsibility for the proper maintenance, survival and condition of all landscape items during such period at no additional cost.

L. Method of Measurement.

1. The quantities to be paid for will be the items shown in the plans, completed and accepted.

M. Basis of Payment.

1. <<No separate pay item(s) for Landscape Installation will be provided under this contract.>>
2. Prices and payments will be full compensation for all work specified in this Article. (add pay items)

600 GENERAL PROVISIONS FOR TRAFFIC CONTROL DEVICES (REV. 04-14-15)

A. Please refer to Appendices to the Special Provisions for Traffic Signals and Signs Provisions and Specifications.

701 AUDIBLE AND VIBRATORY PAVEMENT MARKINGS (REV. 01-07-2014)

A. Description

1. Apply audible and vibratory pavement markings in accordance with the Contract Documents.

B. Materials

1. Thermoplastic:
   a. Use thermoplastic material meeting the requirements of FDOT 971-1 and 971-9 and listed on the FDOT's Approved Product List (APL) as an approved system. The Engineer will take random samples of the materials in accordance with the FDOT's Sampling, Testing and Reporting Guide schedule.
2. Retroreflective Elements:
   a. Use reflective elements recommended by the manufacturer that meet the requirements of FDOT 971-1.7 and are part of the system listed on the APL.

C. Equipment.

1. Use equipment capable of providing continuous, uniform heating of the striping material to temperatures exceeding 390ºF, mixing and agitating the material in the reservoir to provide a homogenous mixture without segregation. Use equipment that will maintain the striping material in a plastic state, in all mixing and conveying parts, including the line dispensing device until applied. Use equipment which is capable of producing a consistent pattern of transverse bumps positioned at regular and predetermined intervals. Use equipment which meets the following requirements:
   a. Capable of traveling at a uniform rate of speed, both uphill and downhill, to produce a uniform application of striping material and capable of following straight lines and making normal curves in a true arc.
   b. Capable of applying reflective elements to the surface of the completed stripe by automatic dispensers attached to the striping machine such that the reflective elements are dispensed closely behind the installed line. Use reflective element dispensers equipped with an automatic cut-off control that is synchronized with the cut-off of the thermoplastic material and applies the reflective elements uniformly on the entire traffic stripe surface with 50 to 60% embedment.
   c. Equipped with a special kettle for uniformly heating and melting the striping material. The kettle must be equipped with an automatic temperature control device and material thermometer for positive temperature control and to prevent overheating or scorching of the thermoplastic material.
   d. Meets the requirements of the National Fire Protection Association (NFPA), State and Local authorities.

D. Application

1. General:
   a. Before applying traffic stripes and markings, remove any material that would adversely affect the bond of the traffic stripes by a method approved by the Engineer.
   b. Before applying traffic stripes to any portland cement surface, apply a primer, sealer or surface preparation adhesive of the type recommended by the manufacturer. Offset longitudinal lines at least 2 inches from construction joints of portland cement concrete pavement.
   c. Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 50ºF and rising for asphalt surfaces and 60°F and rising for concrete surface.
   d. Apply striping to the same tolerances in dimensions and in alignment specified in Article 710, Painted Pavement Markings, Subarticle D. When applying traffic stripes and marking over existing markings, ensure that no more than 2 inches on either end and not more than 1 inch on either side of the existing line is visible.
   e. Conduct field tests in accordance with FM 5-541. Take test readings representative of the striping performance. Remove and replace markings not meeting the requirements of this Section.

E. Thickness:

1. Apply flat base lines having a thickness of 0.100 to 0.150 inches, exclusive of the audible bumps, when measured above the pavement surface.
2. Measure, record and certify and submit to the Engineer, the thickness of white and yellow pavement markings in accordance with FM 5-541.
3. The Engineer will verify the thickness of the pavement markings in accordance with FM 5-541 within 30 days of receipt of the Contractor's certification.

F. Dimensions of Audible Bumps:

1. Apply the raised bumps with a profile such that the leading and trailing edges are sloped at a sufficient angle to create an audible and vibratory warning.
2. Bumps on shoulder and centerline markings shall be at least 0.45 inches at the highest point of the bump, above the pavement surface, including the base line. The height shall be measured after application of drop-on reflective elements. Bumps shall have a minimum baseline coverage dimension of 2.5 inches in both transverse and longitudinal directions. The bumps may have a drainage channel, the width of each drainage channel will not exceed 1/4 inch at the bottom of the channel. The longitudinal distance between bumps shall be approximately 30 inches.

G. Retroreflectivity:

1. Apply white and yellow audible and vibratory markings that will attain an initial retroreflectance of not less than 300 mcd/lx·m2 and not less than 250 mcd/lx·m2, respectively. Measure, record, and submit to the

Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.

H. Color:

1. Use pavement marking materials that meet the requirements of FDOT 971-1.

I. Reflective Elements:

1. Apply reflective elements to all markings at the rates determined by the manufacturer's recommendations as identified for the APL System.

J. Loss:

1. If more than 1% of the bumps or more than three consecutive bumps are missing or broken (less than half a bump remaining) within the first 45 days under traffic, replace all failed bumps at no expense to the Department. If more than 2% of the bumps fail within the first 45 days under traffic, the replacement period will extend an additional 45 days from the date all replacement bumps were installed. If, at the end of the additional 45 days, more the 2% of all bumps (initial and replacement) fail, replace all failed bumps at no expense to the Department. Measure, record, certify and submit to the Engineer, the loss of bumps.

K. Contractor's Responsibility for Notification.

1. Notify the Engineer prior to the placement of audible and vibratory markings. Furnish the Engineer with the manufacturer's name and batch numbers of the thermoplastic materials and reflective elements to be used. Ensure that the batch numbers appear on the thermoplastic materials and reflective elements packages.

L. Protection of Newly Applied Audible and Vibratory Markings.

1. Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause.

M. Observation Period.

1. Longitudinal pavement markings are subject to a 180 day observation period under normal traffic. The observation period will begin with the satisfactory completion and acceptance of the pavement marking work.
2. The longitudinal pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of reflectivity or vehicular damage. The retroreflectivity shall meet the initial requirements of Subarticle G. The Department reserves the right to check the retroreflectivity any time prior to the end of the observation period.
3. Replace, at no expense to the Department, any longitudinal pavement markings that do not perform satisfactorily under traffic during the 180 day observation period.

N. Corrections for Deficiencies.

1. Correct all deficiencies by removal and reapplication of a one mile section centered around the deficiency at no cost to the Department.

O. Submittals.

1. Submittal Instructions:
   a. Prepare and submit a certification of quantities to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities.

P. Method of Measurement.

1. The quantities to be paid for under this Section will be as follows:
   a. The length, in net miles, of 6 inches solid traffic stripe, authorized and acceptably applied.
   b. The total traversed distance in gross miles of 10-30 skip line. The actual applied line is 25% of the traverse distance for a 1:3 ratio. This equates to 1,320 feet of marking per mile of single line.

Q. Basis of Payment.

1. Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.
2. <<No separate pay item(s) for Audible and Vibratory Pavement Markings will be provided under this contract.>>
3. Payment will be made under:

Item	Description	Unit

705 OBJECT MARKERS AND DELINEATORS (REV. 08-23-12)

A. Description.

1. Furnish and install object markers to mark obstructions within or adjacent to the roadway of the types and at the locations called for in the Contract Documents.
2. Furnish and install delineators along the side of the roadway to indicate the alignment of the roadway as indicated in the Contract Documents.

3. Meet all requirements of the FDOT Design Standards and the Contract Documents.

B. Materials.

1. General:

a. Meet the following requirements:

Object Markers and Delineators	FDOT Section 993
Retroreflective and Nonreflective Sign Sheeting	FDOT Section 994

2. Product Acceptance on the Project:

a. Ensure that delineators, delineator posts, and markers used to delineate guardrail and barrier wall are listed on the FDOT Qualified Products List.

b. Provide to the Engineer a manufacturer's certification conforming to the requirements of Article 1.04 (Controlling Materials) of Division 1, which confirms that each product meets the requirements of this Article.

C. Installation Requirements.

1. Install delineators, object markers, and reflector units for guardrail and barrier wall and in accordance with the MUTCD, FDOT Design Standards and Contract Documents.

D. Method of Measurement.

1. The quantity to be paid for will be the number of delineators or object markers furnished, installed and accepted.

E. Basis of Payment.

1. Prices and payments will be full compensation for work specified in this Article, including the cost of labor, materials, and incidental items required to complete the work.

2. <<No separate pay item(s) for Object Markers and Delineators will be provided under this contract.>>

3. Payment will be made under:

Item No.	Description	Unit

706 RAISED RETRO-REFLECTIVE PAVEMENT MARKERS AND BITUMINOUS ADHESIVE (REV. 05-02-12)

A. Description.

1. Place raised Retro-Reflective Pavement Markers (RPMs) and adhesive, which upon installation produces a positive guidance system to supplement other reflective pavement markings.

B. Materials.

1. Use only Class B markers unless otherwise shown on the Plans.

2. Meet the requirements of FDOT Section 970.

3. Product Acceptance on the Project.

a. Use only reflective pavement markers and bituminous adhesive that are listed on the FDOT Qualified Products List.

b. Provide Engineer a producer's certification, conforming to the requirements of Article 1.04 (Controlling Materials) of the General Requirements to these Specifications, which confirms that each product meets the requirements of this Article.

C. Equipment.

1. Use equipment having either thermostatically controlled double boiler type units utilizing heat transfer oil or thermostatically controlled electric heating pots to install hot applied bituminous adhesive. Do not use direct flame melting units with flexible adhesives; however, this type of unit may be used with standard adhesive in accordance with manufacturer's recommendations. Use a melter/applicator unit suited for both melting and pumping the adhesive through heated applicator hoses.

2. Heat the adhesive to between 375 and 425ºF and apply directly to the bonding surface from the melter/applicator by either pumping or pouring. Maintain the application temperature between 375 and 425ºF. The adhesive may be reheated. Do not exceed the manufacturer's recommendations for pot life at application temperatures.

D. Application.

1. Apply RPMs to the bonding surface using bituminous adhesives only. Engineer will conduct field testing in accordance with Florida Method (FM) 5-566. Correct RPMs not applied in accordance with these requirements at no cost to the Department.

2. Prior to application of adhesive, clean the bonding surface to remove any material that would adversely affect the adhesive.

3. Apply the adhesive to the bonding surface, not the RPMs, so that 100% of the bonding area of the RPMs will be covered, in accordance with adhesive manufacturer's recommendations. Apply sufficient adhesive to ensure, that when the RPMs are pressed downward into the adhesive, adhesive will be forced out around the entire perimeter of each RPM.

4. Immediately remove excess adhesive from the bonding surface and exposed surfaces of the RPMs. Soft rags moistened with mineral spirits meeting Federal Specifications TT-T-291 or kerosene may be used to remove adhesive from exposed faces of the RPMs. Do not use any other solvent. If any adhesive, pavement marking materials or other foreign matter adheres to the reflective face of the RPM, replace the RPM at no cost to the Department.

5. Install RPMs with the reflective face of the RPM perpendicular to a line parallel to the roadway centerline.

Do not install RPMs over longitudinal or transverse joints of the bonding surface.

6. Ensure that all final RPMs are in place prior to opening the road to traffic.
7. If more than 2 percent of the RPMs fail in adhesion or alignment within the first 45 days under traffic, replace all failed RPMs at no expense to the Department. If more than 5 percent of the RPMs fail in adhesion and or alignment during the initial 45 day period, Engineer will extend the replacement period an additional 45 days from the date that all replacement RPMs have been installed. If, at the end of the additional 45 day period, more than 2 percent of all RPMs (initial installation and 45 day replacements combined) fail in adhesion or alignment, replace all failed RPMs at no expense to the Department.

E. Contractor's Responsibility for Notification.

1. Notify Engineer prior to the placement of RPMs. At the time of notification, indicate the manufacturer and the LOT numbers of RPMs and bituminous adhesive that are intended for use. Verify that the approved LOT numbers appear on the material packages. Furnish a test report to Engineer certifying that the materials meet all requirements specified.

F. Method of Measurement.

1. Unless otherwise specified herein, the quantities to be paid for will be the number of RPMs, furnished and installed, completed and accepted.

G. Basis of Payment.

1. Lump Sum Payment: When the pay item for Painted Pavement Markings (Final Surface) is included in the Contract, price and payment for RPMs is as stipulated in Article 710 of these Specifications. RPMs will not be measured or paid for separately.
2. Payment will be made under the item(s) below if provided in the Contract with awarded Contract unit price(s) for the completed quantities, measured and accepted by Engineer. Price and payment will be full compensation for all work specified in this Article.
3. Payment will be made under:

Item	Description	Unit
706- 3	Retro-Reflective Pavement Marker	EA

710 PAINTED PAVEMENT MARKINGS (REV. 05-02-12)

A. Description.

1. Apply Painted Traffic Stripes and Raised Retro-Reflective Pavement Markers (RPMs), in accordance with the Contract Documents.

B. Materials.

1. Use only materials listed on the FDOT Qualified Products List (QPL) meeting the following requirements:

Raised Retro-reflective Pavement Markers and Bituminous Adhesive	FDOT Section 970
Standard Waterborne Fast Dry Traffic Paint	FDOT 971-1 and 971-3
Fast Dry Solvent Paint	FDOT 971-1 and 971-4
Glass Spheres	FDOT 971-1 and 971-2

C. Equipment.

1. Use equipment that will produce continuous uniform dimensions of pavement markings of varying widths and meet the following requirements:
   a. Capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of paint and capable of following straight lines and making normal curves in a true arc.
   b. Capable of applying glass spheres to the surface of the completed stripe by an automatic sphere dispenser attached to the striping machine such that the glass spheres are dispensed closely behind the installed line. Use a glass spheres dispenser equipped with an automatic cut-off control that is synchronized with the cut-off of the traffic paint and applies the glass spheres in a manner such that the spheres appear uniform on the entire pavement markings surface with 50 to 60 percent embedment.
   c. Capable of spraying the paint to the required thickness and width without thinning of the paint.
2. Paint tank must be equipped with nozzles having cut-off valves, which will apply broken or skip lines automatically.

D. Application:

1. General:
   a. Remove, by a method approved by Engineer, existing pavement markings such that scars or traces of removed markings will not conflict with new stripes and markings. Refer to Subarticle J below for Removal of Existing Painted Traffic Stripes and Markings Clean and dispose at an approved site all resulting debris. Use of paint to cover conflicting pavement markings is prohibited. Cost for removal of pavement markings is incidental to the work specified in this Article and will not be measured separately for payment. Cost for removing conflicting pavement markings during maintenance of traffic operations is included in general costs for Maintenance of Traffic.
   b. Before applying traffic stripes and markings, remove any material that would adversely affect the bond of the traffic stripes by a method approved by Engineer and consistent with manufacturer's specifications.
   c. Remove any vegetation, soil, and other materials covering the pavement where the marking is to be applied.
   d. Apply traffic stripes and markings only to dry surfaces, and when the ambient air and surface temperature is at

least 40ºF and rising. Do not apply traffic stripes and markings when winds are sufficient to cause spray dust.

e. Apply traffic stripes and markings, having well defined edges, over existing pavement markings such that not more than 2 inches on either end and not more than 1 inch on either side is visible.

f. Mix the paint thoroughly prior to pouring into the painting machine. Apply paint to the pavement by spray or other means approved by Engineer.

g. Conduct field testing in accordance with Florida Method (FM) 5-541. Remove and replace traffic stripes and markings not meeting the requirements of this Article at no additional cost to the Department.

h. Apply all pavement markings prior to opening the road to traffic.

i. Apply all retro-reflective pavement markers per the requirements of Article 706 (Raised Retro-Reflective Pavement Markers and Bituminous Adhesive).

2. Painted Pavement Markings (Final Surface), when included as a single lumps sum item in the Contract having and awarded Contract price, will include two applications of standard painted pavement markings and one application of retro-reflective pavement markers applied to the final surface. Wait at least 14 days after the first application to apply the second application of Painted Pavement Markings (Final Surface). Second application must be applied prior to final acceptance of the project.

3. Thickness: Apply paint to attain a minimum wet film thickness in accordance with the manufacturer's recommendations.

4. Retroreflectivity:

a. Apply white and yellow standard pavement markings that will attain an initial retroreflectance of not less than 300 mcd/lx•m^2 and not less than 250 mcd/lx•m^2, respectively. Measure, record and certify on a Department approved form and submit to Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.

b. The Department reserves the right to test the markings within 3 days of receipt of the Contractor's certification. Failure to afford the Department opportunity to test the markings will result in non-payment. The test readings should be representative of the Contractor's striping performance. If the retroreflectivity values measure below values shown above, reapply the pavement markings at no additional cost to the Department.

c. For standard pavement markings, ensure that the minimum retroreflectance of white and yellow pavement markings are not less than 150 mcd/lx m^2. If the retroreflectivity values fall below the 150 mcd/lx m^2 value within six months of initial application, the striping will be reapplied at the Contractor's expense.

5. Color: Use paint material that meets the requirements of FDOT 971-1.

6. Glass Spheres: Apply glass spheres on all pavement markings immediately and uniformly following the paint application. The rate of application shall be based on the manufacturer's recommendation.

E. Tolerances in Dimensions and in Alignment.

1. Establish tack points at appropriate intervals for use in aligning stripes, and set a stringline from such points to achieve accuracy.

2. Dimensions:

a. Longitudinal Lines: Apply painted skip line segments with no more than ±12 inches variance, so that over-tolerance and under-tolerance lengths between skip line and the gap will approximately balance. Apply longitudinal lines at least 2 inches from construction joints of Portland cement concrete pavement.

b. Transverse Markings, Gore Markings, Arrows, and Messages: Apply paint in multiple passes when the marking cannot be completed in one pass, with an overall line width allowable tolerance of ±1 inch

c. Contrast Lines: Use black paint to provide contrast on concrete or light asphalt pavement, when specified by Engineer. Apply black paint in 10 foot segments following each longitudinal skip line.

3. Alignment:

a. Apply painted stripes that will not deviate more than 1 inch from the stringline on tangents and curves one degree or less.

b. Apply painted stripes that will not deviate more than 2 inches from the stringline on curves greater than one degree.

c. Apply painted edge stripes uniformly, not less than 2 inches or more than 4 inches from the edge of pavement, without noticeable breaks or deviations in alignment or width.

d. Remove and replace at no additional cost to the Department, traffic stripes that deviate more than the above stated requirements.

4. Correction Rates: Make corrections of variations in width at a maximum rate of 10 feet for each 0.5 inches of correction. Make corrections of variations in alignment at a maximum rate of 25 feet for each 1 inch of correction, to return to the stringline.

F. Contractor's Responsibility for Notification.

1. Notify Engineer prior to the placement of the materials. Furnish Engineer with the manufacturer's name and batch numbers of the materials and glass spheres to be used. Ensure that the approved batch numbers appear on the materials and glass spheres packages.

G. Protection of Newly Painted Pavement Markings.

1. Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry.

2. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

H. Corrections for Deficiencies to Applied Painted Pavement Markings.

1. Reapply a 1.0 mile section centered around any deficiency, at no additional cost to the Department.

I. Submittals.

1. Submittal Instructions: Prepare a certification of quantities, using the Department's current approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to Engineer. The Department will not pay for any disputed items until Engineer approves the certification of quantities.
2. Contractor's Certification of Quantities: Request payment by providing to Engineer a monthly certification of quantities with each payment requisition or as directed by Engineer, based on the amount of work done or completed. Ensure the certification of quantities include the following:
   a. Contract Number, Certification Number, Certification Date and the period that the certification represents.
   b. The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown provided on the certification of items of payment.

J. Removal of Existing Painted Traffic Stripes and Markings.

1. Removal Requirements.
   a. Remove existing pavement markings by water blasting, sandblasting, or other method approved by the Engineer. Do not use chemicals for the removal of painted traffic stripes and/or markings. Provide positive means to control dust and accumulation of debris from the removal operations. Remove all pavement marking materials from the pavement surface. Remove accumulated piles of any debris as a result of the removal operation from the right of way and dispose of in accordance with applicable Federal, State, and Local regulations, at no additional cost to the Department.
2. Protection of Existing Pavement Surfaces.
3. Conduct removal operations in a manner that will not damage existing pavement surfaces (concrete or asphalt) or damage pavement joint materials. Repair, to the satisfaction of the Engineer, any damage as a result of the removal operations.
4. Do not paint over existing pavement markings to blackout, hide, or disguise markings.

K. Method of Measurement.

1. The quantities to be paid for under this Article will be as follows:
   a. Length, in net miles, of 6 inch Solid Traffic Stripe, authorized and acceptably applied.
   b. Total traversed distance in gross miles of 10-30 or 3-9 skip line. The actual applied line is 25 percent of the traverse distance for a 1:3 ratio. This equates to 1,320 feet of marking per mile of single line.
   c. Net length, in feet, of each of all other types of lines and stripes, authorized and acceptably applied.
   d. Number of pavement messages, symbols and directional arrows, authorized and acceptably applied. For bicycle marking, the bicycle symbol and the arrow will be paid as one unit.
   e. Lump Sum, as specified under Final Surface above, when the item for Painted Pavement Markings (Final Surface) is provided in the Contract with an awarded Contract Unit Price.
2. The net length, in feet of dotted and skip stripes other than 10-30 and 3-9 will be measured as the distance from the beginning of the first painted stripe to the end of the last painted stripe with proper deductions made for unpainted intervals as determined by plan dimensions or stations, subject to the requirements of Subarticle 1.07 F.3 (Determination of Pay Areas) of the General Requirements to these Specifications. Unpainted intervals will not be included in pay quantity.
3. The gross-mile measurement of 10-30 and 3-9 Skip Traffic Stripes will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe, and will include the unpainted intervals. It will not include any lengths of unpainted intervals which, by design or by other intent of the Department, are greater than 30 feet. Final measurement will be determined by plan dimensions or stations, subject to the requirements of Subarticle 1.07 F.3 of the General Requirements to these Specifications.
4. Removal:
   a. The area, in square feet, for removal of existing markings acceptably removed.
   b. Payment for removal of conflicting markings will be in accordance with 102-E.8. Payment for removal of non-conflicting markings will be paid separately.
   c. The gross mile measurement will be taken as the distance from the beginning of the painted line to the end of the painted line and will include the unmarked gaps for skip and dotted lines.
   d. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc.

L. Basis of Payment.

1. General:
   a. Prices and payments will be full compensation for all work specified in this Article, including all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. There will be no separate payment for removal of conflicting markings.
   b. Final payment will be withheld until all deficiencies are corrected.
2. Lump Sum Payment: When the item for Painted Pavement Markings (Final Surface) is included in the proposal, prices and payments will be full compensation for two applications of all painted pavement markings applied to the final surface, and one application of retro-reflective pavement markers applied to the final surface in accordance Article 706 of these Specifications.

3. Payment, for the completed quantities measured and accepted by Engineer, will be made under the item(s) below if provided in the Contract with awarded Contract unit price(s).

Item	Description	Unit
710-11-102A	Painted Pavement Markings,Standard,White,Solid for interchange and urban island, 8”	LF
710-11-121	Painted Pavement Markings,Standard,White,Solid, 6"	LF
710-11-123	Painted Pavement Markings,Standard,White,Solid, 12"	LF
710-11-124	Painted Pavement Markings,Standard,White,Solid, 18"	LF
710-11-125	Painted Pavement Markings,Standard,White,Solid, 24"	LF
710-11-133	Painted Pavement Marking, Standard, White, 12"Wide, 3'-9' Skip And Approach To Toll Plaza	LF
710-11-141B	Painted Pavement Markings (Standard) (White) (Skip, 10-30 or 3-9 Skip, 6” wide	LF
710-11-141C	Painted Pavement Markings, Standard, White, 2-4 Dotted Guidelines 6-10 Dotted Extension, 6”	LF
710-11-160	Painted Pavement Markings, Standard, White, Message or Symbol	EA
710-11-170	Painted Pavement Markings, Standard, White, Arrows	EA
710-11-221	Painted Pavement Markings, Standard, Yellow, Solid ,6"	LF
710-11-224	Painted Pavement Markings, Standard, Yellow, Solid,18"	LF
710-11-251	Painted Pavement Markings, Standard, Yellow, Dotted/Guideline/6-10 Gap Extension, 6"	LF
710-11-290	Painted Pavement Markings, Standard, Yellow, Island Nose	SF

711 THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS (REV. 05-02-12)

A. Description.

1. Apply new thermoplastic traffic stripes and markings, or refurbish existing thermoplastic traffic stripes and markings, in accordance with the Contract Documents.

B. Materials.

1. Thermoplastic: Use only thermoplastic materials listed on the FDOT Qualified Products List (QPL). Engineer may require random samples of all material. Use materials meeting the following requirements:

Initial or Recapped Stripes and Markings:	FDOT 971-1 and 971-5
Refurbishing Existing Stripes and Markings:	FDOT 971-1 and 971-5
Preformed Stripes and Markings:	FDOT 971-1 and 971-6

2. Glass Spheres: Use only glass spheres listed on the FDOT QPL, meeting the requirements of FDOT 971-1 and 971-2. Engineer may require random samples of all glass spheres in accordance with ASTM D 1214.

3. Sand: Use materials meeting the requirements of FDOT 971-5.4.

C. Equipment.

1. Use equipment capable of providing continuous uniform heating of striping materials to temperatures exceeding 390ºF, mixing and agitation of the material reservoir to provide a homogeneous mixture without segregation. Use equipment that will maintain the striping material in a plastic state, in all mixing and conveying parts, including the line dispensing device until applied.

2. Use equipment which can produce varying width traffic stripes and which meets the following requirements:

   a. Capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of striping material and capable of following straight lines and making normal curves in a true arc.

   b. Capable of applying glass spheres to the surface of the completed stripe by a double drop application for initial traffic striping and marking and a single drop application for recapping and refurbishing. The bead dispenser for the first bead drop shall be attached to the striping machine in such a manner that the beads are dispensed closely behind with the thermoplastic material. The second bead dispenser bead shall be attached to the striping machine in such a manner that the beads are dispensed immediately after the first bead drop application. Glass spheres dispensers shall be equipped with an automatic cut-off control that is synchronized with the cut-off of the thermoplastic material and applies the glass spheres in a manner such that the spheres appear uniform on the entire traffic stripes and markings surface with, 50 to 60 percent embedment.

   c. Equipped with a special kettle for uniformly heating and melting the striping material. The kettle must be equipped with an automatic temperature control device and material thermometer for positive temperature control and to prevent overheating or scorching of the thermoplastic material.

   d. Meet the requirements of the National Fire Protection Association, state, and local authorities.

D. Application.

1. General:

   a. Remove, by a method approved by Engineer, existing pavement markings such that scars or traces of removed markings will not conflict with new stripes and markings. Clean and dispose at an approved site all resulting debris. Use of paint to cover conflicting pavement markings is prohibited. Cost for removal of pavement markings is incidental to the work specified in this Article. Cost for removing conflicting pavement markings during maintenance of traffic operations to be included in Maintenance of Traffic.

   b. Remove any vegetation, soil, and other materials covering the pavement where the marking is to be applied.

   c. Before applying traffic stripes and markings remove, by a method approved by Engineer and consistent with manufacturer's specifications, any material that would adversely affect the bond of the traffic stripes. Before applying traffic stripes to any Portland cement concrete surface, apply a primer, sealer or surface preparation adhesive of the type recommended by the manufacturer. Offset longitudinal lines at least 2 inches from any longitudinal joints of Portland cement concrete pavement.

   d. Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 50ºF and rising for asphalt surfaces and 60°F and rising for concrete surfaces.

   e. Apply striping to the same tolerances in dimensions and in alignment specified under "Tolerances in Dimension and in Alignment" below. When applying traffic stripes and markings over existing markings, ensure that not more than 2 inches on either end and not more than 1 inch on either side of the existing line is visible.

   f. Apply thermoplastic material to the pavement either by spray, extrusion or other means approved by Engineer.

   g. Conduct field tests in accordance with Florida Method (FM) 5-541. Take test readings representative of the striping performance. Remove and replace traffic stripes and markings not meeting the requirements of this Article at no additional cost to the Department.

   h. Apply all final pavement markings prior to opening the road to traffic.

   i. Preformed Thermoplastic: Apply markings only to dry surfaces and when ambient air temperature is at least 32°F. Prior to installation, follow the manufacturer's recommendations for pre-heating.

2. Thickness:

   a. Initial or Recapped Stripes and Markings:

      1) Apply or recap traffic stripes or markings such that all lane lines, center lines, transverse markings and traffic stripes and markings within traffic wearing areas, will have a thickness of 0.10 to 0.15 inch when measured above the pavement surface.

      2) Gore, island, and diagonal stripe markings, bike lane symbols and messages, wherever located, will have a thickness of 0.09 to 0.12 inch when measured above the pavement surface.

      3) Measure, record, certify and submit to Engineer, the thickness of white and yellow pavement markings in accordance with FM 5-541.

   b. Refurbishing Existing Traffic Stripes and Markings: Apply a minimum of 0.06 inch of thermoplastic material. Ensure that the combination of the existing stripe and the overlay after application of glass spheres does not exceed the maximum thickness of 0.150 inch for all lines.

3. Retroreflectivity:

   a. Apply white and yellow traffic stripes and markings that will attain an initial retroreflectivity of not less than 450 mcd/lx•m^2 and not less than 350 mcd/lx•m^2, respectively for all longitudinal lines.

   b. All transverse lines, messages and arrows will attain an initial retroreflectivity of not less than 300 mcd/lx•m^2 and 250 mcd/lx•m^2 for white and yellow respectively.

   c. All pedestrian crosswalks, bike lane symbols or messages in a proposed bike lane shall attain an initial retroreflectivity of not less than 275 mcd/lx•m^2.

   d. Measure, record, certify, and submit to Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.

4. Glass Spheres:

   a. Longitudinal Lines:

      1) For initial traffic striping and marking, apply the first drop of Type 4 or larger glass spheres immediately followed by the second drop of Type 1 glass spheres.

      2) For refurbishing, apply a single drop of Type 3 glass spheres.

      3) Apply reflective glass spheres to all markings at the rates determined by the manufacturer's recommendations.

   b. Transverse Stripes and Markings:

      1) Apply a single drop of Type 1 glass spheres.

      2) Apply reflective glass spheres to all markings at the rates determined by the manufacturer's recommendations.

      3) Apply a mixture consisting of 50 percent glass spheres and 50 percent sharp silica sand to all thermoplastic pedestrian crosswalk lines and bike lane symbols at the rates determined by the manufacturer's recommendations.

   c. Preformed Markings: These markings are factory supplied with glass spheres and skid resistant material. No additional glass spheres or skid resistant material should be applied during installation.

E. Tolerances in Dimensions and in Alignment.

1. Establish tack points at appropriate intervals for use in aligning stripes, and set a stringline from such points to achieve accuracy.

2. Dimensions:

a. Longitudinal Lines: Apply thermoplastic skip line segments with no more than ±12 inches variance, so that over-tolerance and under-tolerance lengths between skip line and the gap will approximately balance. Apply longitudinal lines at least 2 inches from construction joints of Portland cement concrete pavement.

b. Transverse Markings, Gore Markings, Arrows, and Messages: Apply thermoplastic in multiple passes when the marking cannot be completed in one pass, with an overall line width allowable tolerance of ±1 inch

c. Contrast Lines: Use black paint to provide contrast on concrete or light asphalt pavement, when specified by Engineer. Apply black paint in 10 foot segments following each longitudinal skip line.

3. Alignment:

a. Apply thermoplastic stripes that will not deviate more than 1 inch from the stringline on tangents and curves one degree or less.

b. Apply thermoplastic stripes that will not deviate more than 2 inches from the stringline on curves greater than one degree.

c. Apply thermoplastic edge stripes uniformly, not less than 2 inches or more than 4 inches from the edge of pavement, without noticeable breaks or deviations in alignment or width.

d. Remove and replace at no additional cost to the Department, traffic stripes that deviate more than the above stated requirements.

4. Correction Rates:

a. Make corrections of variations in width at a maximum rate of 10 feet for each 0.5 inches of correction. Make corrections of variations in alignment at a maximum rate of 25 feet for each 1 inch of correction, to return to the stringline.

F. Contractor's Responsibility for Notification.

1. Notify Engineer prior to the placement of the thermoplastic materials.

2. Furnish Engineer with the manufacturer's name and batch numbers of the thermoplastic materials and glass spheres to be used.

3. Ensure that the approved batch numbers appear on the thermoplastic materials and glass spheres packages.

G. Protection of Newly Applied Traffic Stripes and Markings.

1. Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry.

2. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

H. Observation Period.

1. Pavement markings are subject to a 180 day observation period under normal traffic. The observation period shall begin with the satisfactory completion and acceptance of the work.

2. The pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of reflectivity or vehicular damage. The retroreflectivity must meet the initial requirements stipulated above. The Department reserves the right to check the color and retroreflectivity any time prior to the end of the observation period.

3. Replace, at no additional expense to the Department, any pavement markings that do not perform satisfactorily under traffic during the 180 day observation period.

I. Corrections for Deficiencies.

1. Recapping applies to conditions where additional striping material is applied to new or refurbished traffic stripes or markings to correct a deficiency. Recap a 1.0 mile section centered around the deficiency with additional striping material or by complete removal and reapplication at no additional cost to the Department.

2. If recapping will result in a thickness exceeding the maximum allowed, the traffic stripes or markings must be removed and reapplied.

J. Submittals.

1. Submittal Instructions: Prepare a certification of quantities, for each project in the Contract. Submit the certification of quantities and daily worksheets to Engineer. The Department will not pay for any disputed items until Engineer approves the certification of quantities.

2. Contractor's Certification of Quantities: Request payment by submitting a certification of quantities with each payment requisition, based on the amount of work done or completed. Ensure the certification of quantities includes the following:

a. Contract Number, Certification Number, Certification Date and the period that the certification represents.

b. The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown provided on the certification of items of payment.

K. Method of Measurement.

1. Quantities to be measured by Engineer for payment under this Article will be as follows:

a. The length, in net miles, of 6 inch Solid Traffic Stripe, authorized and acceptably applied.

b. The total traversed distance in gross miles of 10-30 or 3-9 skip line. The actual applied line is 25 percent of the traverse distance, for a 1:3 ratio. This equates to 1,320 feet of marking per mile of single line.

c. The net length, in feet, of all other types of lines and stripes, authorized and acceptably applied.

d. The area, in square feet, of Removal of Existing Pavement Markings, acceptably removed. Cost for removing conflicting pavement markings during maintenance of traffic operations is included in Maintenance of Traffic.

e. The number of pavement messages, symbols and directional arrows, authorized and acceptably applied.

L. Basis of Payment.

1. Prices and payments will be full compensation for all work specified in this Article, including all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

2. Payment, for the completed quantities measured and accepted by Engineer, will be made under the item(s) below if provided in the Contract with awarded Contract unit price(s).

Item	Description	Unit
711-11-123	Thermoplastic (White) Solid 12"	LF
711-11-124	Thermoplastic (White) Solid 18"	LF
711-11-125	Thermoplastic (White) Solid 24"	LF
711-11-151	Thermoplastic (White) Dotted/Guideline 6"	LF
711-11-160	Thermoplastic (White) Message	EA
711-11-170	Thermoplastic (White) Arrows	EA
711-11-224	Thermoplastic (Yellow) Solid 18"	LF
711-11-251	Thermoplastic (Yellow) Dotted/Guideline 6"	LF
711-14-125	Thermoplastic, Preformed, White, Solid, 24” for Crosswalk	LF
711-14-160	Thermoplastic, Preformed, Message (Bike)	EA
711-14-170	Thermoplastic, Performed, Arrows (Bike thru)	EA
711-16-101A	Thermoplastic, Standard, Other Surfaces, White, Solid, 6”	LF
711-16-103	Thermoplastic, Standard, Other Surfaces, White, Solid, 8”	LF
711-16-131A	Thermoplastic, Standard, Other Surfaces, While, Skip, 10-30 or 3-9 Skip, 6” Wide	LF
711-16-133A	Thermoplastic, Standard, Other Surfaces, White 3-9 Dotted Drop Line, 12”	LF
711-16-201A	Thermoplastic, Standard, Other Surfaces, Yellow, Solid, 6”	LF

715 ROADWAY LIGHTING (REV. 12-31-2015)

A. Description.

1. Install a roadway lighting system in accordance with the details shown in the Plans. Use pole assemblies as shown in the FDOT Design Standards when standard aluminum pole assemblies are required by the Contract Documents. Include in the system the light poles, bases, luminaires, ballasts, cable, conduit, protective devices, and control devices; all as specified or required for the complete facility.

2. Obtain conventional light pole assemblies from a fabrication facility that is listed on FDOT’s Production Facility Listing with an Accepted Quality Control Program, meeting the requirements of FDOT 105-3.

3. Provide metal lighting poles with internal vibration damping devices in accordance with FDOT Design Standard 17515 in all installations on bridges, walls and concrete median barriers.

4. When used on bridges, in order to minimize vibration of light poles due to traffic, locate light poles near substructure supports.

B. Shop Drawings and Working Drawings.

1. Submit shop drawings and working drawings with descriptive specifications and engineering data for the service main, control panel enclosure, control panel main disconnect, lighting contactor, electrical panel, transformer, in-line fuse holders, surge protective devices, non-standard light poles (including brackets), luminaires, ballast, photo-electric cell, conduit and cable or any other item requested by Engineer as specified in the Contract Documents.

C. Materials and Equipment to be Installed.

1. General: Meet the materials and equipment requirements of FDOT Section 992.

2. Criterion Designation of Materials and Equipment: Where a criterion specification is designated for any material or equipment to be installed, by the name or catalog number of a specific manufacturer, understand that such designation is intended only for the purpose of establishing the style, quality, performance characteristics, etc., and is not intended to limit the acceptability of competitive products. Engineer will consider products of other manufacturers which are approved as similar and equal as equally acceptable.

D. Furnishing of Electrical Service.

1. Start the system with a weatherhead on a riser on a service pole and extend through the required metering equipment of the power company, and through the lighting system as shown on the Plans.

2. The power company will provide service to the areas in the vicinities indicated. Consult and cooperate with the power company in locating its distribution transformer and service pole so that the lines will be as short and

direct as possible. Bear any line-extension costs up to the first 2,000 feet. Furnish or install only those parts of the metering equipment or connections that are customary and required by the power company in the locality involved.

E. Excavation and Backfilling.

1. General: For excavation and backfilling, meet the requirements of FDOT Section 125, except that when rock is encountered, carry the excavation 3 inches below the required level and refill with sand or with selected earth material, 100% of which passes the 1 inch sieve.
2. Trenches for Cable: Construct trenches for cable or conduit no less than 6 inches in width and deep enough to provide a minimum cover in accordance with the FDOT Design Standards.
3. Placing Backfill for Cable: For installation of the cable, place an initial layer of 6 inches thick, loose measurement, sand or selected earth material, 100% of which passes a 1 inch sieve. Place and compact the remaining material in accordance with FDOT 125-8.

F. Foundations for Light Poles.

1. Concrete Foundations: Provide foundations for light poles of the sizes and shapes shown in the Plans. Construct precast or cast-in-place concrete foundations in accordance with the FDOT Design Standards. Obtain precast foundations from a plant that is currently on the FDOT's Production Facility Listing with Accepted FDOT Quality Control Programs.
2. Setting Anchor Bolts: Set anchor bolts according to manufacturer's templates and adjust to a plumb line, check for elevation and location, and hold rigidly in position to prevent displacement while pouring concrete.
3. Installation:
   a. Do not erect roadway light poles until the concrete strength in the cast-in-place foundation is at least 2,500 psi. Determine concrete strength from tests on a minimum of two test cylinders sampled and tested in accordance with ASTM C31 and ASTM C39 and verifying test results have been provided to Engineer.
   b. Fill the voids around precast concrete foundations under roadway light poles with flowable fill meeting the requirements of Article 121 or clean sands placed using hydraulic methods to a level 6 inches below grade.

G. Pulling Conductors.

1. Leave at least 3 feet of conductor where the cable enters and leaves conduit. Protect conductors pulled into conduit or ducts against abrasion, kinking, and twisting. Locate pull boxes so that the conductors are not subjected to excessive pulling stresses.

H. Splicing.

1. Make all conductor splices in the bases of the light poles, or in pull boxes designed for the purpose. Do not make any other underground splices.
2. Unless otherwise shown in the FDOT Design Standards or authorized by Engineer, splices must be made with split bolt connectors. The connector must be sealed in silicone gel that easily peels away leaving a clean connection. The gel will be contained in a closure that when snapped around the split bolt will provide a waterproof connection without the use of tools or taping. This closure will be UV resistant, impact resistant and abrasion resistant.

I. Conduit and Ducts.

1. Install conduit at the locations shown in the Plans and in accordance with FDOT Section 630.

J. Erecting Light Poles.

1. General: Install the light poles at the locations and in accordance with the details shown in the Plans. Unless otherwise specifically approved by the Engineer, fasten bracket (truss) arms to the pole prior to erection. Do not field weld on any part of the pole assembly. Plumb the poles after erection and use metal shims or leveling nuts if necessary to obtain precise alignment. Use a thin cement grout where necessary to eliminate unevenness or irregularities in the top of the base.
2. Adjusting Anchor Bolts and Installing Nuts on Anchor Bolts: Where poles are to be placed on existing foundations or bases with anchor bolts in place, furnish poles with a base which fits the anchor bolt spacing. Include the cost of any necessary extension of existing anchor bolts in the price bid for the lighting system. For high mast light pole bases, install nuts on anchor bolts in accordance with FDOT 649-5.
3. Installation of Luminaire: Install the luminaire on the truss arm in accordance with the manufacturer's instructions, and place it so that the light pattern is evenly distributed along the roadway.
4. Electrical Connections: Make primary ballast connections in accordance with manufacturer's instructions. Install sufficient cable to allow all connections to be made outside the light pole base. Connect the ground conductor to the ground stud provided.
5. Identification Plates Stamp the identification plate on the pole with an identifying number or legend. Number the poles consecutively, beginning with number 1. Stamp each light pole number with 3/4 inch figures and stamp each circuit number with 1/2 inch figures.

K. Grounding.

1. Ground in accordance with the NEC, and local codes which exceed these Specifications.
2. Ground each metal light pole, not on a bridge structure, with an approved rod, 20 feet in length and at least 5/8 inch in diameter.
3. For poles on bridge structures, bring the grounding conductors out to a pull box at each end of the structure and connect them to driven ground rods, 20 feet in length and at least 5/8 inch in diameter.

4. The 20 feet length of rod may be either two rods 10 feet in length connected by a threaded coupling and driven as a single rod or two rods 10 feet in length separated by at least 6 feet.
5. Make all bonds between ground wires and grounding electrode assemblies or arrays with an exothermic bond with the following exception: do not exothermically bond grounding electrode to grounding electrode connections.
6. The work specified in this Subarticle will not be paid for directly, but will be considered as incidental work.

L. Labeling.

1. Stencil labels on the cases of transformer and panel board with white oil paint, as designated by Engineer. Also, mark the correct circuit designations in accordance with the wiring diagram on the terminal marking strips of each terminal block and on the card holder in the panel board.

M. Markers.

1. Construct duct, cable, and splice markers as shown in the Plans, and place them over the ends of underground ducts and at each change in direction of cable or conduit run. Place markers flat on the ground with 1 inch projecting above finished grade.

N. Tests of Installation.

1. Upon completion of the work, test the installation to ensure that the installation is entirely free of ground faults, short circuits, and open circuits and that it is in satisfactory working condition. Furnish all labor, materials, and apparatus necessary for making the required tests. Remove and replace any defective material or workmanship discovered as a result of these tests at no expense to the County, and make subsequent re-tests to the satisfaction of Engineer.
2. Make all arrangements with the power supplier for power. Pay all costs, excluding energy charges, required for the test period.
3. Not less than 48 hours prior to the beginning of the test period, give the power supplier the schedule for such test.
4. Test the installation under normal operating conditions during the seven day test period specified in 715-O below, rather than as a continuous burn test period.
5. If the work is not open to traffic at the end of the seven day test period, de-energize the lighting system until the work is opened.

O. Acceptance of Roadway Lighting.

1. Engineer may make partial acceptance of the roadway lighting based on satisfactory performance of all system for seven consecutive days. The seven day evaluation period may commence upon written authorization by the Engineer that roadway lighting is considered ready for acceptance evaluation. Contract Time will be charged during the entire roadway lighting evaluation period. Correct any defects in materials or workmanship which might appear during the evaluation period at no expense to the County. Transfer to the County any guarantees on equipment or materials furnished by the manufacturer and ensure that the manufacturer includes with such guarantees the provision that they are subject to such transfer, and proper validation of such fact. The County's written acceptance of roadway lighting and the transfer to the County of all manufacturer guarantees will be conditions precedent to final acceptance of all work under the Contract in accordance with Contract Final Acceptance.

P. Method of Measurement.

1. The quantities to be paid for will be as follows, completed and accepted:
   a. Conduit: Payment will be made in accordance with FDOT Section 630.
   b. Luminaire and Truss Arm: The Contract unit price will include the truss arm, luminaire with lamp, and all necessary mounting hardware as indicated in the Plans and the FDOT Design Standards.
   c. Electrical Power Service Assembly: The Contract unit price will include the service pole, insulators, weatherheads, transformers, enclosures, panel boards, breakers, safety switches, H.O.A. switches, lightning protectors, fuses, photo electric assembly, meter base, and all external and internal conduit and conductors for the service as indicated in the Plans and the PWWM Traffic Signals and Signs Section 639.
   d. Light Pole Foundation: The Contract unit price will include the foundation and anchor bolts with lock nuts and washers as indicated in the Plans and the FDOT Design Standards.
   e. Luminaire: The Contract unit price will include the luminaire with lamp and necessary mounting hardware as indicated in the Plans and the FDOT Design Standards.
   f. Pull Box: Payment will be made in accordance with Article 635.
   g. Frangible Base for Light Pole: The Contract unit price will include the frangible base, attachments, bolts, and washers as indicated in the Plans and the FDOT Design Standards.
   h. Photo Electric Control Assembly: The Contract unit price will include the photo electric control, transformers, conduit, and conductors as indicated in the Plans and the FDOT Design Standards.
   i. Pre-Fab Pilaster: The Contract unit price will include the pilaster and all mounting hardware as indicated in the Plans.
   j. Conductor: The length, in feet, as indicated in the Plans and the FDOT Design Standards.
   k. Lighting Pole Complete: The Contract unit price will include the pole, internal vibration damping device, truss arm, luminaire with lamp, anchor bolts with lock nuts and washers, frangible base and foundation.
   l. Pole Cable Distribution System: The Contract Unit price will include the surge protector, fuse holders with fuses, waterproof connectors and the waterproof wiring connection to the luminaries.

Q. Basis of Payment.

1. Prices and payments will be full compensation for all work specified in this Section, including all materials, equipment and tests.
2. Payment Items: Payment will be made under:

Item No.	Description	Unit
715-1-12	Lighting Conductors (Furnish & Install) (No. 8 to No.6)	LF
715-1-13	Lighting Conductors (Furnish & Install) (No. 4 to No.2)	LF
715-4-70	Light Pole Complete (Remove)	EA
715-4-111A	Light Pole Complete, F&I, Wind Speed 150, Pole Height 40'	EA
715-4-400	Light Pole Complete, Relocate	EA
715-7-11G	Load Center, F&I, Secondary Voltage	EA
715-500-11	Pole Cable Distribution System (Furnish & Install)	EA

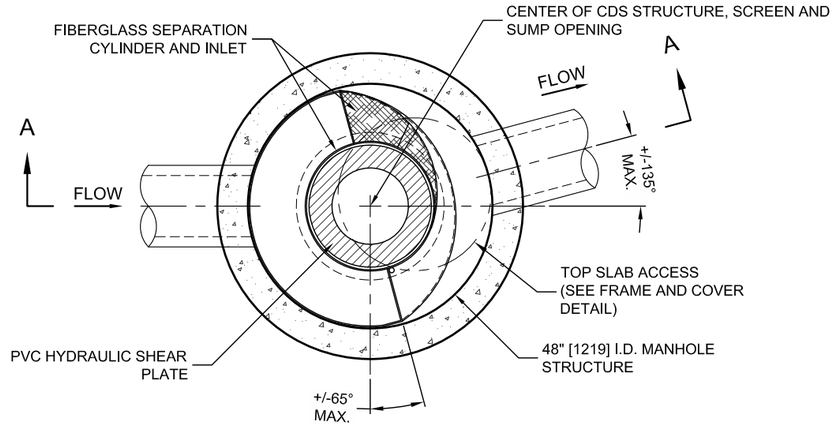
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

Roadway Improvements to NE 151st Street - Phase 1

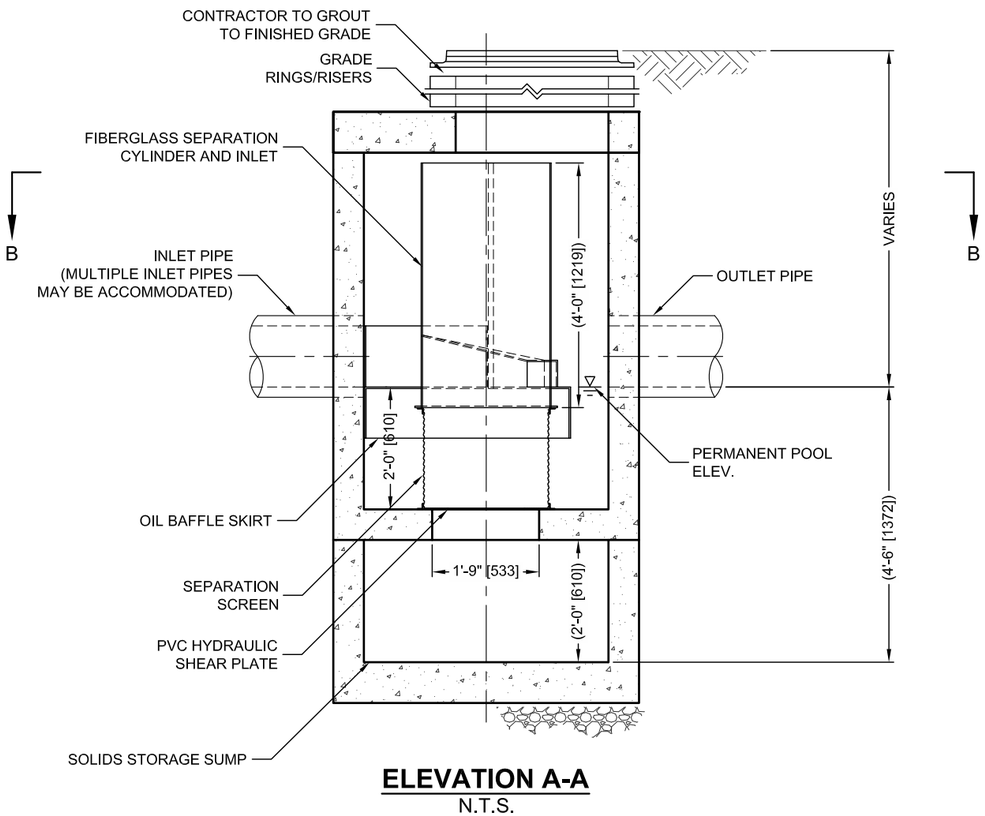
RPQ NO. 20240269-R

ADDENDUM NO.1

INLINE CDS,
STANDARD DETAILS SHEETS



PLAN VIEW B-B
N.T.S.

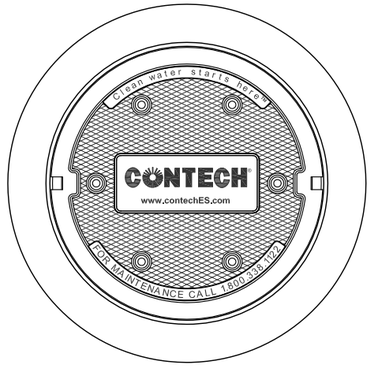


ELEVATION A-A
N.T.S.

CDS2015-4-C DESIGN NOTES

THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

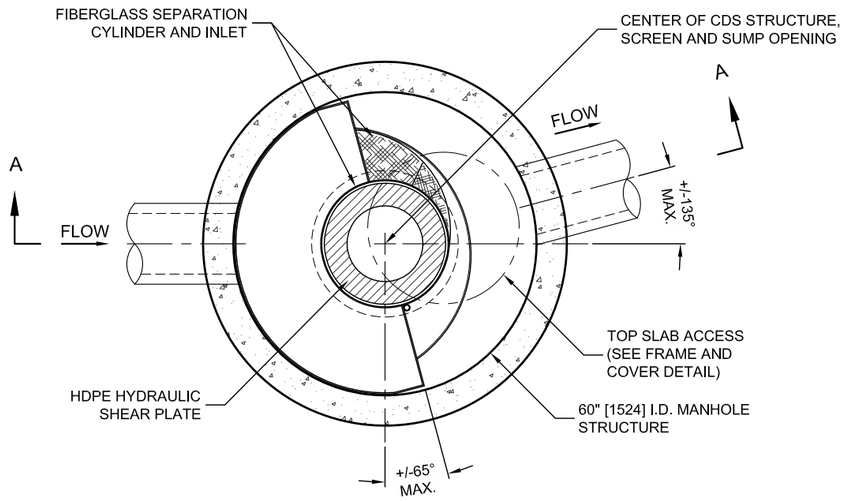
* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

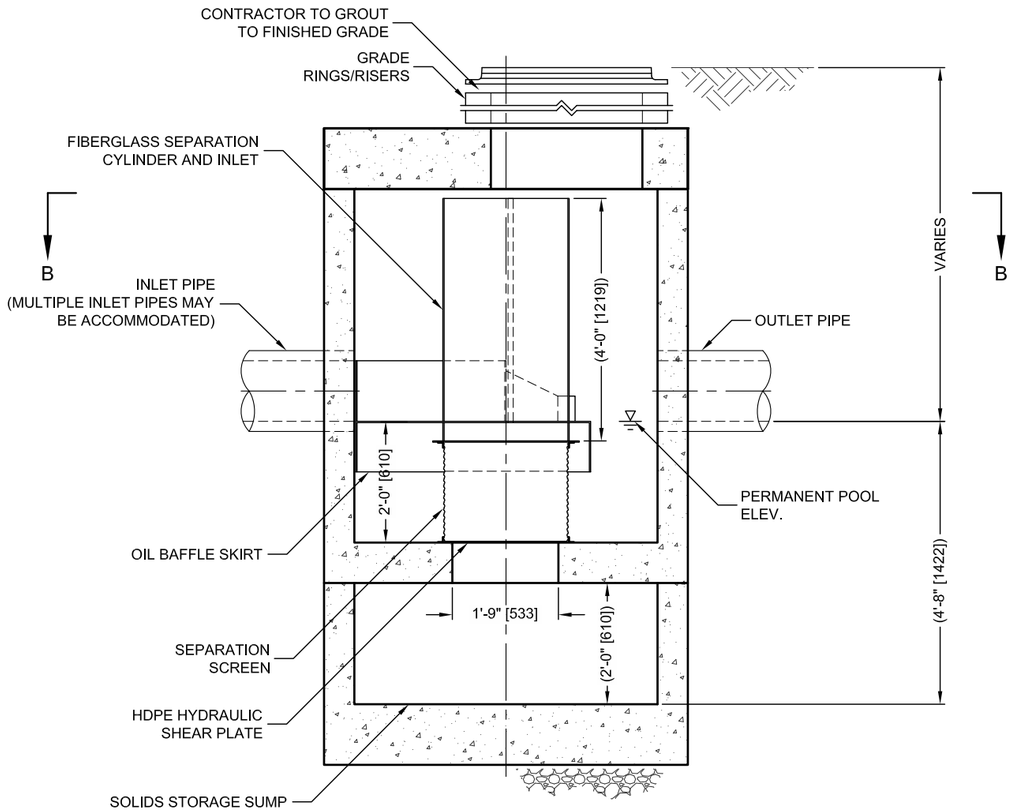
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C INLINE CDS STANDARD DETAIL



PLAN VIEW B-B
N.T.S.

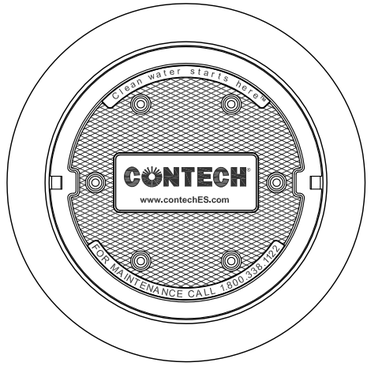


ELEVATION A-A
N.T.S.

CDS2015-5-C DESIGN NOTES

THE STANDARD CDS2015-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
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3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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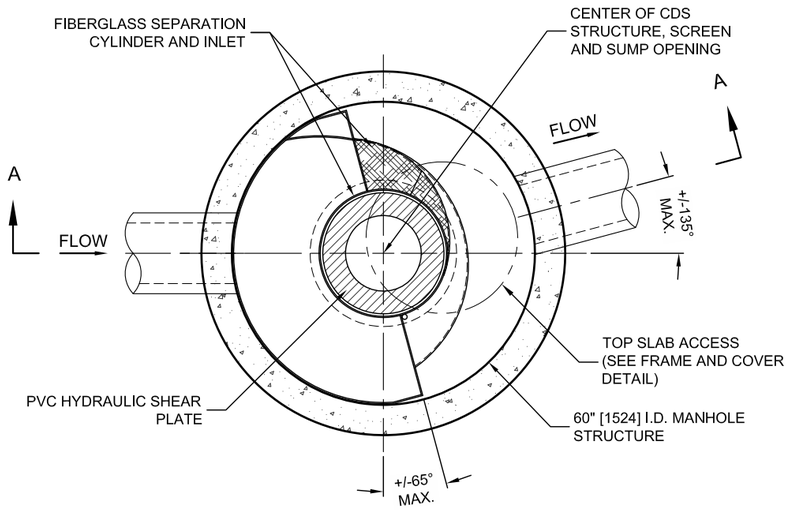
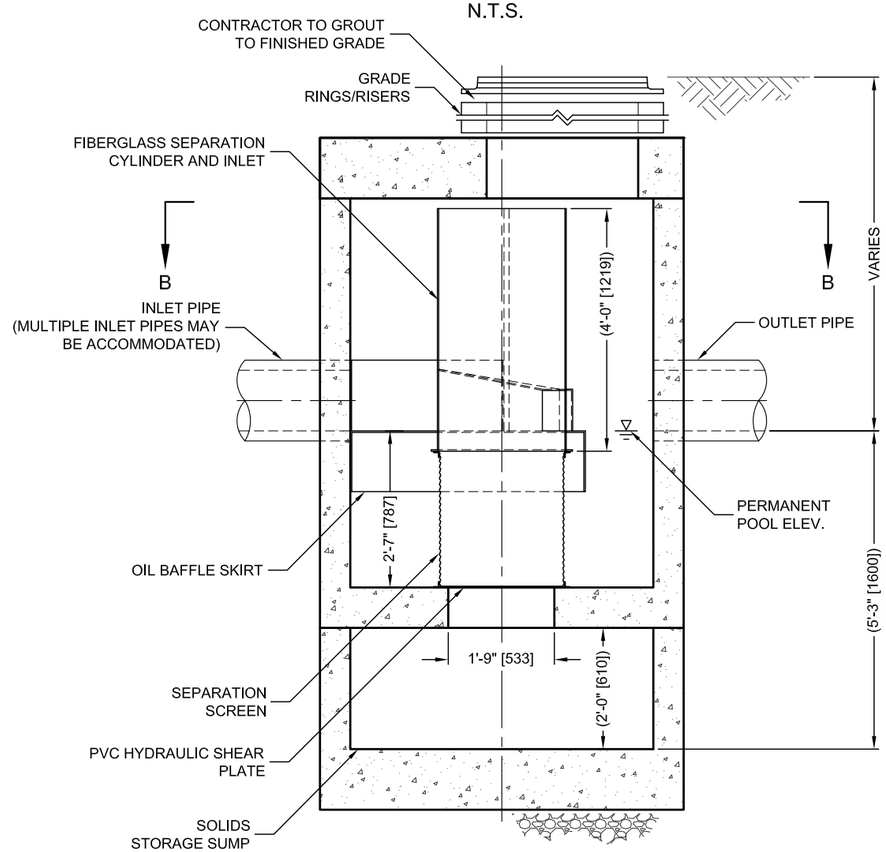
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-5-C INLINE CDS STANDARD DETAIL



PLAN VIEW B-B
N.T.S.

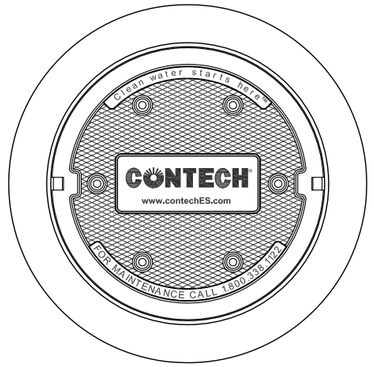


ELEVATION A-A
N.T.S.

CDS2020-5-C DESIGN NOTES

THE STANDARD CDS2020-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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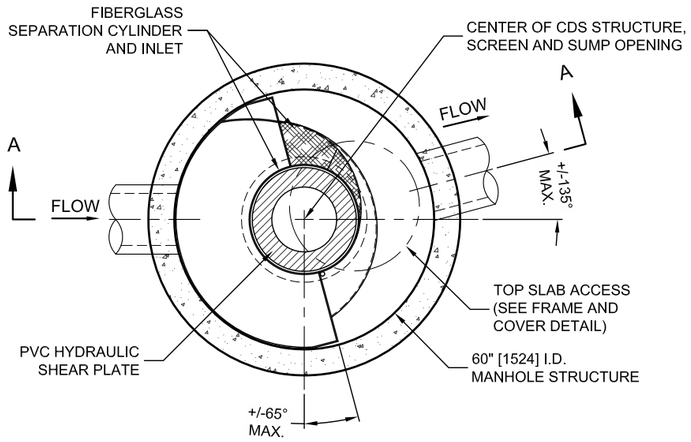
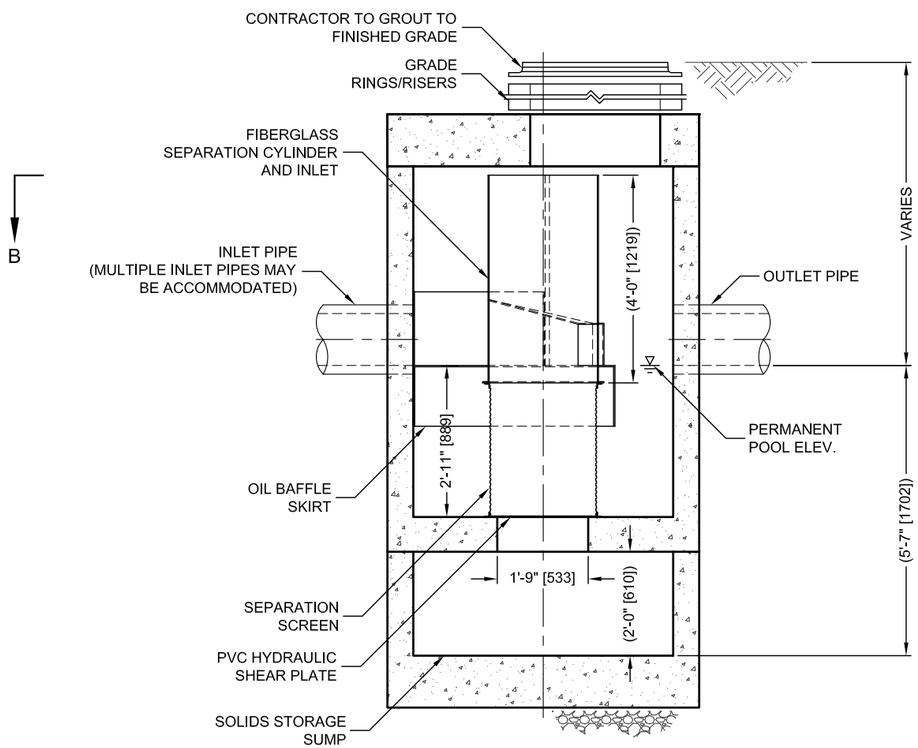
CDS2020-5-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B
N.T.S.

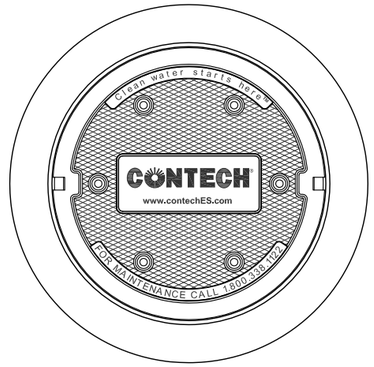


ELEVATION A-A
N.T.S.

CDS2025-5-C DESIGN NOTES

THE STANDARD CDS2025-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
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C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
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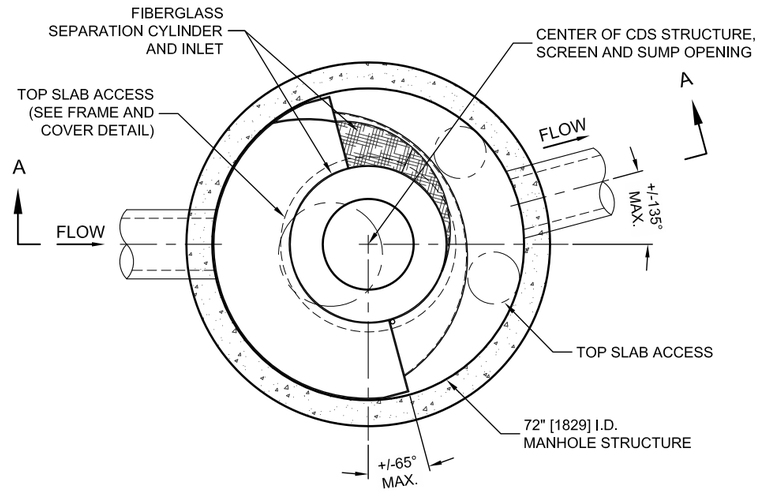
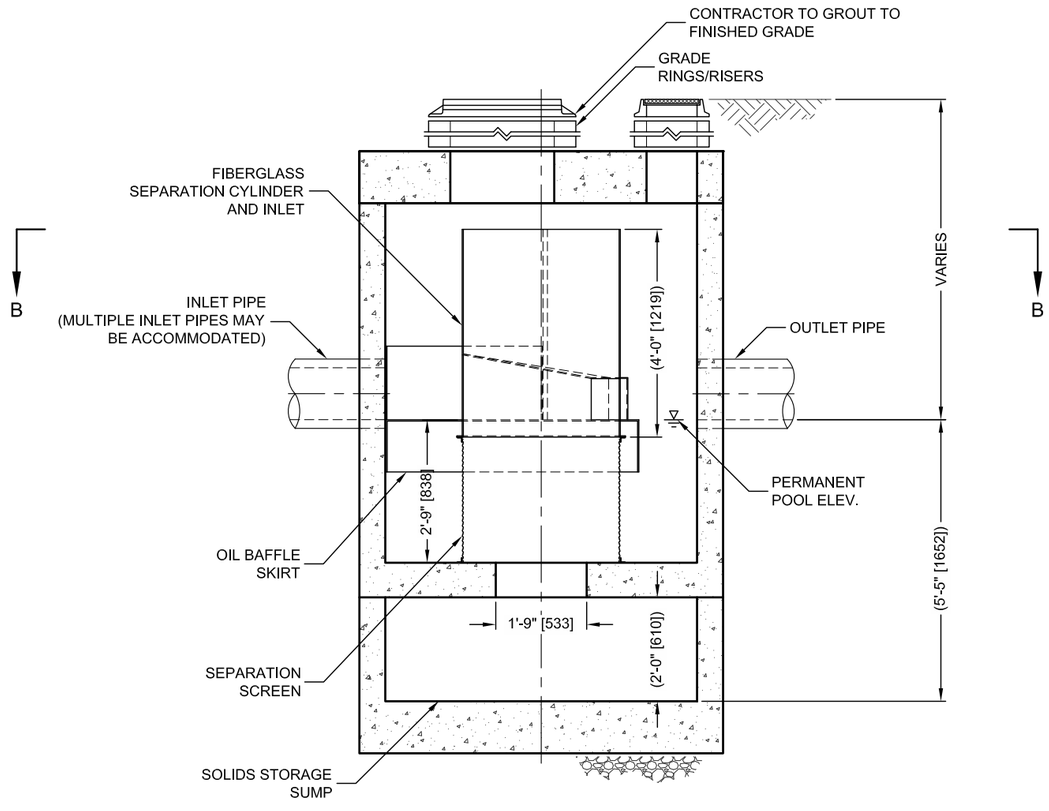
CDS2025-5-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B
N.T.S.

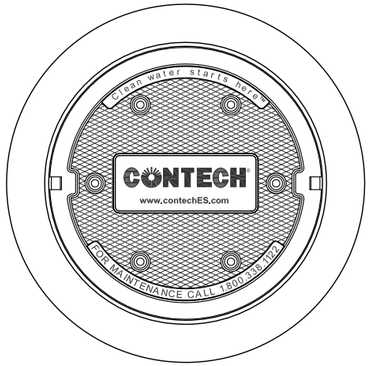


ELEVATION A-A
N.T.S.

CDS3020-6-C DESIGN NOTES

THE STANDARD CDS3020-6-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
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5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

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C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
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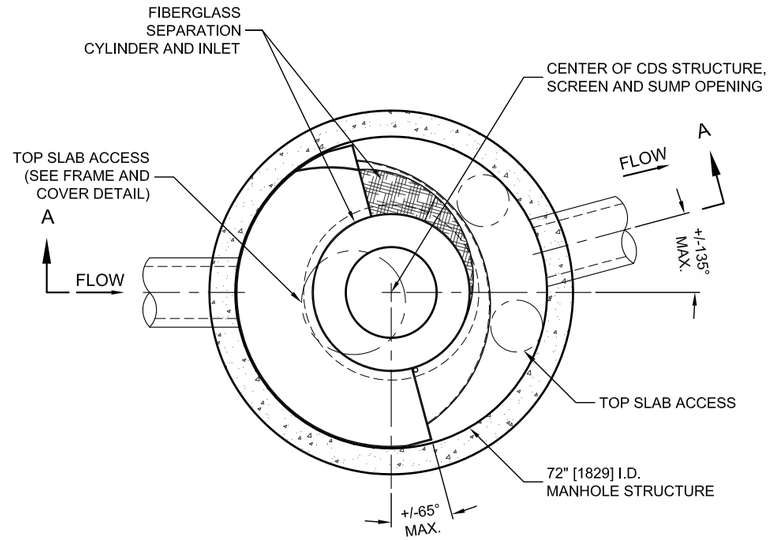
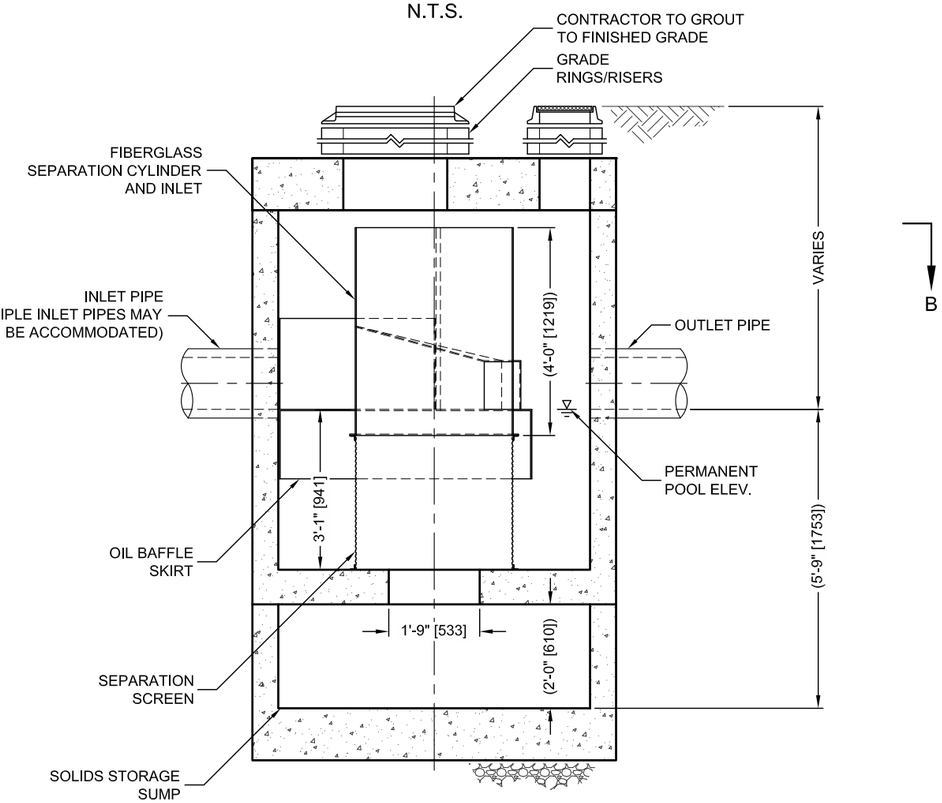
CDS3020-6-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B
N.T.S.

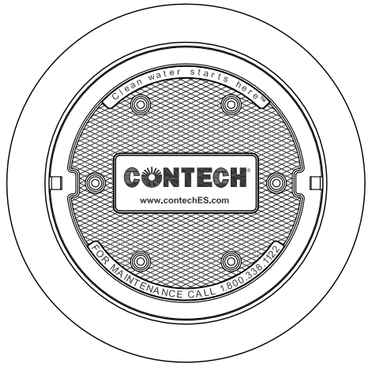


ELEVATION A-A
N.T.S.

CDS3025-6-C DESIGN NOTES

THE STANDARD CDS3025-6-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
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5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
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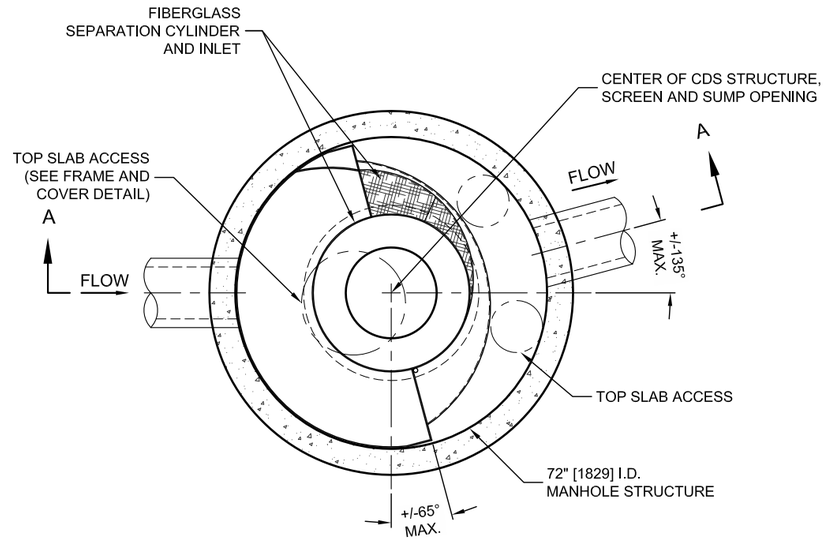
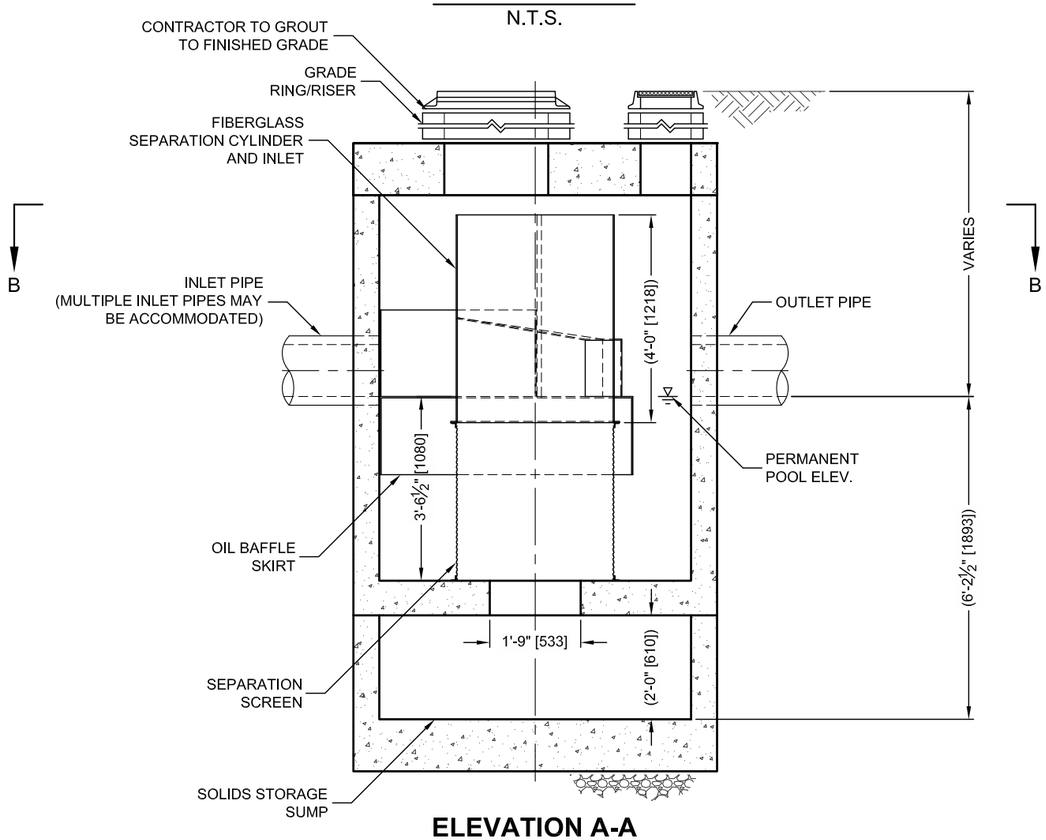
CDS3025-6-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B

N.T.S.



ELEVATION A-A

N.T.S.

FRAME AND COVER

(DIAMETER VARIES)

N.T.S.

CDS3030-6-C DESIGN NOTES

THE STANDARD CDS3030-6-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
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5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
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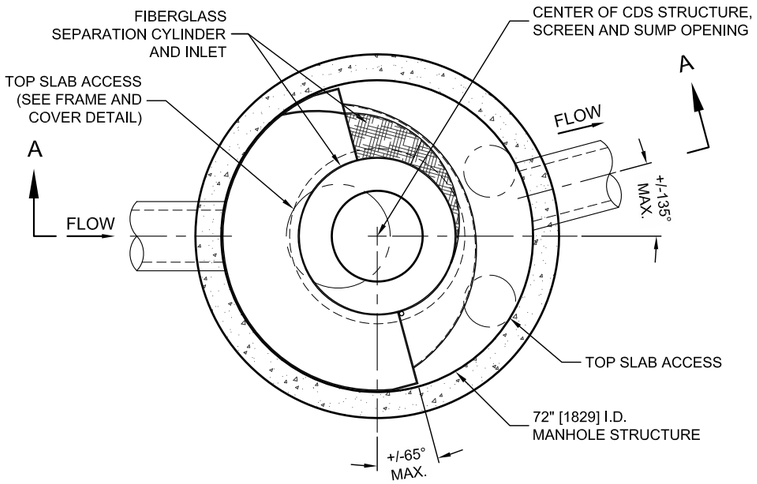
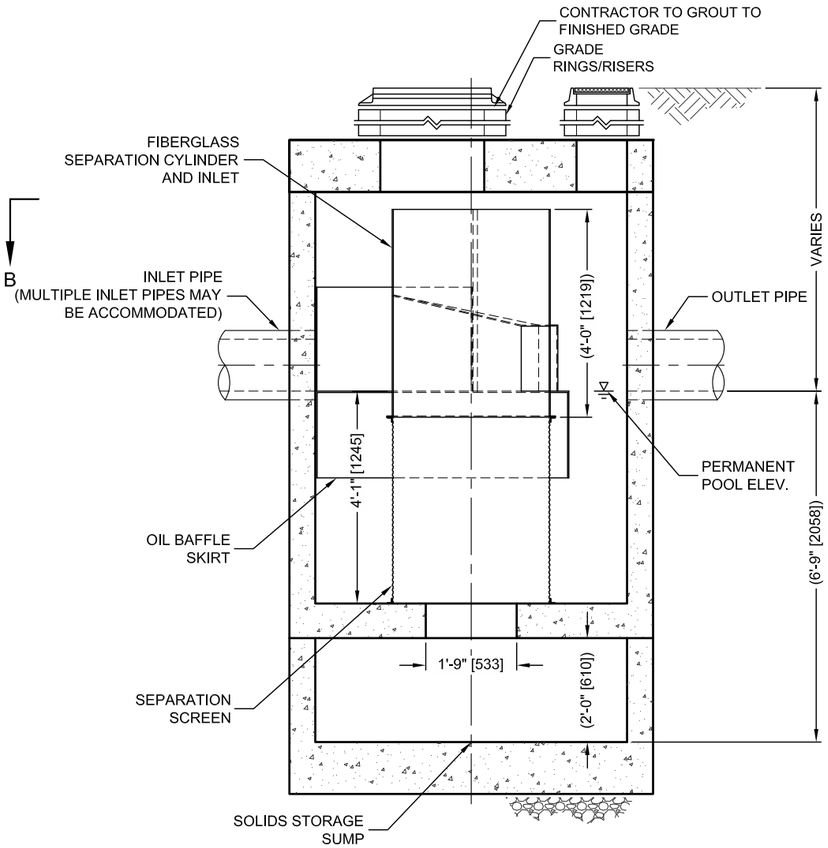
CDS3030-6-C INLINE CDS STANDARD DETAIL



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

CDS3035-6-C DESIGN NOTES

THE STANDARD CDS3035-6-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
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SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
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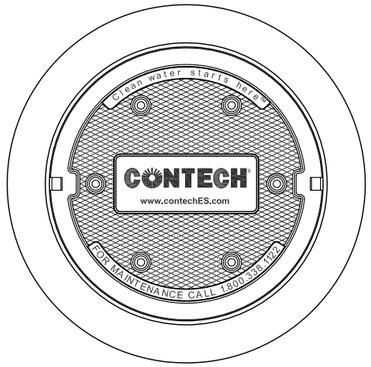

FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
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C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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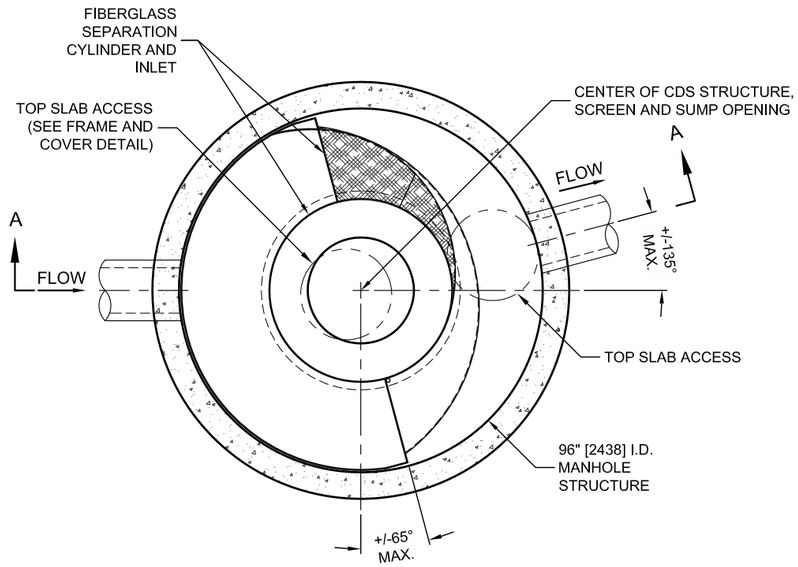
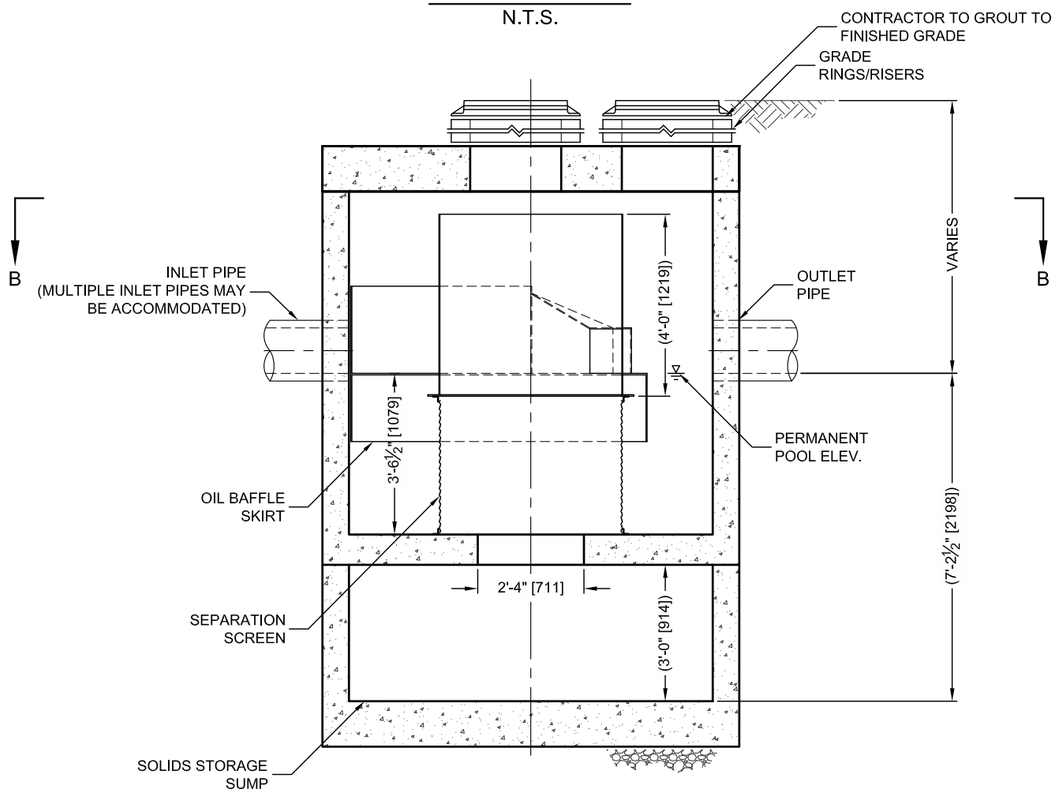
CDS3035-6-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B

N.T.S.



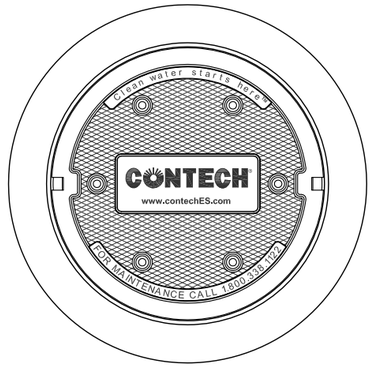
ELEVATION A-A

N.T.S.

CDS4030-8-C DESIGN NOTES

THE STANDARD CDS4030-8-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER

(DIAMETER VARIES)

N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECHENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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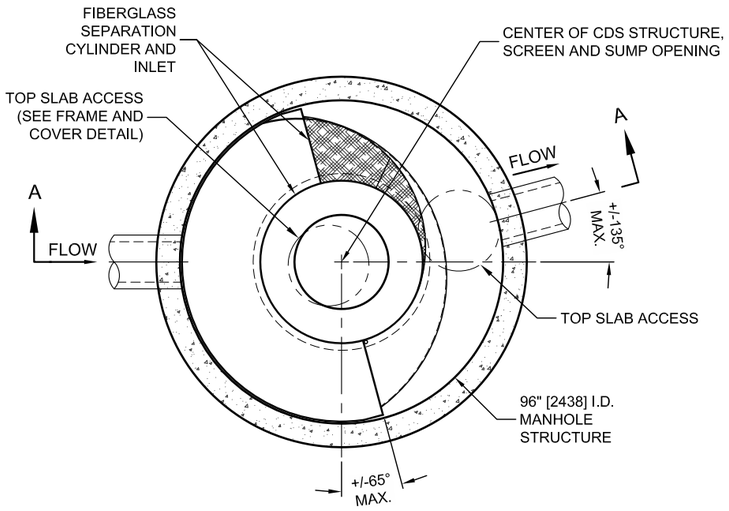
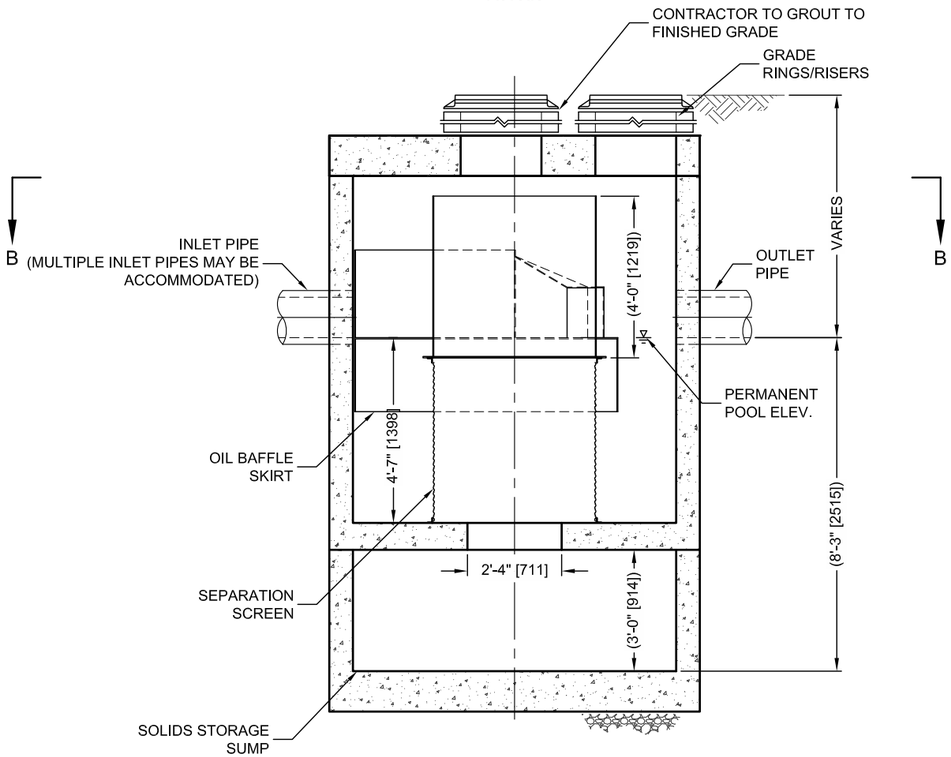
CDS4030-8-C INLINE CDS STANDARD DETAIL



PLAN VIEW B-B
N.T.S.



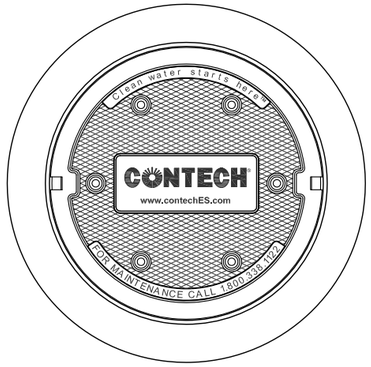
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,849; 6,641,720; 6,511,600; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS4040-8-C DESIGN NOTES

THE STANDARD CDS4040-8-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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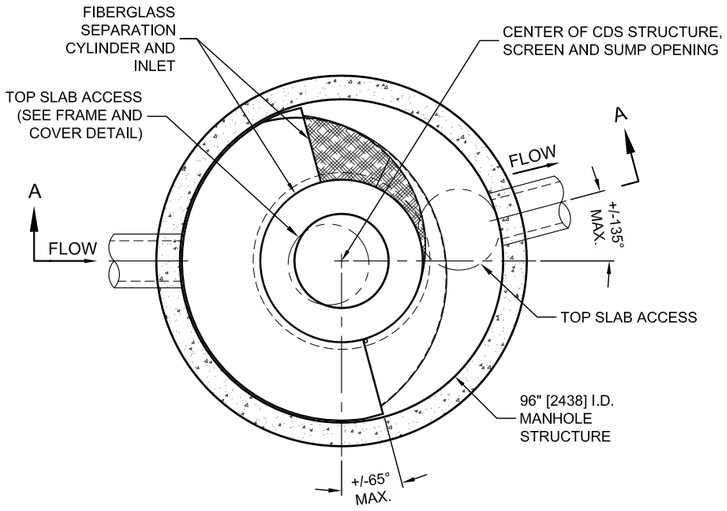
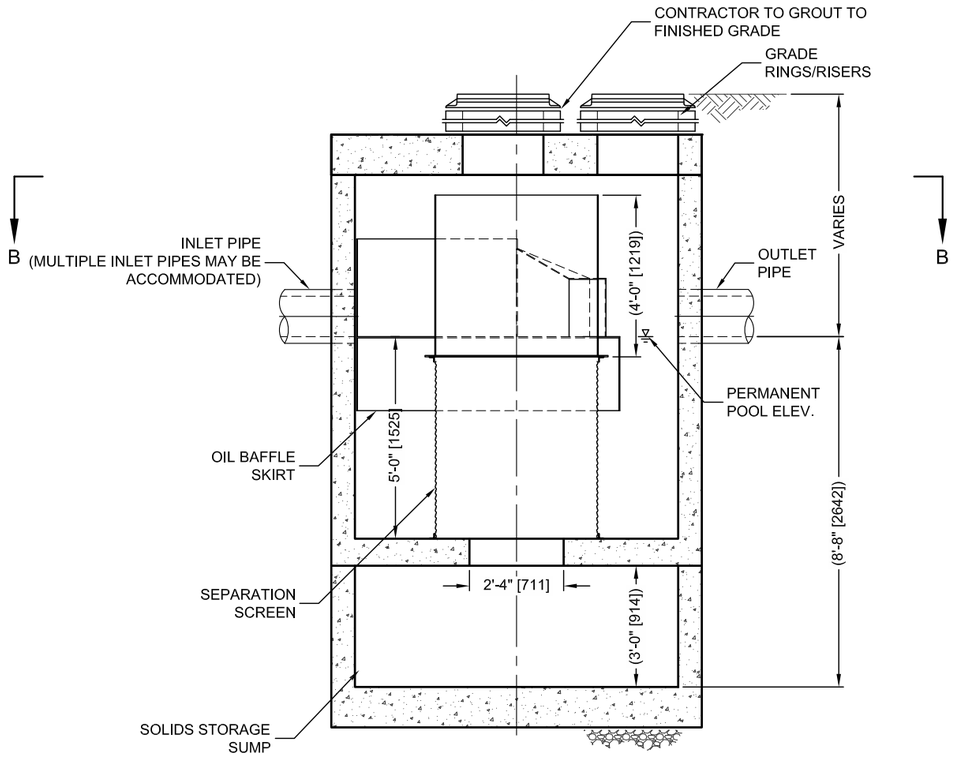
CDS4040-8-C INLINE CDS STANDARD DETAIL



PLAN VIEW B-B
N.T.S.



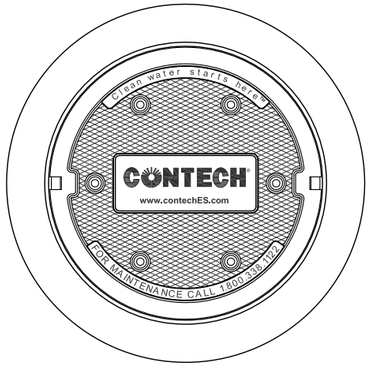
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS4045-8-C DESIGN NOTES

THE STANDARD CDS4045-8-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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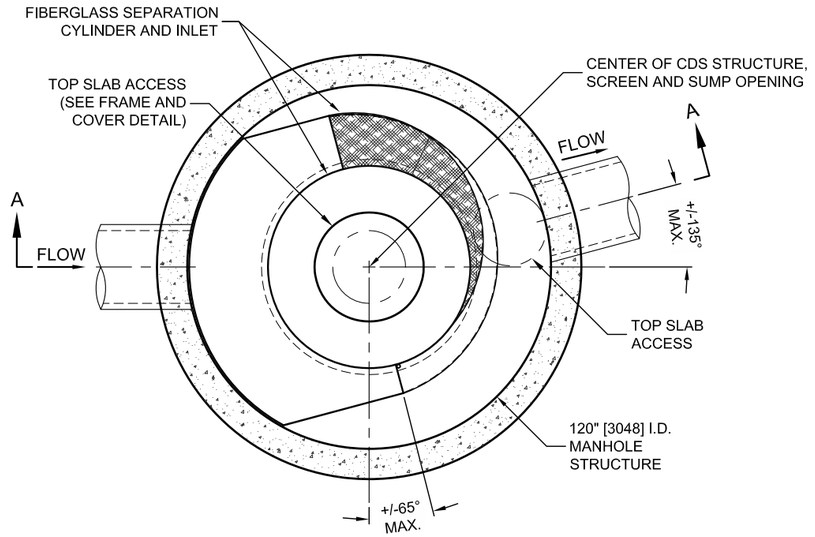
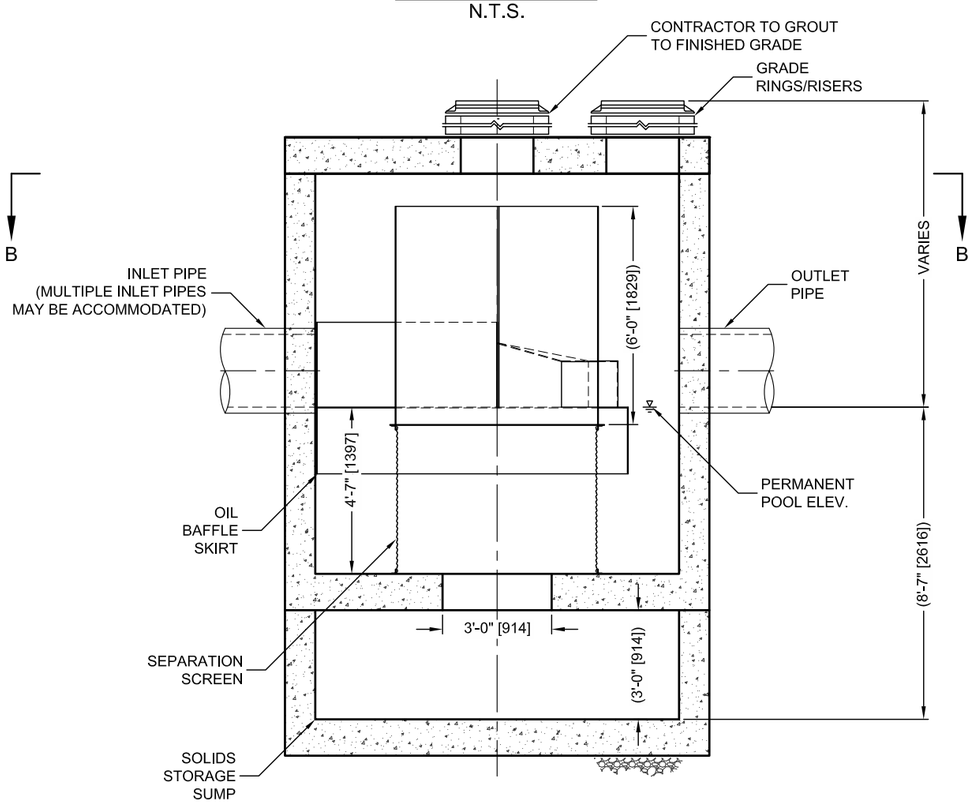
CDS4045-8-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B
N.T.S.

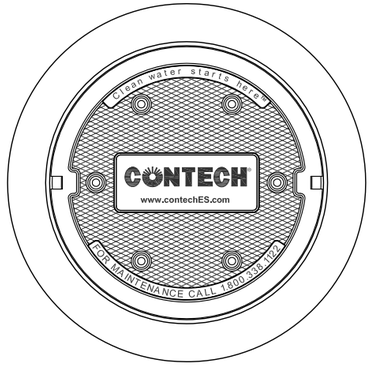


ELEVATION A-A
N.T.S.

CDS5640-10-C DESIGN NOTES

THE STANDARD CDS5640-10-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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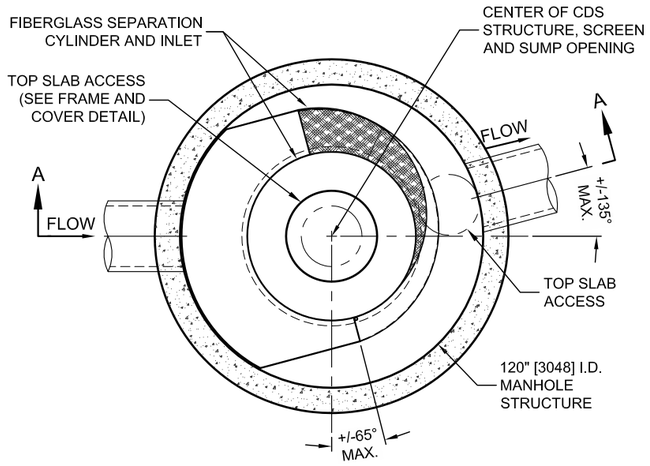
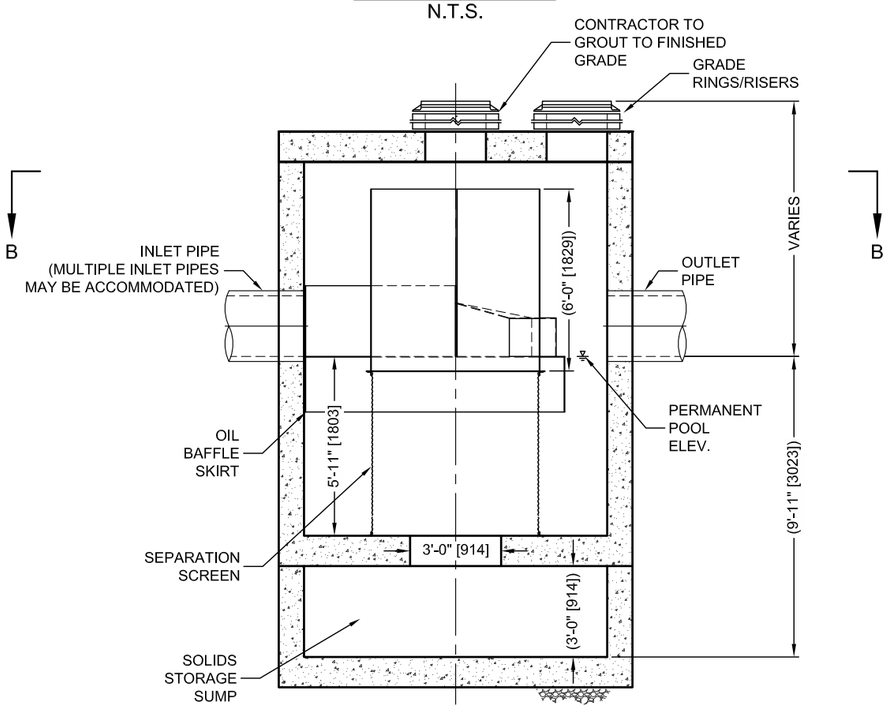
CDS5640-10-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B
N.T.S.



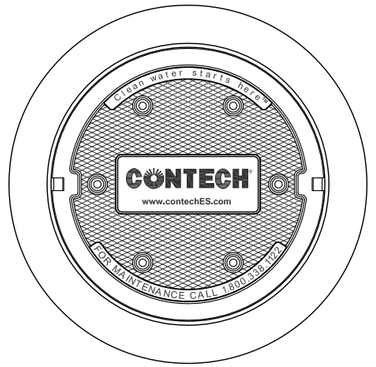
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,766,849; 6,641,720; 6,511,595; 6,581,792; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS5653-10-C DESIGN NOTES

THE STANDARD CDS5653-10-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechEScom
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET HS20 (AASHTO M 306) AND BE CAST WITH THE CONTECH LOGO.
6. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
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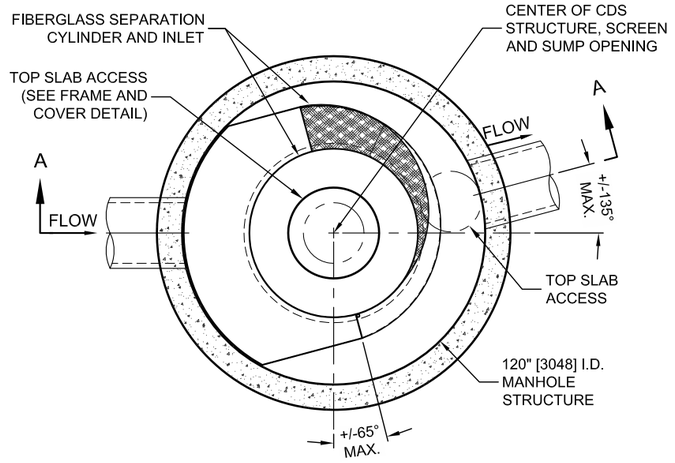
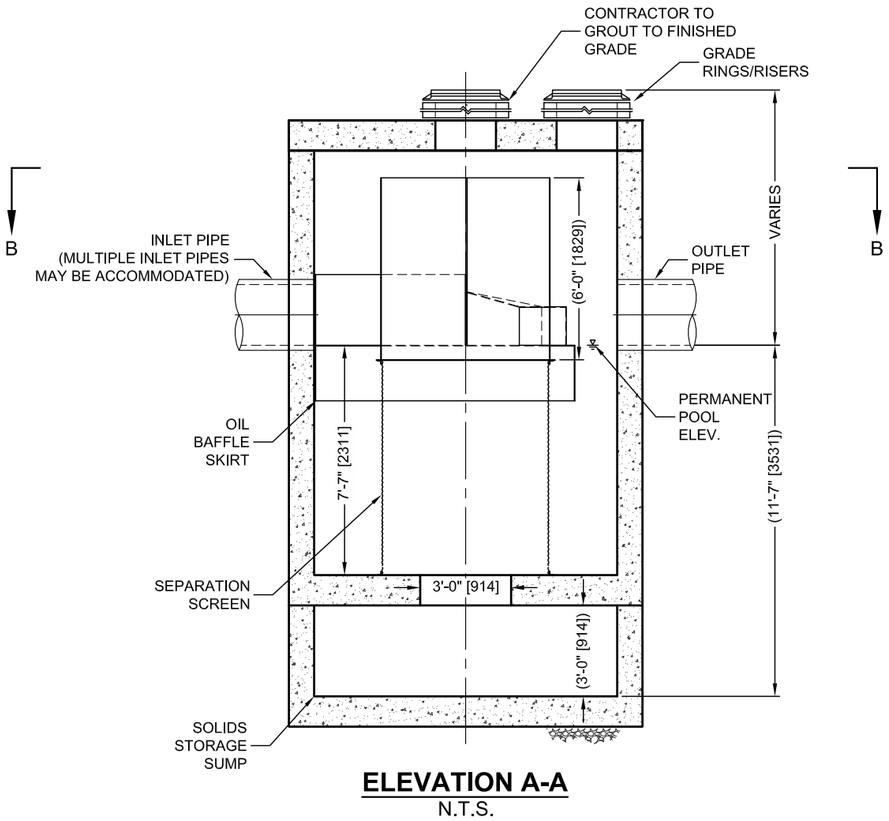
CDS5653-10-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B
N.T.S.



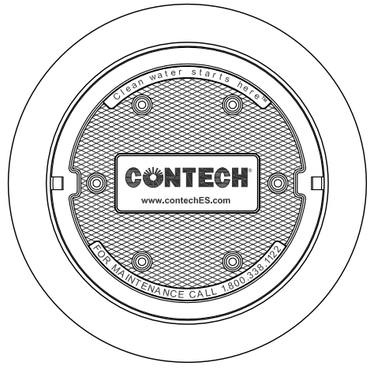
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,792; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS5668-10-C DESIGN NOTES

THE STANDARD CDS5668-10-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

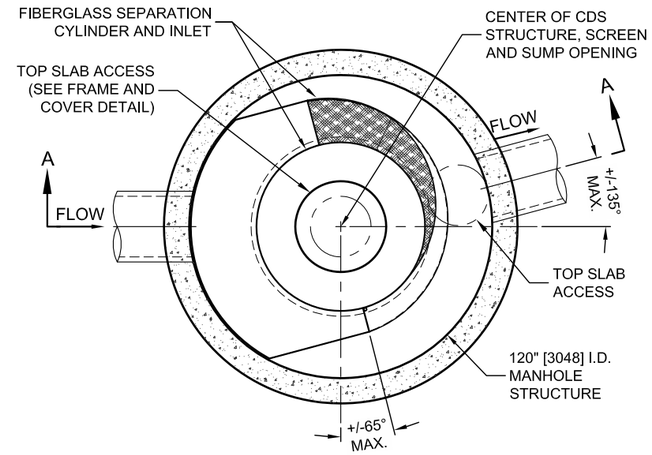
* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

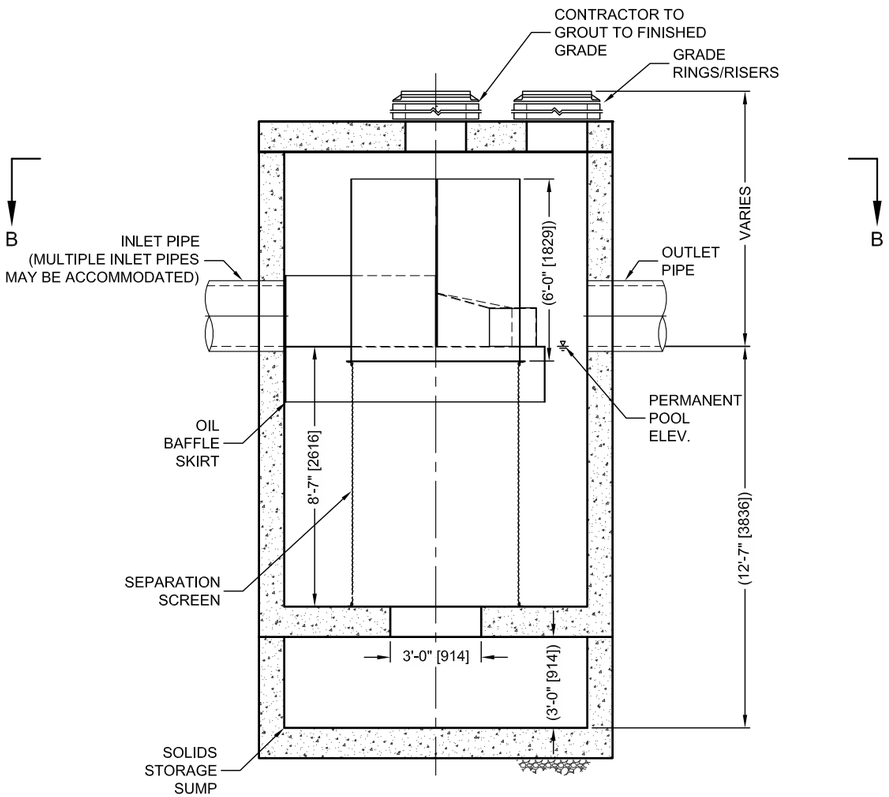
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS5668-10-C
INLINE CDS
STANDARD DETAIL



PLAN VIEW B-B
N.T.S.

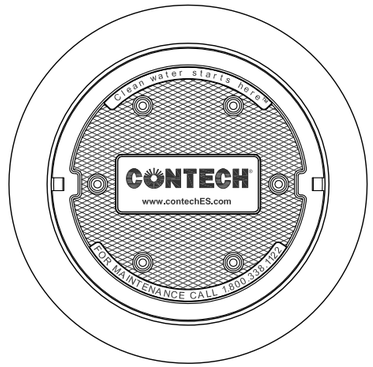


ELEVATION A-A
N.T.S.

CDS5678-10-C DESIGN NOTES

THE STANDARD CDS5678-10-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECHENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
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800-338-1122 513-645-7000 513-645-7993 FAX

CDS5678-10-C
INLINE CDS
STANDARD DETAIL

DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

Roadway Improvements to NE 151st Street - Phase 1

RPQ NO. 20240269-R

ADDENDUM NO.1

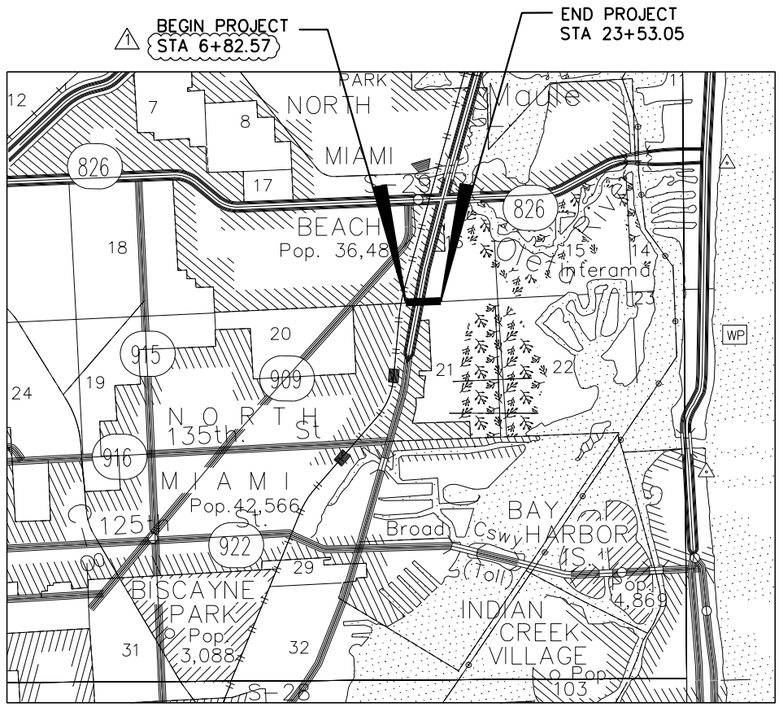
SUMMARY OF QUANTITIES (REVISED)

ENGINEERING DRAWINGS/PLANS

INDEX OF SHEETS

PLANS FOR PROPOSED
IMPROVEMENTS TO
NE 151st STREET

FROM EAST OF RAILROAD TRACKS
TO SOLE MIA WAY
MIAMI–DADE COUNTY PROJECT NO. 20150052



N

0 1/2 1 MILES

NOTE:

ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

REVISIONS:

1 KEY SHEET 1 (10/9/25)
ROADWAY SHEETS 3, 7, 9 (10/9/25)
DRIANAGE SHEETS 4, 18, 18B, 22 (10/9/25)
SIGNING SHEET 36, 38 (10/9/25)
LIGHTING SHEET 52 (10/9/25)

STANDARD INDEX DRAWINGS

INDEX No.	SHEET DESCRIPTION
120–001	EMBANKMENT UTILIZATION
400–011	GRAVITY WALL
425–001	SUPPLEMENTARY DETAILS FOR DRAINAGE STRUCTURES
425–010	STRUCTURE BOTTOMS – TYPE J AND P
425–021	CURB INLET TOPS – TYPES 5 AND 6
430–001	MISCELLANEOUS DRAINAGE DETAILS
443–001	FRENCH DRAIN
443–002	SKIMMERS FOR FRENCH DRAIN OUTLETS
444–T01	DEEP WELL INJECTION BOX
515–070	PIPE GUIDERAIL (ALUMINUM)
520–001	CURB AND GUTTER
522–001	CONCRETE SIDEWALK
522–002	DETECTABLE WARNINGS AND SIDEWALK CURB RAMPS
570–001	PERMANENT EROSION CONTROL

THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE MIAMI–DADE COUNTY PUBLIC WORKS DEPARTMENT STANDARDS AND SPECIFICATIONS PARTS 1, 2 AND 3. THE MANUAL OF UNIFORM MINIMUM STANDARDS FOR DESIGN, CONSTRUCTION AND MAINTENANCE FOR STREETS AND HIGHWAYS. THE FLORIDA DEPARTMENT OF TRANSPORTATION ROADWAY AND TRAFFIC STANDARD PLANS, AND THE FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, AS AMENDED BY CONTRACT DOCUMENTS.

PREPARED FOR

MIAMI–DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY DIVISION

STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

BY

R.J. Behar & Company, Inc.
Engineers • Planners
6861 SW 196 AV., SUITE 302
PEMBROKE PINE, FLORIDA 33332
CERTIFICATE OF AUTHORIZATION NO. 00008365
Phone; (954) 680–7771

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

ENGINEER OF RECORD:

Robert J. Behar, P.E.
FLORIDA REGISTRATION P.E. No. 21755

LENGTH OF JOB		
	LIN. FT.	MILES
ROADWAY	1,705.7	0.323
BRIDGE	N/A	N/A
GROSS LENGTH OF JOB	1,705.7	0.323
EXCEPTIONS	N/A	N/A
NET LENGTH OF JOB	1,705.7	0.323

APPROVED _____ COUNTY ENGINEER
RECOMMENDED _____ ASSISTANT DIRECTOR
SUBMITTED _____ HIGHWAY DIVISION

PROPOSED _____	CHECK _____
DESIGN _____	DRAWN _____
DATE _____	SHEET 1 OF 67

10/14/2025 11:29:44 AM F:\24006_NE 151 Street Phasing Plans\CADD\Segment 1\roadway\keys\r001.dgathernandez

SUMMARY OF QUANTITIES

PAY ITEM NO	PAY ITEM DESCRIPTION	UNIT	TOTAL P	TOTAL F
101-1-A	MOBILIZATION	LS	1	
102-1A	MAINTENANCE OF TRAFFIC	LS	1	
102-30-13	TEMPORARY HIGHWAY LIGHTING (ILLUMINATING ROADWAY)	LS	1	
102-120-B	TEMPORARY DRAINAGE	LS	1	
104-10-1	BALED HAY	EA	15	
104-13-1	STAKED SILT FENCE (TYPE III)	LF	2178	
104-18	INLET PROTECTION SYSTEM	EA	4	
110-1-1-1-1	CLEARING AND GRUBBING	AC	3	
120-1	REGULAR EXCAVATION	CY	536	
120-6	EMBANKMENT	CY	4147	
160-4B	TYPE 'B' STABILIZATION (12")	SY	11601	
200-1-10	LIMEROCK BASE (8" THICK, PRIMED)	SY	10365	
285-709	BASE OPTIONAL (BASE GROUP 9)	SY	524	
327-70-12	MILLING EXISTING ASPHALT PAVEMENT (1-1/4" AVG. DEPTH)	SY	6479	1
334-1-13	SUPERPAVE ASPHALTIC CONCRETE (TRAFFIC C)	TN	72	
334-2-13-2	HOT MIX ASPHALT, TRAFFIC LEVEL C, SP-12.5 (2")	TN	1067	
337-7-82	ASPHALT CONCRETE FRICTION COURSE,TRAFFIC C, FC-9.5, PG 76-22	TN	457	
400-0-11	CONCRETE CLASS NS, GRAVITY WALL	CY	23	1
425-1-351	INLET (CURB) TYPE P-5 (<10')	EA	5	
425-1-352 OPT	INLET (CURB) TYPE P-5 (>10')	EA	2	
425-1-361	INLET (CURB) TYPE P-6 (<10')	EA	2	
425-1-362A	INLET (CURB) TYPE P-6 (>10')	EA	1	
425-1-908	SPECIAL STRUCTURE, W/ WEIR AND BAFFLE (>10')	EA	5	
425-2-63	MANHOLE TYPE 8T (PARTIAL) (TOP ONLY)	EA	1	1
425-4(2)	INLETS, ADJUST	EA	2	
425-6	ADJUST EXISTING VALVE BOXES (MIAMI-DADE COUNTY ONLY)	EA	4	
425-73	ADJUST AND/OR RELOCATE EXISTING FIRE HYDRANTS (MIAMI-DADE COUNTY OWNED)	EA	2	
430-171-115	15" PIPE CULVERT (STORM SEWER)	LF	19	
430-171-118	18" PIPE CULVERT (STORM SEWER)	LF	202	1
430-171-124	24" PIPE CULVERT (STORM SEWER)	LF	331	
430-171-136	36" PIPE CULVERT (STORM SEWER)	LF	284	
430-171-224	19"X30" PIPE CULVERT, ELLIPTICAL (24" DIA. EQUI.)	LF	43	
430-171-236	29"X45" PIPE CULVERT, ELLIPTICAL (36" DIA. EQUI.)	LF	215	
425-82-01	TRENCH DRAIN (12")	LF	35	
444-1A	RELOCATE CONTINUOUS DEFLECTIVE SEPARATION STRUCTURE (C.D.S)	LS	1	
444-70-11	DEEP WELL-OPEN HOLE - 24" WELL DIAMETER	LF	450	
444-71-11	DEEP WELL CASING - 24" WELL DIAMETER	LF	345	
515-1-2A	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	LF	919	
520-1-10	CONCRETE CURB AND GUTTER (TYPE "F") INCLUDES COST OF LIMEROCK	LF	2816	
520-2-4A	CONCRETE CURB, TYPE D	LF	42	1
520-3D	CONCRETE VALLEY GUTTER	LF	78	
520-5-4	TRAFFIC SEPARATOR CONCRETE - TYPE IV, 4' WIDE	LF	157	
522-1	CONCRETE SIDEWALK (4" THICK)(INCLUDING PEDESTRIAN RAMP)	SY	1468	
522-2(1)	CONCRETE SIDEWALK (6" THICK)(INCLUDING PEDESTRIAN RAMP)	SY	48	1
522-4E	BUS SHELTER PAD-CONCRETE	SY	27	
523-1-3	PATTERNED PAVEMENT, VEHICULAR AREAS, GREEN BIKE LANE	SY	260	
526-1-1A	PAVERS, ARCHITECTURAL (ROADWAY)(BRICK)	SY	38	1
527-2	DETECTABLE WARNING ON WALKING SURFACE (CURB RAMP DETECTABLE WARNING SURFACE)	SF	100	
550-60-225	FENCE GATE, TYPE B, DOUBLE, 20.1-24' OPENING	EA	1	
550-60-400	FENCE GATE, RESET EXISTING GATE	EA	1	
575-1-1A	SODDING (PENSACOLA BAHIA OR MATCH EXISTING) (INCLUDES WATERING AND MAINTENANCE)	SY	1335	
580-322-2A	TREE REMOVAL AND DISPOSAL (6" TO 12" DIA.)	EA	35	
580-322-4	TREE REMOVAL AND REPLACEMENT [(INCLUDING WATERING) (12" TO 24" DIAMETER)]	EA	5	
580-322-4A	TREE REMOVAL AND DISPOSAL (12" TO 24")	EA	32	
580-322-5A	TREE REMOVAL AND DISPOSAL (24" TO 36")	EA	1	
751-35-42	ARCHITECTURAL, BUS SHELTER, RELOCATE, 50-100 SF	EA	2	
721-75-4	RELOCATE OR RESET BUS STOP BENCH (any type, includes reattaching to concrete if necessary)	EA	1	

PAY ITEM NOTES

102-1A	TO BE ACCOMPLISHED IN ACCORDANCE WITH THE FLORIDA DEPARTMENT OF TRANSPORTATION INDEX 600 SERIES, THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION (ANSI D6 1-1978), PUBLIC WORKS MANUAL OF METROPOLITAN DADE COUNTY, AND THE LATEST REVISIONS OF THE AFORE MENTIONED MANUALS. INCLUDES THE COST OF FURNISHING, INSTALLING, MAINTAINING, AND REMOVING ALL ITEMS OF MAINTENANCE OF TRAFFIC NOT PAID FOR UNDER SEPARATE ITEMS INCLUDING BUT NOT LIMITED TO SIGNS, BARRICADES, FLASHING LIGHTS, TEMPORARY PAVEMENT, TEMPORARY PAVEMENT MARKINGS, TRAFFIC SIGNAL MODIFICATION FOR TRAFFIC CONTROL, ETC.
110-1-1-1-1	INCLUDES REMOVAL OF EXISTING PAVEMENT, CONCRETE SIDEWALK, DRIVEWAYS, CURB AND GUTTER, DRAINAGE STRUCTURES AND PIPES, MISCELLANEOUS CONCRETE, VEGETATION, TREES AND DEBRIS TO BE DISPOSED OF IN LEGAL AREAS PROVIDED BY THE CONTRACTOR. INCLUDES THE COST OF CLEANING-OUT ALL EXISTING DRAINAGE STRUCTURES WHICH ARE TO REMAIN WITHIN THE LIMITS OF CONSTRUCTION. INCLUDES THE COST OF REPLACING EXISTING AND DAMAGED GEOTEXTILE BETWEEN THE SUBGRADE AND THE LIMEROCK IN THE VICINITY OF SOLE MIA WAY
120-1	THESE ARE ESTIMATED QUANTITIES AND MAY BE INCREASED OR DECREASED BY THE ENGINEER.
160-4B	INCLUDES THE COST OF LBR 40 AND CBR 30. REFER TO TYPICAL SECTION SHEETS ARE FOR ADDITIONAL DETAILS.
425-1 TO 425-2	THE COST OF BAFFLE, MATERIALS, METAL PIPE ENCASEMENT, INLET AND MANHOLE, LABOR & CONSTRUCTION SHALL BE INCLUDED IN COST OF STRUCTURES.
425-6	WITHIN PAVEMENT AREA, VALVE ADJUSTMENTS TO BE DONE AS NECESSARY. THIS ITEM IS CONTINGENT UPON FIELD CONDITIONS AND MAY BE INCREASED, DECREASED, OR ELIMINATED BY THE ENGINEER.)
425-1-908	INCLUDES THE COST OF INSTALLING A CHECK VALVE AT STRUCTURE S-8.
425-82-01	INCLUDES THE COST OF FITTINGS TO CONNECT TO EXISTING SYSTEM.
430-XXX	FOR PIPE ALTERNATIVES, SEE SPECIAL PROVISIONS AND BID DOCUMENTS.
520-1-10	INCLUDES DROP CURB AT DRIVEWAYS AND 3 FT OF CURB ENDING AS DIRECTED BY THE ENGINEER.
522-1	INCLUDES THE COST OF PEDESTRIAN RAMPS.
522-2(1)	QUANTITY FOR DRIVEWAYS AT LOCATIONS SHOWN IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER.
550-10-228	INCLUDES THE COST OF RESETTING ANY EXISTING FENCE TYPES.
575-1-1A	INCLUDES SOD TO BE USED IN THE RESTORATION OF LAWNS AND MAY BE INCREASED OR DECREASED AS DIRECTED BY THE ENGINEER. PENSACOLA OR TO MATCH EXISTING SOD.
580-332-2 & 580-322-4	INCLUDES REMOVAL, DISPOSAL, TRANSPORTATION, FURNISHING PLANTING, AND ALL APPURTENANCES NEEDED. REFER TO TREE DISPOSITION PLANS FOR DETAILS.

SUMMARY OF EARTHWORK

ITEM	QUANTITY
REGULAR EXCAVATION	536
TOTAL REGULAR EXCAVATION	536 C.Y.
EMBANKMENT	
NE 151st ST	3933
SOLE MIA BEND	214
TOTAL EMBANKMENT	4147 C.Y.

10/10/2025 9:29:49 AM F:\24006_NE 151 Street Phasing Plans\CADD\Segment 1\roadway\SUMORD01.dgn dhernandez

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/09/25		1 UPDATED PAY ITEM QUANTITES & ADDED PAY ITEMS.						

R.J. Behar & Company, Inc.
Engineers • Planners
6861 SW 196 Avenue, Suite 302
Pembroke Pines, Florida 33332
ROBERT J. BEHAR, P.E. LICENSE NO. 21755
CERTIFICATE OF AUTHORIZATION NO. 00008365

	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		

SUPERVISED BY:

MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

SUMMARY OF QUANTITIES AND PAY ITEM NOTES

QUANTITY	STR. NO	STATION	SIDE	DESCRIPTION	BARRELS	CURB INLETS														REMARKS
												P-5		P-6		P-8T				
						19"X30"	29"X45"	15"	18"	24"	36"	<10	>10	<10	>10	PARTIAL (TOP ONLY)		SPECIAL STRUCTURE		
	1	11+15.70	RT	INLET, PIPE						144		1						1		
	2	11+27.32	LT	INLET, PIPE						132		1								
	3	12+63.20	RT	INLET, PIPE						55			1							
	4	12+63.20	LT	WELL, PIPE			215											1		ELLIPTICAL PIPE
	5	12+63.20	LT	INLET, PIPE		43							1							ELLIPTICAL PIPE
	6	300+82.70	RT	WELL, CDS, PIPE				19										1		
	7	14+86.60	RT	INLET, PIPE					54			1								
	8	14+86.60	LT	WELL, PIPE							117							1		FLAP GATE
	9	300+90.00	LT	INLET, PIPE					20			1								CONC. COLLAR
	10	16+13.47	RT	INLET, PIPE					48						1					
	11	16+13.47	LT	WELL, PIPE							167							1		
	12	16+13.47	LT	INLET, PIPE					35					1						
	13	16+30.00	RT	WELL TOP, PIPE					9									1		
	18	21+13.47	LT	INLET, PIPE					35			1								
	EX-24	21+43.94	LT	MANHOLE TOP												1				
SHEET TOTALS -				PLAN QUANTITY		43	215	19	201	331	284	5	2	1	1	1		5		
				FINAL QUANTITY													1			
GRAND TOTALS -				PLAN QUANTITY		43	215	19	201	331	284	5	2	1	1	1		5		
				FINAL QUANTITY				1												

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/09/25		1 ADDED & UPDATED STRUCTURE ITEMS.						

R.J. Behar & Company, Inc.
Engineers • Planners
6861 SW 196 Avenue, Suite 302
Pembroke Pines, Florida 33332
ROBERT J. BEHAR, P.E. LICENSE NO. 21755
CERTIFICATE OF AUTHORIZATION NO. 00008365

	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		
SUPERVISED BY:					

MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

SUMMARY OF DRAINAGE STRUCTURES

MIAMI-DADE COUNTY DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
NE 151st Street
From Biscayne Blvd to Sole Mia Way
PROJECT NO. N/A SHEET 7 OF 67

BEGIN PROJECT
BEGIN MILLING & RESURFACING
STA. 6+82.57 ℄ CONST.
MATCH EXISTING PAVEMENT

END MILLING & RESURFACING
BEGIN RECONSTRUCTION
STA. 10+72.46 ℄ CONST.
MATCH EXISTING PAVEMENT

NE 151st ST.

BISCAYNE BLVD

STA. 9+99.04 ℄ 151 = STA. 103+55.31 ℄ BISCAYNE BLVD

POT STA. 10+00.00

N 86°26'18" E

MATCH LINE STA 12+00.00

SCALE 1"=40'

TEMPORARY SITE BENCHMARK #1
T.B.M. #1
SET MAG NAIL & DISC
(L.B. 7335)
Sta: 10+85.08
Offset: 37.98 RIGHT
Elev.: 5.75
N:575699.35'
E:912,883.15

LEGEND
- RELOCATED BUS SHELTER TO BE INSTALLED ON PROPOSED 9" THICK REINFORCED 8' X 15' SHELTER FOUNDATION
- DETECTABLE WARNING
- [1] DENOTES WASD FM VALVE (TO BE ADJUSTED BY THE CONTRACTOR)
- (2) DENOTES WASD SS MANHOLE COVER (TO BE ADJUSTED BY THE CONTRACTOR)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/09/25		⚠1 UPDATED PROJECT LIMIT LABEL.						

R.J. Behar & Company, Inc.
Engineers • Planners
6861 SW 196 Avenue, Suite 302
Pembroke Pines, Florida 33332
ROBERT J. BEHAR, P.E. LICENSE NO. 21755
CERTIFICATE OF AUTHORIZATION NO. 00008365

	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		
SUPERVISED BY:					

MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

PLAN

10/14/2025 11:17:51 AM F:\24006_NE 151 Street Phasing Plans\CADD\Segment 1\roadway\PLANRD01.DGN dhernandez

MIAMI-DADE COUNTY DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
NE 151st Street
From Biscayne Blvd to Sole Mia Way
PROJECT NO. N/A SHEET 9 OF 67

SCALE 1"=40'

MATCH LINE STA 17+80.00

END GRAVITY WALL W/GUIDERAIL
+45.58
51.17 LT

R/W LINE

LIMITS OF MILLING AND RESURFACING

END PROJECT
END MILLING AND RESURFACING
STA. 23+53.05 ℄ CONST.

+13.47
42.50 LT
EL. 4.32

+45.58
44.50 LT

+20.00
42.50 LT

+48.50
50 LT

+65.47
36.96 LT

+67.89
24.56 LT

+60.08
34.58 LT

S-18

EX-24

35 LF OF
18" PIPE

GRAVITY WALL

6' SIDEWALK

TYPE 'F' CURB
AND GUTTER

℄ SURVEY

℄ SURVEY

36" PIPE 72" FM

PLUG PIPE

NE 151st ST.

PGL LT

℄ CONST.

PI STA. 22+39.59

18 19 20 21 22 23

Vvh14 Vvh15A Vvh15 Vvh16 Vvh42 Vvh17 Vvh18 Vvh19 Vvh20 Vvh21A Vvh21 Vvh18A

N 85° 20' 56" E
T.B.M.#2
PGL RT

STA. 18+36.85 ℄ =
STA. 18+49.66 ℄

Vvh41

TRENCH DRAINS TO BE REMOVED

VALLEY GUTTER

TYPE F CURB
& GUTTER

Vvh43

+96.40
42.50 RT

TYPE 'F' CURB
AND GUTTER

+61.52
42.50 RT

CR-G

+39.45
42.50 RT

+16.02
42.50 RT

+90.16
42.50 RT

+20.00
42.50 RT

+41.09
46.64 RT

R 15'

R 24'

R/W LINE

6' SIDEWALK

20 LF OF 12" TYPE II
TRENCH DRAIN

REPLACE TYPE D CURB

REPLACE TYPE D CURB

15 LF OF TYPE II
TRENCH DRAIN

MATCH EXISTING
+76.50, 65.50 RT

MATCH EXISTING
+26.04, 66.45 RT

EXIST. 8" HDPE
SEE TRENCH DRAIN TO EXIST.
PIPE CONNECTION DETAIL

EXIST. 8" HDPE
SEE TRENCH DRAIN TO EXIST.
PIPE CONNECTION DETAIL

EXIST SIDEWALK
(TO BE REMOVED)

+90.16
52.77 RT

6' SIDEWALK

END RECONSTRUCTION
BEGIN MILLING AND RESURFACING
STA. 21+20.00 ℄ CONST.
MATCH EXISTING PAVEMENT

SOLE MIA WAY

R/W LINE

LIMITS OF MILLING
AND RESURFACING

86'

62'

TEMPORARY SITE BENCHMARK #2
T.B.M. #2
SET MAG NAIL & DISC
(L.B. 7335)
Sta: 19+97.34
Offset: 44.23' RIGHT
Elev.: 5.13
N: 575,793.58'
E: 934,324.27

LEGEND

DETECTABLE WARNING

BRICK PAVERS (1)

WIDENING

WETLAND BOUNDARY

(2) DENOTES WASD SS MANHOLE COVER (TO BE ADJUSTED BY THE CONTRACTOR)

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/9/25		(1) ADDED S-18 & PIPE. UPDATED PROPOSED WORK AT DRIVEWAY ENTRANCE & LABELS.						

R.J. Behar & Company, Inc.
Engineers • Planners
6861 SW 196 Avenue, Suite 302
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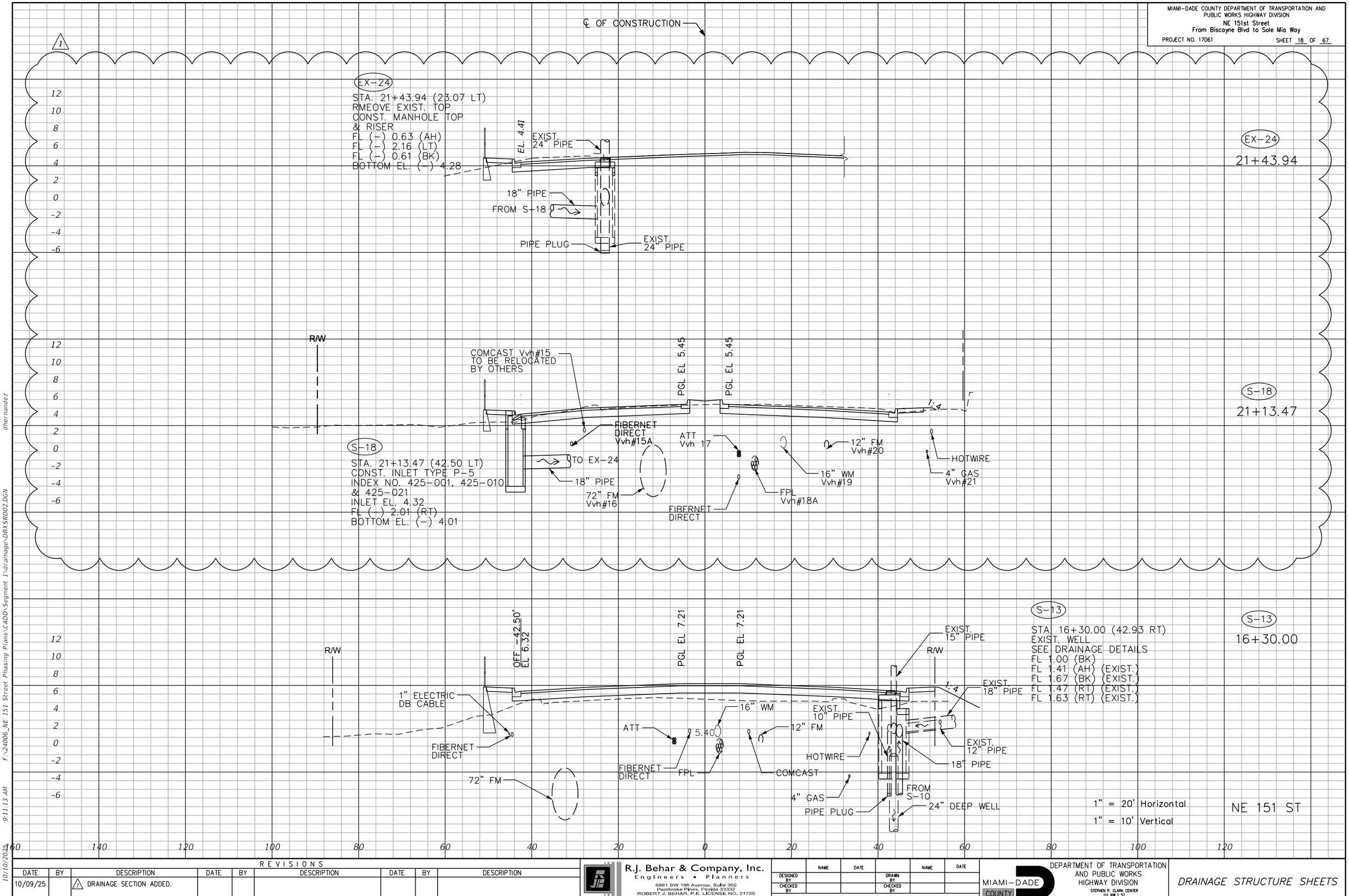
SUPERVISED BY:					

MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

PLAN

10/10/2025 8:30:21 AM F:\24006_NE 151 Street Phasing Plans\CADD\Segment 1\roadway\PLANRD03.DGN dhernandez

MIAMI-DADE COUNTY DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
NE 151st Street
From Biscayne Blvd to Sole Mia Way
PROJECT NO. 17061 SHEET 18 OF 67



REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/09/25		1 DRAINAGE SECTION ADDED.						

R.J. Behar & Company, Inc.
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DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
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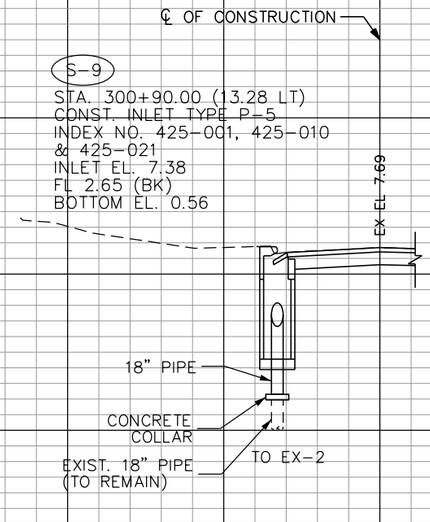
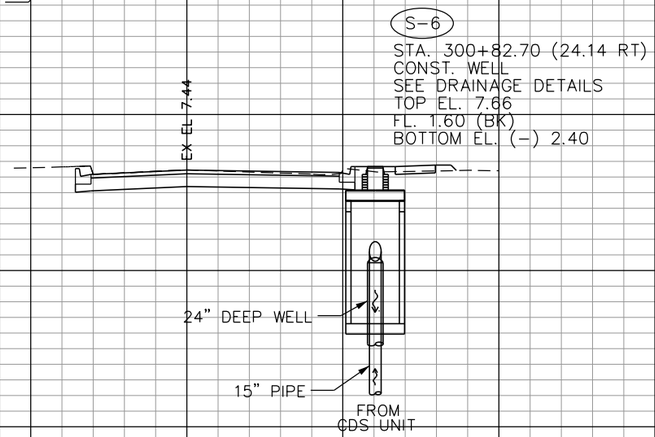
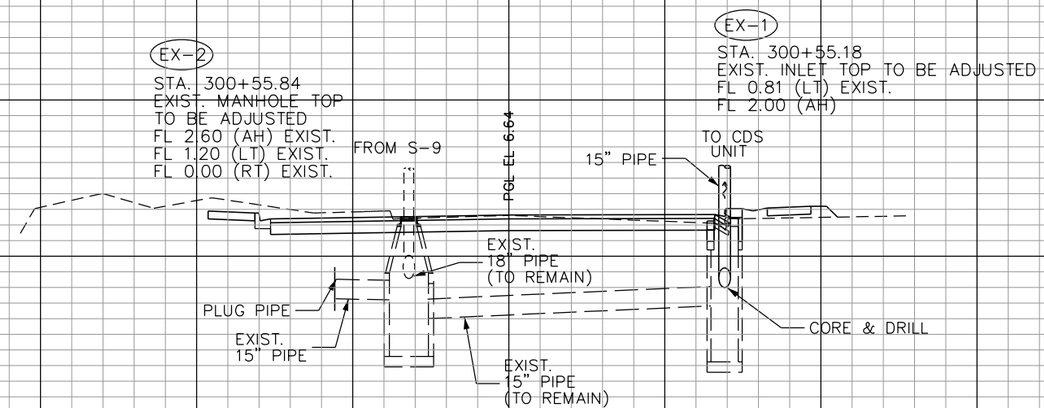
MIAMI, FLORIDA 33128

DRAINAGE STRUCTURE SHEETS







S-9
300+90.00

S-6
300+82.70

EX-2
EX-1
300+55.30

1" = 20' Horizontal
1" = 10' Vertical

SOLE MIA BEND

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/09/25		1 SHEET ADDED.						

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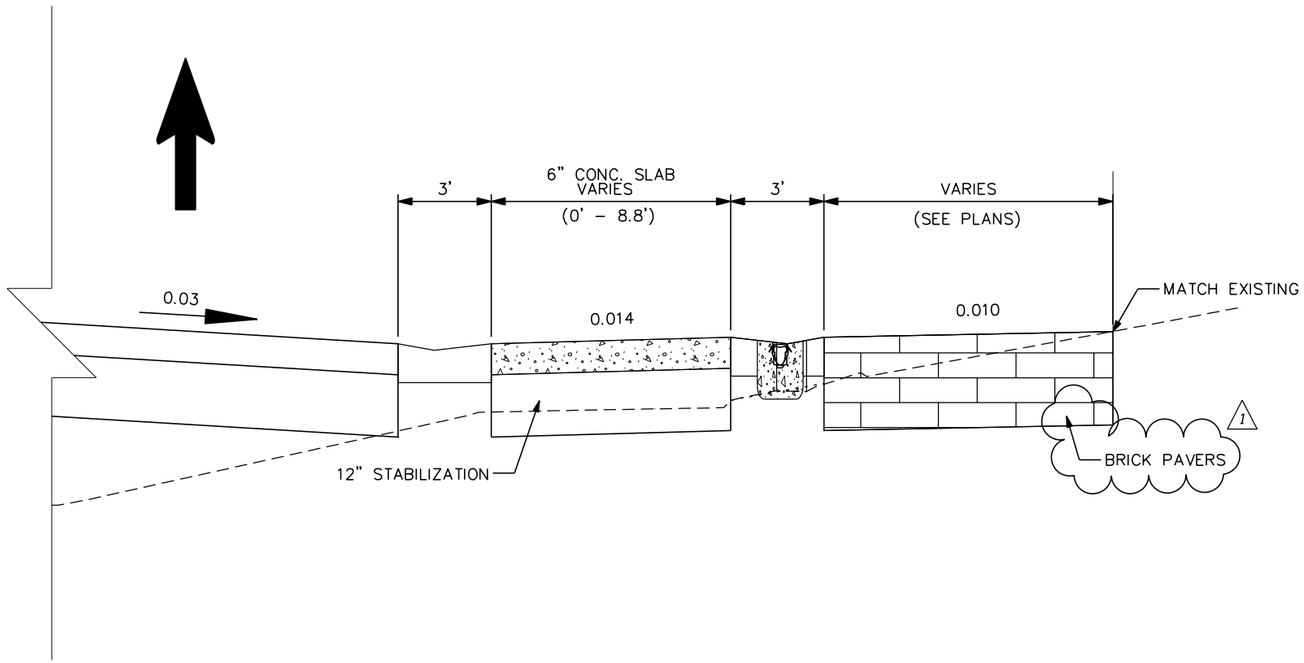
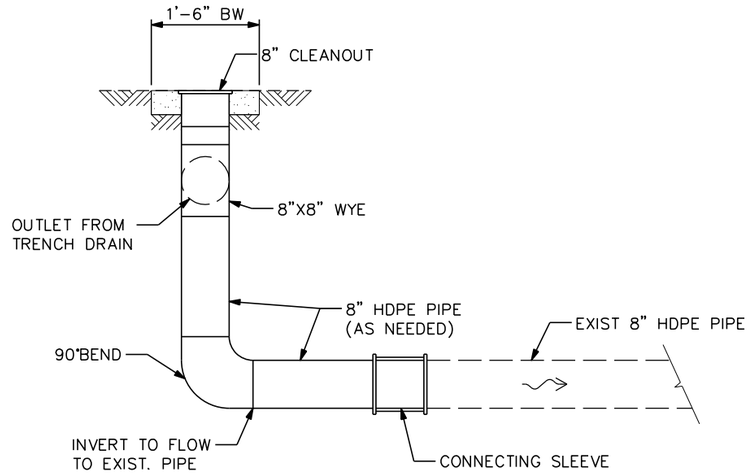
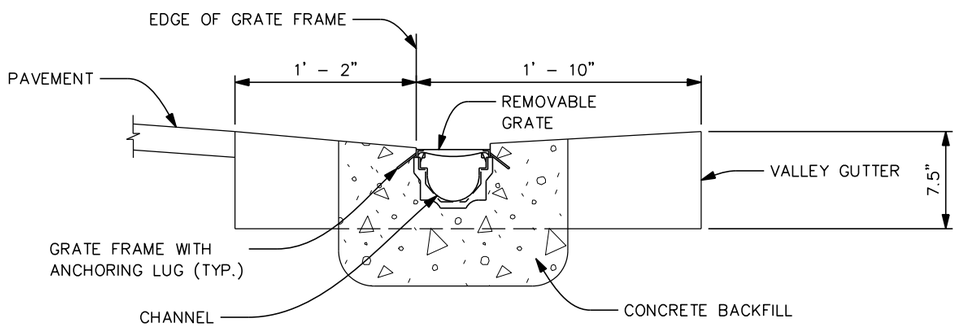
SUPERVISED BY:

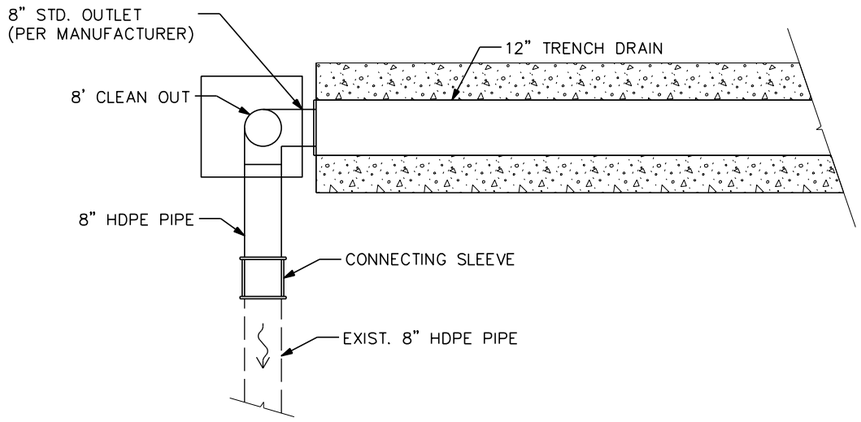
MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

DRAINAGE STRUCTURE SHEETS









12" TRENCH DRAIN DETAIL (FDOT TYPE II) WITH VALLEY GUTTER
N.T.S.

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/09/25		1 UPDATED LABEL.						

R.J. Behar & Company, Inc.
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HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
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MIAMI, FLORIDA 33128

DRAINAGE DETAILS

10/9/2025 2:20:47 PM F:\24006_NE 151 Street Phasing Plans\CADD\Segment 1\drainage\DRDTRD07.dgn dhernandez

TABULATION OF QUANTITIES

PAY ITEM NO.	DESCRIPTION	UNIT	SHEET NUMBERS						TOTAL THIS SHEET		GRAND TOTAL	
			SHT 47		SHT 48		SHT 49					
			ORIG.	FINAL	ORIG.	FINAL	ORIG.	FINAL	ORIG.	FINAL	ORIG.	FINAL
700-1-11B	SINGLE POST SIGN, F&I GROUND MOUNT, UP TO 12 SF	AS	10	1	3		2		15	1	15	1
700-1-12C	SINGLE POST SIGN, F&I GROUND MOUNT, 12-20 SF	AS			1				1		1	
700-1-50	SINGLE POST SIGN, RELOCATE	AS	2				2		4		4	
700-1-60	SINGLE POST SIGN, REMOVE	AS	3		9		1		13		13	
700-3-601	SIGN PANEL, REMOVE, UP TO 12 SF	EA	1		1				2		2	
706-3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	130		131		106		367		367	
710-11-121	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID, 6"	LF	1968	1	935		1498		4401	1	4401	1
710-11-102A	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID FOR INTERCHANGE AND URBAN ISLAND, 8"	LF	303		418				720		720	
710-11-123	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID FOR CROSSWALK AND ROUNDABOUT, 12"	LF	900		123		241		1264		1264	
710-11-124	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID FOR DIAGONAL OR CHEVRON, 18"	LF	20				64		84		84	
710-11-125	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID FOR STOP LINE OR CROSSWALK, 24"	LF	288	1	112		83		483	1	483	1
710-11-141B	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SKIP, 10-30 OR 3-9 SKIP, 6" WIDE	LF	784	1	2128		1120		4032	1	4032	1
710 11-133	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, 3-9 DOTTED DROP LINE, 12"	LF			79				79		79	
710-11-141C	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, 2-4 DOTTED GUIDELINE/ 6-10 DOTTED EXTENSION, 6"	LF	516		477		528		1521		1521	
710-11-160	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, MESSAGE OR SYMBOL	EA	2		1		2		5		5	
710-11-170	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, ARROWS	EA	9		5		6		20		20	
710-11-221	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, SOLID, 6"	LF	963	1	1255		1528		3746	1	3746	1
710-11-224	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, SOLID FOR DIAOGNAL OR CHEVRON, 18"	LF	31		12		100		143		143	
710-11-251	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, DOTTED/GUIDELINE, 6"	LF	282				106		388		388	
710-11-290	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, ISLAND NOSE	SF	19		11				30		30	
711-11-123	THERMOPLASTIC, STANDARD, WHITE, SOLID, 12" FOR CROSSWALK OR AND ROUNDABOUT	LF	900		123		241		1264		1264	
711-11-124	THERMOPLASTIC, STANDARD, WHITE, SOLID, 18" FOR DIAGONAL CHEVRONS	LF	20				64		84		84	
711-11-125	THERMOPLASTIC, STANDARD, WHITE, SOLID, 24" FOR STOP LINE AND CROSSWALK	LF	288	1	112		83		483	1	483	1
711-11-151	THERMOPLASTIC, STANDARD, WHITE, DOTTED/GUIDELINE, 6"	LF	516		477		528		1521		1521	
711-11-160	THERMOPLASTIC, STANDARD, MESSAGE OR SYMBOL	EA	2		1		2		5		5	
711-11-170	THERMOPLASTIC, STANDARD, WHITE, ARROWS	EA	9		5		6		20		20	
711-11-224	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 18" FOR DIAGONAL OR CHEVRONS	LF	31		12		100		143		143	
711-11-251	THERMOPLASTIC, STANDARD, YELLOW, DOTTED/GUIDELINE, 6"	LF	282				106		388		388	
711-14-125	THERMOPLASTIC, PREFORMED, WHITE, SOLID, 24" FOR CROSSWALK	LF	812		148		371		1331		1331	
711-14-160	THERMOPLASTIC, PREFORMED, MESSAGE (BIKE)	EA	4		2		3		9		9	
711-14-170	THERMOPLASTIC, PREFORMED, ARROWS (BIKE THRU)	EA	4		2		3		9		9	
711-16-101A	THERMOPLASTIC, STANDARD, OTHER SURFACES, WHITE, SOLID, 6"	LF	1968	1	935		1498		4401	1	4401	1
711-16-103	THERMOPLASTIC, STANDARD, OTHER SURFACES, WHITE, SOLID, 8"	LF	303		418				720		720	
711-16-131A	THERMOPLASTIC, STANDARD, OTHER SURFACES, WHITE, SKIP, 6", 10-30 SKIP OR 3-9 SKIP, 6" WIDE	LF	784	1	2128		1120		4032	1	4032	1
711-16-133A	THERMOPLASTIC, STANDARD, OTHER SURFACES, WHITE, 3-9 DOTTED DROP LINE, 12"	LF			79				79		79	
711-16-201A	THERMOPLASTIC, STANDARD, OTHER SURFACES, YELLOW, SOLID, 6"	LF	963	1	1255		1528		3746	1	3746	1

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/9/25		1 UPDATED QUANTITIES.						

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Pembroke Pines, Florida 33332
ROBERT J. BEHAR, P.E. LICENSE NO. 21755
CERTIFICATE OF AUTHORIZATION NO. 00008365

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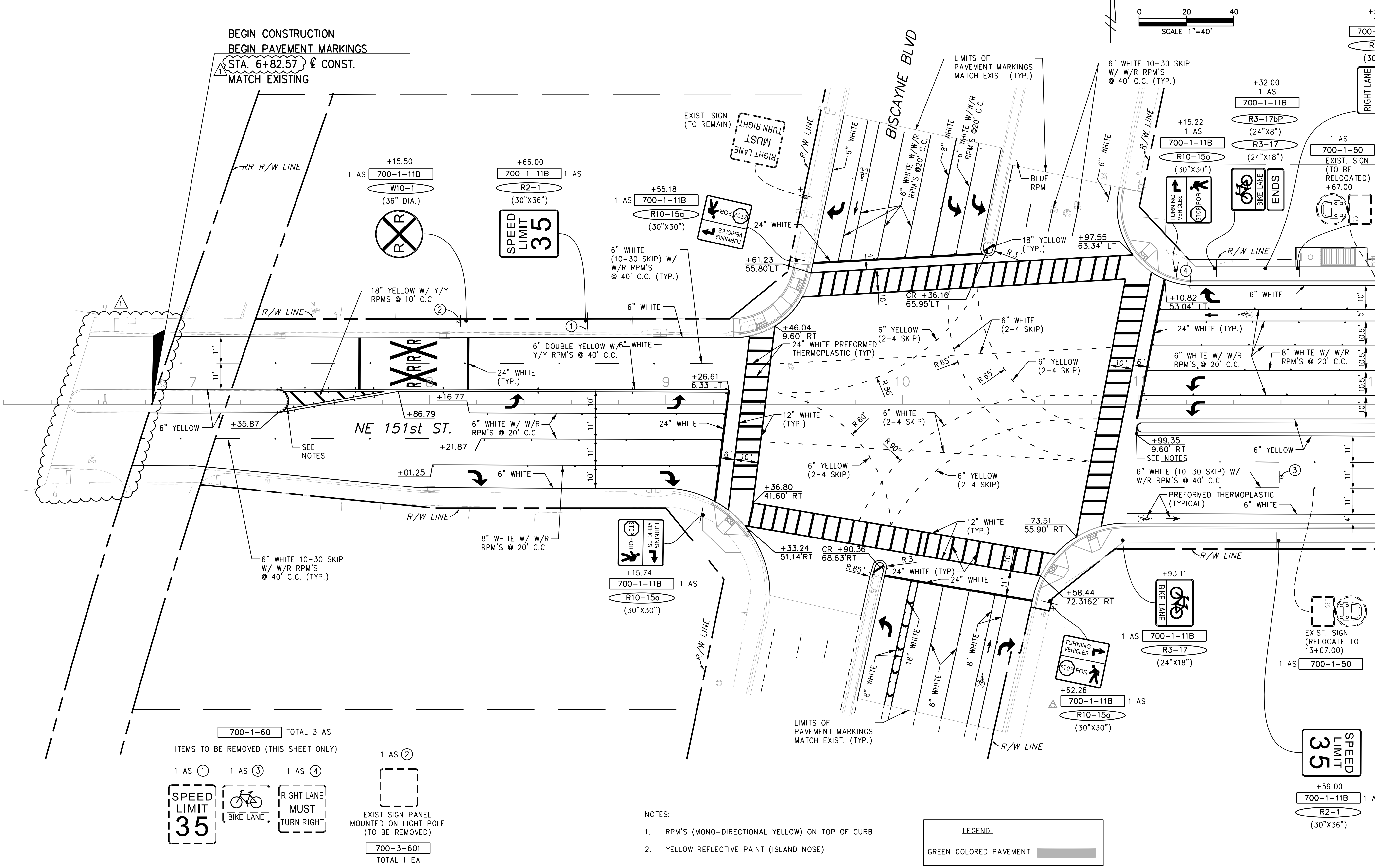
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		

SUPERVISED BY:

MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

SIGNING AND PAVEMENT MARKING QUANTITIES


SCALE 1"=40'
BEGIN CONSTRUCTION
BEGIN PAVEMENT MARKINGS
STA. 6+82.57 ℄ CONST.
MATCH EXISTING
BISCAYNE BLVD
NE 151st ST.
MATCH LINE STA 12+00.00
RR R/W LINE
R/W LINE
+15.50 1 AS 700-1-11B W10-1 (36" DIA.)
+66.00 700-1-11B 1 AS R2-1 (30"X36")
SPEED LIMIT 35
+55.18 1 AS 700-1-11B R10-15a (30"X30")
EXIST. SIGN (TO REMAIN)
RIGHT LANE MUST TURN RIGHT
LIMITS OF PAVEMENT MARKINGS MATCH EXIST. (TYP.)
6" WHITE 10-30 SKIP W/ W/R RPM'S @ 40' C.C. (TYP.)
+32.00 1 AS 700-1-11B R3-17bP (24"X8") R3-17 (24"X18")
+53.30 1 AS 700-1-11B R3-7R (30"X30")
+15.22 1 AS 700-1-11B R10-15a (30"X30")
1 AS 700-1-50 EXIST. SIGN (TO BE RELOCATED) +67.00
BIKE LANE ENDS
TURNING VEHICLES STOP FOR
18" YELLOW W/ Y/Y RPMS @ 10' C.C.
6" WHITE (10-30 SKIP) W/ W/R RPM'S @ 40' C.C. (TYP.)
24" WHITE
6" WHITE W/W/R RPM'S @20' C.C.
8" WHITE W/W/R RPM'S @20' C.C.
BLUE RPM
18" YELLOW (TYP.)
+61.23 55.80' LT
+97.55 63.34' LT
CR +36.16 65.95' LT
+10.82 53.04' LT
6" DOUBLE YELLOW W/ Y/Y RPM'S @ 40' C.C.
24" WHITE (TYP.)
+46.04 9.60' RT
24" WHITE PREFORMED THERMOPLASTIC (TYP)
6" YELLOW (2-4 SKIP)
6" WHITE (2-4 SKIP)
R 65'
R 86'
R 60'
R 90'
+26.61 6.33' LT
+16.77
+86.79
+35.87
6" YELLOW
SEE NOTES
6" WHITE W/ W/R RPM'S @ 20' C.C.
8" WHITE W/ W/R RPM'S @ 20' C.C.
+21.87
+01.25
12" WHITE (TYP.)
+99.35 9.60' RT SEE NOTES
PREFORMED THERMOPLASTIC (TYPICAL)
+36.80 41.60' RT
+73.51 55.90' RT
CR +90.36 68.63' RT
R 3
R 85'
+33.24 51.14' RT
+58.44 72.3162' RT
+15.74 700-1-11B 1 AS R10-15a (30"X30")
6" WHITE 10-30 SKIP W/ W/R RPM'S @ 40' C.C. (TYP.)
+93.11 1 AS 700-1-11B R3-17 (24"X18")
EXIST. SIGN (RELOCATE TO 13+07.00) 1 AS 700-1-50
+62.26 700-1-11B 1 AS R10-15a (30"X30")
+59.00 700-1-11B 1 AS R2-1 (30"X36")
700-1-60 TOTAL 3 AS
ITEMS TO BE REMOVED (THIS SHEET ONLY)
1 AS ① SPEED LIMIT 35
1 AS ③ BIKE LANE
1 AS ④ RIGHT LANE MUST TURN RIGHT
1 AS ② EXIST SIGN PANEL MOUNTED ON LIGHT POLE (TO BE REMOVED)
700-3-601 TOTAL 1 EA

NOTES:

1. RPM'S (MONO-DIRECTIONAL YELLOW) ON TOP OF CURB
2. YELLOW REFLECTIVE PAINT (ISLAND NOSE)

LEGEND	
GREEN COLORED PAVEMENT	

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/9/25		UPDATED LIMITS OF SIGNING & PAVEMENT MARKINGS.						

R.J. Behar & Company, Inc.
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DESIGNED BY			DRAWN BY		
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MIAMI-DADE COUNTY
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
STEPHEN P. CLARK CENTER
111 NW 1 ST
MIAMI, FLORIDA 33128

SIGNING & PAVEMENT MARKING PLANS

F:\24006_NE 151 Street Phasing Plans\CADD\Segment 1\signing\plansp01.DGN dhernandez
10/14/2025 11:22:33 AM

MIAMI-DADE COUNTY DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY DIVISION
NE 151st Street
From Biscayne Blvd to Sole Mia Way
PROJECT NO. N/A SHEET 52 OF 67

0 20 40
SCALE 1"=40'

BEGIN LIGHTING
STA. 8+10.00 ℄ CONST.

BEGIN PROJECT
(STA. 6+82.57) ℄ CONST.

1

R/W LINE

NE 151st ST.

BISCAYNE BLVD

7 8 9 10 11 1

2#6 (A1)
2#6 (A2)
1#6 GR

FPL SERVICE POLE

LOAD CENTER 'A'
240/480V 1-PH 3-W SERVICE
STA. 8+10.00, 42.00 RT
SEE SERVICE POINT DETAIL
MDC STREET LIGHT CIRCUIT

CONNECT NEW CONDUIT & CONDUCTORS TO EXIST. LIGHT POLE PULL BOX

STA 11+40
POLE 1 CKT A1
R/W LINE

3#6

REMOVE EXIST. LIGHT POLE

3#4

3#6

REMOVE EXIST. LIGHT POLE

NO SPLICING IN PULL BOX

EXIST. LIGHT POLE TO BE RELOCATED

STA 10+61
POLE 28 CKT EXIST.

3#4

CONNECT NEW CONDUIT & CONDUCTORS TO EXIST. LIGHT POLE PULL BOX

MATCH LINE STA 12+00.00

NOTE: THE LOAD CENTER FOR THE EXISTING LIGHT POLES ALONG BISCAYNE BLVD. IS LOCATED AT 15050 BISCAYNE BLVD.

REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/09/25		1 UPDATED BEGIN PROJECT LABEL.						

R.J. Behar & Company, Inc.
Engineers • Planners
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DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		
SUPERVISED BY:					

MIAMI-DADE COUNTY
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STEPHEN P. CLARK CENTER
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MIAMI, FLORIDA 33128

LIGHTING PLAN

10/14/2025 11:25:19 AM F:\24006_NE 151 Street Phasing Plans\CADD\Segment 1\lighting\PLANLT01.DGN dhernandez