



April 1, 2019

Rookery Bay National Estuarine Research Reserve
Mr. Jeffery Carter
300 Tower Road
Naples, FL 34113

RE: Fruit Farm Creek Project – Task Deliverables Agreement Number R1804

Dear Jeff,

Coastal Resources Group, Inc. (CRG) is pleased to submit the following deliverables as required and scheduled in Agreement Number R1804 for the Fruit Farm Creek Mangrove Restoration Project. J.R. Evans Engineering has prepared in full the following deliverables.

Task 6. Structural Design of Culverts and Wing Walls

Task 7. Maintenance of Traffic Design to accommodate traffic throughout the project construction.

Please feel free to contact me if you should have any questions regarding these deliverables.

Sincerely,

Laura L. Flynn

Laura L. Flynn
Coastal Resources Group, Inc.

Cc: Curtis Kruer, Vice-President, CRG
Josh Evans, President, J.R. Evans Engineering Inc.

GENERAL NOTES AND DESIGN CRITERIA

010000 GENERAL NOTES:
THE CONTRACTOR SHALL USE A COMPLETE, AND UP TO DATE SET OF CONSTRUCTION DOCUMENTS WHICH INCLUDES DOCUMENTS ISSUED BY OTHERS.

DIMENSIONS AND CONDITIONS SHALL BE FIELD VERIFIED. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO PROCEEDING.

THE STRUCTURE IS DESIGNED FOR THE CONDITION OF THE RETAINING WALL IN A COMPLETED STATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY BRACING, GUYING, SHORING, SHEETING, TIEDOWNS OR OTHER MEANS AS REQUIRED TO AVOID EXCESSIVE STRESSES, MAINTAIN THE STABILITY OF THE STRUCTURE, AND SAFEGUARD THE WELFARE OF PERSONNEL DURING CONSTRUCTION.

THE STRUCTURAL ENGINEER SHALL NOT HAVE CONTROL OR BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, PROCEDURES OR SEQUENCES, FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, OR ANY OTHER PERSONS PERFORMING THE WORK, OR FOR THE FAILURE OF ANY ENTITY TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

013316 DESIGN CRITERIA:
STRUCTURAL DOCUMENTS ARE PREPARED IN COMPLIANCE WITH THE 2017 FLORIDA BUILDING CODE (F.B.C.), 6th EDITION BUILDING AND EXISTING BUILDING.

LOADING DESIGN CRITERIA:

SURCHARGE BEHIND WALL: 100 PSF
HS 20 AXLE LOAD: 32,000 KIPS

WIND LOADS (F.B.C. SECTION 1609, ASCE 7-10):
ULTIMATE DESIGN WIND SPEED = 155 MPH
NOMINAL DESIGN WIND SPEED = 120 MPH
RISK CATEGORY = I
WIND EXPOSURE = CATEGORY C
ENCLOSURE CLASSIFICATION = N/A
INTERNAL PRESSURE COEFFICIENTS = N/A
NOMINAL COMPONENT & CLADDING PRESSURES: +/- 44 psf

MATERIAL DESIGN CRITERIA:

CONCRETE: $f_c = 3000$ PSI

REINFORCING STEEL:
PLAIN DEFORMED BARS: ASTM A615, GR. 60

FOUNDATION DESIGN:
PRESUMPTIVE ALLOWABLE BEARING PRESSURE = 2000 PSF
(SEE SECTION 018201 FOR GEOTECHNICAL REQUIREMENTS)

018201 SHALLOW FOUNDATION SYSTEMS:
FOUNDATIONS ARE DESIGNED FOR AN ASSUMED NET ALLOWABLE SOIL BEARING PRESSURE AS STATED IN THE DESIGN CRITERIA, SECTION 013316. PRIOR TO CONSTRUCTION, VERIFY THE ABOVE BY MEANS OF A SUBSURFACE INVESTIGATION, FIELD TESTS AND CERTIFIED LABORATORY TESTS. A SITE PREPARATION PROGRAM SHALL BE IMPLEMENTED UNDER THE WRITTEN DIRECTION OF A FLORIDA LICENSED GEOTECHNICAL ENGINEER AS REQUIRED TO ACHIEVE THE ABOVE-STATED ALLOWABLE BEARING CAPACITY. SUBMIT A WRITTEN GEOTECHNICAL REPORT TO THE ENGINEER OF RECORD FOR REVIEW PRIOR TO CONSTRUCTION.

0018202 SHALLOW FOUNDATION SYSTEMS:
SITE PREPARATION AND FOUNDATION INSTALLATION SHALL COMPLY WITH THE GEOTECHNICAL REPORT FOR THIS PROJECT. SEE DESIGN CRITERIA SECTION 013316 FOR REPORT INFORMATION.

030000 CONCRETE:
CONCRETE SHALL BE PLACED AND CURED IN ACCORDANCE WITH ACI STANDARDS AND SPECIFICATIONS. SUBMIT PROPOSED MIX DESIGNS TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL. EACH MIX SHALL BE UNIQUELY IDENTIFIED BY MIX NUMBER. THE INTENDED LOCATION OF PLACEMENT OF EACH MIX DESIGN SHALL BE CLEARLY STATED. PROVIDE THREE QUARTER (0.75) INCH CHAMFER AT ALL EXPOSED CORNERS OF BEAMS, WALLS ETC, UNLESS OTHERWISE NOTED.

031000 CONCRETE FORMWORK:
FORMWORK FOR STRUCTURAL CONCRETE SHALL NOT BE REMOVED UNTIL THE CONCRETE HAS ATTAINED AT LEAST TWO-THIRDS OF THE SPECIFIED 28 DAY DESIGN STRENGTH.

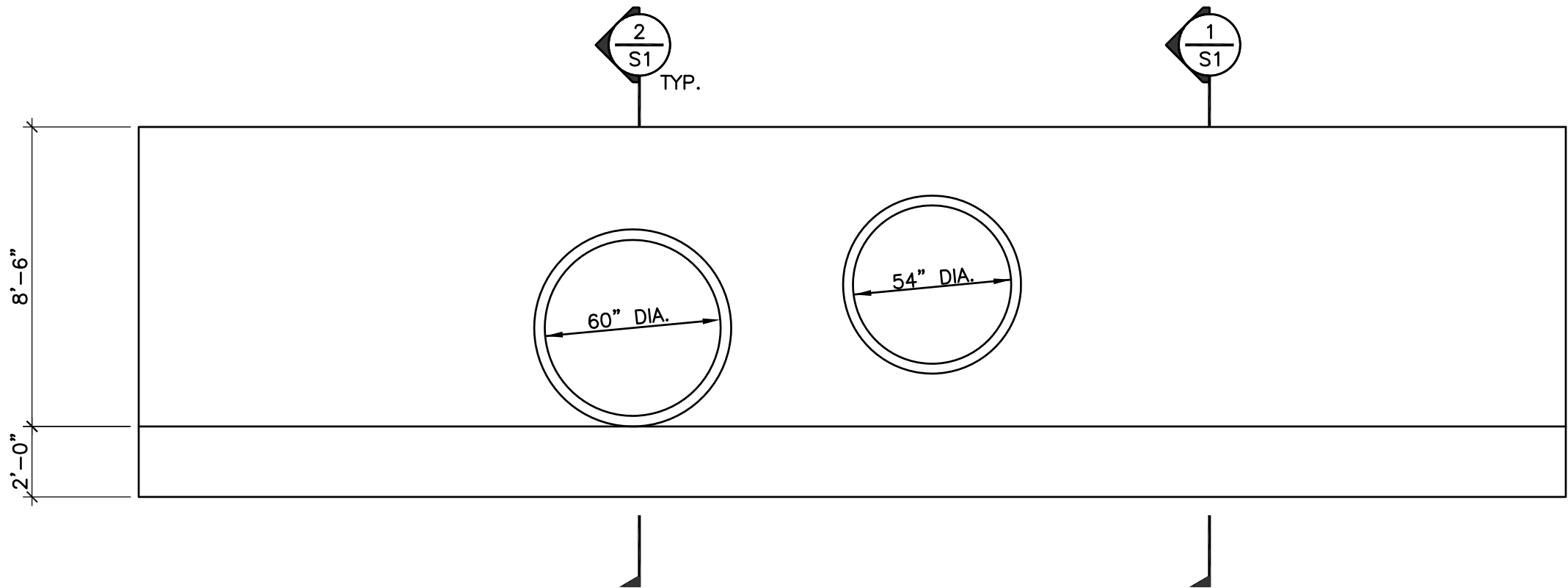
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PENETRATIONS SHALL NOT BE PERMITTED IN ANY STRUCTURAL MEMBERS OTHER THAN THOSE SPECIFICALLY INDICATED ON THE STRUCTURAL DRAWINGS WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER OF RECORD. THE CONTRACTOR SHALL SUBMIT DRAWINGS TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL INDICATING ANY CONCENTRATION OF PIPES, OPENINGS OR PENETRATIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS PRIOR TO CONCRETE POURS.

T.O. WALL
NAVD +3'-0"

INVERT ELEV.
NAVD -4'-0"

INVERT ELEV.
NAVD -5'-6"



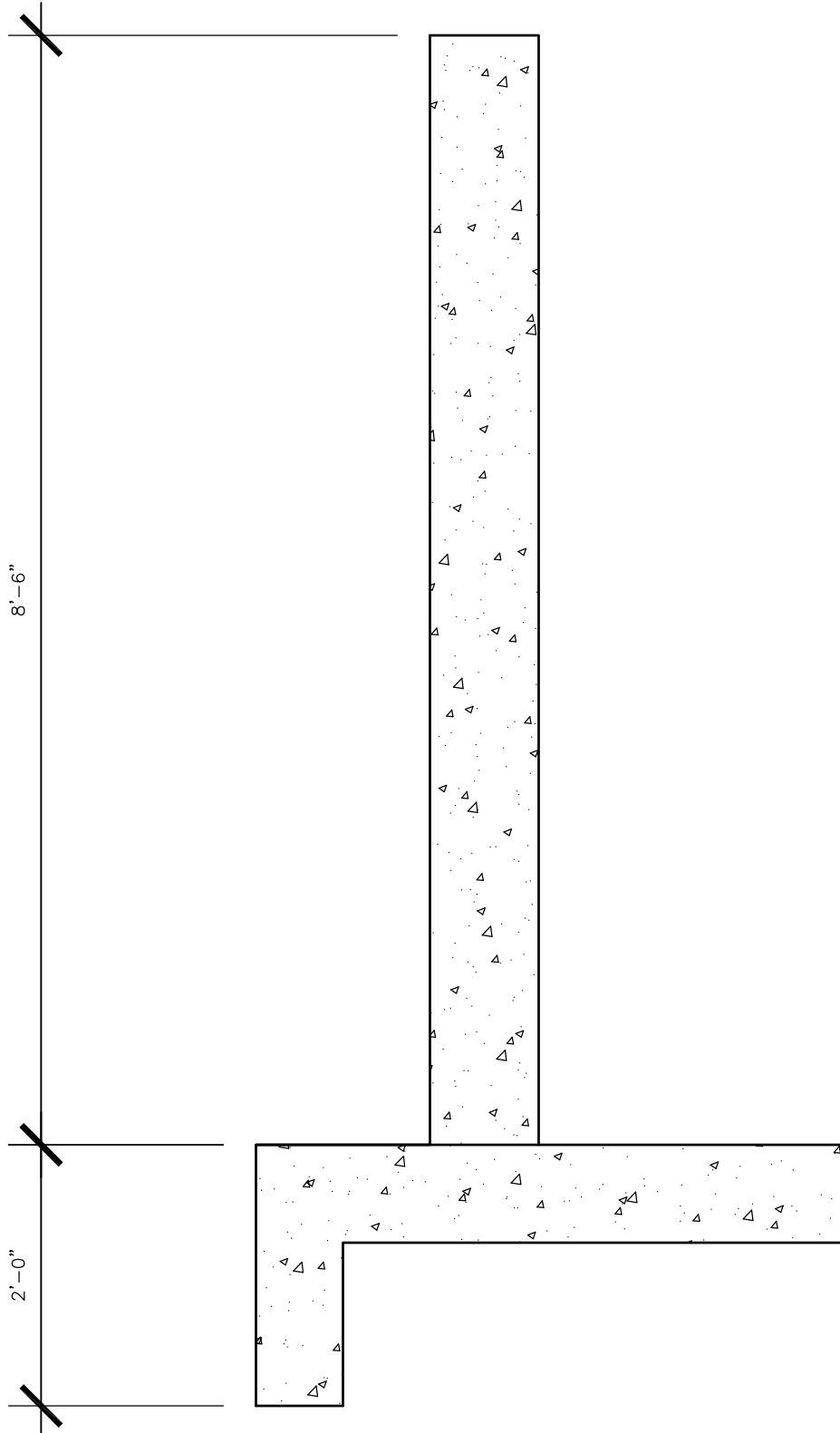
HALF ELEVATION
(SHOWING BARS FRONT
FACE OF WALL)

SCALE: $\frac{3}{8}" = 1'-0"$

HALF ELEVATION
(SHOWING BARS BACK
FACE OF WALL)

SCALE: $\frac{3}{8}" = 1'-0"$

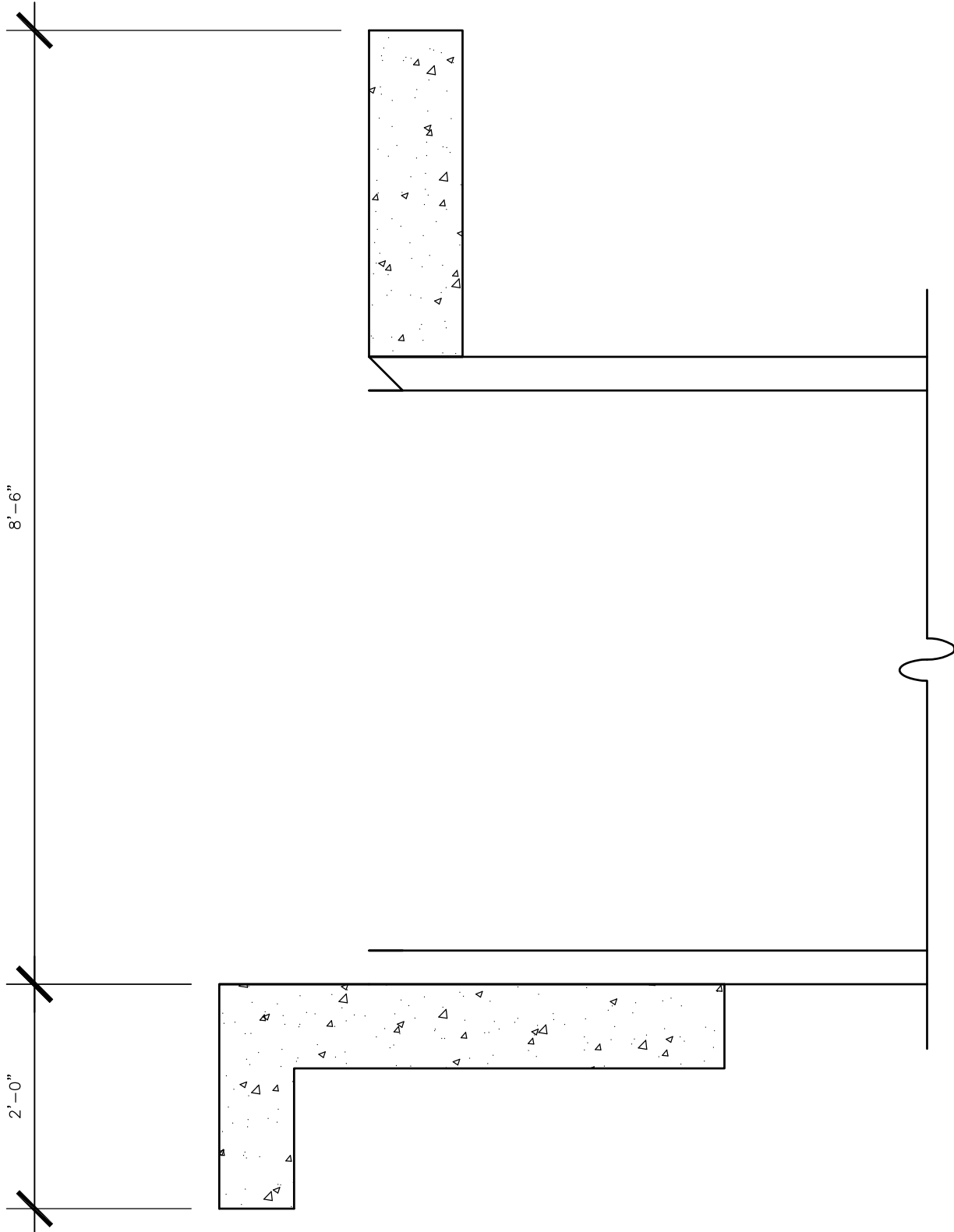
T.O. WALL
SEE ELEV.



SECTION
SCALE: 1" = 1'-0"

1
S1

T.O. WALL
SEE ELEV.



SECTION
SCALE: 1" = 1'-0"

2
S1

REVISIONS:



FRUIT FARM CREEK
San Marco Road, Marco Island, FL 34145

PROJECT TITLE:

SHEET TITLE:
RETAINING WALL

BRB
BRB STRUCTURES, INC.
10000 W. Main Street, Suite 201, Fort Myers, FL 33906
Ph: 239-777-7777 | info@brbstructures.com | CA No. 00000000

BRS Job No.: 19-004

TO THE BEST OF MY KNOWLEDGE AND ABILITY, THE
COMPLETED STRUCTURE DEPICTED ON THESE PLANS
COMPLIES WITH THE FLORIDA BUILDING CODE WITH ALL
SUPPLEMENTS INCLUDING CHAPTER 16 (DESIGN LOADS).

DRAWN: SMD

CHECKED: RSR

DATE: 4-1-19

SHEET NO.:

S1

Robert S. Rude, P.E.
Florida Reg. #44553

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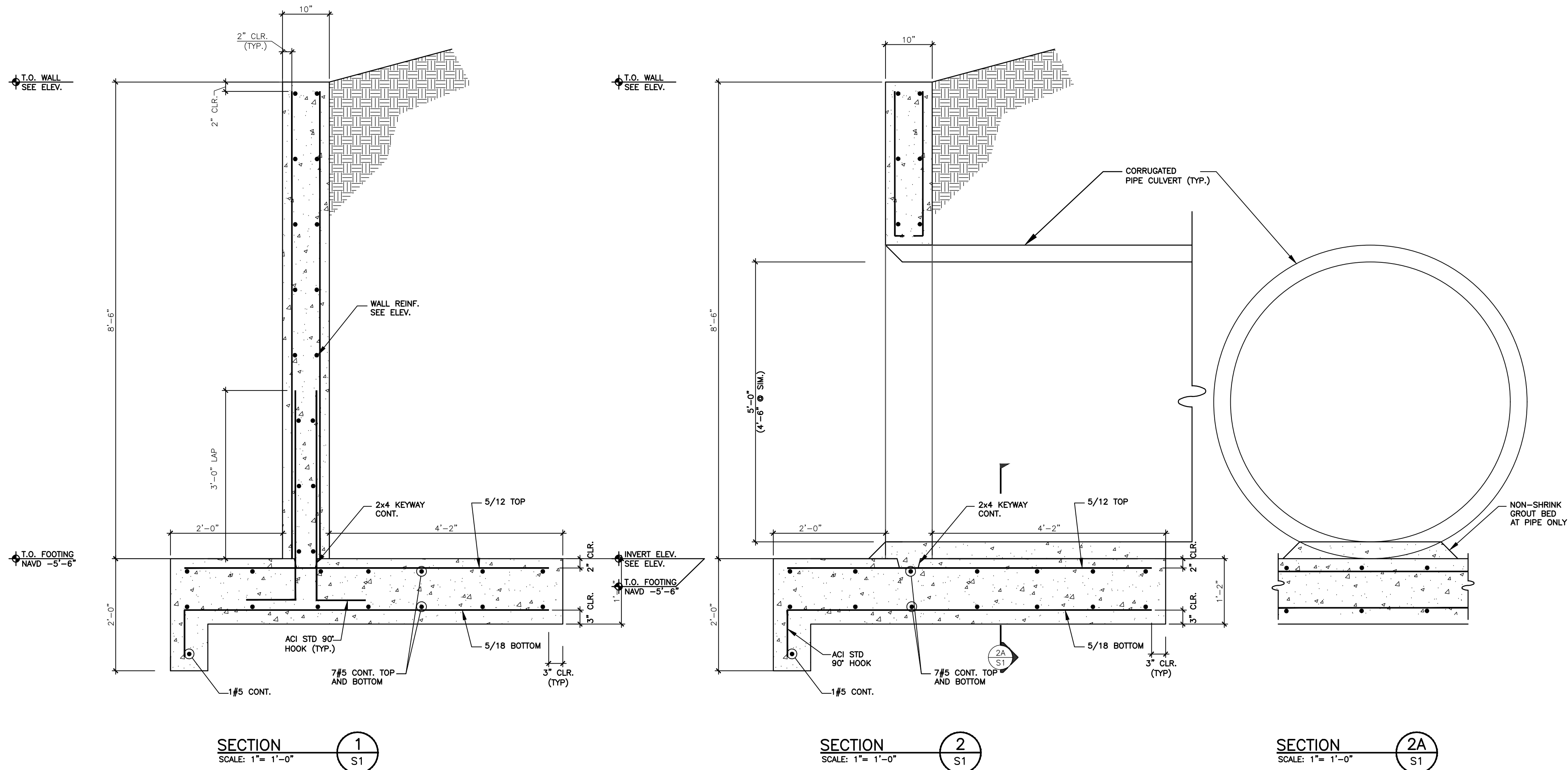
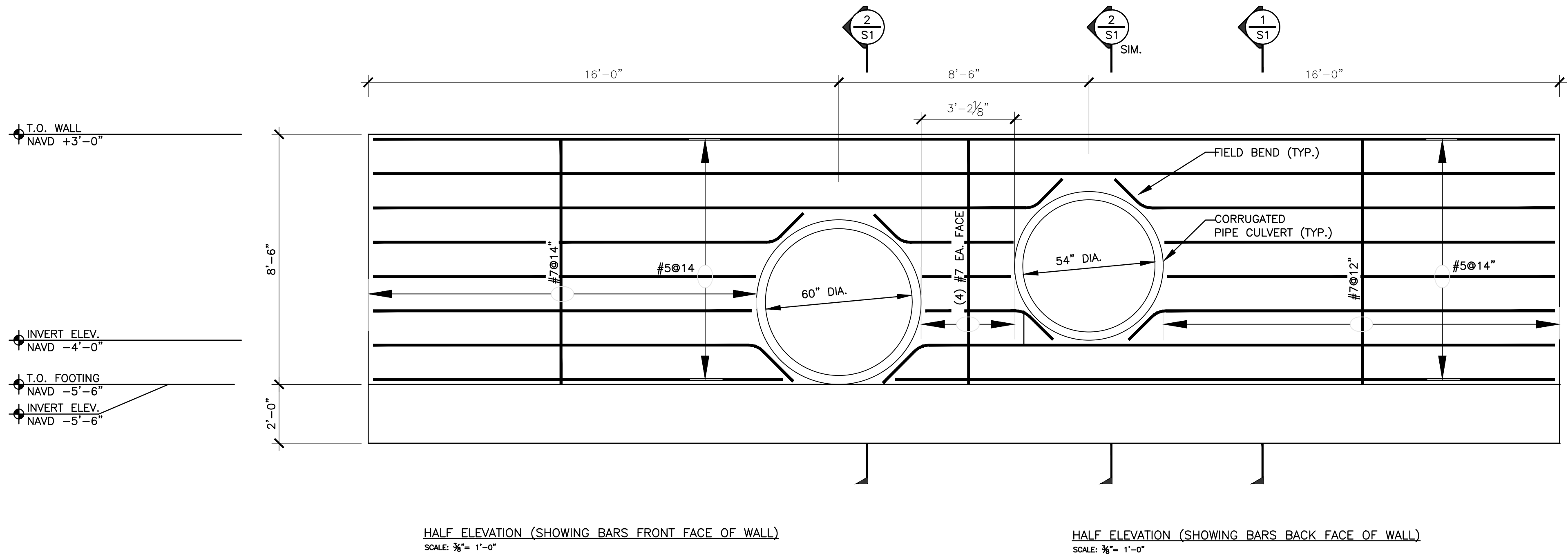
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PROGRESS DRAWINGS
NOT FOR CONSTRUCTION
2 APRIL 2019

Robert S. Rude, P.E.
Florida Reg. #44553

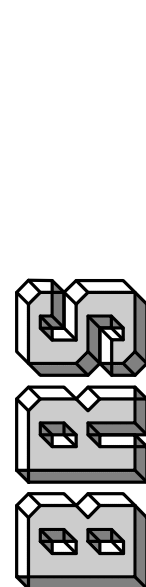
REVISIONS:

FRUIT FARM CREEK
San Marco Road, Marco Island, FL 34145

RETAINING WALL

PROJECT TITLE:

SHEET TITLE:



ROBERT S. RUDE STRUCTURES, INC.
10000 S.W. 11th Street, Suite 100, Fort Lauderdale, FL 33334
ph: 352-377-7771 | www.rudestructures.com | C.A. No. 8019

BRS Job No.: 19-004

TO THE BEST OF MY KNOWLEDGE AND ABILITY, THE DESIGN AND CONSTRUCTION OF THIS PROJECT COMPLIES WITH THE 2017 6TH EDITION FLORIDA BUILDING CODE WITH ALL SUPPLEMENTS INCLUDING CHAPTER 16 (DESIGN LOADS).

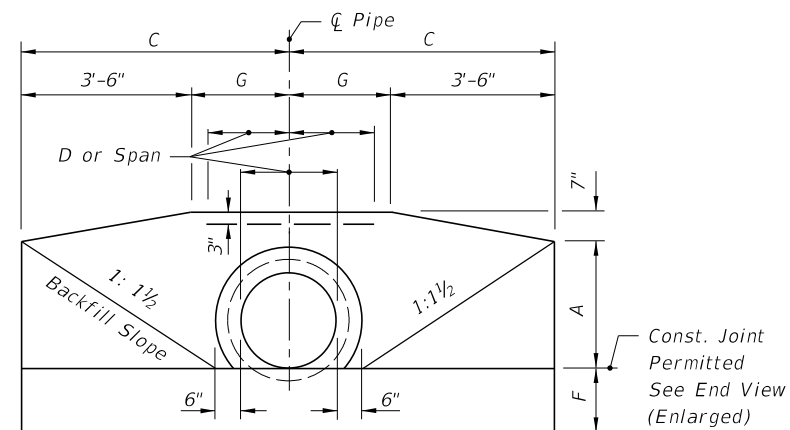
DRAWN: SMD

CHECKED: RSR

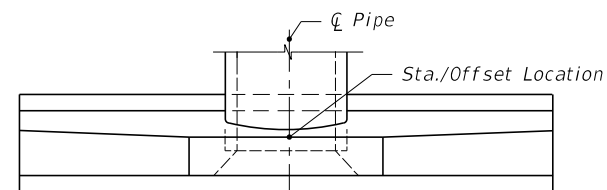
DATE: XX-XX-XXXX

SHEET NO.:

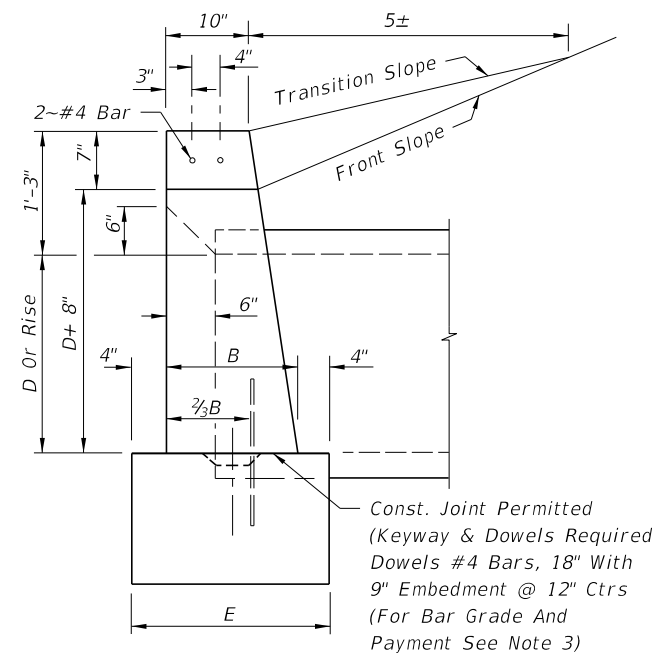
S1



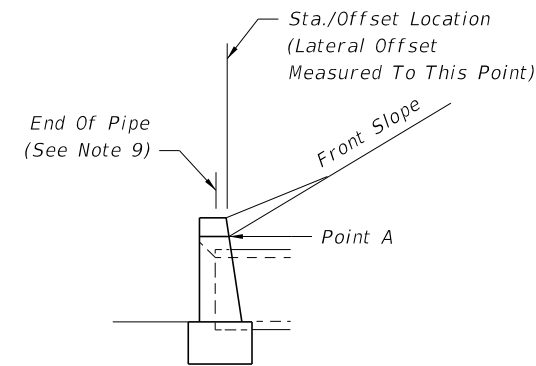
FRONT VIEW



TOP VIEW



END VIEW (ENLARGED)



END VIEW

1. Position is set by the intersection of the front slope and Point A where this intersection falls outside the clear zone.
2. Where the front slope and Point A intersects inside the clear zone, the endwall is positioned so the Station/Offset Location is at the clear zone limit. The front slope is transitioned to the endwall as shown in Index 430-001.

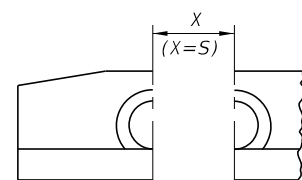
STANDARD LOCATION CONTROL

GENERAL NOTES

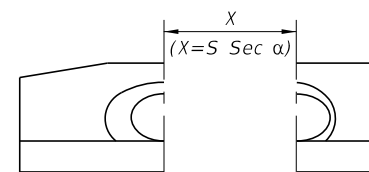
1. Endwall dimensions, locations and positions are for round and elliptical concrete pipe and for round and pipe-arch corrugated metal pipe. Round concrete pipe shown.
2. Front slope and ditch transitions shall be in accordance with Index 430-001.
3. Endwalls may be cast in place or precast concrete. Reinforcing steel shall be Grades 40 or 60. Additional reinforcement necessary for handling precast units shall be determined by the Contractor or the supplier. Cost of reinforcement shall be included in the contract unit price for Concrete, (Endwalls).
4. All exposed corners and edges of concrete are to be chamfered $\frac{3}{4}$ ".
5. Concrete shall be Class I, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
6. On outfall ditches with side slopes flatter than 1:1 $\frac{1}{2}$ provide 20' transitions from the endwall to the flatter side slopes, right of way permitting.
7. For sodding around endwalls see Index 524-001.
8. Payment for concrete quantities for endwalls skewed to the pipe shall be made on the following basis:

Endwall Skew to Pipe	Use Tabulated Value
0° to 5°	0°
6°	15°
16°	30°
31° or over	45°
9. Pipe length plan quantities shall be based on the pipe end locations shown in the standard location control end view, or lengths based on special endwall locations called for in the plans.
10. Payment for pipe in pipe culverts shall be based on plan quantities, adjusted for endwall locations subsequently established by the Engineer.
11. Endwalls to be paid for under the contract unit price for Class I Concrete (Endwalls), CY.

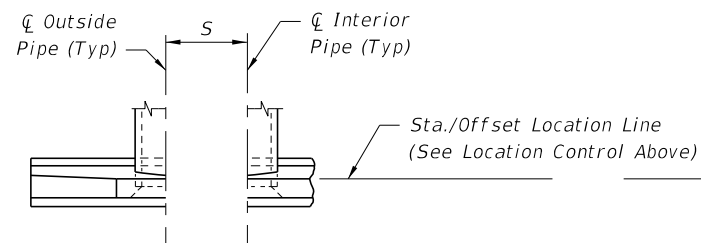
ENDWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)



FRONT VIEW

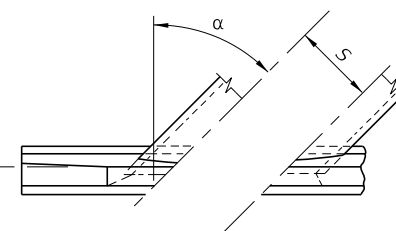


FRONT VIEW



TOP VIEW

NORMAL PIPE



TOP VIEW

SKEWED PIPE

LEGEND

- α Pipe Skew
- S Center To Center Pipe Spacing
- X Centerline To Centerline Dimension At Face Of Headwall

PIPE AND SPACING FOR MULTIPLE PIPE ENDWALL POSITIONS FOR SINGLE AND MULTIPLE

10/24/2018 8:58:44 AM

LAST REVISION 11/01/17	DESCRIPTION:	FY 2019-20 STANDARD PLANS	STRAIGHT CONCRETE ENDWALLS SINGLE AND MULTIPLE PIPE	INDEX 430-030	SHEET 1 of 2
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DATA AND ESTIMATED QUANTITIES FOR ONE ENDWALL

ROUND CONCRETE AND CORRUGATED METAL PIPE

D	Opening Area (SF)				Dimensions										Class I Concrete (CY)																												D
															Number And Type Of Pipe And Skew Angle Of Pipe																												
															Single		Double								Triple								Quadruple										
	Number Of Pipes				A	B	C	E	F	G	S	X				Conc	Metal	Concrete				Metal				Concrete				Metal				Concrete				Metal					
	1	2	3	4									0°	15°	30°	45°	0°	0°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°					
15"	1.23	2.46	3.69	4.92	1'-11"	1'-2"	4'-0"	1'-10"	1'-2"	0'-6"	2'-7"	2'-7"	2'-8"	3'-0"	3'-8"	1.23	1.24	1.59	1.60	1.65	1.74	1.62	1.63	1.68	1.78	1.94	1.96	2.05	2.23	1.99	2.02	2.11	2.30	2.30	2.34	2.47	2.74	2.37	2.41	2.75	2.84	15"	
18"	1.77	3.54	5.31	7.08	2'-2"	1'-3"	4'-6"	1'-11"	1'-3"	1'-0"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.56	1.59	1.99	2.01	2.06	2.17	2.04	2.06	2.11	2.23	2.43	2.46	2.56	2.79	2.51	2.54	2.65	2.89	2.86	2.91	3.06	3.40	2.96	3.01	3.17	3.53	18"	
21"	2.41	4.82	7.23	9.64	2'-5"	1'-4"	5'-0"	2'-0"	1'-4"	1'-6"	3'-2"	3'-2"	3'-3"	3'-8"	4'-6"	1.97																										21"	
24"	3.14	6.28	9.42	12.56	2'-8"	1'-4"	5'-6"	2'-0"	1'-4"	2'-0"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"	2.24	2.29	2.82	2.84	2.91	3.06	2.91	2.93	3.01	3.17	3.39	3.43	3.57	3.87	3.52	3.56	3.71	4.03	3.97	4.03	4.24	4.69	4.14	4.20	4.43	4.91	24"	
27"	3.98	7.96	11.94	15.92	2'-11"	1'-5"	6'-0"	2'-1"	1'-5"	2'-6"	3'-10"	3'-10"	4'-0"	4'-5"	5'-5"	2.73																										27"	
30"	4.91	9.82	14.73	19.64	3'-2"	1'-6"	6'-6"	2'-2"	1'-6"	3'-0"	4'-3"	4'-3"	4'-5"	4'-11"	6'-0"	3.26	3.34	4.13	4.16	4.26	4.49	4.28	4.31	4.43	4.67	4.98	5.04	5.25	5.69	5.20	5.27	5.49	5.97	5.84	5.93	6.24	6.91	6.13	6.23	6.56	7.29	30"	
36"	7.07	14.14	21.21	28.28	3'-8"	1'-8"	7'-6"	2'-4"	1'-8"	4'-0"	5'-1"	5'-1"	5'-3"	5'-10"	7'-2"	4.53	4.64	5.73	5.77	5.92	6.23	5.95	6.00	6.15	6.49	6.92	7.00	7.29	7.91	7.25	7.34	7.65	8.33	8.13	8.26	8.69	9.62	8.57	8.71	9.18	10.20	36"	
42"	9.62	19.24	28.86	38.48	4'-2"	1'-10"	8'-6"	2'-6"	2'-0"	5'-0"	6'-0"	6'-0"	6'-3"	6'-11"	8'-6"	6.33	6.49	8.11	8.17	8.39	8.85	8.43	8.50	8.73	9.23	9.90	10.02	10.45	11.38	10.38	10.52	10.98	11.99	11.68	11.87	12.51	13.89	12.32	12.52	13.22	14.73	42"	
48"	12.57	25.14	37.71	50.28	4'-8"	2'-1"	9'-6"	2'-9"	2'-0"	6'-0"	6'-9"	6'-9"	7'-0"	7'-10"	9'-7"	8.15	8.38	10.40	10.48	10.75	11.33	10.85	10.94	11.23	11.87	12.64	12.80	13.34	14.50	13.34	13.51	14.11	15.39	14.89	15.13	15.93	17.68	15.82	16.08	16.97	18.90	48"	
54"	15.90	31.80	47.70	63.60	5'-2"	2'-6"	10'-6"	3'-2"	2'-3"	7'-0"	7'-8"	7'-8"	7'-11"	8'-10"	10'-10"	11.71	11.77	15.23	15.35	15.78	16.69	15.35	15.48	15.90	16.83	18.77	19.02	19.86	21.69	18.93	19.18	20.04	21.89	22.29	22.66	23.93	26.67	22.51	22.89	24.17	26.96	54"	

CORRUGATED METAL PIPE ARCH

CORRUGATED METAL PIPE ARCH																																				
Span	Rise	Opening Area (SF)				Dimensions												Class I Concrete (CY)																Span	Rise	Approx. Equiv. Round Pipe
																		Number Of Pipe And Skew Angle Of Pipe																		
		Number Of Pipes				A	B	C	E	F	G	S	X				Single	Double				Triple				Quadruple										
		1	2	3	4								0°	15°	30°	45°		0°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°						
17"	13"	1.1	2.2	3.3	4.4	1'-9"	1'-2"	3'-10"	1'-10"	1'-2"	0'-4"	2'-6"	2'-6"	2'-7"	2'-11"	3'-6"	1.16	1.47	1.48	1.52	1.60	1.78	1.80	1.88	2.04	2.09	2.12	2.23	2.48	17"	13"	15"				
21"	15"	1.6	3.2	4.8	6.4	1'-11"	1'-2"	4'-3"	1'-10"	1'-2"	0'-9"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.33	1.69	1.70	1.75	1.84	2.04	2.06	2.15	2.33	2.40	2.44	2.57	2.84	21"	15"	18"				
28"	20"	2.8	5.6	8.4	11.2	2'-4"	1'-3"	5'-2"	1'-11"	1'-3"	1'-8"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"	1.78	2.31	2.33	2.39	2.53	2.83	2.87	2.99	3.26	3.36	3.42	3.60	4.01	28"	20"	24"				
35"	24"	4.3	8.6	12.9	17.2	2'-8"	1'-4"	5'-11½"	2'-0"	1'-4"	2'-5½"	4'-0"	4'-0"	4'-2"	4'-7"	5'-8"	2.34	3.03	3.05	3.14	3.32	3.72	3.77	3.93	4.29	4.40	4.47	4.72	5.25	35"	24"	30"				
42"	29"	5.9	11.8	17.7	23.6	3'-1"	1'-5"	6'-10½"	2'-1"	1'-5"	3'-4½"	4'-9"	4'-9"	4'-11"	5'-6"	6'-9"	3.13	4.06	4.09	4.20	4.45	4.99	5.06	5.28	5.76	5.93	6.03	6.36	7.09	42"	29"	36"				
49"	33"	8.4	16.8	25.2	33.6	3'-5"	1'-6"	7'-8"	2'-2"	1'-6"	4'-2"	5'-6"	5'-6"	5'-8"	6'-4"	7'-9"	3.83	5.00	5.04	5.18	5.48	6.16	6.24	6.52	7.12	7.32	7.44	7.86	8.76	49"	33"	42"				
57"	38"	10.6	21.2	31.8	42.4	3'-10"	1'-7"	8'-7½"	2'-3"	1'-7"	5'-1½"	6'-4"	6'-4"	6'-7"	7'-4"	8'-11"	4.87	6.31	6.36	6.53	6.91	7.74	7.84	8.18	8.93	9.18	9.33	9.85	10.96	57"	38"	48"				
64"	43"	13.2	26.4	39.6	52.8	4'-3"	1'-8"	9'-6½"	2'-4"	1'-8"	6'-0½"	7'-1"	7'-1"	7'-4"	8'-2"	10'-0"	5.88	7.64	7.70	7.91	8.37	9.40	9.52	9.94	10.86	11.15	11.33	11.97	13.33	64"	43"	54"				
71"	47"	16.9	33.8	50.7	67.6	4'-7"	1'-10"	10'-4"	2'-6"	2'-0"	6'-10"	7'-10"	7'-10"	8'-1"	9'-1"	11'-1"	7.80	10.15	10.23	10.51	11.12	12.49	12.65	13.22	14.43	14.85	15.10	15.94	17.77	71"	47"	60"				

Note: Use the guidelines of General Note 8 for selecting tabular quantities.

CONCRETE ELLIPTICAL PIPE

CONCRETE ELLIPTICAL PIPE																																		
Rise	Span	Opening Area (SF)				Dimensions										Class I Concrete (CY)																Rise	Span	Approx. Equiv. Round Pipe
																Number Of Pipe And Skew Angle Of Pipe																		
		Number Of Pipes				A	B	C	E	F	G	S	X				Single	Double				Triple				Quadruple								
		1	2	3	4								0°	15°	30°	45°		0°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°				
12"	18"	1.3	2.6	3.9	5.2	1'-8"	1'-2"	3'-9"	1'-10"	1'-2"	0'-3"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.09	1.45	1.46	1.51	1.60	1.80	1.82	1.91	2.09	2.16	2.20	2.33	2.60	12"	18"	15"		
14"	23"	1.8	3.6	5.4	7.2	1'-10"	1'-3"	4'-2½"	1'-11"	1'-3"	8½"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"	1.36	1.82	1.84	1.89	2.01	2.29	2.32	2.43	2.68	2.75	2.80	2.97	3.33	14"	23"	18"		
19"	30"	3.3	6.6	9.9	13.2	2'-3"	1'-4"	5'-1½"	2'-0"	1'-4"	1'-7½"	4'-2"	4'-2"	4'-4"	4'-10"	5'-11"	1.89	2.55	2.57	2.65	2.82	3.22	3.27	3.43	3.77	3.88	3.95	4.19	4.70	19"	30"	24"		
24"	38"	5.1	10.2	15.3	20.4	2'-8"	1'-5"	6'-3"	2'-1"	1'-5"	2'-9"	5'-2"	5'-2"	5'-4"	6'-0"	7'-4"	2.64	3.55	3.58	3.69	3.93	4.48	4.54	4.77	5.24	5.39	5.49	5.82	6.53	24"	38"	30"		
29"	45"	7.4	14.8	22.2	29.6	3'-1"	1'-6"	7'-0"	2'-2"	1'-6"	3'-6"	6'-0"	6'-0"	6'-3"	6'-11"	8'-6"	3.32	4.48	4.52	4.66	4.96	5.64	5.72	6.00	6.60	6.80	6.92	7.34	8.24	29"	45"	36"		
34"	53"	10.2	20.4	30.6	40.8	3'-6"	1'-7"	7'-11½"	2'-3"	1'-7"	4'-5½"	7'-1"	7'-1"	7'-4"	8'-2"	10'-0"	4.24	5.76	5.81	6.00	6.39	7.29	7.40	7.76	8.55	8.81	8.97	9.52	10.70	34"	53"	42"		
38"	60"	12.9	25.8	38.7	51.6	3'-10"	1'-8"	8'-9"	2'-4"	1'-8"	5'-3"	7'-11"	7'-11"	8'-2"	9'-2"	11'-2"	5.22	7.16	7.23	7.46	7.96	9.10	9.24	9.70	10.71	11.05	11.25	11.95	13.46	38"	60"	48"		
43"	68"	16.6	33.2	49.8	66.4	4'-3"	1'-10"	9'-8½"	2'-6"	1'-10"	6'-2½"	8'-10"	8'-10"	9'-2"	10'-2"	12'-6"	6.63	9.01	9.09	9.38	10.00	11.39	11.56	12.13	13.36	13.77	14.02	14.88	16.73	43"	68"	54"		
48"	76"	20.5	41.0	61.5	82.0	4'-8"	2'-1"	10'-8"	2'-9"	2'-0"	7'-2"	9'-9"	9'-9"	10'-1"	11'-3"	13'-9"	8.66	11.74	11.85	12.22	13.02	14.82	15.04	15.77	17.37	17.91	18.23	19.34	21.74	48"	76"	60"		
53"	83"	24.8	49.6	74.4	99.2	5'-1"	2'-6"	11'-7"	3'-2"	2'-6"	8'-1"	10'-7"	10'-7"	10'-11"	12'-3"	15'-0"	12.50	16.98	16.98	17.67	18.83	21.47	21.78	22.86	25.18	25.97	26.44	28.06	31.55	53"	83"	66"		
58"	91"	29.5	59.0	88.5	118.0	5'-6"	2'-10"	12'-6½"	3'-6"	2'-10"	9'-0½"	11'-4"	11'-4"	11'-9"	13'-1"	16'-0"	16.46	22.26	22.46	23.16	24.66	28.05	28.46	29.85	32.85	33.85	34.46	36.55	41.05	58"	91"	72"		



HP Storm Pipe 12"–60"



THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS™



HP STORM PIPE 12"–60" FOR STORM APPLICATIONS

Overview

An addition to our proven line of pipe products, HP Storm is a high-performance polypropylene (PP) pipe for gravity-flow storm drainage applications. HP Storm is the perfect choice when premium joint performance and/or greater pipe stiffness is required. HP Storm couples advanced polypropylene resin technology with a proven, dual-wall profile design for superior performance and durability.

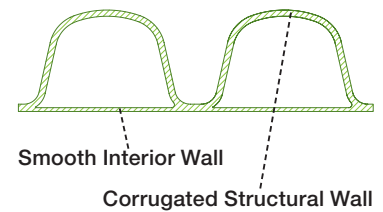
Specify HP Storm with confidence based on national standards and approvals. This innovative product meets or exceeds ASTM F2881 and AASHTO M330. From a federal perspective, polypropylene pipe is approved for use by the Army Corps of Engineers for storm drainage applications under Section 33 40 00 (Unified Facilities Guide Specifications). The Federal Aviation Authority (FAA) permits polypropylene pipe under airfield pavements per Item D-701, Pipe for Storm Drains and Culverts in AC 150/5370-10G (Standards for Specifying Construction of Airports). Additionally, the American Railway Engineering and Maintenance-of-Way Association (AREMA) approves polypropylene pipe in storm drainage applications under railroads.

Advanced Dual Wall Profile Construction

12"-60" (300 - 1500 mm) diameter HP Storm pipe utilizes an enhanced dual wall construction, providing increased pipe stiffness. The additional stiffness and beam strength enhances jobsite performance in stringent line and grade requirements. The pipe profile is completed with a smooth interior which provides additional strength and excellent flow characteristics.

Superior Polypropylene Material

Made from an engineered impact modified co-polymer compound, the superior strength and material properties of polypropylene offer robust pipe stiffness, excellent handling characteristics, and long service life when compared to traditional storm sewer products. It is highly resistant to chemical attack and is unaffected by soils or effluents with PH ranges 1.5 to 14. The unique light grey resin color provides immediate jobsite recognition as well as improving the pipe's interior visibility during post-installation inspection.



Interior View



Polypropylene Resin

Superior Joint Performance

HP Storm pipe has an extended bell that adds an additional factor of safety within each joint. The joint performance meets or exceeds the 10.8 psi laboratory performance standards per ASTM D3212 requirements. Third party certification of joint performance is available upon request.

In the field, each section of HP Storm may be tested by a low pressure air test, according to ASTM F1417, which is a commonly used standard and specifies that 3.5 psi air pressure be held for a specified length of time based upon pipe diameter and length of run.

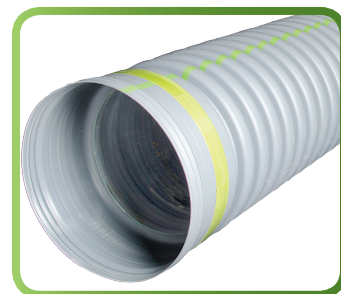
Where an infiltration/exfiltration test is preferred, ASTM F2487 specifies a simplistic method of verifying proper joint performance.

Fittings

Both standard and custom fittings are available for the HP Storm product line. A complete line of standard Nyloplast PVC molded fittings are available in the 12"–30" (300-750mm) mainline sizes. Standard branch laterals are designed to accept SDR-35 or SDR-26 pipe.

Diameter Range

HP Storm is currently manufactured in the 12"–60" (300-1500mm) size range and in 20-foot (6m) lengths. The 20-foot (6m) lengths aid in speed of installation and reduce the total number of joints.



Extended Bell



Fabricated Wye Fitting

DIAMETER	PROFILE TYPE	LENGTH	INSIDE DIAMETER	OUTSIDE DIAMETER	TRUCKLOAD FOOTAGE
12 in. (300 mm)	Dual Wall	20 ft. (6 m)	12.2 in. (310 mm)	14.5 in. (368 mm)	2400 ft. (731.5 m)
15 in. (375 mm)	Dual Wall	20 ft. (6 m)	15.1 in. (384 mm)	17.7 in. (450 mm)	1600 ft. (487.7 m)
18 in. (450 mm)	Dual Wall	20 ft. (6 m)	18.2 in. (462 mm)	21.4 in. (544 mm)	1120 ft. (341.4 m)
24 in. (600 mm)	Dual Wall	20 ft. (6 m)	24.1 in. (612 mm)	28.0 in. (711 mm)	600 ft. (182.9 m)
30 in. (750 mm)	Dual Wall	20 ft. (6 m)	30.2 in. (767 mm)	35.5 in. (902 mm)	360 ft. (109.7 m)
36 in. (900 mm)	Dual Wall	20 ft. (6 m)	36.0 in. (914 mm)	41.5 in. (1054 mm)	240 ft. (73.2 m)
42 in. (1050 mm)	Dual Wall	20 ft. (6 m)	42.0 in. (1067 mm)	47.4 in. (1204 mm)	160 ft. (48.8 m)
48 in. (1200 mm)	Dual Wall	20 ft. (6 m)	47.9 in. (1217 mm)	54.1 in. (1374 mm)	120 ft. (36.6 m)
60 in. (1500 mm)	Dual Wall	20 ft. (6 m)	59.9 in. (1521 mm)	67.1 in. (1704 mm)	80 ft. (24.4 m)



Fittings Available
in PVC or PP

Tap Connections

A standard tapping product, such as INSERTA TEE®, is compatible with HP Storm.

Repair Couplers

Depending on local requirements, ADS offers a full range of repair coupling options. For soil-tight performance, split couplers and Mar Mac® repair bands are offered. Testable repair couplers are also available, which include stainless steel restraint bands and Nyloplast® PVC repair sleeves.

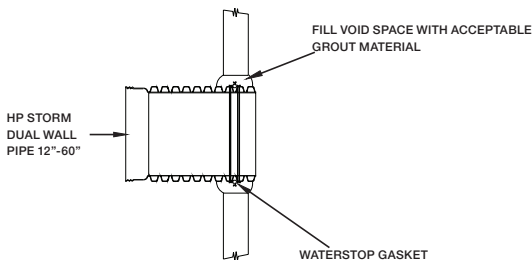
12"–60" Structure Connections

Storm sewer structure connection requirements vary greatly by region. For soil-tight performance, HP Storm exterior corrugations provide an effective profile for grouted connections. For watertight performance, ADS offers a wide selection of connection options utilizing some of the most widely used manhole connectors on the market today from companies such as A-Lok®, Trelleborg® and Press Seal® Gasket Corporation.

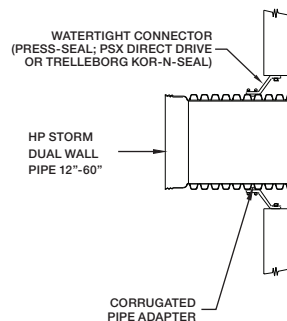


Typical INSERTA TEE Tap

Grouted Waterstop Manhole Connection

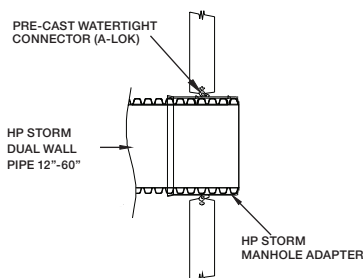


Flexible Boot Connection

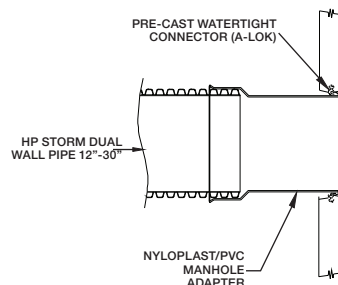


Repair Coupler

Pre-Cast Compression Gasket Connection



Pre-Cast Compression Gasket Connection



Manole Compression Gasket Connection with Corrugated Pipe Adapter

ADS HP STORM 12”–60” PIPE SPECIFICATION

SCOPE

This specification describes 12- through 60-inch (300 to 1500 mm) ADS HP Storm pipe for use in gravity-flow storm drainage applications.

PIPE REQUIREMENTS

- 12- through 60-inch (300 to 1500 mm) pipe shall have a smooth interior and annular exterior corrugations and meet or exceed ASTM F2881 and AASHTO M330.
- Manning’s “n” value for use in design shall be 0.012.

JOINT PERFORMANCE

Pipe shall be joined with a gasketed integral bell & spigot joint meeting the requirements of ASTM F2881.

12- through 60-inch (300 to 1500 mm) shall be watertight according to the requirements of ASTM D3212. Spigots shall have gaskets meeting the requirements of ASTM F477. Gasket shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during joint assembly.

12- through 60-inch (300 to 1500 mm) diameters shall have an exterior bell wrap installed by the manufacturer.

FITTINGS

Fittings shall conform to ASTM F2881 and AASHTO M330. Bell and spigot connections shall utilize a spun-on, welded or integral bell and spigots with gaskets meeting ASTM F477. Bell & spigot fittings joint shall meet the watertight joint performance requirements of ASTM D3212. Corrugated couplings shall be split collar, engaging at least 2 full corrugations.

FIELD PIPE AND JOINT PERFORMANCE

To assure watertightness, field performance verification may be accomplished by testing in accordance with ASTM F1417 or F2487. Appropriate safety precautions must be used when field testing any pipe material. Contact the manufacturer for recommended leakage rates.

MATERIAL PROPERTIES

Polypropylene compound for pipe and fitting production shall be impact modified copolymer meeting the material requirements of ASTM F2881, Section 5 and AASHTO M330, Section 6.1.

INSTALLATION

Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines, with the exception that minimum cover in traffic areas for 12- through 48-inch (300 to 1200 mm) diameters shall be one foot (0.3 m) and for 60-inch (1500 mm) diameters, the minimum cover shall be 2 feet (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 95%) material. Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.04. Contact your local ADS representative or visit our website at www.ads-pipe.com for a copy of the latest installation guidelines.

PIPE DIMENSIONS

Nominal Diameter in. (mm)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	60 (1500)
Average Pipe I.D. in. (mm)	12.2 (310)	15.1 (384)	18.2 (462)	24.1 (612)	30.2 (767)	36.0 (914)	42.0 (1067)	47.9 (1217)	59.9 (1521)
Average Pipe O.D. in. (mm)	14.5 (368)	17.7 (450)	21.4 (544)	28.0 (711)	35.5 (902)	41.5 (1054)	47.4 (1204)	54.1 (1374)	67.1 (1704)
Minimum Pipe Stiffness at 5% Deflection* #/in/in. (kN/m ²)	75 (517)	60 (414)	56 (386)	50 (345)	46 (317)	40 (276)	35 (241)	35 (241)	30 (207)

*Minimum pipe stiffness values listed; contact a representative for maximum values.

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948 MISCELLANEOUS TYPES OF PIPE.
(REV 1-26-12) (FA 2-9-12) (7-12)

SECTION 948 (Pages 900 - 906) is deleted and the following substituted:

SECTION 948
MISCELLANEOUS TYPES OF PIPE

948-1 Polyvinyl-Chloride (PVC) Pipe, or Acrylonitrile-Butadiene-Styrene (ABS) Plastics Pipe.

948-1.1 For Bridge Drains: PVC pipe shall conform to the requirements of ASTM D-1785, for Type I, Grade 1, Schedule 80 PVC pipe with a minimum polymer cell classification of 12454 per ASTM D 1784 and a minimum of 1.5% by weight of titanium dioxide for UV protection.

948-1.2 Pressure Pipe: Pressure pipe for direct burial under pavement shall conform to the requirements of ASTM D-1785, for Type I, Grade I, Schedule 40, for sizes up to and including 2 1/2 inches, and Schedule 80 for sizes up to 4 inches. Pressure pipe 4 inches in diameter and larger shall conform to the requirements of AWWA C900-75, DR18, and ASTM D-1785, Type I, Grade I or other types as may be specifically called for in the Plans or special provisions.

948-1.3 Pipe Marking: All PVC pipe shall be marked as required by Article 8 of ASTM D-1785, and acceptance of the pipe may be based on this data.

948-1.4 Nonpressure Pipe: PVC pipe and ABS pipe intended for direct-burial or concrete encasement, shall meet the following requirements:

(a) PVC Pipe: ASTM D-3034, SDR-35, or ASTM F-949, profile wall without perforations.

(b) ABS Pipe: ASTM D-2680.

The manufacturer of the PVC or ABS pipe shall furnish to the Engineer six copies of mill analysis covering chemical and physical test results.

948-1.5 Underdrain: PVC pipe for use as underdrain shall conform to the requirements of ASTM F-758 or ASTM F-949. Also, PVC underdrain manufactured from PVC pipe meeting ASTM D-3034, perforated in accordance with the perforation requirements given in AASHTO M-36 or AASHTO M-196 will be permitted.

948-1.6 Edgedrain: PVC pipe for use as edgedrain shall conform to the requirements of ASTM F-758, ASTM F-949 or ASTM D-3034 pipe shall be perforated in accordance with the perforation requirements given in AASHTO M-36 or AASHTO M-196. Additional perforations will be required as indicated in the Design Standards, Index No. 286 for pipes designated under ASTM F-758 and ASTM D-3034. PVC pipe intended for direct burial in asphalt shall meet the following requirements:

(a) ASTM D-3034, SDR-35, or ASTM F-949

(b) NEMA TC-2 (pipe material and compounds) and NEMA TC-3 (pipe fittings) for PVC (90°C electrical conduit pipe) NEMA ECP-40 and NEMA ECP-80. Underwriter Laboratory Specifications referenced under NEMA specifications for electrical conductivity are not required.

(c) Pipe shall withstand asphalt placement temperatures specified without permanent deformation.

(d) Perforations shall be in accordance with AASHTO M-36 or AASHTO M-196.

948-1.7 PVC Pipe (12 to 48 Inches): PVC pipe for side drain, cross drain, storm drain and other specified applications shall conform to AASHTO M-278 for smooth wall PVC pipe or ASTM F-949 for PVC ribbed pipe. Resin shall contain a minimum of 1.5% by weight of titanium dioxide for UV protection. Mitered end sections are not to be constructed of polyvinyl chloride. Use only concrete or metal mitered end sections as indicated in the Design Standards.

All pipe produced and shipped to the job site shall meet the requirements of 105-3.2.

948-2 Corrugated Polyethylene Tubing and Pipe.

948-2.1 General: For underdrain, Corrugated Polyethylene Tubing and fittings shall meet the requirements of AASHTO M-252. For edgedrain, Corrugated Polyethylene Tubing and fittings shall meet the requirements of AASHTO M-252, except as modified in 948-2.2. For storm drain side drain, french drain and cross drain corrugated Polyethylene Pipe shall meet the requirements of AASHTO M-294 and 948-2.3.2.

The tubing or pipe shall not be left exposed to sunlight for periods exceeding the manufacturer's recommendation.

948-2.2 Edgedrain (4 to 10 inches): The requirements for edgedrain as specified in AASHTO M-252 are modified as follows:

(a) Coiling of tubing 6 inches in diameter or greater is not permitted. Tubing shall have a minimum pipe stiffness of 46 psi at 5% deflection.

948-2.3 Corrugated High Density Polyethylene Pipe (12 to 60 inches):

948-2.3.1 General: Class I (50 year) corrugated Polyethylene Pipe used for side drain, storm and cross drain or french drain shall meet the requirements of AASHTO M-294. Class II Corrugated Pipe shall meet the requirements of AASHTO M-294 and the additional requirements as specified herein. Corrugations may only be annular. Ensure that pipe resin conforms to ASTM D-3350 minimum cell classification 435400C except that cell class 435400E may be used if the combination of color and UV stabilizer provides the same or better UV protection than that of resin cell class 435400C. Mitered end sections are not to be constructed of polyethylene. Use only concrete or metal mitered end sections as indicated in the Design Standards.

All pipe produced and shipped to the job site shall meet the requirements of 105-3.2.

948-2.3.2 Additional Requirements for Class II (100 Year), Type S Polyethylene Pipe Meet the following requirements:

Table 1			
Stress Crack Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner	FM 5-572, Procedure A	10% Igepal solution at 122°F and 600 psi applied stress, 5 replicates	Average failure time of the pipe liner shall be ≥18.0 hours, no single value shall be less than 13.0 hours.

Table 1			
Pipe Corrugation ⁽¹⁾ , (molded plaque)	ASTM F-2136	10% Igepal solution at 122°F and 600 psi applied stress, 5 replicates	Average failure time shall be ≥24.0 hours, no single value shall be less than 17.0 hours.
Junction	FM 5-572, Procedure B and FM 5-573	Full Test ⁽²⁾⁽³⁾ Test at 3 temperature/stress combinations: 176°F at 650 psi 176°F at 450 psi 158°F at 650 psi; 5 replicates at each test condition	Determine failure time at 500 psi at 73.4°F ≥ 100 years (95% lower confidence) using 15 failure time values ⁽⁴⁾ The tests for each condition can be terminated at duration equal to or greater than the following criteria: 110.0 hr at 176°F 650 psi 430.0 hr at 176°F 450 psi 500.0 hr at 158°F 650 psi
		Single Test ⁽⁵⁾ : Test temperature 176°F and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110.0 hr
Longitudinal Profiles ⁽⁶⁾	FM 5-572, Procedure C, and FM 5-573	Full Test ⁽²⁾⁽³⁾ : Test at 3 temperature/stress combinations: 176°F at 650 psi 176°F at 450 psi 158°F at 650 psi; 5 replicates at each test condition	Determine failure time at 500psi at 73.4°F ≥ 100 years (95% lower confidence) using 15 failure time values ⁽⁴⁾ . The tests for each condition can be terminated at duration equal to or greater than the following criteria: 110.0 hr at 176°F 650 psi 430.0 hr at 176°F 450 psi 500.0 hr at 158°F 650 psi
		Single Test ⁽⁵⁾ : Test temperature 176°F and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110.0 hr
Oxidation Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Liner and/or Crown ⁽⁷⁾	OIT Test (ASTM D-3895)	2 replicates (to determine initial OIT value) on the as manufactured (not incubated) pipe.	25.0 minutes, minimum

Table 1			
Liner and/or Crown ⁽⁷⁾	Incubation test FM 5-574 and OIT test (ASTM D-3895)	Three samples for incubation of 265 days at 176°F ⁽⁸⁾ and applied stress of 250 psi. One OIT test per each sample	Average of 3.0 minutes ⁽⁹⁾ (no values shall be less than 2.0 minutes)
Liner and/or Crown ⁽⁷⁾	MI test (ASTM D-1238 at 190°C/2.16Kg)	2 replicates on the as manufactured (not incubated) pipe.	< 0.4 g/10 minutes
Liner and/or Crown ⁽⁷⁾	Incubation test FM 5-574 and MI test (ASTM D-1238 at 190°C/2.16Kg)	2 replicates on the three aged sampled after incubation of 265 days at 176°F ⁽⁸⁾ and applied stress of 250 psi	MI Retained Value ⁽⁹⁾⁽¹⁰⁾ shall be greater than 80% and less than 120%.

Note: FM = Florida Method of Test.

(1) Required only when the resin used in the corrugation is different than that of the liner.

(2) A higher test temperature (194° F) may be used if supporting test data acceptable to the State Materials Engineer is submitted and approved in writing.

(3) Full test shall be performed on alternative pipe diameter of pipe based on wall profile design, raw material cell classification, and manufacturing process. Full test must be performed on maximum and minimum pipe diameters within a manufacturing process.

(4) Computer program to predict the 100 year SCR with 95% lower confidence can be obtained from FDOT.

(5) Single test for the junction and longitudinal profile may be used on alternating pipe sizes within a manufacturing process. Single point tests may not be used on maximum and minimum pipe sizes within a manufacturing process except by approval of the Engineer. Single point tests may be used for quality assurance testing purposes.

(6) Longitudinal profiles include vent holes and molded lines.

(7) OIT and MI tests on the crown are required when resin used in the corrugation is different than that of the liner.

(8) The incubation temperature and duration can also be 196 days at 185°F.

(9) The tests for incubated and “as-manufactured” pipe samples shall be performed by the same lab, same operator, the same testing device, and in the same day.

(10) The MI retained value is determined using the average MI value of incubated sample divided by the average MI value of as-manufactured pipe sample.

Manufacturer may use ground Class II, but not Class I, pipe for reworked plastic.

948-2.3.3 Certification: Furnish to the Engineer certification from the manufacturer for each pipe diameter manufacturers LOT to be incorporated into the project that the pipe meets the requirements of these Specifications.

Manufacturers seeking evaluation of a product in accordance with Departmental procedures must submit test reports conducted by a laboratory qualified by the Geosynthetic Accreditation Institute-Laboratory Accreditation Program (GAI-LAP) or qualified by ISO 17025 accreditation agency using personnel with actual experience running the test methods for Class II HDPE pipe. Submit the test reports to the State Materials Office.

948-2.3.4 Verification Samples: Furnish verification samples as directed by the Engineer.

948-3 Fiberglass Reinforced Polymer Pipe.

948-3.1 For Bridge Drains: Fiberglass pipe shall conform to the requirements of ASTM D-2996 or ASTM D-2310, for Type I, Grade 2, Class E, using polyvinyl ester as the only resin. The minimum designation shall be RTRP-11EA. The resin shall contain UV stabilizers or a two-part 100% solids polyurethane coating.

948-4 Ductile Iron Pipe.

948-4.1 For Bridge Drains: Ductile iron pipe shall conform to the requirements of AWWA C151.

948-5 Hot Dip Galvanized Steel Pipe.

948-5.1 For Bridge Drains: Hot dip galvanized steel pipe shall conform to the requirements of ASTM A-53.

948-6 Flexible Transition Couplings and Pipe.

948-6.1 For Bridge Drains: Flexible transition couplers and pipe shall conform to the requirements of ASTM C-1173.

948-7 Profile Wall Polypropylene (PP) Pipe.

PP pipe (12 to 60 inches) for side drain, cross drain, storm drain, and other specified applications shall meet the requirements of AASHTO MP21-11. Mitered end sections are not to be constructed of polypropylene. Use only concrete or metal mitered end sections as indicated in the Design Standards.

All pipe produced and shipped to the job site shall meet the requirements of 105-3.2. The manufacturer shall demonstrate that resin oxidation resistance will last using accelerated aging by use of incubation tests in accordance with FM 5-574. Tests shall demonstrate that stabilization package is present and that no degradation has occurred.

948-8 Filter Fabric Sock for Use with Underdrain.

For Type I Underdrain specified in the Design Standards, Index No. 286, filter sock shall be an approved strong rough porous, polyester or other approved knitted fabric which completely covers and is secured to the perforated plastic tubing underdrain in such a way as to prevent infiltration of trench backfill material.

The knitted fabric sock shall be a continuous one piece material that fits over the tubing like a sleeve. It shall be knitted of continuous 150 denier yarn and shall be free from any chemical treatment or coating that might significantly reduce porosity and permeability.

The knitted fabric sock shall comply with the following physical properties:

Weight, applied (oz/sq. yd.)	3.5 min	ASTM D-3887
Grab tensile strength (lbs.)	50 min.*	ASTM D-5034
Equivalent opening size (EOS No.)	25 min.**	Corps of Engineers CW-02215-77
Burst strength (psi)	100 min.**	ASTM D-3887
*Tested wet.		
**Manufacturer's certification to meet test requirement.		

The knitted fabric sock shall be applied to the tubing in the shop so as to maintain a uniform applied weight. The tubing with knitted fabric sock shall be delivered to the job site in such manner as to facilitate handling and incorporation into the work without damage. The knitted fabric sock shall be stored in UV resistant bags until just prior to installation. Torn or punctured knitted fabric sock shall not be used.

948-9 Pipe Liner.

948-9.1 Cured-In-Place Pipe Liner: Cured-in-place pipe liner shall be continuous, resin impregnated, flexible tubing that meets the requirements of ASTM D-5813 and ASTM F-1216.

948-9.2 Deformed Pipe Liner: Deformed pipe liner shall be manufactured in an out of round state, usually collapsed circumferentially and folded on the long axis. After installation in a host pipe, the liner is rounded by means of heat and pressure to fit the host pipe. Deformed pipe liner, when installed, shall extend from one structure to the next in one continuous length with no intermediate joints.

(1) Polyethylene: Deformed polyethylene pipe liner shall meet the requirements of ASTM F-714 with a minimum cell classification of 335420c.

(2) PVC: Deformed PVC pipe liner shall meet the requirements of ASTM F-1504.

948-9.3 Discrete Pipe Liner: Discrete pipe liner shall be round, flexible or semi-rigid liner, manufactured in lengths that may be joined in a manhole or access pit before insertion in a host pipe.

(1) High Density Polyethylene Solid Wall: Discrete high density polyethylene pipe liner shall meet the requirements of ASTM F-714 or AASHTO M-326 and shall have a minimum of cell classification of 345464c.

(2) High Density Polyethylene Profile Wall: Discrete high density polyethylene pipe liner shall meet the requirements of AASHTO M-294 and shall have a minimum cell classification of 435400c.

(3) PVC: Discrete PVC pipe liner shall meet the requirements of ASTM F-794, ASTM F-949, or AASHTO M-304 and shall have a minimum cell classification of 12454.

(4) Fiberglass: Discrete fiberglass pipe liner shall meet the requirements of ASTM D-3262.

948-9.4 Spiral Wound Pipe Liner: Spiral wound pipe liner shall consist of coils of profile strips that are wound into a host pipe helically, after which a cementitious grout is injected into the annular space between the liner and the host pipe, forming a rigid composite structure.

(1) PVC: PVC spiral wound pipe liner shall meet the requirements of ASTM F-1697 or ASTM F-1735 and shall have a minimum cell classification of 12454.

948-9.4.1 Machine Spiral Wound Pipe Liner: Machine spiral wound pipe liner shall consist of a continuous one piece profile strip wound directly into the deteriorated pipelines. The liner can be installed in close fit to the host pipe, or alternatively installed at a fixed diameter. Where the liner is installed at a fixed diameter, the annular space between the spiral wound liner pipe and the existing pipe is grouted.

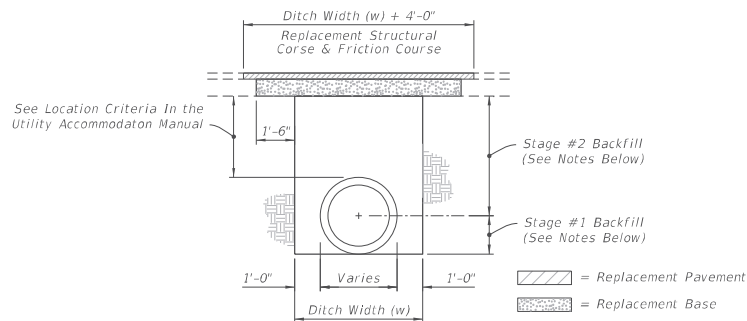
(1) PVC: PVC machine spiral wound pipe liner shall meet the requirements of ASTM F-1697 and shall have a minimum cell classification of 12454.

948-9.5 Paneled Pipe Liner: Paneled pipe liner consists of custom-cut flat or curved panels that are formed to the inside circumference of a host pipe.

(1) PVC: PVC paneled pipe liner shall meet the requirements of ASTM F-1735 and shall have a minimum cell classification of 12454.

948-9.6 Point Pipe Liner: Point pipe liner may consist of any materials covered by this specification when used to repair and rehabilitate an isolated portion of an existing storm drain pipe. Materials which are restricted (as primary components) to point repair are; steel, which shall meet the requirements of AASHTO M-167M, ASTM A-167, or ASTM A-240; aluminum, which shall meet the requirements of AASHTO M-196, and rubber; which shall meet the requirements of ASTM C-923.

948-9.7 Coated Pipe Liner: Coated pipe liner consists of liquid, slurry, foam or gel that is spread or sprayed over the interior surface of an existing pipe to rehabilitate it. Materials that may be used for coating are hydrophilic urethane gel, epoxy resin, polyester resin, gunite, shotcrete, low density cellular concrete, and cementitious grout.



NOTES:

PAVEMENT REMOVAL AND REPLACEMENT

1. Pavement shall be mechanically sawed.
2. The replacement asphalt shall match the existing structural and friction courses for type and thickness in accordance with current FDOT asphalt mix specifications.
3. The new base materials shall be either of the same type and composition as the materials removed or of equal or greater structural adequacy (See Index No. 514).

BACKFILL OPTION

1. COMPACTED AND STABILIZED FILL

- A. Backfill material shall be placed in accordance with Section 125 of the Standard Specifications.
- B. In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.
- C. In Stage #2, construct compacted fill along the sides of the pipe and up to the bottom of the base, with the upper 12" receiving Type B Stabilization. In lieu of Type B Stabilization, the Contractor may construct using Optional Base Group 3.

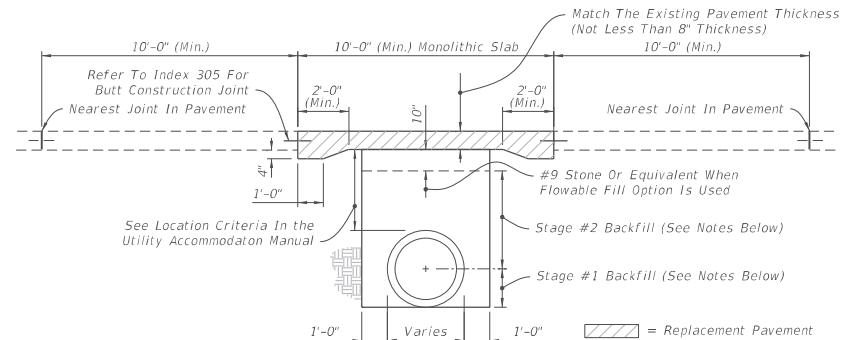
2. FLOWABLE FILL

- A. If compaction can not be achieved through normal mechanical methods then flowable fill may be used.
- B. Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.
- C. Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.
- D. In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.
- E. In Stage #2, place flowable fill to the bottom of the existing base course.

FLEXIBLE PAVEMENT CUT

GENERAL NOTES

1. The details provided in this standard index apply to cases in which jack and bore or directional boring methods are not required by the Engineer.
2. Flowable fill shall not be placed directly over loose, or high plastic, or muck material (see Index 505) which will cause settlement due to fill weight. Where highly compressible material exists, the amount, shape and depth of flowable fill must be engineered to prevent pavement settlement.
3. These details do not apply to utility cuts longitudinal to the centerline of the roadway which may require the additional use of geotextiles, special bedding and backfill, or other special requirements.
4. Method of construction must be approved by the Engineer.
5. Some pipe may require special granular backfill up to 6" above top of pipe. Geotextiles may be required to encapsulate the special granular material.



NOTES:

PAVEMENT REMOVAL AND REPLACEMENT

1. High early strength cement concrete (3000 psi) meeting the requirements of Standard Specification 346 shall be used for rigid pavement replacement.
2. Pavement shall be mechanically sawed and restored to conform with existing pavement joints within 12 hours. (See Index 305)

BACKFILL OPTION

1. GRANULAR BACKFILL

- A. Any edgedrain system that is removed shall be replaced with the same type materials. Any edgedrain system that is damaged shall be repaired with methods approved by the Engineer.
- B. Fill material shall be placed in accordance with the Standard Specifications. Fill material shall be special select soil in accordance with Index 505.
- C. In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.
- D. In Stage #2, construct fill along the sides of the pipe and up to the bottom of replacement pavement.

2. FLOWABLE FILL

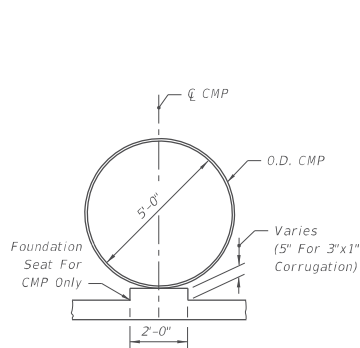
- A. If mechanical compaction can not be achieved through normal mechanical methods then flowable fill may be used.
- B. Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.
- C. Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.
- D. In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.
- E. In Stage #2, place flowable fill to the bottom of the stone layer.

RIGID PAVEMENT CUT

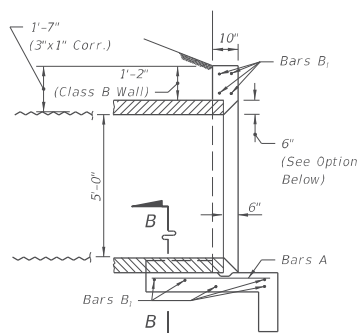
6. Where asphalt concrete overlays exist over full slab concrete pavement, the replacement pavement shall have an overlay constructed over the replacement slab. The overlay shall match the existing asphalt pavement thickness. The replacement friction course shall match the existing friction course, except structural course may be used in lieu of dense graded friction course.
7. All shoulder pavement, curb, curb and gutter, and their substructure disturbed by utility trench cut construction shall be restored in kind.
8. The use of flowable fill to reduce the time traffic is taken off a facility is acceptable but must have prior approval by the Engineer. Flowable fill use is allowed only when properly engineered for pavement crossings, whether straight or diagonal, and shall not be installed for significant depths or lengths. The maximum length shall be fifty (50) feet and a maximum depth of six (6) feet unless supported by an engineering document prepared by a registered professional engineer that specializes in soils engineering. The engineering document shall address the evaluation of local groundwater flow interruption and settlement potential.
9. Excavatable flowable fill is to be used when the flowable fill option is selected.

TRENCH CUTS AND RESTORATIONS ACROSS ROADWAYS

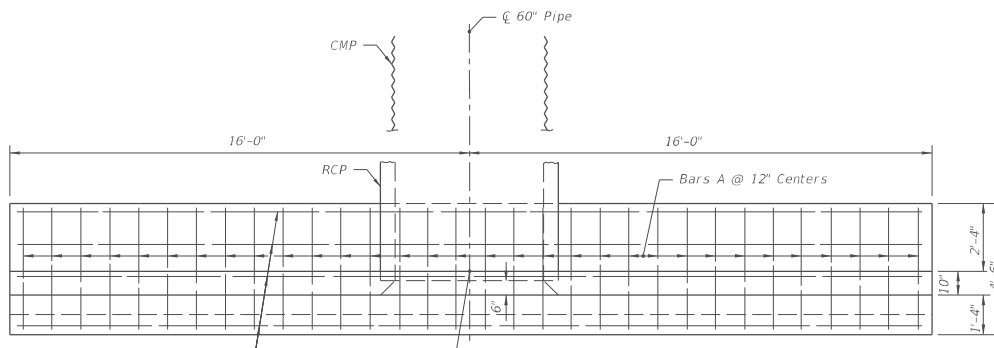
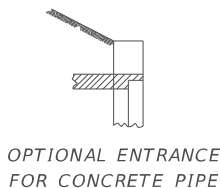
LAST REVISION 11/01/16	DESCRIPTION:	FDOT FY 2017-18 DESIGN STANDARDS	MISCELLANEOUS UTILITY DETAILS	INDEX NO. 307	SHEET NO. 1 of 3
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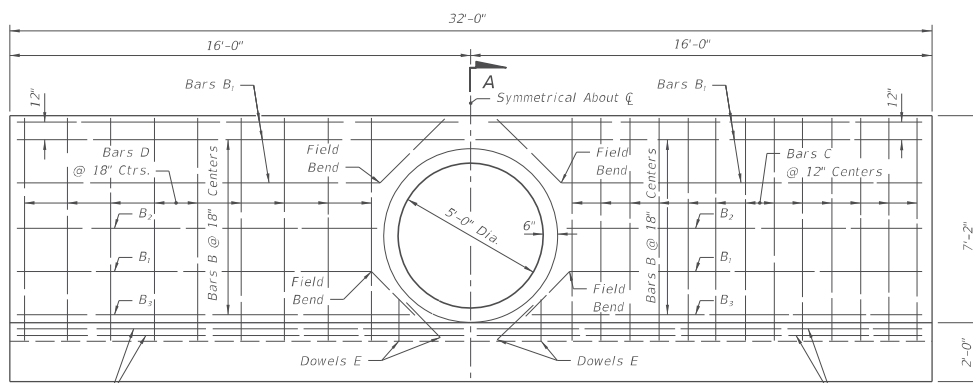
SECTION BB



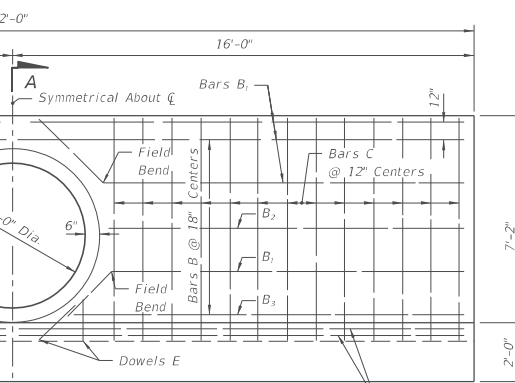
SECTION AA



PLAN
(Showing Bar In Footing)



HALF ELEVATION
(Showing Bars In Front Face Of Wall)



HALF ELEVATION
(Showing Bars In Back Face Of Wall)

GENERAL NOTES

- Straight concrete endwalls are intended for use outside the clear zone.
- Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this Index. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
- Reinforcing steel shall be either Grade 40 or 60.
- Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
- Chamfer: All exposed edges and corners to be chamfered $\frac{3}{4}$ " unless otherwise shown.
- That portion of corrugated metal pipe in direct contact with the concrete slab and extending 12" beyond shall have a continuous bituminous coating of .004" minimum thickness applied prior to placing of the concrete.
- Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Performance Turf, SY.
- Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls), CY and Reinforcing Steel (Roadway), LB.

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REOD.	LENGTH	LOCATION	BENDING
A	#4	32	4'-2"	Footing	Straight
B	#4	13	31'-8"	Footing & Wall	Straight
B ₁	#4	4	12'-4"	Wall	Straight
B ₂	#4	4	13'-9"	Wall	Straight
C	#4	26	9'-4"	Wall	Bend
D	#4	18	7'-6"	Wall	Straight
E	#4	8	1'-8"	Footing & Wall	Straight

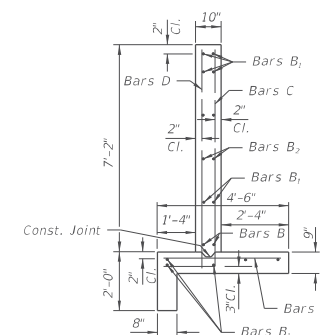
BENDING DIAGRAM



NOTE: All bar dimensions are out to out

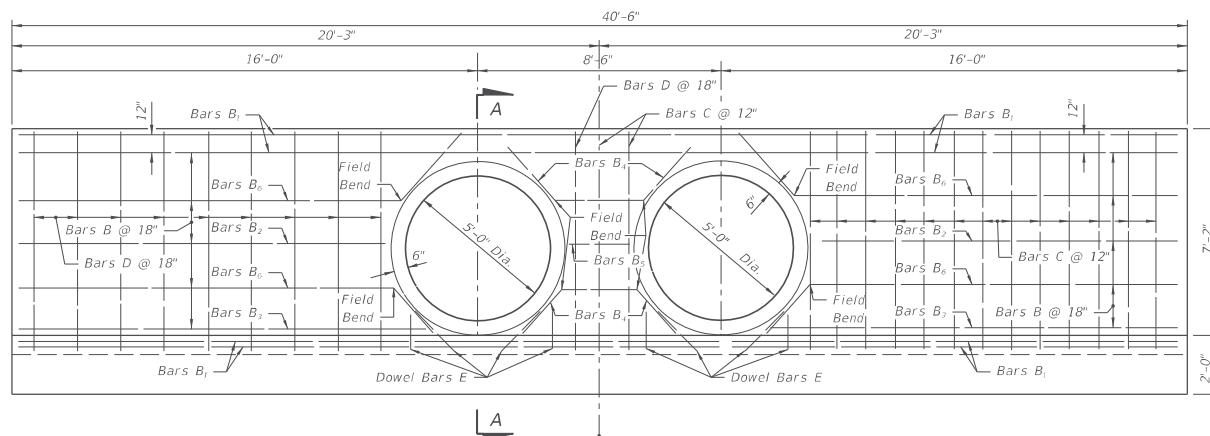
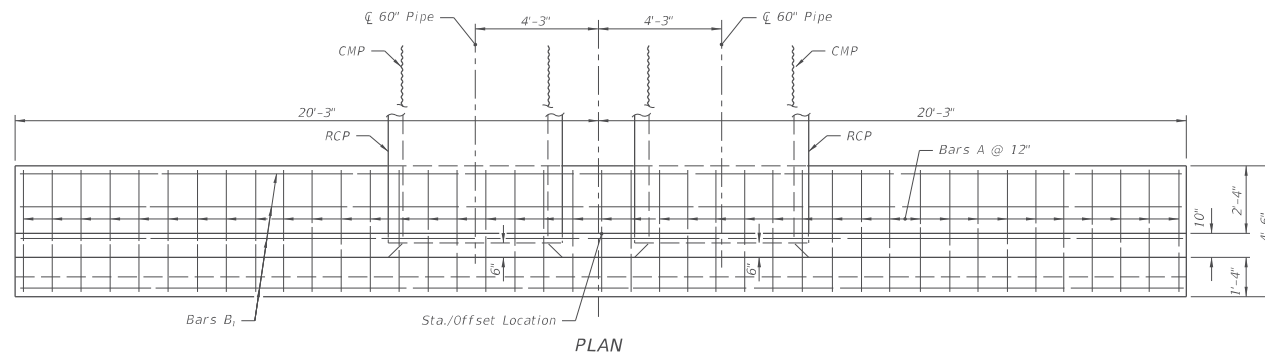
ESTIMATED QUANTITIES

ITEM	UNIT	RCP	CMP
Class II Concrete	Cu. Yd.	11.3	11.4
Reinforcing Steel	Lb.	695	695



TYPICAL SECTION
THRU ENDWALL

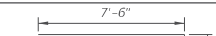
LAST REVISION 11/01/16	DESCRIPTION:	FDOT FY 2017-18 DESIGN STANDARDS	STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 60" PIPE	INDEX NO. 251	SHEET NO. 1 of 2
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HALF ELEVATION
(Showing Bars In Front Face Of Wall)

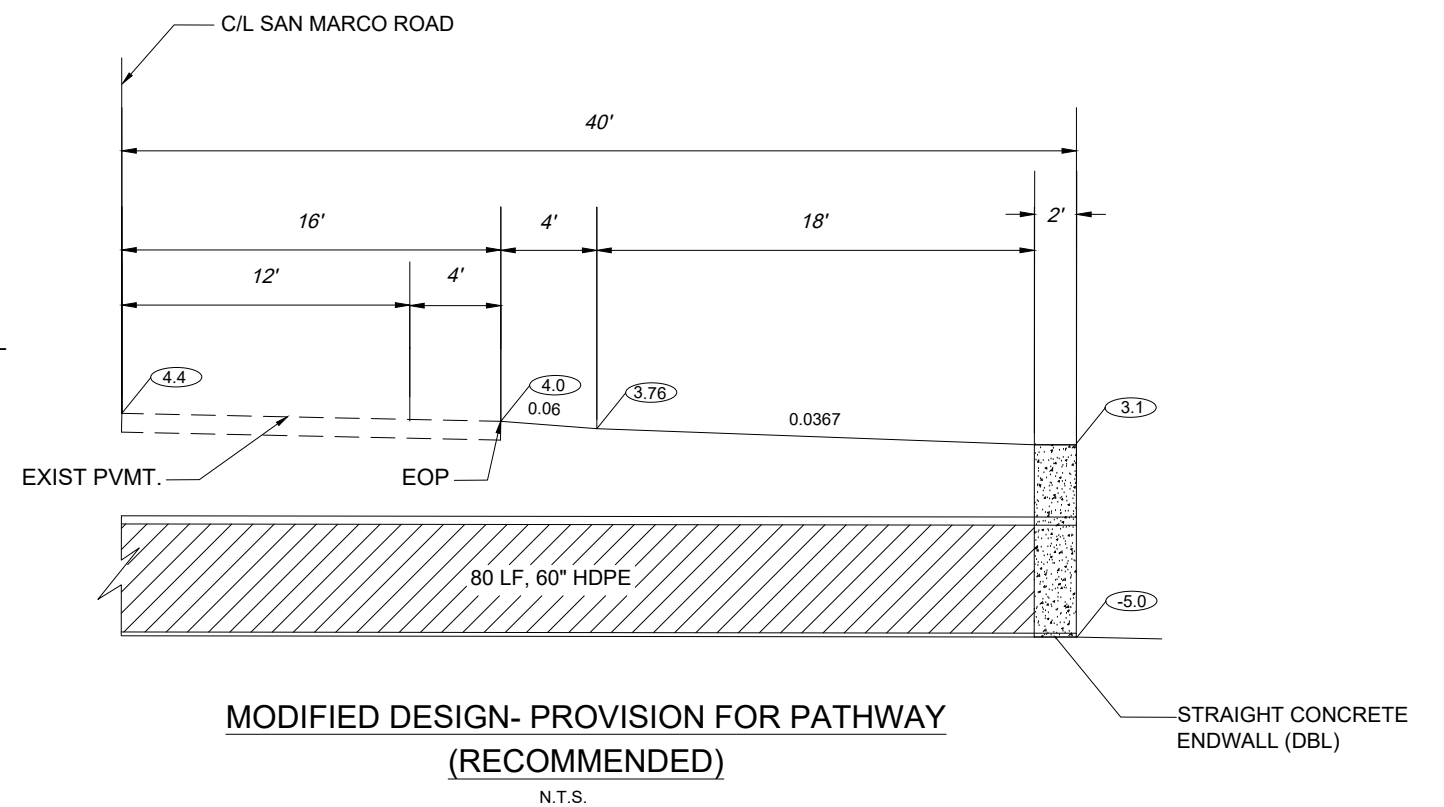
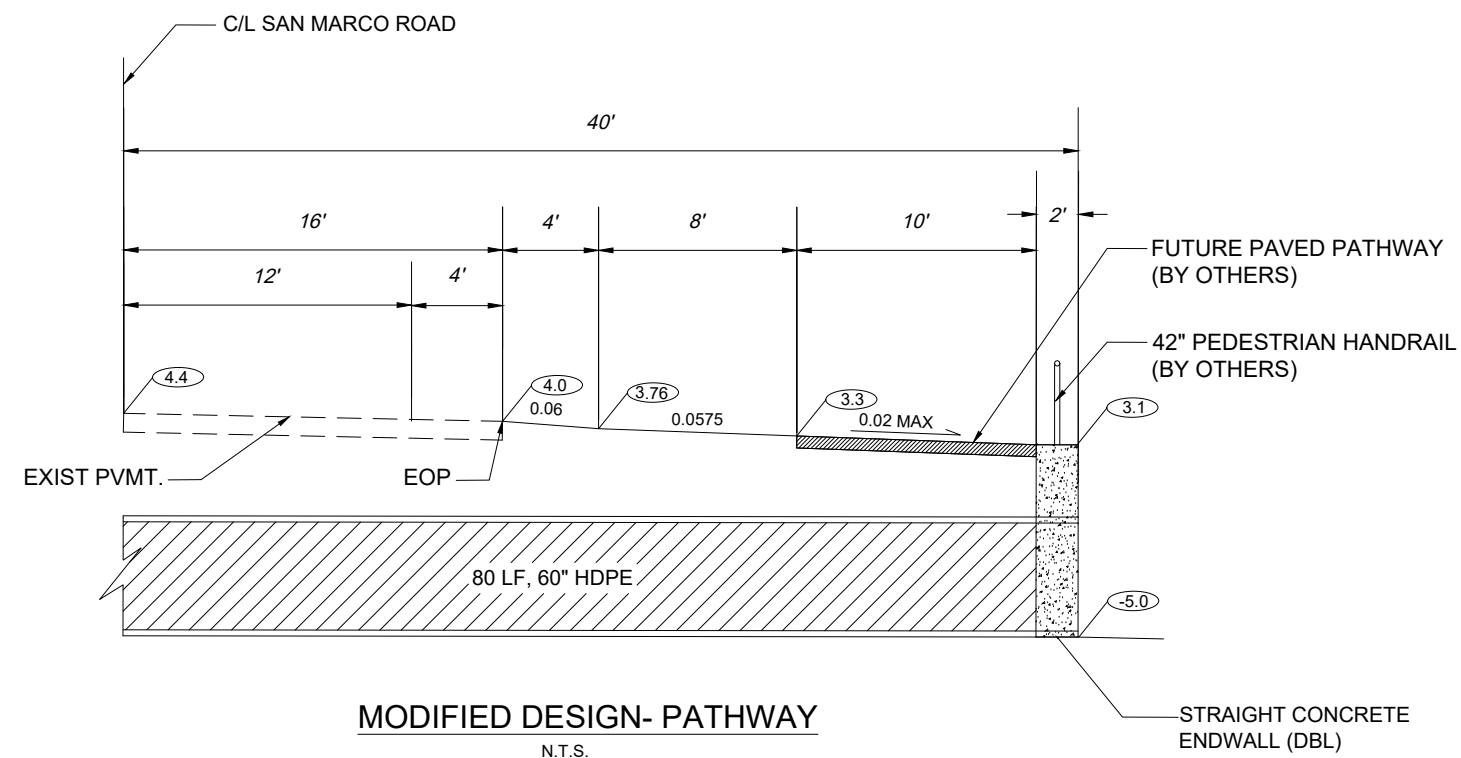
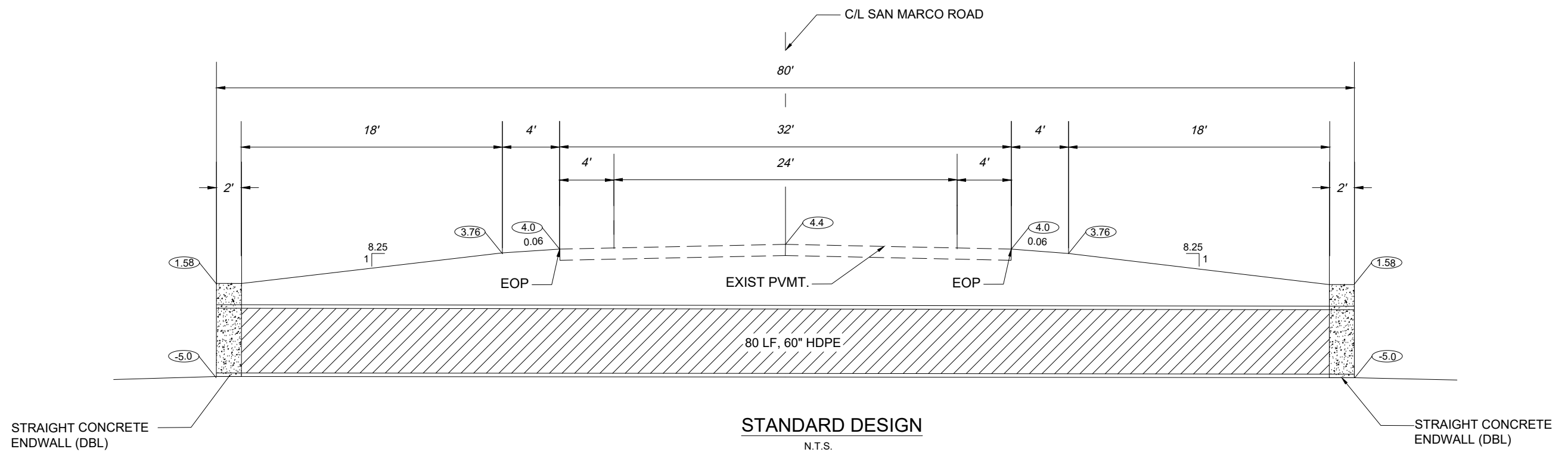
HALF ELEVATION
(Showing Bars In Back Face Of Wall)



BILL OF REINFORCING STEEL						BENDING DIAGRAM			
MARK	SIZE	NO. REQD.	LENGTH	LOCATION	BENDING				
A	#4	41	4'-2"	Footing	Straight	NOTE: All bar dimensions are out to out			
B ₁	#4	9	40'-2"	Footing & Wall	Straight				
B ₂	#4	4	12'-6"	Wall	Straight				
B ₃	#4	4	13'-9"	Wall	Straight				
B ₄	#4	4	6'-0"	Wall	Field Bend				
B ₅	#4	2	2'-2"	Wall	Straight	ESTIMATED QUANTITIES			
B ₆	#4	8	15'-0"	Wall	Field Bend				
C	#4	29	9'-4"	Footing & Wall	Bend				
D	#4	20	7'-6"	Footing & Wall	Straight				
E	#4	16	1'-8"	Footing & Wall	Straight				

ITEM	UNIT	RCP	CMP
Class II Concrete	Cu. Yd.	13.7	13.8
Reinforcing Steel	Lb.	824	824

NOTE: See Sheet 1 of 2 For General Notes.



NORMAN TREBILCOCK, AICP, PE #47116
TCS CERTIFICATE OF AUTHORIZATION No. 27796
PLANS ISSUED FOR SUBMITTAL: 4/2/2019

REVISIONS				 2800 DAVIS BLVD SUITE 200 NAPLES FL 34104	SAN MARCO ROAD (CR 92) FRUIT FARM CREEK			FUTURE PATHWAY PROVISION EXHIBIT	SHEET NO. 1
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					CR 92	COLLIER	NA		

4/2/2019 2:28:48 PM

S:\Operations\Projects\2 City - Marco Island\San Marco Road\Fruit Farm Creek SR 92 Culvert Project\MOT\MOT-4-2-19.dwg

CITY OF MARCO ISLAND
SAN MARCO ROAD (CR 92)

INDEX OF PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2	TRAFFIC CONTROL PLAN NOTES
3	PHASE 2 TRAFFIC CONTROL PLAN
4	PHASE 3 TRAFFIC CONTROL PLAN
5	PHASE 4 TRAFFIC CONTROL PLAN
6	PHASE 5 TRAFFIC CONTROL PLAN

RESTORATION OF MANGROVES
AT FRUIT TREE FARM CREEK
TRAFFIC CONTROL PLAN

PLANS PREPARED FOR:

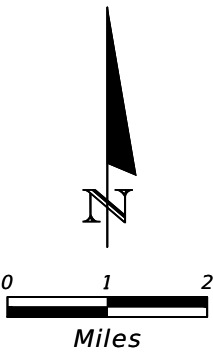
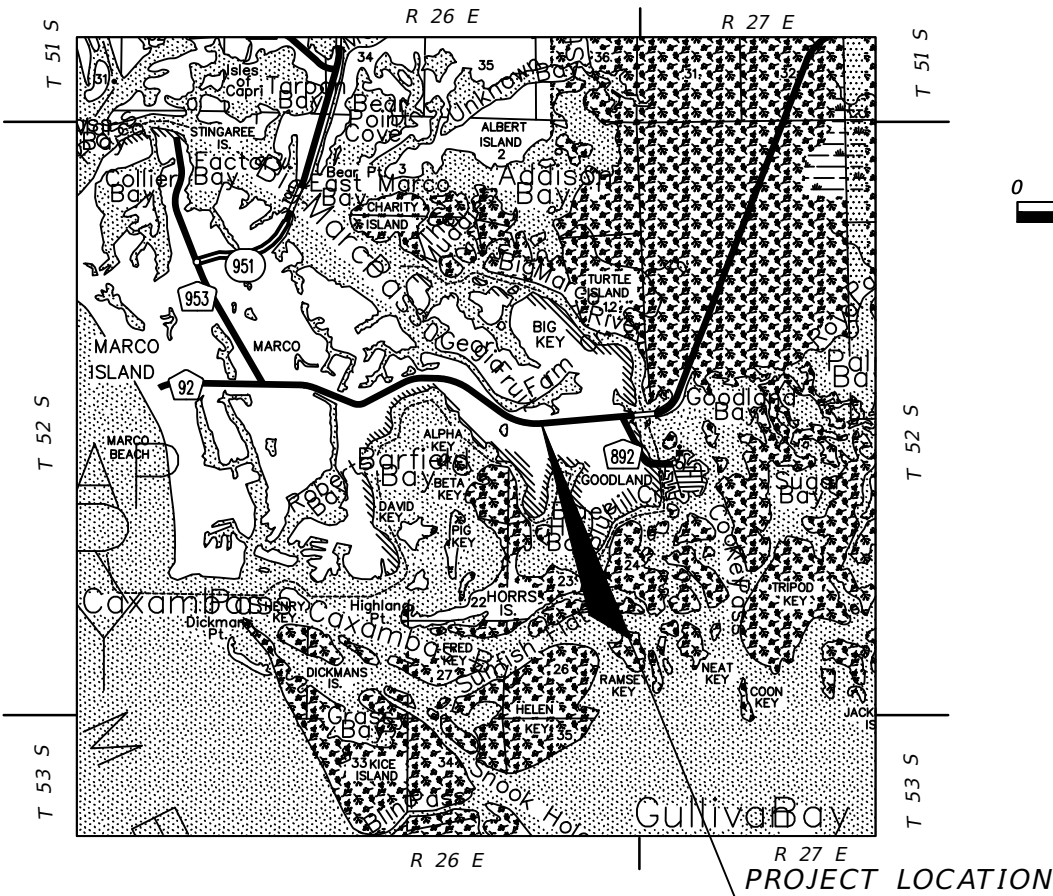
J.R. EVANS, ENGINEERING, PE
9351 CORKSCREW ROAD, SUITE 102
ESTERO, FL 33928

GOVERNING STANDARDS AND SPECIFICATIONS:

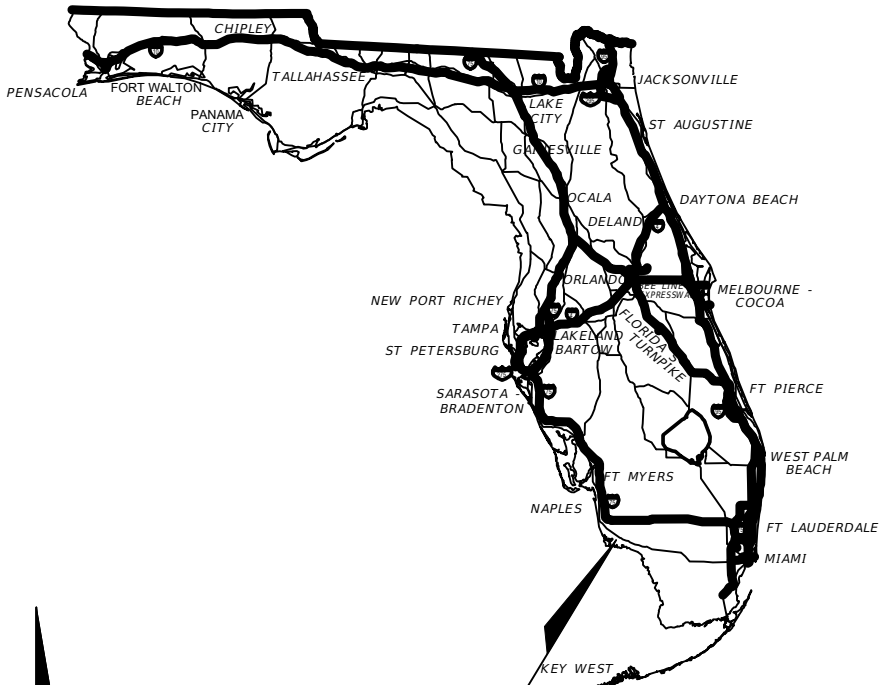
Florida Department of Transportation, STANDARD PLANS 2019-20 and revised Index Drawings as appended herein, and 2019 Standard Specifications for Road and Bridge Construction, as amended by Contract Documents.

For Design Standards click on the "Design Standards" link at the following web site:
[HTTPS://WWW.FDOT.GOV/DESIGN/STANDARDPLANS/CURRENT/DEFAULT.SHTM](https://www.fdot.gov/design/standardplans/current/default.shtm)
Design Standards

For the Standard Specifications for Road and Bridge Construction click on the "Specifications" link at the following web site:
[http://www.dot.state.fl.us/specificationoffice/Standard Specifications](http://www.dot.state.fl.us/specificationoffice/Standard%20Specifications)



PROJECT LOCATION



SHOP DRAWINGS
TO BE SUBMITTED TO:

PLANS PREPARED BY:



2800 DAVIS BLVD SUITE 200 NAPLES FL 34104
TREBILCOCK CONSULTING SOLUTIONS PA
CERTIFICATE OF AUTHORIZATION No. 27796
PHONE: 239 566 9551
FAX: 239 566 9553

NOTE: THE SCALE OF THESE PLANS MAY
HAVE CHANGED DUE TO REPRODUCTION.

ISSUE FOR SUBMITTAL DATE: 4/8/19

TRAFFIC CONTROL PLANS
ENGINEER OF RECORD: NORMAN J. TREBILCOCK, PE AICP

P.E. NO.: 47116

KEY SHEET REVISIONS	
DATE	DESCRIPTION

FISCAL YEAR	SHEET NO.
19	1

SAN MARCO RD (C.R. 92) TRAFFIC CONTROL PLAN FOR SITE WORK

GENERAL NOTES:

- 1. MAINTAIN ACCESS TO ALL EXISTING DRIVEWAYS, EXCEPT AS OTHERWISE DEPICTED ON THE PLANS.
- 2. STREET SPEED ALONG SAN MARCO RD OF 45 MPH IS TO BE MAINTAINED.
- 3. PERFORM OPERATIONS IN ACCORDANCE WITH FDOT DESIGN STANDARD PLANS FOR ROAD CONSTRUCTION, INDEX NO. 102-600 SERIES AS APPLICABLE. THE 2009 MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES SHALL ALSO BE USED AS A GUIDE.
- 4. THE PERMIT HOLDERS ARE OBLIGATED TO INFORM THE ROAD ALERT COORDINATOR AT 239-252-8192 AND THE ROW PERMIT SECTION AT 239-389-3831, TWO WEEKS PRIOR TO CONSTRUCTION.

PHASE 1 -PRECONSTRUCTION PHASE:

- 1. WORK TO BE ACCOMPLISHED:
 - a. INSTALLATION OF SIGNAL CONTROL AND INFORMATION BOARDS.
- 2. TRAFFIC CONTROL PLAN:
PERFORM OPERATIONS IN ACCORDANCE WITH INDEXES 102- 600 AND MUTCD PART 6, CHAPTER 6A "TEMPORARY TRAFFIC CONTROL" FOR SIGNAL CONTROL AND INFORMATION BOARDS.
INFORMATION BOARDS TO BE INSTALLED TWO WEEKS PRIOR TO CONSTRUCTION.

PHASE 2 -WESTBOUND LANE TWIN CULVERTS CONSTRUCTION:

- 1. WORK TO BE ACCOMPLISHED:
 - a. CLEARING, GRUBBING AS DEMOLITION ALONG WESTBOUND TRAVEL WAY AND SHOULDER AS APPLICABLE..
 - b. INSTALLATION OF TWIN CULVERTS AND ASSOCIATED ENDWALLS, BACKFILL, PLACE PAVEMENT FOR TEMPORARY USAGE
 - c. GRADE AND SOD SHOULDER.
- 2. TRAFFIC CONTROL PLAN:
PERFORM OPERATIONS IN ACCORDANCE WITH INDEXES 102- 600, 102-601, 102-602 , 102-603 AND 102-607. REFER TO MUTCD PART 6, CHAPTER 6A "TEMPORARY TRAFFIC CONTROL" FOR SIGNAL CONTROL AND INFORMATION BOARDS.

PHASE 3 -EASTBOUND LANE TWIN CULVERT CONSTRUCTION:

- 1. WORK TO BE ACCOMPLISHED:
 - a. CLEARING, GRUBBING AS DEMOLITION ALONG EASTBOUND TRAVEL WAY AND SHOULDER AS APPLICABLE..
 - b. INSTALLATION OF TWIN CULVERT AND ASSOCIATED ENDWALLS, BACKFILL, PLACE PAVEMENT FOR TEMPORARY USAGE
 - c. GRADE AND SOD SHOULDER.
- 2. TRAFFIC CONTROL PLAN:
PERFORM OPERATIONS IN ACCORDANCE WITH INDEXES 102- 600, 102-601, 102-602 , 102-603 AND 102-607. REFER TO MUTCD PART 6, CHAPTER 6A "TEMPORARY TRAFFIC CONTROL" FOR SIGNAL CONTROL AND INFORMATION BOARDS.

PHASE 4 -WESTBOUND LANE CULVERT CONSTRUCTION:

- 1. WORK TO BE ACCOMPLISHED:
 - a. CLEARING, GRUBBING AS DEMOLITION ALONG WESTBOUND TRAVEL WAY AND SHOULDER AS APPLICABLE.
 - b. REMOVE EXISTING CULVERT.
 - c. INSTALLATION OF NORTH ENDS OF TWO NEW CULVERTS PER CONSTRUCTION PLANS AND CONSTRUCT ENDWALLS, BACKFILL, PLACE PAVEMENT FOR TEMPORARY USAGE.
 - d. GRADE AND SOD SHOULDER.
- 2. TRAFFIC CONTROL PLAN:
PERFORM OPERATIONS IN ACCORDANCE WITH INDEXES 102- 600, 102-601, 102-602 , 102-603 AND 102-607. REFER TO MUTCD PART 6, CHAPTER 6A "TEMPORARY TRAFFIC CONTROL" FOR SIGNAL CONTROL AND INFORMATION BOARDS.

PHASE 5 -EASTBOUND LANE CULVERT CONSTRUCTION:

- 1. WORK TO BE ACCOMPLISHED:
 - a. CLEARING, GRUBBING AS DEMOLITION ALONG EASTBOUND TRAVEL WAY AND SHOULDER AS APPLICABLE.
 - b. REMOVE EXISTING CULVERT.
 - c. INSTALLATION OF SOUTH ENDS TWO NEW CULVERTS PER CONSTRUCTION PLANS AND CONSTRUCT ENDWALLS, BACKFILL, PLACE PAVEMENT FOR TEMPORARY USAGE.
 - d. GRADE AND SOD SHOULDER.
- 2. TRAFFIC CONTROL PLAN:
PERFORM OPERATIONS IN ACCORDANCE WITH INDEXES 102- 600, 102-601, 102-602 , 102-603 AND 102-607. REFER TO MUTCD PART 6, CHAPTER 6A "TEMPORARY TRAFFIC CONTROL" FOR SIGNAL CONTROL AND INFORMATION BOARDS.

PHASE 6 -FINAL ROADWAY CONSTRUCTION:

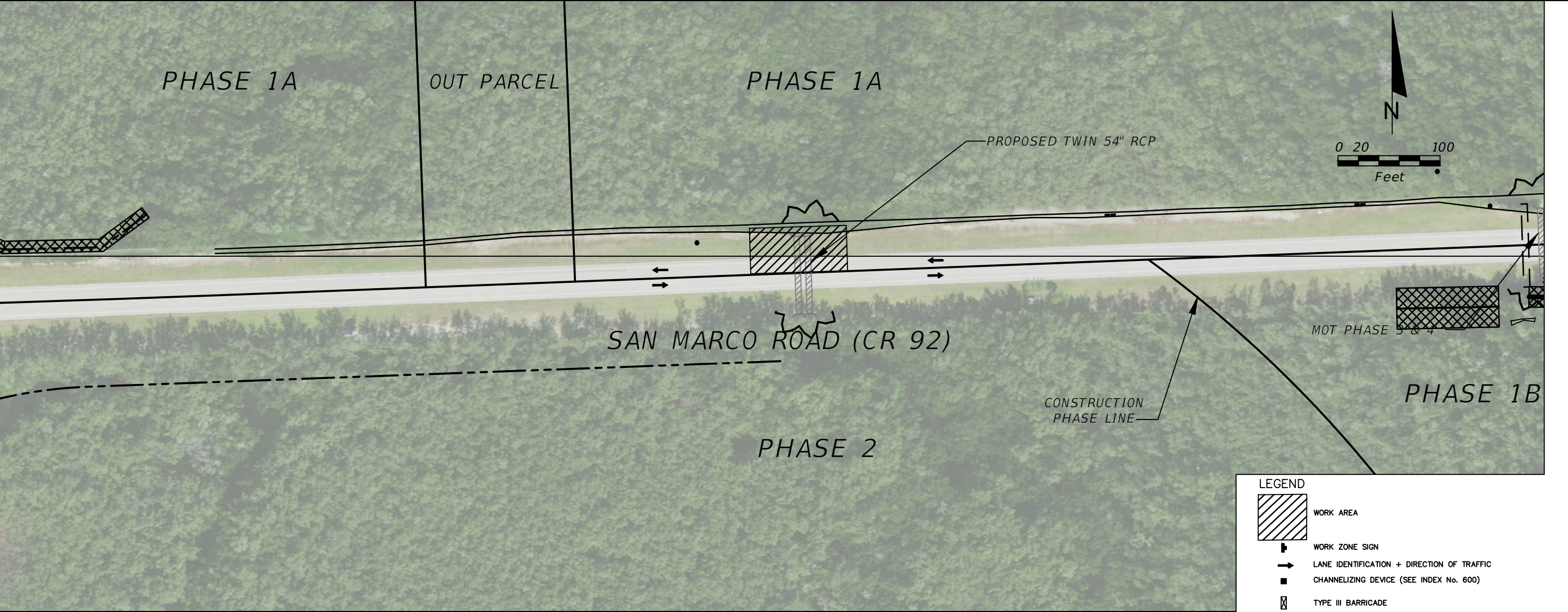
- 1. WORK TO BE ACCOMPLISHED:
 - a. CONSTRUCT FINAL ASPHALT LIFT PER CONSTRUCTION PLANS
- 2. TRAFFIC CONTROL PLAN:
PERFORM OPERATIONS IN ACCORDANCE WITH INDEXES 102- 600, 102-601, 102-602 AND 102-603.

PHASE 7 -FINAL ROADWAY CONSTRUCTION:

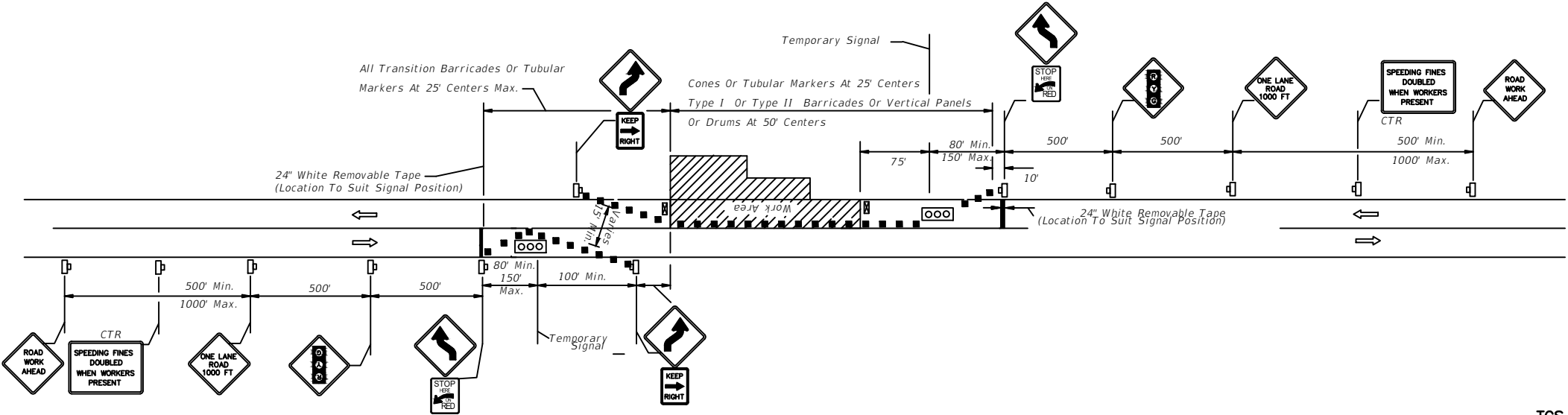
- 1. WORK TO BE ACCOMPLISHED:
 - a. UTILTIY LINE WORK WITHIN THE NORTH SHOULDER AS APPLICABLE.
 - b. GRADING AND SOD AS APPLICABLE.
- 2. TRAFFIC CONTROL PLAN:
PERFORM OPERATIONS IN ACCORDANCE WITH INDEXES 102- 600, 102-601 AND 102-602.

NORMAN TREBILCOCK, AICP, PE #47116
TCS CERTIFICATE OF AUTHORIZATION No. 27796
PLANS ISSUED FOR SUBMITTAL: 4/8/2019

REVISIONS				 Trebilcock planning-engineering 2800 DAVIS BLVD SUITE 200 NAPLES FL 34104	RESTORATION OF MANGROVES SAN MARCO ROAD TRAFFIC CONTROL PLAN			TRAFFIC CONTROL PLAN NOTES	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					CR 92	COLLIER	NA	2	



MOT PHASE 2 IN CONSTRUCTION PHASE 1A



NORMAN TREBILCOCK, AICP, PE #47116
TCS CERTIFICATE OF AUTHORIZATION No. 27796
PLANS ISSUED FOR SUBMITTAL: 4/8/2019

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

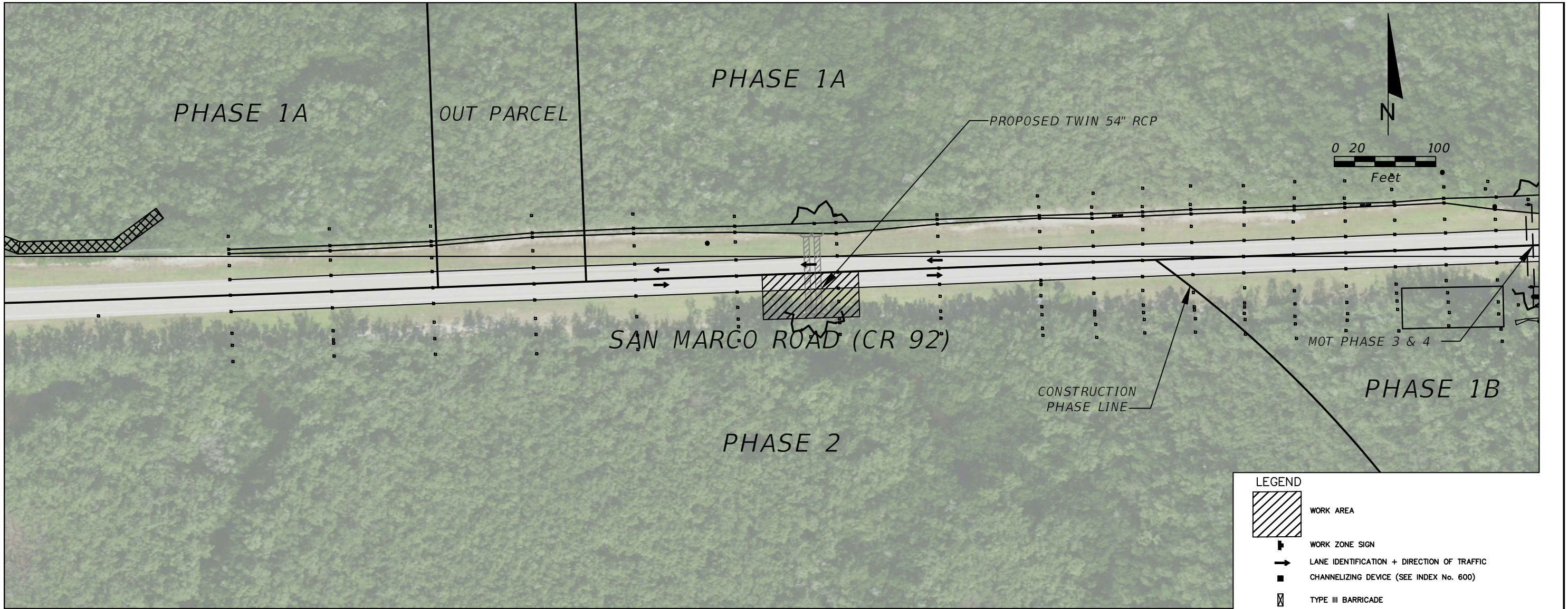


2800 DAVIS BLVD SUITE 200 NAPLES FL 34104

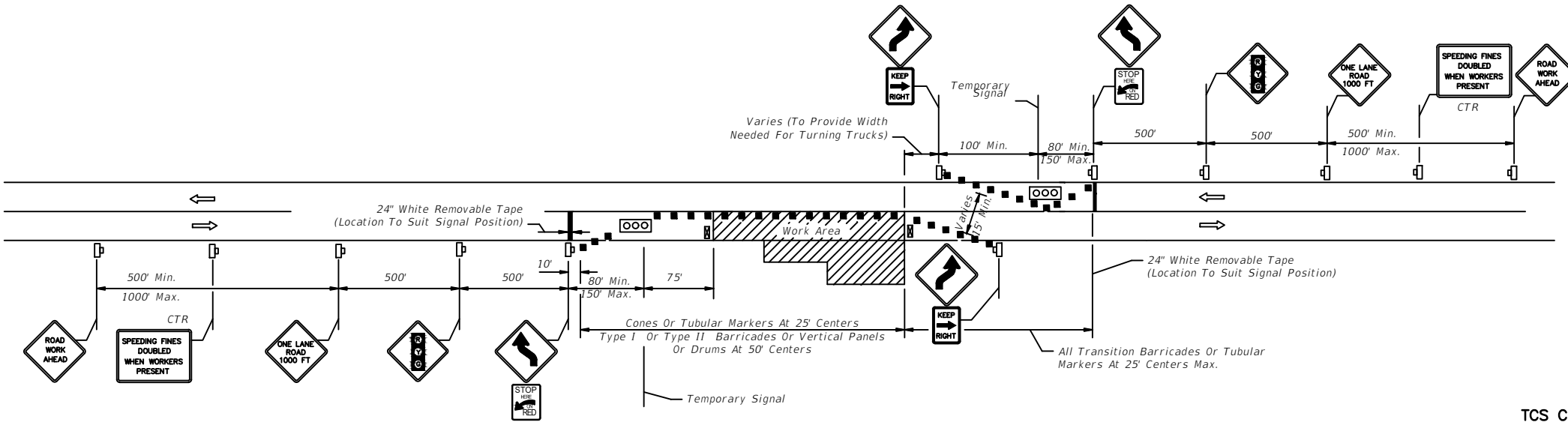
RESTORATION OF MANGROVES SAN MARCO ROAD TRAFFIC CONTROL PLAN		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 92	COLLIER	NA

PHASE 2
TRAFFIC CONTROL PLAN

SHEET NO.
3

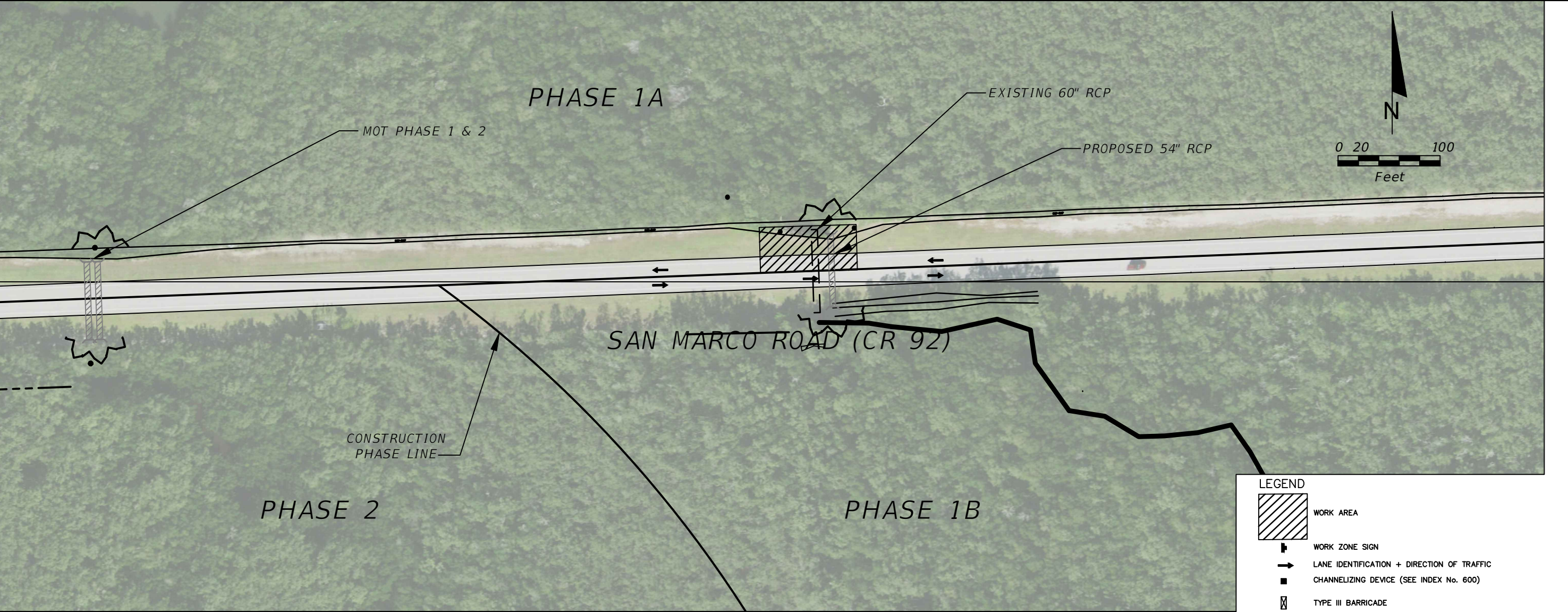


MOT PHASE 3 IN CONSTRUCTION PHASE 2

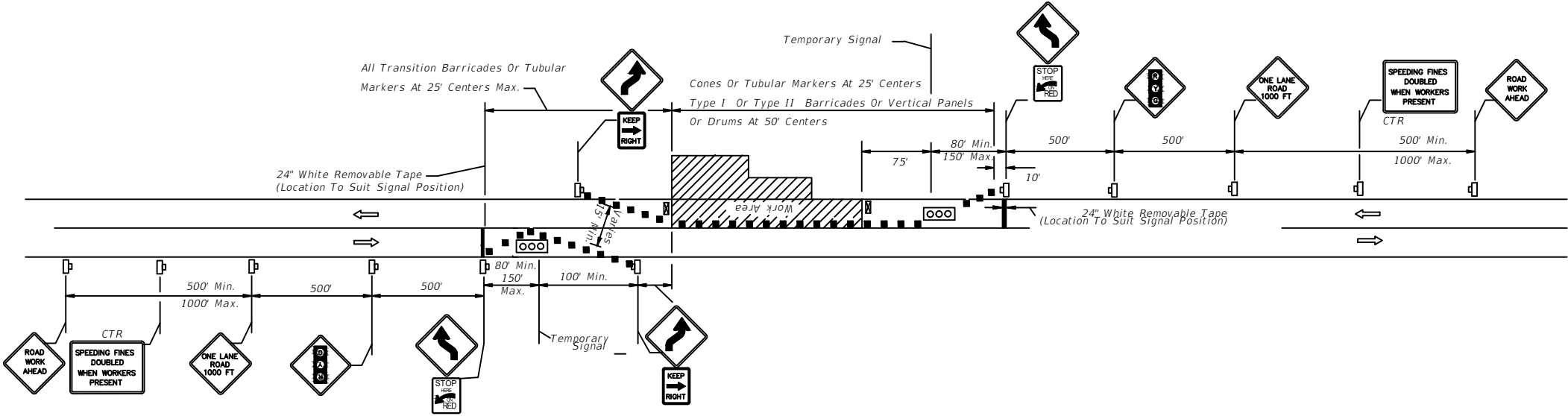


NORMAN TREBILCOCK, AICP, PE #47116
TCS CERTIFICATE OF AUTHORIZATION No. 27796
PLANS ISSUED FOR SUBMITTAL: 4/8/2019

REVISIONS				 2800 DAVIS BLVD SUITE 200 NAPLES FL 34104	RESTORATION OF MANGROVES SAN MARCO ROAD TRAFFIC CONTROL PLAN			PHASE 3 TRAFFIC CONTROL PLAN		SHEET NO. 4
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID			
					CR 92	COLLIER	NA			



MOT PHASE 4 IN CONSTRUCTION PHASE 1A



NORMAN TREBILCOCK, AICP, PE #47116
TCS CERTIFICATE OF AUTHORIZATION No. 27796
PLANS ISSUED FOR SUBMITTAL: 4/8/2019

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION



2800 DAVIS BLVD SUITE 200 NAPLES FL 34104

RESTORATION OF MANGROVES SAN MARCO ROAD TRAFFIC CONTROL PLAN		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 92	COLLIER	NA

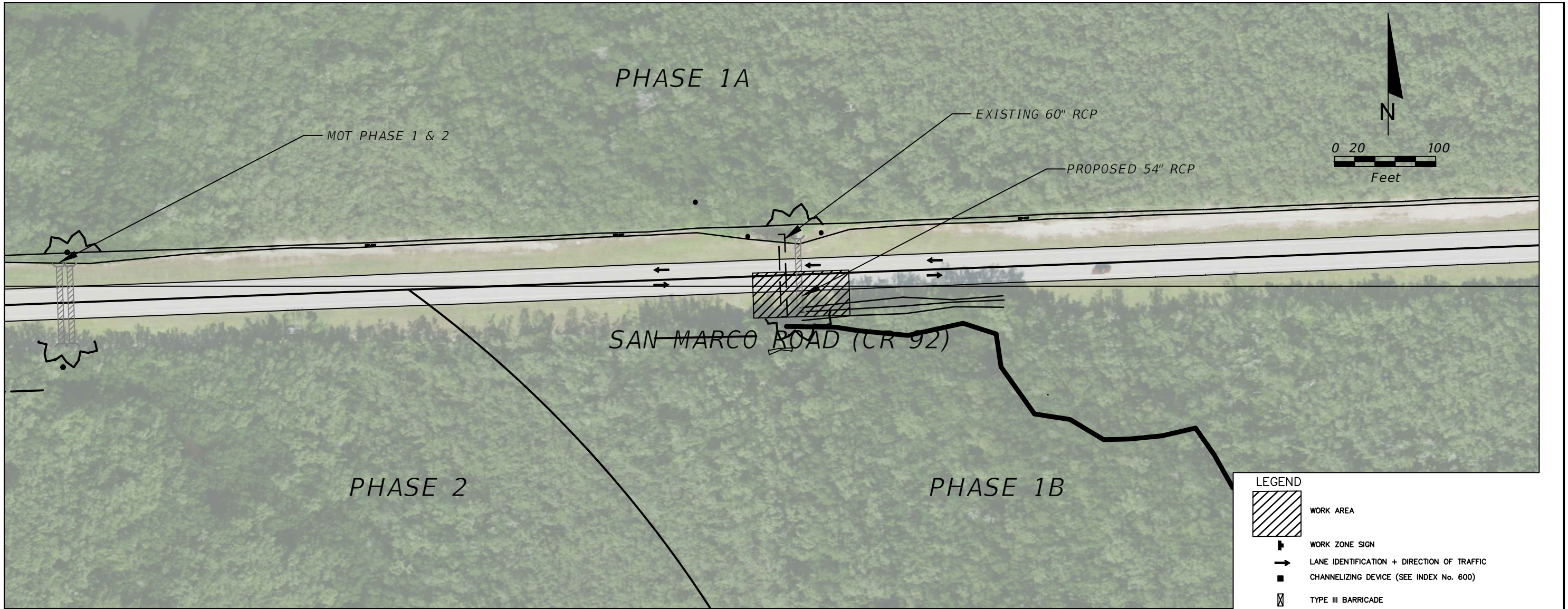
PHASE 4
TRAFFIC CONTROL PLAN

SHEET NO.
5

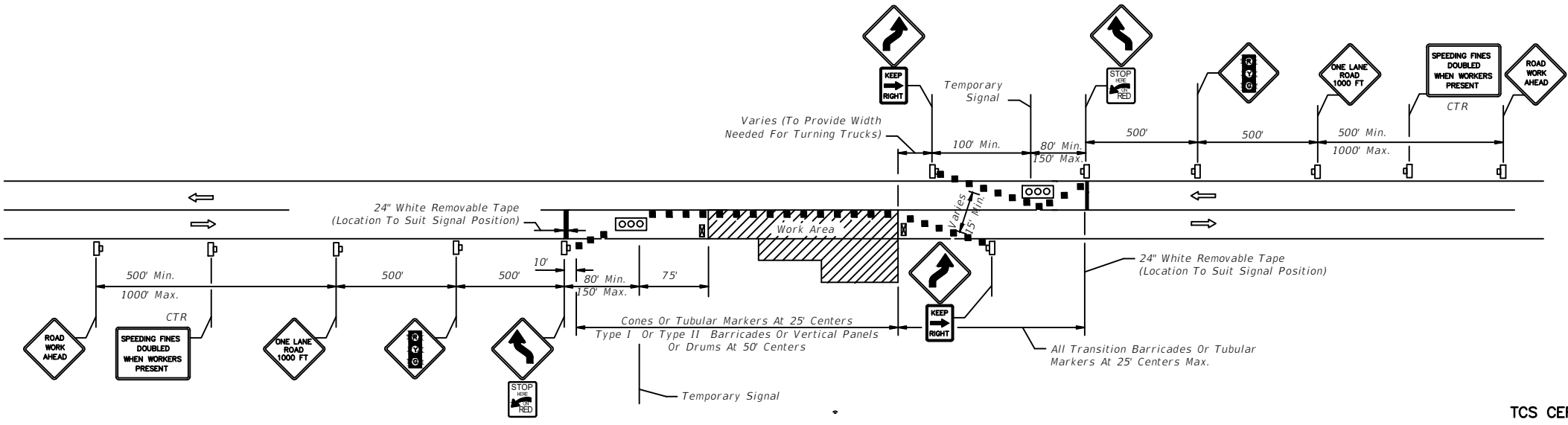
Owner

4/9/2019 7:15:51 AM

S:\Operations\Projects\2 City - Marco Island\San Marco Road\Fruit Farm Creek SR 92 Culvert Project\MOT\MOT-4-2-19.dwg



MOT PHASE 5 IN CONSTRUCTION PHASE 1B



NORMAN TREBILCOCK, AICP, PE #47116
TCS CERTIFICATE OF AUTHORIZATION No. 27796
PLANS ISSUED FOR SUBMITTAL: 4/8/2019

REVISIONS				 2800 DAVIS BLVD SUITE 200 NAPLES FL 34104	RESTORATION OF MANGROVES SAN MARCO ROAD TRAFFIC CONTROL PLAN			PHASE 5 TRAFFIC CONTROL PLAN		SHEET NO. 6	
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID				
					CR 92	COLLIER	NA				