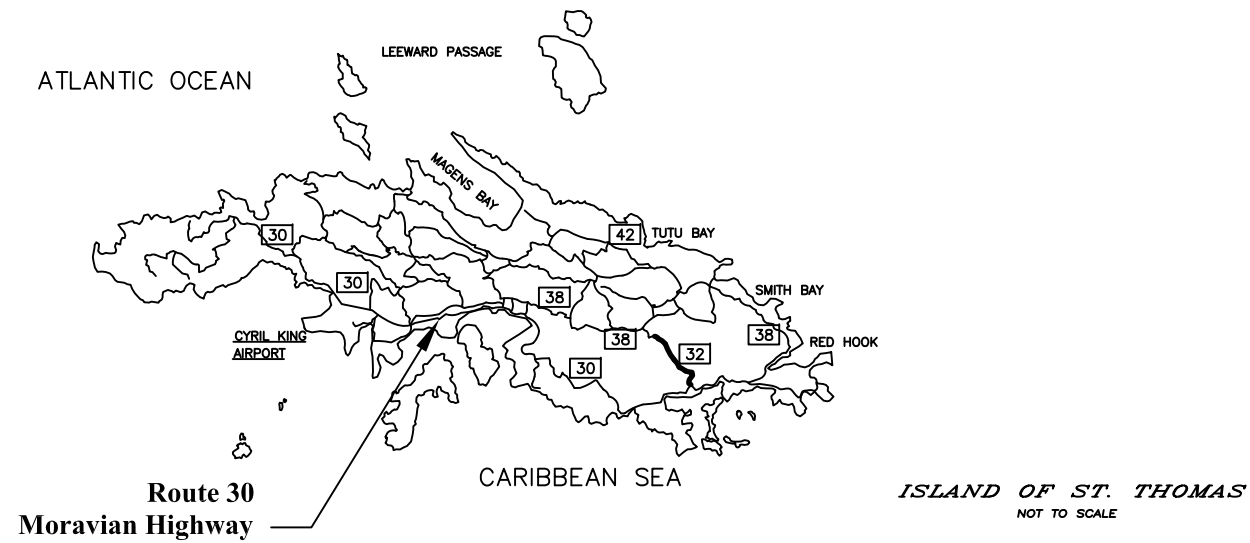


THE UNITED STATES VIRGIN ISLANDS
DEPARTMENT OF PUBLIC WORKS
PLANS FOR THE CONSTRUCTION OF
FEDERAL-AID PROJECT NO. VI-30(39)
MORAVIAN HIGHWAY – ROUTE 30
PAVEMENT REHABILITATION



LEGEND

- MANHOLE
- ▨ ASPHALT OVERLAY
- ▧ MILLING & ASPHALT OVERLAY
- ▩ FULL DEPTH ROADWAY RECONSTRUCTION

INDEX OF SHEETS

TYPE OF CONSTRUCTION:
PAVEMENT REHABILITATION

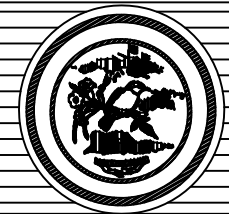
DESIGN DESIGNATIONS:

MAJOR ARTERIAL
ADT (2009) 20,900
V (POSTED) 20 MPH

LENGTH OF PROJECT:
5425 LF

1	TITLE SHEET	11	PERMANENT SIGN SCHEDULE
2	TABULATION OF QUANTITIES	12	PERMANENT SIGN SCHEDULE
3	TYPICAL ROAD SECTION	13	PERMANENT SIGN SCHEDULE
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5	PLANS – SHEET 2	15	STANDARD DETAIL – PAVEMENT TRANSITIONS
6	PLANS – SHEET 3	16	STANDARD DETAIL – GUARDRAILS
7	PLANS – SHEET 4	17	STANDARD DETAIL – TRAFFIC CONTROL SHEET 1
8	PLANS – SHEET 5	18	STANDARD DETAIL – TRAFFIC CONTROL SHEET 2
9	TYPICAL WALL DETAIL	19	STANDARD DETAIL – TRAFFIC CONTROL SHEET 3
10	TRAFFIC DETECTION SYSTEM PLAN		

THIS PROJECT IS TO BE CONSTRUCTED IN ACCORDANCE WITH
STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND
BRIDGES ON FEDERAL HIGHWAY PROJECTS FP-14.



DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING
8244 SUB BASE
ST. THOMAS, USVI

DESIGNED BY:
OFFICE OF HIGHWAY ENGINEERING

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	2

SCHEDULE OF QUANTITIES				
ITEM NO.	ITEM DESCRIPTION	UNITS	QTY.	NOTES
15101-0000	MOBILIZATION	LS	1	
15201-0000	CONSTRUCTION SURVEY AND STAKING	LS	1	
15401-0000	CONTRACTOR TESTING	LS	1	
15706-1000	SOIL EROSION CONTROL, INLET PROECTION	EA	10	
20102-0000	CLEARING AND GRUBING	LS	1	1
20302-0300	REMOVAL OF CURB AND GUTTER, CONCRETE	LF	20	
20302-1200	REMOVAL OF GUARDRAIL	LF	762.5	
20303-1600	REMOVAL OF PAVEMENT, ASPHALT	SY	3115	
20303-3200	REMOVAL OF SIDEWALK, CONCRETE	SY	25	
20401-0000	ROADWAY EXCAVATION	CY	690	
30102-0800	AGGREGATE BASE, 8", GRADING D	SY	3115	
40301-0200	HOT ASPHALT CONCRETE PAVEMENT, GRADE B, 4"	TON	706	
40301-0400	HOT ASPHALT CONCRETE PAVEMENT, GRADE D, 2"	TON	3455	
41301-0600	ASPHALT PAVEMENT MILLING, 2"	SY	15000	
60101-0000	MINOR CONCRETE, EXTEND EXISTING WALL	CY	150	2
60101-1000	MINOR CONCRETE, CURB & SIDEWALK REPAIRS	CY	20	2
60201-0400	12" PIPE CULVERT, HDPE	LF	120	
60412-2000	REMOVE AND RESET MANHOLE FRAME AND COVER	EA	20	
60706-0000	CLEANING DRAINAGE STRUCTURE	EA	9	
61101-0000	WATER SYSTEM, IRRIGATION	LS	1	
61701-1350	GUARDRAIL SYSTEM, G4, TYPE 2 CLASS B STEEL POST	LF	137.5	
61703-1000	TERMINAL END, TYPE ROUND	EA	2	
61703-2000	TERMINAL END, TYPE FLARED (WALL MOUNT)	EA	2	
62632-0000	PLANTINGS	LS	1	3
63303-0500	PROJECT SIGN, 4x8 PLYWOOD	EA	2	
63304-0900	SIGNS, ALUMINUM PANELS, TYPE 3 SHEETING	SF	220	
63401-1500	PAVEMENT MARKINGS, TYPE H, SOLID 6"	LF	20000	
63401-1550	PAVEMENT MARKINGS, TYPE H, SOLID 24"	LF	600	
63401-1600	PAVEMENT MARKINGS, TYPE H, BROKEN 6"	LF	2750	
63405-2900	PAVEMENT MARKINGS, TYPE H, TURN ARROW	EA	10	
63405-2950	PAVEMENT MARKINGS, TYPE H, STRAIGHT ARROW	EA	12	
63405-3000	PAVEMENT MARKINGS, TYPE H, STRAIGHT/TURN ARROW	EA	4	
63501-0000	TEMPORARY TRAFFIC CONTROL	LS	1	4
63602-6000	SYSTEM INSTALLATION, TRAFFIC DETECTOR SYSTEM, CAMERA/VIDEO TYPE	EA	4	

Notes:

1. Clear and remove existing vegetation and topsoil to 2" below existing curb height on all medians and islands.
2. Item shall include all required steel reinforcement.
3. Item shall include 1500 shrubs 18"-24" in height (500 dracaena reflexa / 1000 ficus microcarpa) and 55 palm trees 8' height (Pheonix Sylvestris). Plantings shall be installed along medians as directed by project engineer.
4. Contractor shall submit a Temporary Traffic Control Plan for approval prior to performing any work.

SCHEDULE OF WORK			
STATION	SIDE		DESCRIPTION OF WORK
	LT	RT	
10+00 to 11+68	X	X	Milling and Paving Intersection, approximately 1700 SY
11+68 to 13+07		X	Milling and Paving 30' Wide, approximately 450 SY
12+00 to 15+75		X	Remove Existing Guardrail, Extend Existing Concrete Wall to 29" Above Curb - 375 LNFT
15+75 to 16+75		X	Remove Existing Guardrail, Install New Guardrail, Connect to Existing - 100 LNFT
12+83 to 14+66	X		Milling and Paving Intersection, approximately 420 SY
13+57	X		Cleaning Drainage Structure, Inlet
14+39 to 15+75		X	Full Depth Reconstruction 22'+/- Wide, approximately 370 SY
14+30 to 17+00	X		Remove Existing Guardrail, Extend Existing Concrete Wall to 29" Above Curb - 350 LNFT
17+00 to 17+38	X		Remove and Replace Existing Guardrail, Connect to Concrete Wall - 37.5 LNFT
17+00 to 18+50	X		Full Depth Roadway Reconstruction, approximately 490 SY
19+28 to 19+78	X	X	Full Depth Roadway Reconstruction, approximately 330 SY
19+78 to 20+60	X	X	Milling and Paving, approximately 780 SY
20+60 to 22+16		X	Milling and Paving Right Lane, 11' Wide, approximately 200 SY
23+00	X	X	Cleaning Drainage Structure, Inlets (2)
25+90 to 30+02		X	Milling and Paving Right Lane, 11' Wide, approximately 600 SY
27+00	X	X	Cleaning Drainage Structure, Inlets (2)
30+02 to 31+53	X	X	Full Depth Roadway Reconstruction, approximately 820 SY
34+00	X	X	Cleaning Drainage Structure, Inlets (2)
37+53 to 39+71	X	X	Milling and Paving Intersection, approximately 2140 SY
39+71 to 42+00		X	Full Depth Roadway Reconstruction 32'+/- Wide, approximately 820 SY
47+00	X	X	Cleaning Drainage Structure, Inlets (2)
53+02 to 56+42	X	X	Milling and Paving Intersection, approximately 2100 SY
56+42 to 57+25	X		Full Depth Roadway Reconstruction, approximately 158 SY
58+35 to 64+15	X	X	Milling and Paving Intersection, approximately 3230 SY
59+62 to 59+87	X		Full Depth Roadway Reconstruction, approximately 42 SY
60+56 to 60+81		X	Full Depth Roadway Reconstruction, approximately 45 SY
64+15 to 64+25	X	X	Full Depth Roadway Reconstruction, approximately 48 SY

General Note

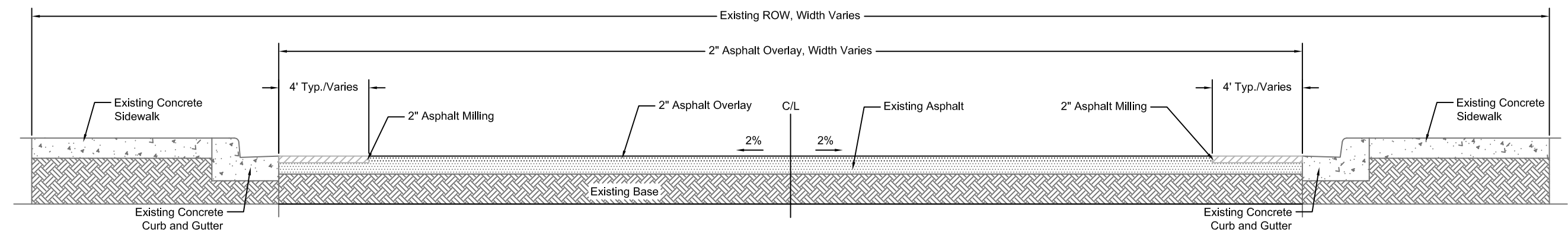
Stations are base on field measurements.

Contractor shall verify all work limits in the field with the CO prior to commencing any activities.

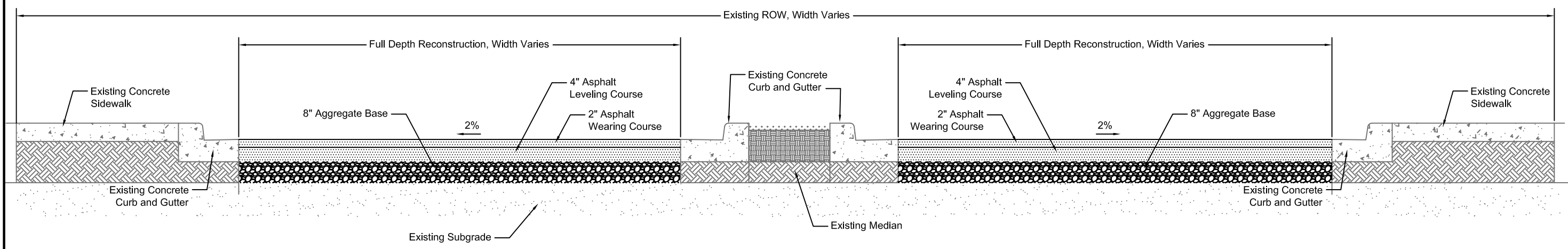
VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

**MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION
TABULATION OF QUANTITIES**

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	3



Typical Roadway Section - Overlay



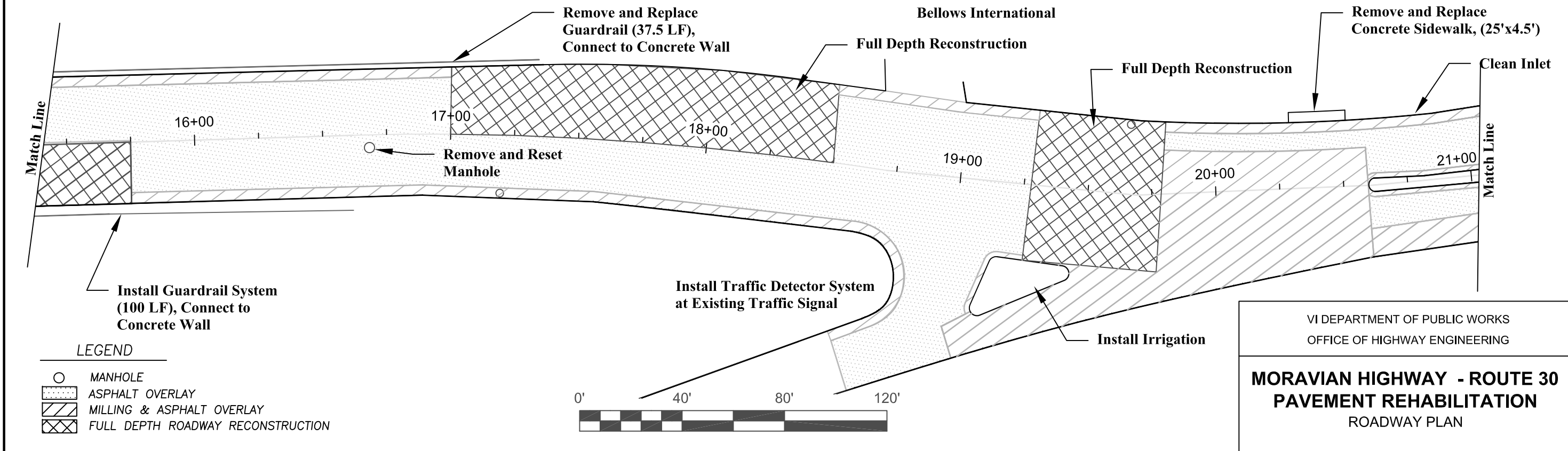
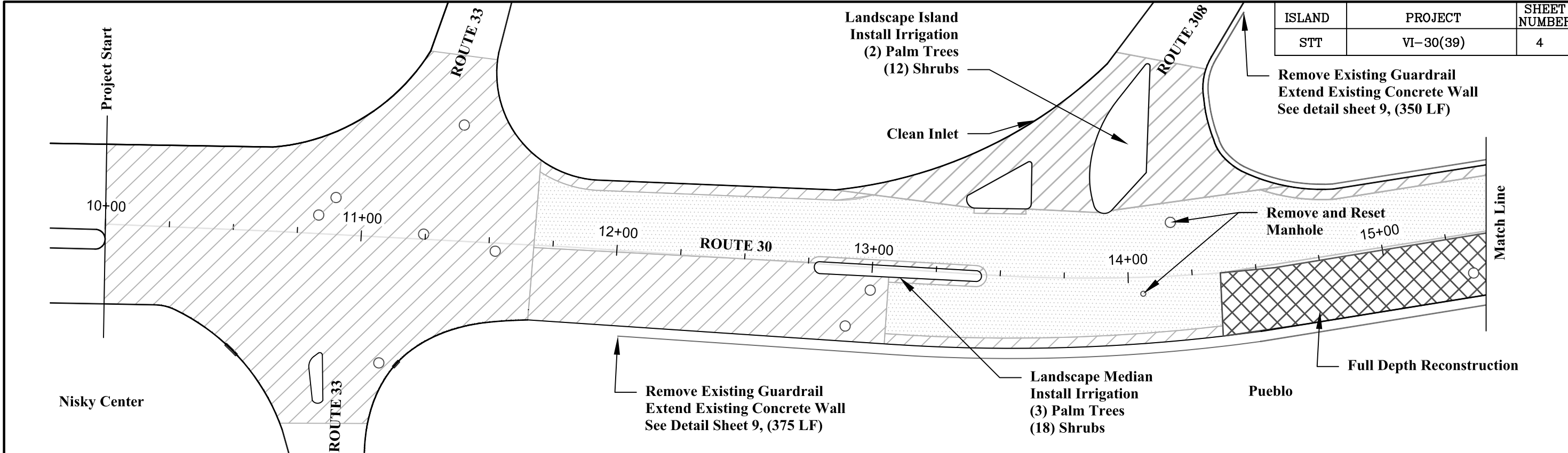
Typical Roadway Section - Full Depth Reconstruction

NOT TO SCALE

VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

**MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION**
TYPICAL SECTIONS

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	4



LEGEND

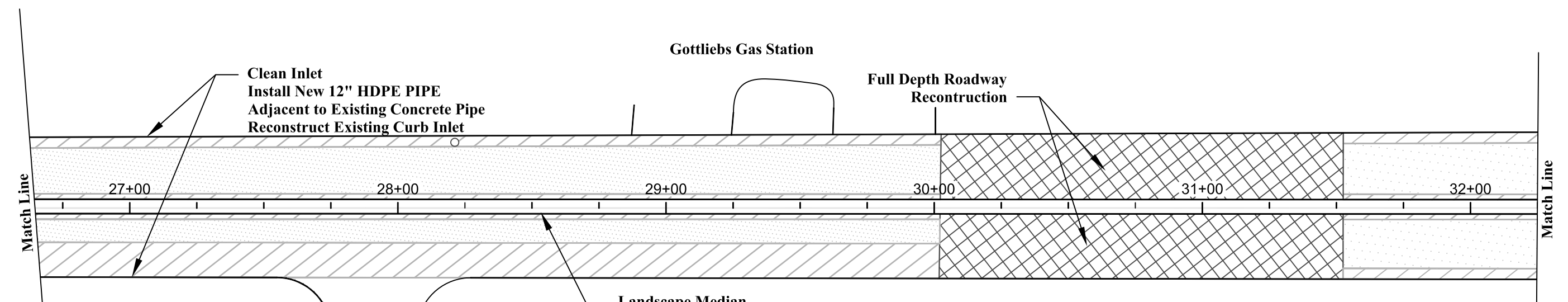
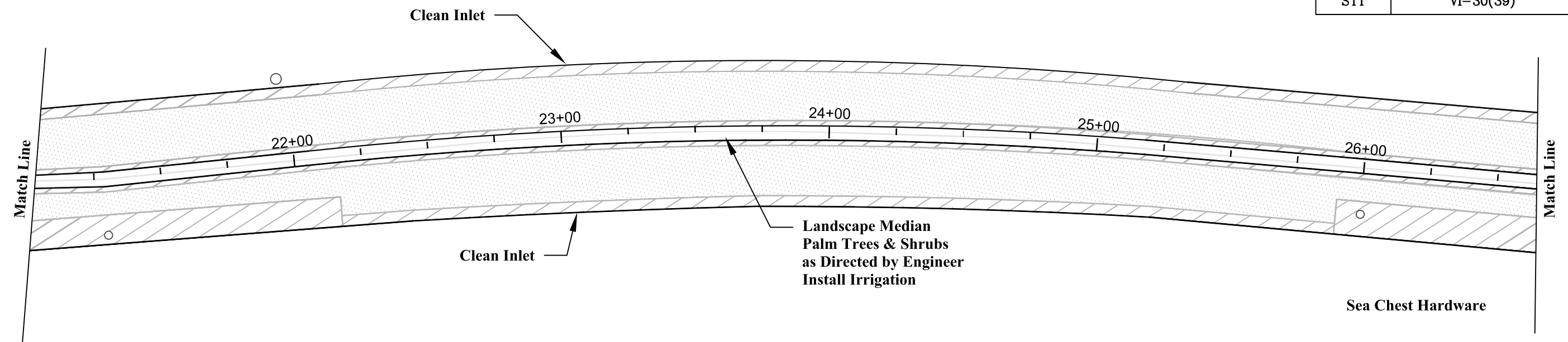
- MANHOLE
- ▨ ASPHALT OVERLAY
- ▧ MILLING & ASPHALT OVERLAY
- ▩ FULL DEPTH ROADWAY RECONSTRUCTION



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OFFICE OF HIGHWAY ENGINEERING

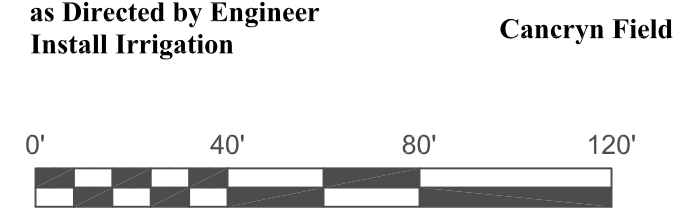
**MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION**
ROADWAY PLAN

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	5



LEGEND

- MANHOLE
- ▨ ASPHALT OVERLAY
- ▧ MILLING & ASPHALT OVERLAY
- ▩ FULL DEPTH ROADWAY RECONSTRUCTION

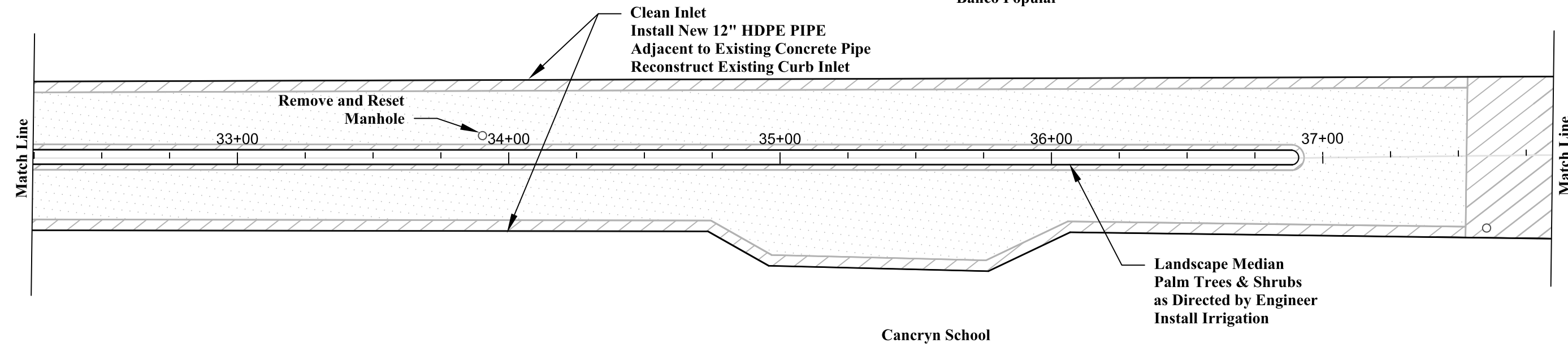


VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

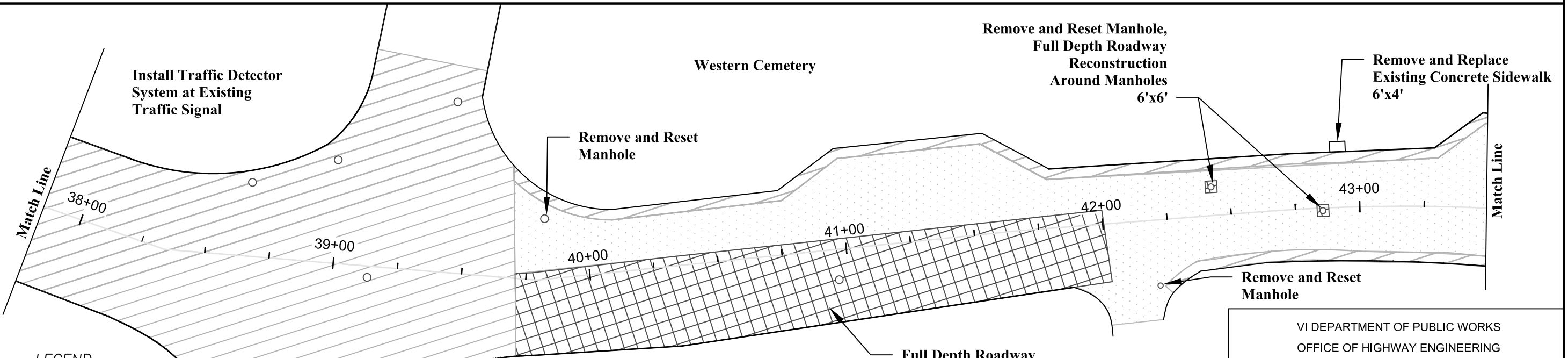
MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION
ROADWAY PLAN

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	6

Banco Popular



Western Cemetery



LEGEND

○	MANHOLE
▨	ASPHALT OVERLAY
▧	MILLING & ASPHALT OVERLAY
▩	FULL DEPTH ROADWAY RECONSTRUCTION

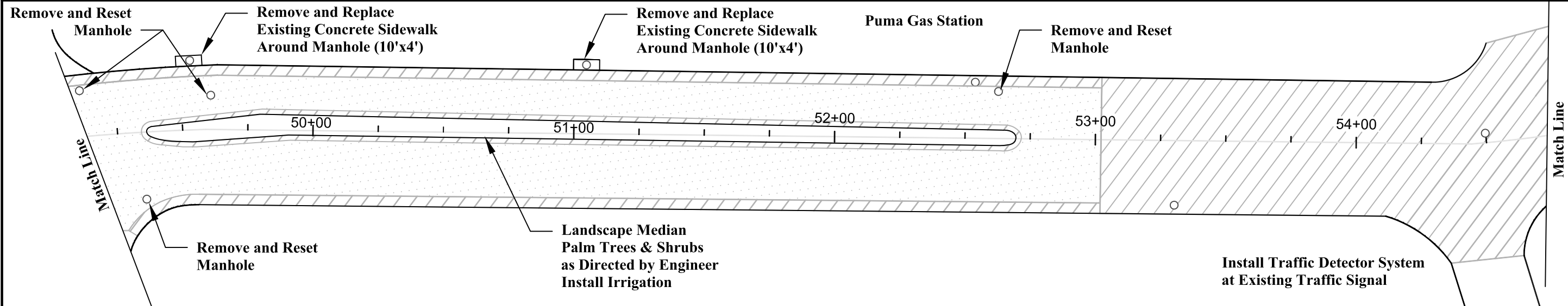
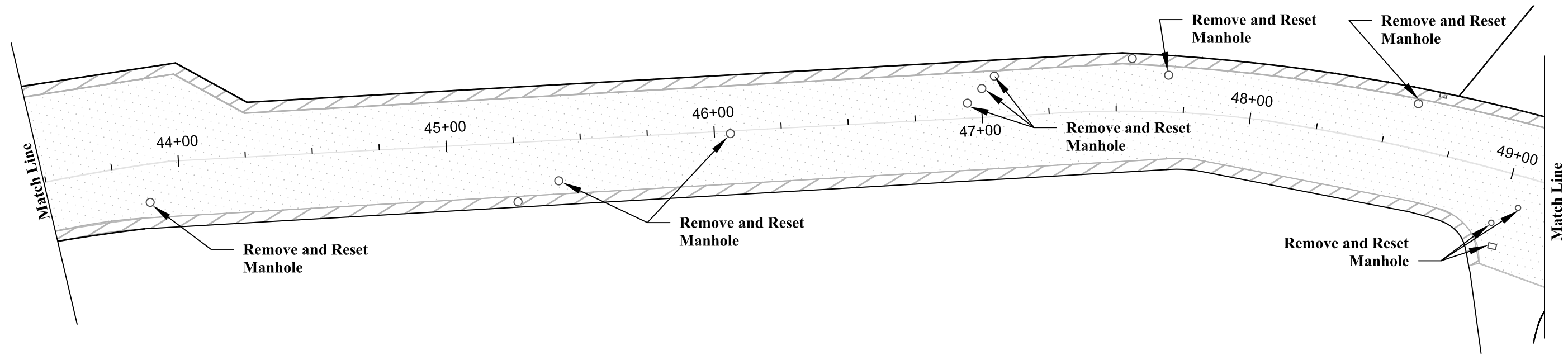


VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

**MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION**
ROADWAY PLAN

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	7

Western Cemetery



LEGEND

- MANHOLE
- ▨ ASPHALT OVERLAY
- ▧ MILLING & ASPHALT OVERLAY
- ▩ FULL DEPTH ROADWAY RECONSTRUCTION

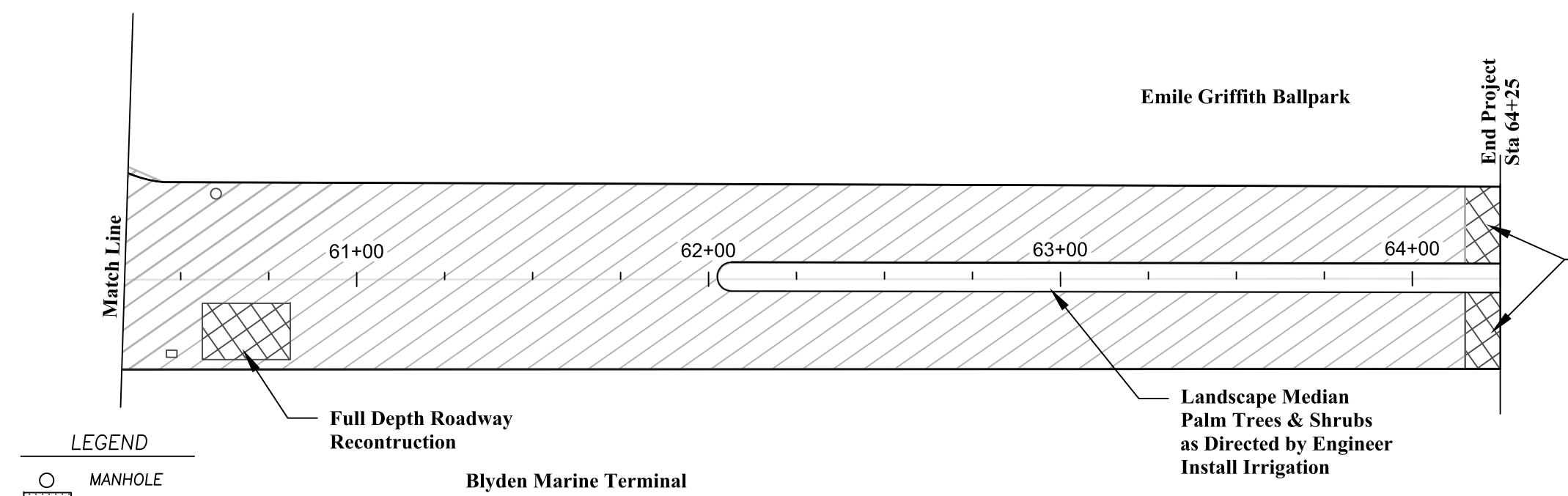
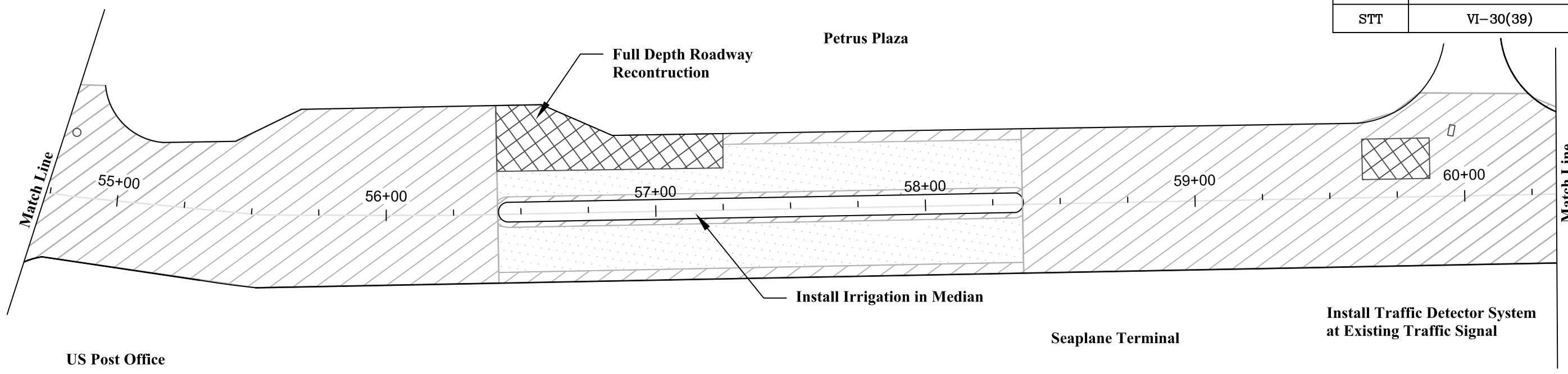


Install Traffic Detector System at Existing Traffic Signal

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MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION
ROADWAY PLAN

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	8



LEGEND

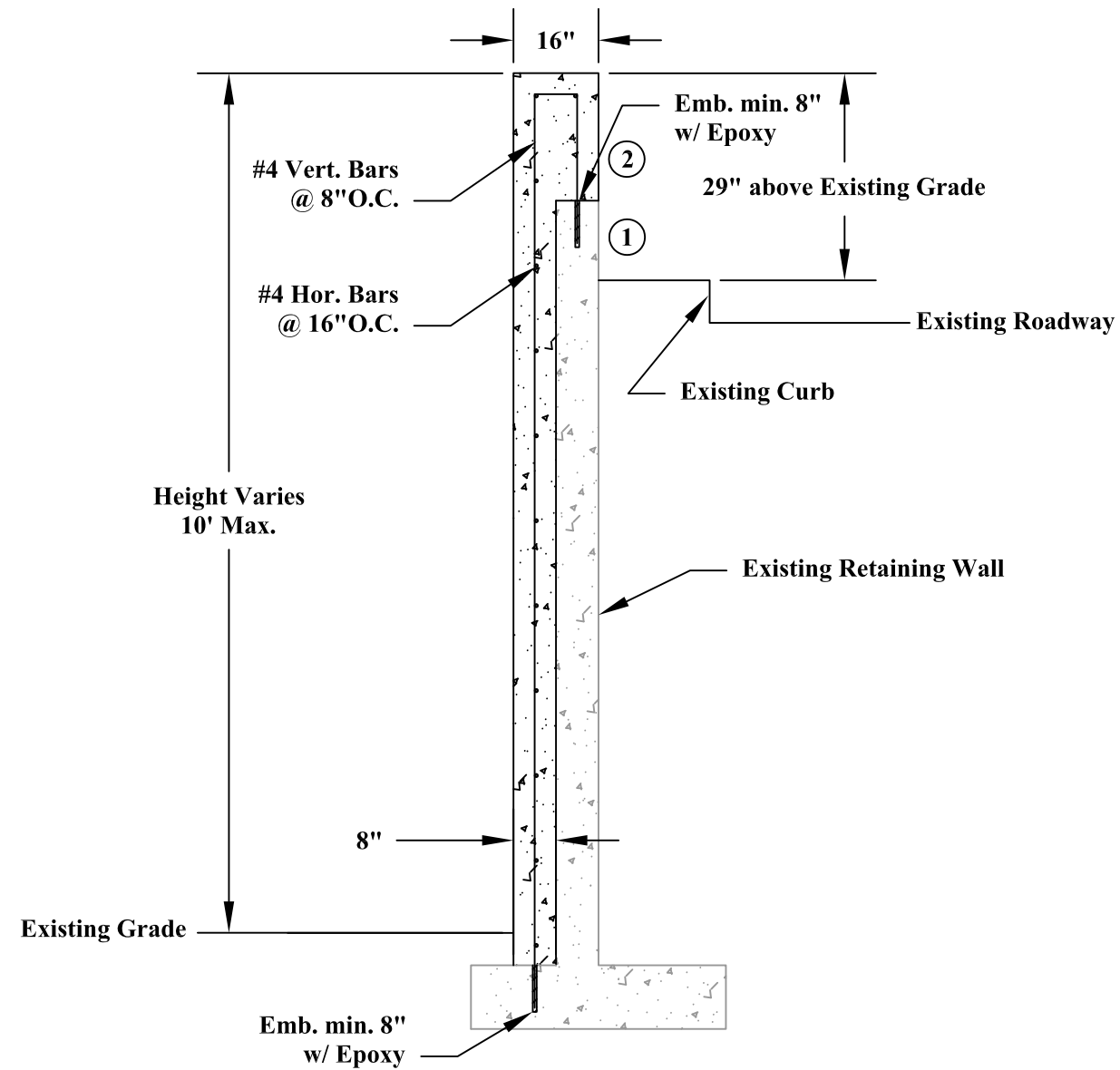
○	MANHOLE
▨	ASPHALT OVERLAY
▧	MILLING & ASPHALT OVERLAY
▩	FULL DEPTH ROADWAY RECONSTRUCTION



VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION
ROADWAY PLAN

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	9



Notes

- ① Patch and repair existing wall.
- ② Plaster finish on wall facing roadway.

Patching, repairs, and plaster shall be paid under pay item 60101-0000

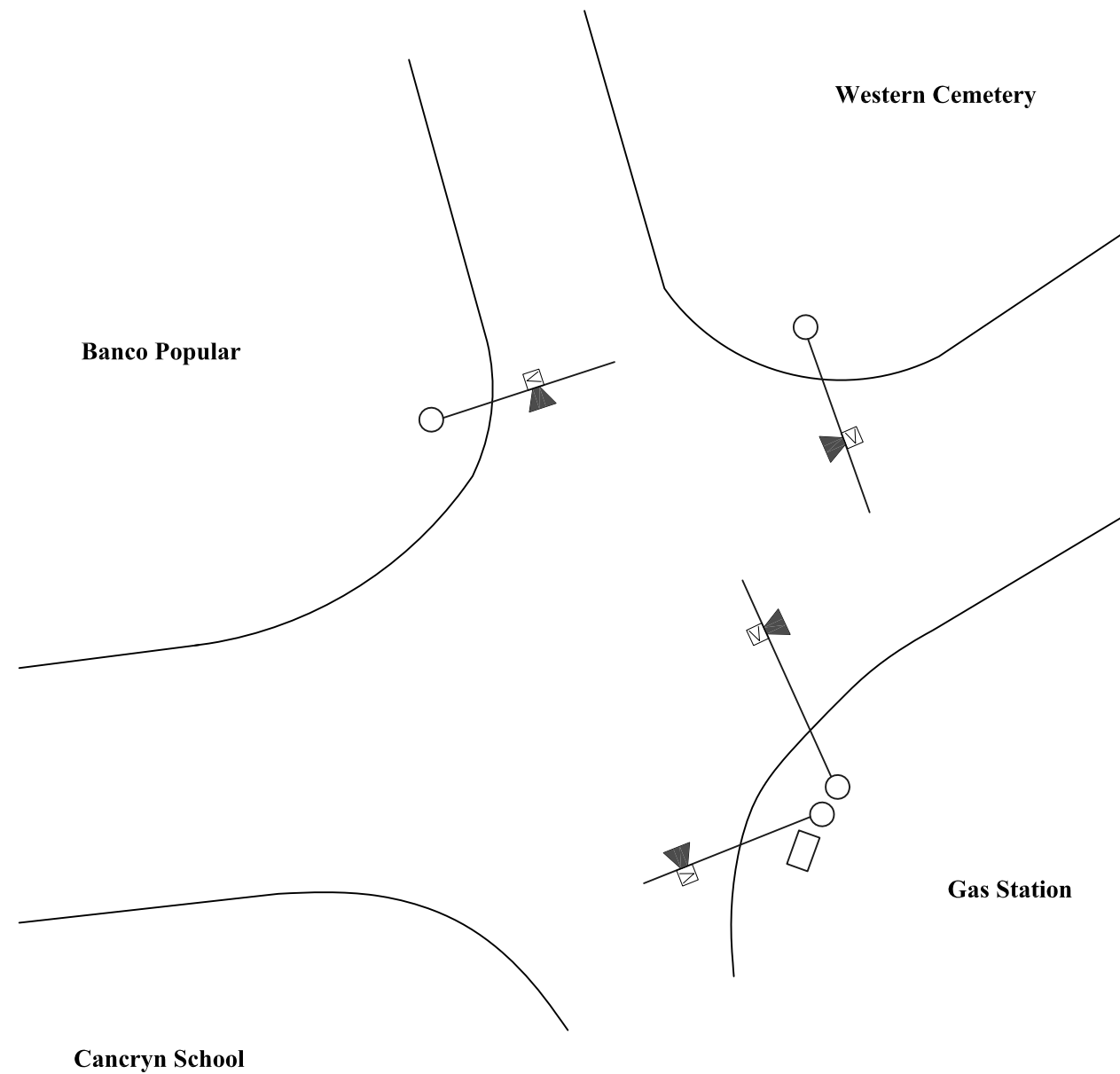
TYPICAL WALL DETAIL





Stations 12+00 to 17+00 (approx.)
Right & Left
(not to scale)

VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

**MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION
WALL DETAIL**

ISLAND	PROJECT	SHEET NUMBER
STT	VI-30(39)	10







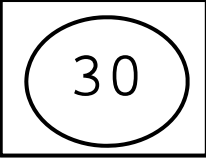


- LEGEND**
-  VIDEO DETECTOR
 -  EXISTING POLE
 -  EXISTING ARM
 -  EXISTING CONTROL CABINET

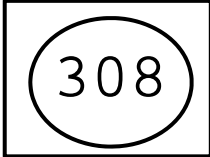

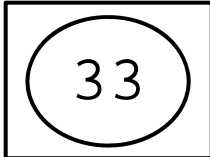




TRAFFIC DETECTION SYSTEM PLAN
INTERSECTION ROUTE 30 AT BANCO POPULAR
(TYPICAL FOR 4)






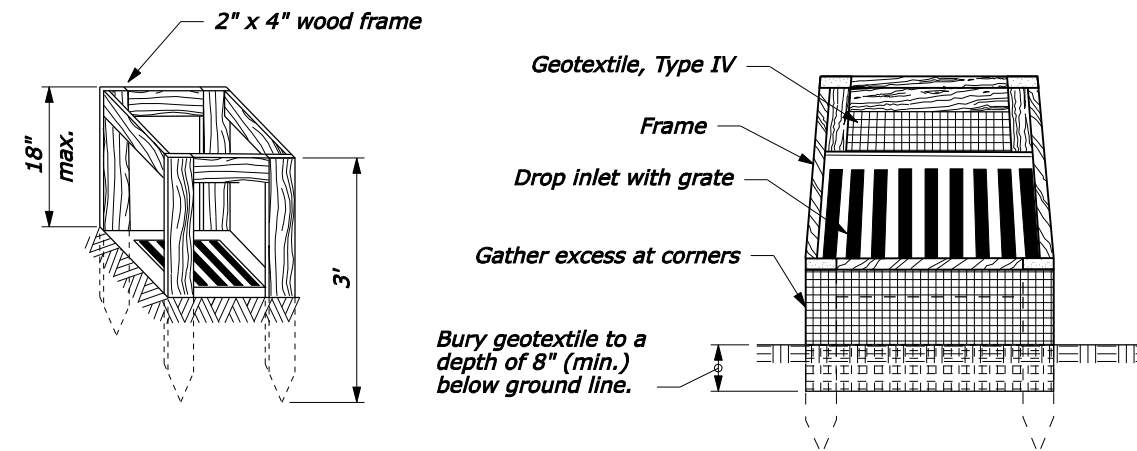
VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

MORAVIAN HIGHWAY - ROUTE 30
PAVEMENT REHABILITATION
TRAFFIC DETECTION SYSTEM DETAIL

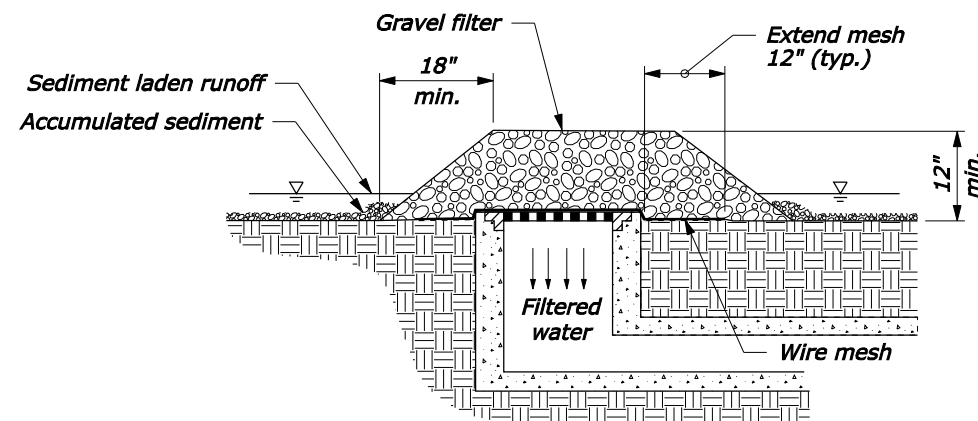
																	PROJECT	SHEET NO.		
																	VI-30(39)	10		
SIGN NO.	TEXT NO.	SIGN TEXT	LOCATION		PANEL SIZE						TEXT SIZE				Color Combination	Quantity	Total Area (sq ft)	SUPPORT (ft)	REMARKS	
			STATION	SIDE	Width (in.)	Height (in.)	Area (sq ft)	Corner Radii (in.)	Border Width (in.)	Margin Width (in.)	Numbers (in.)	Upper Case (in.)	Lower Case (in.)	Series						
1	R2-1		SEE NOTE 2 TYP.		24	30	5	SEE NOTE 3 TYP.						White on Red	6	30	SEE NOTE 1 TYP.			
2	S4-3P				24	8	1.33								Black on Fluorescent Yellow-Green	2	2.66			
3	R2-1				24	30	5								Black on White	2	10			
4	S4-2P				24	10	1.67								Black on White	2	3.34			
5	M1-6				30	30	6.25								Black on White	6	37.5			
6	M3-2				30	15	3.13								Black on White	3	9.39			
7	M3-4				30	15	3.13								Black on White	3	9.39			
NOTES:													Total (this sheet)		24	102.28				
<p>1. Sign post supports will not be measured for payment and shall be in accordance with Detail 633-01.</p> <p>2. Place signs at or near their original location. Final location of signs will be determined in the field, as approved by the project engineer.</p> <p>3. Construct and erect all signs in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD)</p>																	<p>Department of uPublic Works Office of Highway Engineering St. Thomas, Virgin Islands</p> <p>PERMANENT SIGNS SCHEDULE</p>			

																	PROJECT	SHEET NO.	
																	VI-30(39)	11	
SIGN NO.	TEXT NO.	SIGN TEXT	LOCATION		PANEL SIZE						TEXT SIZE				Color Combination	Quantity	Total Area (sq ft)	SUPPORT (ft)	REMARKS
			STATION	SIDE	Width (in.)	Height (in.)	Area (sq ft)	Corner Radii (in.)	Border Width (in.)	Margin Width (in.)	Numbers (in.)	Upper Case (in.)	Lower Case (in.)	Series					
8	M1-6		SEE NOTE 2 TYP.		30	30	5	SEE NOTE 3 TYP.						White on Red	3	15	SEE NOTE 1 TYP.		
9	M6-1				21	15	2.19								Black on White	2	4.38		
10	M1-6				30	30	6.25								Black on White	2	12.5		
11	M2-1				21	15	2.19								Black on White	3	6.57		
12	R10-7				24	30	5								Black on White	6	30		
13	I-5				24	24	4								White on Green	1	4		
14	M6-3				21	15	2.19								White on Green	1	2.19		
NOTES:													Total (this sheet)		18	74.64			
<p>1. Sign post supports will not be measured for payment and shall be in accordance with Detail 633-01.</p> <p>2. Place signs at or near their original location. Final location of signs will be determined in the field, as approved by the project engineer.</p> <p>3. Construct and erect all signs in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD)</p>																	<p>Department of uPublic Works Office of Highway Engineering St. Thomas, Virgin Islands</p> <p>PERMANENT SIGNS SCHEDULE</p>		

																	PROJECT	SHEET NO.				
																	VI-30(39)	12				
SIGN NO.	TEXT NO.	SIGN TEXT	LOCATION		PANEL SIZE						TEXT SIZE				Color Combination	Quantity	Total Area (sq ft)	SUPPORT (ft)	REMARKS			
			STATION	SIDE	Width (in.)	Height (in.)	Area (sq ft)	Corner Radii (in.)	Border Width (in.)	Margin Width (in.)	Numbers (in.)	Upper Case (in.)	Lower Case (in.)	Series								
15	R1-1		SEE NOTE 2 TYP.		30	30	6.25	SEE NOTE 3 TYP.						White on Red	4	25	SEE NOTE 1 TYP.					
16	R3-4				24	24	4								Black on White	2	8					
17	S4-1102				24	30	5								Black on White / Fluorescent Yellow-Green	2	10					
																0						
																0						
																0						
																0						
NOTES:													Total (this sheet)		8	43						
1. Sign post supports will not be measured for payment and shall be in accordance with Detail 633-01 & 633-02													Total									
2. Place signs at or near their original location. Final location of signs will be determined in the field, as approved by the project engineer.													50	219.92								
3. Construct and erect all signs in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD)																			Department of uPublic Works Office of Highway Engineering St. Thomas, Virgin Islands PERMANENT SIGNS SCHEDULE			



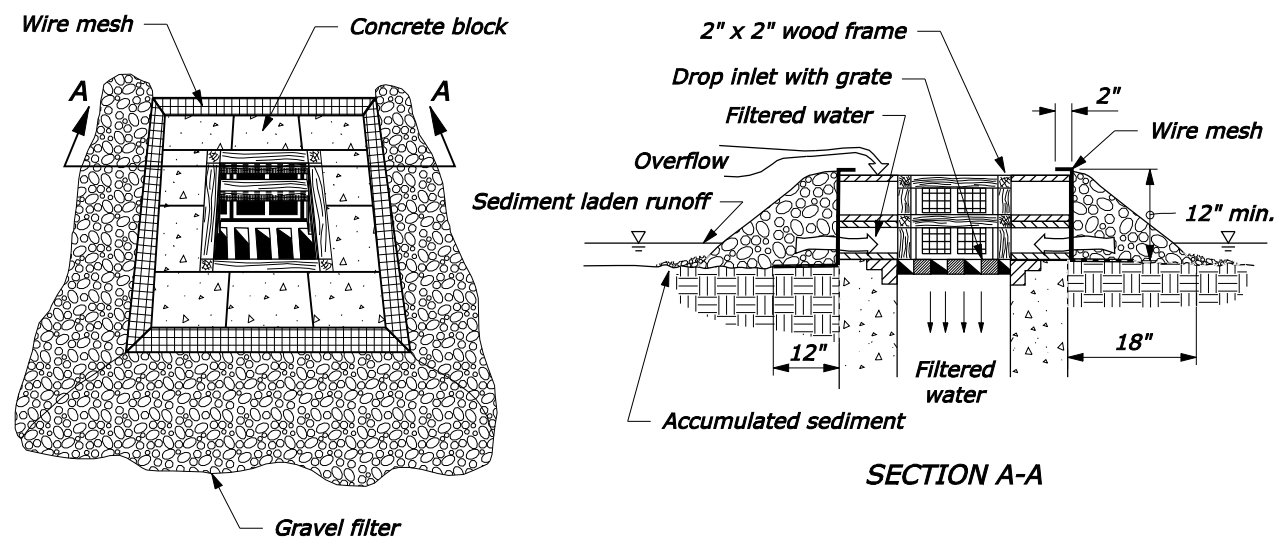
SILT FENCE DROP INLET PROTECTION (TYPE A)



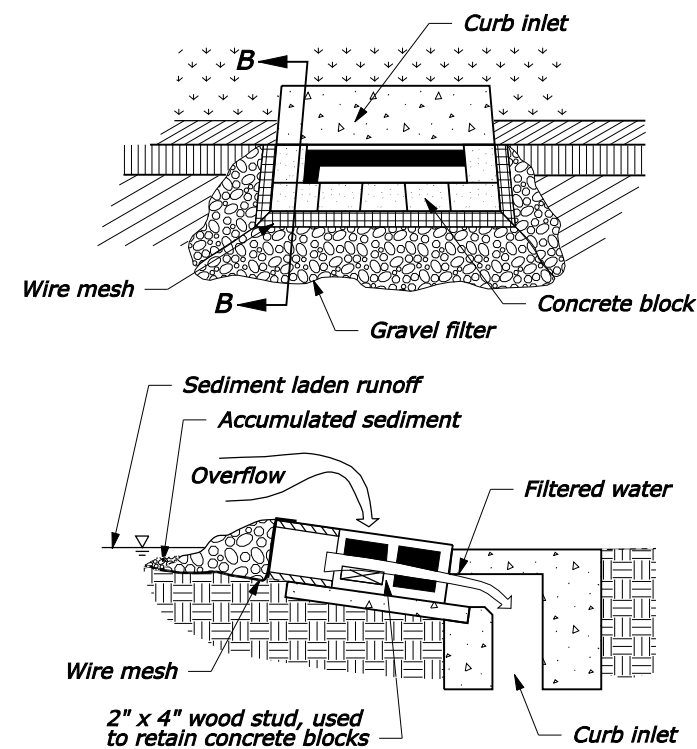
GRAVEL AND WIRE MESH DROP INLET PROTECTION (TYPE B)

NOTE:

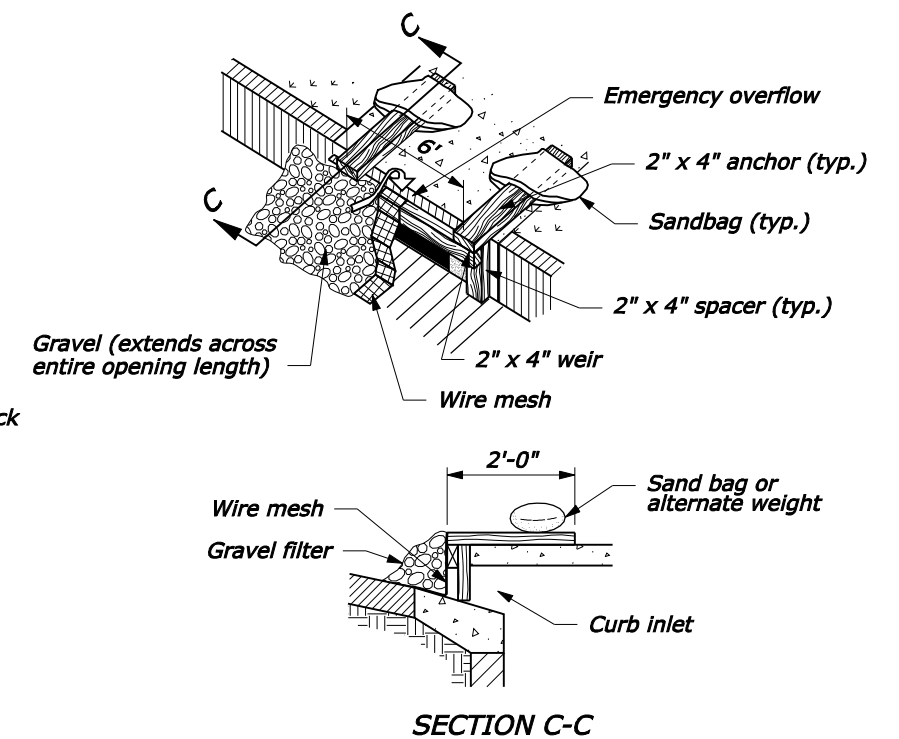
1. For gravel filters use 2" - 3" diameter coarse aggregate.
2. Use wire mesh with 1/2" x 1/2" openings.
3. Use Type A inlet protection in sump locations only.
4. Use Type B inlet protection only in sump locations where heavy concentrated flows are not expected. Do not use where ponding around the structure might cause inconvenience or damage.



BLOCK AND GRAVEL DROP INLET PROTECTION (TYPE C)



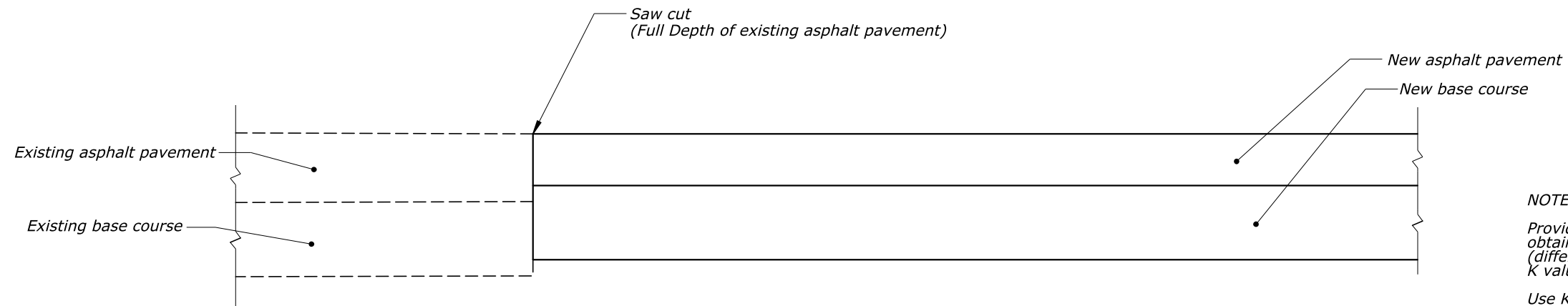
CURB INLET PROTECTION, BLOCK AND GRAVEL (TYPE D)



CURB INLET PROTECTION, WOODEN WEIR (TYPE E)

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD	
TEMPORARY INLET PROTECTION	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED:	157-2



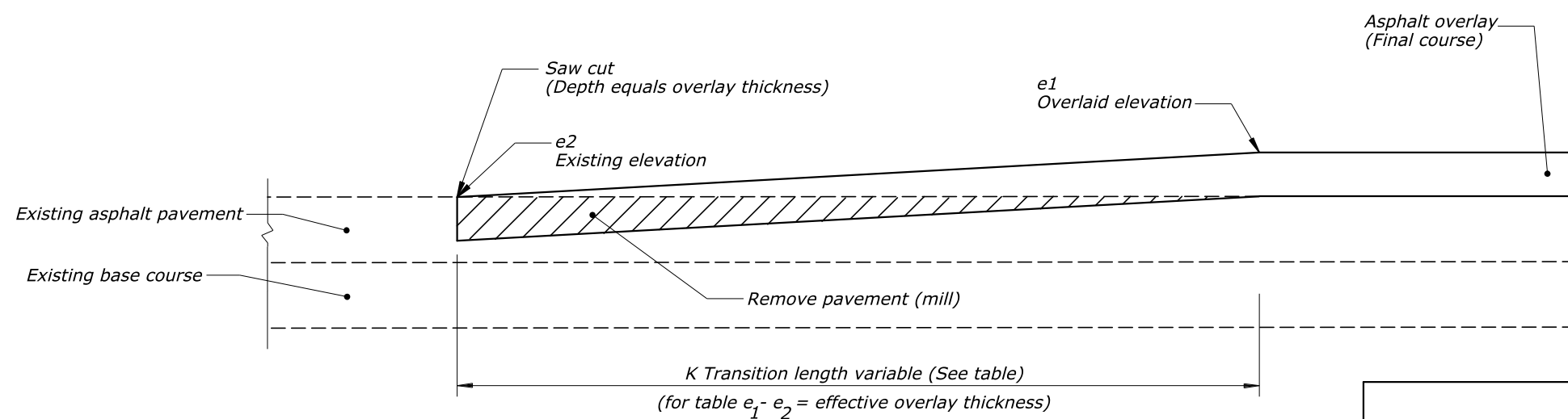
NEW PAVEMENT

NOTE :

Provide a transition length in feet that is not less than the value obtained by multiplying the effective overlay thickness in inches (difference between the existing and overlaid elevations) by the K value from the Table for the posted speed of the roadway.

Use $K*[e1-e2]=T$, or $K*[d1-d2]=T$ (whichever applies), to obtain the transition length.
(Minimum transition length=30 feet)

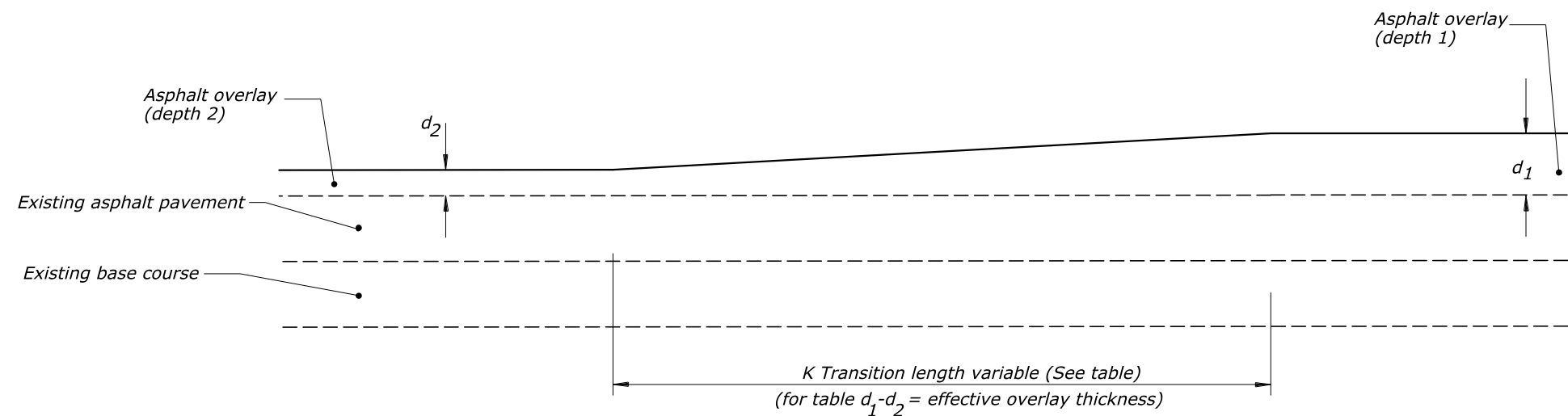
Example :
If the posted speed is 55 MPH
Effective overlay thickness = 2"
Then the minimum transition length =
2 inches x 42.5 ft/in = 85 feet.



OVERLAY

K VALUE TABLE (ft/in)										
POSTED SPEED (MPH) *	30	35	40	45	50	55	60	65	70	75
K	30	32.5	35	37.5	40	42.5	45	47.5	50	52.5

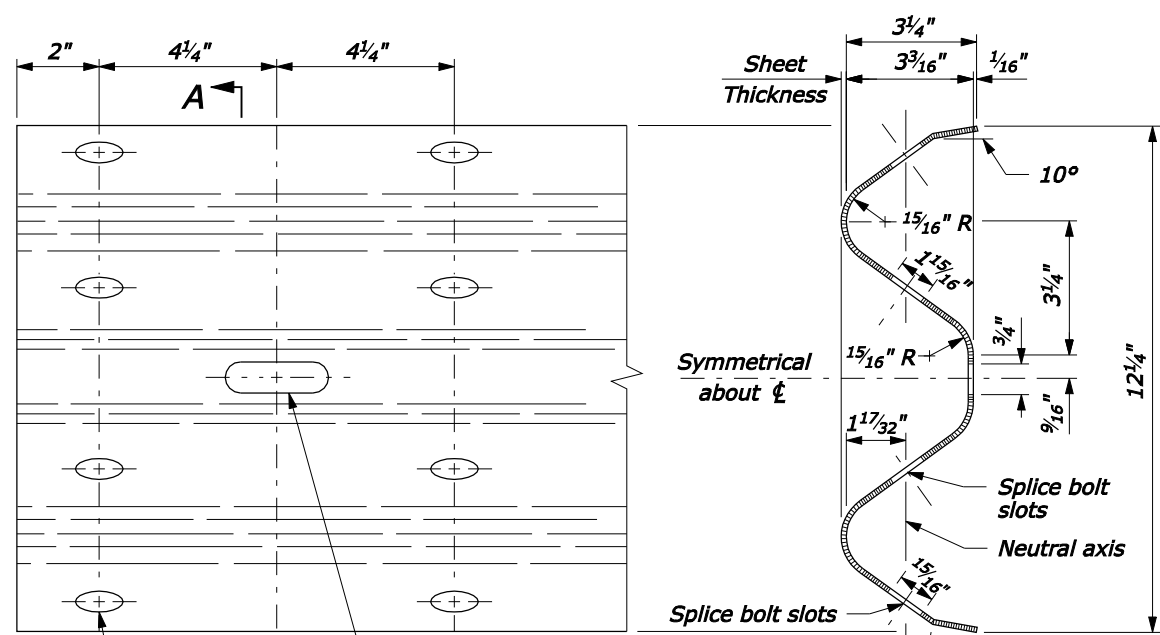
* Use a K Value of 30 for speeds less than 30 MPH.



OVERLAY - DEPTH TRANSITIONS

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION	
U.S. CUSTOMARY DETAIL	
PAVEMENT TRANSITIONS	
DETAIL APPROVED FOR USE	DETAIL
APPROVED : FEBRUARY 2013	E401-01



RAIL ELEMENT ELEVATION

SECTION A-A

15/16" x 1 1/8" splice bolt slot. 8 required, each end rail element

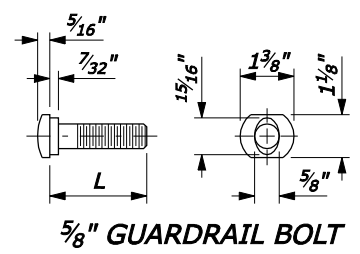
3/4" x 2 1/2" post bolt slot at 6'-3" spacing, center to center

Symmetrical about ϵ

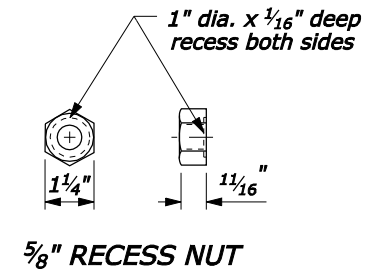
Splice bolt slots

Neutral axis

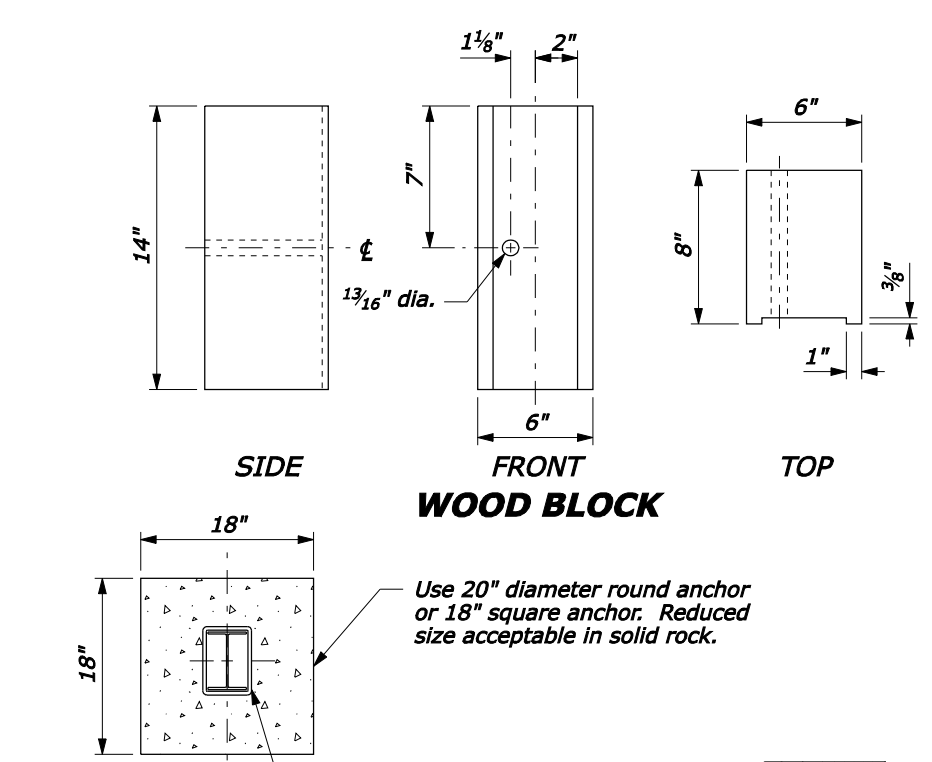
W BEAM RAIL MEMBERS



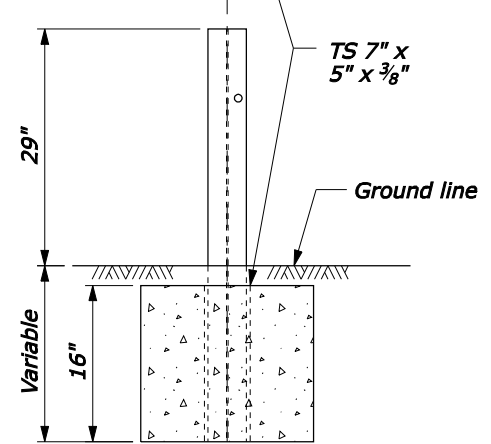
L	Thread Length
1 3/8"	1 1/8" minimum
2"	1 3/4" minimum
10"	4" minimum
18"	4" minimum
25"	4" minimum



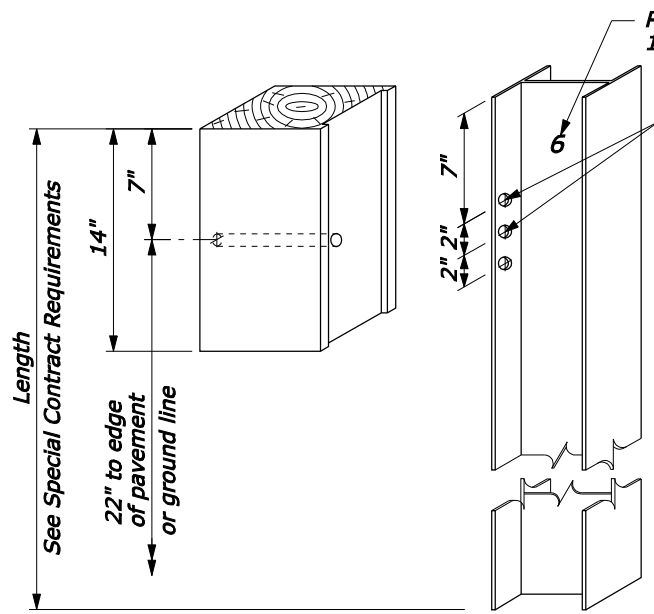
GUARDRAIL BOLT AND RECESS NUT



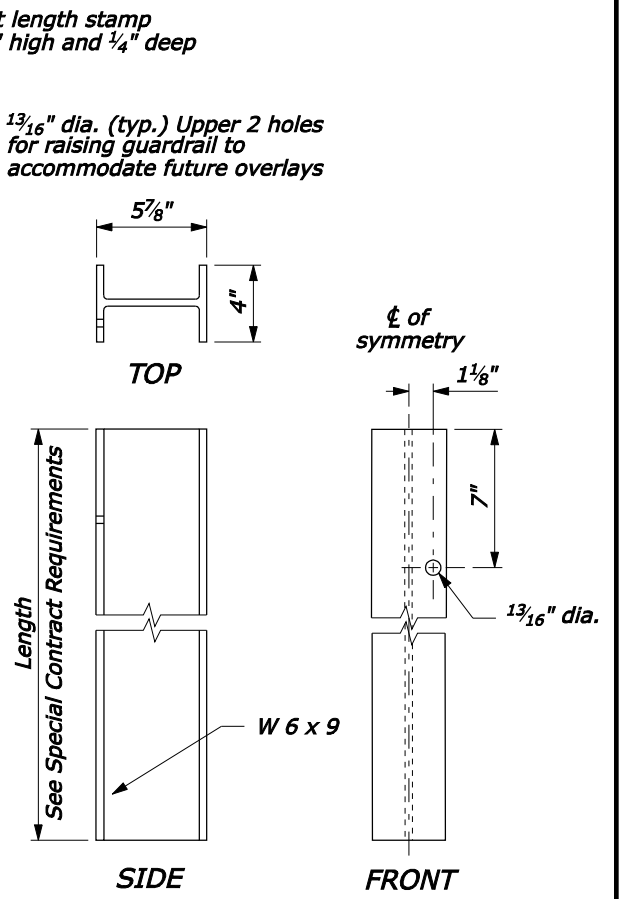
WOOD BLOCK



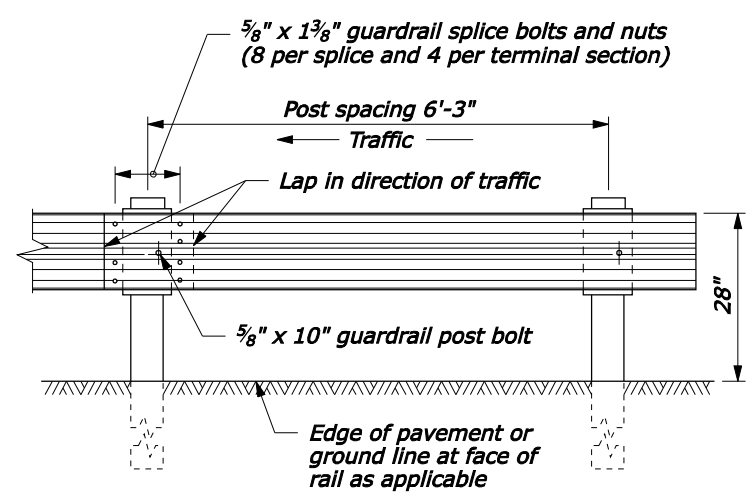
CONCRETE ANCHOR FOR SHORT GUARDRAIL POST
(See Note 1 and 2)



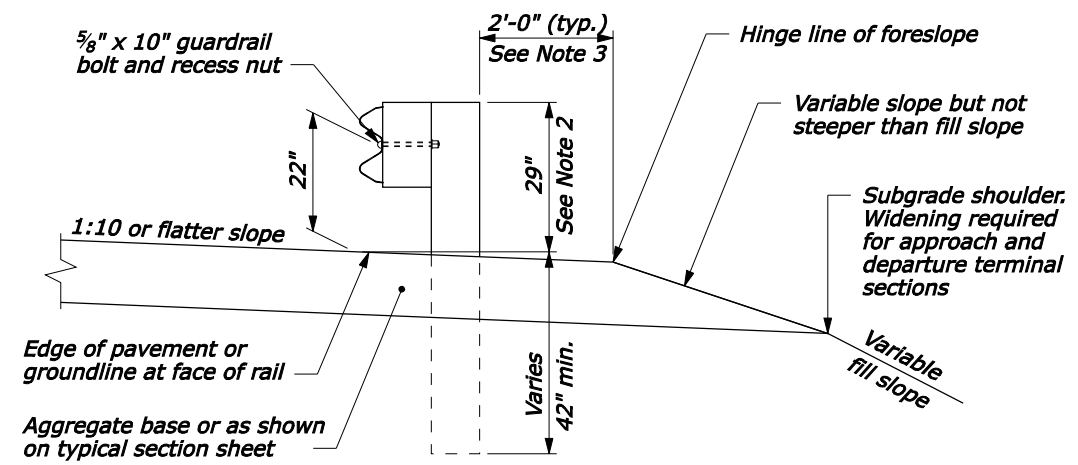
ALTERNATE HOLE ARRANGEMENT POST AND BLOCK DETAIL



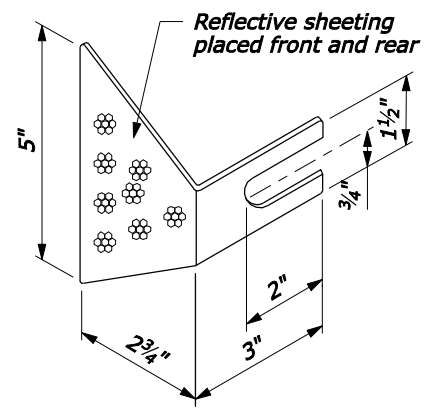
STRUCTURAL SHAPE POST



POST SPACING STANDARD POST SECTION



TYPICAL GUARDRAIL CROSS SECTION



REFLECTOR TAB
(See Note 4)

NO SCALE

- NOTE:**
1. Use no more than 3 short guardrail posts in a row.
 2. If directed to use alternate hole arrangement, post above ground shall be 33 inches tall.
 3. See Special Contract Requirements when 7'-0" or longer posts are specified.
 4. Install reflector tab between post bolt and rail, every fourth post. Alternate reflector tab shapes are acceptable.
 5. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.

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FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

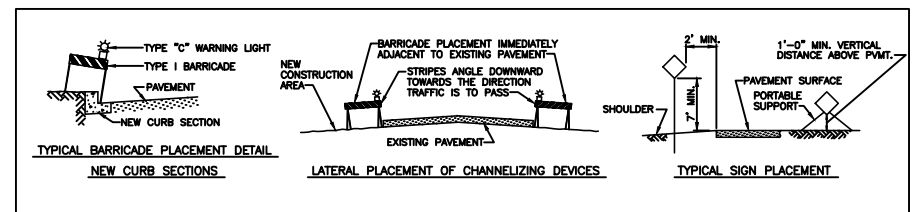
U.S. CUSTOMARY STANDARD

G4 W-BEAM GUARDRAIL STEEL POSTS

STANDARD APPROVED FOR USE 1/1994
REVISED: 4/1994 6/2005
DRAFT: 3/2007

STANDARD 617-11

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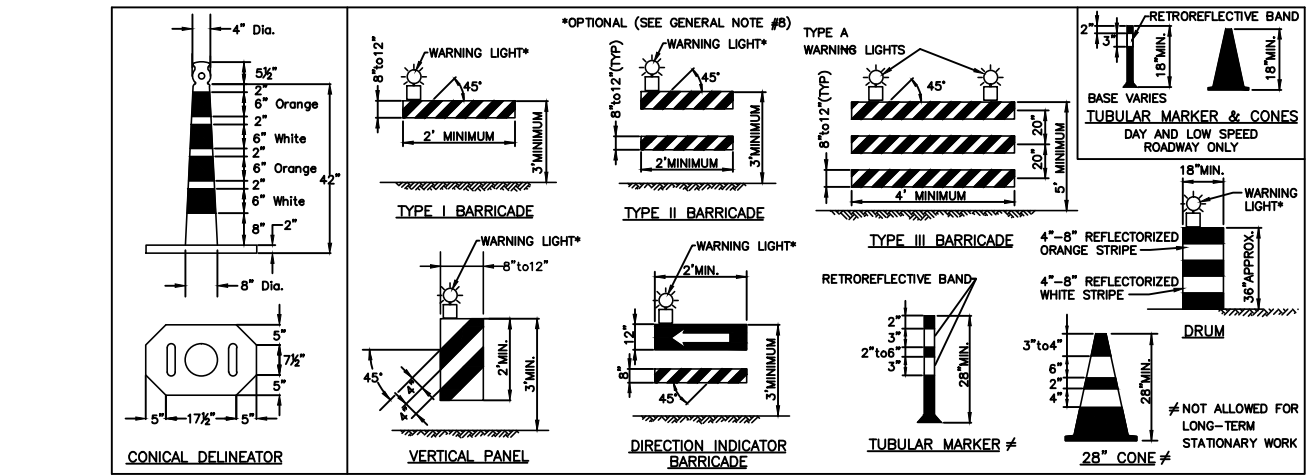
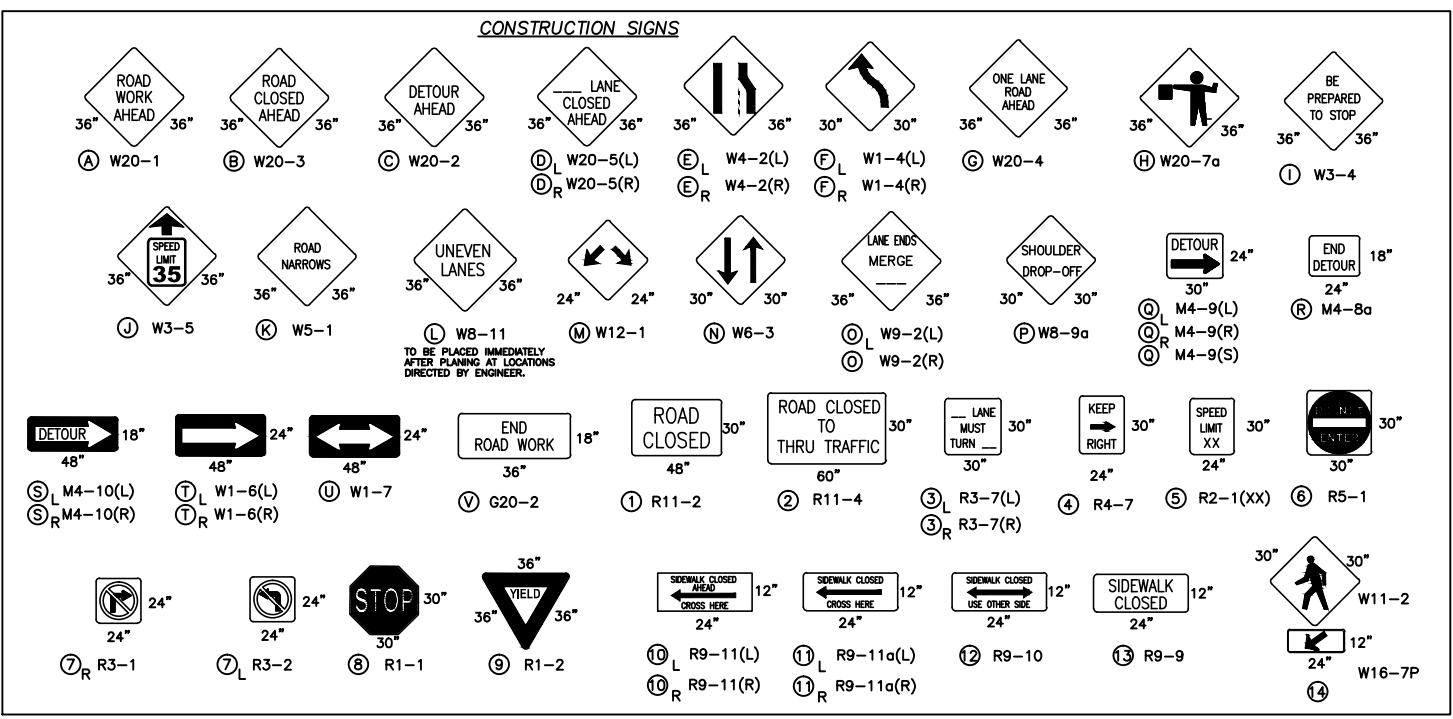
Traffic Control General Notes

- Traffic Control Device Requirements:**
- All traffic control devices shall be fabricated and installed in accordance with the M.U.T.C.D., and N.C.H.R.P. 350 latest editions. This traffic control plan (T.C.P.) will cover a major portion of the work involved in this project. The contractor may develop his own T.C.P. upon submission and approval by the engineer before it can be implemented for this project.
 - All orange construction signs shall be reflectorized with fluorescent orange prismatic grade retroreflective sheeting. All regulatory signs used in the construction traffic control shall be reflectorized with micro-encapsulated prismatic retroreflective sheeting. All type I, II, III and indicator barricades and channelizing devices shall be reflectorized with an approved high intensity grade retroreflective sheeting. White bands on conical delineators, tubular markers, drums and cones shall be approved High Intensity grade retroreflective sheeting. Orange bands shall be fluorescent prismatic grade sheeting. All markings shall be reflectorized with glass beads.
 - All barricades 3' in length or longer shall have 6" wide stripes of alternating high intensity grade retroreflective white and orange sheeting. All barricades less than 3' in length shall use 4" wide stripes.
 - Drums, conical delineators, direction indicator barricades, and type I or II barricades are acceptable channelization devices for use in tapers and transition areas.
 - Vertical panels, 28" retro-reflective cones and 28" retro-reflective tubular markers may be used for taper channelization and transition areas where space restrictions don't allow for other more visible devices or for short duration maintenance or utility work. 18" reflectorized orange tubular markers or non-reflective 18" orange cones may be used during daylight construction or under low speed conditions only.
 - Type III barricades shall be used at street closings at the point of closure.
 - The spacing of channelizing devices should not exceed a distance in feet equal to the speed limit for taper channelization, and a distance in feet equal to two times the speed limit in MPH in tangent channelization areas.
 - Warning lights shall be used at night on all barricades and shall conform to the latest edition of the M.U.T.C.D. and N.C.H.R.P. 350 for crashworthiness. Flashing warning lights shall be used when barricades or drums are used singly. Steady burn lights shall be used when channelizing devices are used in a series, i.e. lane closure, delineation of edge of traveled construction, etc.
 - Properly equipped flaggers shall be used to direct traffic for a lane closure of a two-lane street when construction vehicles are entering and exiting the work area or at other locations as directed by the City. Flaggers' clothing and equipment shall conform to the latest edition of the M.U.T.C.D.
 - Advance warning arrow displays shall be used at all lane closures on multilane streets but should not be used in lieu of proper traffic control signs, barricades, or channelizing devices. Preferred placement of the arrow display should be at the start of the taper area.
 - Traffic control devices when not in use shall be completely covered or removed from the construction site.
 - The contractor shall be responsible for maintaining all traffic control devices on an around the clock basis, whether or not work is actively being pursued and any deficiencies noted shall be corrected immediately.
 - The traffic control requirements shown on these plans are minimum requirements only and do not attempt to address in depth the variety of situations that may occur once construction has started. In no way do the requirements shown on these plans relieve the contractor of his responsibility for selecting the proper traffic control devices and implementation procedures that will assure the safety of motorists, pedestrians, and workers at all times. Any additional quantities of traffic control devices necessary to complete the contract or as ordered installed by the engineer shall be considered subsidiary to the contract Lump Sum bid price.
 - Should the contractor fail to enforce the traffic control plan or fail to clean, repair, replace or otherwise maintain the traffic control devices when directed to do so by the engineer or his representative, the City may take one or more of the following actions:
 - Employ another agency to correct deficiencies in signing or warning devices and deduct the cost from the contractor's pay estimate.
 - Suspend all pay estimates until deficiencies are corrected.
 - Stop the work until deficiencies are corrected.
 - Place the contractor in default.
 - Any existing permanent signs removed by the contractor for construction purposes other than stop, yield and street name signs shall be returned to the City of overland park maintenance facilities. All stop, yield and street name signs removed shall be temporarily erected in the appropriate locations (no less than 7 feet vertical from grade) until the permanent signing can be installed. Any temporary stop or yield sign installation to be left in place overnight will require prior approval from the engineer.
 - Any permanent sign or existing pavement markings that conflict with this traffic control plan shall be covered, obliterated or removed as directed by the engineer.
 - The contractor shall provide as many barricades with appropriate warning lights as needed to effectively protect pedestrians or traffic from exposed objects or excavations. Lighted barricades shall be used at removed sidewalk sections and temporary rock placed for a walking surface until concrete is placed.
 - During all construction periods, the contractor shall have at the jobsite all necessary traffic control devices (appropriate signs, lighted arrow display, channelizing devices, etc.) to properly close at least one lane of traffic.
 - Any two consecutive drop-off conditions that exist within 50' or more of each other will be considered as one hazard and will require type "C" lights on standard devices in a series. Any drop-off condition 100' or more in length will also require type "C" lights on standard devices to delineate traffic from the hazard. Any drop-off condition existing under 50' in length will require type "A" lights on standard devices used singly to warn of the hazard. These requirements shall apply to any drop-off greater than two inches in height. Appropriate warning signs (SHOULDER DROP-OFF) shall be placed in advance of the hazard.
 - All W20-1 advance warning signs shall be post mounted.
 - Place G20-2 signs 500' minimum past construction. If the G20-2 sign will be less than 1,000 feet from other construction improvements, it can be omitted. Placement of advance work zone signing shall be as indicated in the "advance warning signing spacing" table based on the speed of the facility.

Construction Requirements:

- Construction shall be sequenced to provide the least possible adverse effect to residences.
- Construction materials shall be kept off sidewalks and consolidated in areas within the Government right-of-way unless otherwise approved by the engineer.
- Mud and construction debris on streets or sidewalks shall be cleaned off immediately.
- Access shall be maintained to all drives and side streets or as indicated in the traffic control plan.
- Construction vehicles shall be parked along streets so as not to restrict sight distance for vehicles exiting at streets or any drives.
- The contractor shall be responsible for contacting the following emergency services advising them of all street closure locations and times:

Fire Station	774-7610
Fire Emergency Communications	774-1211
Police Dispatch	774-2211
Medical Emergency	776-8311
- No construction shall be performed on holidays and weekends unless prior approval is received in writing from the engineer.
- The contractor is responsible for avoiding any and all utilities when setting sign posts and will be required to coordinate his activities with any and all utility companies whether their facility is indicated on the plans or not.
- Street plates, when used shall be A36 certified steel at least 1" thick with lift hooks and securely fastened to the pavement with stakes, pins or asphalt wedge course.
- Any construction activities which require the closing of a lane of traffic on thoroughfares (arterial streets) or collector streets shall not occur during the hours of 7:00 a.m. to 8:30 a.m. and 4:00 p.m. to 6:00 p.m. or on holidays or weekends unless prior approval is received through the Project Engineer of there are emergency repairs necessary by a utility company or their representative.
- There shall be no work within 500 feet of any signalized intersection between the hours of 6:30 a.m. and 8:00 a.m.
- Mill and Overlay operations shall be performed between the hours of 7:00 p.m. and 6:00 a.m. Sunday through Thursday unless otherwise indicated in the plans or approved by the engineer in charge of construction.



TYPE	MIN. SIZE	MIN. # LAMPS	USAGE
A	48"x24"	12	LOW SPEED STREETS 25-30 MPH
B	60"x30"	13	INTERMEDIATE SPEED STREETS 35-45 MPH
C	96"x48"	15	HIGH SPEED STREETS 50-55 MPH

ARROW DISPLAY SHALL BE SET IN THE (LEFT OR RIGHT) SEQUENTIAL CHEVRON MODE FOR LANE CLOSURES.

ARROW DISPLAY SHALL BE SET IN THE CAUTION MODE FOR WORK NEAR ROADSIDE

USE OF A TYPE "C" PANEL AT AN "A" OR "B" LOCATION OR USE OF A TYPE "B" PANEL AT AN "A" LOCATION IS ALLOWABLE.

ARROW DISPLAY

ROAD TYPE	DISTANCE BETWEEN SIGNS**		
	A	B	C
RESIDENTIAL AND COLLECTOR (30 MPH AND UNDER)	100'	100'	100'
URBAN ARTERIALS (35 MPH TO 45 MPH)	350'	350'	350'
URBAN ARTERIALS (50 MPH AND OVER)	350'	350'	350'
RURAL ROADS (40 MPH AND OVER)	500'	500'	500'

** THE COLUMN HEADINGS A, B, AND C ARE THE DISTANCES BETWEEN ADVANCED WARNING SIGNS AND RESTRICTION POINTS AS INDICATED BELOW.

ADVANCE WARNING SIGN SPACING TABLE

LENGTH AND DEVICE SPACING FOR LANE CLOSURE AND CHANNELIZATION TAPERS

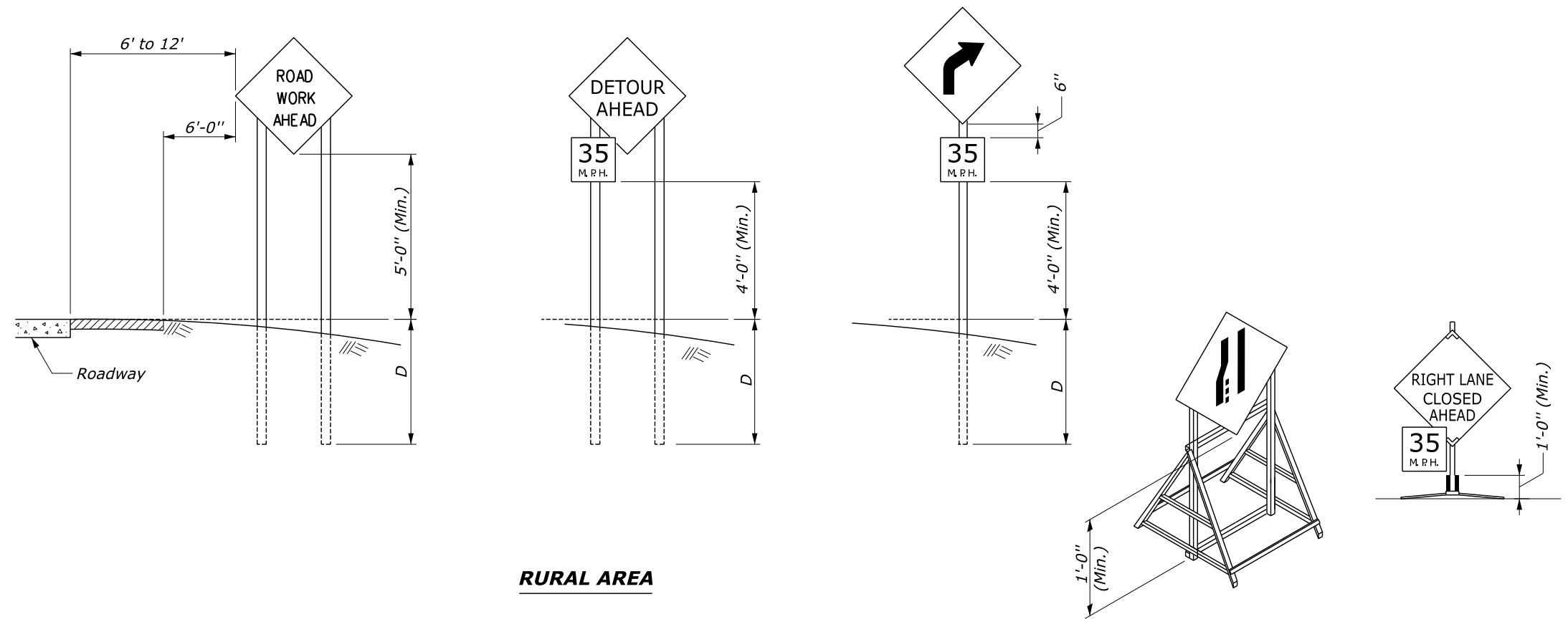
SPEED LIMIT	MINIMUM TAPER LENGTH (L)**			MIN. NO. OF DEVICES FOR TAPER (12FT. LANE)	MAXIMUM DEVICE SPACING
	10	11	12		
20	70	75	80	5	20
25	105	115	125	6	25
30	150	165	180	7	30
35	205	225	245	8	35
40	270	295	320	9	40
45	450	495	540	13	45
50	500	550	600	13	50
55	550	605	660	13	55

**NOTE: TAPER FORMULA - $L = S^2/w$ $S \geq 45$ MPH
 $L = S^2 \times w/60$ $S \leq 40$ MPH

WHERE:
L = MINIMUM TAPER LENGTH
S = POSTED SPEED LIMIT (PRIOR TO CONSTRUCTION)
W = WIDTH OF OFFSET

VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

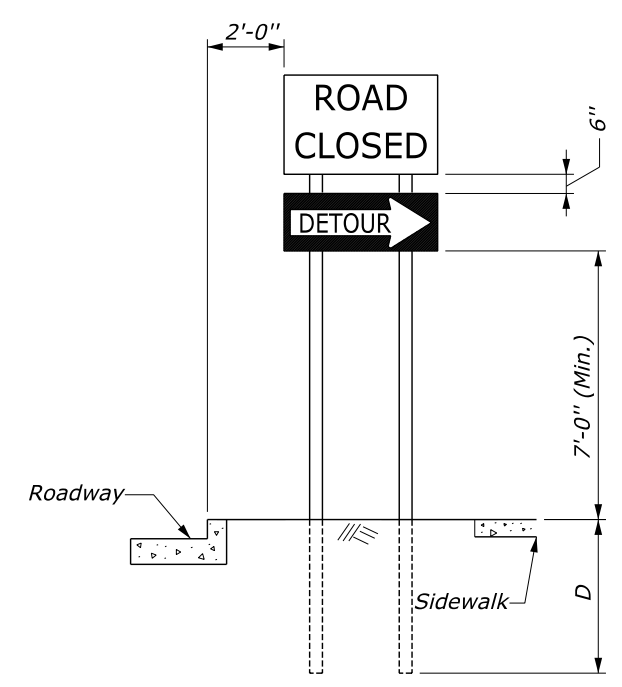
**TRAFFIC CONTROL
INSTALLATION**



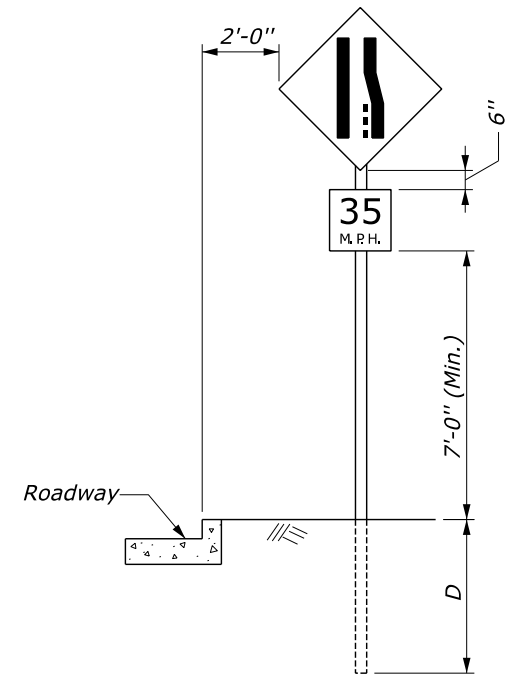
RURAL AREA

PORTABLE SIGNS
(See notes 3 and 4)

- NOTES:
1. Mount signs that are wider than 3-feet or larger than 10 square feet on double posts.
 2. All lumber dimensions are nominal.
 3. The Contractor may submit alternate details for portable signs, however, sign mounts shall hold the sign face in a vertical plane. Portable signs may be mounted lower than fixed signs when approved by the CO. Ensure all portable sign supports meet the requirements of NCHRP-350 for crashworthiness.
 4. When parking is permitted within 200 feet of the sign, mount the sign a minimum of 7 feet above the pavement surface.
 5. When approved by the CO and the Utility Company, utility poles may be used for sign mounting.
 6. For posts 6" x 6" and greater, see the Breakaway Support Detail. If breakaway design cannot be used due to post spacing, the sign should be placed outside the clearzone or be shielded by barrier. Do not place holes in posts of non-breakaway sign.

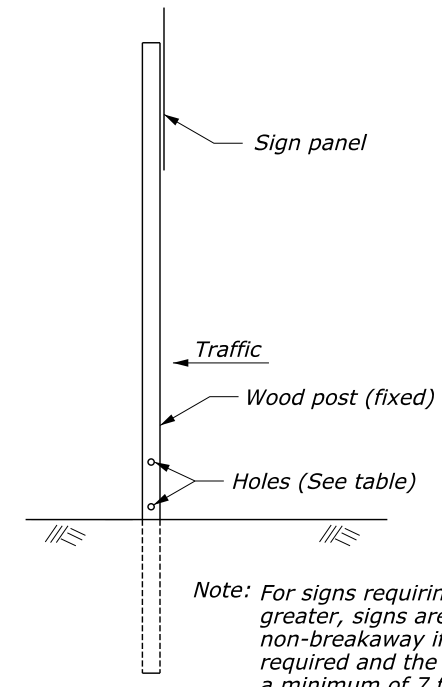


URBAN AREA



BREAKAWAY SUPPORT DETAIL

(FIXED SIGNS 4" X 6" AND GREATER POSTS)



FIXED ROADWAY SIGNS

Note: For signs requiring 6" x 6" posts and greater, signs are considered to be non-breakaway if multiple posts are required and the posts cannot be spaced a minimum of 7 feet apart.

Post Size	D	Hole Diameter	Maximum Sign Area (Sq. ft.)			
			1 Post	2 Post	3 Post	4 Post
4" x 4"	4'	None Required	10	20		
4" x 6"	4'	1.5"		35	50	70
6" x 6"	5'	2"		50	75	100
6" x 8"	5'	3"		85	125	165

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

CONSTRUCTION TRAFFIC CONTROL SIGN MOUNTING

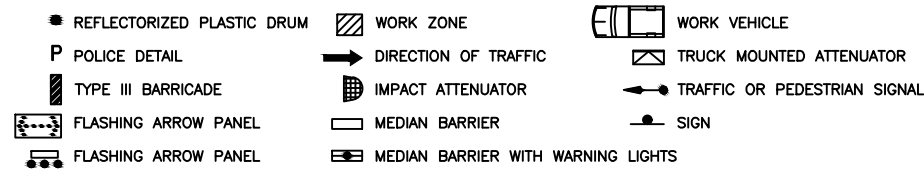
DETAIL APPROVED FOR USE
APPROVED : MAY 2011

DETAIL
E635-01

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."
6. CONTRACTORS SHALL NOTIFY EACH ADJUTANT AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 11 FEET (3.3m) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

LEGEND:



THE IDEAL CAPACITY OF A MAJOR HIGHWAY IS GENERALLY CONSIDERED TO BE 1900 PASSENGER CARS PER HOUR PER LANE (PCPHPL). IN WORK ZONES ON A MULTI-LANE DIVIDED HIGHWAY, THE FOLLOWING VOLUME GUIDELINES HAVE BEEN SUGGESTED:

MEASURED AVERAGE WORK ZONE CAPACITIES

Number of Lanes		Number of Studies	Average Capacity	
NORMAL (existing)	OPEN (to traffic)		VPH	VPHPL
3	1	7	1,170	1,170
2	1	8	1,340	1,340
5	2	8	2,740	1,370
4	2	4	2,960	1,480
3	2	9	2,980	1,490
4	3	4	4,560	1,520

Source: Dudek, C., *Notes on Work Zone Capacity and Level of Service*. Texas Transportation Institute, Texas A&M University, College Station, Texas (1984)

BY OBTAINING HOURLY TRAFFIC COUNTS FOR A PARTICULAR ROADWAY (WITH A MINIMUM OF A 48-HOUR AUTOMATIC TRAFFIC RECORDER (ATR) COUNT), THIS WILL HELP TO DETERMINE AT WHAT TIMES OF THE DAY OR NIGHT A CERTAIN NUMBER OF LANES MAY BE CLOSED.

SUGGESTED WORK ZONE WARNING SIGN SPACING

Road Type	Distance Between Signs**		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS*	350 (100)	350 (100)	350 (100)
MOST OTHER ROADWAYS*	500 (150)	500 (150)	500 (150)
FREEWAYS AND EXPRESSWAYS*	1,000 (300)	1,500 (450)	2,640 (800)

SPEED CATEGORY TO BE DETERMINED BY HIGHWAY AGENCY

DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TMP SETUPS. IT IS THE ONE WHICH MAY OFTEN HAVE THE "STANDARD RED OR RED-ORANGE FLAGS (16 in. X 16 in.)" MOUNTED ON IT. THESE ADVANCE WARNING SIGNS ARE LOCATED AT THE PROJECT LIMITS ON ALL APPROACHES (i.e. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT.

* THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

** R2-10 SIGNS SHALL BE PLACED BETWEEN THE FIRST AND SECOND SIGNS.

R2-10 AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.

Based on: Table 6C-1 2003 MUTCD

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (km/h)	DISTANCE (m)	SPEED* (mph)	DISTANCE (ft)
30	35	20	115
40	50	25	155
50	65	30	200
60	85	35	250
70	105	40	305
80	130	45	360
90	160	50	425
100	185	55	495
110	220	60	570
120	250	65	645
		70	730
		75	820

*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING.

Source: Table 6C-2 2003 MUTCD

CONVENTIONAL ROADWAY- A STREET OR HIGHWAY OTHER THAN A LOW-VOLUME ROAD, EXPRESSWAY, OR FREEWAY.

EXPRESSWAY- A DIVIDED HIGHWAY WITH PARTIAL CONTROL OF ACCESS.

FREEWAY- A DIVIDED HIGHWAY WITH FULL CONTROL OF ACCESS.

LOW-VOLUME ROAD- A FACILITY LYING OUTSIDE OF BUILT-UP AREAS OF CITIES, TOWNS, AND COMMUNITIES, AND IT SHALL HAVE A TRAFFIC VOLUME OF LESS THAN 400 AADT. IT SHALL NOT BE A FREEWAY, EXPRESSWAY, INTERCHANGE RAMP, FREEWAY SERVICE ROAD, OR A ROAD ON A DESIGNATED STATE HIGHWAY SYSTEM.

Source: 2003 MUTCD

FORMULAS FOR DETERMINING TAPER LENGTHS

Speed Limit (S)	Taper Length (L) Feet	Speed Limit (S)	Taper Length (L) Meters
40 MPH OR LESS	$L = \frac{WS^2}{60}$	60 KM/H OR LESS	$L = \frac{WS^2}{155}$
45 MPH OR MORE	$L = WS$	70 KM/H OR MORE	$L = \frac{WS}{1.6}$

WHERE: L = TAPER LENGTH IN FEET (METERS)

W = WIDTH OF OFFSET IN FEET (METERS)

S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH (KM/H)

Source: Table 6C-4 2003 MUTCD

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

Type of Taper	Taper Length (L)*
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	100 FT (30 m) MAXIMUM
DOWNSTREAM TAPER	100 FT (30 m) PER LANE

Source: Table 6C-3 2003 MUTCD

VI DEPARTMENT OF PUBLIC WORKS
OFFICE OF HIGHWAY ENGINEERING

**TRAFFIC MANAGEMENT
GENERAL NOTES AND
GUIDELINES**

STANDARD 635