STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T63

NOTES FOR WORK ON CONRETE STRUCTURES:

MATERIALS:
Unless otherwise noted:

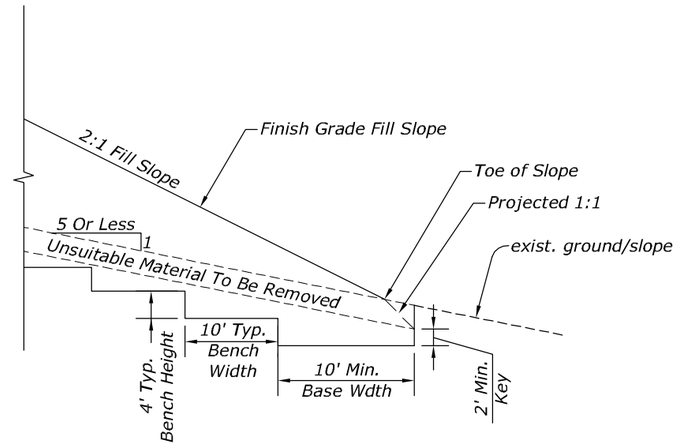
1. *Concrete shall be 4,000 psi compressive strength at 28 days.*
2. *Reinforcing steel shall conform to AASHTO M31 Grade 60 (ASTM A615 Grade 60) unless otherwise noted.*
3. *Reinforcing shall be ASTM A706 where welded connections are required.*
4. *Welded wire fabric reinforcement shall conform to AASHTO M55 (ASTM A185).*
5. *Structural steel (except wide flanges, pipes, and tubes) shall be AASHTO M270 Grade 36 (ASTM A36) zinc coated.*
6. *Structural steel wide flanges shall conform to ASTM A270 Grade 50 (ASTM A709 Grade 50) zinc coated.*
7. *Structural steel pipe shall conform to ASTM A53, Type E or S, Grade B zinc coated.*
8. *Structural steel tubes shall conform to ASTM A500, Grade B zinc coated.*
9. *Anchor bolts for aluminum and stainless steel structures, including nuts and washers, shall be stainless steel and shall conform to ASTM A193 UNS Designation S31600 and AASHTO M292, AISI 316 (ASTM A194, Type 316 Grade 8M, 8MA). Anchor bolts for structural steel, including nuts and washers, shall conform to AASHTO M314-90, (ASTM F1554) zinc coated.*
10. *Structural connection bolts shall be AASHTO M164 (ASTM A325) zinc coated.*
11. *Zinc coating shall conform to AASHTO M111 or AASHTO M232 (ASTM A123 or ASTM A153).*
12. *For Glass Fiber Reinforced Polymer (GFRP) rebars, see Special Provisions.*

CONSTRUCTION METHODS:

1. *Except as otherwise noted, all vertical dimensions are measured plumb.*
2. *Exact location of reinforcing bars shall be so arranged that no interference will occur between vertical and horizontal reinforcing, so that the concrete can be properly placed and consolidated, and as directed by the Engineer.*
3. *All dimensions relating to reinforcing are to centers of bars unless otherwise noted.*
4. *Anchor bolts for structural supports for highway signs, luminaires and traffic signals shall be installed with misalignments of less that 1:40 from vertical.*

GENERAL NOTES:

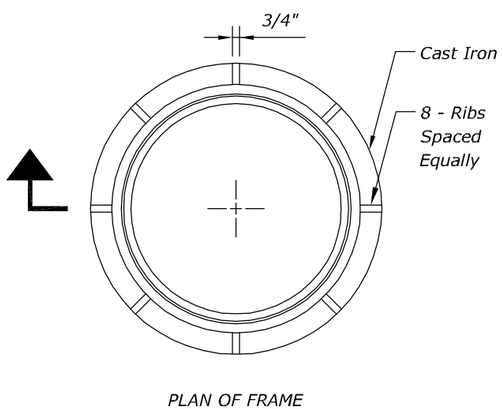
1. *The Contractor shall verify the location of all existing utility lines and notify the respective owners before commencing work.*
2. *Except as otherwise noted on drawings, all exterior corners and re-entrant angles 90 degrees or less in concrete work shall be chamfered 3/4" x 3/4".*
3. *Standard plans, details, and drawings refer to all structures in general except for modifications as may be required for special conditions. For such modifications refer to corresponding detailed drawings.*
4. *Gothic letters and figures approximating dimensions shown will be acceptable if approved by the Engineer.*



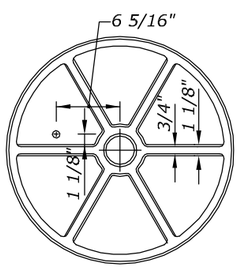
TYPICAL FILL SLOPE KEY AND BENCH DETAIL

NOTE:

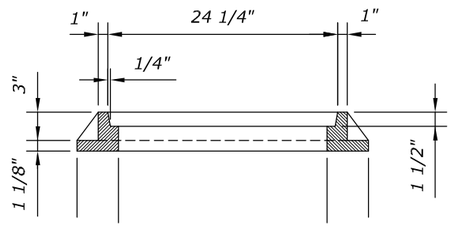
Where Natural/existing Slope is 5:1 or Flatter, Benching is not Necessary. However, Fill Should Not be Placed on Compressible or Unsuitable Material.



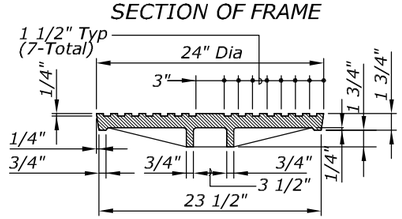
PLAN OF FRAME



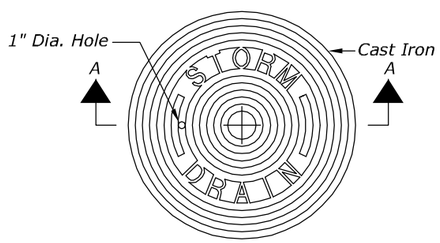
BOTTOM VIEW OF COVER



SECTION OF FRAME



SECTION



PLAN OF MANHOLE COVER

TYPE "P" CAST IRON FRAME AND COVER

NO SCALE

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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

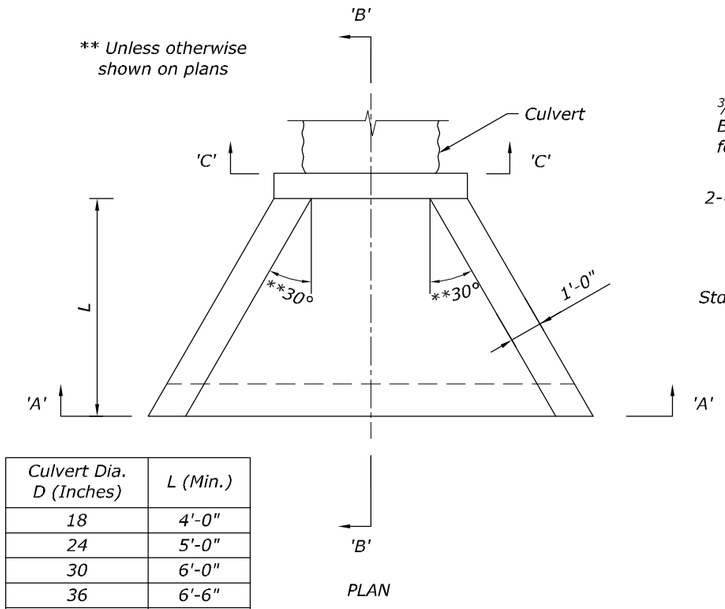
U.S. CUSTOMARY SPECIAL

DRAIN DETAILS

SPECIAL

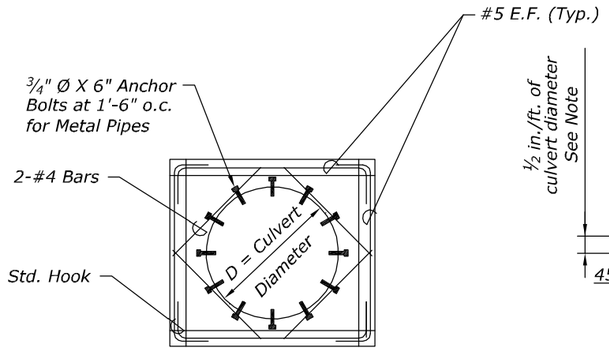
DRAWING NO.:

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T64

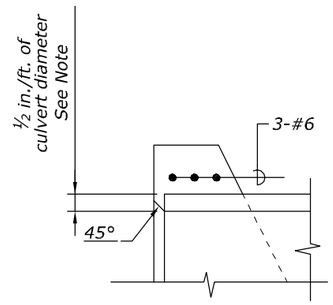


Culvert Dia. D (Inches)	L (Min.)
18	4'-0"
24	5'-0"
30	6'-0"
36	6'-6"
42	7'-0"

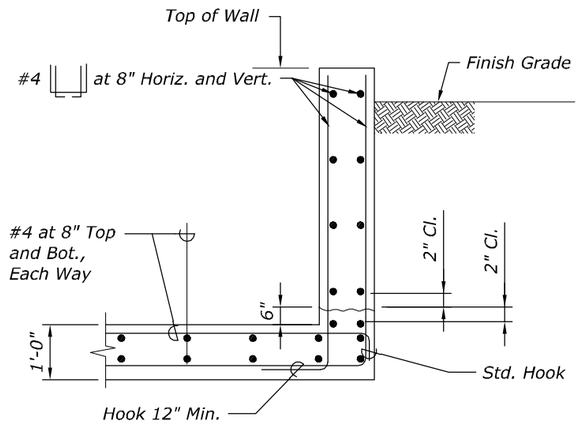
PLAN



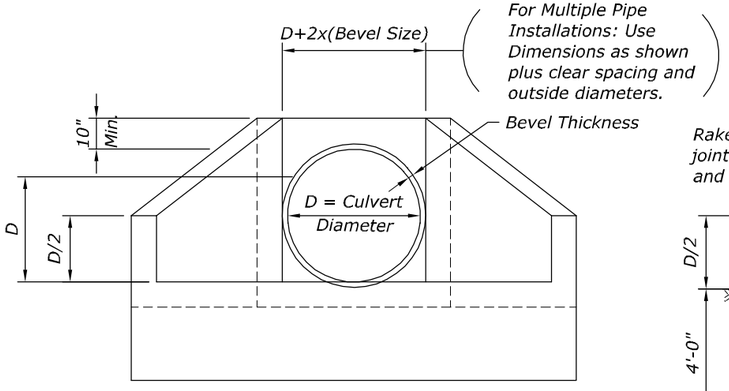
SECTION C-C



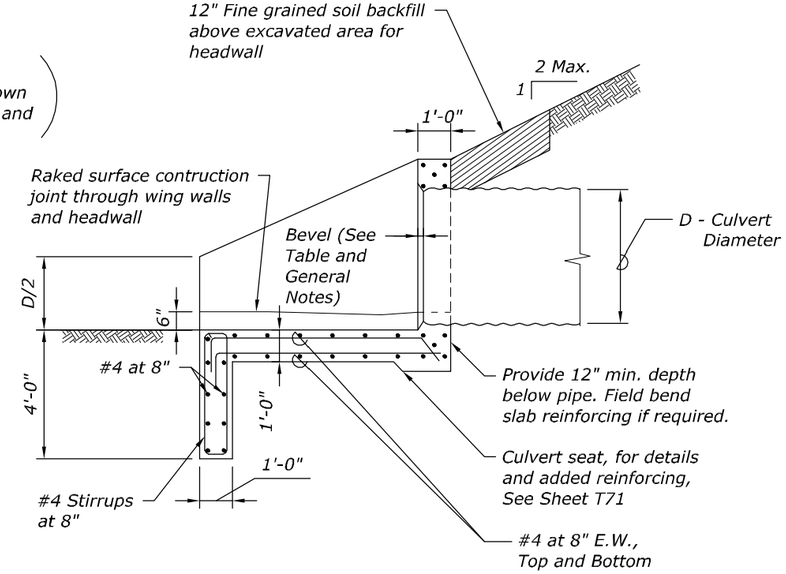
BEVEL DETAIL



TYPICAL WING WALL REINFORCING SECTION



SECTION A-A



SECTION B-B

INLET/OUTLET STRUCTURE FOR CULVERT SIZES 18 IN. TO 42 IN. DIA.

NO SCALE

GENERAL NOTES:

1. Construct bevels ½ in./ft. of culvert diameter or rise.
2. The groove or bell end of the concrete culvert may be used in place of the bevels.
3. Anchor bolts shall be ASTM A307 and zinc coated.
4. Design Criteria
   a. Active Horizontal Pressure = 60 pcf (2 to 1 Sloping Backfill, Above Groundwater)
   b. Active Vertical Pressure = 30 pcf (2 to 1 Sloping Backfill, Above Groundwater)
   c. Strength Bearing Capacity = 2,500 psf
   d. Inlet / Outlet Structures were not designed for Extreme Event Load Combination
5. See Sheet T63 for additional notes.

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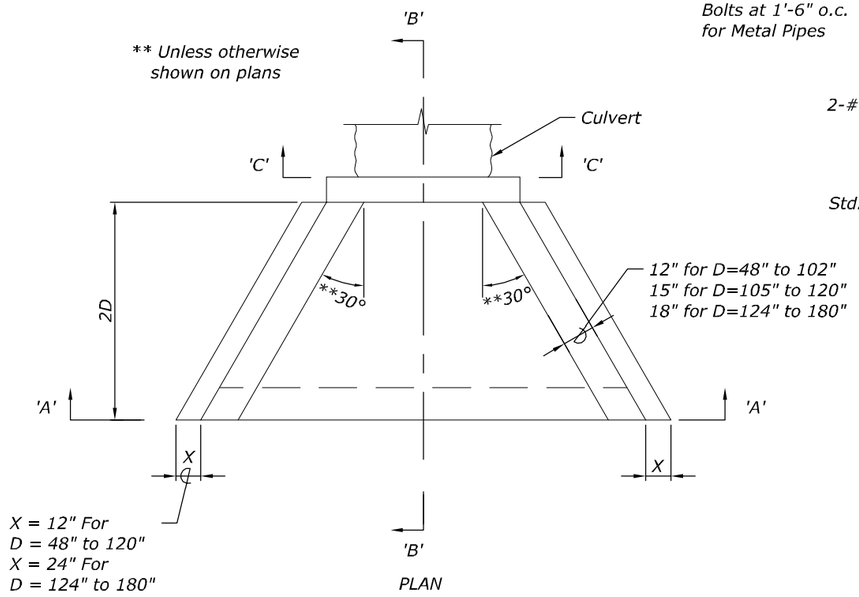
U.S. CUSTOMARY SPECIAL

CULVERT HEADWALL DETAILS

SPECIAL

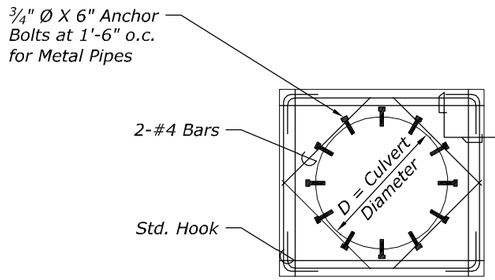
DRAWING NO.:

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T65

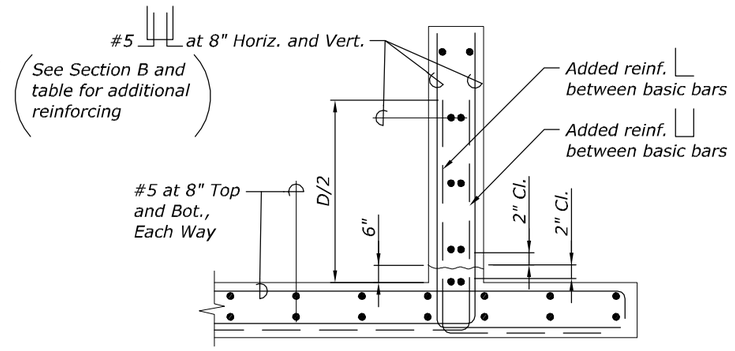


X = 12" For
D = 48" to 120"
X = 24" For
D = 124" to 180"

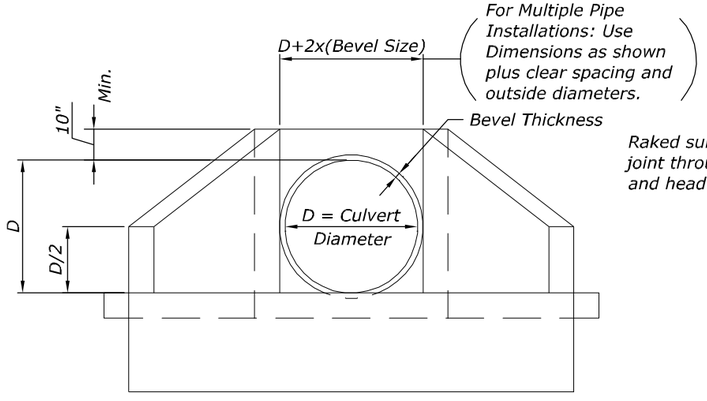
PLAN



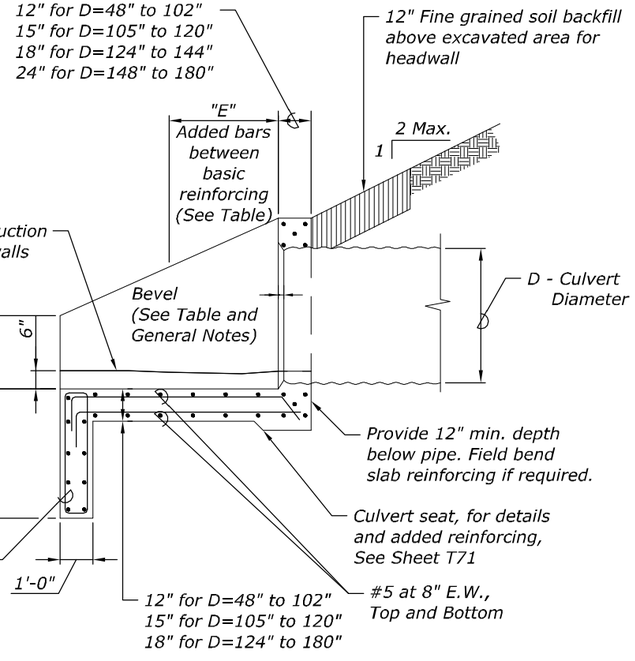
SECTION C-C



12", 15", AND 18" WING WALLS
TYPICAL WING WALL REINFORCING SECTION



SECTION A-A



SECTION B-B

ADDITIONAL REINFORCING AND BEVEL SIZE			
CULVERT DIA. D (INCHES)	ADD BAR SIZE	E (FEET)	BEVEL (INCHES)
108	#4	4	4 1/2
120	#4	6	5
144	#5	9	6
180	#7	20	7 1/2

INLET/OUTLET STRUCTURE FOR CULVERT SIZES 48 IN. TO 180 IN. DIA.

GENERAL NOTES:

1. Construct bevels ½ in./ft. of culvert diameter or rise. See Sheet T64 for bevel detail.
2. The groove or bell end of the concrete culvert may be used in place of the bevels.
3. Anchor bolts shall be ASTM A307 and zinc coated.
4. Design Criteria
   a. Active Horizontal Pressure = 60 pcf (2 to 1 Sloping Backfill, Above Groundwater)
   b. Active Vertical Pressure = 30 pcf (2 to 1 Sloping Backfill, Above Groundwater)
   c. Strength Bearing Capacity = 2,500 psf
   d. Inlet / Outlet Structures were not designed for Extreme Event Load Combination
5. See Sheet T63 for additional notes.

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY SPECIAL

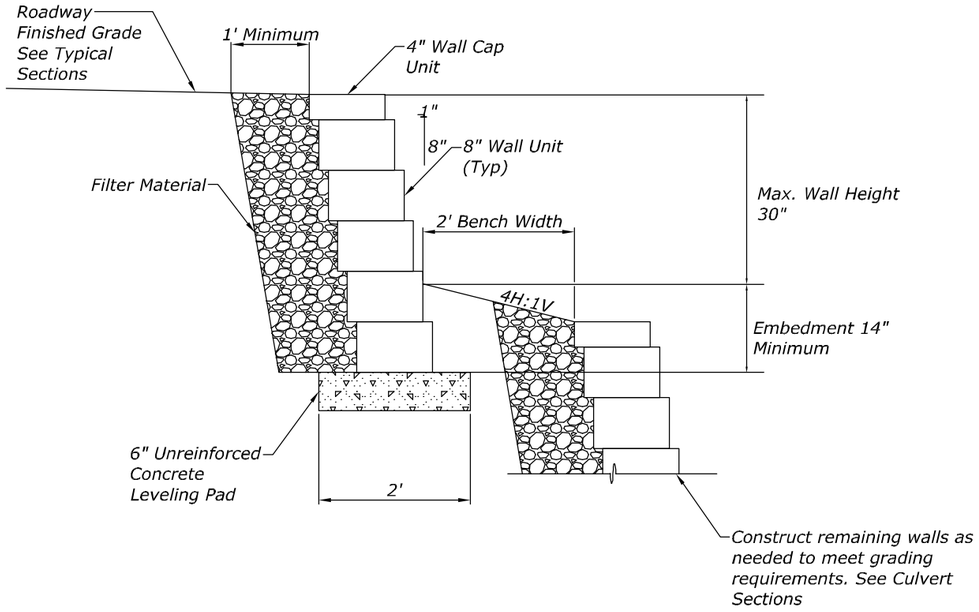
CULVERT HEADWALL DETAILS

NO SCALE

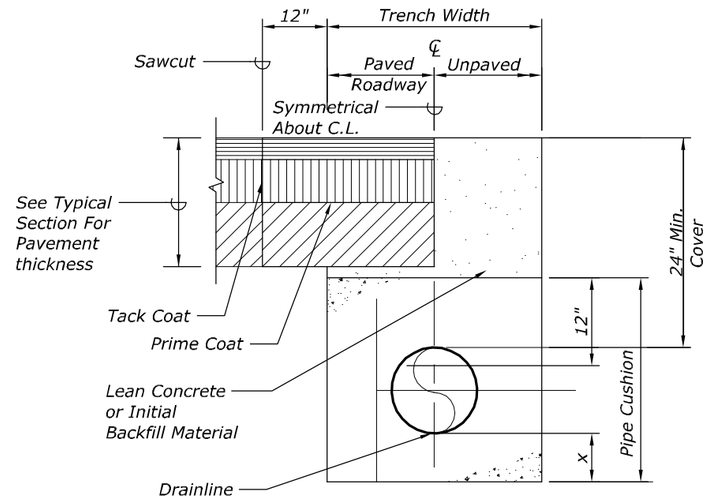
SPECIAL

DRAWING NO.:

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T66

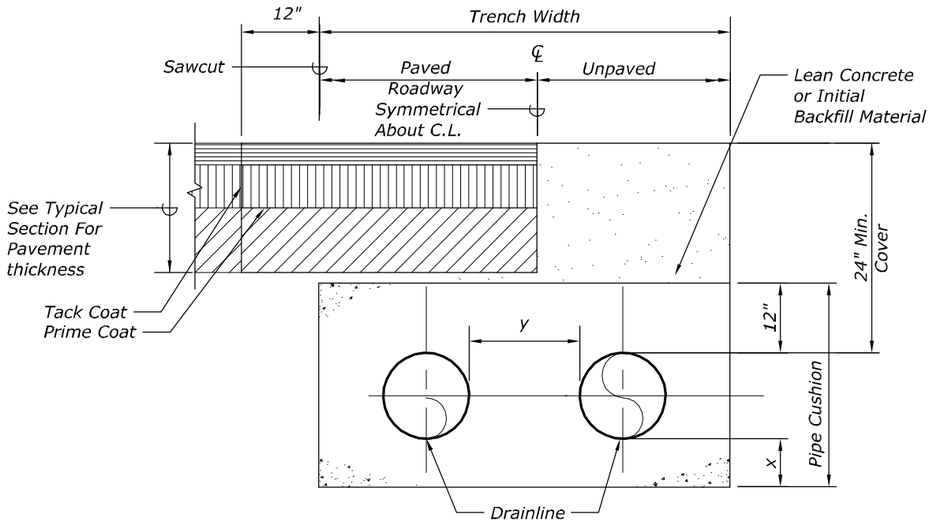


CMU DETAIL



Culvert Dia. D (Inches)	x (Min.)
12 to 54	4"
> 54	6"

DRAINLINE TRENCH RESTORATION



Culvert Dia. D (Inches)	x (Min.)	y (Min.)
48"	4"	2'
60"	6"	2.5'

MULTIPLE DRAINLINE TRENCH RESTORATION

NO SCALE

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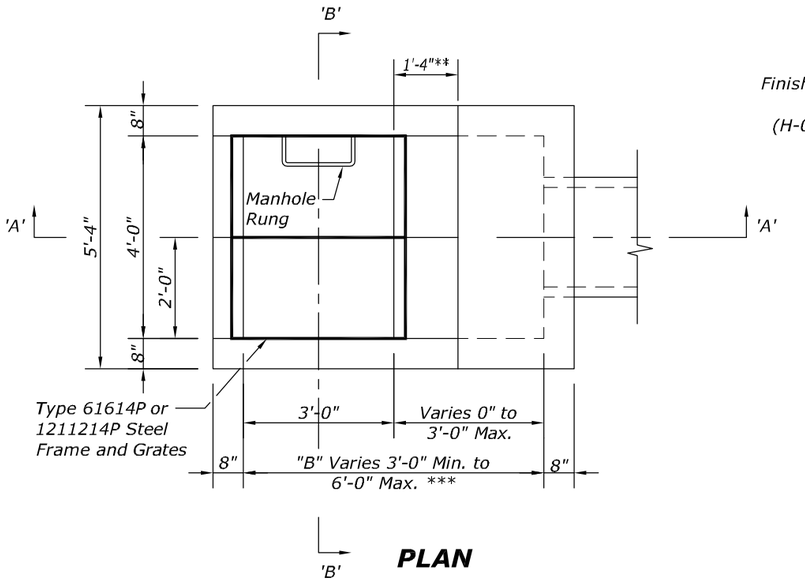
U.S. CUSTOMARY SPECIAL

DRAIN DETAILS

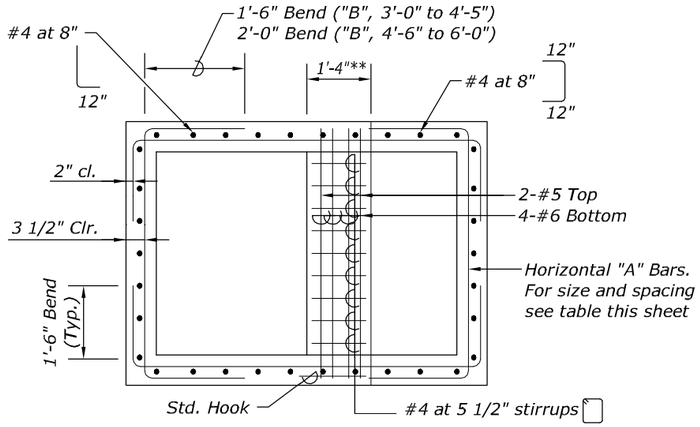
SPECIAL

DRAWING NO.:

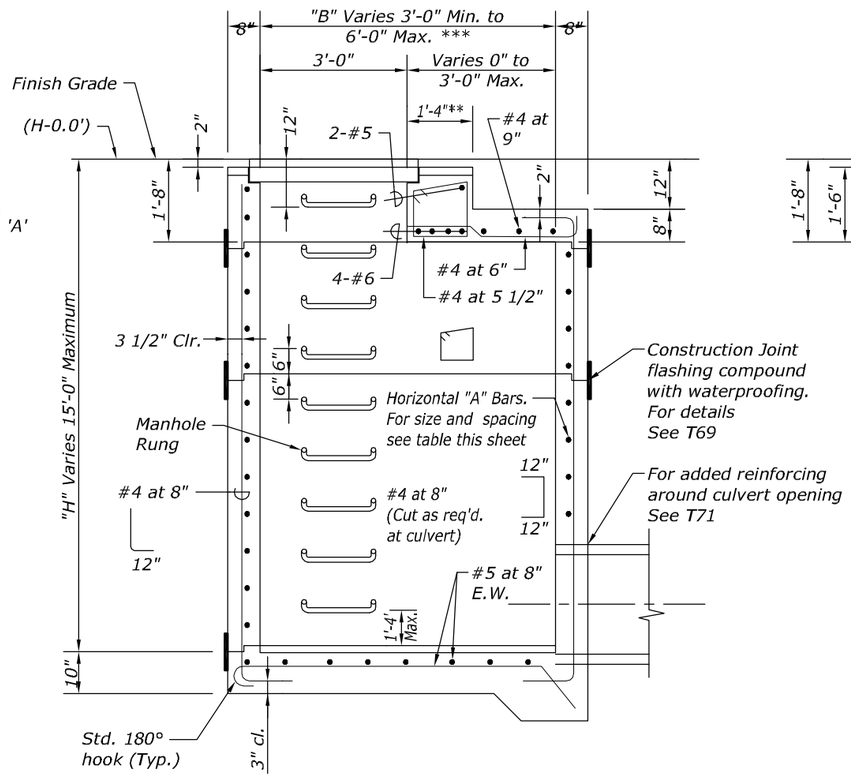
STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T67



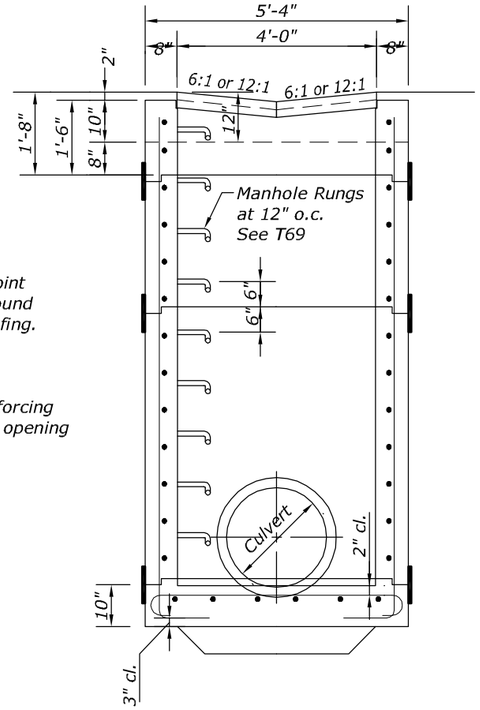
PLAN



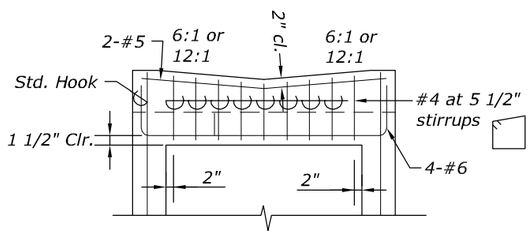
PLAN VIEW OF WALL REINFORCING



SECTION A-A



SECTION B-B



SECTION OF BEAM REINFORCING

HORIZ. "A" BARS FOR GRATED DROP INLET		
DEPTH "H'	"A" BARS	
	"B"-3'-0" to 4'-5"	"B"-4'-6" to 6'-0"
0'-0" to 5'-0"	#4 at 12"	#5 at 10"
5'-1" to 10'-0"	#4 at 10"	#5 at 8"
10'-1" to 15'-0"	#4 at 8"	#5 at 6"

TYPE 61614(P) GRATED DROP INLET

GENERAL NOTES:

1. General Criteria
   a. At-rest Horizontal Pressure = 80 pcf (2 to 1 sloping backfill, above groundwater)
   b. At-rest Vertical Pressure = 40 pcf (2 to sloping backfill, above groundwater)
   c. Allowable Bearing Capacity = 1,700 psf+8 x (overburden pressure); where overburden pressure equals 100 pcf x H
   d. Live Load Surcharge (Equivalent Height of Soil)
      For H = 0' to 5'; heq = 4'-0"
      For H = 5' to 20'; heq = 3'-0"
2. Exposure Factor (For Crack Control) = 1.0 for Class 1 exposure.
3. For vertical rebar lap splice length, See T72.
4. See T63 for additional notes.

LEGEND:

** For minimum size box (3'-0"), eliminate beam and use typical wall and wall reinforcing shown in the top portion.

*** For culverts larger than 30", the minimum dimension shall be D (Diameter of pipe culvert or 3'-0", whichever is bigger.)

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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

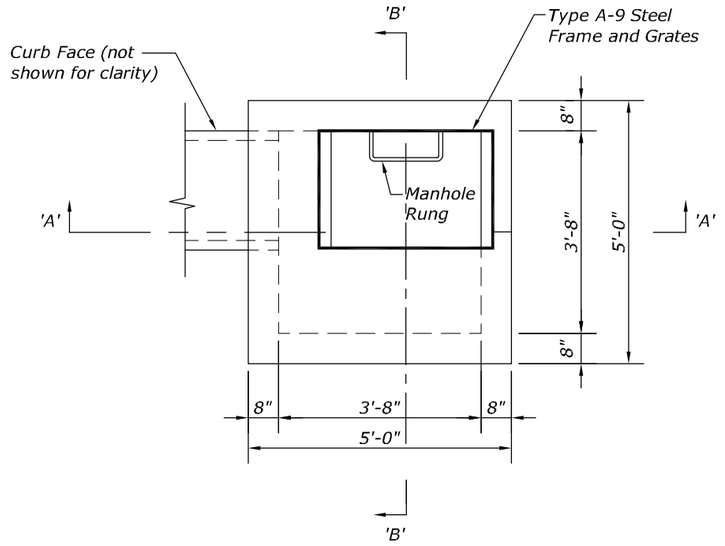
U.S. CUSTOMARY SPECIAL

DRAINAGE DETAILS

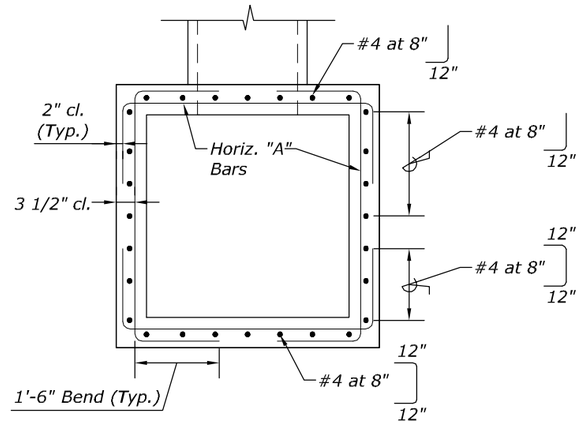
SPECIAL

DRAWING NO.:

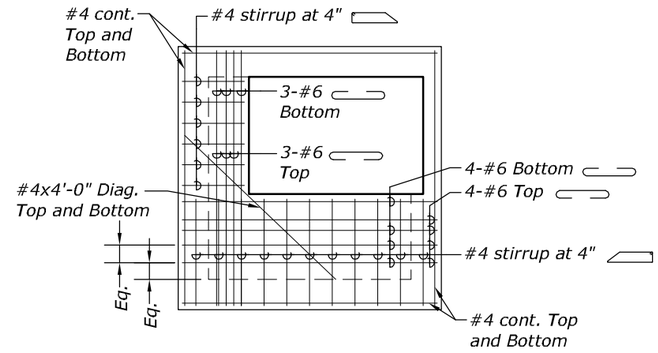
STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T68



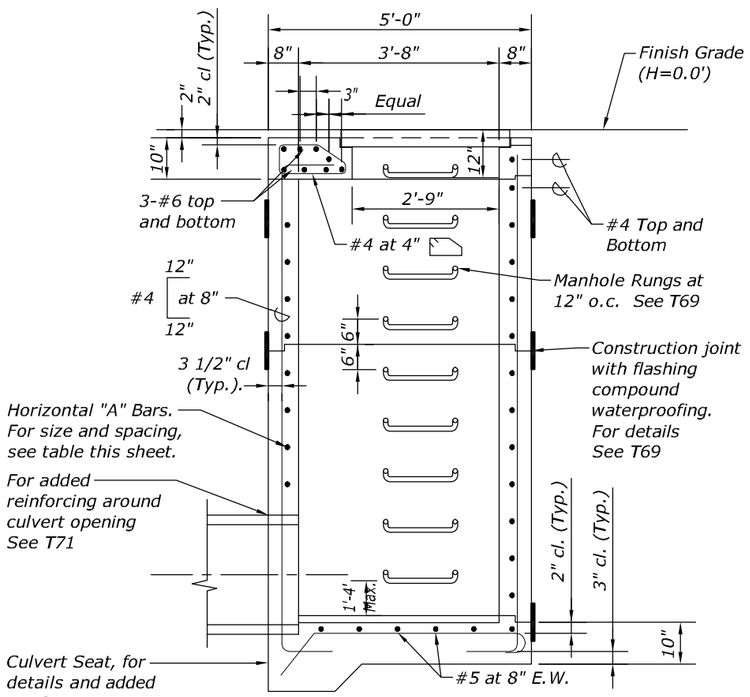
PLAN



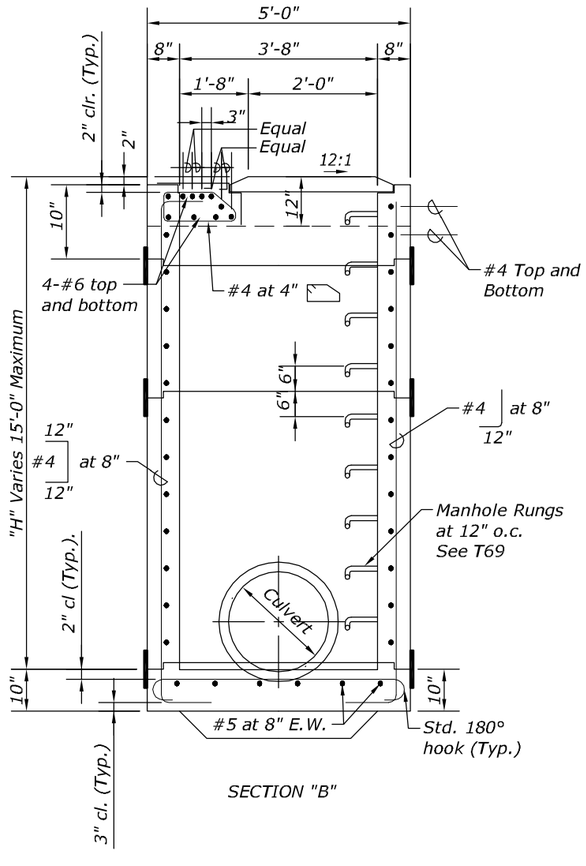
PLAN VIEW OF WALL REINFORCING



PLAN VIEW OF TOP SLAB REINFORCING



SECTION "A"



SECTION "B"

TYPE 1A-9 GRATED DROP INLET

HORIZONTAL "A" BARS FOR GRATED DROP INLET	
DEPTH "H"	"A" BARS
0'-0" to 5'-0"	#4 at 12"
5'-1" to 10'-0"	#4 at 12"
10'-1" to 15'-0"	#4 at 9"

GENERAL NOTES:

1. General Criteria
   a. At-rest Horizontal Pressure = 80 pcf (2 to 1 sloping backfill, above groundwater)
   b. At-rest Vertical Pressure = 40 pcf (2 to 1 sloping backfill, above groundwater)
   c. Allowable Bearing Capacity = 1,700 psf+8 x (overburden pressure); where overburden pressure equals 100 pcf x H
   d. Live Load Surcharge (Equivalent Height of Soil)
      For H = 0' to 5'; heq = 4'-0"
      For H = 5' to 20'; heq = 3'-0"
2. Exposure Factor (For Crack Control) = 1.0 for Class 1 exposure.
3. For vertical rebar lap splice length, See T72.
4. See T63 for additional notes.

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WILSON OKAMOTO CORPORATION — APRIL 30, 2020 LIC. EXP. DATE

NO SCALE

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

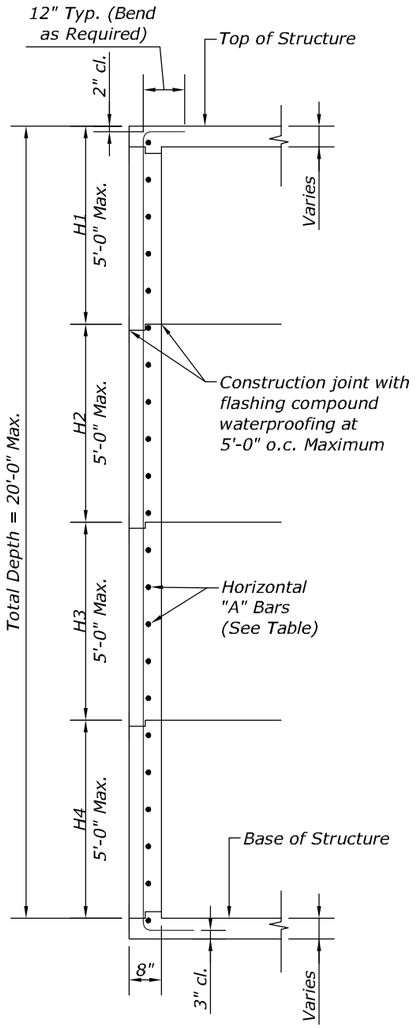
U.S. CUSTOMARY SPECIAL

DRAINAGE DETAILS

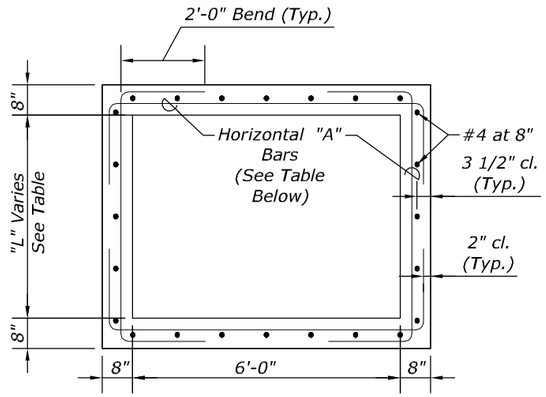
SPECIAL

DRAWING NO.:

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T69



ELEVATION VIEW OF WALL SECTION



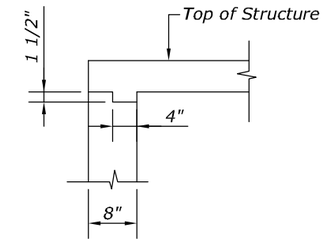
PLAN VIEW OF WALL REINFORCING

General Notes:

1. General Criteria
   a. At-rest Horizontal Pressure = 80 pcf (2 to 1 sloping backfill, above groundwater)
   b. At-rest Vertical Pressure = 40 pcf (2 to 1 sloping backfill,above groundwater)
   c. Allowable Bearing Capacity = 1,700 psf+8 x (overburden pressure); where overburden pressure equals 100 pcf x H
   d. Live Load Surcharge (Equivalent Height of Soil)
      For H = 0' to 5'; heq = 4'-0"
      For H = 5' to 20'; heq = 3'-0"
2. Exposure Factor (For Crack Control) = 1.0 for Class 1 exposure.
3. See T63 for additional notes.

HORIZONTAL "A" BARS FOR CATCH BASINS					
DEPTH	"L" MAX.				
	4'-0"	6-0"	7'-4"	8'-4"	9'-4"
H1 0" to 5'-0"	#5 at 10"	#5 at 10"	#5 at 8"	#5 at 6"	#5 at 5"
H2 5'-1" to 10'-0"	#5 at 8"	#5 at 8"	#5 at 6"	N.A.	N.A.
H3 10'-1" to 15'-0"	#5 at 6"	#5 at 6"	N.A.	N.A.	N.A.
H4 15'-1" to 20'-0"	#5 at 6"	N.A.	N.A.	N.A.	N.A.

Note: N.A. = Not Applicable



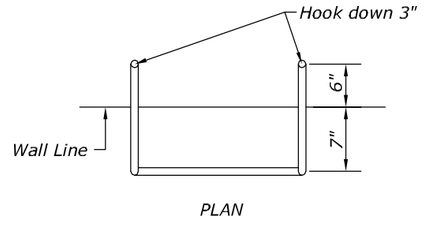
JOINT AT TOP

INTERMEDIATE JOINT

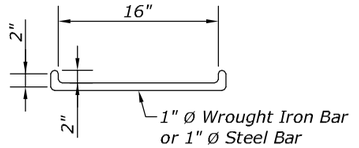
JOINT AT BASE

Note:
Waterproof all construction joints.

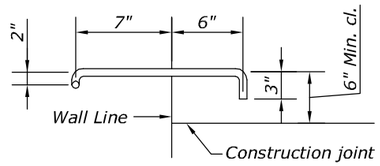
CONSTRUCTION JOINT AND WATERPROOFING DETAILS



PLAN



FRONT VIEW



SIDE VIEW

MANHOLE RUNG

NO SCALE

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

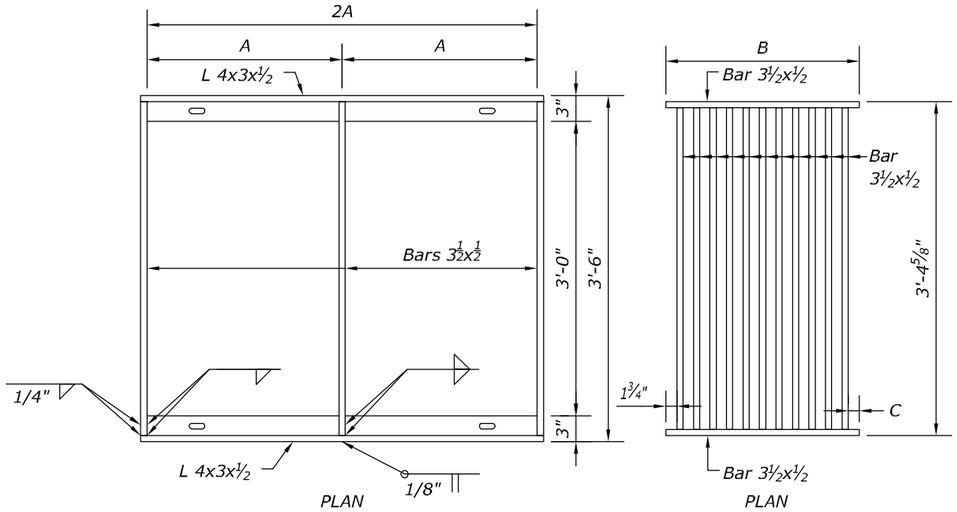
U.S. CUSTOMARY SPECIAL

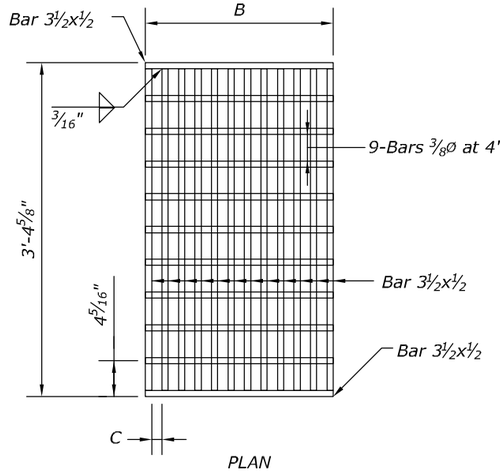
DRAINAGE DETAILS TYPICAL REINFORCING FOR DRAINAGE STRUCTURES

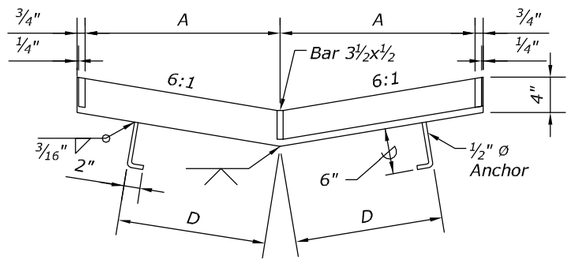
SPECIAL

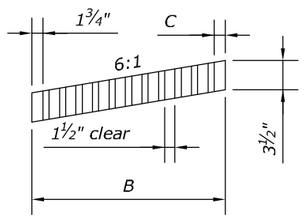
DRAWING NO.:

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T70





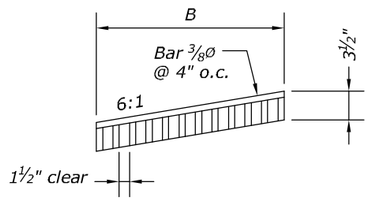




DIMENSIONS					
TYPE	NO. BARS	A	B	C	D
61614	11	2'-0"	1'-11½"	1¼"	1'-6"
61616	17	3'-0"	2'-11⅜"	1⅛"	2'-0"

TYPE 61614 STEEL FRAME AND GRATES

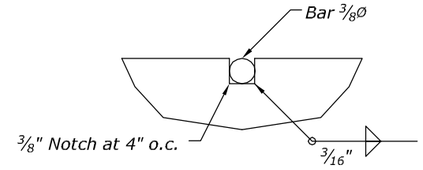
(GRATE PLAN AND SECTION DRAWN FOR TYPE 61614, TYPE 61616 SIMILAR)



DIMENSIONS			
TYPE	NO. BARS	B	C
61614P	12	1'-11½"	2"
61616P	18	2'-11⅜"	1 15/16"

TYPE 61614P STEEL GRATES

(GRATE PLAN AND SECTIONS DRAWN FOR TYPE 61614P, TYPE 61616P SIMILAR)



NOTCH DETAIL

GRATE

GENERAL NOTES:

1. All welds ⅜" unless otherwise noted.
2. Grates and frames shall be zinc coated after fabrication.
3. Anchors shall be ASTM A 307 and zinc coated.
4. See T63 for additional notes.

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U.S. CUSTOMARY SPECIAL

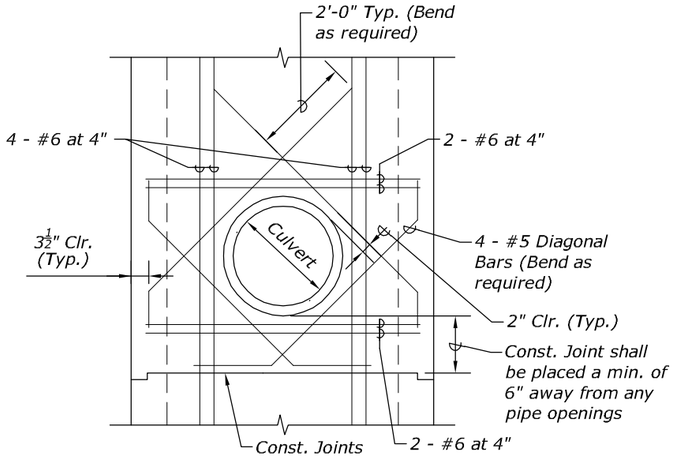
DRAINAGE DETAILS TYPE 61614 STEEL FRAME AND GRATE

NO SCALE

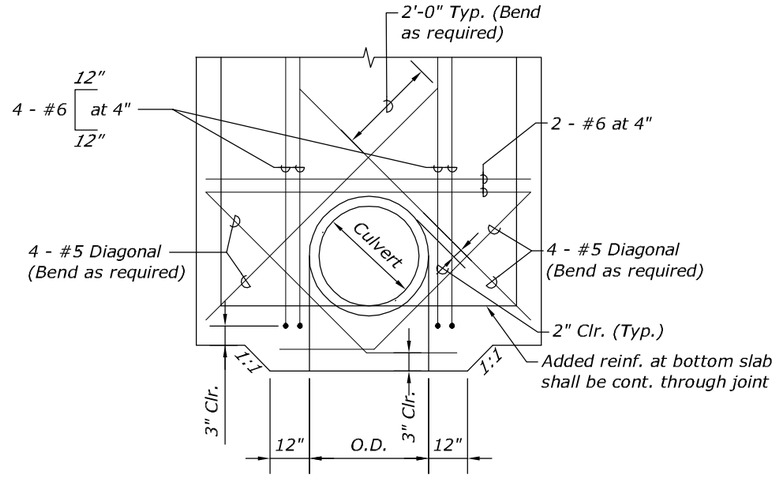
SPECIAL

DRAWING NO.:

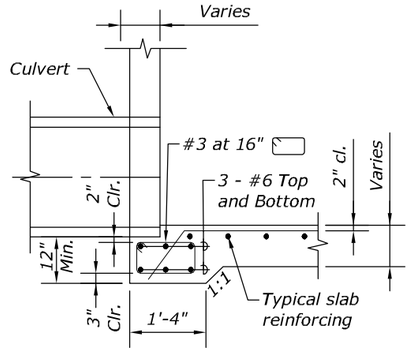
STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T71



ADDED REINFORCING FOR CULVERT OPENINGS (ABOVE BOTTOM SLAB)



ADDED REINFORCING FOR CULVERT OPENINGS AT BOTTOM SLAB



DETAIL OF CULVERT SEAT

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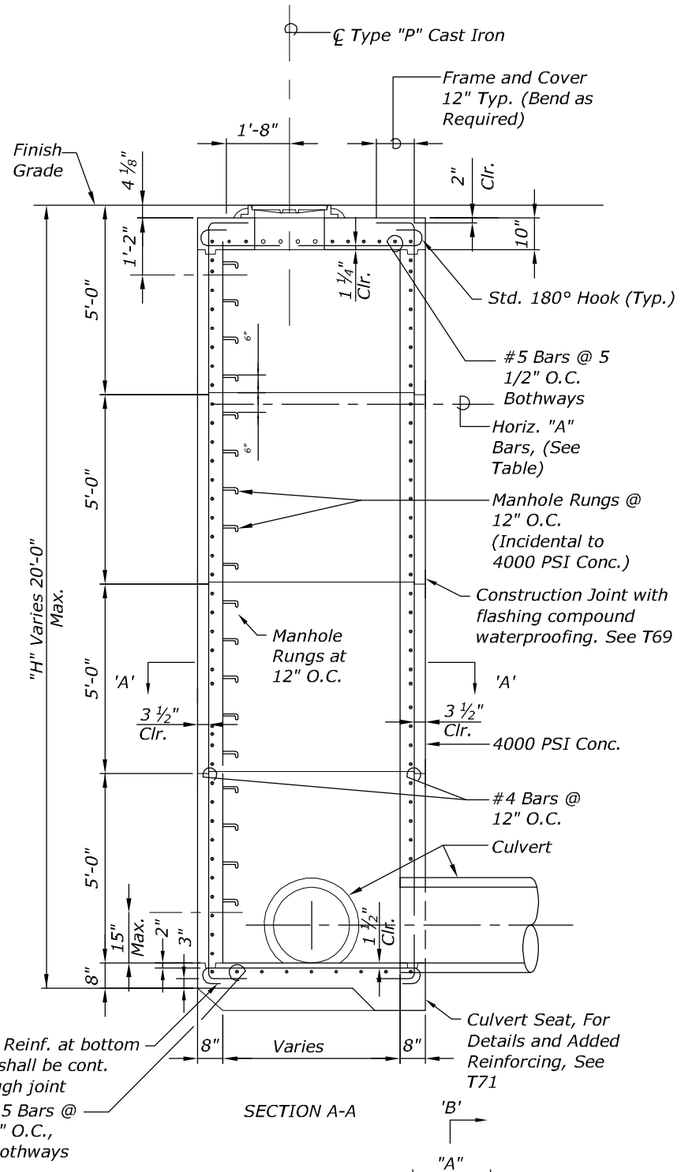
DRAINAGE DETAILS TYPICAL REINFORCING FOR DRAINAGE STRUCTURES

NO SCALE

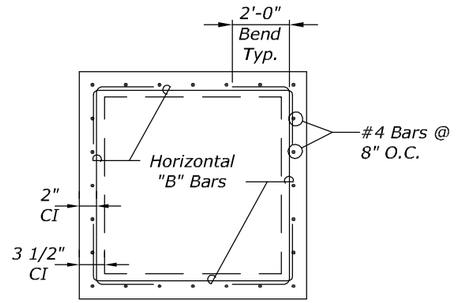
SPECIAL

DRAWING NO.:

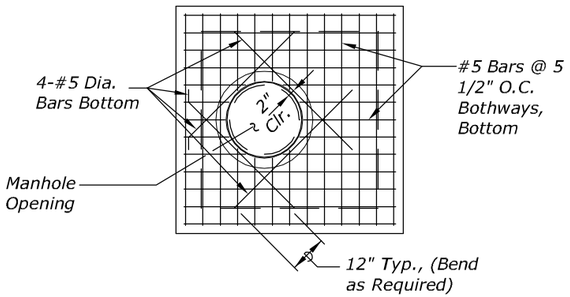
STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T72



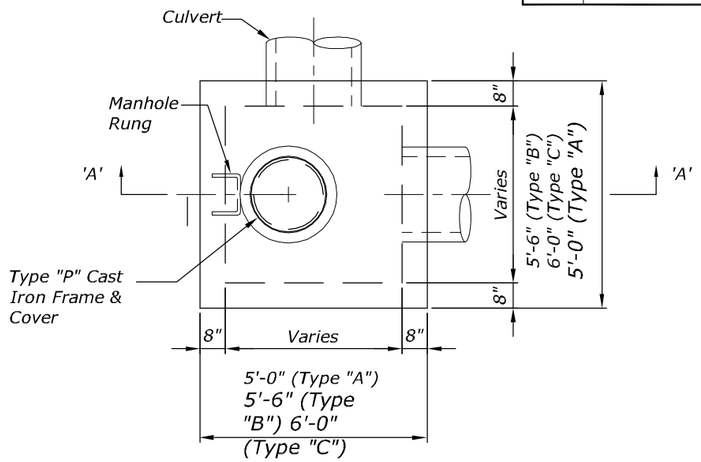
SECTION A-A



SECTION B



PLAN
(Top Slab Reinforcing)

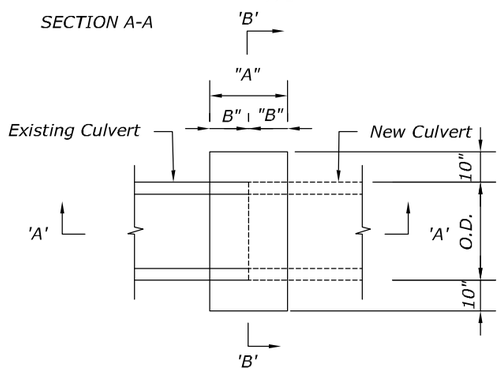


PLAN

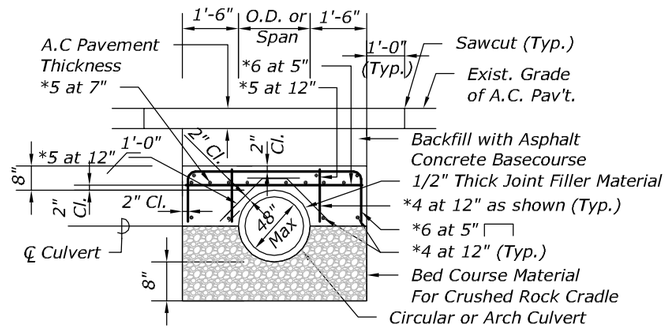
HORIZONTAL "A" BARS FOR STORM DRAIN MANHOLE	
SDMH DEPTH	Horizontal "A" Bars
0'-0" to 5'-0"	#5 at 10"
5'-1" to 10'-0"	#5 at 8"
10'-1" to 15'-0"	#5 at 6"
15'-1" to 20'-0"	#5 at 6"

VERT. BAR LAP SPLICE	
BAR	VERT. LAP LENGTH
*4	1'-B"
*5	2'-2"

MODIFIED TYPE "A", "B", & "C" STORM DRAIN MANHOLE



PLAN



REINFORCED CONCRETE JACKET

NO SCALE

GENERAL NOTES

1. General Criteria
   a. At-rest Horizontal Pressure = 80 pcf (2 to 1 sloping backfill, above groundwater)
   b. At-Rest Vertical Pressure = 40 pcf (2 to 1 sloping backfill, above groundwater)
   c. Allowable Bearing Capacity = 1,700 psf+8 x (overburden pressure); where overburden pressure equals 100 pcf x H
   d. Live Load Surcharge (Equivalent Height of Soil)
      For H = 0' to 5';heq = 4'-0"
      For H = 5' to 20';heq = 3'-0"
2. Exposure Factor (For Crack Control) = 1.0 for Class 1 exposure
3. See T63 for additional notes

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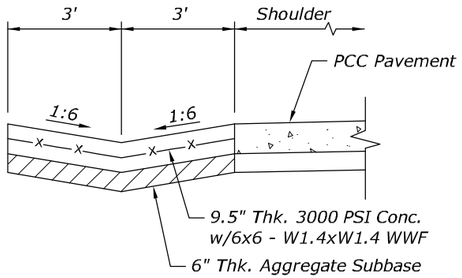
U.S. CUSTOMARY SPECIAL

DRAINAGE DETAILS

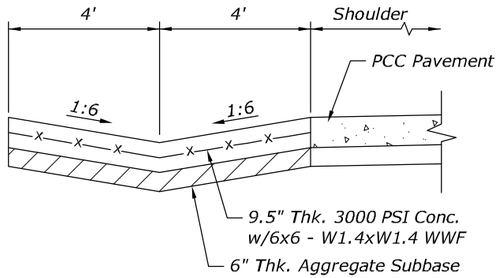
SPECIAL

DRAWING NO.:

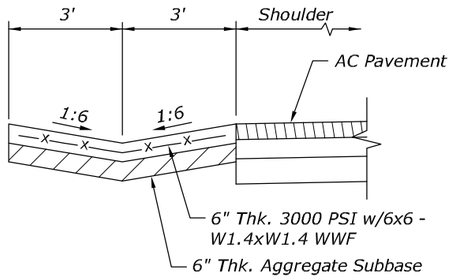
STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	T73



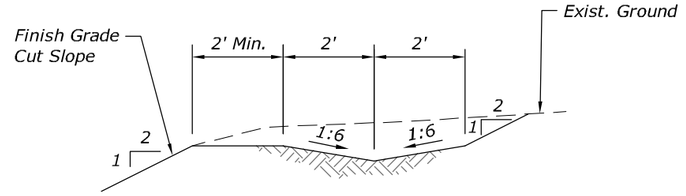
6' CONCRETE SWALE-PCC PAVEMENT



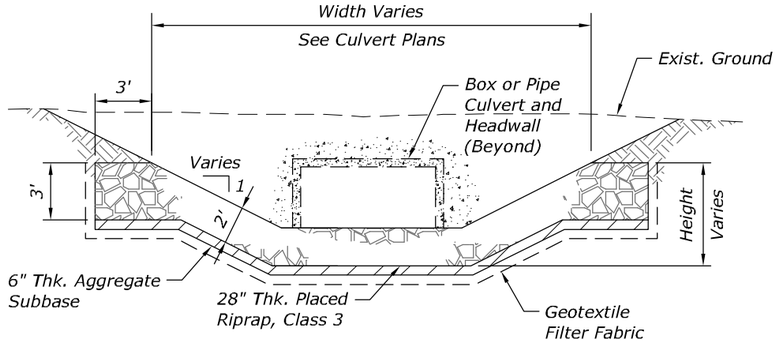
8' CONCRETE SWALE-PCC PAVEMENT



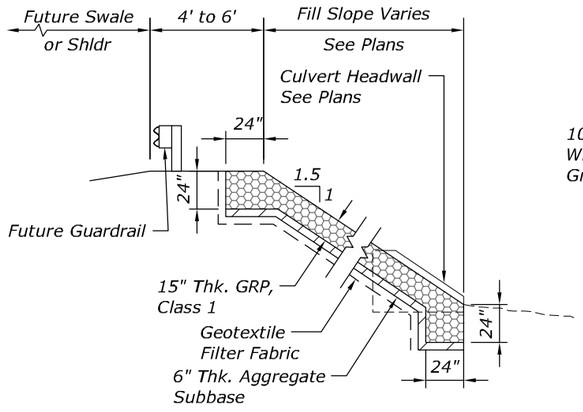
CONCRETE SWALE-AC PAVEMENT



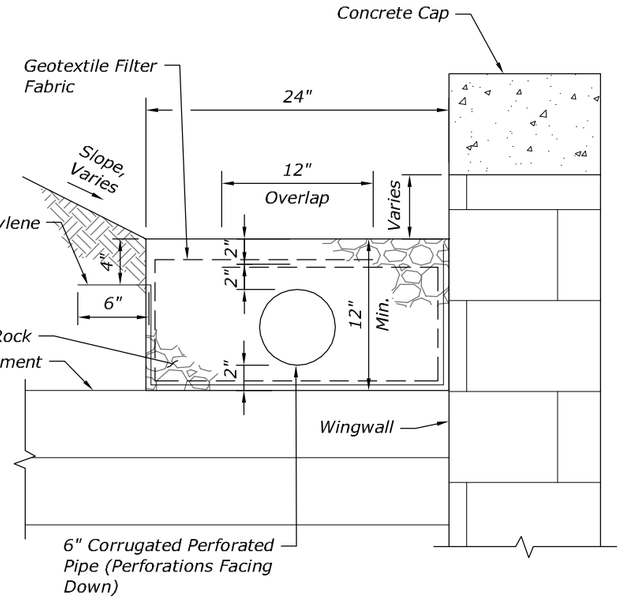
4' WIDE GRASS SWALE AT GRADE



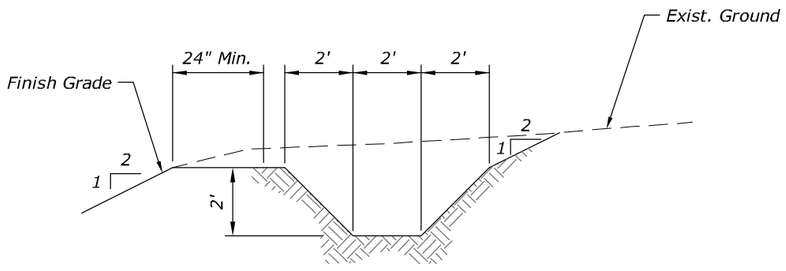
TYPICAL SECTION OF PLACED RIPRAP AT CULVERT INLET/OUTLET



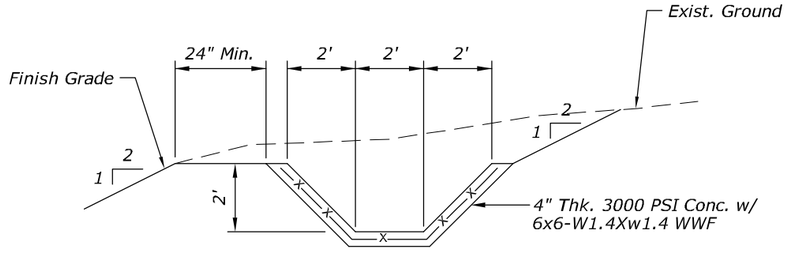
TYPICAL SECTION OF GRP-LINED SLOPE FOR SLOPES GREATER THAN 1:2



GRAVEL EDGE DRAIN



EARTH CUTOFF DITCH AT GRADE



CONCRETE CUTOFF DITCH AT GRADE

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U.S. CUSTOMARY SPECIAL

DRAINAGE DETAILS

NO SCALE

SPECIAL

DRAWING NO.: