IDAHO
TRANSPORTATION DEPARTMENT

STANDARD DRAWINGS

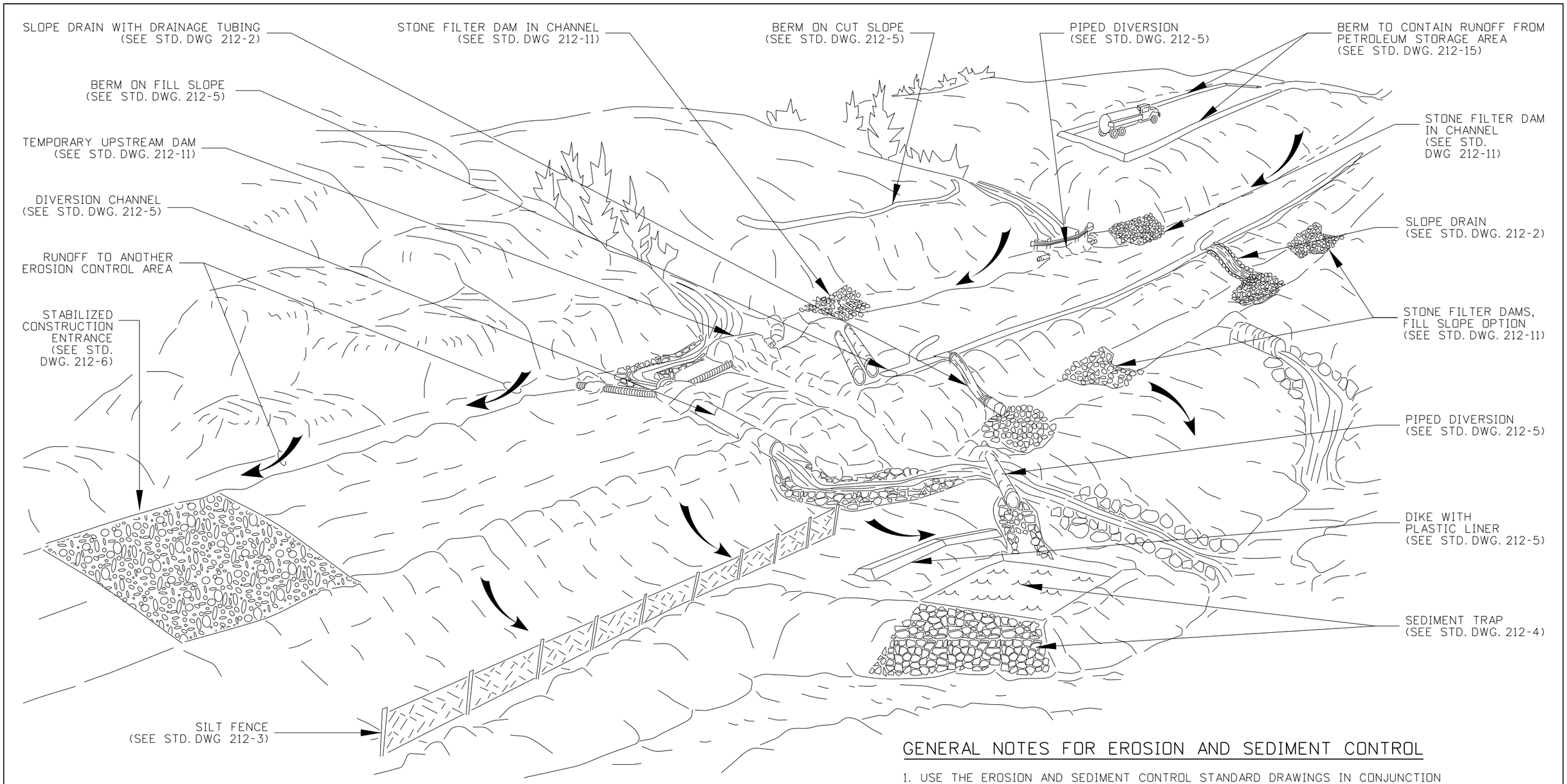
APRIL 2022

STANDARD DRAWINGS
APRIL 2022

DRAWING NUMBER	DRAWING NAME
212-1	Erosion and Sediment Control - Example Applications
212-2	Temporary Erosion and Sediment Control - Slope Drains
212-3	Temporary Erosion and Sediment Control - Silt Fence, Fiber Wattle, and Compost Sock
212-4	Temporary Erosion and Sediment Control - Sediment Trap
212-5	Temporary Erosion and Sediment Control - Diversion Channel, Ditch, Swale, Dike, Berm, Waterbar, and Rolling Dip
212-6	Temporary Erosion and Sediment Control - Stabilized Construction Entrance and Vehicle Washdown
212-7	Temporary Erosion and Sediment Control - Inlet Protection
212-10	Permanent Erosion Control and Sediment Control - Gabion and Revet Mattress
212-11	Permanent Erosion Control and Sediment Control - Stone Filter Berms, Dams and Weirs
212-12	Permanent Erosion Control and Sediment Control - Slope and Channel Protection
212-15	Petroleum Storage Area
212-16	Temporary Concrete Washout
405-1	Rural Approaches
405-2	Mailbox Turnout
409-1	Portland Cement Concrete Pavement
409-2	Portland Cement Concrete Pavement Ramp Gore Details
411-1	Urban Concrete Pavement
411-2	Urban Concrete Pavement Manhole Collars
601-1	Pipe and Conduit Installation
605-1	Storm Sewer Pipe, 12" Thru 30" Slotted Drain
605-10	Manhole Type A
605-11	Manhole Type B
605-12	Manhole Types C & D
605-13	Manhole Frame, Cover, & Concrete Collar
605-20	Inlets & Catch Basins, Types 1, 2, & 3
605-21	Inlets & Catch Basins, Types 1A, 2A, & 3A
605-22	Inlets & Catch Basins, Types 4 & 5
605-23	Catch Basin, Type 6
605-24	Catch Basin, Type 7
605-25	Inlet, Type 8
605-26	Inlet Median Drain, Type 9
605-27	Catch Basin, Type 10
605-30	Sediment Control Catch Basin
605-31	Sediment and Oil Trap Manhole
605-32	Sediment and Oil Trap Manhole (In Street)
605-35	Drywell
606-2	Edge Drain
607-1	Embankment Protector
607-2	Embankment Protector with Slotted Drain
608-1	Galvanized Steel Aprons for Pipe Culverts
608-2	Concrete Aprons for Pipe Culverts
608-3	Metal Safety Slope Apron
609-1	Culvert Inlet Headwall
609-2	Concrete Headwall for Single Pipe Culvert
609-3	Concrete Headwall for Twin Pipe Culvert
609-4	Concrete Headwall for Arch Pipe Culvert
609-5	Concrete Headwall for Siphons
609-6	Precast Concrete Headgate
610-1	Fences
610-2	Gates
610-3	Fence Braces
611-1	Cattle Guard Type A
611-2	Cattle Guard, Pavement Markings

DRAWING NUMBER	DRAWING NAME
612-1	31" W-Beam Guardrail
612-3	Guardrail Terminal Types 7 & 8
612-5	Guardrail Anchor
612-6	Guardrail Terminal, Buried-in-Backslope
612-7	Guardrail Terminal, Flared
612-8	Guardrail Terminal, Tangent
612-10	Guardrail Transition, Low Speed
612-11	Guardrail Transition, High Speed
612-18	Precast Concrete Barrier
612-20	Precast Concrete Barrier Terminals
612-24	F-Shape to New Jersey Shape Transition
612-25	F-Shape to Single Slope Transition
613-1	Bullnose Crash Cushion
614-1	Sidewalks
614-2	Driveways
614-3	Curb Ramps
615-1	Curb and Gutter
616-1	Punching Schedule for Type "B" or Type "E" Signs
616-2	Extruded Aluminum Signs
616-5	Breakaway Steel Sign Post Installation, Type A - Wide Flange
616-6	Breakaway Steel Sign Post Installation, Type B
616-7	Breakaway Steel Sign Post Installation, Type E
616-10	Breakaway Sign Posts, Type D
616-15	Route Marker Bracket Details
616-16	B Post and Brace Angle Detail
616-17	Route Sign
617-1	Delineators
617-2	Milepost Assemblies
618-1	Marker Post, Witness Posts, and Street Monuments
619-1	Light Pole Foundation Detail
628-1	Snow Poles
630-1	Pavement Markings
631-1	Rumble Strips
634-1	Mailboxes
634-2	Mailbox Snow Shield
656-1	Mast Arm Traffic Signal Poles
656-2	Frangible Cast Base Traffic Signal Poles
656-3	Mast Arm Signal Pole Foundation Detail
656-5	Signal Cabinet & Service Pedestral Foundation Details
656-6	Signal Cabinet Foundation Detail
656-10	Loop Detectors, 10 ft/sec² Deceleration Rate
656-15	Pedestrian Pushbutton Placement
657-1	Flashing Beacons
706-6	Corrugated Metal Pipe Watertight Coupling Bands

INDIVIDUAL STANDARD DRAWINGS AND AN ELECTRONIC BOOK OF ALL STANDARD DRAWINGS ARE AVAILABLE ON THE ITD WEBSITE



GENERAL NOTES FOR EROSION AND SEDIMENT CONTROL

1. USE THE EROSION AND SEDIMENT CONTROL STANDARD DRAWINGS IN CONJUNCTION WITH THE ITD BEST MANAGEMENT PRACTICES MANUAL.
2. THE PLACEMENT OF EROSION CONTROL MEASURES IS SITE SPECIFIC. OBTAIN THE ENGINEER'S APPROVAL OF THE EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO INSTALLATION.
3. EROSION AND SEDIMENT CONTROL MEASURES PLACEMENT AND INSTALLATION MAY BE CONTROLLED BY THE NPDES, 404 PERMIT OR CONTRACT SPECIFICATIONS.
4. DRAWING NOT TO SCALE

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO
ORIGINAL SIGNED AND SEALED MARCH 18, 2021

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	9-93	MSM	6	12-16	RDL			
2	6-96	MSM	7	02-21	TWF			
3	10-10	KEH						
4	10-11	KEH						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-01_0421.dgn

DRAWING DATE: APRIL, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

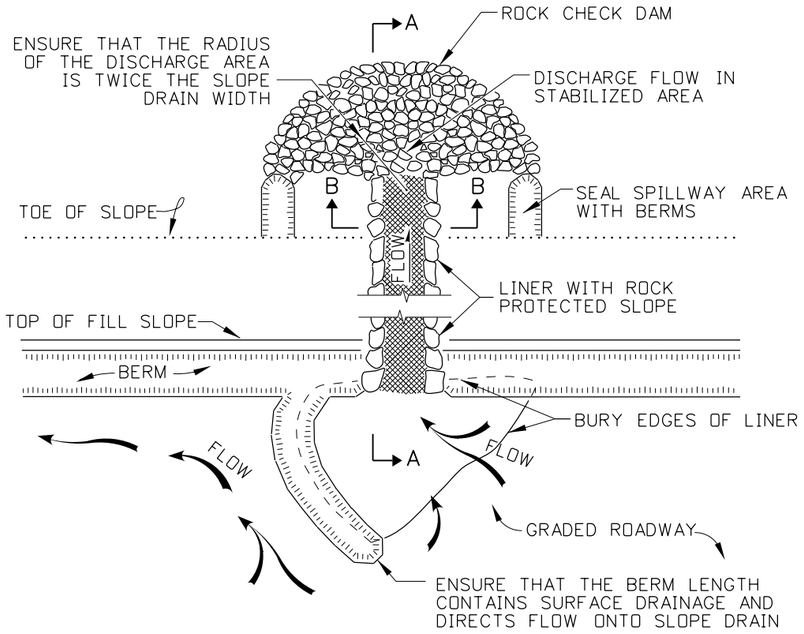
STANDARD DRAWING

EROSION AND SEDIMENT CONTROL EXAMPLE APPLICATIONS

English

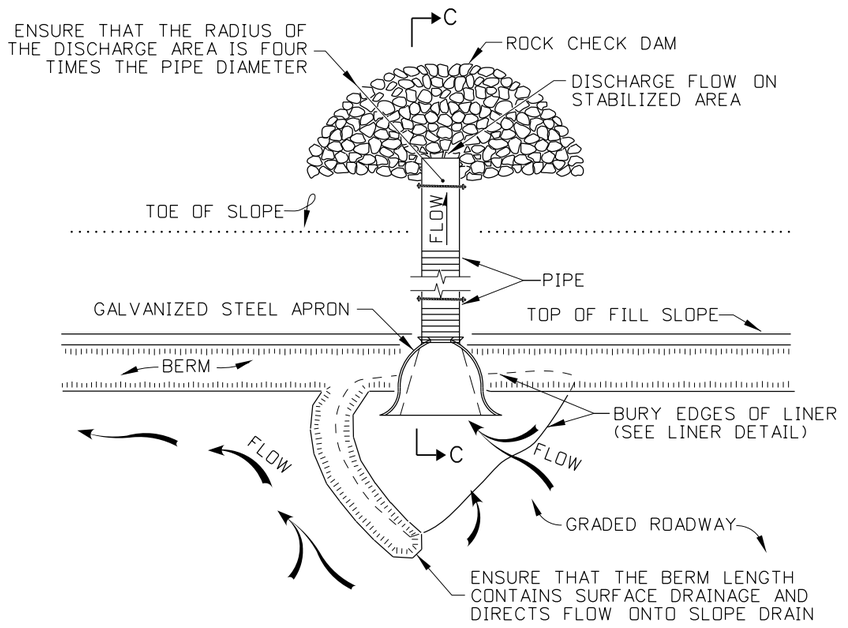
STANDARD DRAWING NO. 212-1

SHEET 1 OF 1

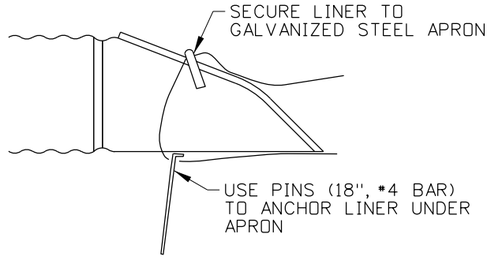


SLOPE DRAIN (LINER)

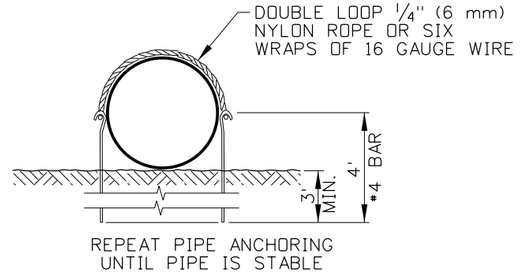
TO BE USED WITH 4:1 SLOPE OR FLATTER



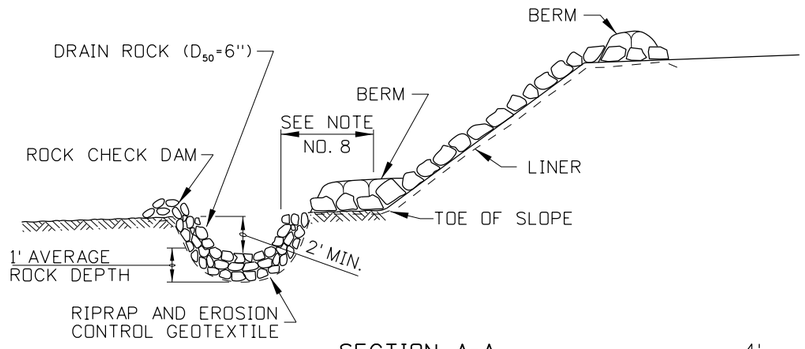
SLOPE DRAIN (PIPE)



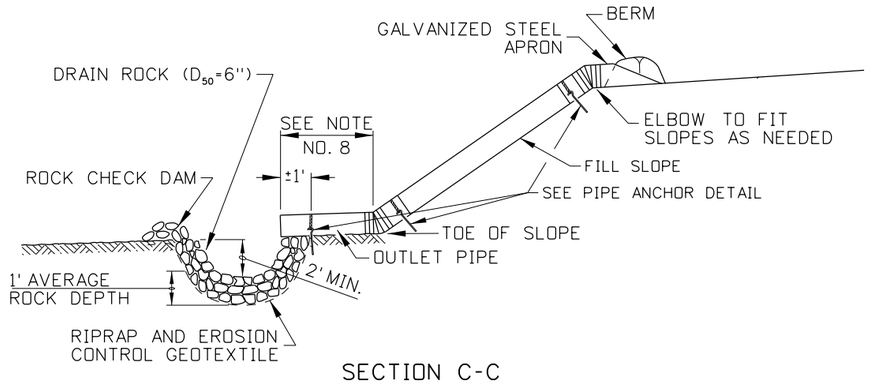
LINER DETAIL



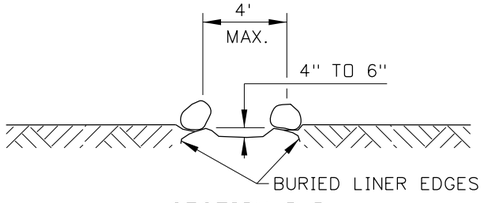
PIPE ANCHOR DETAIL



SECTION A-A



SECTION C-C



SECTION B-B

NOTES

1. SEE THE GENERAL NOTES FOR TEMPORARY EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. PLACE SLOPE DRAINS ON UNDISTURBED SOIL OR WELL COMPACTED FILL AND LOCATE AS SHOWN ON THE PLANS.
3. DETERMINE SLOPE DRAIN SIZE AND NUMBER BY DESIGN STORM EVENT.
4. INSTALL GALVANIZED STEEL APRONS AS SHOWN ON STANDARD DRAWING 608-1. CONNECT PIPES AS SHOWN ON STANDARD DRAWING 706-6.
5. CHECK SLOPE DRAINS PERIODICALLY FOR DAMAGE OR DEBRIS. PLACE ANCHORS AS NEEDED TO SECURE THE SLOPE DRAIN.
6. LINERS MAY CONSIST OF PLASTIC SHEETING, EROSION CONTROL GEOTEXTILES, OR APPROVED TURF REINFORCED MAT (TRM).
7. EXTEND LINER AT LEAST 3.5' IN FRONT OF DRAIN INLET.
8. 4' MINIMUM AT LESS THAN 1 PERCENT SLOPE. ENSURE DISCHARGE IS AT A NON-EROSIVE VELOCITY.
9. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY: J. CALEB LAKEY DATE OF ORIGINAL SIGNATURE: NOVEMBER 20, 2013 15116 STATE OF IDAHO J. CALEB LAKEY

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	9-93	MSM						
2	6-96	GFK						
3	10-10	KEH						
4	11-13	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-2_1113.dgn

DRAWING DATE: APRIL, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TOM COLE *for*
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

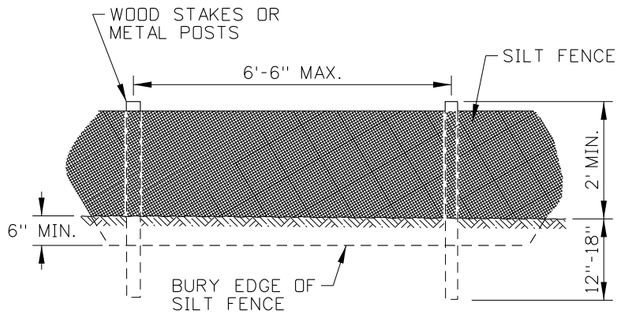
TEMPORARY EROSION AND SEDIMENT CONTROL SLOPE DRAINS

REQ. STD. DWGS. 212-1, 212-5, 608-1, & 706-6

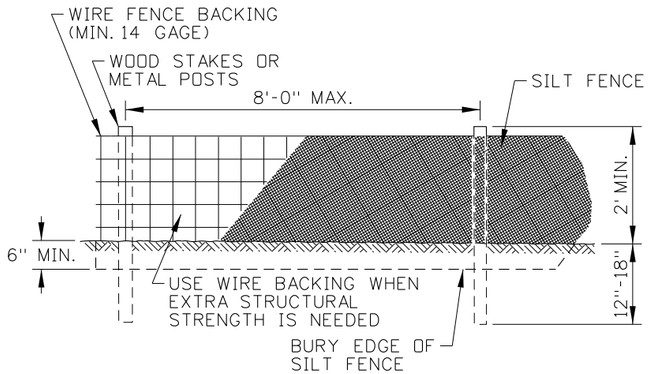
English

STANDARD DRAWING NO. 212-2

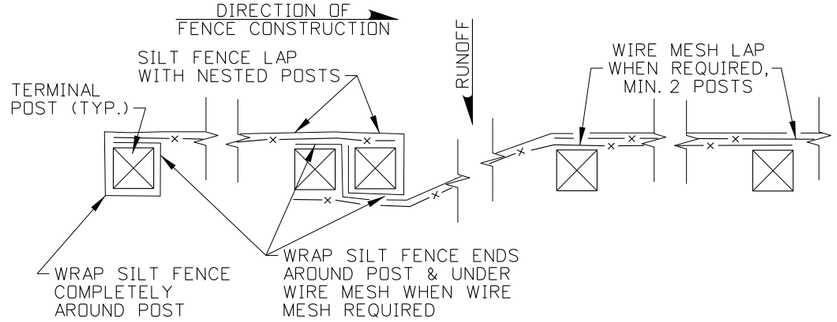
SHEET 1 OF 1



SILT FENCE (NO WIRE BACKING)



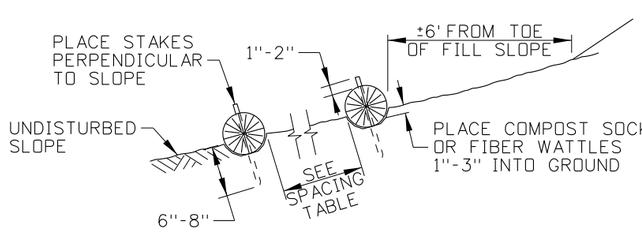
SILT FENCE (WIRE BACKING)



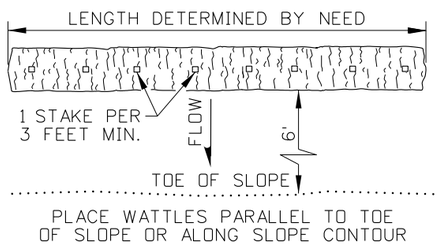
SILT FENCE LAP DETAIL

FIBER WATTLE & COMPOST SOCK SPACING TABLE				
SLOPE	WATTLE SIZE			
	6"	9"	12"	20"
1:1	5 FT	10 FT	15 FT	20 FT
2:1	10 FT	20 FT	30 FT	40 FT
3:1	15 FT	30 FT	45 FT	60 FT
4:1 OR FLATTER	20 FT	40 FT	60 FT	80 FT

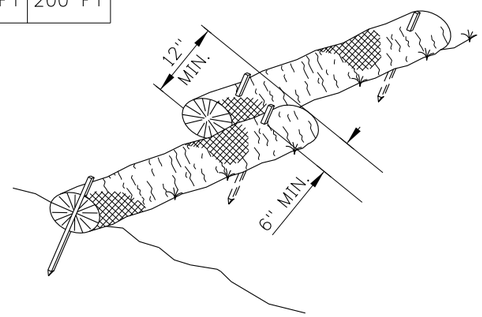
SILT FENCE SPACING TABLE			
SLOPE	SOIL TYPE		
	SILTY	CLAYS	SANDY
1:1	50 FT	75 FT	100 FT
2:1	75 FT	100 FT	125 FT
4:1	100 FT	125 FT	150 FT
10:1 OR FLATTER	125 FT	150 FT	200 FT



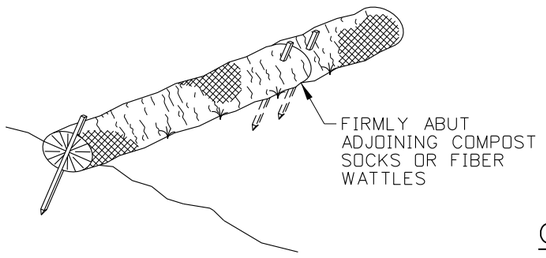
COMPOST SOCK AND FIBER WATTLE
SIDE VIEW



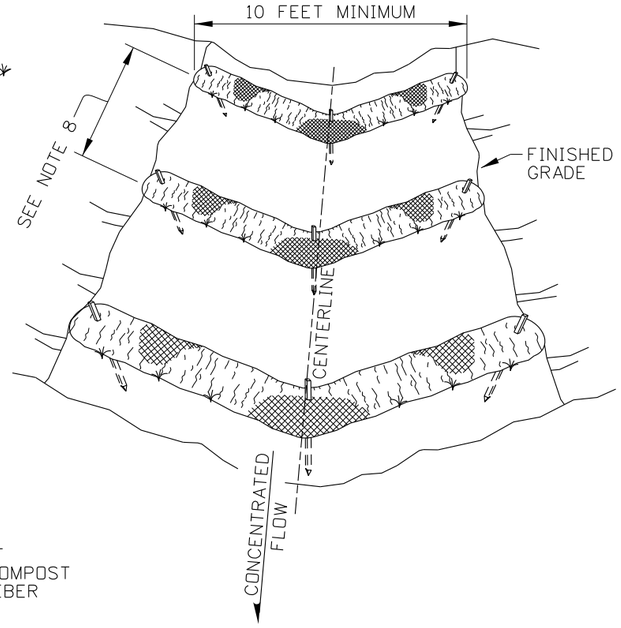
COMPOST SOCK AND FIBER WATTLE
PLAN VIEW



COMPOST SOCK AND FIBER WATTLE OVERLAPPING DETAIL



COMPOST SOCK AND FIBER WATTLE ABUTTING DETAIL



COMPOST SOCK AND FIBER WATTLE TEMPORARY CHECK DAM DETAIL

NOTES

1. SEE THE GENERAL NOTES FOR EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. THE NEED FOR TEMPORARY SEDIMENT CONTROL DEVICES ARE DETERMINED BY SITE DESIGN. SPACE SILT FENCES, COMPOST SOCKS, AND FIBER WATTLES IN ACCORDANCE WITH THE SILT FENCE SPACING TABLE AND FIBER WATTLE & COMPOST SOCK SPACING TABLE.
3. INSTALL TEMPORARY SEDIMENT CONTROL BARRIERS IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND SPECIFICATIONS. THE DIMENSIONS SHOWN ARE GENERAL GUIDELINES.
4. PLACE SEDIMENT BARRIERS TO FOLLOW THE SLOPE CONTOURS. USE EITHER METAL POSTS OR WOOD STAKES.
5. ENSURE RUNOFF PASSES THROUGH THE SILT FENCE AND NOT AROUND THE FENCE.
6. GROUND SILT FENCES WITH WIRE MESH IN ACCORDANCE WITH THE GROUNDING DETAIL SHOWN ON STANDARD DRAWING 610-1.
7. EXTEND OR JOIN SILT FENCE USING SILT FENCE LAP WITH NESTED POSTS.
8. SPACE CHECK DAMS ACCORDING TO THE HEIGHT OF THE DAM AND THE SLOPE OF THE CHANNEL SO THE BACKWATER FROM THE DOWNSTREAM DAM REACHES THE TOE OF THE UPSTREAM DAM.
9. ON SLOPES, TURN THE ENDS OF EACH ROW OF COMPOST SOCKS AND FIBER WATTLES UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE SOCK OR WATTLE.
10. REMOVE SEDIMENT FROM THE UPSLOPE SIDE OF SILT FENCES, COMPOST SOCKS, AND FIBER WATTLES WHEN ACCUMULATION HAS REACHED 1/2 OF THE EFFECTIVE HEIGHT OF THE BARRIER.
11. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED DATE OF ORIGINAL SIGNATURE MARCH 18, 2021 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-93	MSM	6	01-13	RDL			
2	12-94	MSM	7	03-21	TWF			
3	06-96	GFK						
4	10-10	KEH						
5	10-11	KEH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-03_0421.dgn

DRAWING DATE: APRIL, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

TEMPORARY EROSION AND SEDIMENT CONTROL

SILT FENCE, FIBER WATTLE, AND COMPOST SOCK

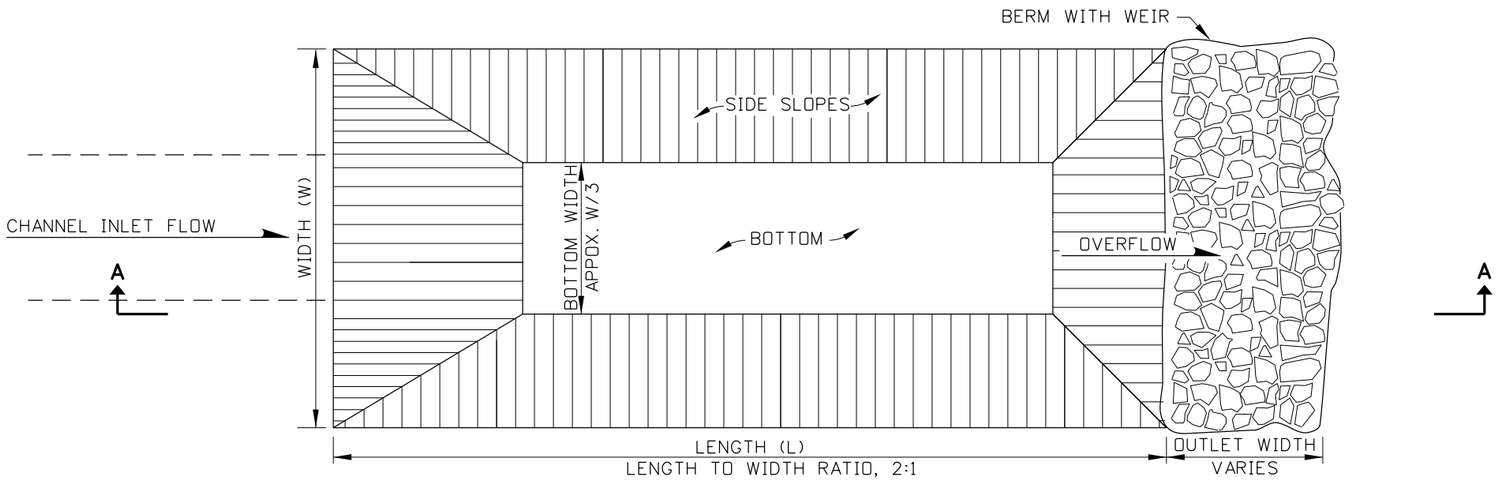
REQUIRES STD. DWG. 212-1

English

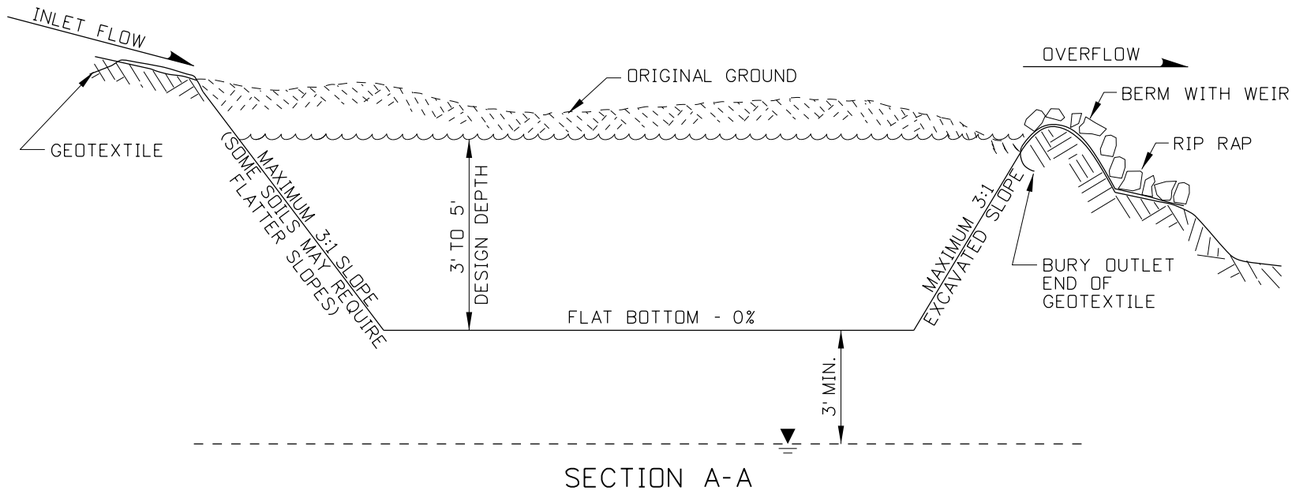
STANDARD DRAWING NO.

212-3

SHEET 1 OF 1



SEDIMENT TRAP BASIN



SECTION A-A

NOTES

1. SEE THE GENERAL NOTES FOR TEMPORARY EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. DETERMINE SEDIMENT TRAP SIZE ON A 2-YEAR 24-HOUR STORM DESIGN OR 3,600 CU. FT./ACRE. THE MAXIMUM DRAINAGE AREA PER SEDIMENT TRAP IS 5 ACRES.
3. LOCATE SEDIMENT TRAP OUTSIDE OF THE SLOPE STAKE LIMITS AND CONSTRUCT PRIOR TO THE START OF EXCAVATION OR REMOVAL OF EXISTING VEGETATION.
4. ENSURE THAT RIPRAP MATERIAL IS IN ACCORDANCE WITH 711.04 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
5. PROVIDE TYPE II RIPRAP/EROSION CONTROL GEOTEXTILE IN ACCORDANCE WITH SUBSECTION 718.06 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
6. ENTIRE TRAP MAY BE ROCK LINED IF NECESSARY.
7. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED J. CALEB LAKEY NOVEMBER 20, 2013 15116 STATE OF IDAHO J. CALEB LAKEY

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-93	MSM						
2	02-96	MSM						
3	10-10	KEH						
4	10-11	KEH						
5	11-13	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-4_1113.dgn

DRAWING DATE: APRIL, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TOM COLE *for*
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

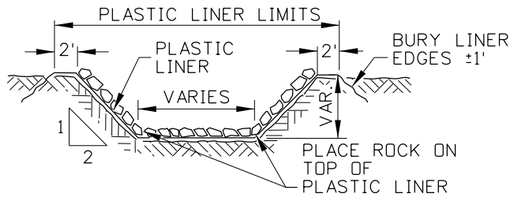
TEMPORARY EROSION AND SEDIMENT CONTROL SEDIMENT TRAP

REQUIRES STD. DWG. 212-1

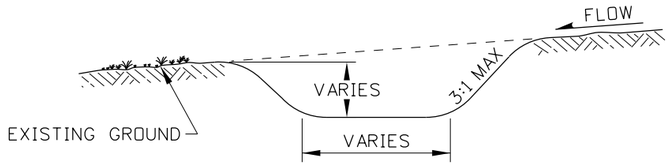
English

STANDARD DRAWING NO. 212-4

SHEET 1 OF 1

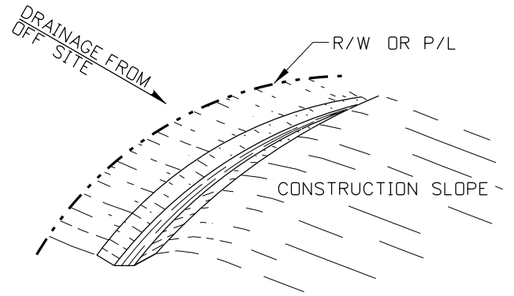


DIVERSION CHANNEL

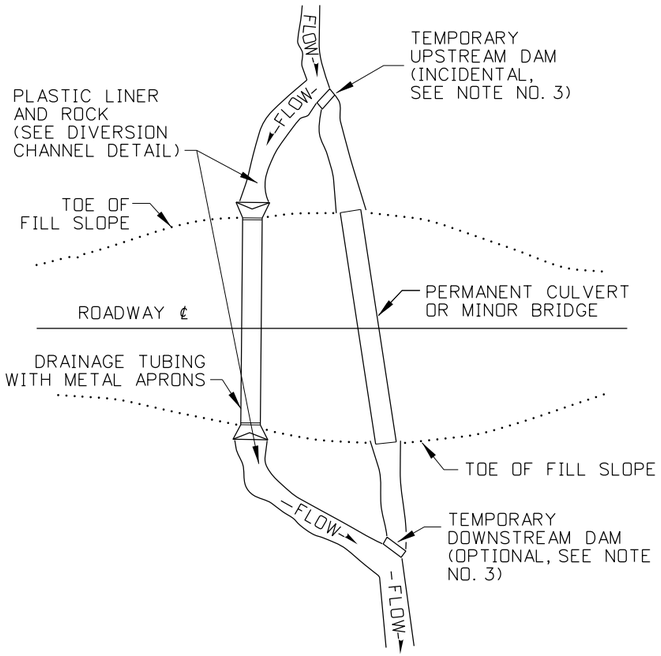


SWALE

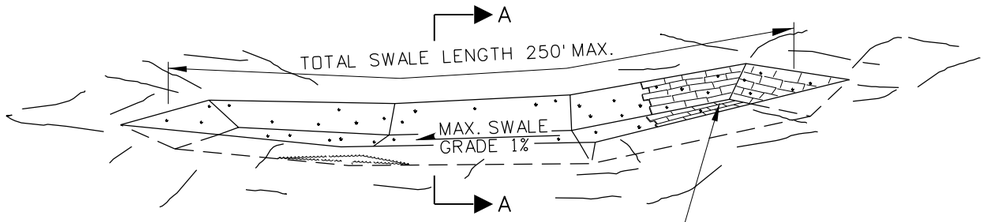
FOR PERIMETER, INTERCEPTOR, AND DIVERSION SWALES



PERIMETER SWALE

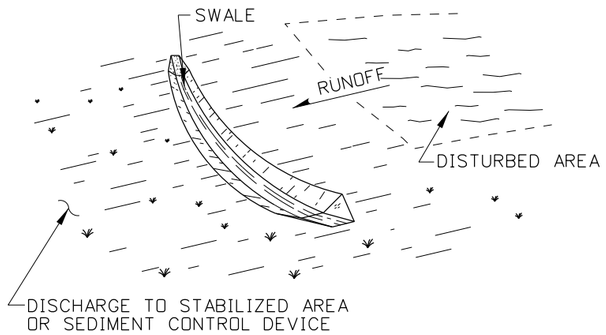


DIVERSION CHANNEL EXAMPLE

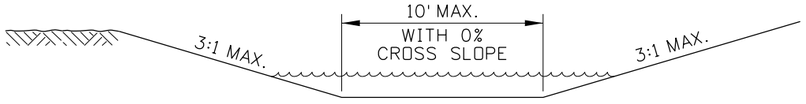


DIVERSION OF RUNOFF MAY BE NECESSARY DURING THE ESTABLISHMENT OF VEGETATION ON THE SWALE SIDES AND BOTTOM. WHERE RUNOFF DIVERSION IS NOT POSSIBLE, COVER GRADED AND SEEDED AREAS WITH SUITABLE EROSION CONTROL MATERIALS OR SOD.

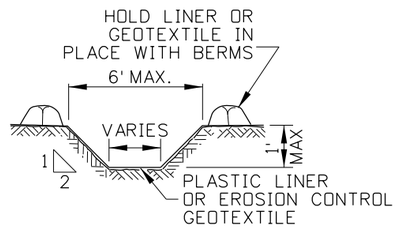
GRASSED SWALE



INTERCEPTOR SWALE

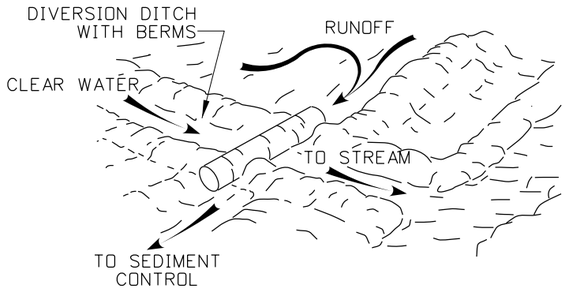


SECTION A-A

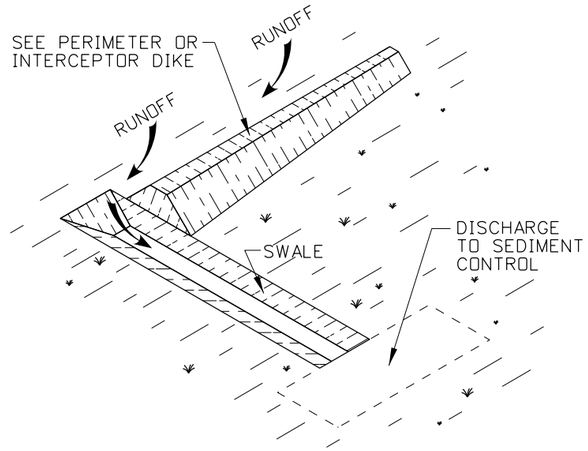


DIVERSION DITCH

ONLY USE WITH CLEAR WATER



DIVERSION DITCH EXAMPLE



DIVERSION SWALE

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE ORIGINAL SIGNED DECEMBER 27, 2016 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-5_1216.dgn

DRAWING DATE: NOVEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED MASON

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

TEMPORARY EROSION AND SEDIMENT CONTROL

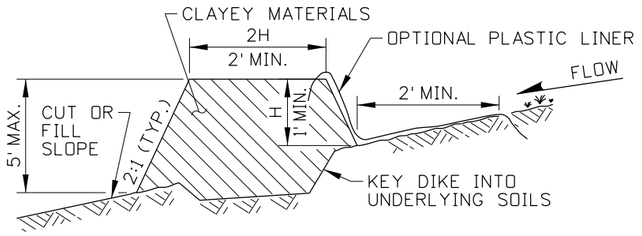
DIVERSION CHANNEL, DITCH, SWALE, DIKE, BERM, WATERBAR, AND ROLLING DIP

REQUIRES SHT. 2 OF 2 & STD. DWG. 212-1

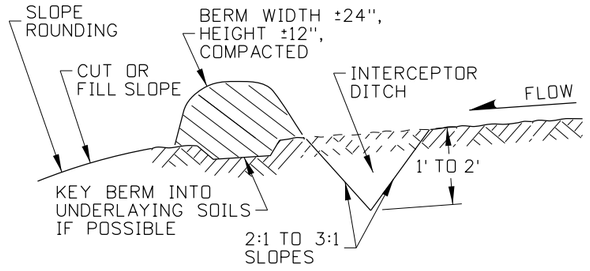
English

STANDARD DRAWING NO. 212-5

SHEET 1 OF 2

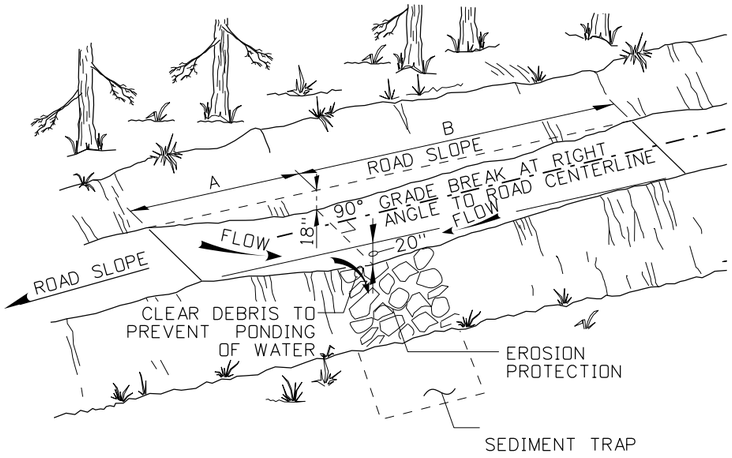


DIKE



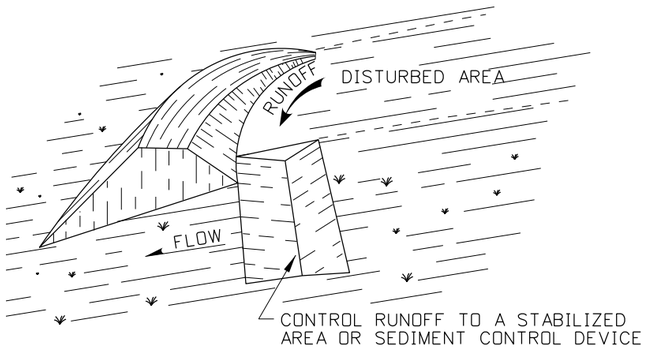
BERM

SHOWN WITH INTERCEPTOR DITCH

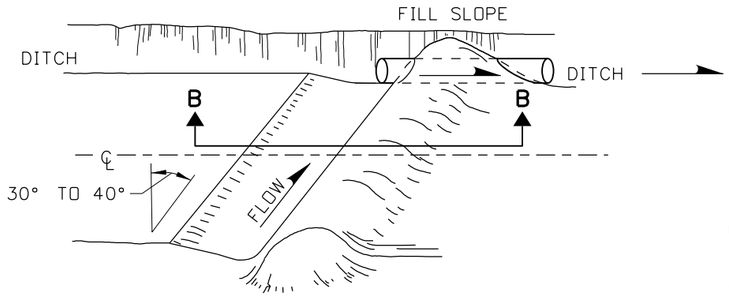


ROLLING DIP

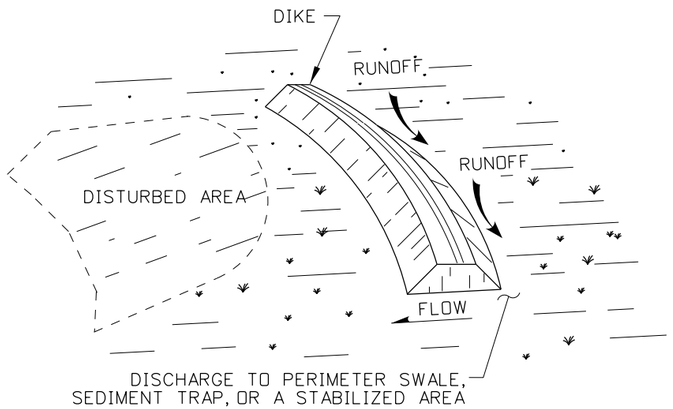
ROLLING DIP DIMENSION TABLE		
% ROAD SLOPE	A (DOWNHILL)	B (UPHILL)
0% TO 4%	35'	65'
4% TO 6%	25'	75'



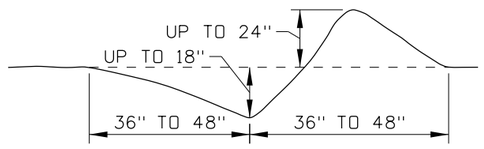
PERIMETER DIKE



WATERBAR



INTERCEPTOR DIKE



SECTION B-B

NOTES

1. SEE THE GENERAL NOTES FOR TEMPORARY EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. CONSTRUCT DIVERSION CHANNELS, DITCHES, SWALES, DIKES, BERMS, WATER BARS, AND ROLLING DIPS TO THE DIMENSIONS SHOWN ON THE PLANS. USE A PLASTIC LINER WHEN RUNOFF IS NOT INTENDED TO INFILTRATE INTO THE SOIL.
3. WHEN USING A DIVERSION CHANNEL, CONSTRUCT A TEMPORARY DAM TO DIVERT WATER INTO THE CHANNEL. A TEMPORARY DOWNSTREAM DAM IS OPTIONAL AND MAY BE USED TO PREVENT WATER FROM RETURNING TO THE UPSTREAM WORK AREA.
4. USE DIVERSION DITCHES WITH CLEAR WATER. USE A DIVERSION CHANNEL WHEN THE FLOW EXCEEDS 0.25 CUBIC FEET PER SECOND.
5. INSTALL A PLASTIC LINER ALONG THE LENGTH AND WIDTH OF DIVERSION CHANNELS AND DITCHES. OVERLAP THE PLASTIC LINER EDGES 2 FEET. SECURE THE PLASTIC LINER EDGES WITH BERMS, ROCKS, OR OTHER SUITABLE MATERIALS.
6. THE RECOMMENDED MAXIMUM DRAINAGE AREA FOR GRASSED SWALES IS 1 ACRE. THE RECOMMENDED MAXIMUM DRAINAGE AREA CONTRIBUTING RUNOFF TO A DIKE, SWALE OR COMBINATION THEREOF SHOULD NOT EXCEED 5 ACRES.
7. USE DIKES WHEN BERMS ARE NOT SUFFICIENT TO CONTROL RUNOFF. COMPACT DIKES TO 90 PERCENT OF STANDARD DENSITY.
8. DIVERT COLLECTED RUNOFF, INTERCEPTED RUNOFF, OR BOTH FROM A BERM, DIKE, SWALE OR COMBINATION THEREOF TO A SEDIMENT CONTROL DEVICE OR STABILIZED AREA.
9. ENSURE THAT THE SIDE SLOPES OF A DIKE OR SWALE WITHIN THE CLEAR ZONE ARE 6:1 OR FLATTER UNLESS SHIELDED.
10. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED AND DATED DECEMBER 27, 2016 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-5_1216.dgn

DRAWING DATE: NOVEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED MASON

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

TEMPORARY EROSION AND SEDIMENT CONTROL

DIVERSION CHANNEL, DITCH, SWALE, DIKE, BERM, WATERBAR, AND ROLLING DIP

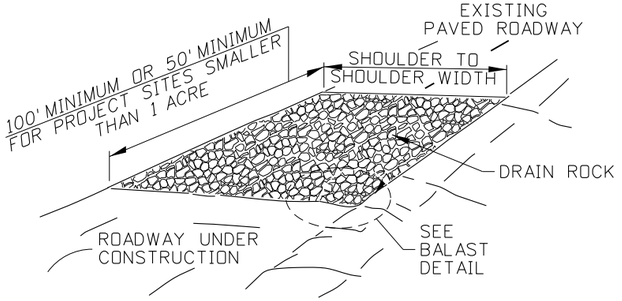
REQUIRES SHT. 1 OF 2 & STD. DWG. 212-1

English

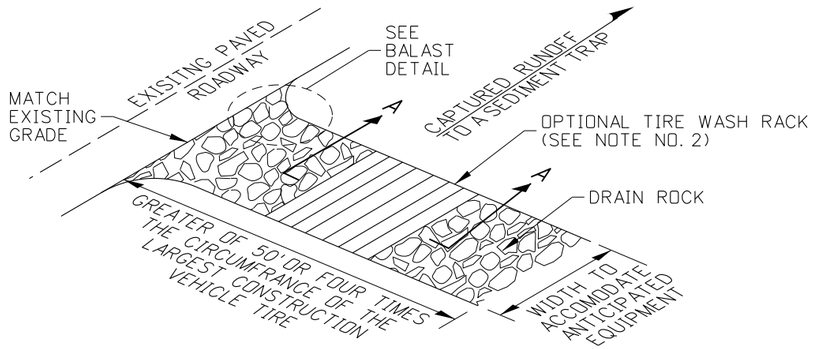
STANDARD DRAWING NO.

212-5

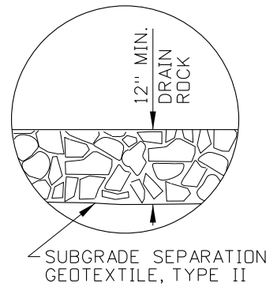
SHEET 2 OF 2



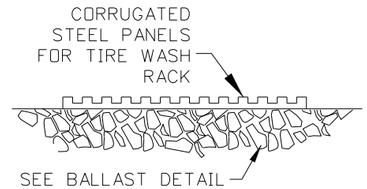
IN-LINE WITH HIGHWAY



PERPENDICULAR TO HIGHWAY

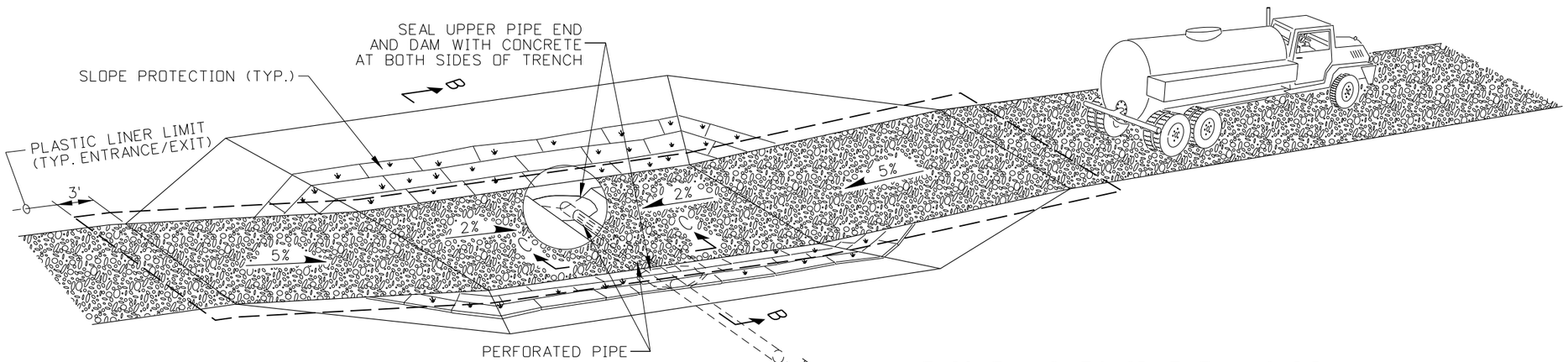


BALLAST DETAIL

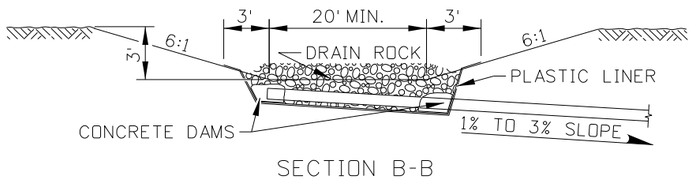


SECTION A-A

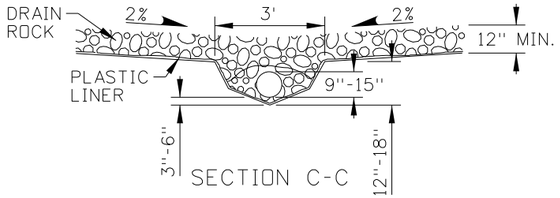
STABILIZED CONSTRUCTION ENTRANCE



VEHICLE AND EQUIPMENT WASHDOWN



SECTION B-B



SECTION C-C

NOTES

1. SEE THE GENERAL NOTES FOR EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO 13683 MARCH 18, 2021 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-21	TWF						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-06_0421.dgn

DRAWING DATE: NOVEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

TEMPORARY EROSION AND SEDIMENT CONTROL

STABILIZED CONSTRUCTION ENTRANCE AND VEHICLE WASHDOWN

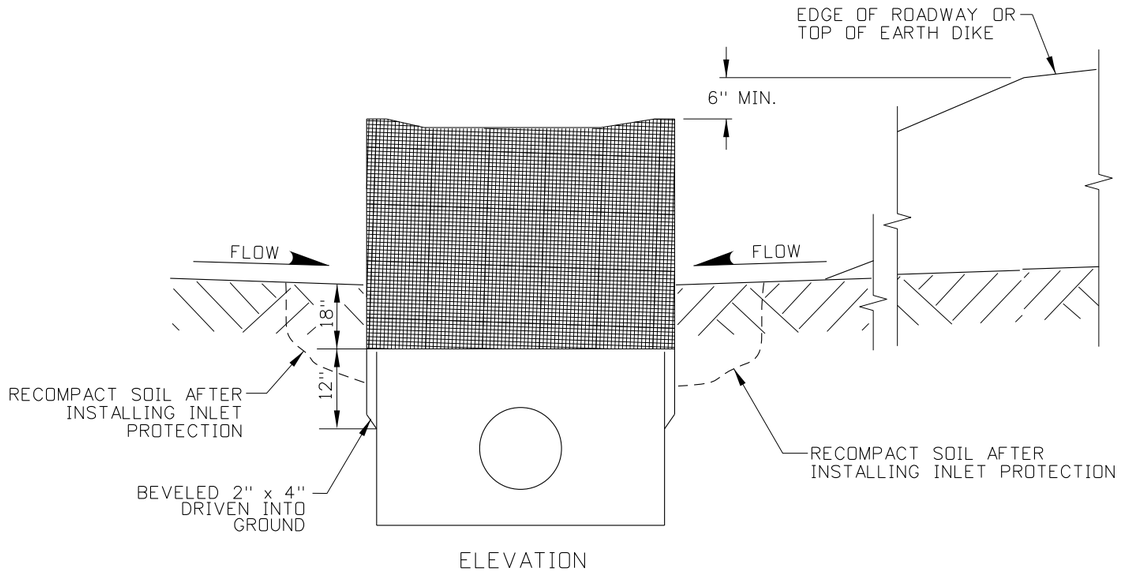
REQUIRES STD. DWG. 212-1

English

STANDARD DRAWING NO.

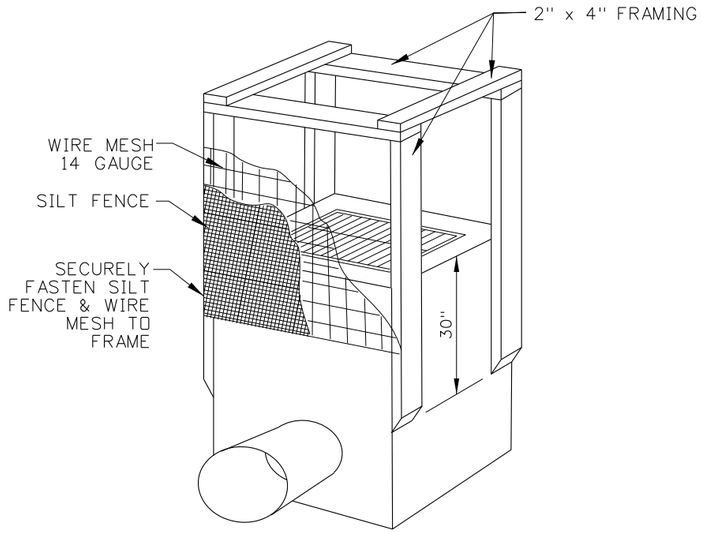
212-6

SHEET 1 OF 1

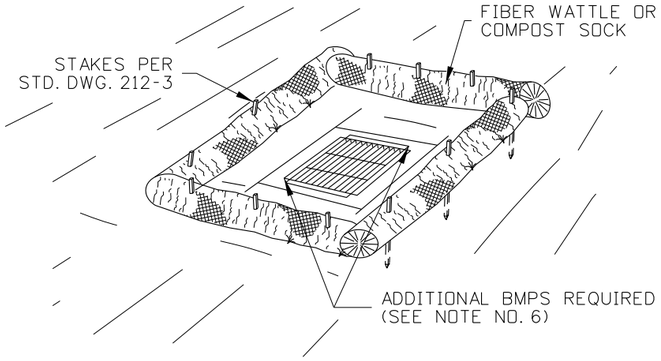


ELEVATION

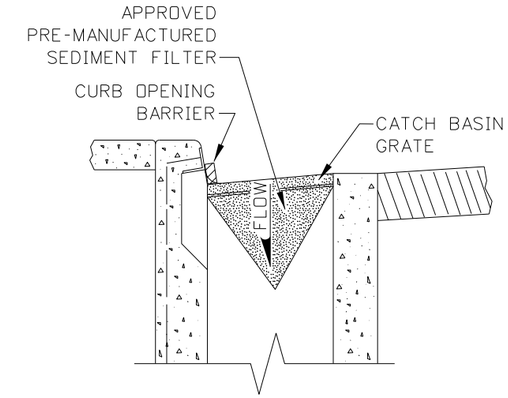
FRAMED WIRE/FABRIC FILTER



PERSPECTIVE VIEW



FIBER WATTLE FILTER



PRE-MANUFACTURED SEDIMENT FILTER FOR INLET GRATE

NOTES

1. SEE THE GENERAL NOTES FOR EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. REMOVE TRASH, DEBRIS, DUFF, AND MATERIALS THAT MAY INTERFERE WITH THE INLET OR CATCH BASIN PROTECTION FUNCTION PRIOR TO PLACEMENT AND DAILY THEREAFTER OR AS NEEDED.
3. ADJUST TO ENSURE EFFECTIVENESS.
4. FRAMED WIRE/FABRIC FILTER AND FIBER WATTLE FILTERS ARE INTENDED TO BE USED ON STRUCTURES NOT PRESENTLY SURROUNDED BY PAVEMENT.
5. ENSURE WATER DISCHARGING FROM THE INLET MEETS APPLICABLE WATER QUALITY STANDARDS.
6. USE IN CONJUNCTION WITH OTHER INLET PROTECTION DEVICES, NOT AS THE SOLE BMP. SEE SECTION SC-6 IN THE BMP MANUAL.
7. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER — LICENSED — RYAN D. LANCASTER — 13683 — STATE OF IDAHO — ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 18, 2021

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-10	KEH						
2	10-11	KEH						
3	01-13	RDL						
4	03-21	TWF						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-07_0421.dgn

DRAWING DATE: JUNE, 1996

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

TEMPORARY EROSION AND SEDIMENT CONTROL INLET PROTECTION

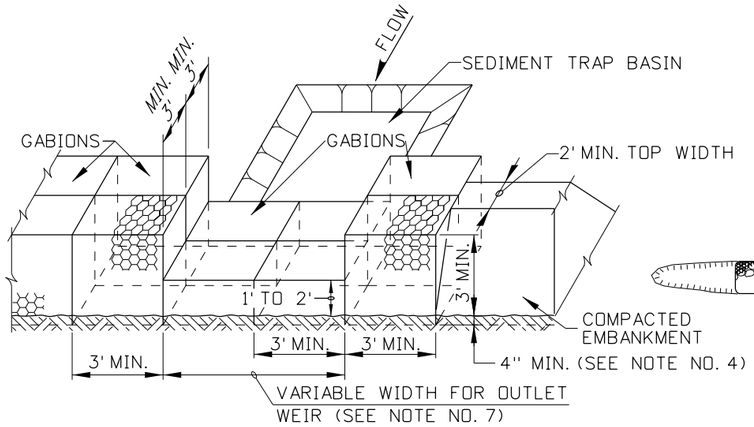
REQUIRES STD. DWG. 212-1

English

STANDARD DRAWING NO.

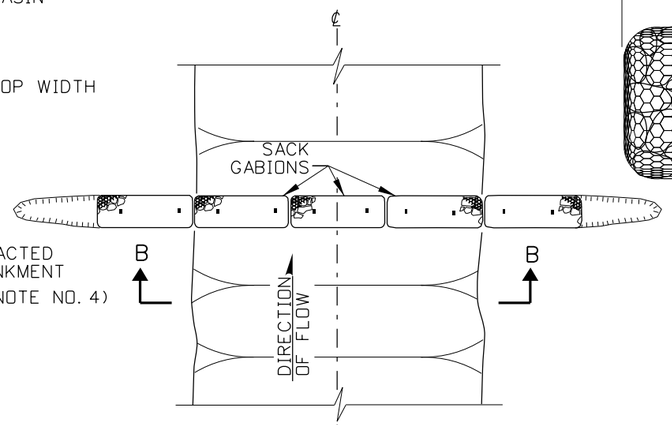
212-7

SHEET 1 OF 1

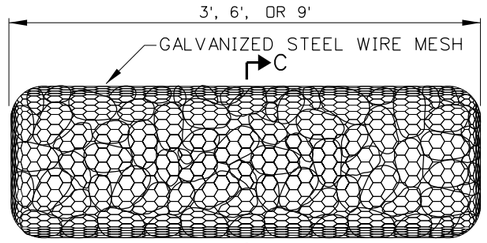


MINIMUM DIMENSIONS SHOWN. SITE CONDITIONS WILL DETERMINE ACTUAL DIMENSIONS.

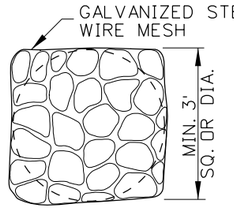
GABION OUTLET WEIR



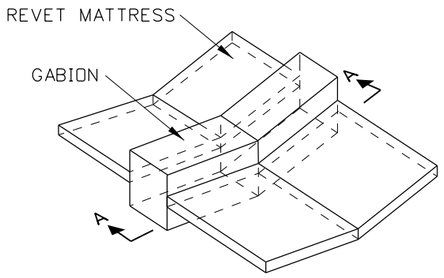
GABION CHECK DAM



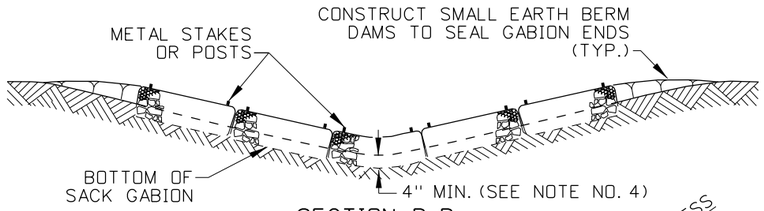
SACK GABION



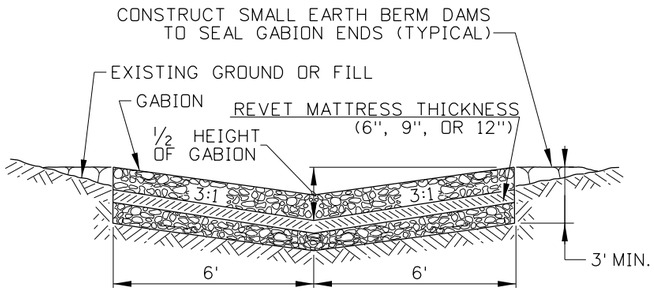
SECTION C-C



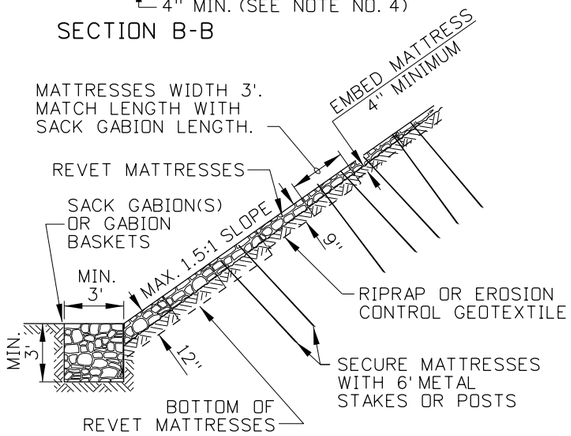
REVET MATTRESSES WITH GABIONS



SECTION B-B



SECTION A-A



TYPICAL SLOPE SECTION

SLOPE REVETMENT

GENERAL NOTES FOR PERMANENT EROSION CONTROL

1. USE PERMANENT EROSION CONTROL DEVICES STANDARD DRAWINGS IN CONJUNCTION WITH THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND THE ITD BEST MANAGEMENT PRACTICES MANUAL.
2. SEE PLANS FOR SITE DIMENSIONS.
3. THE PLACEMENT OF PERMANENT EROSION CONTROL MEASURES IS SITE SPECIFIC. OBTAIN THE ENGINEER'S APPROVAL OF THE PERMANENT EROSION CONTROL MEASURES PRIOR TO INSTALLATION.
4. PERMANENT EROSION CONTROL DEVICES ARE INTENDED TO LAST MORE THAN 6 MONTHS AND SHOULD BE INTEGRATED THE FINAL EROSION CONTROL PLAN.

NOTES

1. OBTAIN APPROPRIATE PERMITS BEFORE EROSION DEVICES ARE PLACED IN STREAMS AND, CHANNELS, OR BOTH.
2. GABIONS AND REVET MATTRESSES MAY BE USED FOR PERMANENT EROSION CONTROL, TEMPORARY EROSION CONTROL, OR BOTH.
3. THE DISCHARGE THROUGH OR OVER REVET MATTRESSES, GABIONS, OR BOTH SHOULD BE DIRECTED ONTO STABILIZED AREA SUCH AS VEGETATION, RIPRAP, OR BOTH.
4. GABIONS AND REVET MATTRESSES SHOULD BE EMBEDDED A MINIMUM OF 4" INTO THE EXISTING GROUND.
5. ALL SACK GABIONS SHOULD BE SECURED WITH 6' x 3/4" METAL STAKES OR 6' STEEL POSTS.
6. ENSURE THAT THE WIDTH OF THE GABION OUTLET WEIR IS CONSTRUCTED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
7. GABIONS MAY BE USED WITH REVET MATTRESSES TO FORM SEDIMENT CONTROL DAMS AND SHOULD BE INSTALLED SO THAT THE CHANNEL CAPACITY IS NOT RESTRICTED SHOULD THE DEVICE TOTALLY SILT-UP. REVET MATTRESSES MAY BE USED AS A CHANNEL LINER TO PREVENT EROSION AND TO INTERCEPT SEDIMENT LADEN RUNOFF.
8. 6" REVET MATTRESSES WILL USUALLY PROMOTE VEGETATION FOR SIDE SLOPES THAT ARE NOT CONTINUALLY SUBMERGED IN WATER. 9" REVET MATTRESSES MAY BE USED TO LINE LARGE CHANNELS OR STREAMS WITH GREATER FLOW RATES OR IN SOILS THAT ERODE EASILY. 12" REVET MATTRESSES MAY BE USED TO LINE LARGE STREAMS AND RIVERS.
9. SECURE REVET MATTRESSES USED FOR SLOPE REVETMENT WITH METAL POSTS OR STAKES TO PREVENT SLIDING OR SHIFTING.
10. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED J. CALEB LAKEY ORIGINAL SIGNED DATE OF ORIGINAL SIGNATURE FEBRUARY 1, 2013 15116 STATE OF IDAHO J. CALEB LAKEY

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-96	MSM						
2	10-10	KEH						
3	10-11	KEH						
4	01-13	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-10_0213.dgn

DRAWING DATE: JANUARY, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

PERMANENT EROSION AND SEDIMENT CONTROL

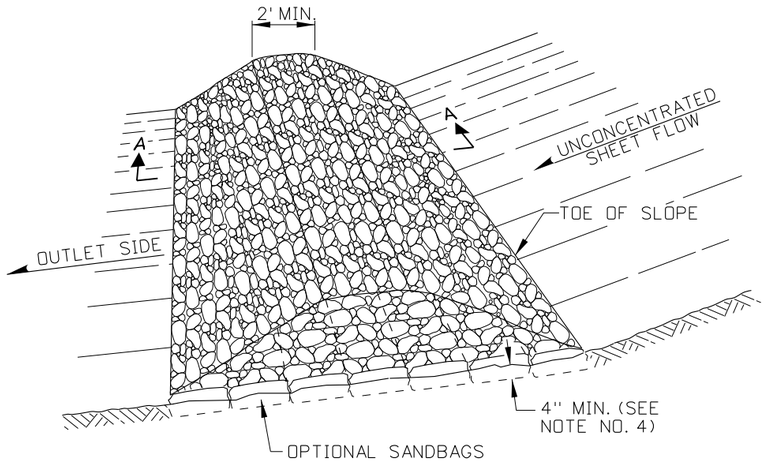
GABION AND REVET MATTRESS

English

STANDARD DRAWING NO.

212-10

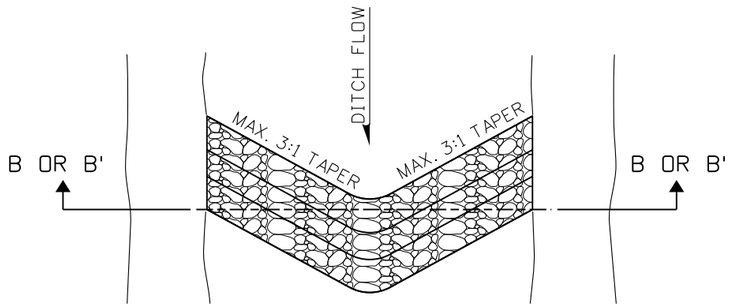
SHEET 1 OF 1



PERSPECTIVE VIEW - AT TOE OF SLOPE

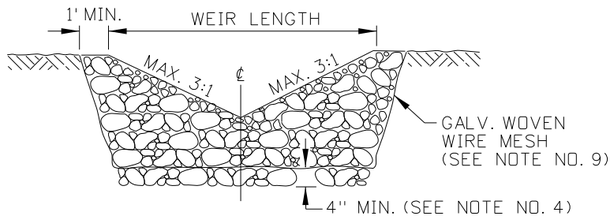
STONE FILTER BERM

(SEE NOTE NO. 6)



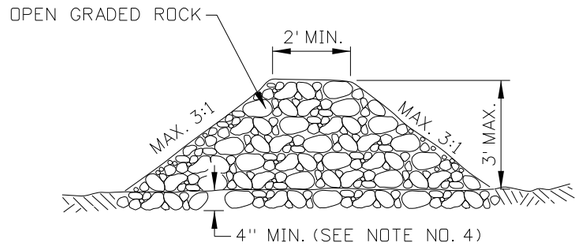
STONE FILTER WEIR

(SEE NOTE NOS. 7 & 8)

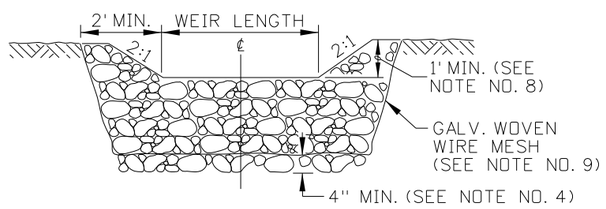


"V" NOTCHED WEIR

SECTION B - B
FOR HIGH VELOCITY FLOWS

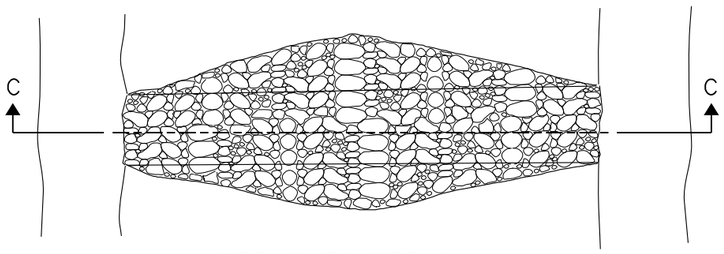


SECTION A-A



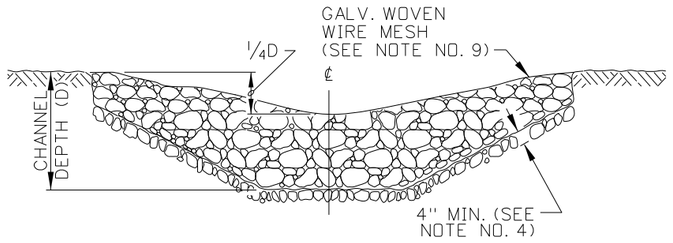
LEVEL CRESTED WEIR

SECTION B' - B'



STONE FILTER DAM

(SEE NOTE NOS. 9 THROUGH 11)



ELEVATION - AT CHANNEL SECTION

SECTION C - C

NOTES

1. SEE THE GENERAL NOTES FOR PERMANENT EROSION CONTROL STANDARD DRAWINGS ON 212-10.
2. PLACE STONE FILTER DAMS WHERE UP GRADIENT EROSION IS ANTICIPATED, SUCH AS AT THE TOE OF SLOPES, UPSTREAM OF DRAINAGE STRUCTURES, DOWNSTREAM OF DRAINAGE STRUCTURES, OR BOTH, IN ROADWAY DITCHES AND IN CHANNELS.
3. DIRECT THE OUTLET SIDE OF STONE FILTER DAMS ONTO A STABILIZED AREA SUCH AS VEGETATION, STONE, OR BOTH.
4. EMBED STONE FILTER DAMS A MINIMUM OF 4 INCHES INTO THE EXISTING GROUND OR EMBANKMENT.
5. ENSURE BERM, WEIR, AND DAM SIDE SLOPES ARE 3:1 OR FLATTER. ENSURE BERMS, WEIRS, AND DAMS WITHIN THE CLEAR ZONE HAVE SLOPES OF 6:1 OR FLATTER UNLESS SHIELDED.
6. USE FILTER BERMS ON SLOPE TOES, AROUND INLETS, IN SHALLOW DITCHES, AND AT DIKE AND SWALE OUTLETS. THIS TYPE OF STONE FILTER BERM IS RECOMMENDED TO CONTROL SEDIMENT FROM A DRAINAGE AREA OF 5 ACRES OR LESS. DO NOT USE FILTER BERMS IN CONCENTRATED HIGH VELOCITY FLOWS (GREATER THAN 8FT./SEC.) WHERE AGGREGATE WASH-OUT MAY OCCUR. EMBED SANDBAGS AT THE FILTER DAM EDGES (4" OR MORE) FOR BETTER FILTERING EFFICIENCY WHEN DIRECTED.
7. USE FILTER WEIRS, DAMS, OR BOTH IN DITCHES AND AT DIKE AND SWALE OUTLETS.
8. ENSURE FILTER WEIRS HAVE A MINIMUM OF 1 FT DISTANCE BETWEEN THE TOP OF WEIR AND THE TOP OF THE EMBANKMENT. THE "V" NOTCH OPTION IS INTENDED TO BE USED ON HIGH VELOCITY FLOWS (GREATER THAN 8FT/SEC).
9. SECURE FILTER WEIRS AND DAMS WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1" DIAMETER HEXAGONAL OPENINGS. PLACE THE STONE IN THE MESH TO THE HEIGHT AND SLOPE SPECIFIED. THE MESH SHOULD BE FOLDED AT THE UPSTREAM SIDE OVER THE AGGREGATE AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES, OR HOG RINGS.
10. CONSTRUCT FILTER DAMS DOWNSTREAM FROM THE DISTURBED AREAS TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF, CONCENTRATED FLOW, OR BOTH. DAMS SHOULD BE SIZED TO FILTER A MAXIMUM FLOW RATE OF 60 GPM PER LINEAR FOOT OF DAM WIDTH. USE A FIVE YEAR STORM FREQUENCY TO CALCULATE THE FLOW RATE.
11. USE FILTER DAMS IN STREAMS AND CHANNELS. SECURE TO THE STREAM BED AND EMBANKMENT EDGES.
12. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED AND SEALED MARCH 18, 2021 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	05-95	MSM	6	11-16	RDL			
2	02-96	MSM	7	03-21	TWF			
3	10-10	KEH						
4	10-11	KEH						
5	01-13	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-11_0421.dgn

DRAWING DATE: JANUARY, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

PERMANENT EROSION AND SEDIMENT CONTROL

STONE FILTER BERMS, DAMS, AND WEIRS

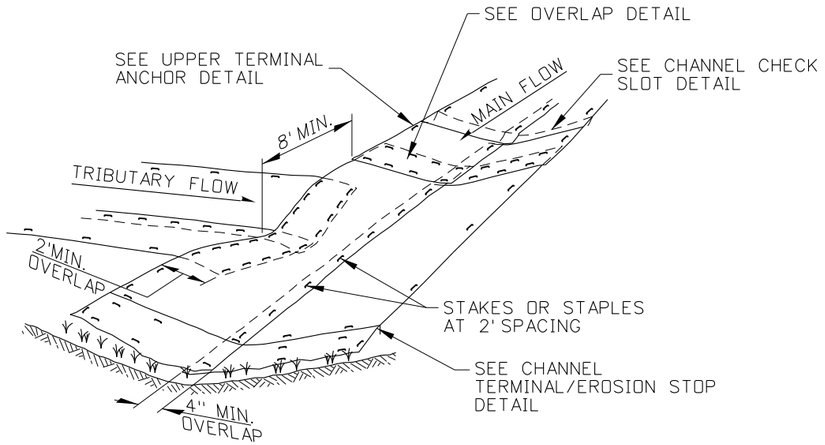
REQUIRES STD. DWG. 212-10

English

STANDARD DRAWING NO.

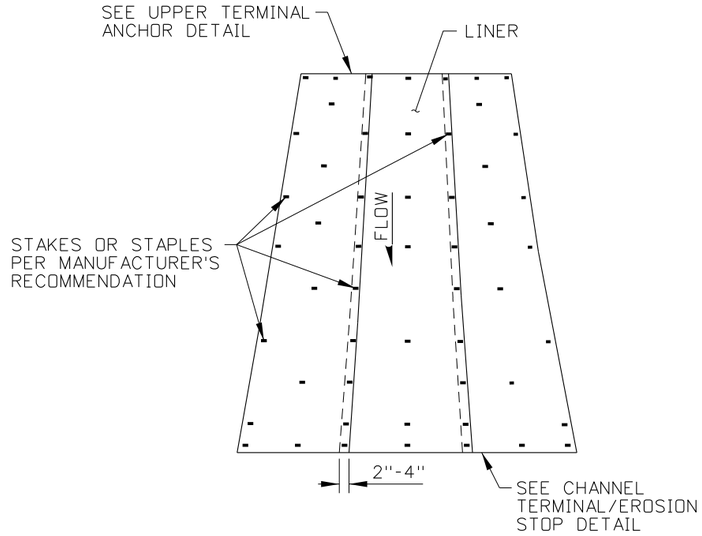
212-11

SHEET 1 OF 1



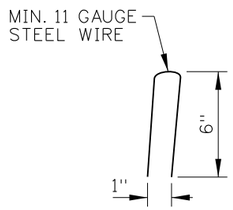
CHANNEL & INTERSECTION EXAMPLE

(SEE NOTE NO. 3)



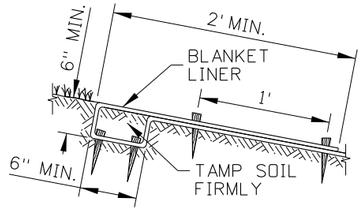
SLOPE INSTALLATION EXAMPLE

(SEE NOTE NO. 3)



WIRE STAPLE DETAIL

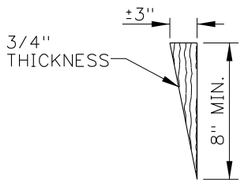
(SEE NOTE NO. 5)



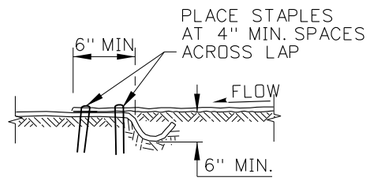
UPPER TERMINAL ANCHOR DETAIL

NOTES

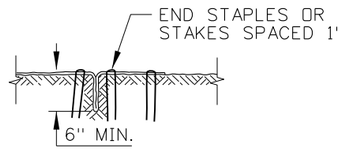
1. SEE THE GENERAL NOTES FOR PERMANENT EROSION CONTROL STANDARD DRAWINGS ON 212-10.
2. USE IN TEMPORARY OR PERMANENT APPLICATIONS.
3. THE LOCATION, SPACING, AND CONFIGURATION OF THE SLOPE AND CHANNEL PROTECTION WILL VARY FOR EACH INSTALLATION ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
4. BEGIN LINER PLACEMENT AT THE UPSTREAM END OR CREST OF THE SLOPE.
5. INSTALL WIRE STAPLES PERPENDICULAR TO THE SLOPE PLANE.
6. DRAWING NOT TO SCALE.



WOOD STAKE DETAIL



OVERLAP DETAIL



CHANNEL TERMINAL/EROSION STOP DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER — LICENSED — ORIGINAL SIGNED — RYAN D. LANCASTER — DATE OF ORIGINAL SIGNATURE MARCH 18, 2021 — 13683 — STATE OF IDAHO

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	05-95	MSM	6	03-21	TWF			
2	02-96	MSM						
3	10-10	KEH						
4	11-13	RDL						
5	11-14	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-12_0421.dgn

DRAWING DATE: DECEMBER, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

PERMANENT EROSION AND SEDIMENT CONTROL

SLOPE AND CHANNEL PROTECTION

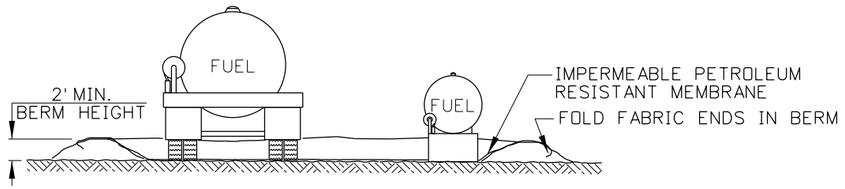
REQUIRES STD. DWG. 212-10

English

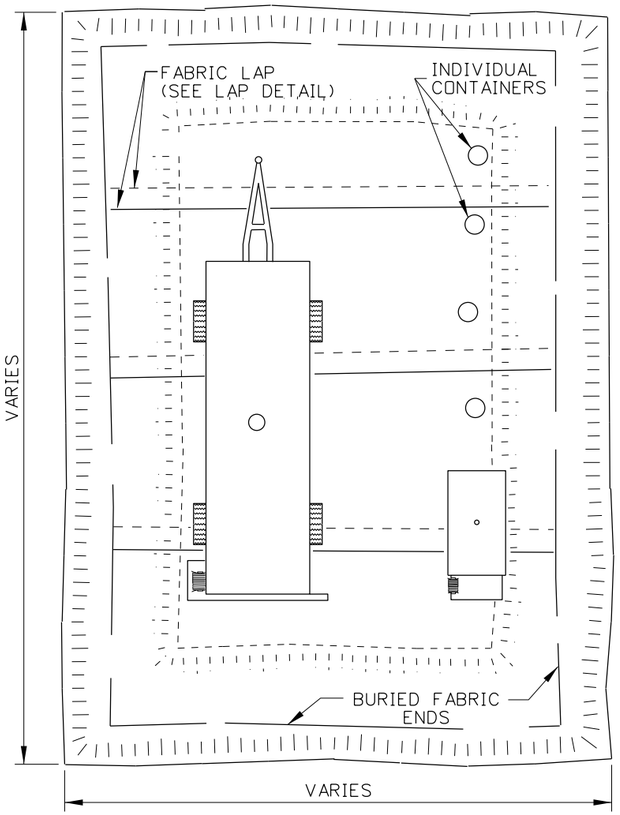
STANDARD DRAWING NO.

212-12

SHEET 1 OF 1

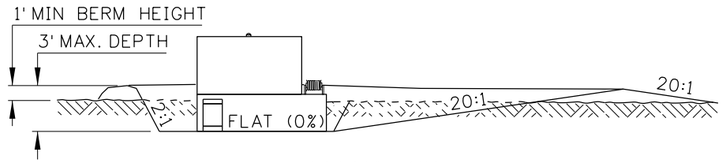


ELEVATION

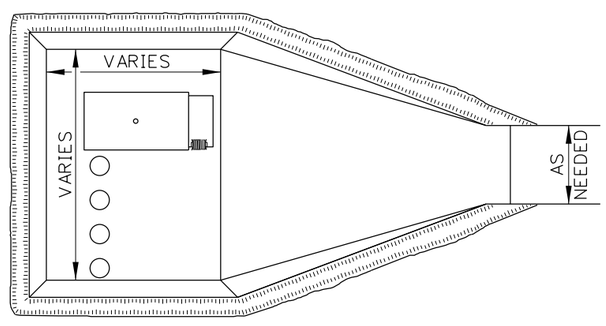


PLAN

PETROLEUM STORAGE AREA - TYPE 1

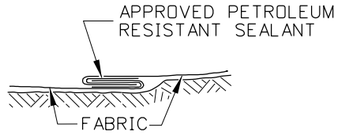


ELEVATION



PLAN

PETROLEUM STORAGE AREA - TYPE 2



LAP DETAIL

NOTES

1. USE THIS DRAWING IN CONJUNCTION WITH THE ITD BEST MANAGEMENT PRACTICES (BMP) MANUAL.

2. ENSURE THAT THE PETROLEUM STORAGE AREAS LAST FOR THE DURATION OF THE PROJECT.

3. PROVIDE A TYPE 1 OR TYPE 2 PETROLEUM STORAGE AREA WITH AN IMPERMABLE PETROLEUM RESISTANT MEMBRANE IF PETROLEUM PRODUCTS ARE STORED ONSITE.

4. ENSURE THAT THE TOTAL VOLUME OF THE BERMED AREA IS 110 PERCENT OF THE TOTAL CAPACITY OF THE STORAGE CONTAINER(S) INSIDE THE BERM.

5. NOTIFY THE ENGINEER AND THE HAZARDOUS MATERIALS COORDINATOR OF SOIL CONTAMINATION RESULTING FROM PETROLEUM SPILLAGE. REMOVAL PROCEDURE REQUIRES ENGINEER AND HAZARDOUS MATERIAL COORDINATOR APPROVAL.

6. ENSURE THAT RUNOFF AT THE EQUIPMENT STAGING AREA ENTRANCE(S) IS RETAINED IN THE STAGING AREA.

7. REMOVE UNCONTAMINATED STORM WATER FROM INSIDE THE STORAGE AREA. TREAT CONTAMINATED STORMWATER AS A HAZARDOUS WASTE AND HAVE IT REMOVED BY A CERTIFIED HAZARDOUS WASTE CONTRACTOR.

8. STORE INCOMPATIBLE MATERIALS IN SEPARATE STORAGE AREAS.

9. STORE MATERIALS IN THEIR ORIGINAL PACKAGING AND ON PALLETS, IF PRACTICAL.

10. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY: J. CALEB LAKEY NOVEMBER 20, 2013 STATE OF IDAHO 15116 J. CALEB LAKEY

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-98	MSM						
2	10-10	KEH						
3	11-13	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-15_1113.dgn

DRAWING DATE: DECEMBER, 1995

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TOM COLE *for*
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

PETROLEUM STORAGE AREA

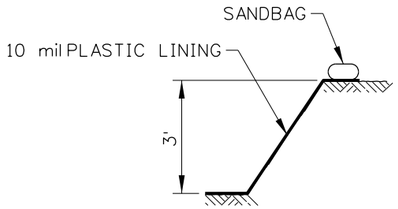
REFER TO STD. DWG. 212-5

English

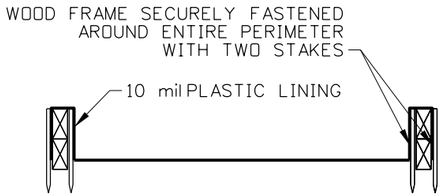
STANDARD DRAWING NO.

212-15

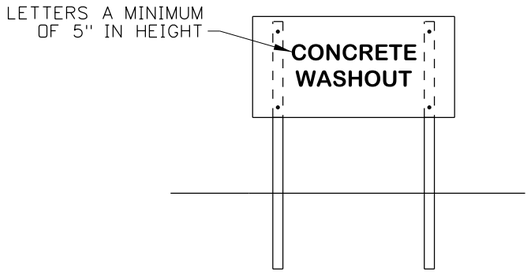
SHEET 1 OF 1



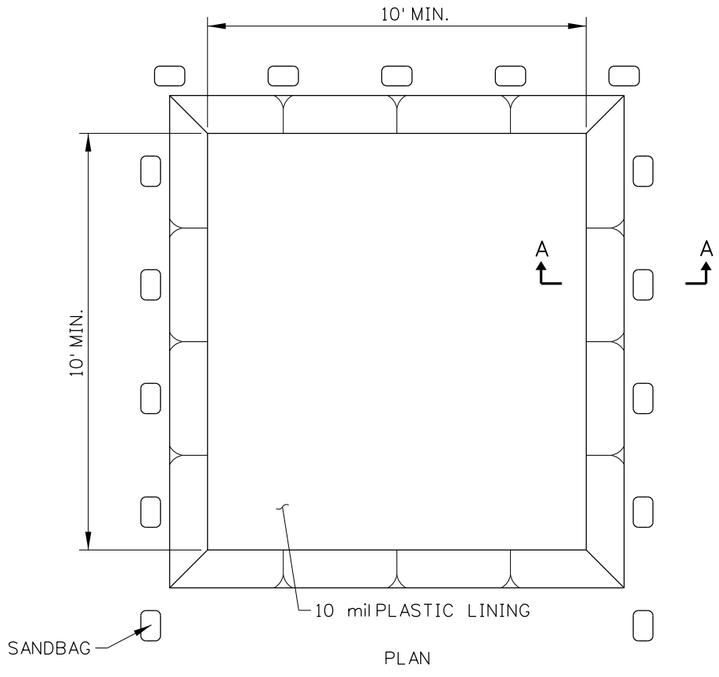
SECTION A-A



SECTION B-B

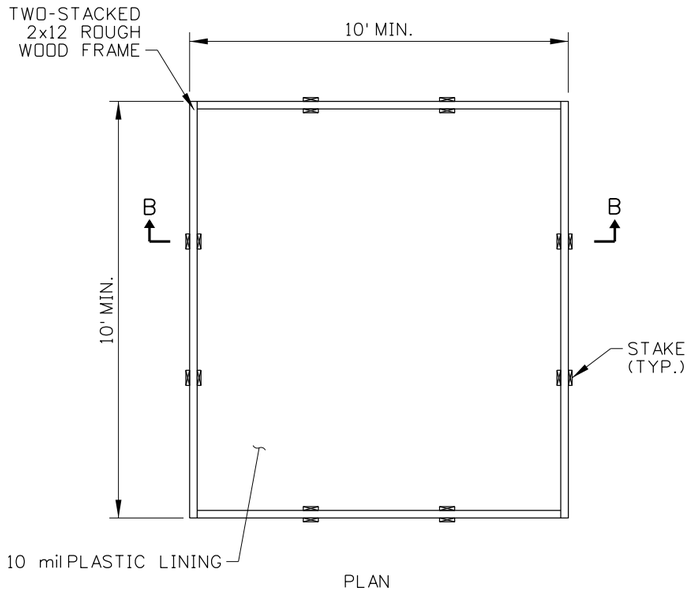


CONCRETE WASHOUT SIGN DETAIL
(SEE NOTE NO. 2)



PLAN

TYPE BELOW GRADE



PLAN

TYPE ABOVE GRADE

NOTES

1. USE THIS DRAWING IN CONJUNCTION WITH THE ITD BEST MANAGEMENT PRACTICES (BMP) MANUAL.
2. ACTUAL LAYOUT DETERMINED IN THE FIELD
3. INSTALL THE CONCRETE WASHOUT SIGN WITHIN 30 FEET OF THE TEMPORARY CONCRETE WASHOUT FACILITY.
4. USE OF PREFABRICATED TEMPORARY WASHOUT MAY ONLY BE USED ON APPROVAL BY THE ENGINEER.
5. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED J. CALEB LAKEY ORIGINAL SIGNED BY: J. CALEB LAKEY NOVEMBER 20, 2013 15116 STATE OF IDAHO J. CALEB LAKEY

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	11-13	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 212-16_1113.dgn

DRAWING DATE: OCTOBER, 2010

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TOM COLE *for*
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

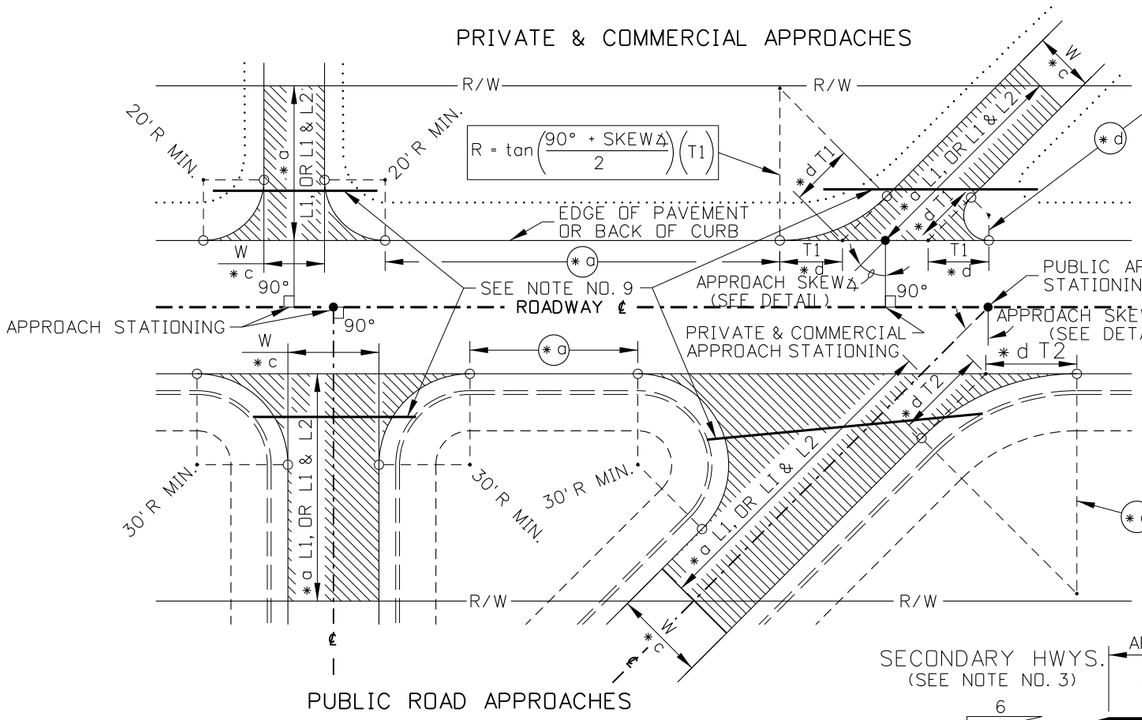
TEMPORARY CONCRETE WASHOUT

English

STANDARD DRAWING NO.
212-16

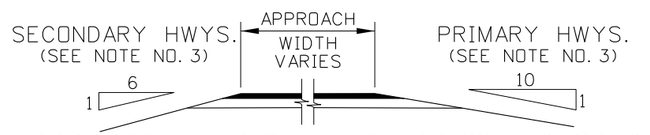
SHEET 1 OF 1

PRIVATE & COMMERCIAL APPROACHES



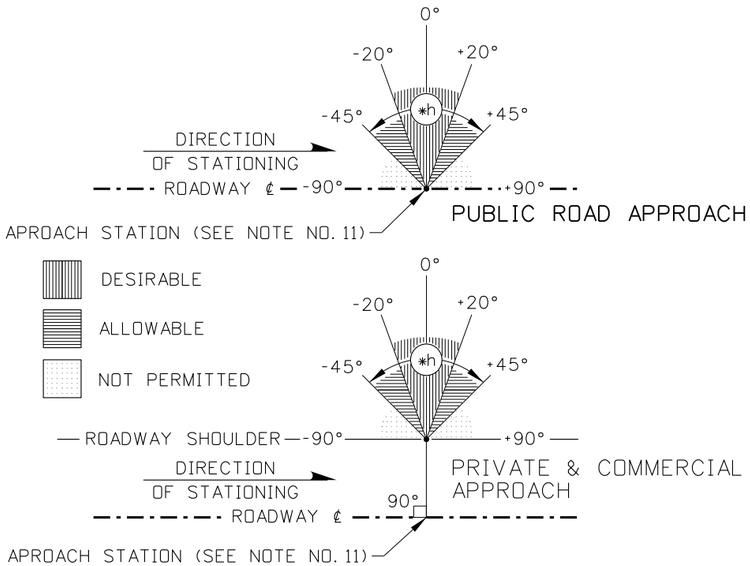
APPROACH PLAN TYPICALS

APPROACH PLAN LEGEND & APPROACH NOMENCLATURE	
CUT	– – – –
FILL	.....
PROPOSED DITCH	═ ═ ═
PROPOSED CULVERT	———
SKEW Δ	SEE NOTE NO. 10
R	RADIUS OF SHD. CURVE
T1 & T2	TANGENT OF SHD. CURVE
W	APPROACH WIDTH
G1 & G2	APPR. GRADES 1 & 2 (%)
C	CHANGE IN GRADE (%)
L1 & L2	HORZ. LENGTH OF GRADE



APPROACH TYPICAL - CLEARZONE SLOPES

(PUBLIC & PRIVATE)

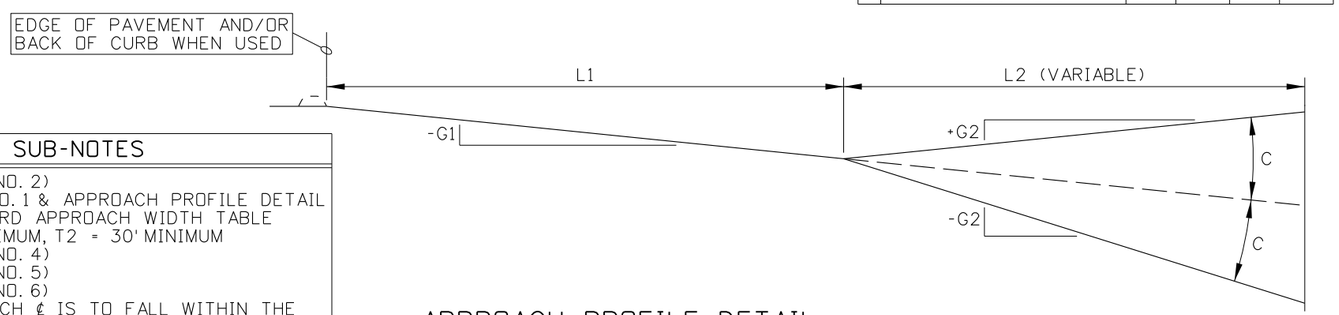


APPROACH SKEW ANGLE

(SEE NOTE NO. 10)

APPROACH GRADE TABLE				
TRAFFIC TYPE	GRADE PARAMETER G1 (RANGE)	GRADE PARAMETER G2 (MAX.)	MAX. CHANGE IN GRADE C (*e)	MINIMUM LENGTH L1
HIGH VOLUME (COMMERCIAL, INDUSTRIAL)	-2% TO -3%	±5%	±3%	40'
LOW VOLUME (COMMERCIAL, INDUSTRIAL)	-2% TO -5%	±8%	±6%	40'
SINGLE RESIDENTIAL, FARMYARD, FIELD	-2% TO -8%	±15% * g	VEHICLE CLEARANCE	10'
MULTIPLE RESIDENTIAL	-2% TO -8%	±15% * g	±6%	20'
PUBLIC ROAD	-2%	* f	±2%	20'

(*a) STANDARD APPROACH WIDTH TABLE					
POSTED SPEED (mph)		≤35		>35	
MIN./MAX. WIDTH		MIN.	MAX.	MIN.	MAX.
APPR. TYPE	MULTIPLE RESIDENTIAL	28'	40'	28'	40'
	SINGLE RESIDENTIAL, FARMYARD, FIELD	12'	40'	20'	40'
	COMMERCIAL (ONE-WAY)	15'	30'	20'	30'
	COMMERCIAL (TWO-WAY)	25'	40'	25'	40'
	PUBLIC ROAD	28'	N/A	28'	N/A



APPROACH PROFILE DETAIL

SUB-NOTES

- * a (SEE NOTE NO. 2)
- * b SEE NOTE NO. 1 & APPROACH PROFILE DETAIL
- * c SEE STANDARD APPROACH WIDTH TABLE
- * d T1 = 20' MINIMUM, T2 = 30' MINIMUM
- * e (SEE NOTE NO. 4)
- * f (SEE NOTE NO. 5)
- * g (SEE NOTE NO. 6)
- * h THE APPROACH ℄ IS TO FALL WITHIN THE ALLOWABLE OR DESIRABLE LIMITS. THE DESIRABLE LIMIT IS CONSIDERED THE "SAFEST OPTION."

NOTES

1. RURAL PRIVATE, COMMERCIAL, AND PUBLIC APPROACHES SHALL BE PAVED TO THE RIGHT-OF-WAY LINE OR TO THE BACK OF THE SHOULDER CURVE (APPROACH RADIUS). FARMYARD AND FIELD APPROACHES THAT ARE OCCASIONALLY USED MAY BE PAVED A MINIMUM OF 5' FROM THE SHOULDER LINE. APPROACHES ON EXISTING UNPAVED HIGHWAYS ARE EXEMPT.
2. REFER TO THE ITD ADMINISTRATIVE POLICY 5005 FOR ADDITIONAL INFORMATION ON LOCATION OF APPROACHES.
3. WITHIN THE CLEARZONE THE SIDE SLOPES OF APPROACHES SHALL BE A MINIMUM OF 6:1 OF SECONDARY HIGHWAYS AND A MINIMUM OF 10:1 ON PRIMARY HIGHWAYS.
4. WHEN THE "MAXIMUM CHANGE IN GRADE" (APPROACH GRADE TABLE) "C" IS EXCEEDED, A MINIMUM 10' VERTICAL CURVE SHALL BE USED IN THE APPROACH PROFILE.
5. THE % GRADE OF "G2" SHALL BE A MAXIMUM OF 7% FOR FLAT TERRAIN, 11% FOR ROLLING TERRAIN, OR 15% FOR MOUNTAINOUS.
6. APPROACH GRADES EXCEEDING 10% ARE NOT RECOMMENDED BECAUSE EMERGENCY VEHICLES MAY BE IMPEDED.
7. THE BALLAST REQUIREMENTS OF RURAL APPROACHES SHALL BE AS SHOWN ON THE PLANS.
8. WHEN A MAILBOX TURNOUT IS INSTALLED WITH A RURAL APPROACH, STD. DWG. 405-2 IS REQUIRED.
9. ALL RURAL PRIVATE AND COMMERCIAL APPROACHES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT THE APPROACH DRAINAGE IS INDEPENDENT AND DOES NOT CONTRIBUTE TO EXISTING HIGHWAY DRAINAGE. ALL RURAL PUBLIC APPROACHES SHALL BE DESIGNED AND CONSTRUCTED TO ADDRESS BOTH THE MAIN HIGHWAY AND APPROACH DRAINAGE.
10. THE APPROACH SKEW ANGLE IS THE DEFLECTION ANGLE BETWEEN A LINE PERPENDICULAR TO THE HIGHWAY CENTERLINE AND THE APPROACH CENTERLINE.
11. RURAL PRIVATE AND COMMERCIAL APPROACHES ARE REFERENCED LEFT OR RIGHT OF THE HIGHWAY CENTERLINE STATION TO THE CENTER OF THE APPROACH OPENING WHICH IS AT THE EDGE OF PAVEMENT OR BACK OF CURB. A PUBLIC APPROACH STATION OCCURS WHERE THE PUBLIC APPROACH CENTERLINE INTERSECTS THE HIGHWAY CENTERLINE.
12. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED AT: MILFORD MILLER DATE ORIGINAL SIGNED: JUNE 19, 2007 STATE OF IDAHO MILFORD MILLER 2240

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	01-00	MSM	6	12-05	MSM			
2	01-02	MSM	7	06-07	MSM			
3	07-02	MSM						
4	10-02	MSM						
5	08-04	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 405-1_0607.dgn

DRAWING DATE: SEPTEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

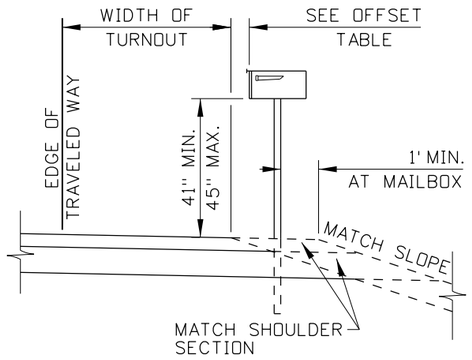
STANDARD DRAWING

RURAL APPROACHES

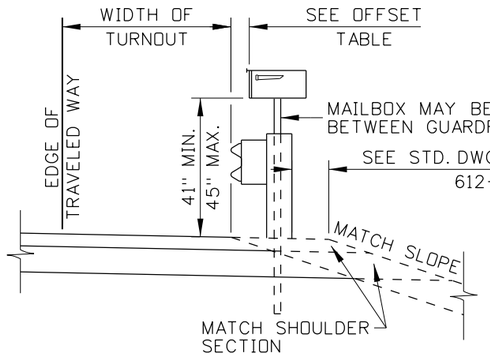
English

STANDARD DRAWING NO. 405-1

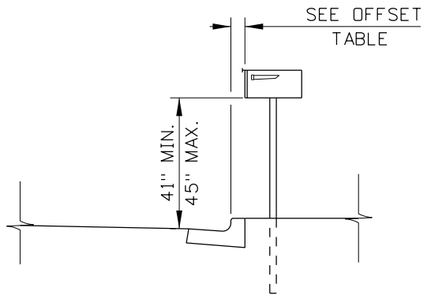
SHEET 1 OF 1



INSTALLATION AT MAILBOX TURNOUT



INSTALLATION BEHIND GUARDRAIL

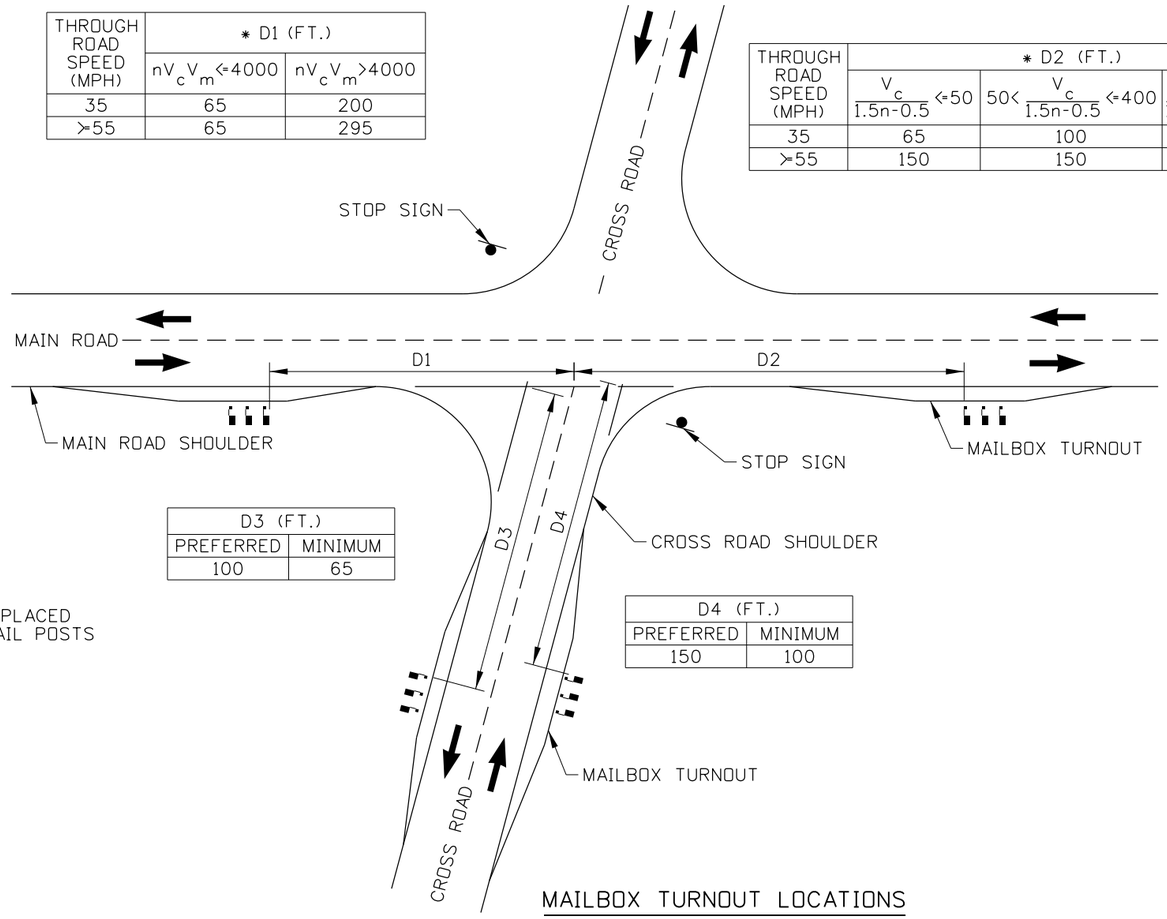


INSTALLATION ON CURBED RESIDENTIAL STREET

TYPICAL MAILBOX INSTALLATIONS

THROUGH ROAD SPEED (MPH)	* D1 (FT.)	
	$nV_cV_m \leq 4000$	$nV_cV_m > 4000$
35	65	200
≥55	65	295

THROUGH ROAD SPEED (MPH)	* D2 (FT.)		
	$\frac{V_c}{1.5n-0.5} \leq 50$	$50 < \frac{V_c}{1.5n-0.5} \leq 400$	$\frac{V_c}{1.5n-0.5} > 400$
35	65	100	100
≥55	150	150	200



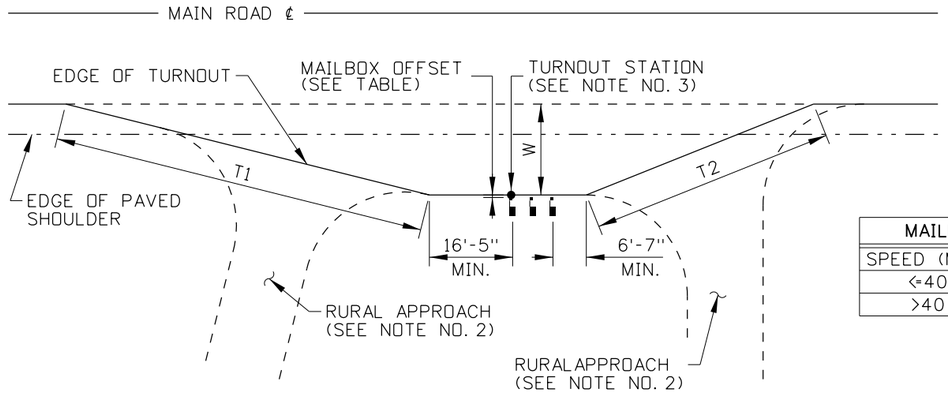
* n = NUMBER OF MAILBOXES AT MAIL STOP
V_c = ADT ON CROSS ROAD
V_m = ADT ON MAIN ROAD

D3 (FT.)	
PREFERRED	MINIMUM
100	65

D4 (FT.)	
PREFERRED	MINIMUM
150	100

MAILBOX TURNOUT LOCATIONS

TURNOUT WIDTH AND MAILBOX OFFSET TABLE				
ADT	TURNOUT WIDTH (FT.)		MAILBOX OFFSET (IN.)	
	PREFERRED	MINIMUM	PREFERRED	MINIMUM
>10,000	>12	8	6 TO 8	0
1,500 TO 10,000	12	8		
400 TO 1,500	10	8		6
<400	8	6		
RESIDENTIAL STREET (NO CURB)	6	0		
RESIDENTIAL STREET (WITH CURB)	NOT APPLICABLE		8 TO 12	6



MAILBOX TAPER		
SPEED (MPH)	T1	T2
≤40	4:1	2.5:1
>40	20:1	12:1

MAILBOX TURNOUT

NOTES

1. LOCATE MAILBOX TURNOUT SO THAT THE TAPERS DO NOT OVERLAP THE INTERSECTION CURVE RADII.

2. CONSTRUCT MAILBOX ASSEMBLIES IN ACCORDANCE WITH STANDARD DRAWING 634-1. CONSTRUCT RURAL APPROACHES IN ACCORDANCE WITH STANDARD DRAWING 405-1.

3. MEASURE MAILBOX TURNOUT STATION AND OFFSET AT THE EDGE OF THE TURNOUT PERPENDICULAR TO THE FIRST MAILBOX.

4. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED BY RYAN D. LANCASTER JANUARY 31, 2013

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	11-02	MSM						
2	06-05	MSM						
3	01-13	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 405-2_0213.dgn

DRAWING DATE: SEPTEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

MAILBOX TURNOUT

REQUIRES STD. DWG. 405-1

English

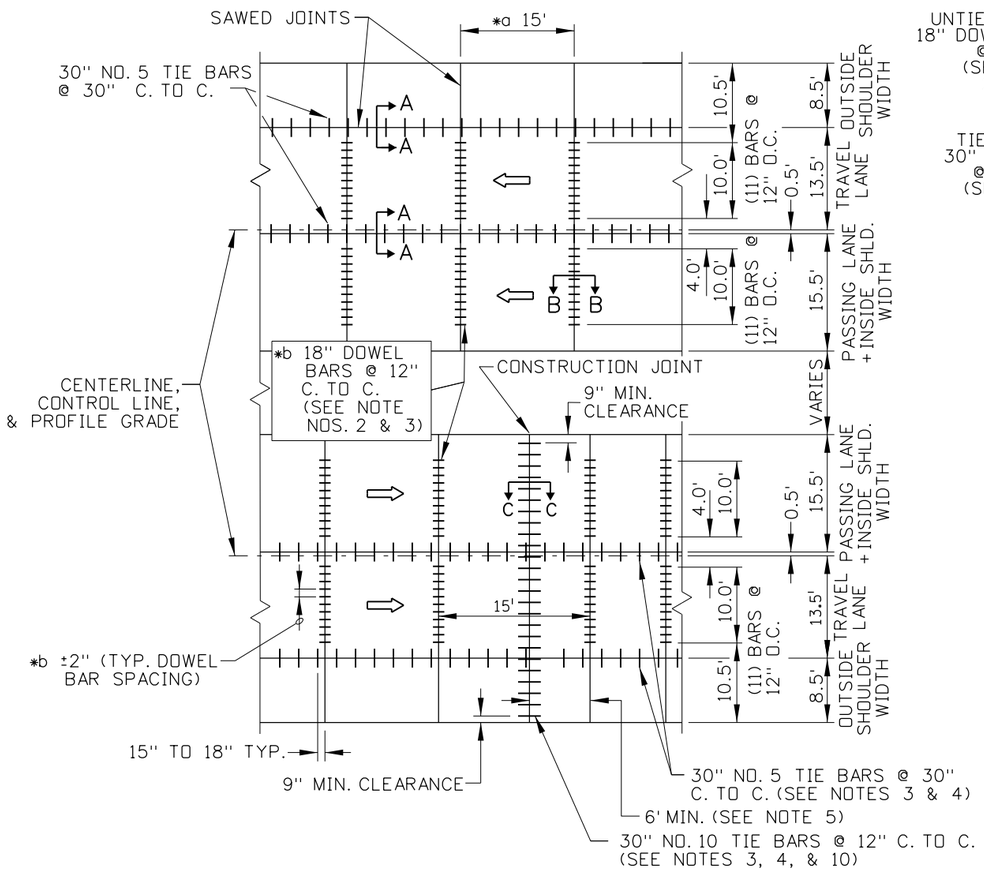
STANDARD DRAWING NO.

405-2

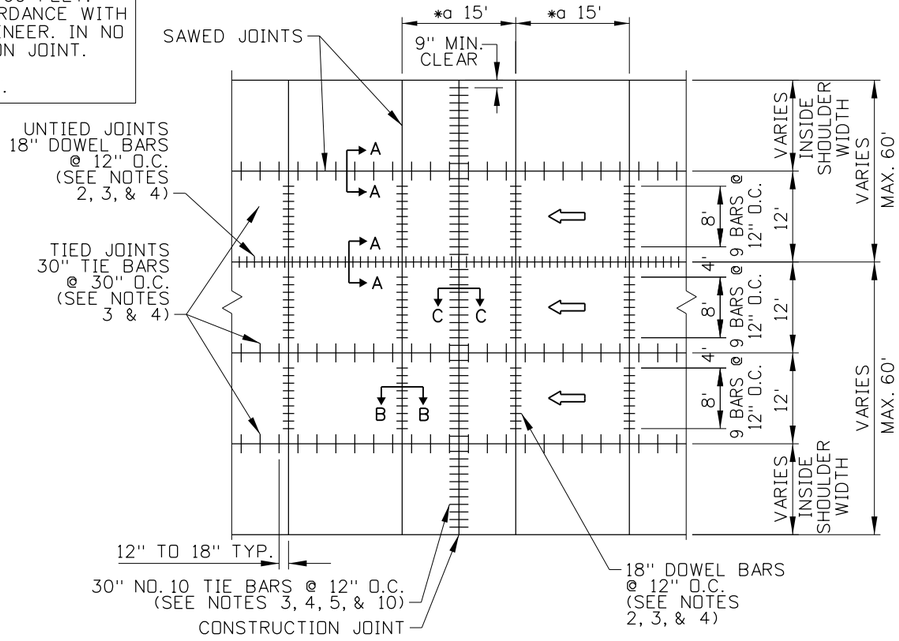
SHEET 1 OF 1

THE MAXIMUM TIED TRANSVERSE WIDTH SHALL BE 60 FEET. LONGITUDINAL JOINTS THAT ARE UN-TIED IN ACCORDANCE WITH THE FOREGOING SHALL BE APPROVED BY THE ENGINEER. IN NO CASE SHALL AN UN-TIED JOINT BE A CONSTRUCTION JOINT.

THE MAXIMUM TRANSVERSE SLAB LENGTH IS 15 FT.

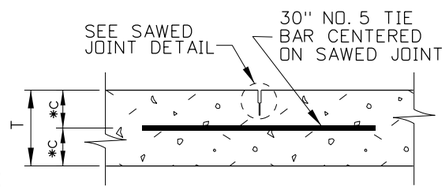


TYPICAL ROADWAY DETAIL

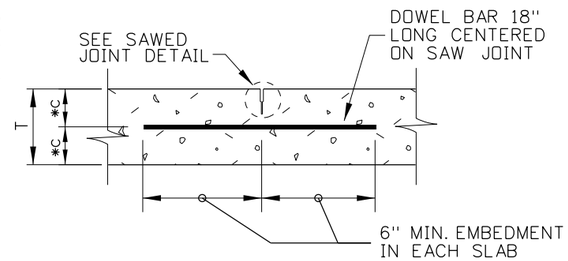


*a ALL JOINTS ARE PERPENDICULAR TO ℄

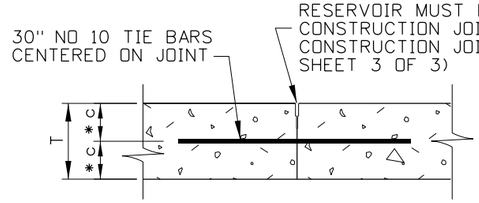
MULTIPLE LANE ROADWAY DETAIL



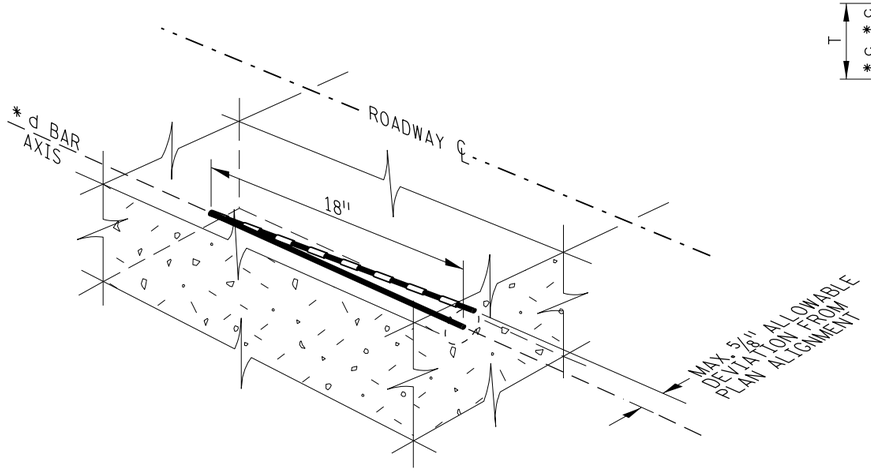
LONGITUDINAL JOINT
SECTION A-A



TRANSVERSE JOINT
SECTION B-B



CONSTRUCTION JOINT
SECTION C-C



ALIGNMENT TOLERANCE FOR PAVEMENT DOWEL BARS

SUB-NOTES
*a ALL JOINTS ARE PERPENDICULAR TO ℄
*b ALL DOWEL BAR SPACING TOLERANCE IS TO 2" (ALSO SEE "ALIGNMENT TOLERANCE FOR PAVEMENT DOWEL BARS" DETAIL).
*c T/2±1"
*d THE PLAN ALIGNMENT IS FOR THE BAR AXIS TO BE PARALLEL TO CENTERLINE AND PARALLEL TO PAVEMENT SURFACE.

BAR DIAMETER TABLE DOWEL BAR IN TRANSVERSE JOINTS (UNLESS OTHERWISE NOTED ON PROJECT)	
T= PAVEMENT THICKNESS	BAR DIAMETER
T < 11"	1 1/4"
11" ≤ T ≤ 13"	1 1/2"
T > 13"	1 3/4"

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	04-84	GB	6	01-91	GB	11	09-08	JRV
2	01-85	GB	7	12-92	AS	12	10-10	PLR
3	08-85	GB	8	04-93	MSM	13	08-11	RSC
4	08-86	GB	9	01-97	AS	14	04-13	RDL
5	11-89	GB	10	11-01	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 409-1_0513.dgn

DRAWING DATE: APRIL, 1984

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

PORTLAND CEMENT CONCRETE PAVEMENT

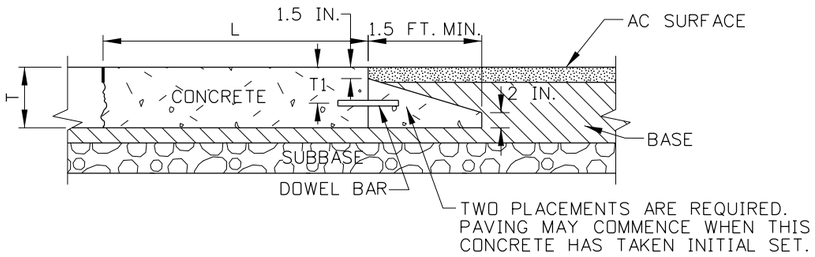
REQUIRES SHEETS 2 OF 3 & 3 OF 3

English

STANDARD DRAWING NO. 409-1

SHEET 1 OF 3

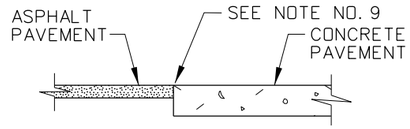
PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY MICHAEL J. SANTI DATE OF ORIGINAL SIGNATURE MAY 9, 2013 6390 STATE OF IDAHO MICHAEL J. SANTI



NOTES:
1. T = THICKNESS OF CONCRETE PAVEMENT (I.E. DEPTH)
2. L = PANEL LENGTH(I.E. JOINT SPACING)
3. T1 = (T + 1.5") / 2
4. FOR RECOMMENDED DOWEL SIZES, SEE JOINT TYPES SHEET.

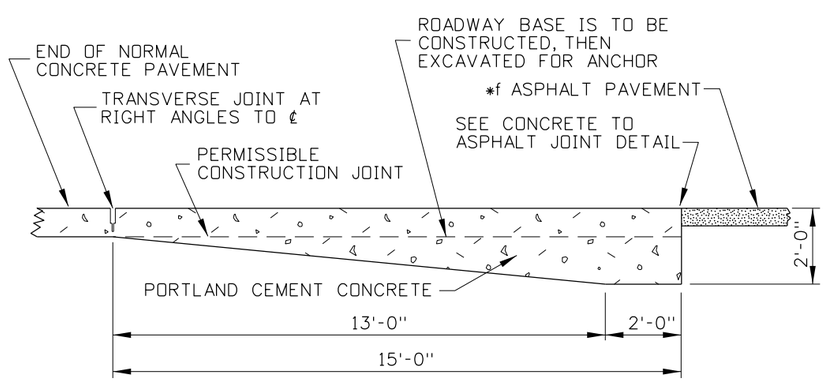
ELEVATION - IMPACT SLAB, HIGHWAYS/STREETS/ROADS

FOR TRANSVERSE JOINTS ABUTTING ASPHALT PAVEMENT IN RECONSTRUCTION OR NEW CONSTRUCTION PROJECTS WHERE T>7 IN.



ASPHALT & CONCRETE PAVEMENT JOINT DETAIL

NOT FOR USE UNLESS SPECIFICALLY CALLED OUT IN PLANS.



ELEVATION - ANCHOR FOR END OF CONCRETE

OPTIONAL

SUB-NOTES
*f THIS ANCHOR IS NOT TO BE USED IN CONJUNCTION WITH CONCRETE PAVEMENT.

NOTES

1. THE PAVEMENT EDGE IS TO BE PLACED APPROXIMATELY VERTICAL.

2. THE DOWEL BAR DIAMETERS SHALL BE DETERMINED BY THE BAR DIAMETER TABLE.

3. THE TIE BARS SHALL BE EPOXY COATED AND MEET THE REQUIREMENTS OF AASHTO M 284. THE DOWEL BARS SHALL BE COATED TO MEET THE REQUIREMENTS OF AASHTO M 254.

4. THE MAXIMUM TIED TRANSVERSE WIDTH SHALL BE 60 FEET. LONGITUDINAL JOINTS THAT ARE UN-TIED IN ACCORDANCE WITH THE FOREGOING SHALL BE APPROVED BY THE ENGINEER. IN NO CASE SHALL AN UN-TIED JOINT BE A CONSTRUCTION JOINT.

5. A CONSTRUCTION JOINT SHALL BE AT LEAST 6 FEET FROM A SAWED JOINT.

6. TRANSVERSE AND LONGITUDINAL JOINTS SHALL BE SAWED JOINTS.

7. SEALANTS AND PREFORMED SEALS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.

8. THE ANCHOR IS TO BE USED AT RAILROAD GRADE CROSSINGS ADJACENT TO FLEXIBLE PAVEMENTS AND SIMILAR INTERRUPTIONS TO THE CONCRETE PAVEMENT.

9. MAKE A VERTICAL SAW CUT IN THE ASPHALT TO SERVE AS A FORM FOR THE END OF THE CONCRETE PAVEMENT.

10. PREFERRED PRACTICE IS TO PLACE THE CONSTRUCTION JOINT AT THE LOCATION OF A PLANNED CONTRACTION JOINT AND USE DOWEL BARS PER STD. TRANSVERSE JOINT DETAILS.

11. NOT TO SCALE

12. ALL LONGITUDINAL CONCRETE TO ASPHALT JOINTS SHALL BE SAWED AND SEALED.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO 6390 ORIGINAL SIGNED BY: MICHAEL J. SANTI MAY 9, 2013 MICHAEL J. SANTI

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	04-84	GB	6	01-91	GB	11	09-08	JRV
2	01-85	GB	7	12-92	AS	12	10-10	PLR
3	08-85	GB	8	04-93	MSM	13	08-11	RSC
4	08-86	GB	9	01-97	AS	14	04-13	RDL
5	11-89	GB	10	11-01	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 409-1_0513.dgn

DRAWING DATE: APRIL, 1984

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

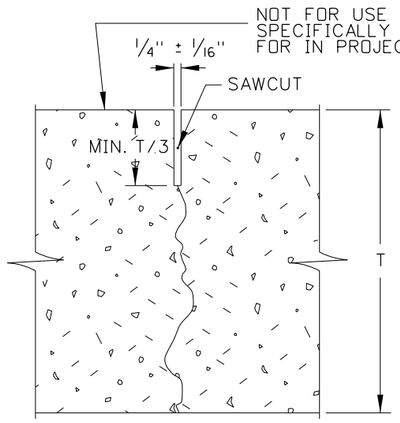
PORTLAND CEMENT CONCRETE PAVEMENT

REQUIRES SHEETS 1 OF 3 & 3 OF 3

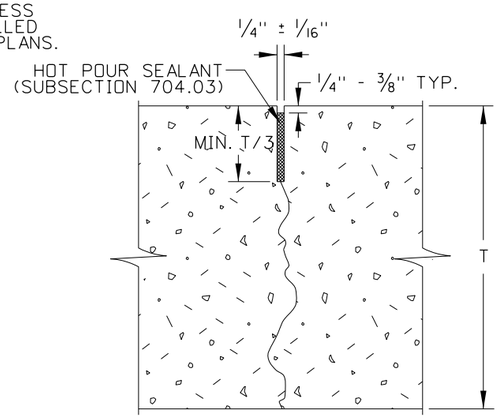
English

STANDARD DRAWING NO.

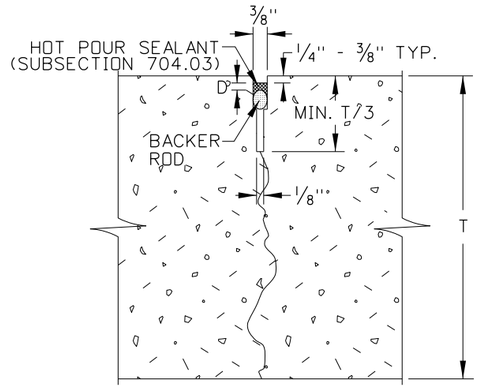
409-1



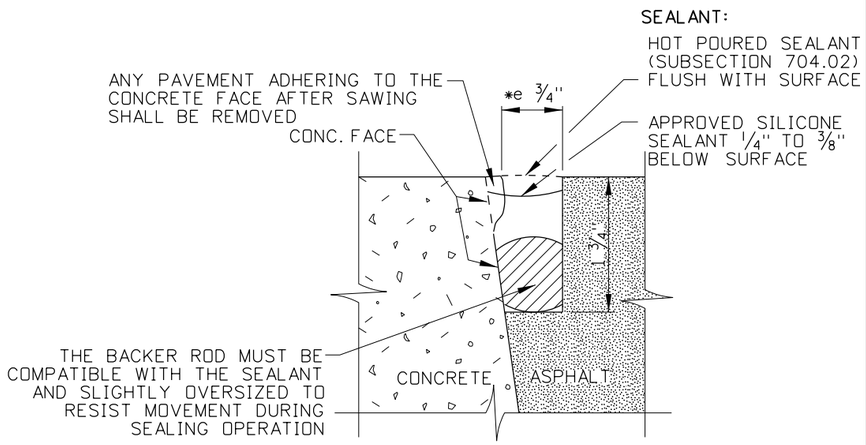
SINGLE CUT
(NO SEALANT)



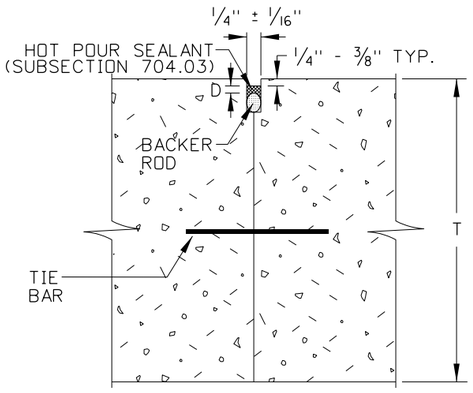
SINGLE CUT
(FIELD-INSTALLED SEALANT)



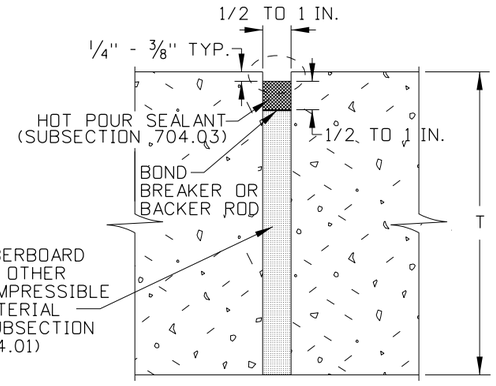
WIDENED CUT
(FIELD-INSTALLED SEALANT)



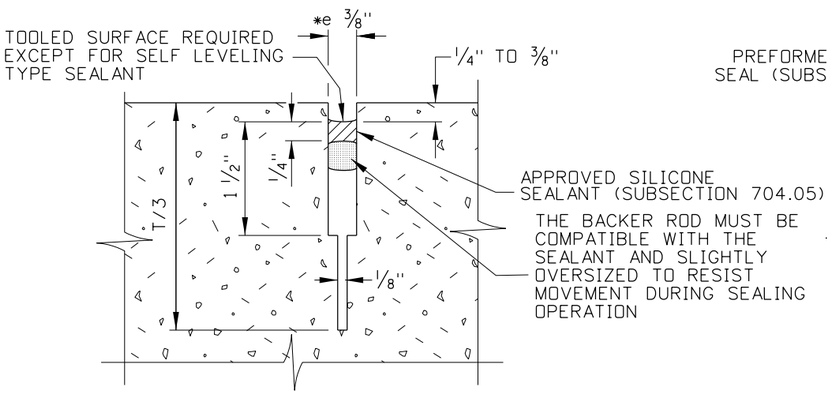
CONCRETE TO ASPHALT



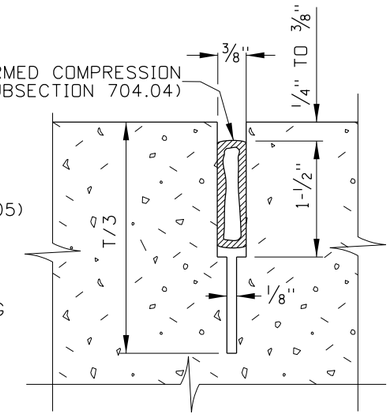
SEALED CONSTRUCTION JOINT
(FIELD-INSTALLED SEALANT)



ISOLATION JOINT
(FIELD-INSTALLED SEALANT)



SILICONE SEALANT



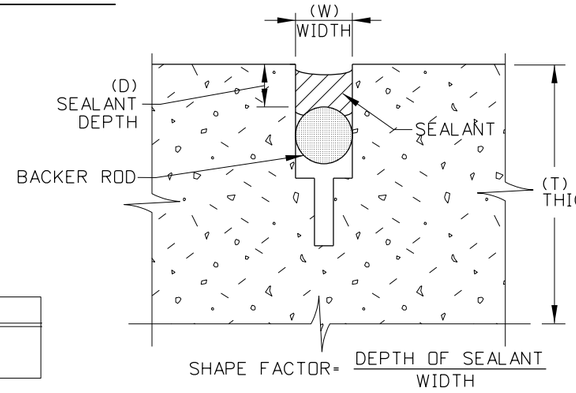
COMPRESSION SEAL

NOTES:

1. FOR HOT-POURED SEALANT, SHAPE FACTOR D/W = 1 (TYPICAL, ONLY IF BACKER ROD USED)
2. FOR SILICONE SEALANT, D/W = 0.5 (TYPICAL)
3. FOR TWO-COMPONENT COLD-POURED SEALANT, D/W = 0.5 (TYPICAL)
4. FOR PREFORMED COMPRESSION SEAL, W IS SIZED FOR SLAB & CLIMATE
5. SUBSECTION REFERENCES ARE ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
6. SEALANTS AND PREFORMED SEALS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
7. SAW CUT TO CONTROL SLAB CRACKING SHALL BE T/3 DEEP."T" EQUALS DESIGN THICKNESS OF CONC. PAVEMENT.

CROSS-SECTIONS:

SUB-NOTES
*e DIMENSIONING REFERS TO SEALANT RESERVOIR ONLY.



SEALANT SHAPE FACTOR

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY: MICHAEL J. SANTI DATE OF ORIGINAL SIGNATURE: MAY 9, 2013 6390 STATE OF IDAHO MICHAEL J. SANTI

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	04-84	GB	6	01-91	GB	11	09-08	JRV
2	01-85	GB	7	12-92	AS	12	10-10	PLR
3	08-85	GB	8	04-93	MSM	13	08-11	RSC
4	08-86	GB	9	01-97	AS	14	04-13	RDL
5	11-89	GB	10	11-01	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 409-1_0513.dgn

DRAWING DATE: APRIL, 1984

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

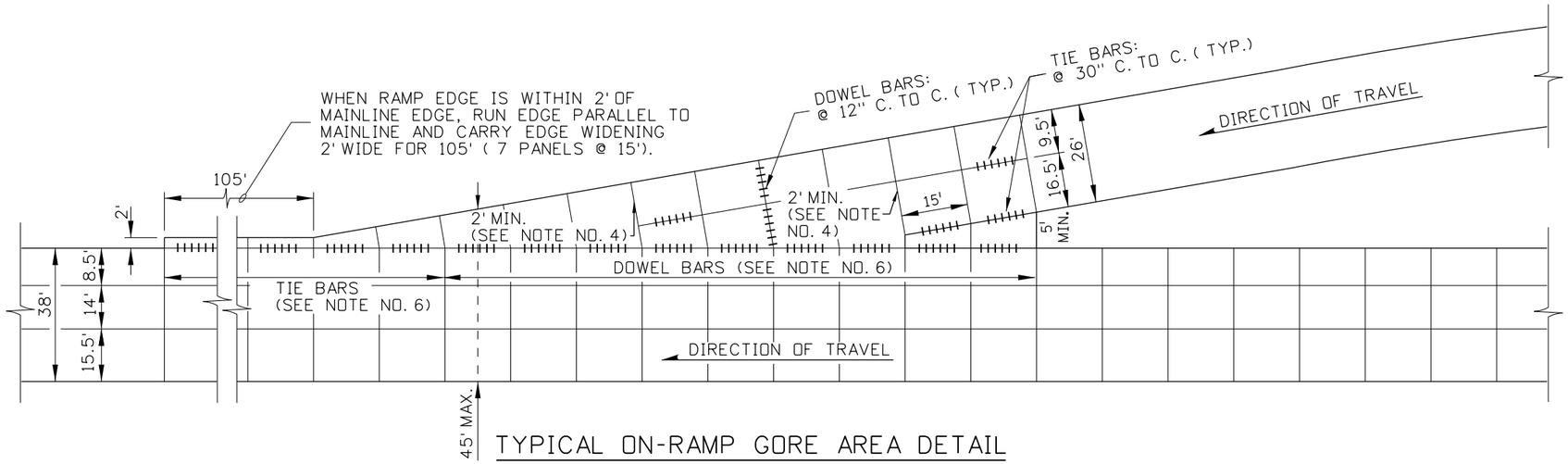
PORTLAND CEMENT CONCRETE PAVEMENT

REQUIRES SHEETS 1 OF 3 & 2 OF 3

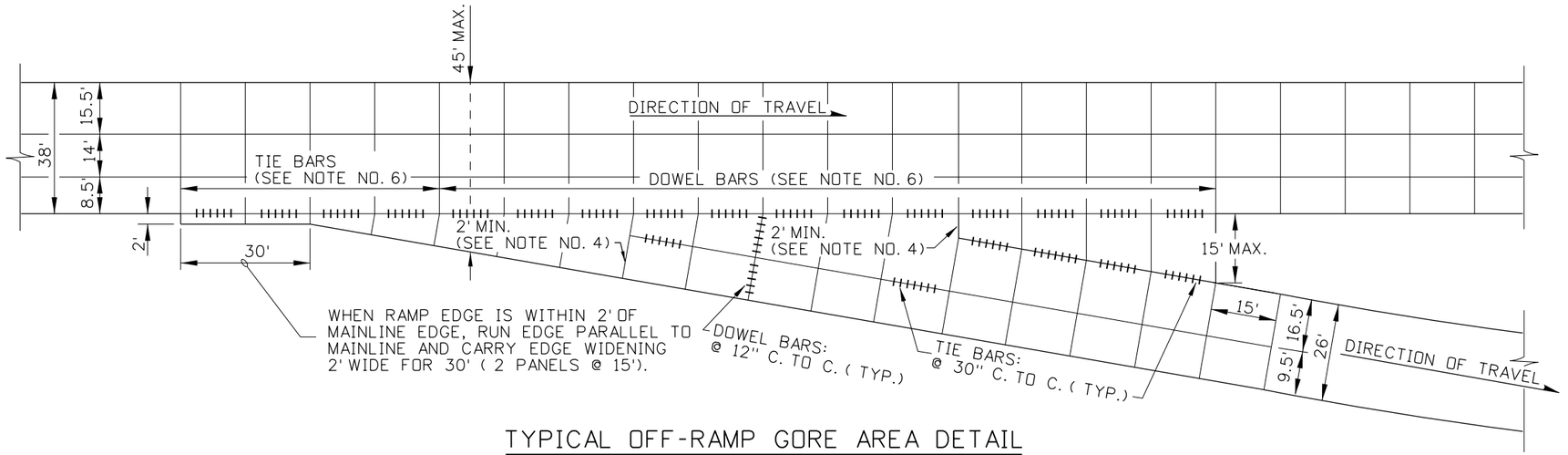
English

STANDARD DRAWING NO. 409-1

SHEET 3 OF 3



TYPICAL ON-RAMP GORE AREA DETAIL



TYPICAL OFF-RAMP GORE AREA DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO 6390 MICHAEL J. SANTI ORIGINAL SIGNED BY: MICHAEL J. SANTI MAY 12, 2016

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-03	MSM						
2	10-08	JRV						
3	10-10	PLR						
4	08-11	RSC						
5	05-16	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 409-2_0516.dgn

DRAWING DATE: FEBRUARY, 1996

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: JESSE BARRUS

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

PORTLAND CEMENT CONCRETE PAVEMENT RAMP GORE DETAILS

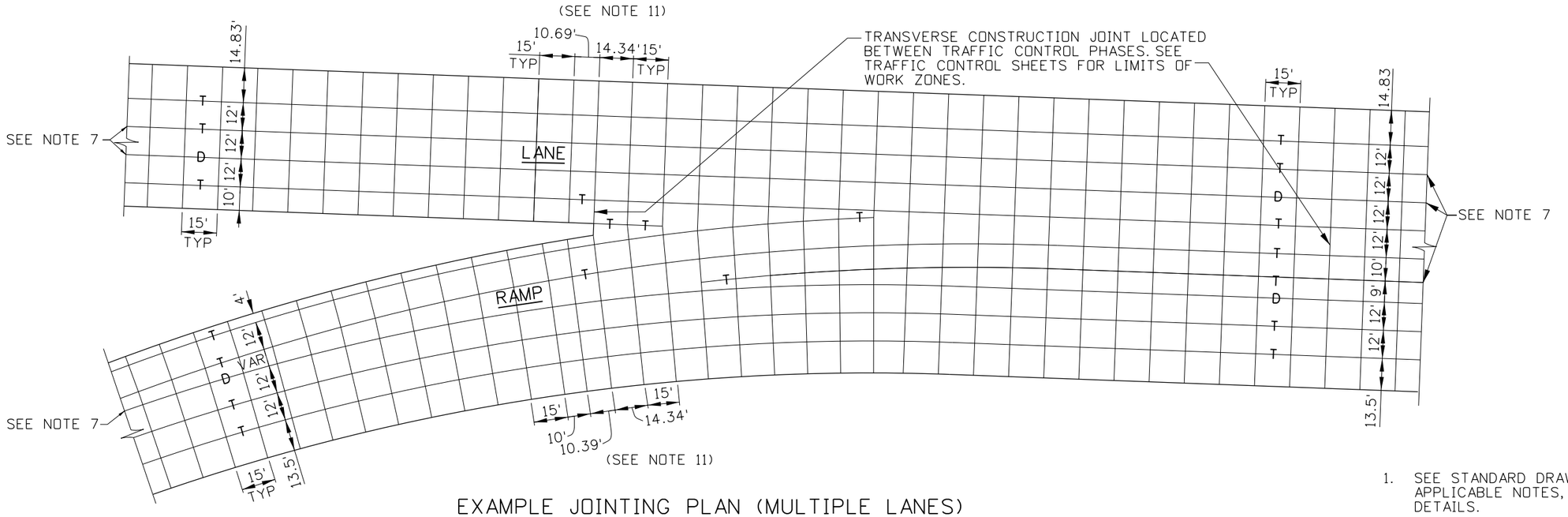
REQUIRES SHT 2 OF 2 & STD. DWG. 409-1

English

STANDARD DRAWING NO.

409-2

SHEET 1 OF 2



EXAMPLE JOINTING PLAN (MULTIPLE LANES)

LEGEND

T = TIED LONGITUDINAL JOINT (NO. 5 REBAR)

D = DOWELED LONGITUDINAL JOINT (SAME DOWEL DIMENSIONS AS TRANSVERSE JOINTS)

NOTES

1. SEE STANDARD DRAWING 409-1 FOR JOINT DETAILS, APPLICABLE NOTES, JOINT LOCATIONS, BAR AND DOWEL DETAILS.
2. SUPPLY SHOP DRAWINGS FOR ENGINEER APPROVAL PRIOR TO THE PLACEMENT OF CONCRETE FOR EACH RAMP GORE AREA.
3. PLACE THE FULL WIDTH OF MAIN LINE ROADWAY CONCRETE PRIOR TO PLACING THE GORE AND RAMP CONCRETE.
4. TERMINATE LONGITUDINAL JOINTS THAT ARE PARALLEL TO THE RAMP CENTERLINE AT A TRAVERSE JOINT. ENSURE THAT THE DISTANCE ALONG THE TRANSVERSE JOINT, BETWEEN THE EDGE OF THE MAIN LINE PAVING AND THE LONGITUDINAL JOINT IS AT LEAST TWO FEET.
5. BEGIN AND END THE EDGE WIDENING AT A JOINT.
6. CONNECT THE NARROW PORTION OF THE RAMP TO THE MAIN ROADWAY WITH TIE BARS ALONG THE LONGITUDINAL JOINT TO THE LAST TRANSVERSE JOINT WHICH IS LESS THAN 60 FEET WIDE, THEN USE DOWEL BARS THROUGH THE REMAINDER OF THE JOINT.
7. LONGITUDINAL CONSTRUCTION JOINT BETWEEN EXISTING AND PROPOSED PAVEMENT.
8. MATCH TRANSVERSE JOINTS WITH THE SPACING OF THE TRANSVERSE JOINTS IN THE ADJACENT EXISTING PAVEMENT.
9. TIE CONSTRUCTION JOINTS.
10. LIMIT TIED TRANSVERSE WIDTH TO 60'.
11. DIMENSIONS ARE FOR ILLUSTRATION PURPOSES ONLY.
12. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY MICHAEL J. SANTI MAY 12, 2016 DATE OF ORIGINAL SIGNATURE 6390 STATE OF IDAHO MICHAEL J. SANTI

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-03	MSM						
2	10-08	JRV						
3	10-10	PLR						
4	08-11	RSC						
5	05-16	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 409-2_0516.dgn

DRAWING DATE: FEBRUARY, 1996

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: JESSE BARRUS

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

PORTLAND CEMENT CONCRETE PAVEMENT RAMP GORE DETAILS

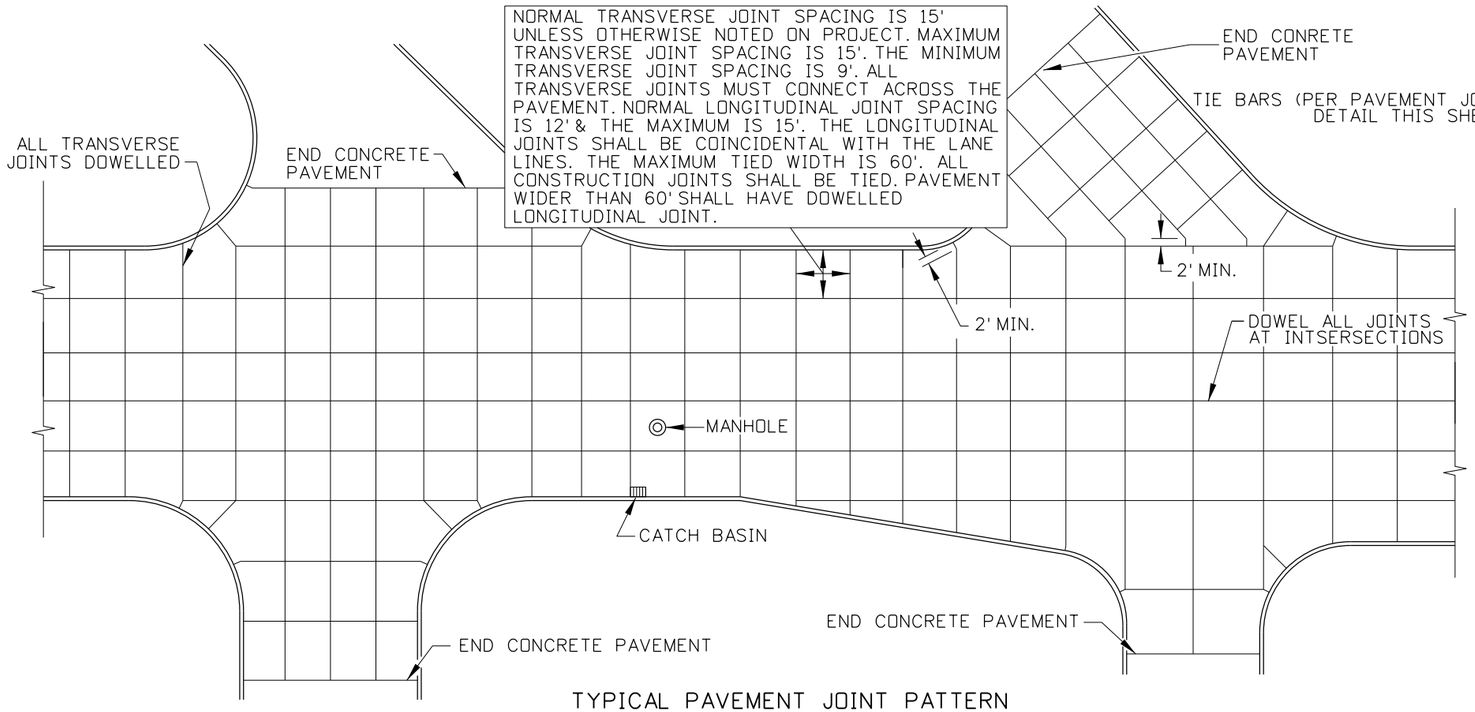
REQUIRES SHT 1 OF 2 & STD. DWG. 409-1

English

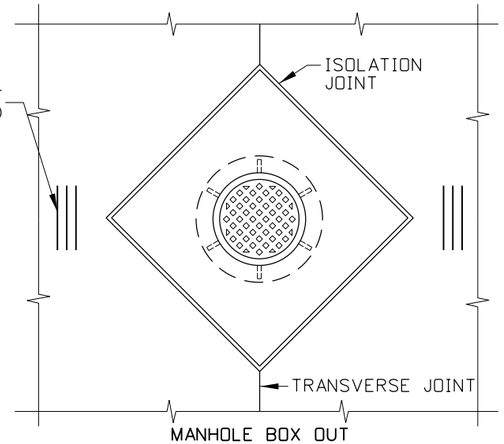
STANDARD DRAWING NO.

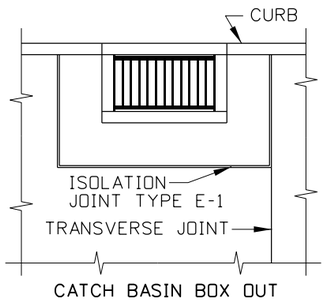
409-2

SHEET 2 OF 2

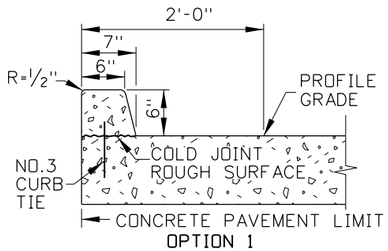


TYPICAL PAVEMENT JOINT PATTERN

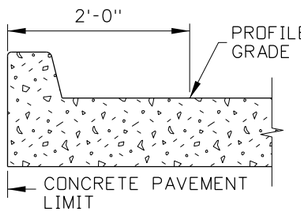




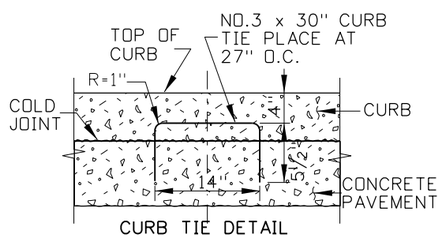
BOX OUT DETAILS



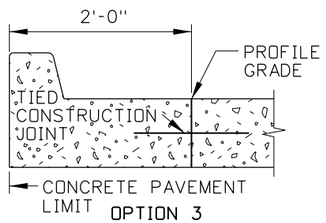
OPTION 1



OPTION 2

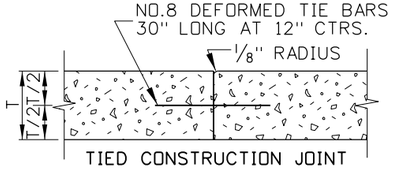


CURB TIE DETAIL



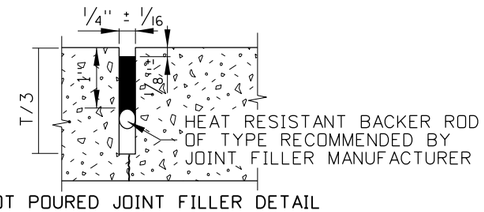
OPTION 3

CURB & GUTTER DETAILS

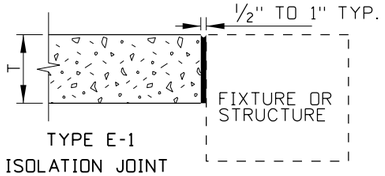


TIED CONSTRUCTION JOINT

PAVEMENT JOINT DETAIL



HOT POURED JOINT FILLER DETAIL



TYPE E-1
ISOLATION JOINT

NOTES

1. THE TYPICAL PAVEMENT JOINT PATTERN SHOWN IS FOR ILLUSTRATION PURPOSES ONLY AND IS INTENDED TO BE USED AS A GUIDE IN DEVELOPING THE JOINT PATTERN FOR THE PROJECT. THE CONTRACTOR SHALL PREPARE A PAVEMENT JOINT PATTERN FOR THE ENTIRE PROJECT FOR APPROVAL BY THE ENGINEER.

2. WHEN POSSIBLE, MANHOLES SHALL BE CENTERED BETWEEN JOINTS. JOINT SPACING MAY BE ADJUSTED NEAR MANHOLES, WITHIN THE STANDARD LIMITS. SEE STANDARD DRAWING 411-2.

3. IF THE CONTRACTOR ELECTS TO BOX OUT AROUND THE MANHOLE OR CATCH BASIN FRAMES AND PLACE THE PAVEMENT AROUND THE FRAME AS A SEPARATE OPERATION, TIED CONSTRUCTION JOINTS SHALL BE PLACED AS SHOWN IN THE BOX OUT DETAIL.

4. JOINTS IN THE CURBS SHALL COINCIDE WITH TRANSVERSE JOINTS IN THE PAVEMENT.

5. SEE STANDARD DRAWING 615-1 FOR ADDITIONAL NOTES ON REQUIREMENTS FOR CURB CONSTRUCTION.

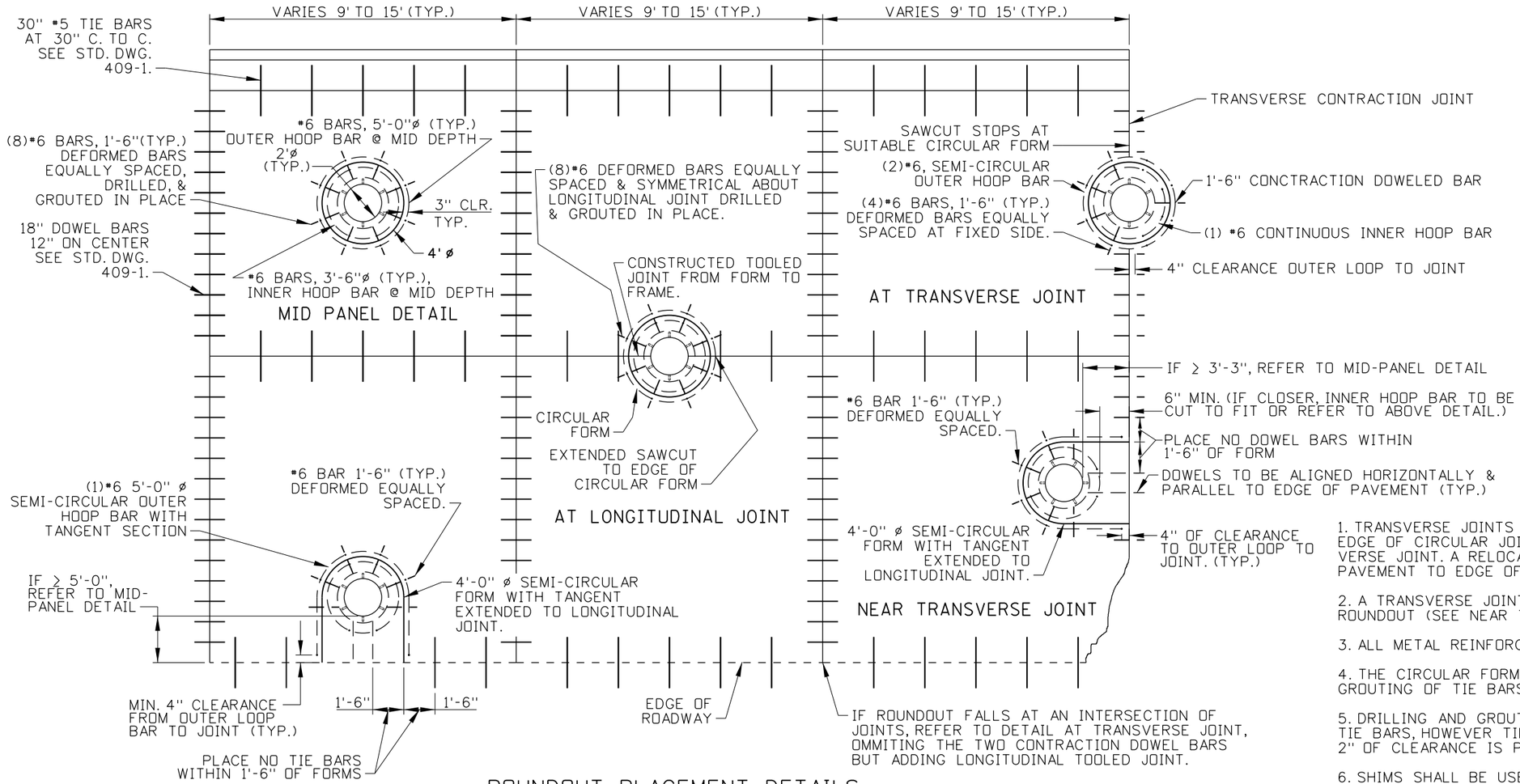
6. THE CONTRACTOR MAY PLACE CURBS AS SHOWN IN OPTIONS 1, 2, OR 3.

7. SAWED JOINTS SHALL BE 1/4" WIDE AND SHALL BE FILLED WITH HOT POURED ELASTOMERIC JOINT FILLER MEETING REQUIREMENTS OF SUBSECTION 704.02 OR A NEOPRENE COMPRESSION SEAL OF APPROVED CONFIGURATION MEETING THE REQUIREMENTS OF SUBSECTION 704.04 MAY BE USED.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED — ELECTRONICALLY SIGNED BY: MICHAEL J. SANTI — DATE OF ELECTRONIC SIGNATURE: OCTOBER 21, 2011 — 6390 — STATE OF IDAHO — MICHAEL J. SANTI

REVISIONS									SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY	IDAHO TRANSPORTATION DEPARTMENT	ORIGINAL SIGNED BY: LOREN THOMAS HIGHWAYS PROGRAM OVERSIGHT ENGINEER ORIGINAL SIGNED BY: TOM COLE CHIEF ENGINEER	STANDARD DRAWING	English
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY	CADD FILE NAME: 411-1_1011.dgn	BOISE IDAHO		URBAN CONCRETE PAVEMENT	STANDARD DRAWING NO. 411-1
									DRAWING DATE: AUGUST, 2011				SHEET 1 OF 1



ROUNDOUT PLACEMENT DETAILS

NOTES

1. TRANSVERSE JOINTS MAY BE MOVED TO ACCOMMODATE ROUNDOUT. THE EDGE OF CIRCULAR JOINT SHALL BE A MINIMUM OF 2'-0" FROM TRANSVERSE JOINT. A RELOCATED JOINT SHALL BE CONTINUOUS FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT.

2. A TRANSVERSE JOINT SHALL BE ALIGNED WITH THE CENTERLINE OF THE ROUNDOUT (SEE NEAR TRANSVERSE JOINT DETAIL.)

3. ALL METAL REINFORCEMENT BARS SHALL BE EPOXY COATED.

4. THE CIRCULAR FORM SHALL BE REMOVED PRIOR TO DRILLING AND GROUTING OF TIE BARS.

5. DRILLING AND GROUTING IS THE PREFERRED METHOD OF PLACING TIE BARS, HOWEVER TIE BARS MAY BE POURED IN PLACE IF A MAXIMUM 2" OF CLEARANCE IS PROVIDED TO OUTER EDGE OF FRAME.

6. SHIMS SHALL BE USED TO ADJUST ALL FRAMES, AFTER ADJUSTING MORTAR HAS CURED, THE SHIMS SHALL BE REMOVED AND THE VOIDS UNDER THE FRAMES FILLED WITH NON-SHRINK GROUT (SEE STD. DWG. 605-13 FOR ALTERNATE FRAME PLACEMENT).

7. METAL REINFORCEMENT FOR HOOP BARS SHALL BE ONE- PIECE CONSTRUCTION HAVING A MINIMUM LAP LENGTH OF 2'-0".

8. ALL SITUATIONS NOT SHOWN AND MAY REQUIRE COMBINATION OF DETAILS.

9. WHEN THE CAST-IN-PLACE ROUNDOUT IS USED THE FRAME SHALL BE ANCHORED TO THE STRUCTURE TO PREVENT MOVEMENT DURING THE PAVING OPERATION.

10. STANDARD DRAWING 605-13 SHALL ACCOMPANY THIS DRAWING.

11. DOWEL BAR AND TIE BAR SIZE AND LOCATION SHALL BE AS SHOWN ON STANDARD DRAWING 409-1.

12. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY MICHAEL J. SANTI OCTOBER 21, 2011 6390 STATE OF IDAHO MICHAEL J. SANTI

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 411-2_1011.dgn

DRAWING DATE: AUGUST, 2011

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

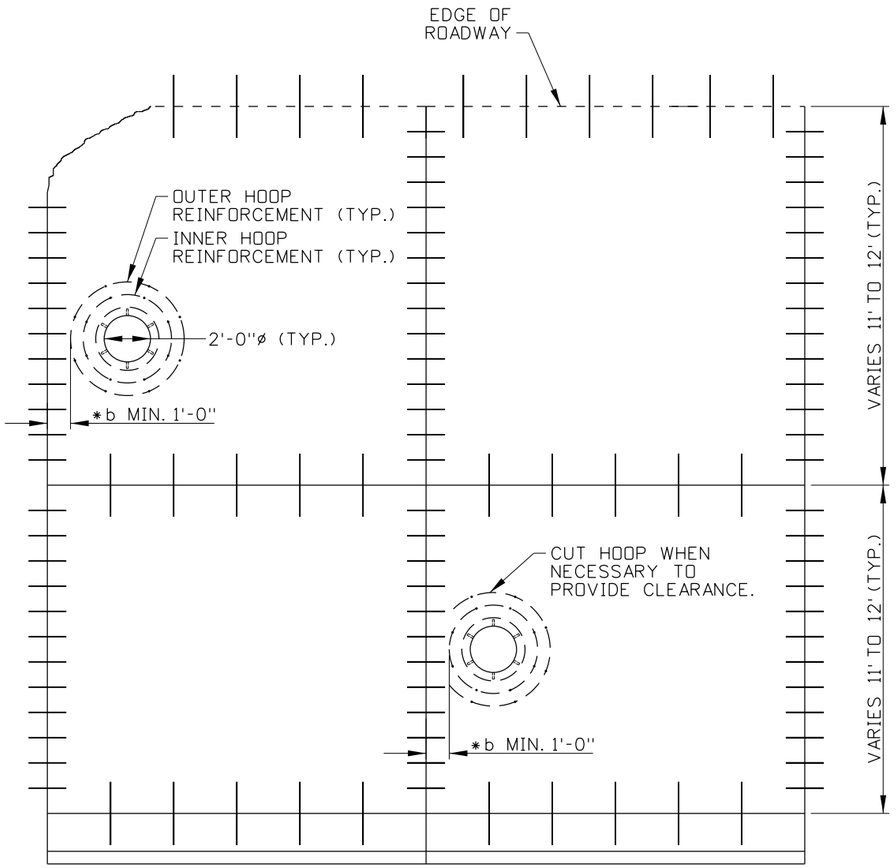
URBAN CONCRETE PAVEMENT MANHOLE COLLARS

REQUIRES SHT. 2 OF 2 & STD. DWG. 605-13

English

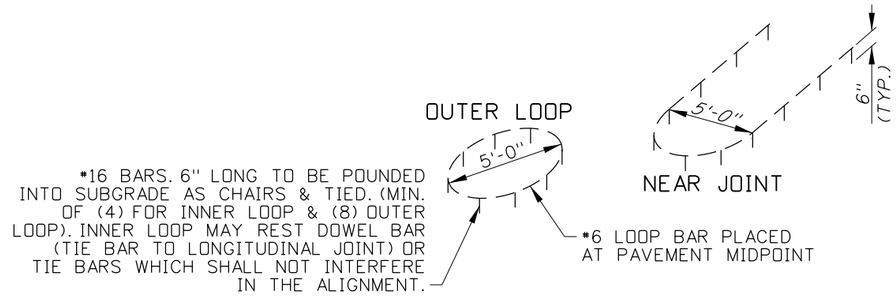
STANDARD DRAWING NO. 411-2

SHEET 1 OF 2

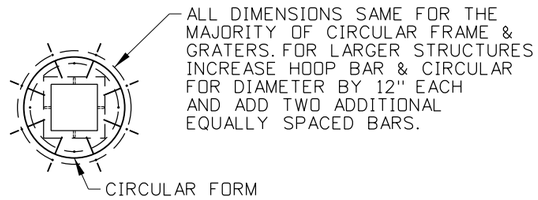


*b WHEN LESS THAN 1'-0" A FORMED ROUNDOUT SHALL BE USED.

CAST IN PLACE DETAIL

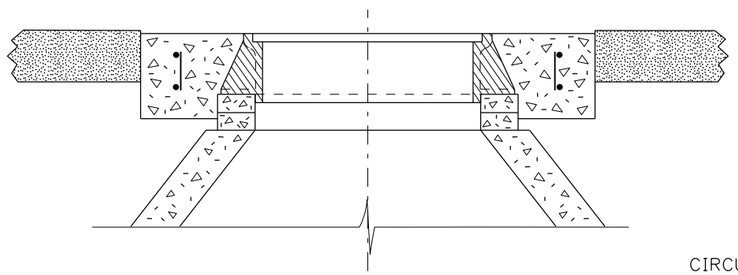


METAL REINFORCEMENT TIEING DETAIL OPTION



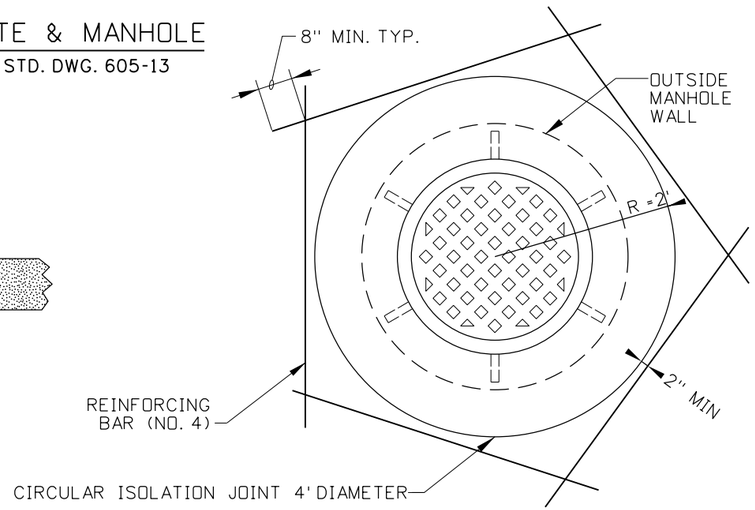
APPLICATION FOR SQUARE FRAME W/GRATE & MANHOLE

FOR DETAILS INSIDE OF CIRCULAR ISOLATION JOINT SEE STD. DWG. 605-13



MANHOLE FRAME FOR VISUAL REFERENCE ONLY

(SEE STANDARD DRAWING 605-13 FOR REINFORCEMENT DETAILS



METAL REINFORCEMENT TIEING DETAIL OPTION

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY: MICHAEL J. SANTI DATE OF ORIGINAL SIGNATURE: OCTOBER 21, 2011 6390 STATE OF IDAHO MICHAEL J. SANTI

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 411-2_1011.dgn

DRAWING DATE: AUGUST, 2011

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

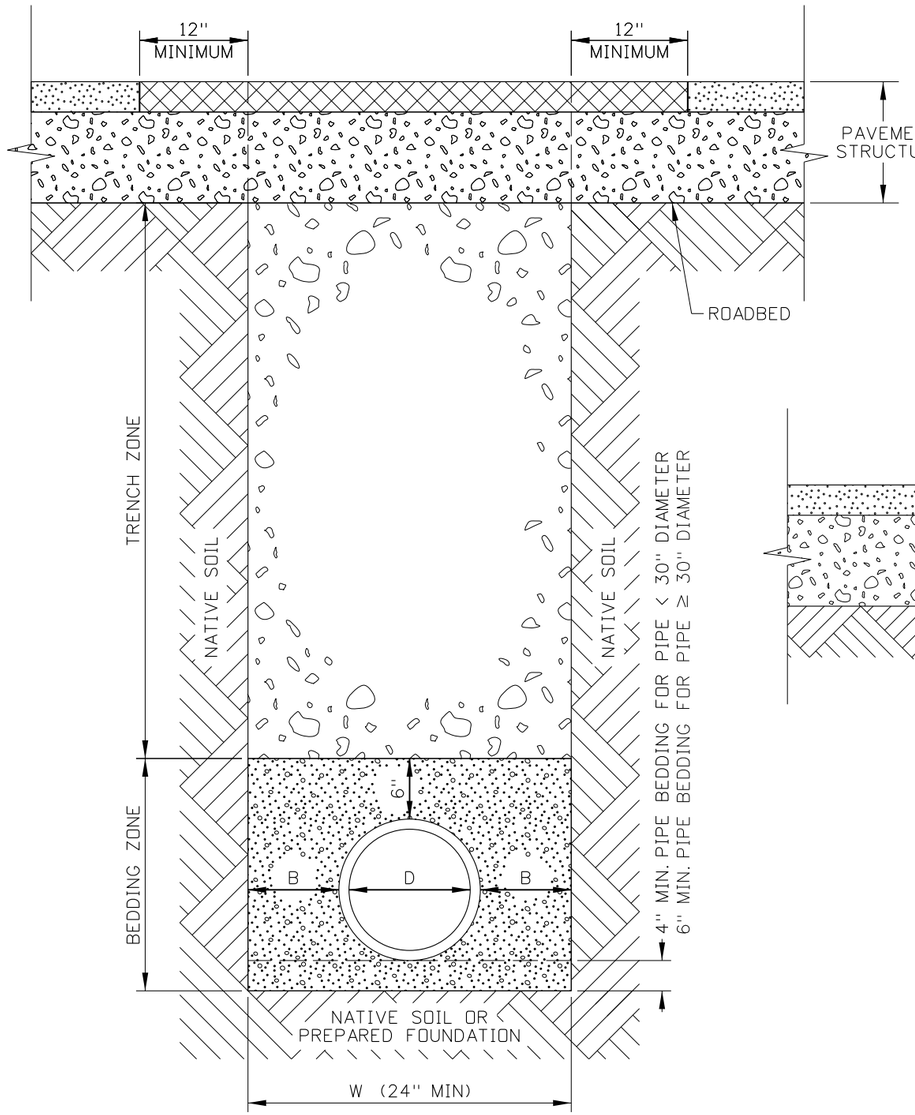
URBAN CONCRETE PAVEMENT MANHOLE COLLARS

REQUIRES SHT. 1 OF 2 & STD. DWG. 605-13

English

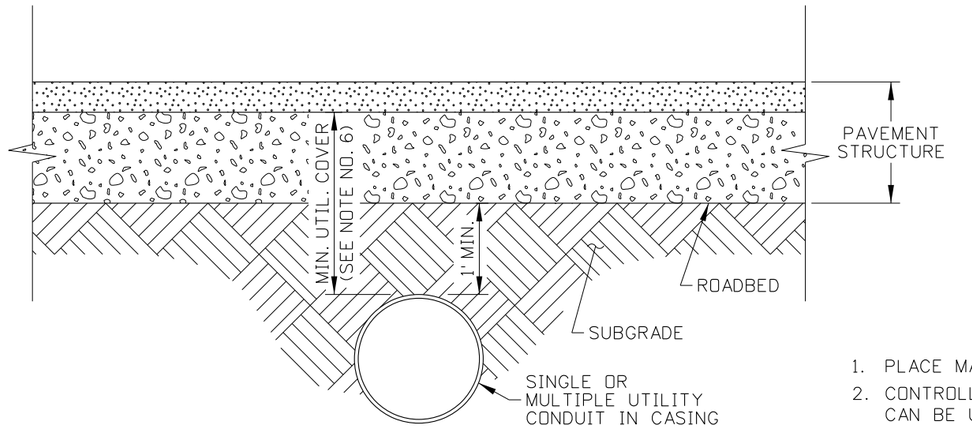
STANDARD DRAWING NO. 411-2

SHEET 2 OF 2

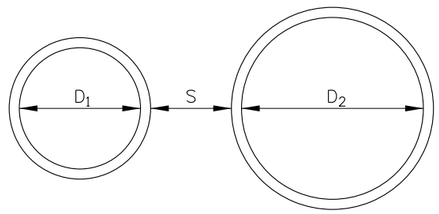


TRENCHING

MATERIALS AND COMPACTION TABLE				
PIPE LOCATION	BEDDING ZONE		TRENCH ZONE	
	MATERIAL REQUIREMENT	COMPACTION REQUIREMENT	MATERIAL REQUIREMENT	COMPACTION REQUIREMENT
INSIDE ROADWAY PRISM	COARSE AGGREGATE FOR CONCRETE SIZE NO. 1, NO. 2A, OR NO. 2B (SUBSECTION 703.02)	ENGINEER ACCEPTANCE	3/4" AGGREGATE FOR BASE (SUBSECTION 703.04) (SEE NOTE NO. 1)	CLASS A COMPACTION (SECTION 205) OR 95% OF IT-74
OUTSIDE ROADWAY PRISM	COARSE AGGREGATE FOR CONCRETE SIZE NO. 1, NO. 2A, OR NO. 2B (SUBSECTION 703.02)	ENGINEER ACCEPTANCE	GRANULAR BORROW OR NATIVE MATERIALS WITH MAXIMUM SIZE OF 6" AND FREE FROM WOOD WASTE OR DELETERIOUS MATERIALS. (SEE NOTE NO. 1)	CLASS D COMPACTION (SECTION 205)



JACKING, DRIVING, OR BORING



MULTIPLE PIPE INSTALLATION DETAIL
(SEE NOTE NO. 4)

MINIMUM DIMENSION TABLE (SEE NOTE NOS. 3 AND 4)		
D (INCHES)	B (INCHES)	S (INCHES)
≤ 6	10	24
7 TO 15	12	24
16 TO 30	18	24
> 30	24	GREATER OF 24 OR D/2

NOTES

1. PLACE MATERIAL IN ACCORDANCE WITH SECTION 210.
2. CONTROLLED DENSITY FILL (CDF) IN ACCORDANCE WITH SECTION 522 CAN BE USED IF APPROVED BY THE ENGINEER.
3. LOOSE LIFT THICKNESS DIRECTLY ON TOP OF PIPE MAY BE INCREASED WITH APPROVAL TO PREVENT DAMAGE TO PIPE DURING COMPACTION.
4. WHEN TWO DIFFERENT DIAMETER PIPES ARE INSTALLED, USE THE LARGER D DIMENSION TO DETERMINE THE S DIMENSION.
5. WHEN THE PIPE DIAMETER IS 36 INCHES OR GREATER AND THE PIPE IS INSTALLED DURING EMBANKEMENT CONSTRUCTION, USE B DIMENSION EQUAL TO THE PIPE DIAMETER.
6. PROVIDE THE FOLLOWING MINIMUM COVER DEPTHS:
   WATER: 4'
   LIQUID OR GAS PETROLEUM: 4'
   ELECTRICAL MAIN LINE: 4'
   COMMUNICATIONS OR ELECTRONICS: 2'
   UTILITY OWNERS AND LOCAL PUBLIC AGENCIES MAY HAVE DIFFERENT MINIMUM COVER DEPTHS. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE REQUIRED COVER DEPTHS.
7. PERFORM TRENCHING PER OSHA REQUIREMENTS.
8. DO NOT DISTURB THE INSTALLED PIPE OR CONDUIT, OR LEAVE VOIDS WHEN USING TRENCH BOXES OR SHIELDS.
9. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO JOHN W. INGRAM III 6755 ORIGINAL SIGNED BY: JOHN W. INGRAM MARCH 18, 2020

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY	
1	12-15	RDL	6	03-21	TWF				
2	03-16	RDL							
3	06-17	RDL							
4	06-18	HEB							
5	11-18	TWF							

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 601-1_0421.dgn

DRAWING DATE: MAY 2014

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

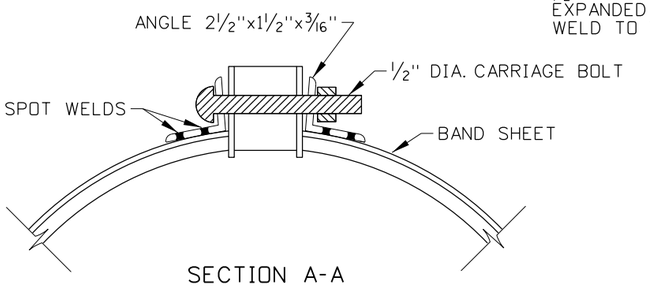
PIPE AND CONDUIT INSTALLATION

English

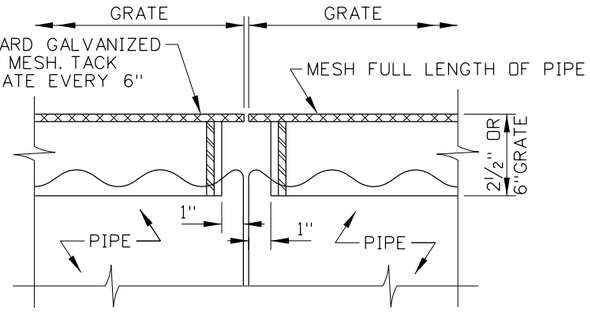
STANDARD DRAWING NO.

601-1

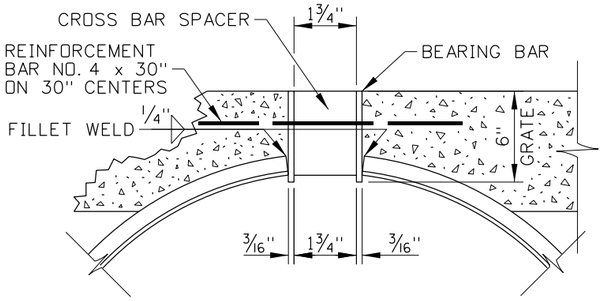
SHEET 1 OF 1



SECTION A-A

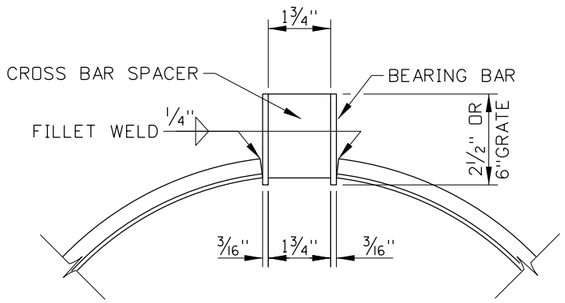


SECTION B-B



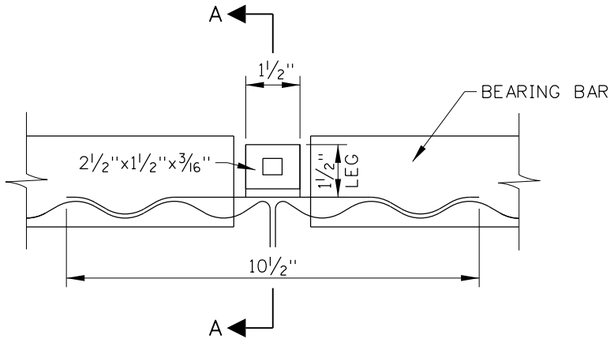
WHEN CONCRETE PAVEMENT IS USED

STANDARD GRATE SLOT DETAIL

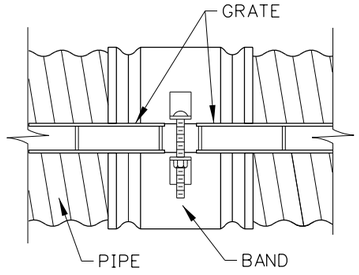


TYPE 1 - STANDARD GRATE SLOT DETAIL

SECTION C-C

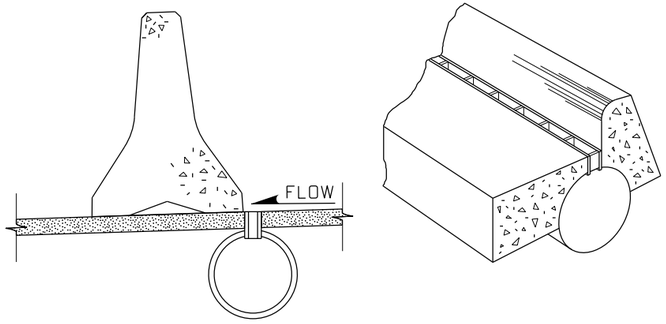


ELEVATION



TOP VIEW

TYPICAL COUPLING BAND

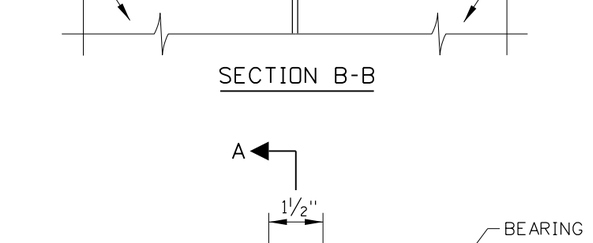


TYPICAL INSTALLATIONS

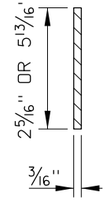
TYPE 2 - ALTERNATE GRADE SLOT DETAIL FOR INCLUSION OF MESH

SECTION C'-C'

GRATE SLOT WELDING DETAIL



GRATE SLOT DRAIN



CROSS BAR SPACER

NOTES

1. USE MINIMUM PIPE THICKNESS OF 0.079 INCHES FOR SLOTTED DRAINS.
2. THE DEPTH OF GRATES ON SLOTTED DRAINS WILL BE AS SHOWN ON THE PLANS.
3. SLOTTED DRAIN GRATES DO NOT NEED TO BE PAINTED OR GALVANIZED.
4. ENSURE THAT GASKETS, GASKET MATERIALS, O-RINGS, AND COUPLING BANDS MEET THE REQUIREMENTS OF STANDARD DRAWING 706-6.
5. THE FINISHED TOP OF PAVEMENT SHALL BE FLUSH WITH THE GRATE SURFACE.
6. WELD THE METAL GRATE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1.
7. NOT TO BE USED IN TEMPORARY OR PERMANENT TRAFFIC LANES. USE ONLY WHERE TRAFFIC IS OCCASIONAL, SUCH AS ON HIGHWAY SHOULDERS.
8. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	01-79							
2	02-96	IJR						
3	06-02	MSM						
4	10-05	MSM						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-1_1212.dgn

DRAWING DATE: MAY, 1977

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

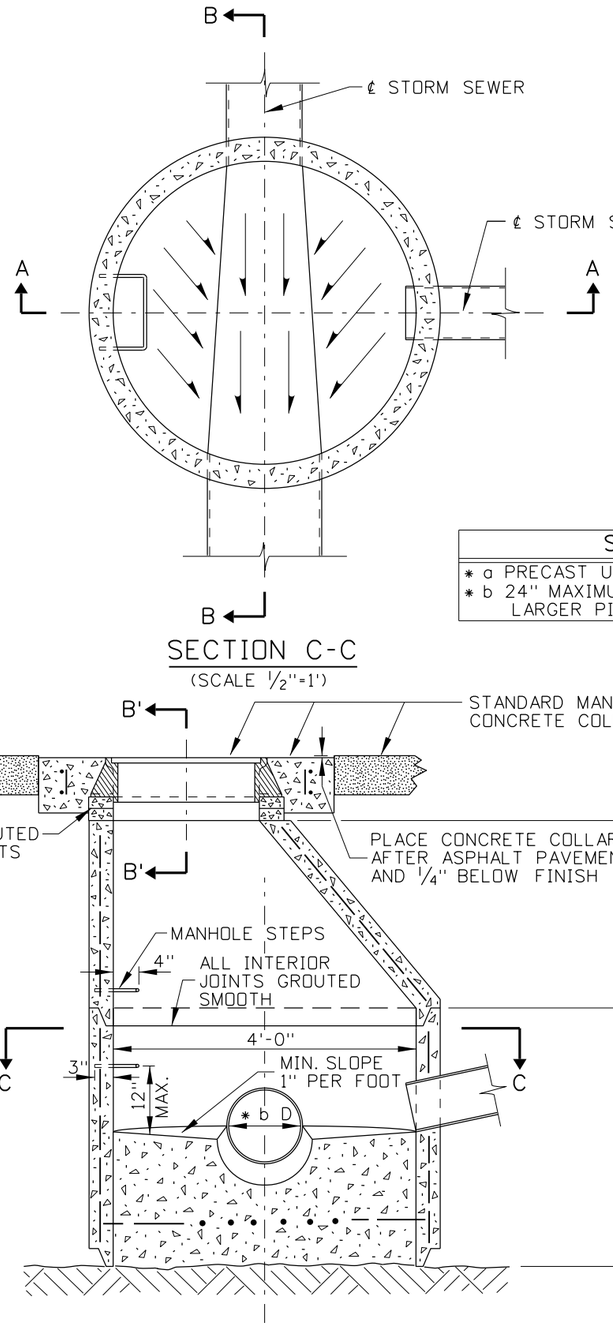
STORM SEWER PIPE 12" THRU 30" SLOTTED DRAIN

REQUIRES STD. DWG. 706-6

English

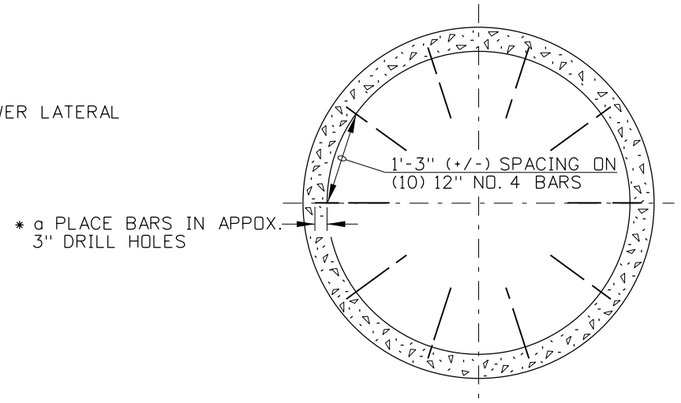
STANDARD DRAWING NO. 605-1

SHEET 1 OF 1



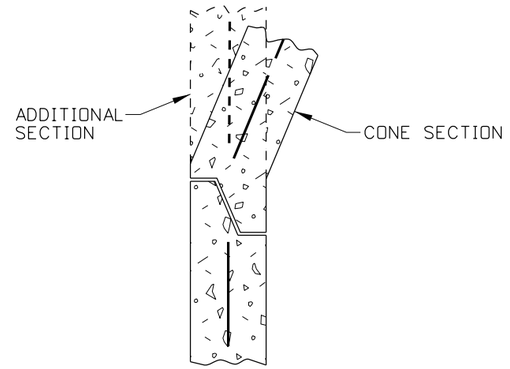
SECTION C-C

(SCALE 1/2"=1')



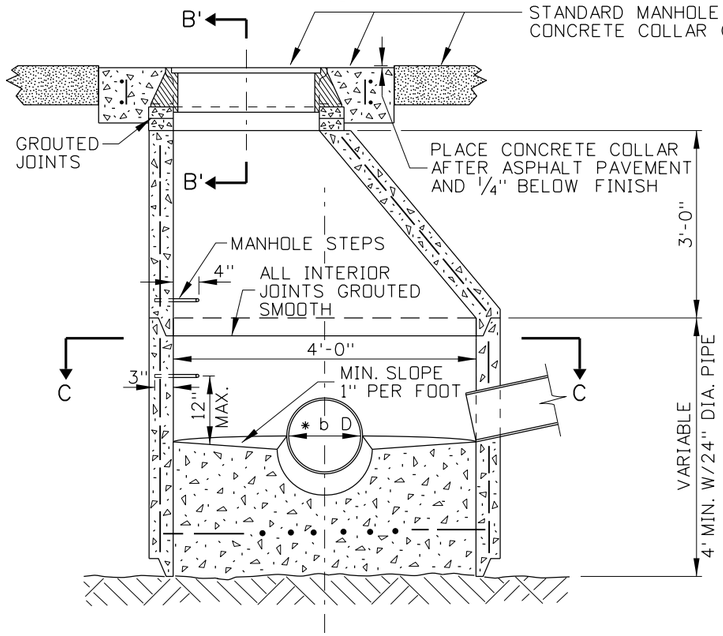
FLOOR METAL REINFORCEMENT

SUB-NOTES
* a PRECAST UNITS ONLY
* b 24" MAXIMUM PIPE DIA., FOR LARGER PIPE USE MANHOLE TYPE D.



PRECAST CONSTRUCTION JOINT DETAIL

(NO SCALE)

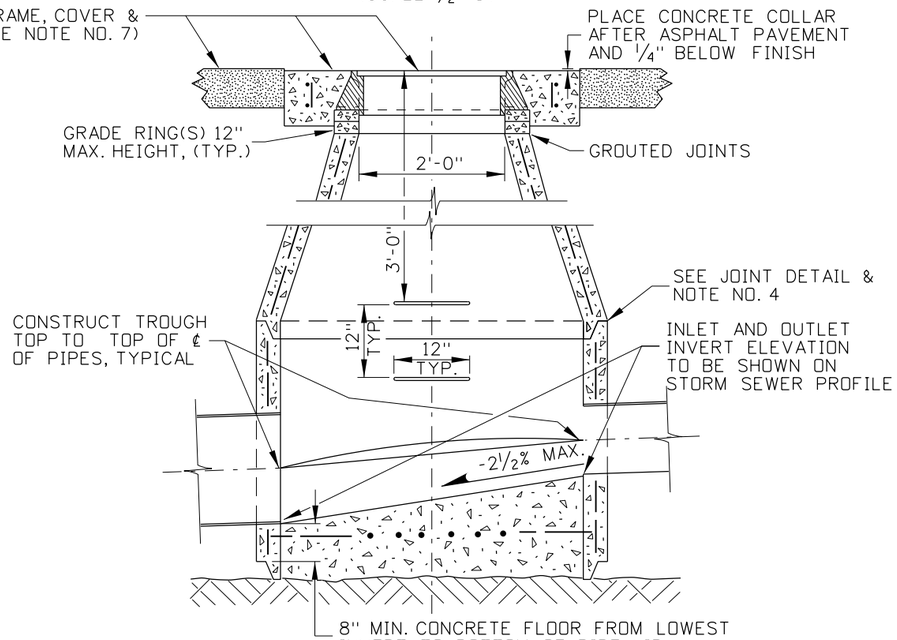


SECTION A-A

(SCALE 1/2"=1')

TOP - SECTION B'-B'

(SCALE 1/2"=1')



BOTTOM - SECTION B-B

(SCALE 1/2"=1')

NOTES

1. CARE SHALL BE TAKEN TO AVOID PLACING MANHOLES IN WHEEL PATHS.
2. MANHOLES TYPE A MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST MANHOLES SHALL MEET THE REQUIREMENTS OF ASTM C478. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON PRECAST UNITS WITH FLOOR AND/OR PIPE OPENINGS.
3. CAST-IN-PLACE MANHOLES TYPE A SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. CAST-IN-PLACE MANHOLES SHALL HAVE 6" WALLS AND MINIMUM 8" FLOORS. THE METAL REINFORCEMENT USED ON THE WALLS AND FLOORS SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND/OR 3" IF CAST AGAINST EARTH.
4. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH TO FORM A WATER TIGHT MANHOLE. MASTIC SEALANTS, GASKETS, AND O-RINGS USED ON PRECAST SECTION(S) CONSTRUCTION JOINT(S) SHALL CONFORM TO AASHTO AND ASTM REQUIREMENTS.
5. BENDS IN THE MAIN STORM SEWER SHALL BE MADE BY FORMING CURVED CHANNELS WITHIN THE MANHOLE. THE INSIDE OF THE TOP LATERAL PIPES MAY NOT BE LOWER THAN THE INSIDE TOP OF MAIN SEWER PIPES. WHEN THE INVERT OF A LATERAL PIPE FALLS BELOW THE 1" PER FOOT MINIMUM SLOPE LINE, THE CHANNEL SHALL BE FORMED FROM THE LATERAL PIPE TO THE MAIN SEWER.
6. WHEN MANHOLE STEPS ARE REQUIRED AN ECCENTRIC CONE SECTION SHALL BE USED. PLASTIC COATED MANHOLE STEPS SHALL BE PLACED IN MANHOLES GREATER THAN 4' IN DEPTH. PLASTIC COATED MANHOLE STEPS SHALL CONFORM TO IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION.
7. USE OF A PLASTIC MANHOLE FRAME SUPPORT, I. E. WHIRLY-GIG OR COMPARABLE DEVICE, IS AN ACCEPTABLE CONSTRUCTION OPTION (FOR FURTHER INFORMATION REFER TO STANDARD DRAWING 605-13).
8. CHEMICAL RESISTANT LINERS MAY BE REQUIRED (SEE PLANS AND/OR SPECIAL PROVISIONS).
9. STANDARD DRAWING 605-13 SHALL ACCOMPANY THIS DRAWING.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED TED E. MASON OCTOBER 26, 2010 STATE OF IDAHO TED E. MASON

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-64		6	12-93	MSM	11	09-10	PLR
2	04-71		7	11-01	MSM			
3	05-74		8	06-03	MSM			
4	02-75		9	12-04	MSM			
5	12-92	MSM	10	05-07	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-10_1010.dgn

DRAWING DATE: JUNE, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

MANHOLE TYPE A

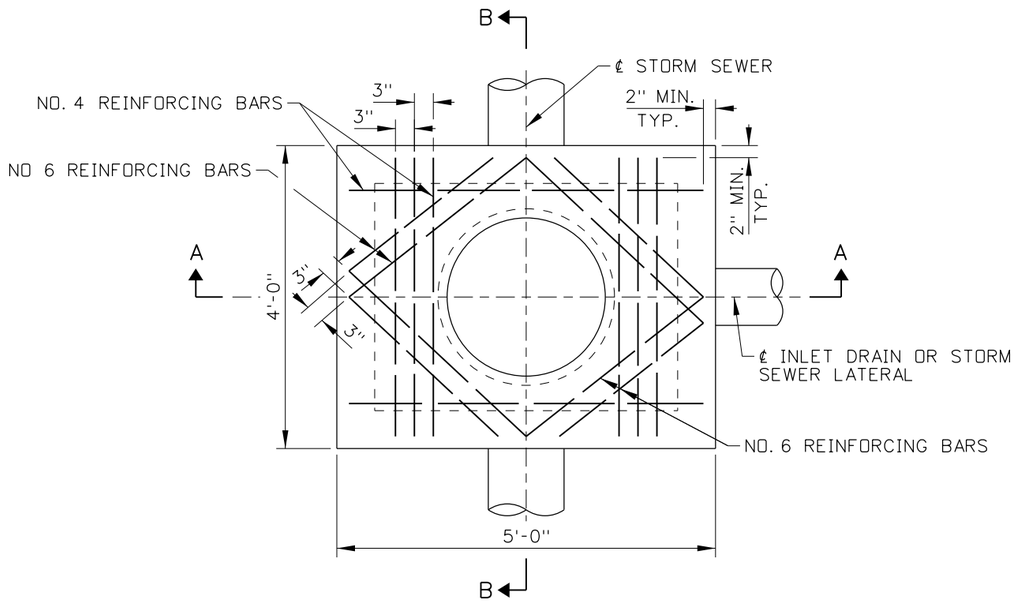
REQUIRES STD. DWG. 605-13

English

STANDARD DRAWING NO.

605-10

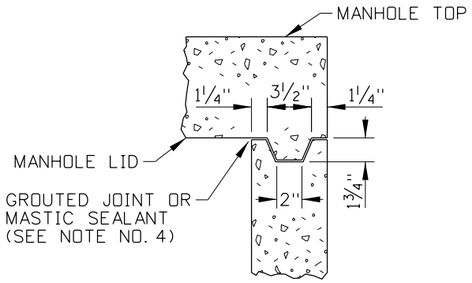
SHEET 1 OF 1



MANHOLE TOP

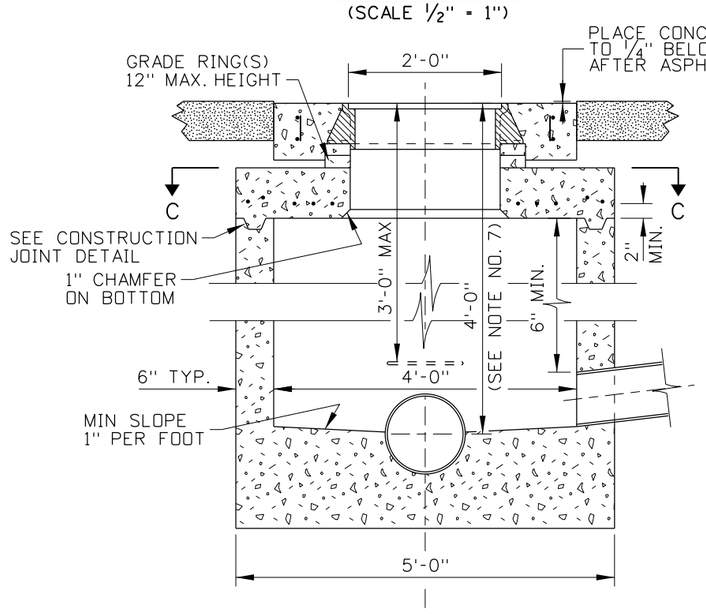
SECTION C-C

(SCALE ½" = 1")



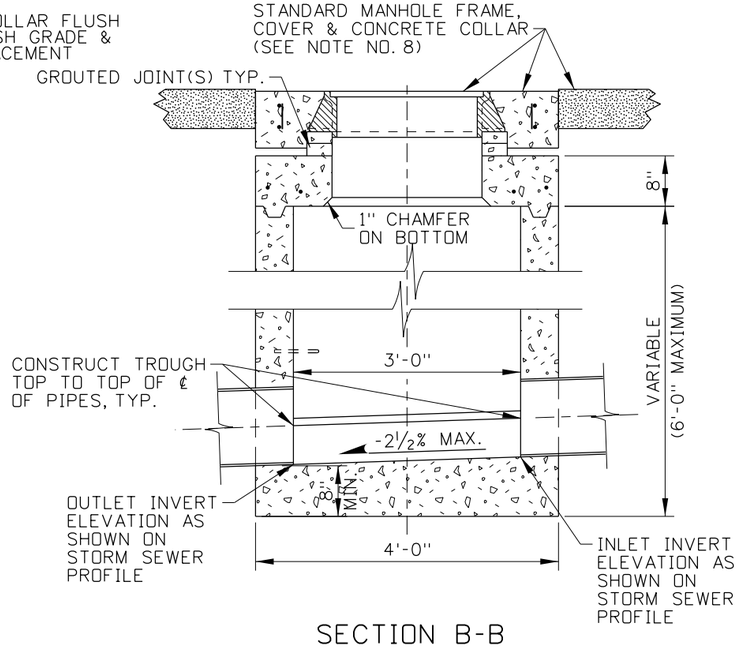
CONSTRUCTION JOINT DETAIL

(NO SCALE)



SECTION A-A

(SCALE ½" = 1")



SECTION B-B

(SCALE ½" = 1")

NOTES

1. CARE SHALL BE TAKEN TO AVOID PLACING MANHOLES IN WHEEL PATHS.
2. MANHOLE TYPE B MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST MANHOLES SHALL MEET THE REQUIREMENTS OF ASTM C478. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON PRECAST UNITS WITH FLOOR AND/OR PIPE OPENINGS.
3. CAST-IN-PLACE MANHOLE TYPE B SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. CAST-IN-PLACE MANHOLES SHALL HAVE 6" WALLS AND MINIMUM 8" FLOORS. THE METAL REINFORCEMENT USED ON THE WALLS AND FLOORS SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND/OR 3" IF CAST AGAINST EARTH.
4. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH TO FORM A WATER TIGHT MANHOLE. MASTIC SEAL ANTS, GASKETS, USED ON PRECAST SECTION(S) CONSTRUCTION JOINT(S) SHALL CONFORM TO AASHTO AND ASTM REQUIREMENTS.
5. BENDS IN THE MAIN STORM SEWER SHALL BE MADE BY FORMING CURVED CHANNELS WITHIN THE MANHOLE. THE INSIDE OF THE TOP LATERAL PIPES MAY NOT BE LOWER THAN THE INSIDE TOP OF MAIN SEWER PIPES. WHEN THE INVERT OF THE LATERAL PIPE FALLS BELLOW THE 1" PER FOOT MINIMUM SLOPE LINE, THE CHANNEL SHALL BE FORMED FROM THE LATERAL PIPE TO THE MAIN SEWER.
6. THE CONCRETE MANHOLE LIDS SHALL BE DESIGNED FOR AASHTO H-25 LIVE LOADS.
7. WHEN MANHOLE DEPTH IS GREATER THAN 4'-0" INSTALL MANHOLE STEP(S), THE NORMAL STEP-TO-STEP SPACING IS 12" AND THE STEP PROTRUDES FROM THE MANHOLE WALL 4".
8. USE OF A PLASTIC MANHOLE FRAME SUPPORT, I. E. WHIRLY-GIG OR COMPARABLE DEVICE IS AN ACCEPTABLE CONSTRUCTION OPTION (FOR FURTHER INFORMATION REFER TO STANDARD DRAWING 605-13).
9. STANDARD DRAWING 605-13 SHALL ACCOMPANY THIS DRAWING.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED BY MILFORD MILLER MAY 16, 2007 STATE OF IDAHO 2240 MILFORD MILLER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-64		6	09-04	MSM			
2	04-71		7	05-07	MSM			
3	05-71							
4	12-92	MSM						
5	11-01	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-11_0507.dgn

DRAWING DATE: JUNE, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

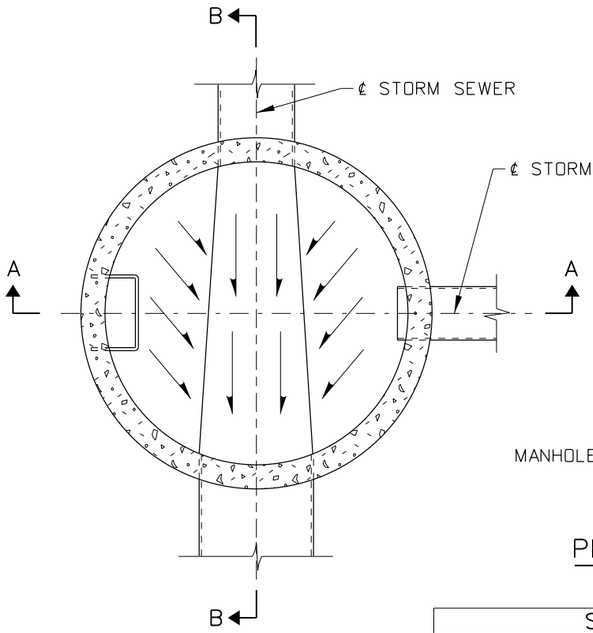
MANHOLE TYPE B

REQUIRES STD. DWG. 605-13

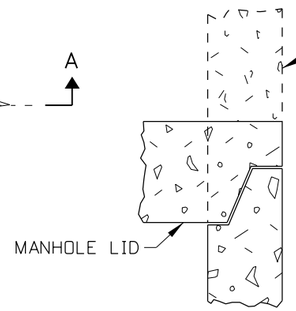
English

STANDARD DRAWING NO. 605-11

SHEET 1 OF 1

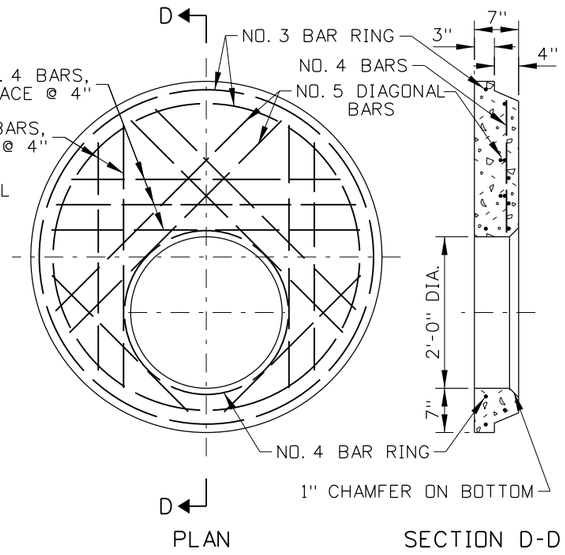


SECTION C-C
(SCALE ½" = 1")

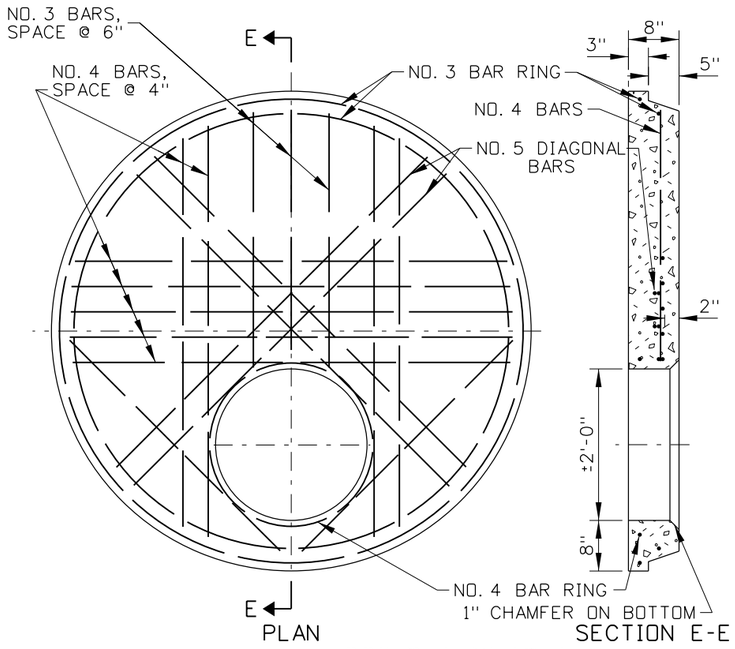


PRECAST JOINT DETAIL
(NO SCALE)

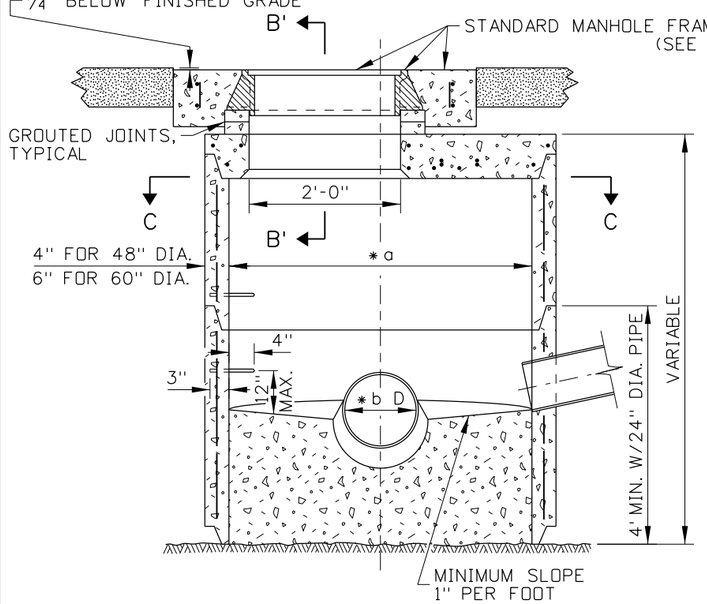
SUB-NOTES
* a MANHOLE TYPE C (48" DIA. SECTION), MANHOLE TYPE D (60" DIA. SECTION)
* b 24" MAX. PIPE DIA. W/48" DIA. SECTION 36" MAX. PIPE W/60" DIA. SECTION



48" DIA. FLAT LID
(SCALE ½" = 1")

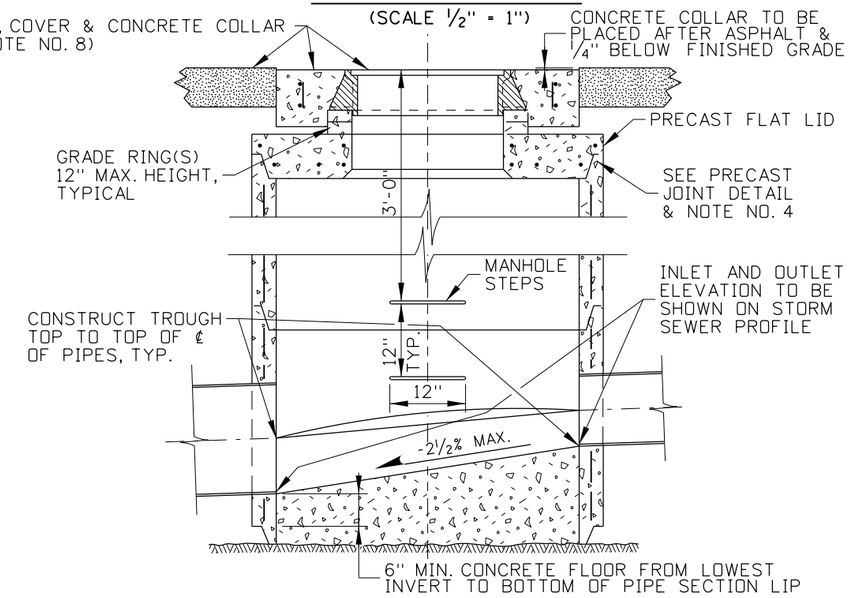


60" DIA. FLAT LID
(SCALE ½" = 1")



SECTION A-A
(SCALE ½" = 1")

TOP SECTION B'-B'
(SCALE ½" = 1")



BOTTOM SECTION B-B
(SCALE ½" = 1")

NOTES

1. CARE SHALL BE TAKEN TO AVOID PLACING MANHOLES IN WHEEL PATHS.
2. MANHOLES TYPE C & D MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST MANHOLES SHALL MEET THE REQUIREMENTS OF ASTM C478. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON PRECAST UNITS WITH FLOOR AND/OR PIPE OPENINGS.
3. CAST-IN-PLACE MANHOLES TYPE C & D SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT "ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION". CAST-IN-PLACE MANHOLES SHALL HAVE 6" WALLS AND MINIMUM 8" FLOORS. THE METAL REINFORCEMENT USED ON THE WALLS AND FLOORS SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND/OR 3" IF CAST AGAINST EARTH.
4. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH TO FORM A WATER TIGHT MANHOLE. MASTIC SEALANTS, GASKETS, AND O-RINGS USED ON PRECAST SECTION(S) CONSTRUCTION JOINT(S) SHALL CONFORM TO AASHTO AND ASTM REQUIREMENTS.
5. BENDS IN THE MAIN STORM SEWER SHALL BE MADE BY FORMING CURVED CHANNELS WITHIN THE MANHOLE. THE INSIDE OF THE TOP LATERAL PIPES MAY NOT BE LOWER THAN THE INSIDE TOP OF MAIN SEWER PIPES. WHEN THE INVERT OF THE LATERAL PIPE FALLS BELLOW THE 1" PER FOOT MINIMUM SLOPE LINE, THE CHANNEL SHALL BE FORMED FROM THE LATERAL PIPE TO THE MAIN SEWER.
6. THE CONCERTE MANHOLE LIDS SHALL BE DESIGNED FOR AASHTO H-25 LIVE LOADS.
7. WHEN MANHOLE STEPS ARE REQUIRED AN ECCENTRIC CONE SECTION SHALL BE USED. PLASTIC COATED MANHOLE STEPS SHALL BE PLACED IN MANHOLES GREATER THAN 4' IN DEPTH. MANHOLE STEPS SHALL CONFORM TO IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION, STANDARD DRAWING SD-509 AND SECTION 504.06 PLASTIC COATED MANHOLE STEPS.
8. USE OF A PLASTIC MANHOLE FRAME SUPPORT, I.E. WHIRLY-GIG OR COMPARABLE DEVICE, IS AN ACCEPTABLE CONSTRUCTION OPTION (FOR FURTHER INFORMATION REFER TO STANDARD DRAWING 605-13).

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED MILFORD MILLER MAY 16, 2007 ORIGINAL SIGNED STATE OF IDAHO MILFORD MILLER 2240

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-92	MSM						
2	11-01	MSM						
3	12-04	MSM						
4	05-07	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-12_0507.dgn

DRAWING DATE: MAY, 1981

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

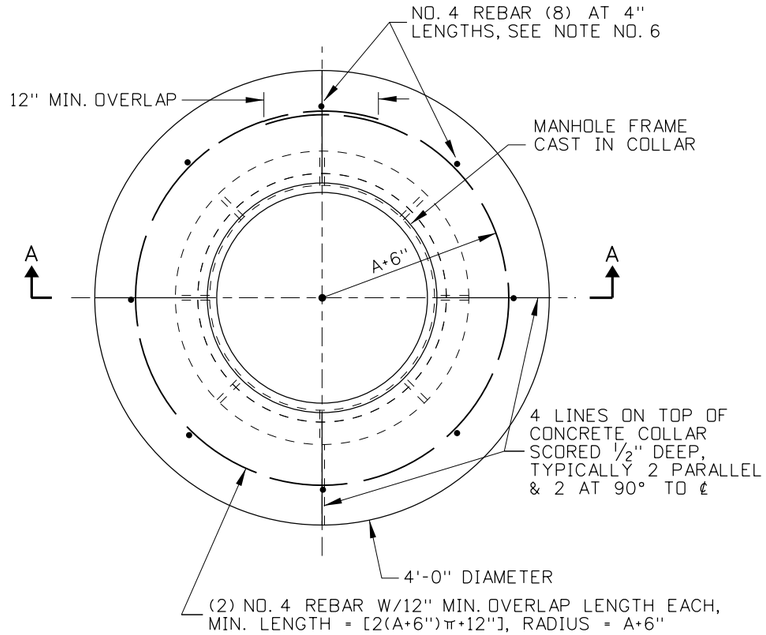
MANHOLE TYPES C & D

REQUIRES STD. DWG. 605-13

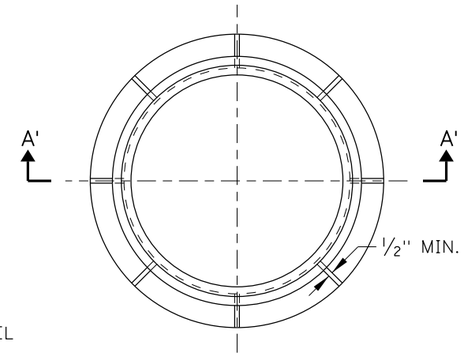
English

STANDARD DRAWING NO.
605-12

SHEET 1 OF 1

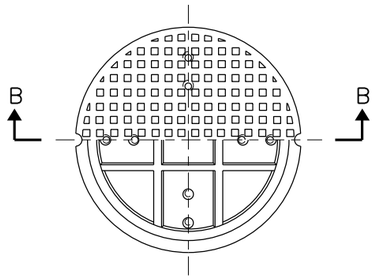


CONCRETE COLLAR PLAN



FRAME PLAN

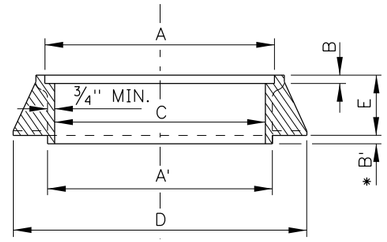
COVER PLAN - TOP HALF VIEW



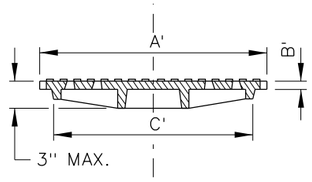
COVER PLAN - BOTTOM HALF VIEW

STANDARD MANHOLE FRAME BASIC DIMENSIONS	
A	24 1/8"
B	1"
C	21" MIN.
D	31" MIN.
E	5"
STANDARD MANHOLE COVER BASIC DIMENSIONS	
A'	23 7/8"
* B'	1"
C'	20"

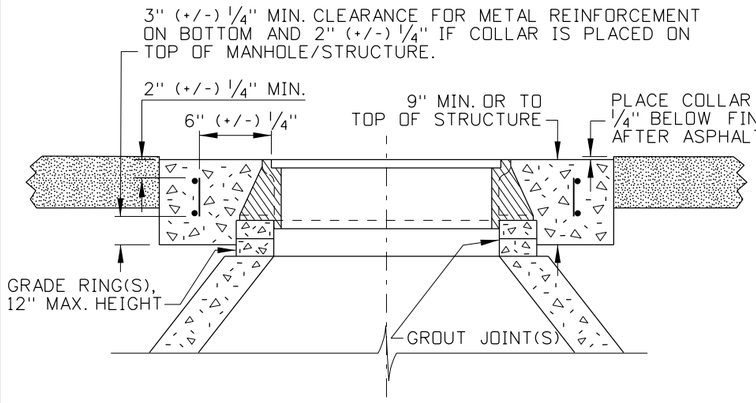
* B' MANHOLE FRAME BOTTOM TO FIT INSIDE ANOTHER FRAME LID OPENING



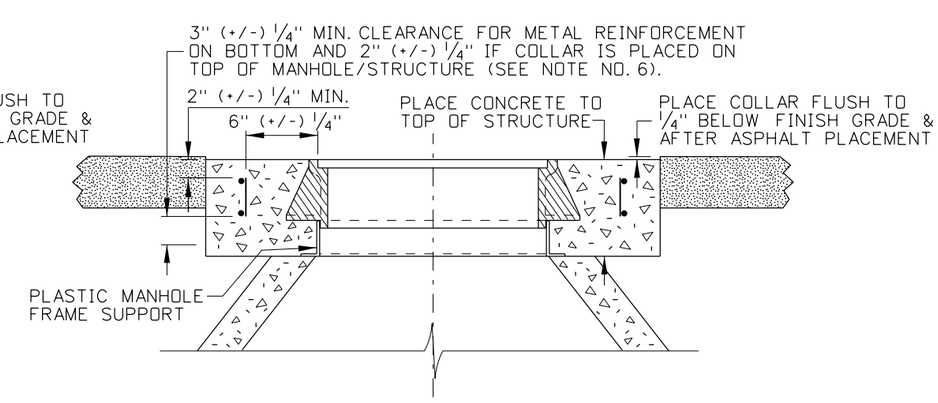
SECTION A'-A'



SECTION B-B



MANHOLE FRAME SUPPORTED WITH CONC. COLLAR RINGS
(SEE NOTE NO. 6)



PLASTIC MANHOLE FRAME SUPPORT
(SEE NOTE NO. 7)

SECTION A-A

NOTES

1. THE MINIMUM WEIGHT OF THE FRAMES SHALL BE 150LBS. AND THE MINIMUM WEIGHT OF COVERS SHALL BE 110LBS. THESE FRAMES AND COVERS ARE TO BE USED IN ALL TRAFFIC AND NON-TRAFFIC AREAS.

2. FRAMES AND COVERS SHALL CONFORM TO AASHTO M 306-05 AND SHALL BE MADE OF CLASS 35B GRAY IRON.

3. THE LAYOUT AND DIMENSIONS OF THE WEBS ARE TYPICAL MINIMUMS. PROPRIETARY MANHOLE COVERS WITHOUT WEBS ARE ACCEPTABLE PROVIDED THEY MEET AASHTO M 306-05 AND MINIMUM WEIGHT REQUIREMENTS. ALL COVER DESIGNS SHALL BE PROVIDED WITH AN ANTI-SHIFT SKIRT THAT EXTENDS A MINIMUM OF 1" BELOW THE COVER SEAT.

4. THE SURFACE SHOWN IS FOR ILLUSTRATION ONLY. ANY SURFACE DESIGN, OTHER THAN SMOOTH, MAY BE USED UPON APPROVAL.

5. A CAST-IN-PLACE CONCRETE COLLAR SHALL BE PLACED AROUND THE MANHOLE FRAME UNLESS OTHERWISE DIRECTED. THE CONCRETE COLLAR SHALL MEET THE REQUIREMENTS OF SECTION 609 - MINOR STRUCTURES, OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

6. THE CONCRETE COLLAR SHALL BE PLACED TO THE TOP OF THE MANHOLE/STRUCTURE OR HAVE A MINIMUM THICKNESS OF 9". WHEN THE CONCRETE COLLAR IS PLACED ON TOP OF A MANHOLE/STRUCTURE THE THICKNESS SHALL NOT BE LESS THAN THE "F DIMENSION" OF THE FRAME. THE VERTICAL METAL REINFORCEMENT LENGTHS MAY BE ADJUSTED WHEN THE COLLAR IS PLACED ON TOP OF A STRUCTURE/MANHOLE.

7. USE OF A PLASTIC MANHOLE FRAME SUPPORT, I.E. WHIRLY-GIG OR COMPARABLE DEVICE, IS AN ACCEPTABLE CONSTRUCTION OPTION.

8. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY TED E. MASON OCTOBER 26, 2012 STATE OF IDAHO TED E. MASON

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-61	NS	6	10-05	MSM			
2	02-74		7	06-07	MSM			
3	12-92	MSM	8	09-10	PLR			
4	05-95	MSM						
5	11-01	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-13_1010.dgn

DRAWING DATE: JUNE, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

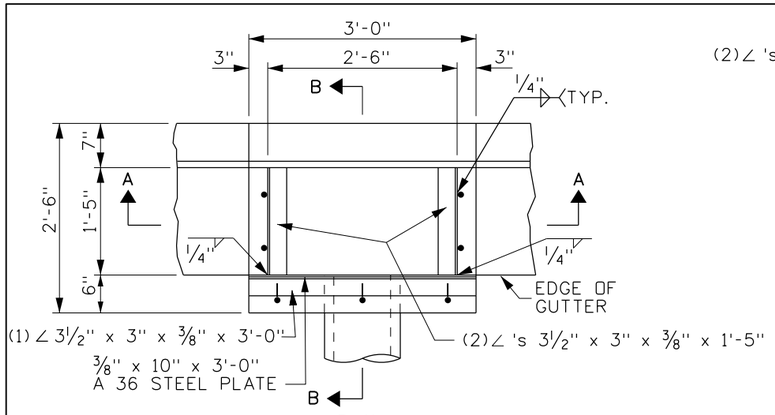
MANHOLE FRAME, COVER, & CONCRETE COLLAR

English

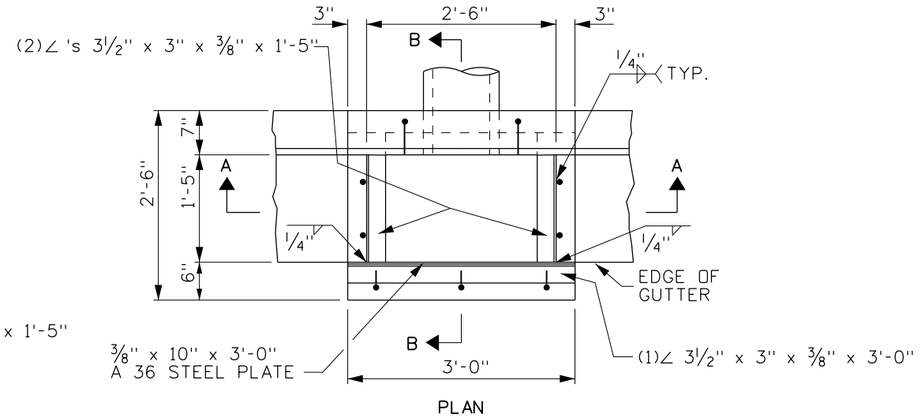
STANDARD DRAWING NO.

605-13

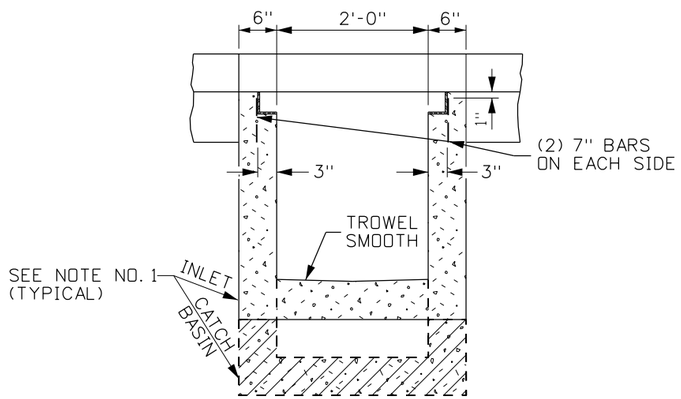
SHEET 1 OF 1



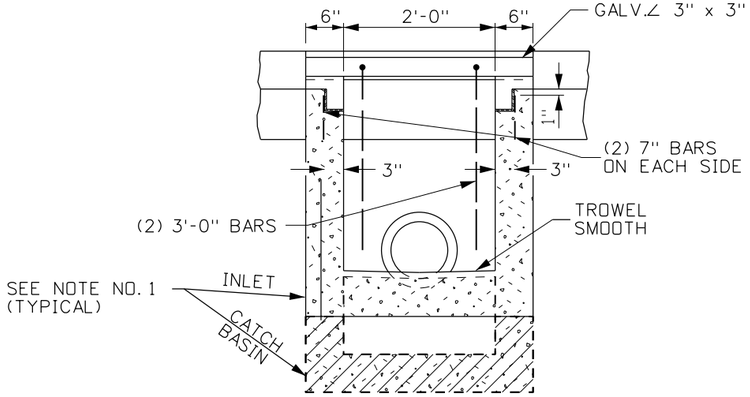
PLAN



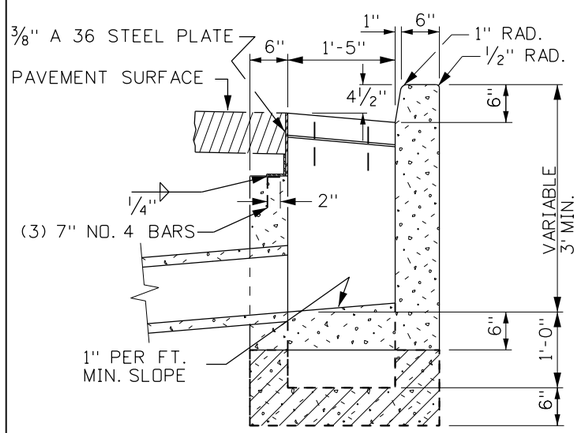
PLAN



SECTION A-A



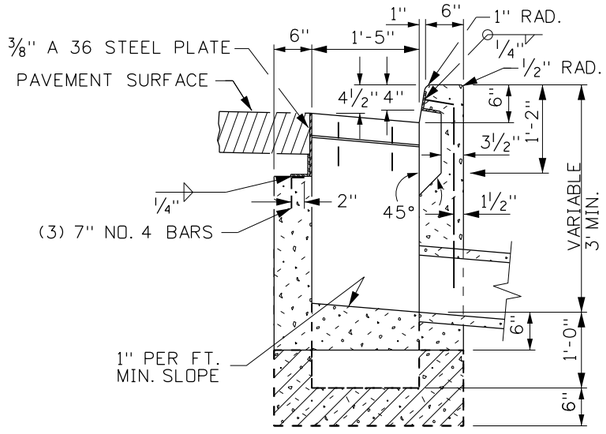
SECTION A-A



SECTION B-B

INLET - TYPE 1

CATCH BASIN - TYPE 1



SECTION B-B

INLET - TYPE 2

CATCH BASIN - TYPE 2

NOTES

1. PATTERNS USED IN DRAWING:

   INLET SECTIONS:

   CATCH BASIN BOTTOMS:

   PAVEMENT:

2. INLETS AND CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM C 913. (PRIOR APPROVAL OF SHOP DRAWINGS WILL BE REQUIRED ON MODIFIED UNITS.)
3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.
4. CAST-IN-PLACE INLETS AND CATCH BASINS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
5. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.
6. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH.
7. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATED GRATE SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE ANGLE/GRATE SURFACE. THE STRUCTURAL STEEL NEED NOT BE PAINTED BUT SHALL MEET THE REQUIREMENTS OF ASTM A 36.
8. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH CUT TO ACCOMMODATE PIPES.
9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.
10. INLET/CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.
11. GRATE B WILL BE USED ONLY WHEN SPECIFIED.
12. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY TED E. MASON NOVEMBER 3, 2005 STATE OF IDAHO 6503 TED E. MASON

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-80		6	09-94	MSM	11	11-08	JRV
2	04-82		7	06-97	MSM			
3	03-84		8	06-01	MSM			
4	01-89	GB	9	11-04	MSM			
5	12-93	MSM	10	05-07	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-20_1108.dgn

DRAWING DATE: JULY, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

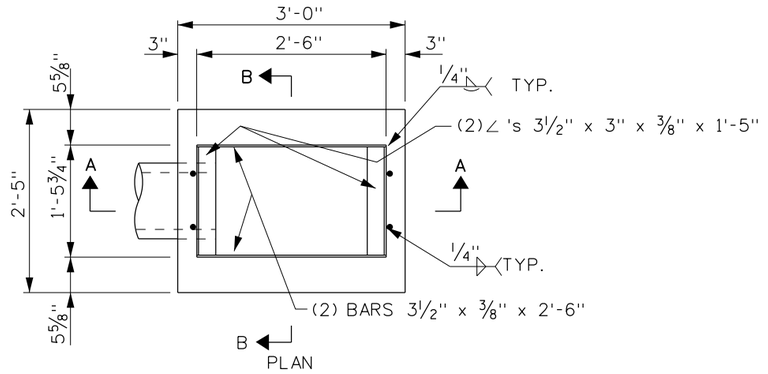
STANDARD DRAWING

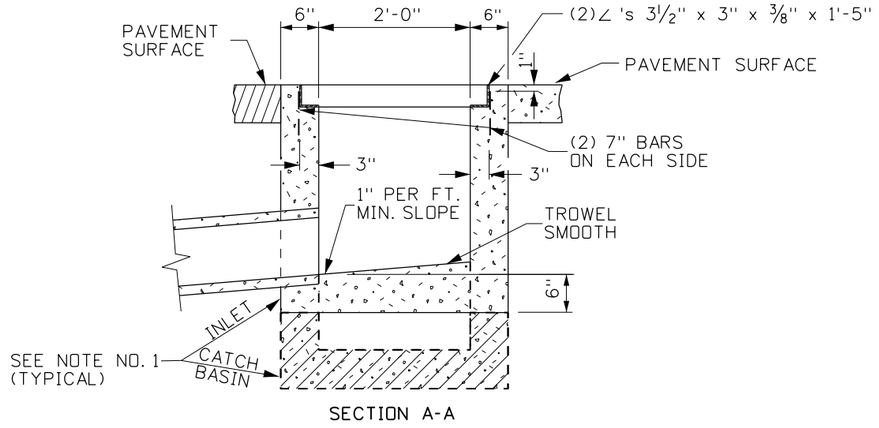
INLETS & CATCH BASINS TYPES 1, 2, & 3

English

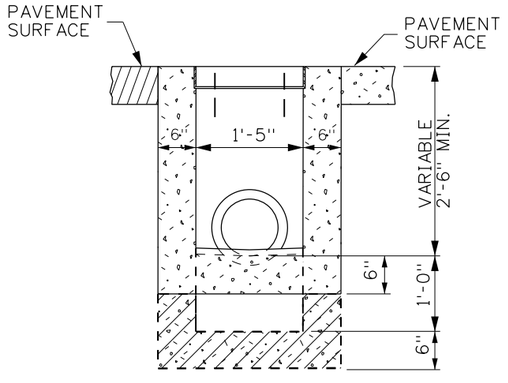
STANDARD DRAWING NO. 605-20

SHEET 1 OF 2





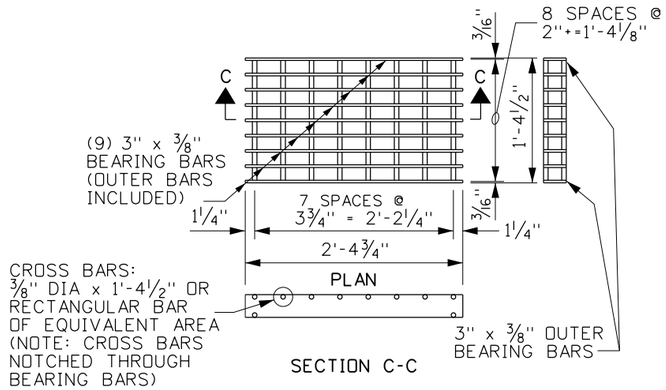
SECTION A-A



SECTION B-B

INLET - TYPE 3

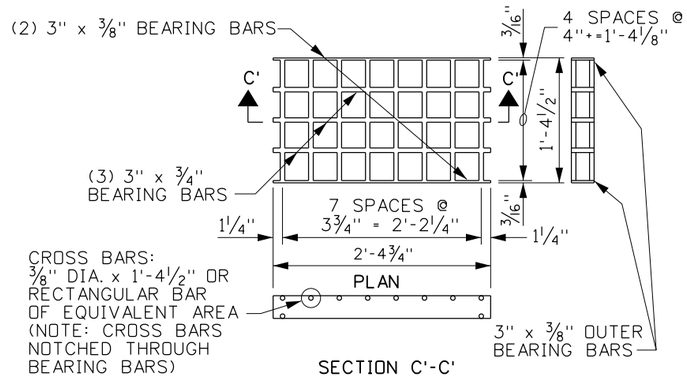
CATCH BASIN - TYPE 3



SECTION C-C

GRATE A (STEEL)

(WEIGHT: APPROXIMATELY 88 LBS., SEE NOTE 9 & 10)



SECTION C'-C'

GRATE B (STEEL)

(WEIGHT: APPROXIMATELY 79 LBS., SEE NOTE 9 & 10)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY TED E. MASON NOVEMBER 3, 2005 STATE OF IDAHO TED E. MASON

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-80		6	09-94	MSM	11	11-08	JRV
2	04-82		7	06-97	MSM			
3	03-84		8	06-01	MSM			
4	01-89	GB	9	11-04	MSM			
5	12-93	MSM	10	05-07	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-20_1108.dgn

DRAWING DATE: JULY, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

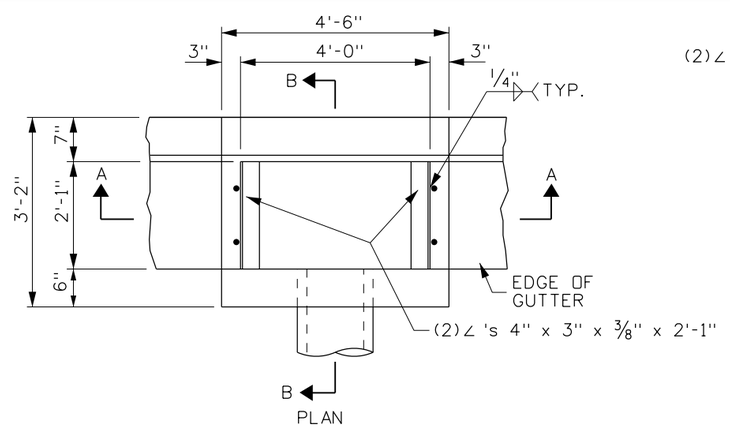
ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

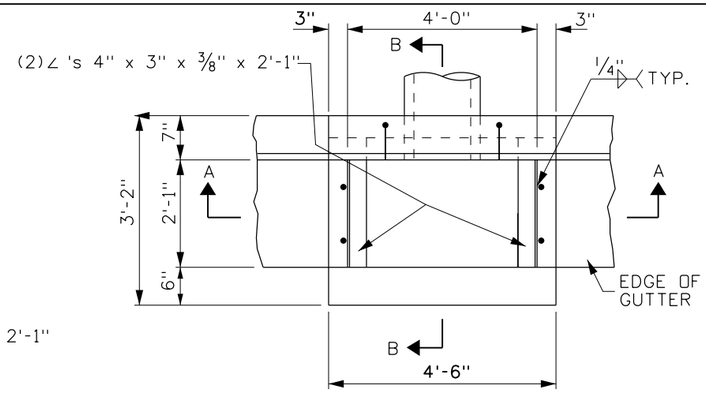
INLETS & CATCH BASINS TYPES 1, 2, & 3

English

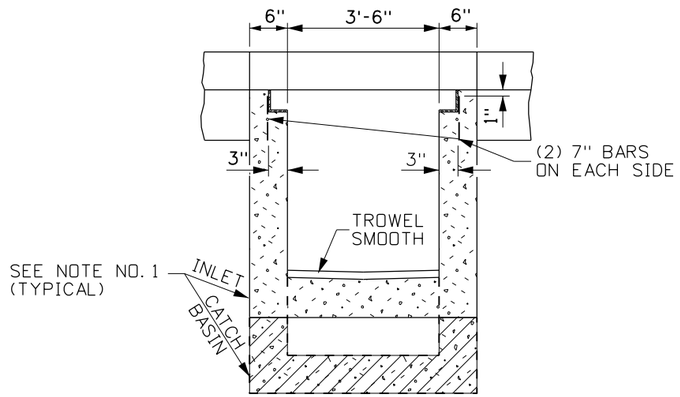
STANDARD DRAWING NO. 605-20



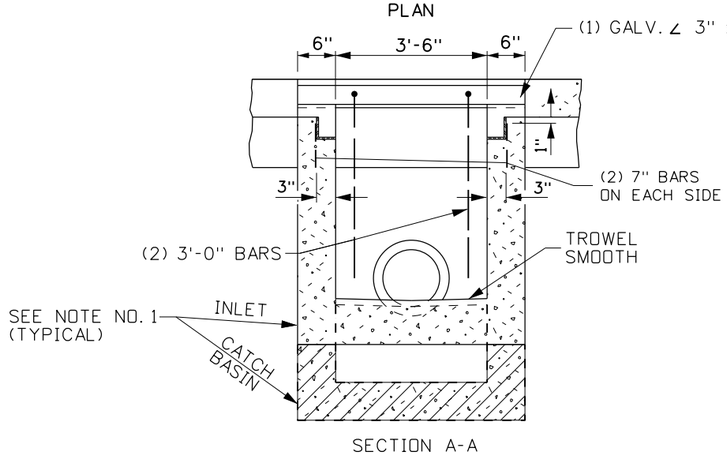
PLAN



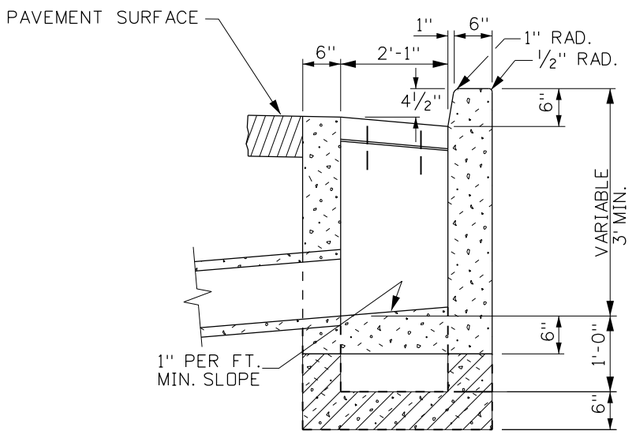
PLAN



SECTION A-A



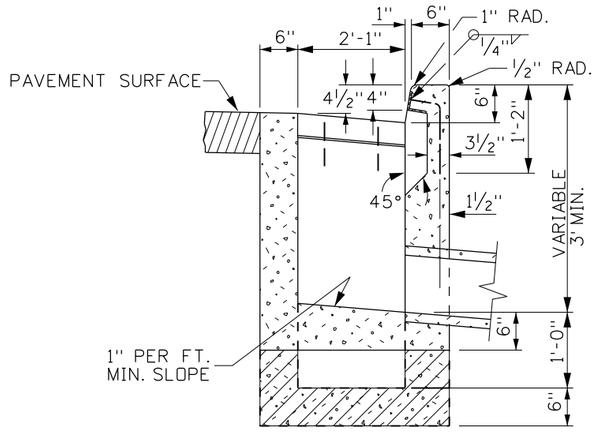
SECTION A-A



SECTION B-B

INLET - TYPE 1A

CATCH BASIN - TYPE 1A



SECTION B-B

INLET - TYPE 2A

CATCH BASIN - TYPE 2A

NOTES

1. PATTERNS USED IN DRAWING:
   - INLET SECTIONS:
   - CATCH BASIN BOTTOMS:
   - PAVEMENT:
2. INLETS AND CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM C 913. (PRIOR APPROVAL OF SHOP DRAWINGS WILL BE REQUIRED ON MODIFIED UNITS.)
3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.
4. CAST-IN-PLACE INLETS AND CATCH BASINS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
5. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.
6. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH.
7. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATED GRATE SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE ANGLE/GRATE SURFACE. THE STRUCTURAL STEEL NEED NOT BE PAINTED BUT SHALL MEET THE REQUIREMENTS OF ASTM A 36.
8. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH CUT TO ACCOMMODATE PIPES.
9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.
10. INLET/CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.
11. GRATE B WILL BE USED ONLY WHEN SPECIFIED.
12. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY TED E. MASON NOVEMBER 3, 2004 STATE OF IDAHO TED E. MASON

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	04-82		6	11-04	MSM			
2	01-89		7	11-08	JRV			
3	12-94	MSM						
4	06-97	MSM						
5	03-01	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-21_1108.dgn

DRAWING DATE: OCTOBER, 1980

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

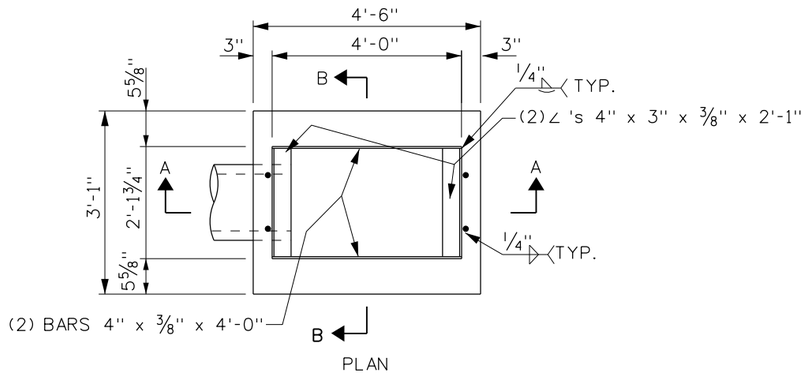
STANDARD DRAWING

INLETS & CATCH BASINS TYPES 1A, 2A, & 3A

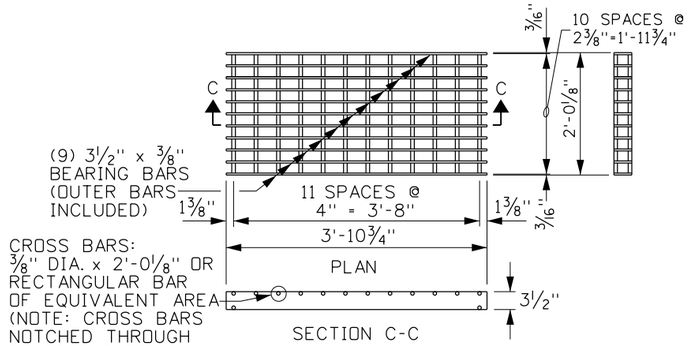
English

STANDARD DRAWING NO. 605-21

SHEET 1 OF 2

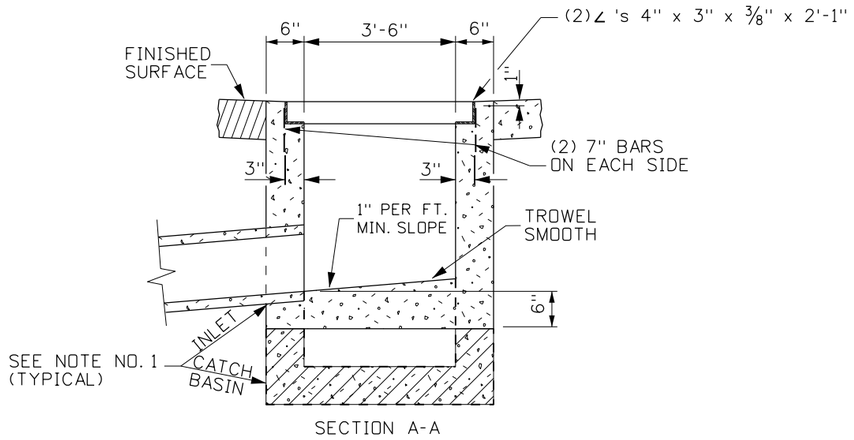


PLAN

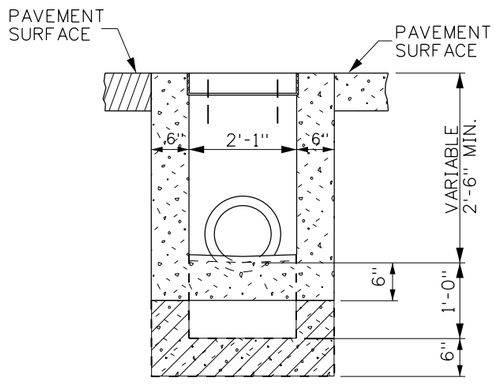


GRATE A (STEEL)

(WEIGHT : APPROXIMATELY 202 LBS., SEE NOTE 9 & 10)



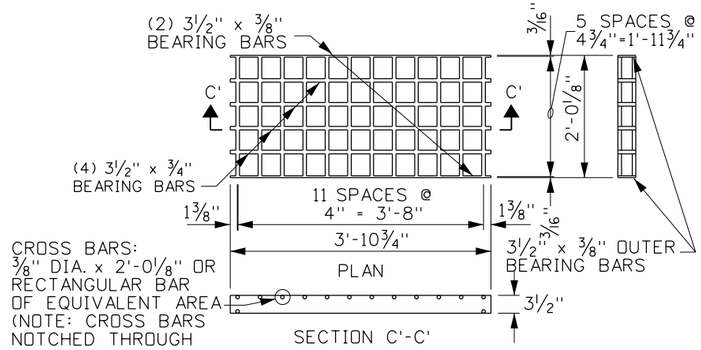
SECTION A-A



SECTION B-B

INLET - TYPE 3A

CATCH BASIN - TYPE 3A



GRATE B (STEEL)

(WEIGHT : APPROXIMATELY 185 LBS., SEE NOTE 9 & 10)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED TED E. MASON NOVEMBER 3, 2005 STATE OF IDAHO

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	04-82		6	11-04	MSM			
2	01-89		7	11-08	JRV			
3	12-94	MSM						
4	06-97	MSM						
5	03-01	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-21_1108.dgn

DRAWING DATE: OCTOBER, 1980

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

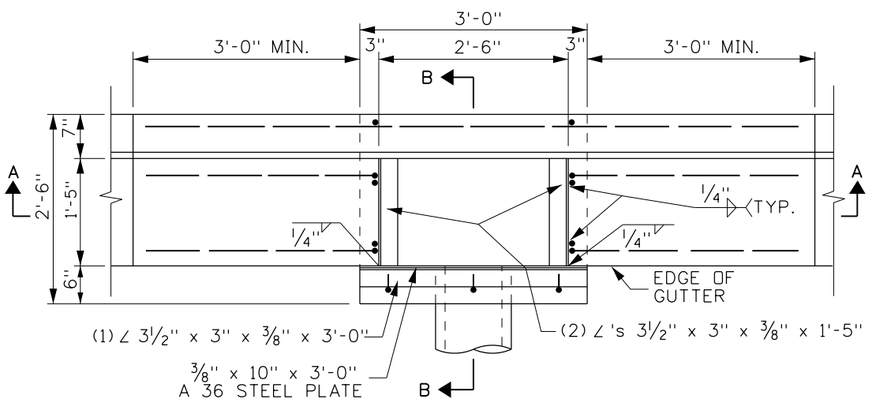
ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

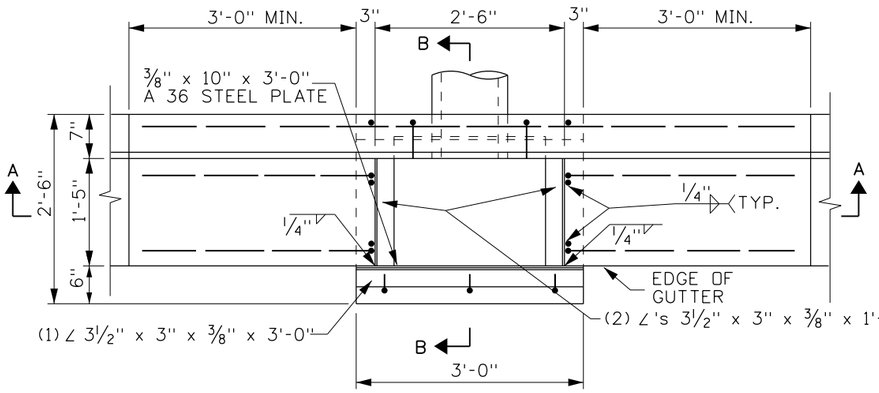
STANDARD DRAWING

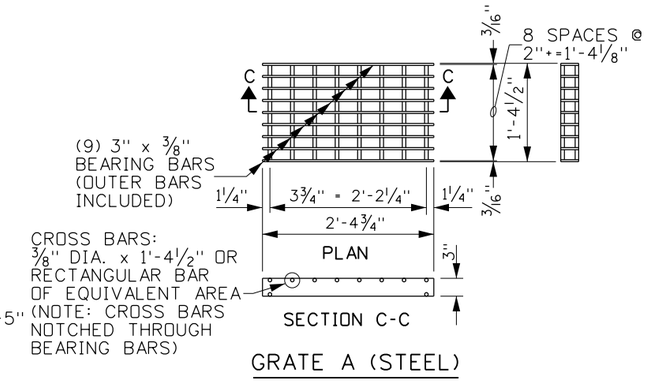
INLETS & CATCH BASINS TYPES 1A, 2A, & 3A

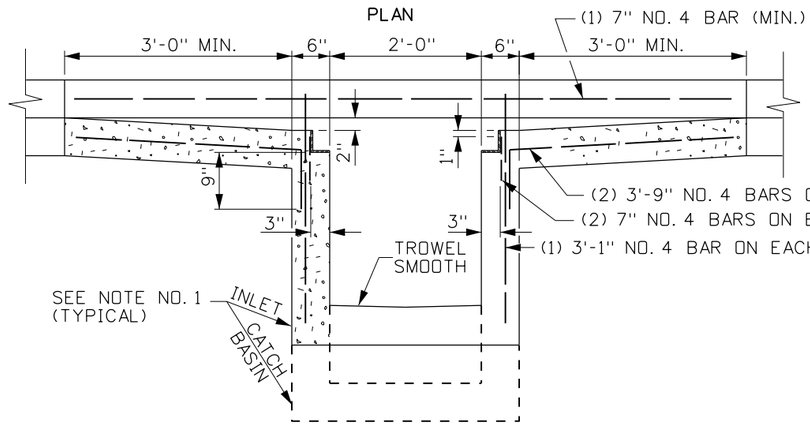
English

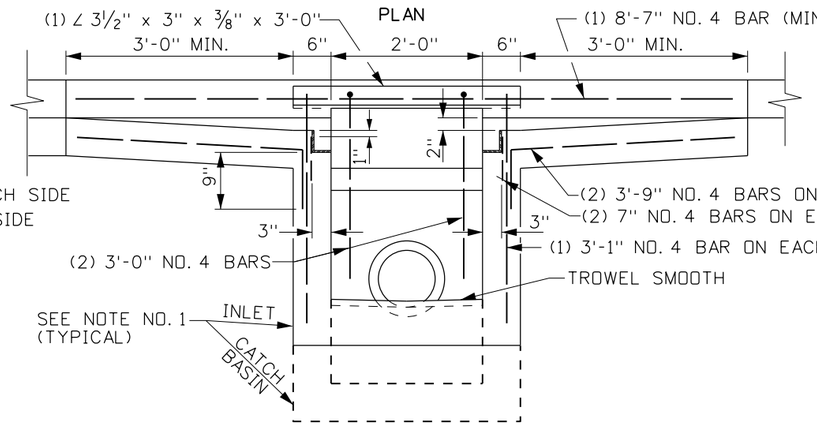
STANDARD DRAWING NO. 605-21

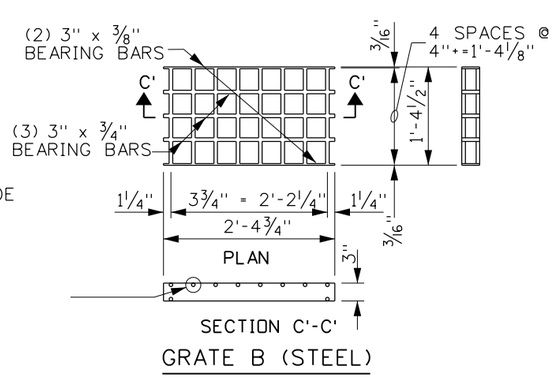


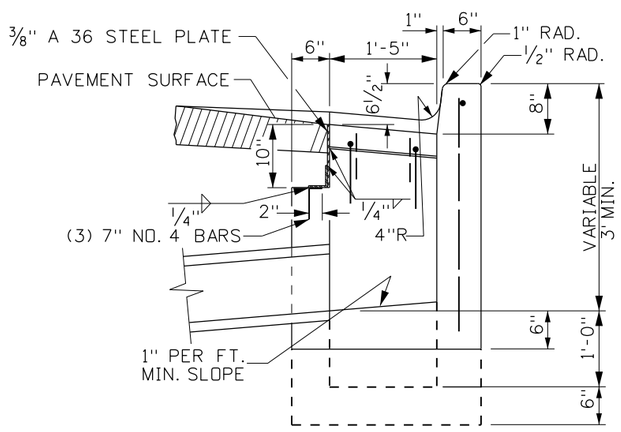


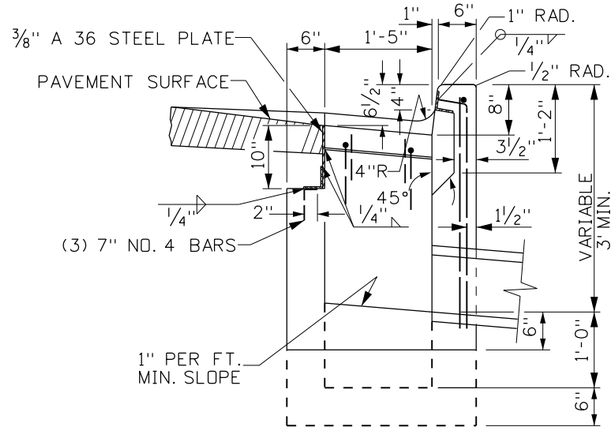












NOTES

2. INLETS AND CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM C 913. (PRIOR APPROVAL OF SHOP DRAWINGS WILL BE REQUIRED ON MODIFIED UNITS.)
3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.
4. CAST-IN-PLACE INLETS AND CATCH BASINS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
5. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.
6. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH.
7. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATED GRATE SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE ANGLE/GRATE SURFACE. THE STRUCTURAL STEEL NEED NOT BE PAINTED BUT SHALL MEET THE REQUIREMENTS OF ASTM A 36.
8. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH CUT TO ACCOMMODATE PIPES.
9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.
10. INLET/CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.
11. GRATE B WILL BE USED ONLY WHEN SPECIFIED.
12. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY TED E. MASON NOVEMBER 3, 2004 STATE OF IDAHO TED E. MASON

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-80		6	06-97	MSM			
2	04-82		7	03-01	MSM			
3	03-84		8	12-04	MSM			
4	01-89		9	11-08	JRV			
5	12-94	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-22_1108.dgn

DRAWING DATE: NOVEMBER, 1969

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

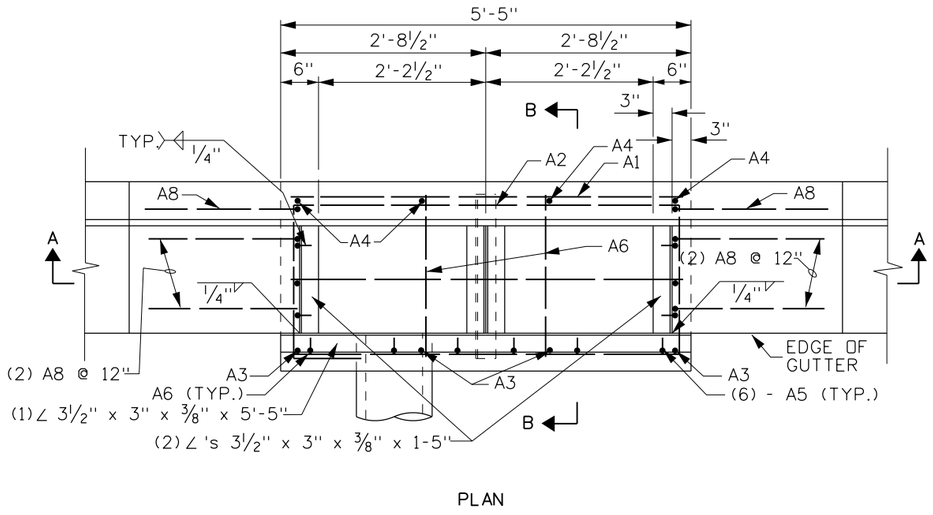
STANDARD DRAWING

INLETS & CATCH BASINS TYPES 4 & 5

English

STANDARD DRAWING NO. 605-22

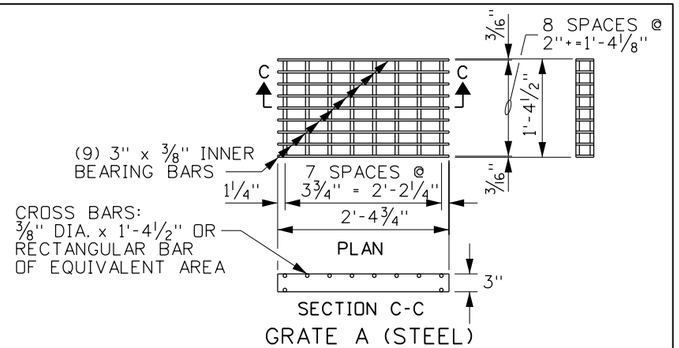
SHEET 1 OF 1



PLAN

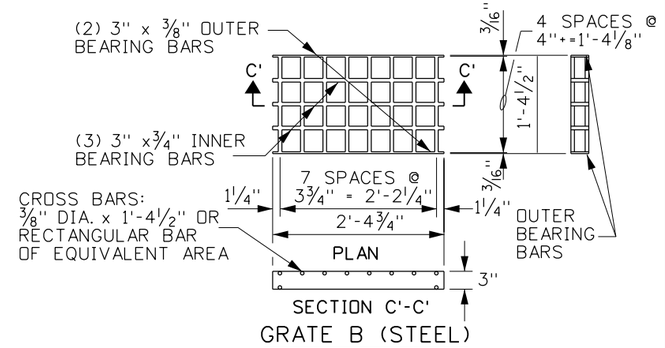
BAR LIST					
MARK	LOCATION	SIZE	TOTAL LENGTH	NO.	SKETCH
A1	FLOOR & WALLS	4	5'-1"	2	5'-1"
A2	WALLS	4	15'-1"	3	5'-0" / 5'-0" / 1' MIN. OVERLAP, 2'-1"
* A3	FRONT WALL	4	3'-7"	4	3'-7"
* A4	BACK WALL	4	4'-1"	4	4'-1"
A5	GRATE DOWEL	4	7"	10	2" / 5"
A6	WALL	4	2'-2"	2	2'-2"
A7	GUTTER & SIDE WALLS	4	2'-9"	4	5°, 2'-0", 9"
A8	CURB & BACK WALL	4	3'-3"	2	2'-0", 1'-3"
113.75 L.F. AT 0.668 LBS/FT. = 76.00 LBS					

* (SEE NOTE NO. 7)



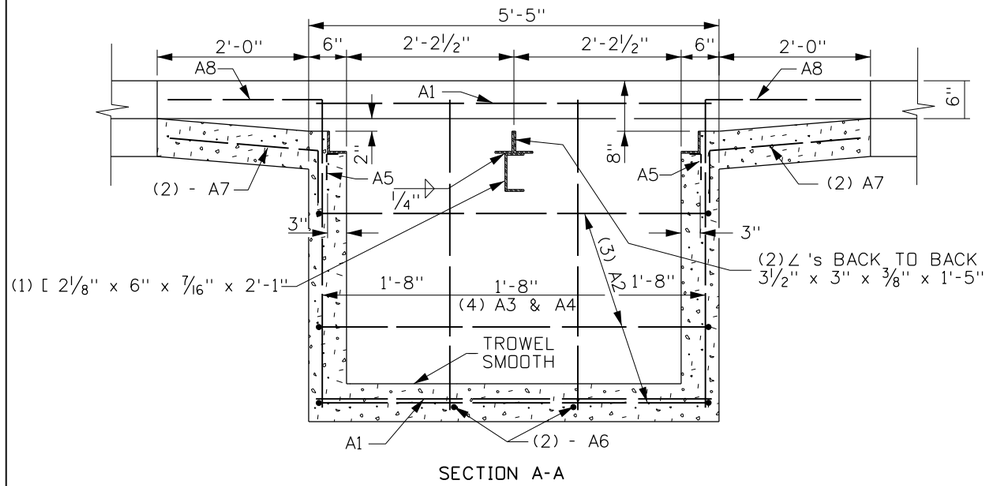
GRATE A (STEEL)

(WEIGHT : APPROXIMATELY 88 LBS., SEE NOTE 9)

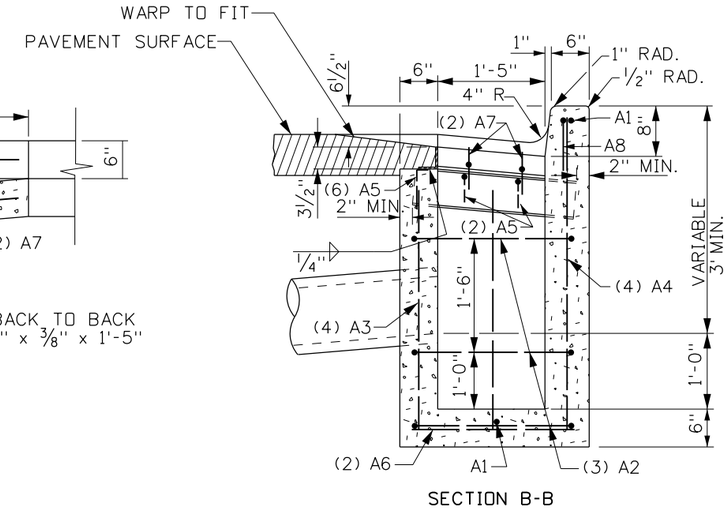


GRATE B (STEEL)

(WEIGHT : APPROXIMATELY 79 LBS., SEE NOTE 9)



SECTION A-A



SECTION B-B

NOTES

1. CATCH BASINS MAY EITHER BE PRECAST OR CAST-IN-PLACE. PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM C913. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON MODIFIED UNITS.
2. CAST-IN-PLACE CATCH BASINS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.
4. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.
5. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH.
6. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATED GRATE SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE ANGLE/GRATE SURFACE. THE STRUCTURAL STEEL NEED NOT BE PAINTED BUT SHALL MEET THE REQUIREMENTS OF ASTM A 36.
7. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH CUT TO ACCOMMODATE PIPES. VERTICAL BARS NEED TO BE LENGTHENED FOR CATCH BASINS DEEPER THAN 4'-6".
8. GRATE B WILL BE USED ONLY WHEN SPECIFIED.
9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.
10. CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.
11. NOT TO SCALE.

CATCH BASIN - DETAILS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER — REGISTERED — ORIGINAL SIGNED BY TED E. MASON — DATE OF ORIGINAL SIGNING: NOVEMBER 3, 2005 — STATE OF IDAHO — TED E. MASON

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-80		6	03-01	MSM			
2	04-82		7	12-04	MSM			
3	03-84		8	11-08	JRV			
4	01-89							
5	12-94	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-23_1108.dgn

DRAWING DATE: OCTOBER, 1980

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

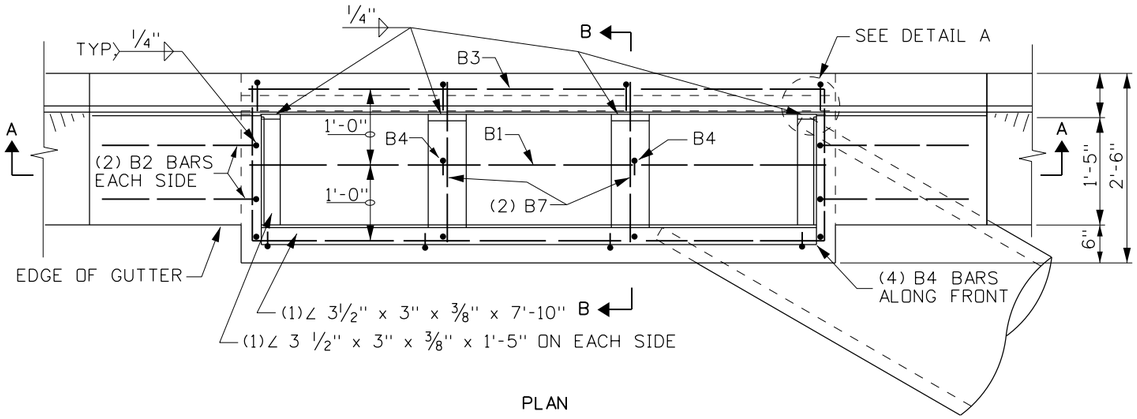
CATCH BASIN TYPE 6

English

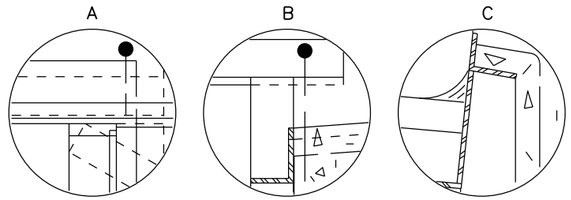
STANDARD DRAWING NO.

605-23

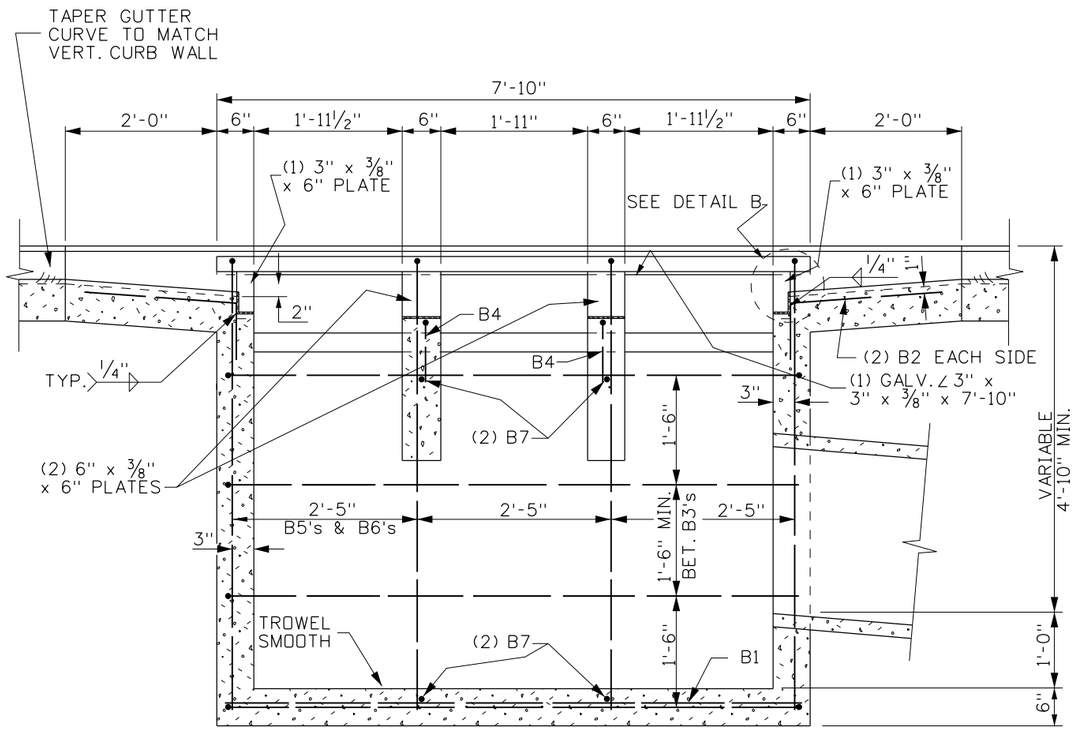
SHEET 1 OF 1



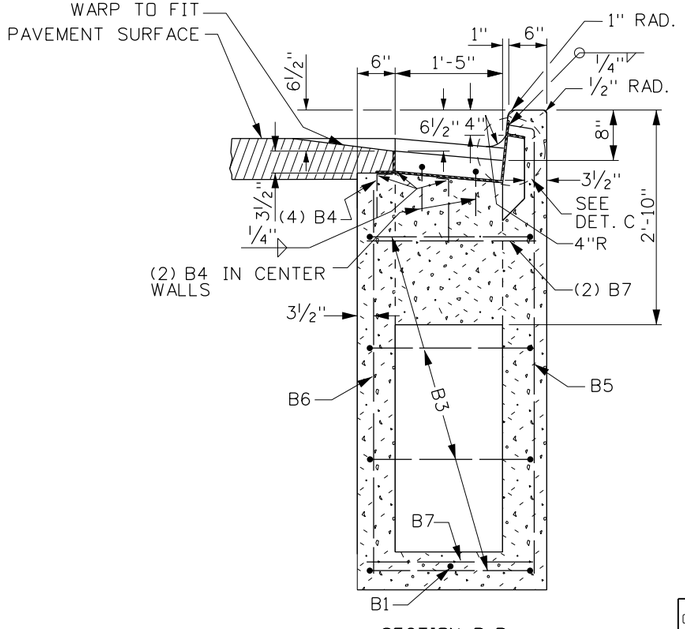
PLAN



DETAILS A, B, & C



SECTION A-A



SECTION B-B

CATCH BASIN - DETAILS

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-80		6	03-01	MSM			
2	04-82		7	12-04	MSM			
3	03-84		8	11-08	JRV			
4	01-89							
5	12-94	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-24_1108.dgn

DRAWING DATE: OCTOBER, 1980

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

CATCH BASIN TYPE 7

English

STANDARD DRAWING NO.

605-24

SHEET 1 OF 2

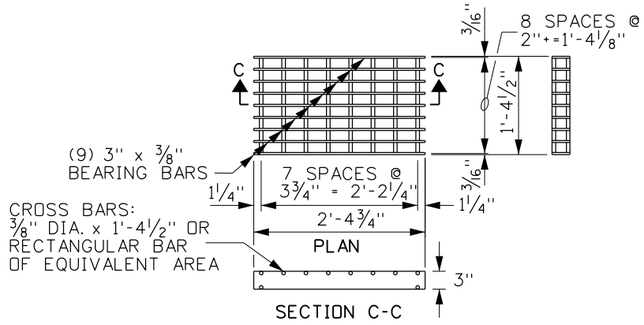
ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY TED E. MASON NOVEMBER 3, 2008 STATE OF IDAHO 6503 TED E. MASON

BAR LIST					
MARK	LOCATION	SIZE	BAR LENGTH	NO.	SKETCH
B1	FLOOR	4	7'-6"	1	7'-6"
B2	WALLS	4	2'-9"	4	2'-0" / 9"
B3	WALLS (ADD AS NEEDED)	4	20'-0"	4	2'-1" / 1'-0" 7'-5" / 7'-5" / 2'-1"
B4	WALL & SUPPORTS	4	1'-0"	6	2½" / 9½"
B5	WALLS & FLOOR (ADD LENGTH AS NEEDED)	4	6'-2"	4	4" / 5'-10"
B6	WALLS & FLOOR (ADD LENGTH AS NEEDED)	4	5'-0"	4	5'-0"
B7	SUPPORTS	4	2'-2"	4	2'-2"
157.8 L.F. AT 0.668 LBS/FT. = 106 LBS					

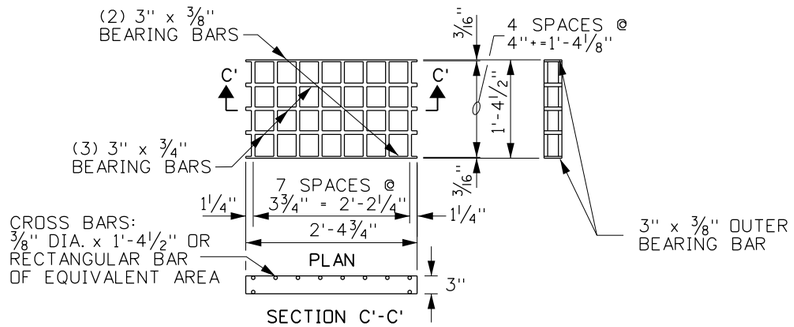
NOTES

1. CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM C913. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON PRECAST UNITS.
2. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.
3. CAST-IN-PLACE CATCH BASINS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
4. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.
5. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH.
6. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATED GRATE SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE ANGLE/GRATE SURFACE. THE STRUCTURAL STEEL NEED NOT BE PAINTED BUT SHALL MEET THE REQUIREMENTS OF ASTM A36.
7. ALL METAL REINFORCEMENT SHALL BE NO. 4 BARS. METAL REINFORCEMENT SHALL BE SMOOTH CUT TO FIT AROUND PIPES. VERTICAL BARS B5 & B6 NEED TO LENGTHENED TO ACCOMMODATE CATCH BASINS DEEPER THAN 6'-4".
8. GRATE B WILL BE USED ONLY WHEN SPECIFIED.
9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.
10. NOT TO SCALE.



GRATE A (STEEL)

(WEIGHT : APPROXIMATELY 88 LBS., SEE NOTE 9)



GRATE B (STEEL)

(WEIGHT : APPROXIMATELY 79 LBS., SEE NOTE 8 & 9)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY TED E. MASON NOVEMBER 3, 2004 STATE OF IDAHO TED E. MASON

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-80		6	03-01	MSM			
2	04-82		7	12-04	MSM			
3	03-84		8	11-08	JRV			
4	01-89							
5	12-94	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-24_1108.dgn

DRAWING DATE: OCTOBER, 1980

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

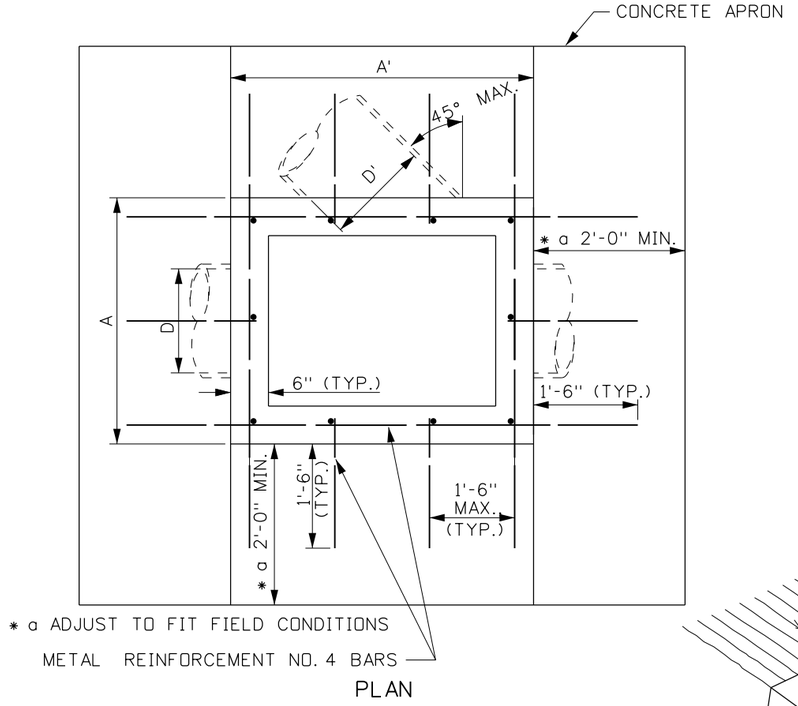
CATCH BASIN TYPE 7

English

STANDARD DRAWING NO.

605-24

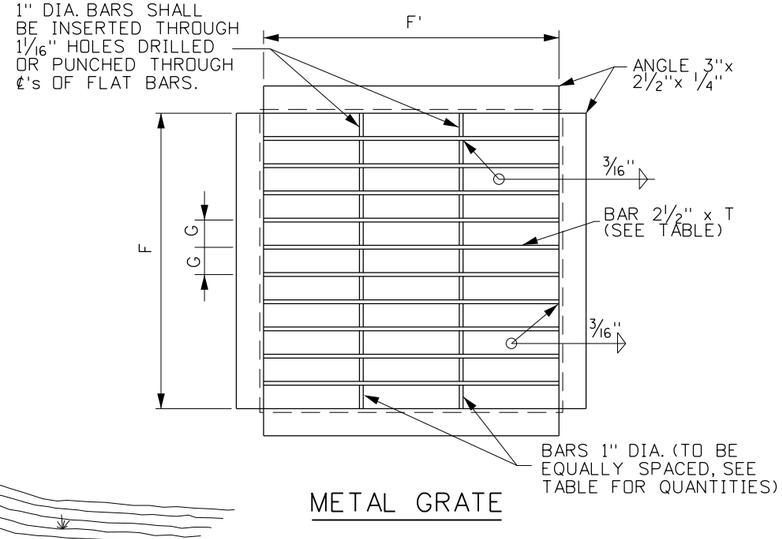
SHEET 2 OF 2



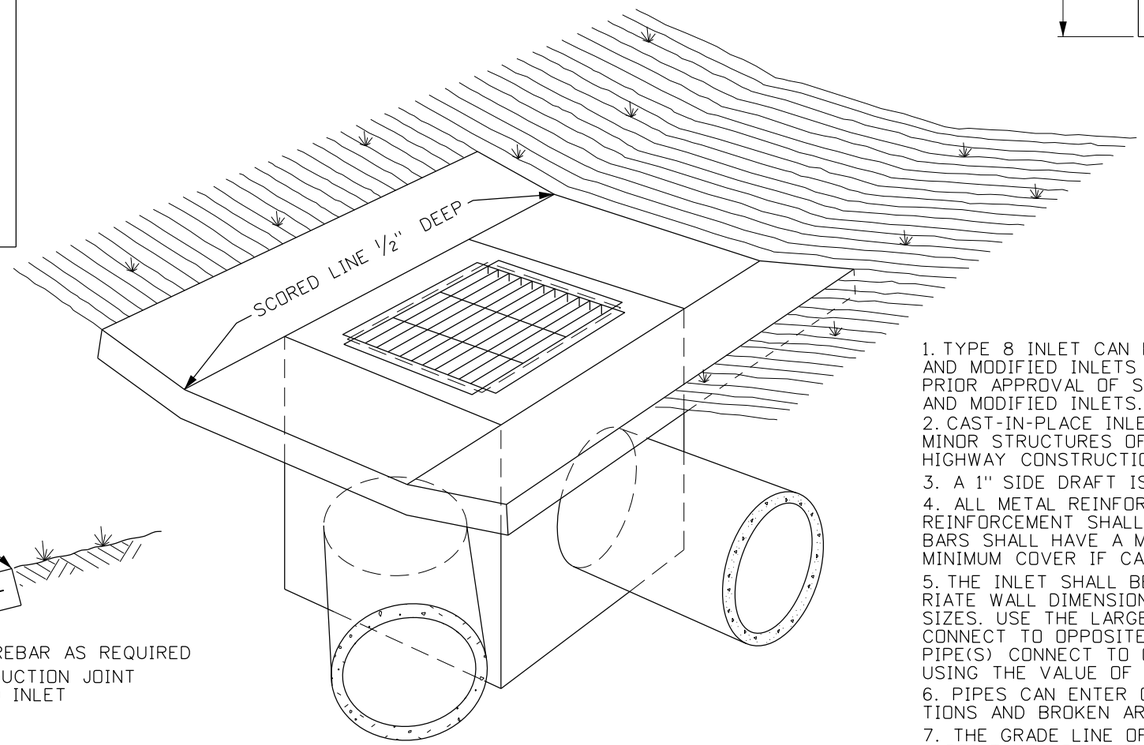
PLAN

* b TABLE OF DIMENSIONS						
D/D'	A/A'	B MIN.	F/F'	G	BARS (EA.)	T
18"	3'-4"	3'-0"	2'-3"	3"	1	1/4"
24"	4'-0"	3'-7"	2'-11"	3 3/16"	2	1/4"
30"	4'-6"	4'-3"	3'-5"	3 1/8"	3	5/16"
36"	5'-0"	4'-9"	3'-11"	3 1/8"	3	3/8"
48"	6'-0"	5'-2"	4'-11"	3 3/8"	4	7/16"

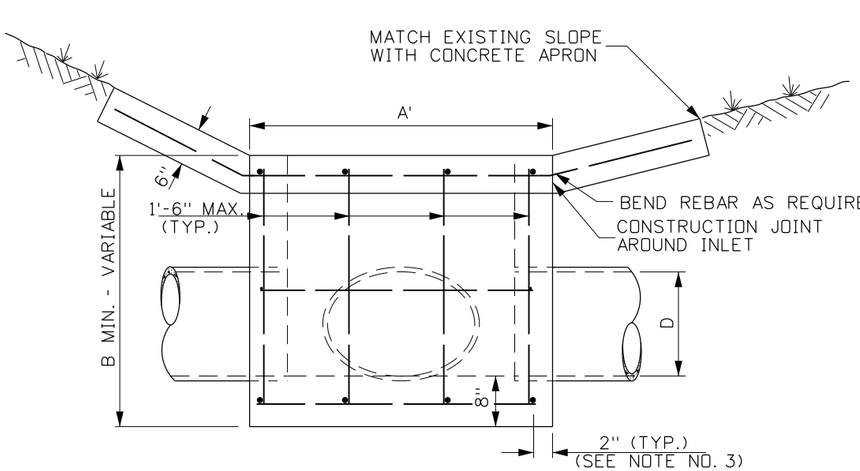
* b SEE NOTE NO. 5



METAL GRATE



PERSPECTIVE VIEW



ELEVATION

NOTES

1. TYPE 8 INLET CAN BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST AND MODIFIED INLETS SHALL MEET THE REQUIREMENTS OF ASTM C913. PRIOR APPROVAL OF SHOP DRAWINGS IS REQUIRED FOR USE OF PRECAST AND MODIFIED INLETS. THE APRON MUST BE CAST-IN-PLACE.
2. CAST-IN-PLACE INLET TYPE 8 SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.
4. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH CUT TO ACCOMMODATE PIPES. ALL BARS SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND/OR 3" MINIMUM COVER IF CAST AGAINST EARTH.
5. THE INLET SHALL BE CONSTRUCTED RECTANGULAR USING THE APPROPRIATE WALL DIMENSIONS (A & A') DETERMINED BY THE CONNECTING PIPE SIZES. USE THE LARGER WALL DIMENSION IF TWO DIFFERENT PIPE SIZES CONNECT TO OPPOSITE WALLS. USE THE MINIMUM WALL DIMENSION IF NO PIPE(S) CONNECT TO OPPOSITE WALLS. SELECT THE DEPTH (B MIN.) BY USING THE VALUE OF THE INLET'S LARGEST CONNECTING PIPE.
6. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH.
7. THE GRADE LINE OF THE TOP INSIDE OF ANY INLET PIPE SHALL BE AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.
8. ONLY COMBINATIONS OF THE DIMENSIONS SHOWN ON THE TABLE SHALL BE USED TO CONSTRUCT A TYPE 8 INLET.
9. THE METAL FOR THE GRATE SHALL MEET THE REQUIREMENTS OF ASTM A36. THE METAL GRATE NEED NOT BE PAINTED OR GALVANIZED.
10. WELDING OF THE METAL GRATE SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1.
11. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.
12. NOT TO SCALE.

INLET - DETAILS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED TED E. MASON NOVEMBER 3, 2008 STATE OF IDAHO

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-80		6	11-08	JRV			
2	12-92	MSM						
3	1-97	MSM						
4	3-01	MSM						
5	12-04	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-25_1108.dgn

DRAWING DATE: AUGUST, 1972

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

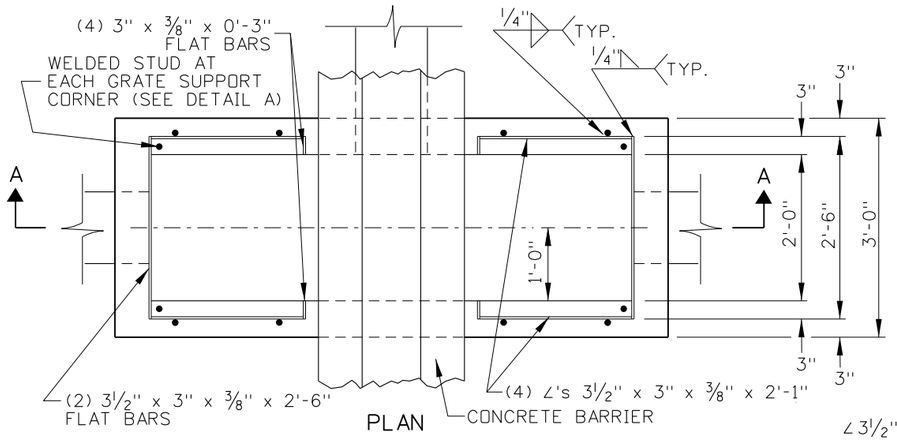
STANDARD DRAWING

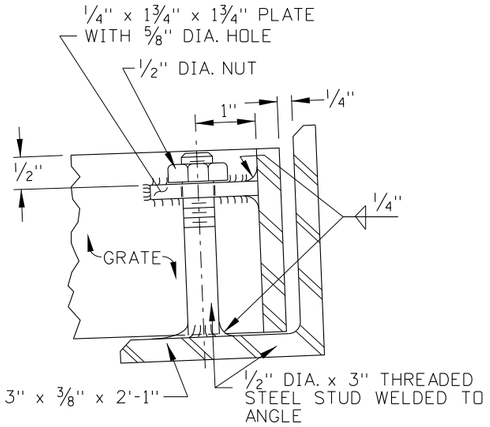
INLET TYPE 8

English

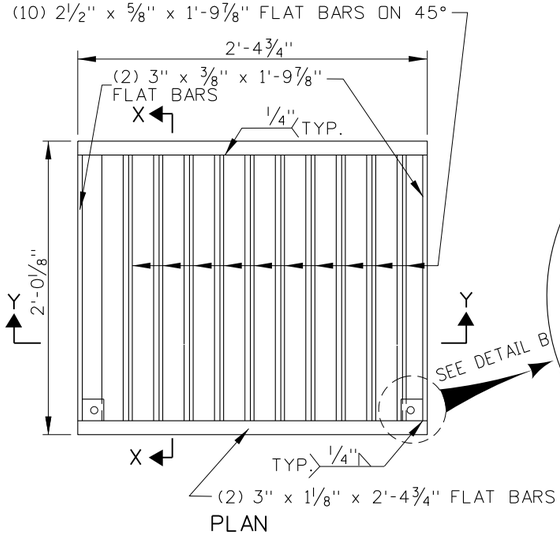
STANDARD DRAWING NO. 605-25

SHEET 1 OF 1

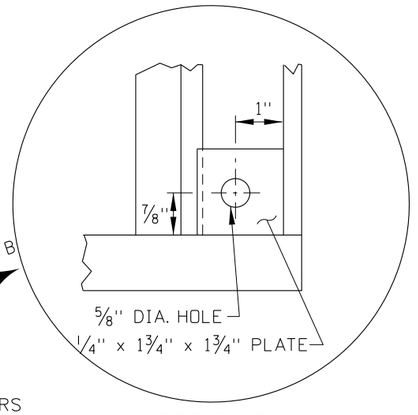




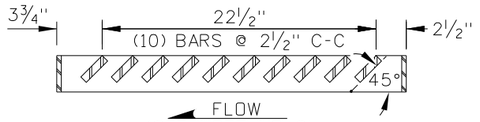
GRATE ANCHOR
DETAIL A



PLAN

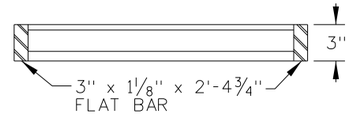


DETAIL B

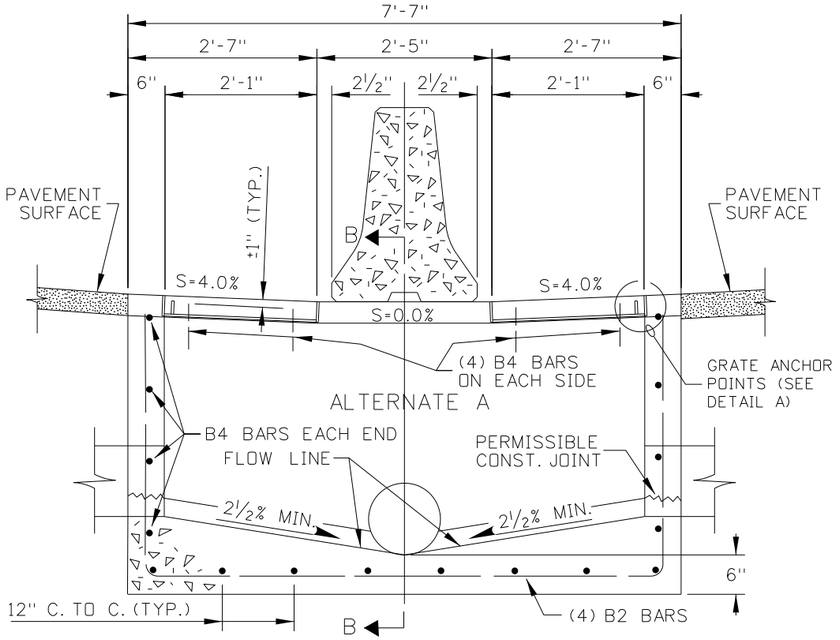


SECTION Y-Y

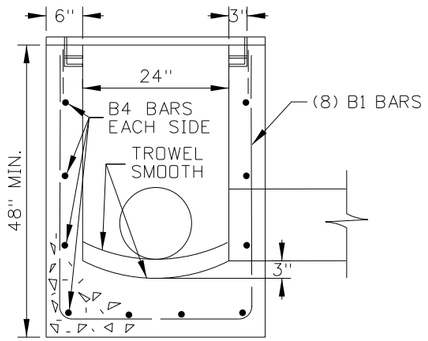
GRATE
(SEE NOTE NO. 9)



SECTION X-X



ELEVATION - SECTION A-A



SECTION B-B

REINFORCING STEEL TABLE

MARK	LOCATION	SIZE	BAR LENGTH	NO.	SKETCH
B1	VERT. IN WALLS & FLOOR (ADD LENGTH AS NEEDED)	4	VARIES	6	42" MIN. 31"
B2	VERT. IN WALLS & FLOOR (ADD LENGTH AS NEEDED)	4	VARIES	4	42" MIN. 85"
B3	WALLS (AS NEEDED)	4	86"	*	86"
B4	WALLS (AS NEEDED)	4	32"	*	32"
B5	WELDED TO: ∠'s 3 1/2" x 3" x 3/8" IN SIDE WALLS	4	12"	6	12"

* (4) MIN., ADD BARS AS NEEDED

NOTES

1. PRECAST OR CAST-IN-PLACE THE INLET MEDIAN DRAIN. WHEN PRECAST, FABRICATE IN ACCORDANCE WITH ASTM C913 AND PROVIDE SHOP DRAWINGS FOR APPROVAL PRIOR TO INSTALLATION.
2. PROVIDE LONGER VERTICAL REINFORCING STEEL BARS WHEN THE INLET IS DEEPER THAN 48". SMOOTHLY CUT REINFORCING STEEL FOR PIPES.
3. PROVIDE STEEL ANGLES IN ACCORDANCE WITH ASTM A36. ENSURE THE FINISHED TOP OF CONCRETE IS EVEN WITH THE ANGLE AND GRATE SURFACE.
4. SIDE DRAFT UP TO 1" CAN BE PROVIDED TO EASE FORM REMOVAL.
5. FABRICATE OR CAST THE GRATES. WHEN FABRICATED, PROVIDE STEEL IN ACCORDANCE WITH ASTM A36. WHEN CAST, CAST IN ACCORDANCE WITH AASHTO M306 CLASS 35B GRAY IRON CASTINGS.
6. ORIENT THE GRADE SO THE FLAT BARS AT THE 45° ANGLE ARE POINTED DOWN IN THE DIRECTION OF THE FLOW.
7. ENSURE THE GRATE FULLY CONTACTS THE STEEL ANGLES.
8. PIPES CAN ENTER OR LEAVE THE INLET IN ANY DIRECTION. GROUT PIPE ENTRANCES AND EXITS.
9. ENSURE THE ELEVATION OF INLET PIPE IS HIGHER THAN THE ELEVATION OF THE OUTLET PIPE.
10. DRAWING NOT TO SCALE.

INLET MEDIAN DRAIN

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	05-07	MSM						
2	09-10	PLR						
3	02-21	PBH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-26_0421.dgn

DRAWING DATE: DECEMBER, 2004

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

INLET MEDIAN DRAIN TYPE 9

English

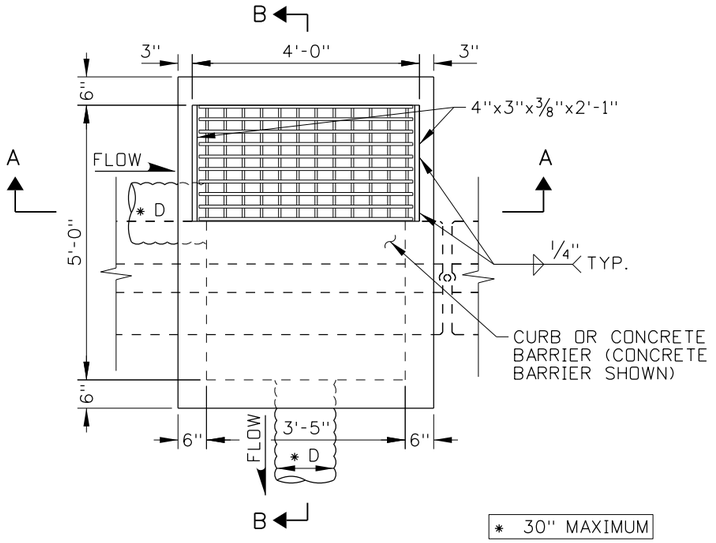
STANDARD DRAWING NO. 605-26

SHEET 1 OF 1

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

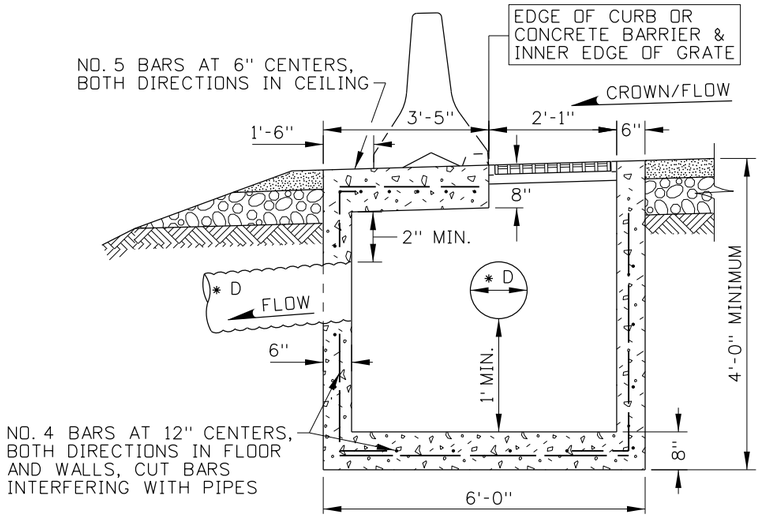
PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO 13683 MARCH 18, 2021

RYAN D. LANCASTER

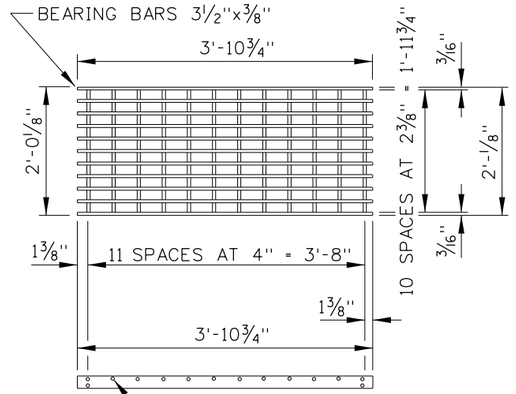


* 30" MAXIMUM

PLAN

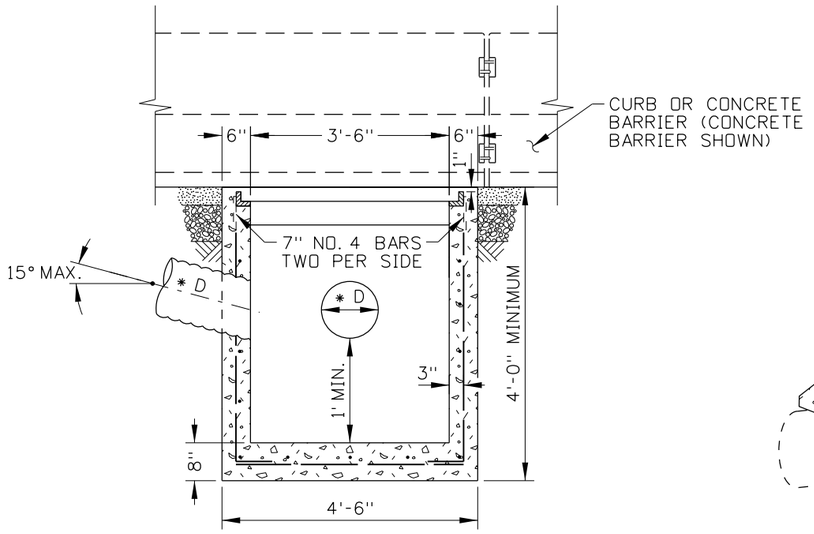


SECTION B-B

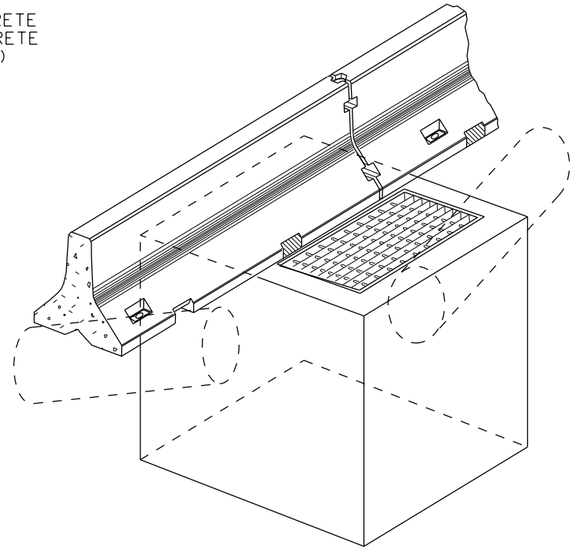


WEIGHT: APPROXIMATELY 203 LBS

METAL GRATE



SECTION A-A



ISOMETRIC VIEW
(10' BARRIER SHOWN)

NOTES

1. CATCH BASIN TYPE 10 IS FOR USE WITH EMBANKMENT PROTECTOR WITH SLOTTED DRAIN, STANDARD DRAWING 607-2.

2. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.

3. CATCH BASINS FOR SLOTTED DRAINS CAN BE PRECAST OR CAST-IN-PLACE. ENSURE THAT PRECAST CATCH BASINS MEET THE REQUIREMENTS OF AASHTO M 199. TILT PRECAST CATCH BASINS OR CONSTRUCT CAST-IN-PLACE CATCH BASINS TO MATCH THE ROADWAY CROWN. OBTAIN THE ENGINEER'S APPROVAL PRIOR TO THE INSTALLATION OF PRECAST CATCH BASINS.

4. CONSTRUCT CAST-IN-PLACE CATCH BASINS IN ACCORDANCE WITH SECTION 609 - MINOR STRUCTURES OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

5. PROVIDE A MINIMUM CONCRETE COVER OF 2" OVER REINFORCING STEEL. PROVIDE A MINIMUM CONCRETE COVER OF 3" OVER REINFORCING STEEL IF CAST AGAINST EARTH.

6. ENSURE THAT THE FINISHED TOP OF CONCRETE IS FLUSH WITH THE GRATE SURFACE.

7. ENSURE THAT THE METAL FOR THE GRATE MEETS THE REQUIREMENTS OF ASTM A36. PAINTING OR GALVANIZATION OF THE METAL GRATE IS NOT REQUIRED.

8. WELD THE METAL GRATE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1.

9. SET ANGLES SO THAT EACH BEARING BAR OF THE PREFABRICATED GRATE HAS FULL BEARING ON BOTH ENDS.

10. ENSURE THAT THE DISCHARGE PIPE SIZE IS THE SAME SIZE AS THE SLOTTED DRAIN PIPE. GROUT PIPE CONNECTIONS.

11. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO JANUARY 31, 2013 13683 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-27_0113.dgn

DRAWING DATE: DECEMBER, 2012

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

CATCH BASIN TYPE 10

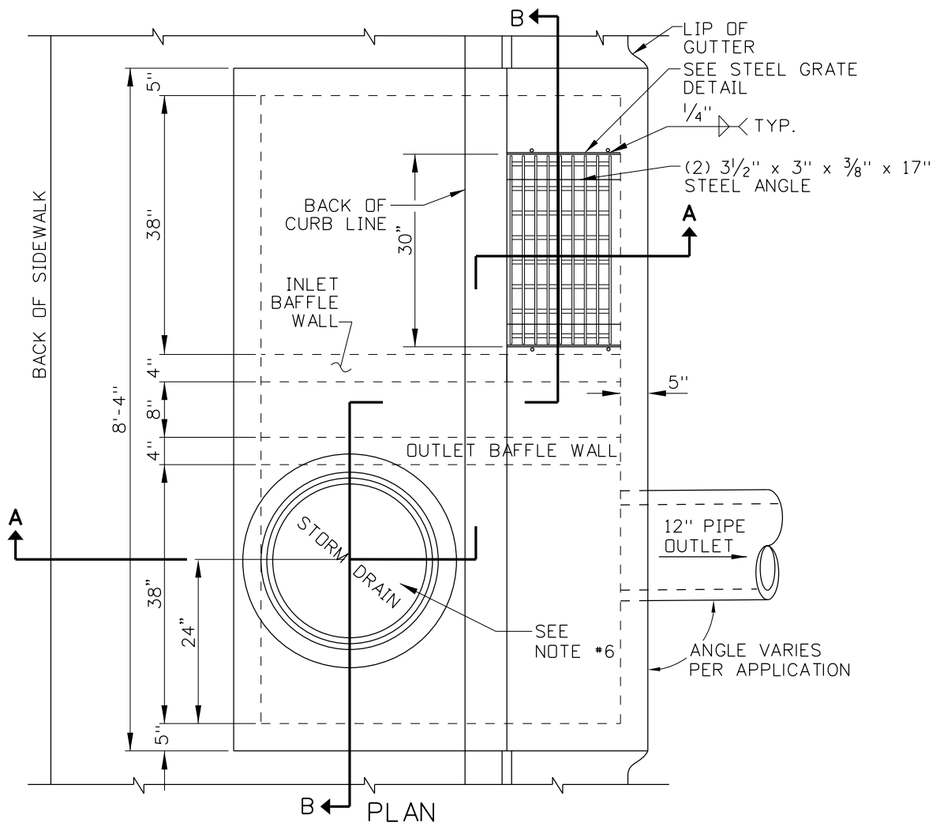
REQUIRES STD. DWG. 607-2

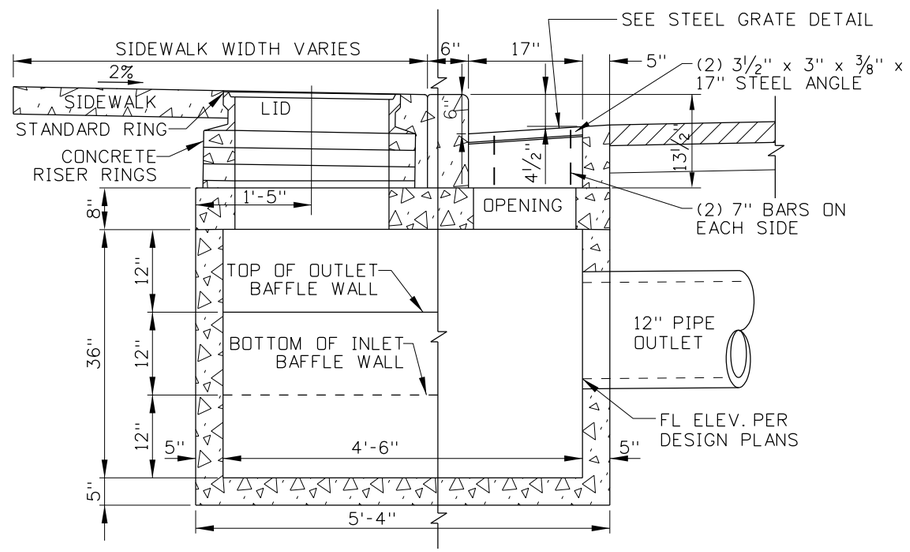
English

STANDARD DRAWING NO.

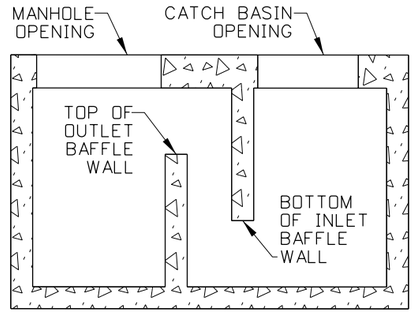
605-27

SHEET 1 OF 1

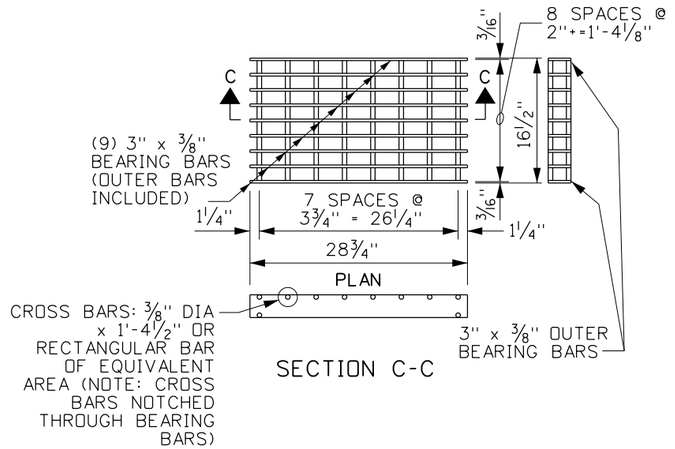




SECTION A-A



SECTION B-B



SECTION C-C

STEEL GRATE

(WEIGHT: APPROXIMATELY 88 LBS., SEE NOTE 9 & 10)

NOTES

1. SEDIMENT CONTROL BOXES CAN BE EITHER PRECAST OR CAST-IN-PLACE. DETAILED DRAWING OF SEDIMENT CONTROL BOX SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

2. CAST-IN-PLACE BOXES SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

3. DESIGN LOAD SHALL MEET AASHTO H-25 HIGHWAY LOADING AND CLASS 4000 PSI CONCRETE.

4. ALL REINFORCING STEEL SHALL BE GRADE 60.

5. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE GRATE SURFACE.

6. THE CATCH BASIN MANHOLE FRAME AND COVER SHALL BE A FLUSH MOUNT TYPE WITH A FRAME NO DEEPER THAN 4". THE FLUSH MOUNT MANHOLE IS NOT PERMITTED FOR VEHICULAR TRAFFIC.

7. TANK CAPACITY IS APPROXIMATELY 750 GALLONS OR 100 CUBIC FEET.

8. DESIGN MAY BE REVERSED FOR BEST APPLICATION WITH MANHOLE AND CATCH BASIN OPENINGS IN OPPOSITE DIRECTIONS AND BAFFLE WALLS REVERSED.

9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.

10. INLET/CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.

11. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED KARISSA HARDY STATE OF IDAHO 14025 ORIGINAL SIGNED BY: KARISSA HARDY OCTOBER 3, 2011 STANDARD

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-96	MSM						
2	10-11	KEH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-30_1011.dgn

DRAWING DATE: JANUARY, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

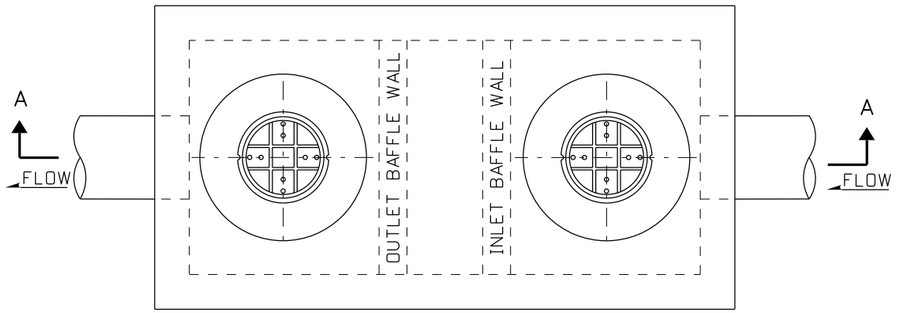
STANDARD DRAWING

SEDIMENT CONTROL CATCH BASIN

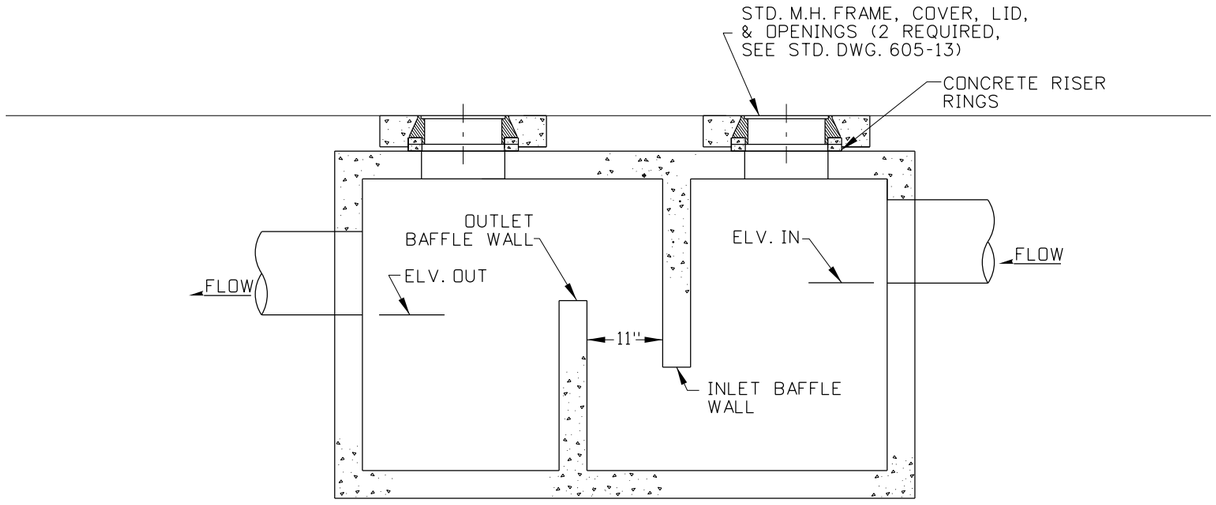
English

STANDARD DRAWING NO. 605-30

SHEET 1 OF 1



PLAN



SECTION A-A

SAND AND OIL TRAP

NOTES

1. SEDIMENT & OIL TRAPS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST TRAPS SHALL MEET THE REQUIREMENTS OF ASTM C 478 AND SHALL HAVE A DESIGN LOAD MEETING AASHTO HS-25 HIGHWAY LOADING.

2. ALL REINFORCING STEEL SHALL BE GRADE 60.

3. CAST-IN-PLACE SEDIMENT & OIL TRAPS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. DETAILED DRAWING OF PRECAST BOX OR CAST-IN-PLACE BOX DESIGN MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

4. FOR DETAILS ON MANHOLE INSTALLATION REFER TO STANDARD DRAWING 605-13 (STANDARD MANHOLE FRAME, COVER, & CONCRETE COLLAR.

5. HEIGHT OF OUTLET BAFFLE WALL AND LENGTH OF INLET BAFFLE WALL DETERMINED BY TANK CAPACITY AND FLOW RATE.

6. IF DISTANCE FROM TOP OF BOX TO BOTTOM OF MANHOLE FORM EXCEEDS 12" USE PRECAST MANHOLE RISER PLUS A MAXIMUM OF 12" OF RISER GRADE RINGS.

7. PROVIDE STEPS WHEN THE DISTANCE FROM TOP OF MANHOLE FRAME TO TOP OF BOX EXCEEDS 24".

8. CONCRETE RISER RINGS (MAX 24"). FOR VAULT DEPTH GREATER THAN 24", USE PRECAST MANHOLE SECTIONS.

9. LOCATION AND FLOW LINE ELVATION PER DESIGN PLANS.

10. ELV. IN > ELV. OF TOP OF OUTLET BAFFLE WALL BY A MINIMUM OF 0.1', UNLESS OTHERWISE APPROVED BY THE ENGINEER.

11. ELV. OUT < ELV OF TOP OF OUTLET BAFFLE WALL BY A MINIMUM OF 0.25', UNLESS OTHERWISE APPROVED BY THE ENGINEER.

12. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY: KARISSA HARDY OCTOBER 3, 2011 STATE OF IDAHO 14025 KARISSA HARDY

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-11	KEH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-31_1011.dgn

DRAWING DATE: JUNE, 1996

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

SEDIMENT AND OIL TRAP MANHOLE

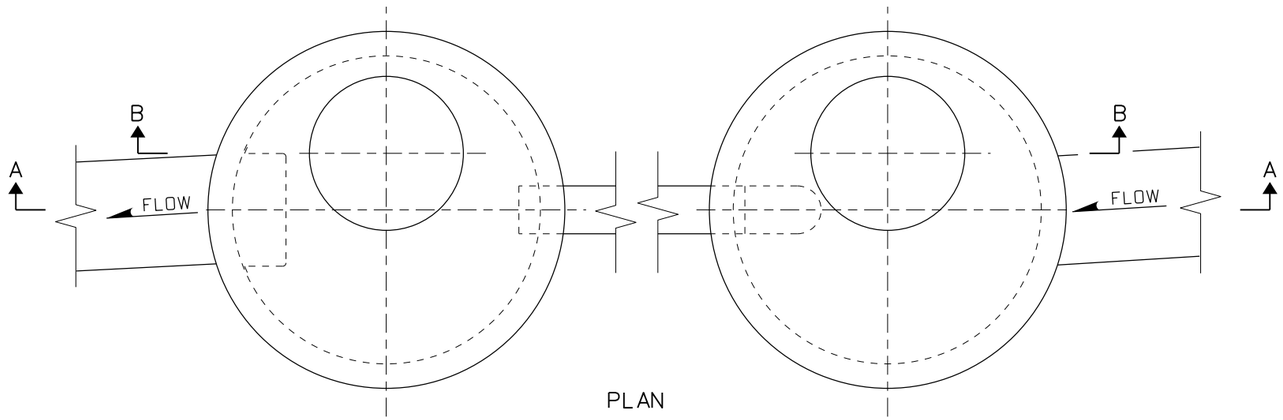
REFER TO STD. DWG. 605-13

English

STANDARD DRAWING NO.

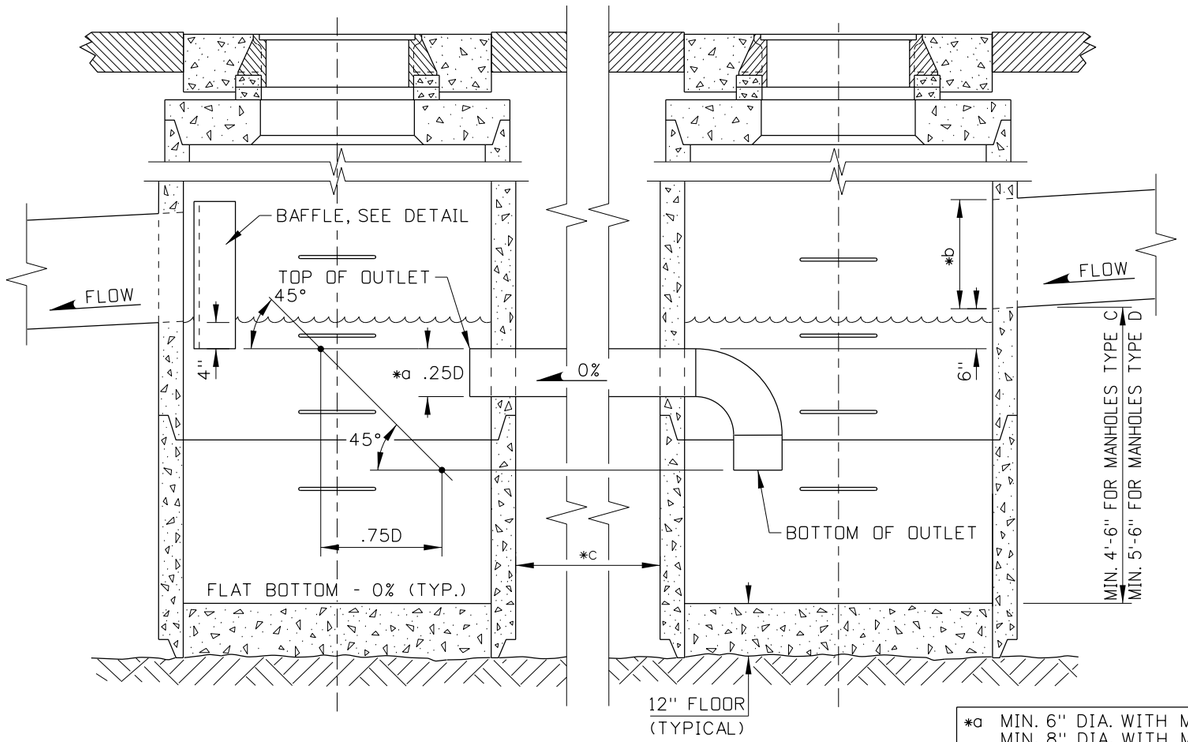
605-31

SHEET 1 OF 1



PLAN

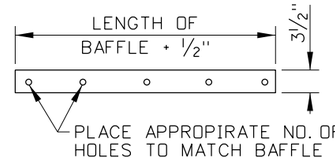
TOP ELEVATION - SECTION B-B



BOTTOM ELEVATION - SECTION A-A

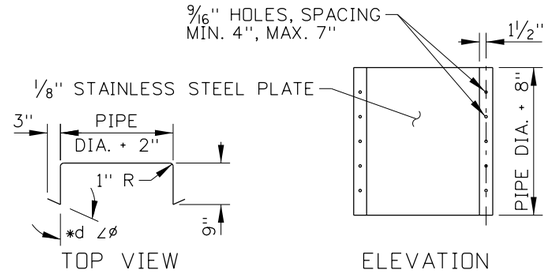
SEDIMENT & OIL TRAP

*a	MIN. 6" DIA. WITH MANHOLE TYPE C MIN. 8" DIA. WITH MANHOLE TYPE D
*b	MAX. 24" DIA. PIPE WITH MANHOLE TYPE C MAX. 36" DIA. PIPE WITH MANHOLE TYPE D
*c	SEE NOTE NO. 4
*d	SEE BAFFLE LIP ANGLE TABLE cos ø = ((OUTLET PIPE DIA.) + 5")/MANHOLE DIA.
*e	BAFFLE REQUIRES TWO GASKETS



*e (2) REQUIRED (SEE NOTE NO. 5)

GASKET DETAIL



BAFFLE DETAIL

BAFFLE LIP ANGLE TABLE		
PIPE SIZE	BEND ANGLE (ø)	
	MANHOLE C (48")	MANHOLE D (48")
12"	±70°	±75°
15"	±65°	±70°
18"	±60°	±65°
24"	±55°	±60°
30"	±45°	±55°
36"	±30°	±45°

NOTES

1. CARE SHALL BE TAKEN TO AVOID PLACING THE MANHOLE OPENINGS IN WHEEL PATHS.
2. SEDIMENT AND OIL TRAPS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST TRAPS SHALL MEET THE REQUIREMENTS OF ASTM C 478. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON PRECAST UNITS.
3. CAST-IN-PLACE SEDIMENT & OIL TRAPS SHALL CONFORM WITH SECTION 609 - MINOR STRUCTURES OF THE CURRENT STANDARD SPECIFICATIONS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND/OR 3" IF CAST AGAINST EARTH.
4. MAXIMUM SPACING BETWEEN MANHOLES SHALL BE 20'FOR TYPE C MANHOLES AND 30'FOR TYPE D MANHOLES.
5. THE BAFFLE SHALL BE INSTALLED SO THAT THE EDGES ARE WATER-TIGHT TO THE STRUCTURE. THE GASKET SHALL BE MADE OF A WATER AND OIL RESISTANT MATERIAL.
6. STANDARD DRAWING 605-12 SHALL ACCOMPANY THIS DRAWING. REFER TO STANDARD DRAWING 605-13 FOR MANHOLE COVERS.
7. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED AT ITD BY MILFORD MILLER ON DECEMBER 21, 1995 STATE OF IDAHO 7240 MILFORD MILLER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-32_1295.dgn

DRAWING DATE: DECEMBER, 1995

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: MONTE FIALA
CHIEF OF HIGHWAY OPERATIONS

ORIGINAL SIGNED BY: JIMMY ROSS
CHIEF ENGINEER

STANDARD DRAWING

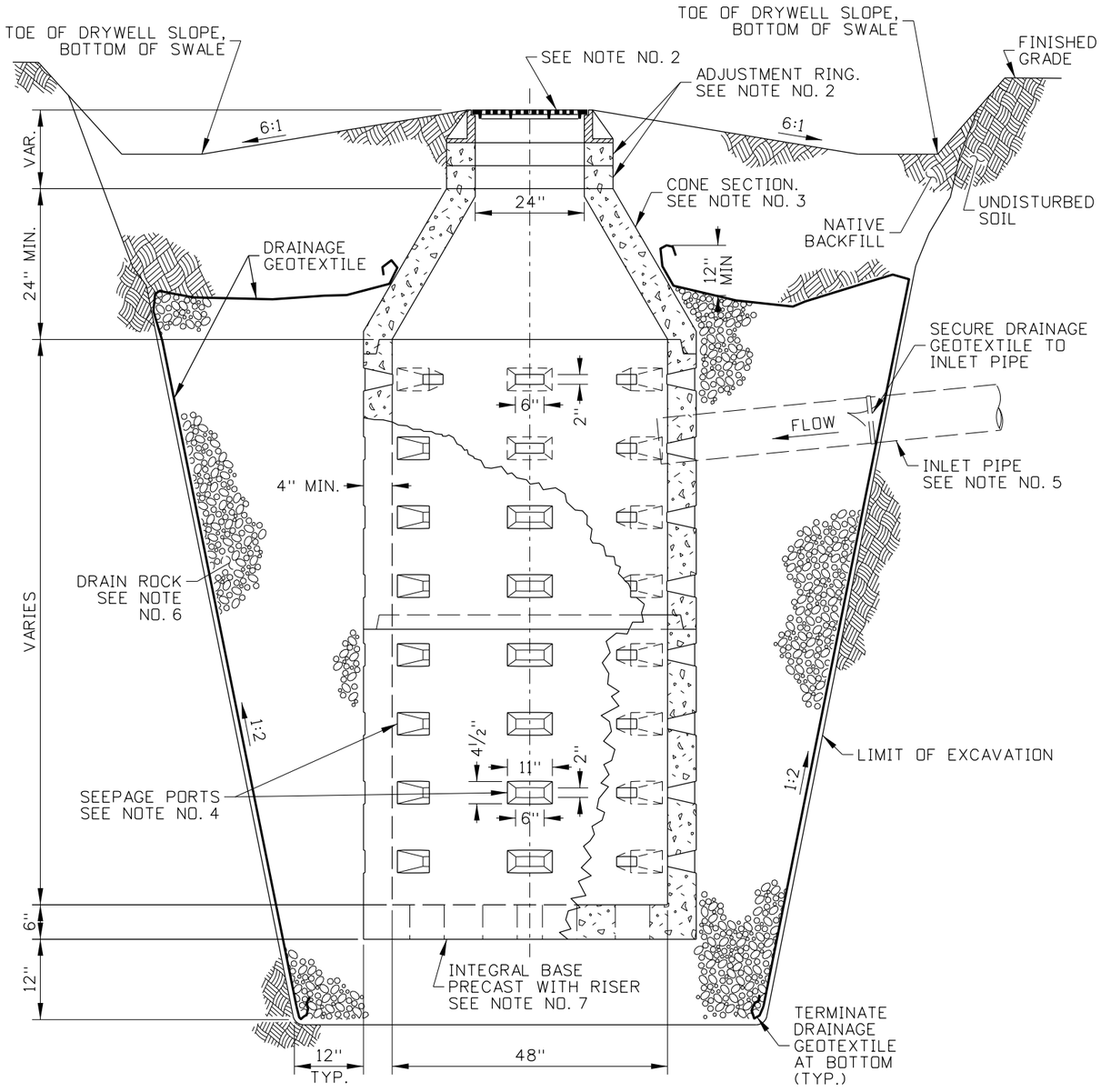
SEDIMENT AND OIL TRAP MANHOLE (IN STREET)

REQUIRES STD. DWG. 605-12 & REFER TO STD. DWG. 605-13

English

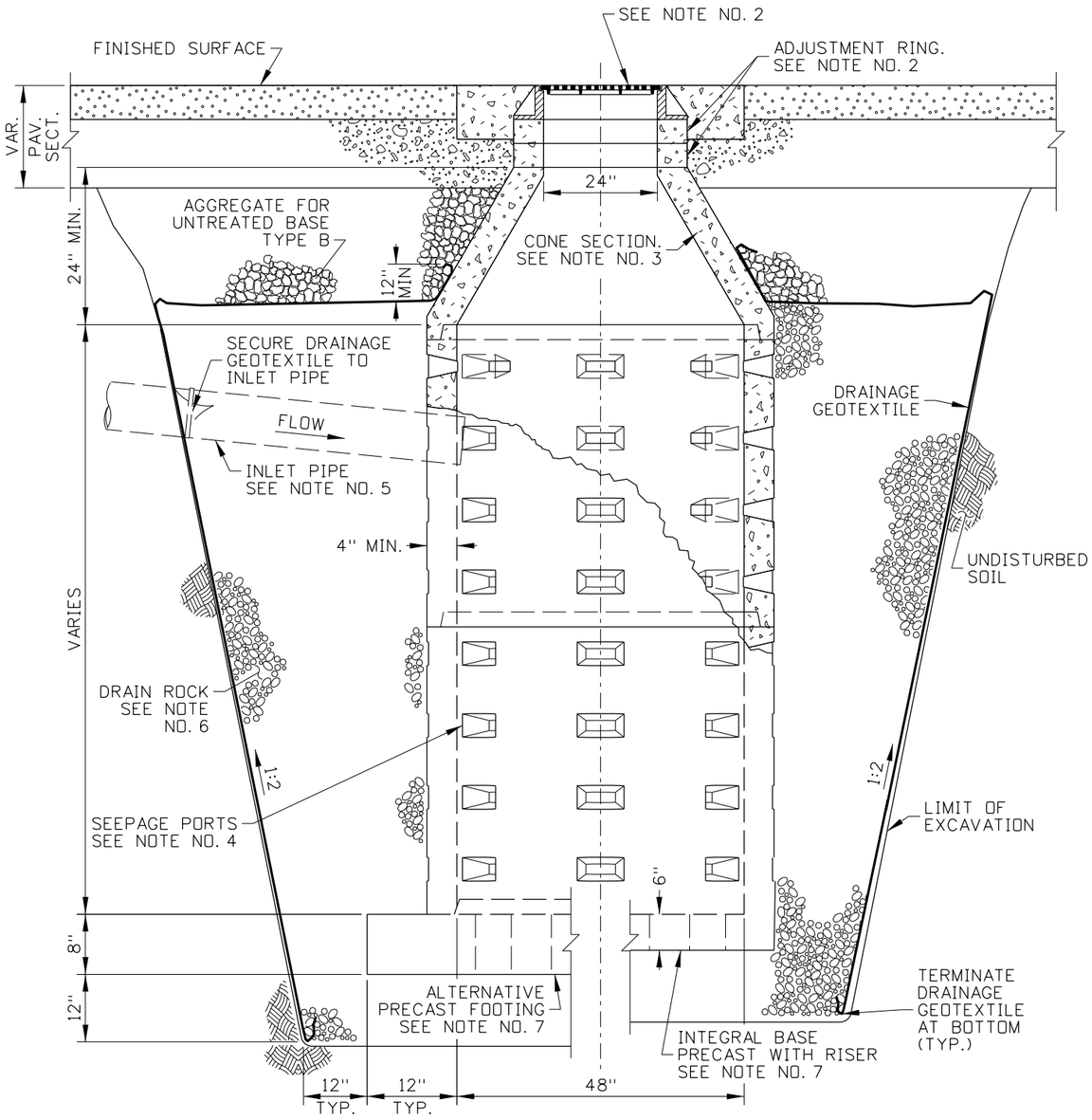
STANDARD DRAWING NO. 605-32

SHEET 1 OF 1



DRYWELL IN DRAINAGE FEATURE

(SEE NOTE NO. 1)



DRYWELL IN TRAVELED WAY

(SEE NOTE NO. 1)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED MARCH 9, 2022 ORIGINAL SEALED

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY	

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-35_0422.dgn

DRAWING DATE: DECEMBER 2021

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

DRYWELL

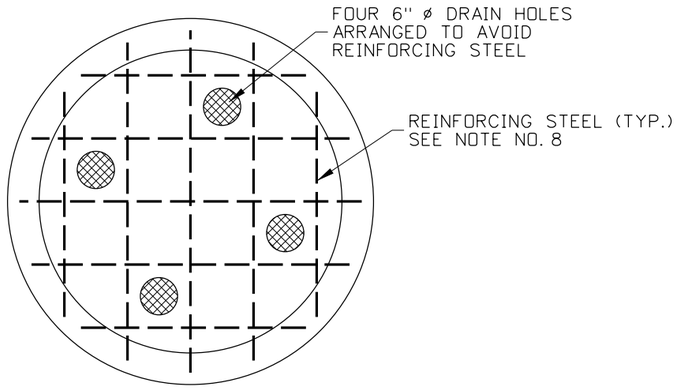
REQUIRES STD. DWG. 605-13

English

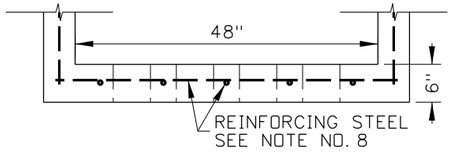
STANDARD DRAWING NO.

605-35

SHEET 1 OF 2

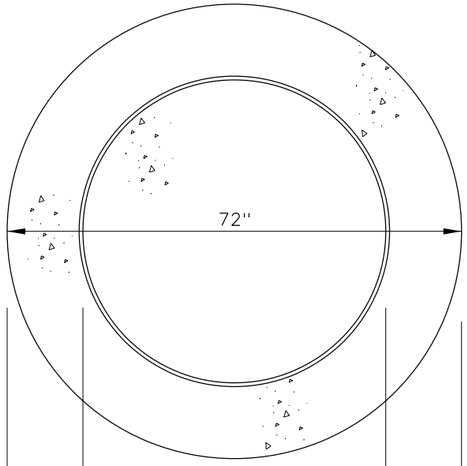


PLAN

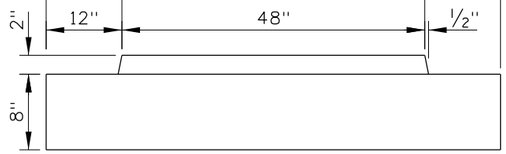


ELEVATION

INTEGRAL BASE DETAIL



PLAN



ELEVATION

ALTERNATIVE PRECAST FOOTING DETAIL

NOTES

1. DRYWELLS MAY BE INSTALLED IN DRAINAGE FEATURES, SUCH AS THE SWALE SHOWN, OR IN THE TRAVELED WAY.
2. SEE STANDARD DRAWING 605-13 FOR MANHOLE FRAME, MANHOLE COVER, MANHOLE COLLAR, AND MANHOLE ADJUSTMENT RINGS. USE CONCENTRIC OR ECCENTRIC MANHOLE CONE SECTION.
3. USE CONCENTRIC OR ECCENTRIC MANHOLE CONE SECTION.
4. SEEPAGE PORT ORIENTATION VARIES AMONG MANUFACTURERS. THE SEEPAGE PORT DIMENSIONS SHOWN ARE APPROXIMATE. ENSURE SEEPAGE PORTS ARE DISTRIBUTED EVENLY AROUND DRYWELL CIRCUMFERENCE.
5. IF INLET PIPE IS USED, CONNECT PIPE TO DRWYWELL USING PRECAST HOLE OR CORE DRILLED HOLE AND FILL GAP BETWEEN PIPE AND DRYWELL WITH GROUT, TYPE B.
6. PROVIDE DRAIN ROCK, SIZE 4 OR 5 COARSE AGGREGATE FOR CONCRETE.
7. FOR DEPTHS OVER 16'-2", USE ALTERNATIVE PRECAST FOOTING.
8. PROVIDE REINFORCING STEEL THROUGHOUT DRYWELL. TO AVOID CLUTTER ON THE DRAWING REINFORCING STEEL IS ONLY SHOWN IN THE INTEGRAL BASE.
9. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED BY RYAN D. LANCASTER
STATE OF IDAHO
13683
MARCH 9, 2022
ORIGINAL SIGNED
RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 605-35_0422.dgn

DRAWING DATE: DECEMBER 2021

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

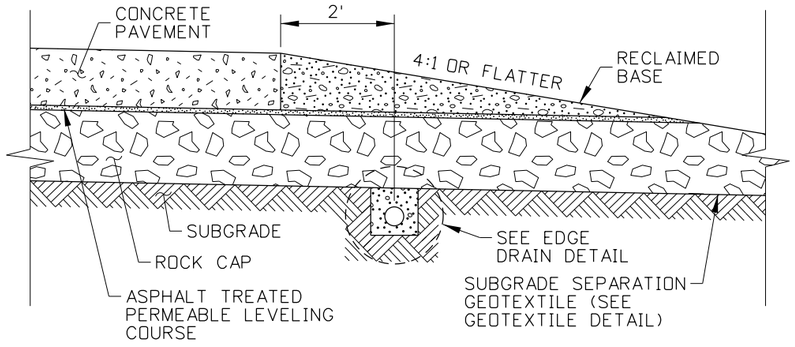
DRYWELL

REQUIRES STD. DWG. 605-13

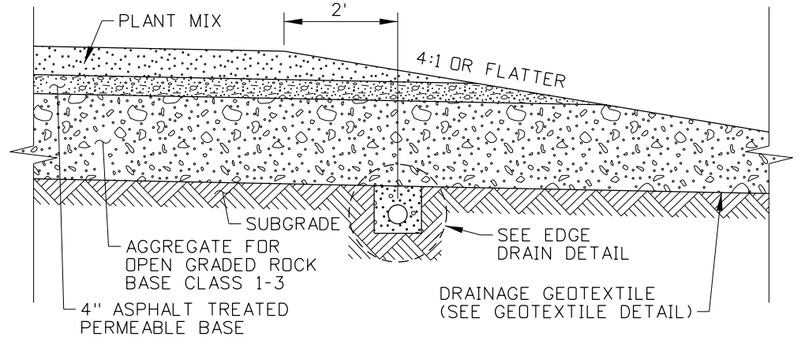
English

STANDARD DRAWING NO.

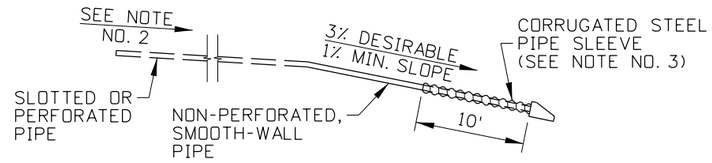
605-35



ROCK CAP



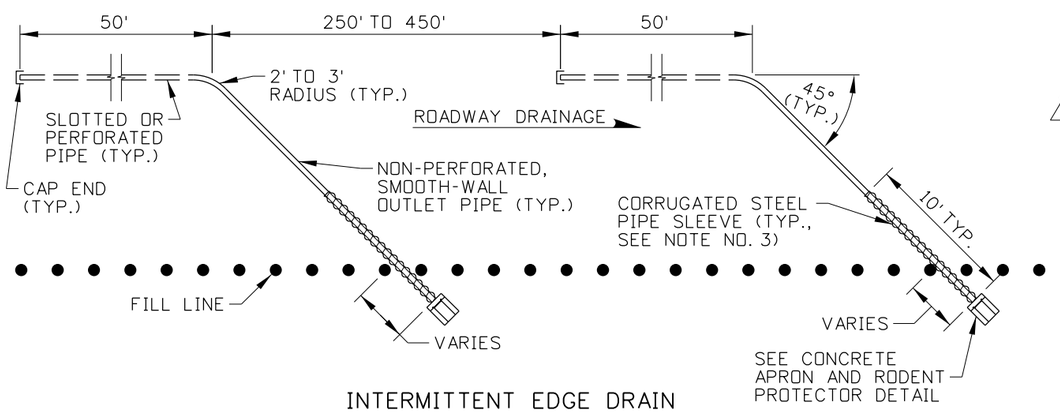
ASPHALT TREATED PERMEABLE BASE LAYER



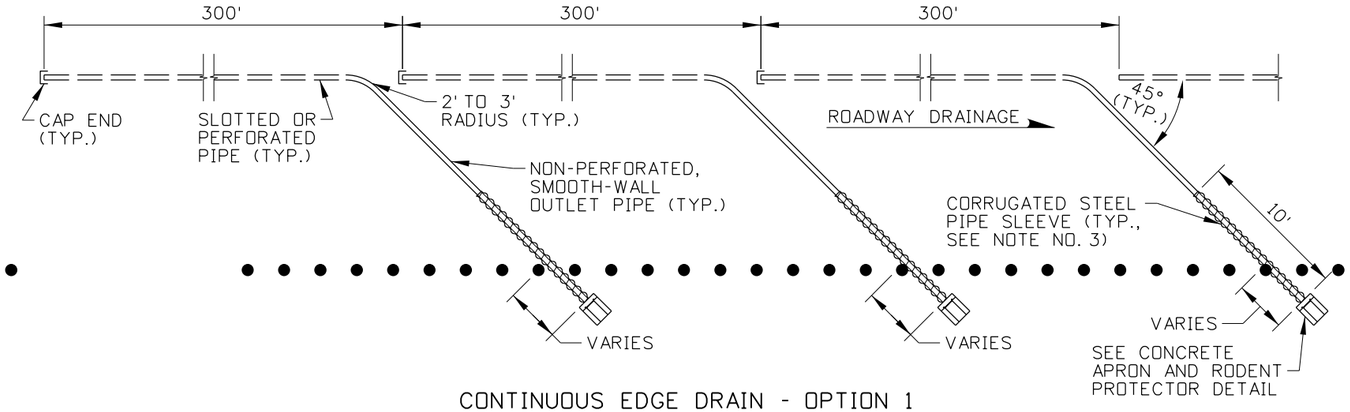
RURAL EDGE DRAIN PIPE PROFILE

(SEE NOTE NO. 5)

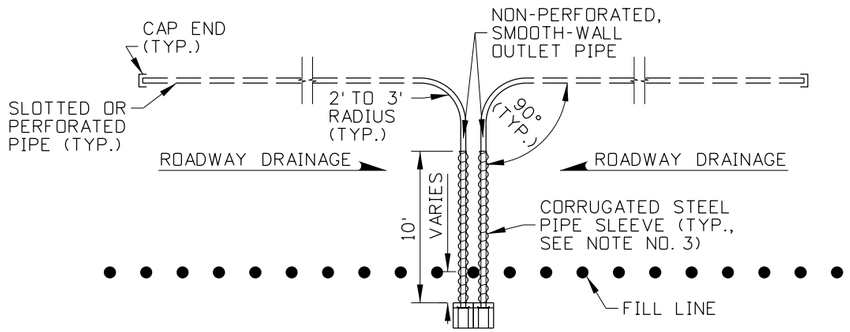
RURAL EDGE DRAIN PLACEMENT



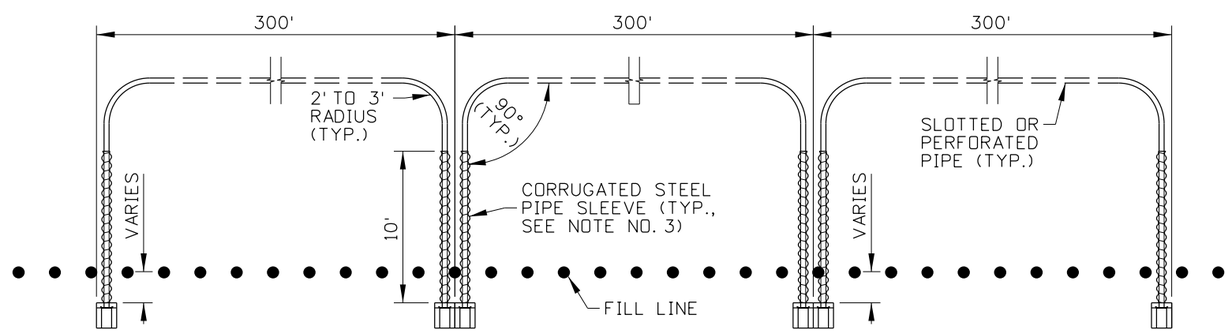
INTERMITTENT EDGE DRAIN
FOR ROCK CAP



CONTINUOUS EDGE DRAIN - OPTION 1
FOR ASPHALT TREATED PERMEABLE BASE



EDGE DRAIN AT SAG VERTICAL CURVE
FOR ROCK CAP OR ASPHALT TREATED PERMEABLE BASE
(SEE NOTE NO. 4)



CONTINUOUS EDGE DRAIN - OPTION 2
FOR ASPHALT TREATED PERMEABLE BASE

RURAL EDGE DRAINS

PLAN VIEW

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO 13683 MARCH 9, 2022 ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-22	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 606-2_0422.dgn

DRAWING DATE: FEBRUARY, 2014

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

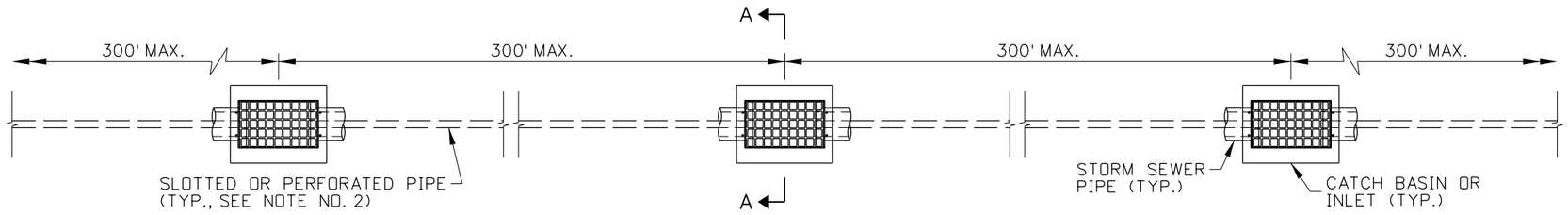
STANDARD DRAWING

EDGE DRAIN

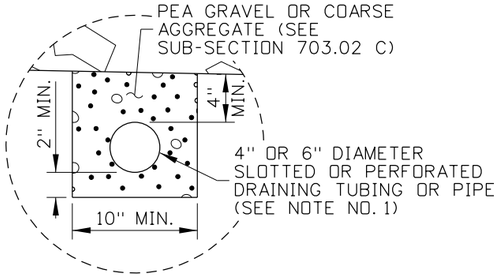
English

STANDARD DRAWING NO.

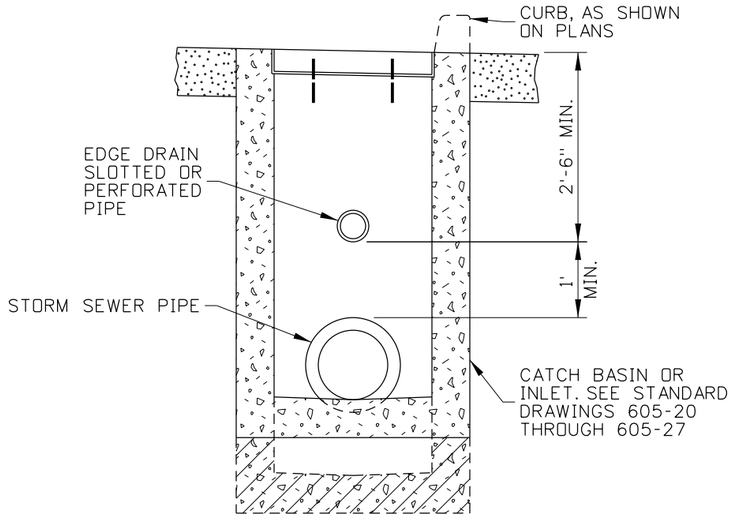
606-2



URBAN EDGE DRAIN
PLAN VIEW

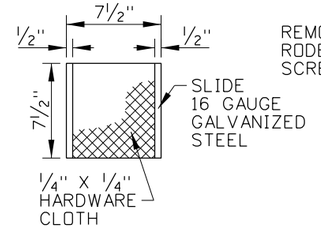


EDGE DRAIN DETAIL

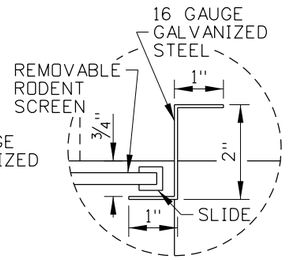


SECTION A-A

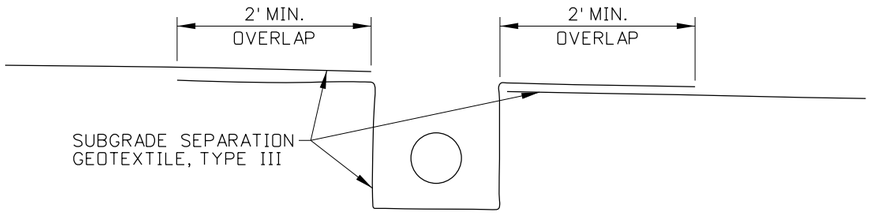
URBAN EDGE DRAIN PLACEMENT



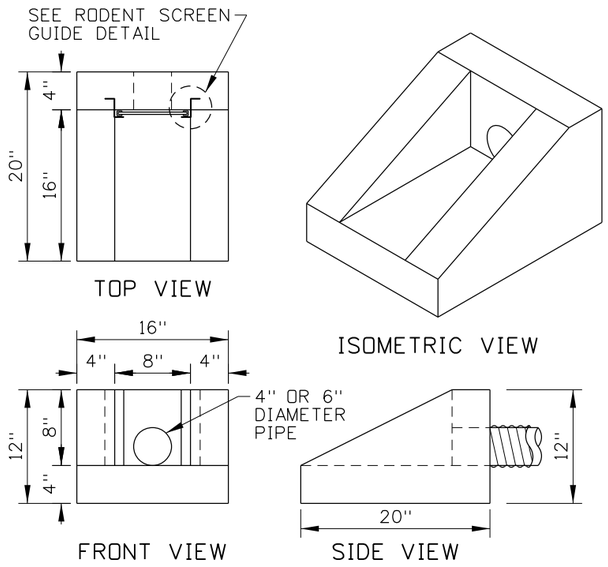
REMOVABLE RODENT
SCREEN DETAIL



RODENT SCREEN
GUIDE DETAIL



GEOTEXTILE DETAIL



CONCRETE APRON AND RODENT PROTECTOR DETAIL
(SEE NOTE NO. 7)

NOTES

1. PROVIDE CORRUGATED POLYETHYLENE DRAINAGE TUBING IN ACCORDANCE WITH 706.10 OR CLASS PS 46 POLYVINYL CHLORIDE (PVC) PIPE IN ACCORDANCE WITH 706.14.
2. MINIMUM 0.5 PERCENT PIPE GRADE. EDGE DRAIN GRADIENTS MAY BE AS FLAT AS 0.2 PERCENT IF PIPE DIAMETERS GREATER THAN 6 INCHES ARE USED.
3. PLACE OUTLET PIPES IN 10 FOOT LONG CORRUGATED STEEL PIPE SLEEVES EXTENDING FROM THE CONCRETE APRON. USE PIPE JUST LARGE ENOUGH TO ALLOW THE OUTLET PIPES TO FIT THROUGH.
4. PROVIDE OUTLET PIPES AT THE BOTTOM OF SAG VERTICAL CURVES.
5. PROVIDE 6 INCH MINIMUM FREEBOARD BETWEEN THE DITCH BOTTOM AND PIPE OUTLET. WHERE THIS IS NOT PRACTICAL, PROVIDE A COLLECTION AND DISPOSAL SYSTEM.
6. USE COUPLINGS TO JOIN PIPES. MINIMIZE EDGE DRAIN AND OUTLET PIPE JOINTS.
7. PRECAST OR CAST-IN-PLACE CONCRETE APRON AND RODENT PROTECTORS. PROVIDE REMOVABLE RODENT SCREEN.
8. VIDEO INSPECT FINISHED EDGE DRAIN AND OUTLET PIPES. REPLACE DAMANGED PIPE.
9. DRAWING NOT TO SCALE.

ORIGINAL STORED
AT: ITD,
Headquarters
3311 West State
Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
RYAN D. LANCASTER
13683
ORIGINAL SIGNED BY
RYAN D. LANCASTER
MARCH 9, 2022
STATE OF IDAHO

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-22	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 606-2_0422.dgn

DRAWING DATE: FEBRUARY, 2014

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

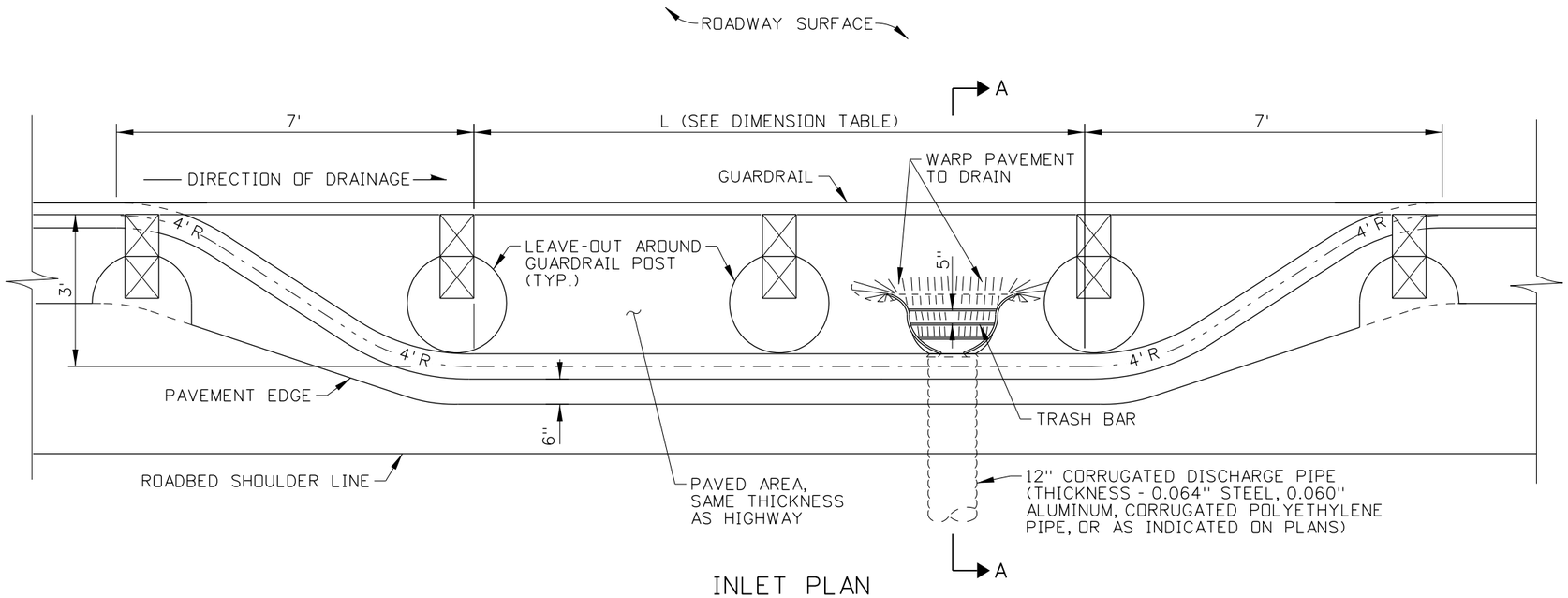
STANDARD DRAWING

EDGE DRAIN

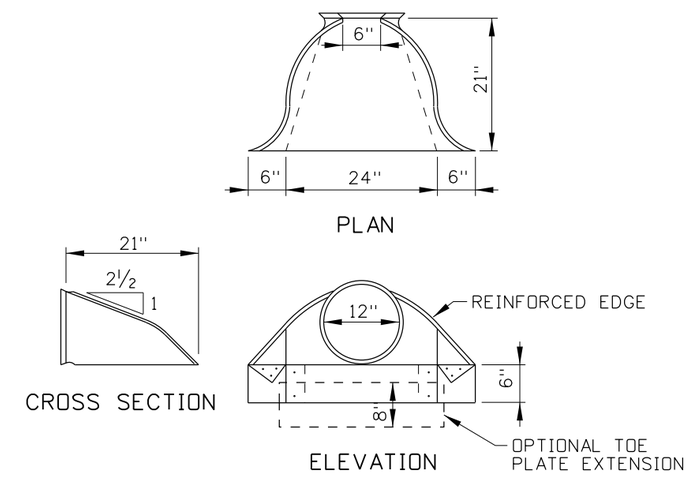
English

STANDARD DRAWING NO.

606-2

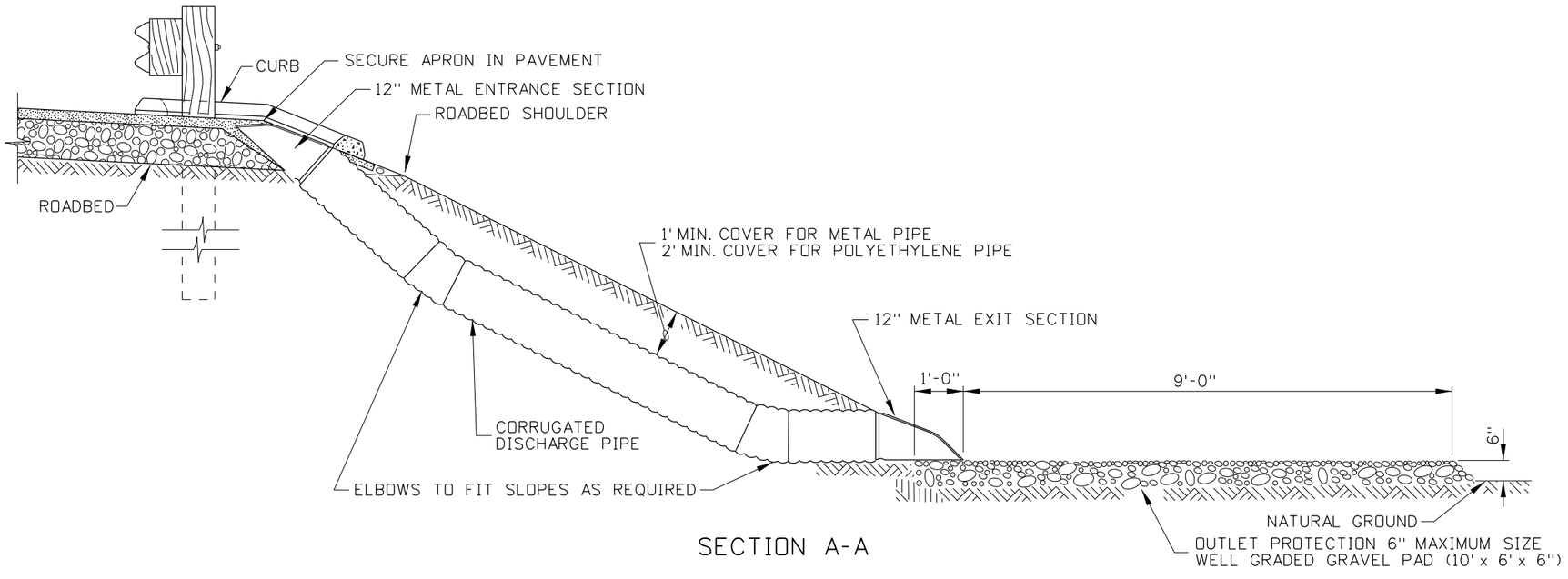


INLET PLAN



METAL ENTRANCE AND EXIT SECTIONS

SEE THE PIPE APRON STANDARD DRAWINGS FOR MORE INFORMATION



SECTION A-A

DIMENSION TABLE	
TYPE	L
1	20'
2	30'
3	40'
4	50'

NOTES

1. DRAWING NOT TO SCALE

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	04-64		6	07-92	MSM	11	12-04	MSM
2	08-65		7	04-93	MSM	12	09-10	PLR
3	03-67		8	12-93	MSM	13	11-15	RDL
4	01-74		9	06-97	MSM			
5	05-77		10	07-02	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 607-1_1215.dgn

DRAWING DATE: APRIL, 1964

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED E. MASON *for*
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

EMBANKMENT PROTECTOR

English

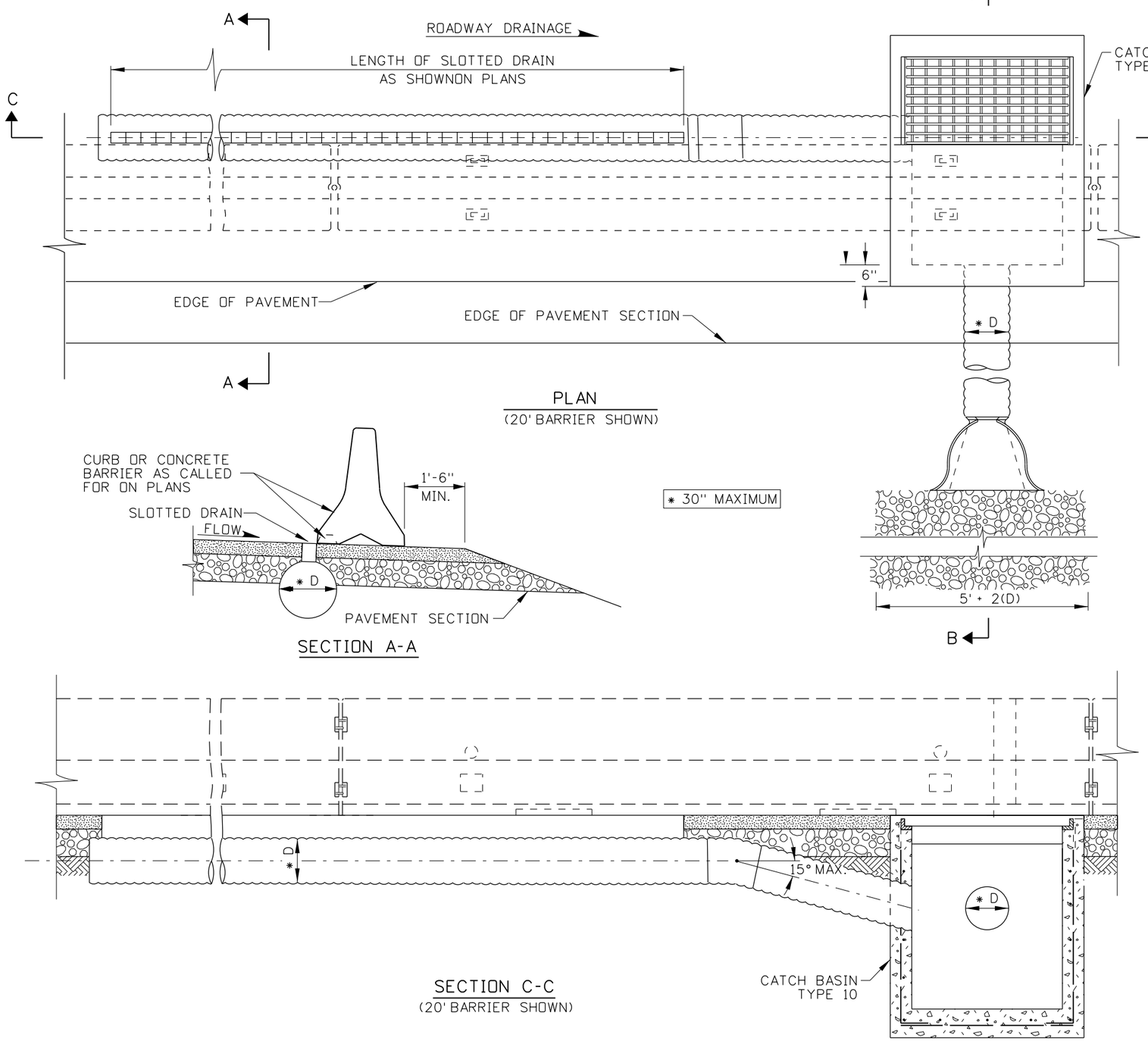
STANDARD DRAWING NO. 607-1

SHEET 1 OF 1

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO

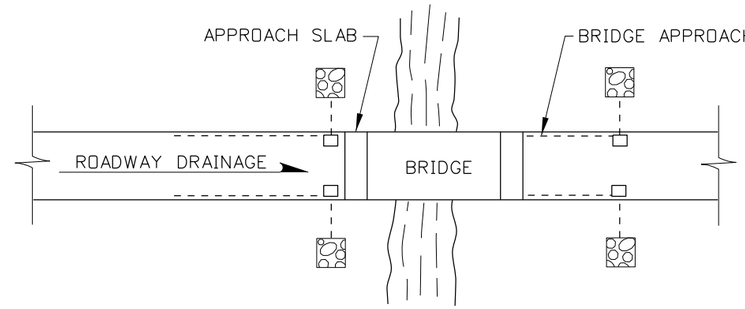
ORIGINAL SIGNED BY RYAN D. LANCASTER DECEMBER 8, 2015



PLAN
(20' BARRIER SHOWN)

SECTION A-A

* 30" MAXIMUM



LOCATION SKETCH

SECTION C-C
(20' BARRIER SHOWN)

NOTES

1. LOCATE CATCH BASINS TO INTERCEPT ROADWAY DRAINAGE PRIOR TO FLOWING ONTO A BRIDGE AND INTERCEPT DRAINAGE THAT HAS COLLECTED ON BRIDGE OR AS SHOWN ON THE PLANS.

2. SEE THE DESIGN MANUAL FOR FURTHER INFORMATION ON RUNOFF DRAIN OR EMBANKMENT PROTECTOR.

3. USE CONCRETE BARRIER WITH SEALED SCUPPERS ON THE UPSTREAM FROM THE GRATE OPENING. USE GROUT OR PLANT MIX TO SEAL THE SCUPPERS ALONG THE DRAIN RUNOFF AREA. 10' OR 20' CONCRETE BARRIER MAY BE USED.

4. DO NOT USE IN TEMPORARY OR PERMANENT TRAFFIC LANES. USE ONLY WHERE TRAFFIC IS OCCASIONAL, SUCH AS ON HIGHWAY SHOULDERS.

5. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE OF ORIGINAL SIGNATURE JANUARY 31, 2013 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-01	MSM						
2	7-02	MSM						
3	3-05	MSM						
4	9-10	PLR						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 607-2_0113.dgn

DRAWING DATE: DECEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

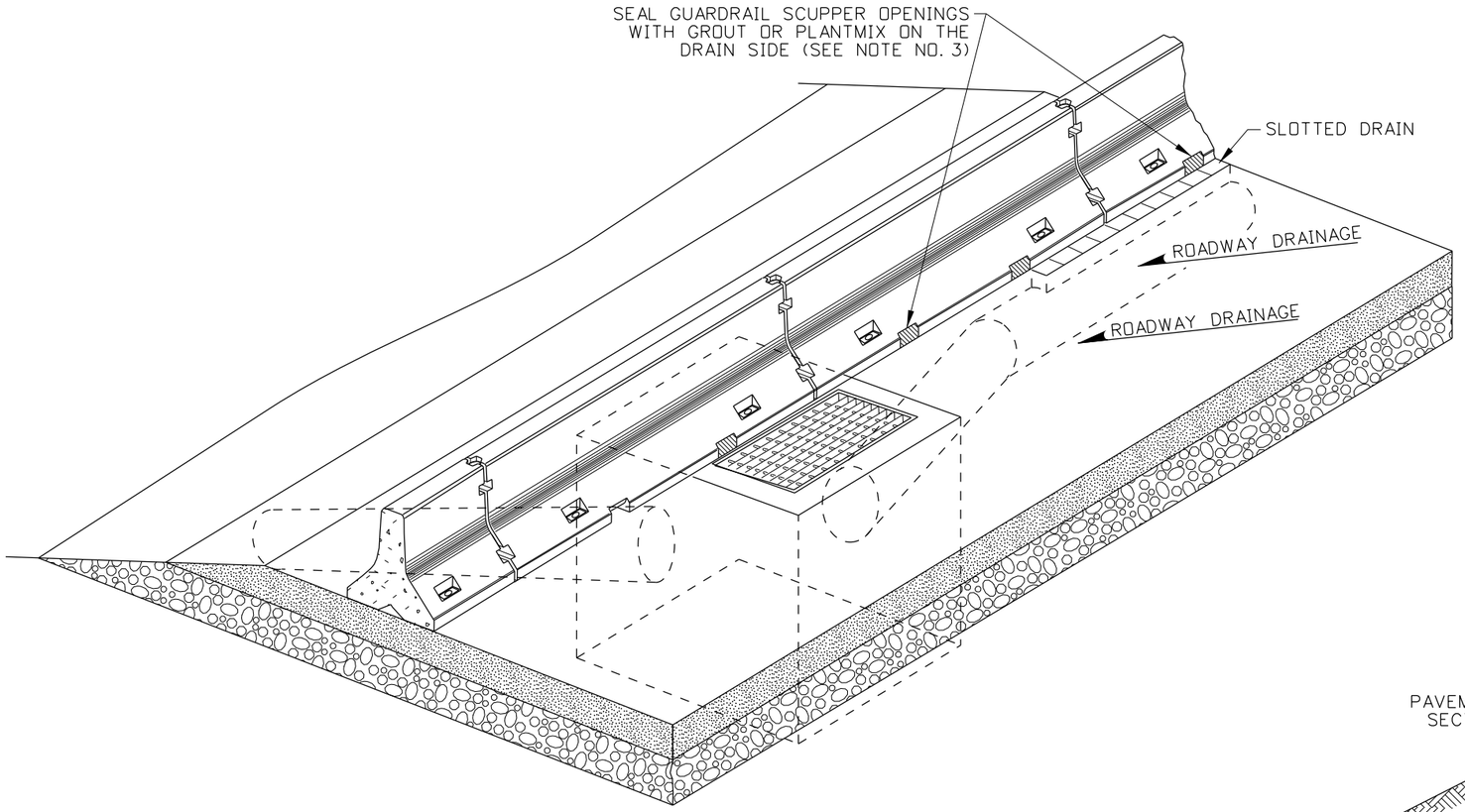
EMBANKMENT PROTECTOR WITH SLOTTED DRAIN

REQUIRES STD. DWG. 605-27

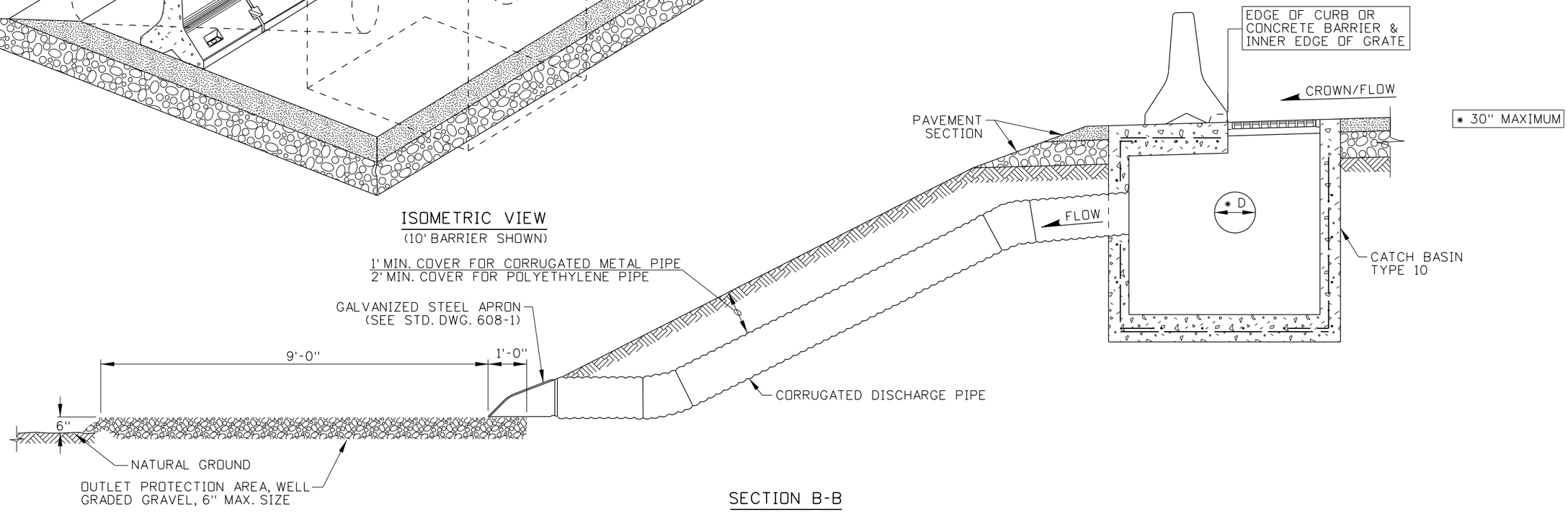
English

STANDARD DRAWING NO.

607-2



ISOMETRIC VIEW
(10' BARRIER SHOWN)



SECTION B-B

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 ORIGINAL SIGNED BY RYAN D. LANCASTER JANUARY 31, 2012 STATE OF IDAHO

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-01	MSM						
2	7-02	MSM						
3	3-05	MSM						
4	9-10	PLR						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 607-2_0113.dgn

DRAWING DATE: DECEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

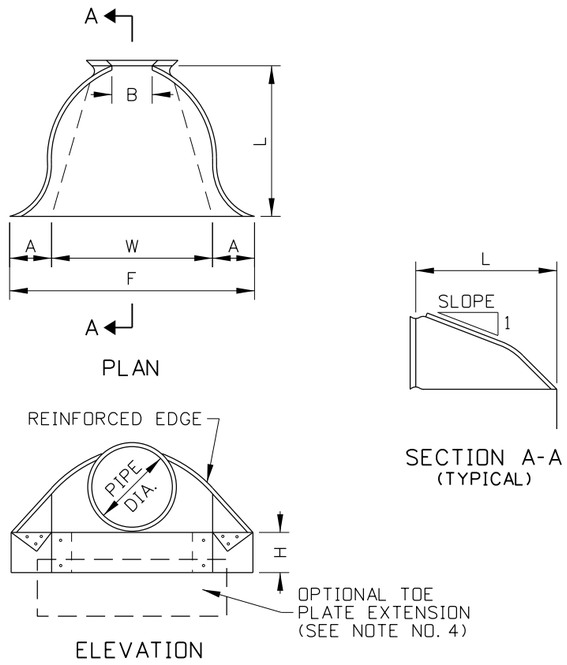
EMBANKMENT PROTECTOR WITH SLOTTED DRAIN

REQUIRES STD. DWG. 605-27

English

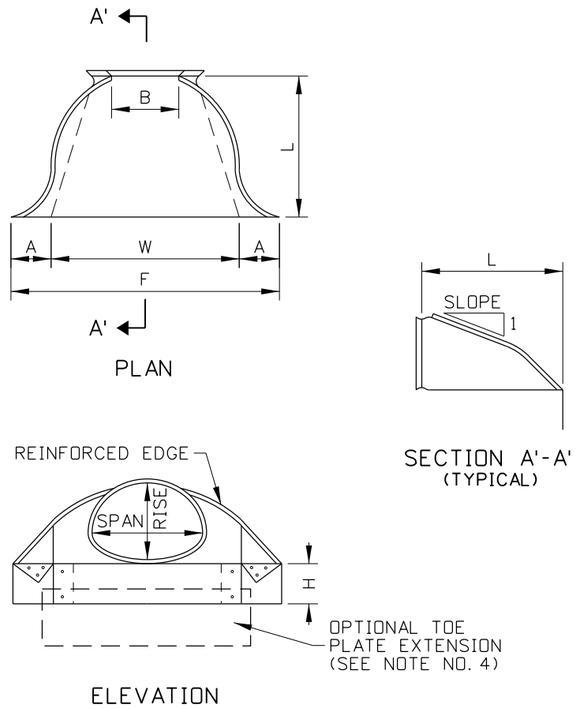
STANDARD DRAWING NO.

607-2



APRON FOR ROUND METAL PIPE

(GALVANIZED STEEL)



APRON FOR METAL ARCH PIPE

(GALVANIZED STEEL)

DIMENSIONS TABLE

PIPE DIA.	THICK-NESS (1000'S)	ALL DIMENSIONS ARE IN INCHES A (MIN.)	B	H (MIN.)	F (MIN.)	L ±2"	W (MAX.)	APPROX. SLOPE	BODY
12	0.064	5	7	6	22	21	24	2½:1	1 PC.
15	0.064	7	8	6	28	26	30	2½:1	1 PC.
18	0.064	7	10	6	34	31	36	2½:1	1 PC.
21	0.064	8	12	6	40	36	42	2½:1	1 PC.
24	0.064	9	13	6	46	41	48	2½:1	1 PC.
30	0.079	13	16	8	55	51	60	2½:1	1 PC.
36	0.079	11	19	9	70	60	72	2½:1	2 PC.
42	0.109	15	25	10	82	69	84	2½:1	2 PC.
48	0.109	17	29	12	88	78	90	2½:1	2 PC.
54	0.109	17	33	12	100	84	102	2:1	2 PC.
60	0.109	17	36	12	112	87	114	2½:1	3 PC.
66	0.109	17	39	12	118	87	120	2½:1	3 PC.
72	0.109	17	44	12	120	87	126	2½:1	3 PC.
78	0.109	17	48	12	130	87	132	2½:1	3 PC.
84	0.109	17	52	12	136	87	138	2½:1	3 PC.

DIMENSIONS TABLE

PIPE-ARCH SPAN IN.	PIPE-ARCH RISE IN.	THICK-NESS (1000'S)	ALL DIMENSIONS ARE IN INCHES A (MIN.)	B	H (MIN.)	F (MIN.)	L ±2"	W (MAX.)	APPROX. SLOPE	BODY
17	13	0.064	5	9	6	28	20	50	2½:1	1 PC.
21	15	0.064	6	11	6	34	24	58	2½:1	1 PC.
24	18	0.064	7	12	6	40	28	63	2½:1	1 PC.
28	20	0.064	7	16	6	46	32	70	2½:1	1 PC.
35	24	0.079	9	16	6	58	39	85	2½:1	1 PC.
42	29	0.079	11	18	8	73	46	104	2½:1	1 PC.
49	33	0.109	12	21	9	82	53	117	2½:1	2 PC.
57	38	0.109	16	26	10	88	62	130	2½:1	2 PC.
64	43	0.109	17	30	12	100	79	142	2¼:1	2 PC.
71	47	0.109	17	36	12	112	77	156	2¼:1	2 PC.
77	52	0.109	17	36	12	124	77	167	2:1	3 PC.
83	57	0.109	17	44	12	130	77	179	2:1	3 PC.

NOTES

1. ALL 3-PIECE BODIES (APRONS WITH PIPE DIA. 60 IN. & LARGER) TO HAVE 0.109 IN. SIDES AND 0.138 IN. CENTER PANELS. MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY GALVANIZED RIVETS OR BOLTS.
2. THE REINFORCED EDGES OF GALVANIZED STEEL APRONS, FOR ROUND METAL PIPE SIZES 60 IN. THROUGH 84 IN. AND FOR ARCH METAL PIPE SIZES 77x62 IN. THROUGH 83x57 IN., ARE TO BE SUPPLEMENTED BY GALVANIZED STIFFENER ANGLES. THE ANGLES ARE TO BE ATTACHED BY GALVANIZED BOLTS AND NUTS.
3. ANGLE REINFORCEMENT WILL BE PLACED UNDER THE CENTER PANEL SEAMS ON ARCH PIPE SIZES 77x52 IN. THROUGH 83x57 IN.
4. A GALVANIZED TOE PLATE IS AVAILABLE AS AN ACCESSORY. WHEN SPECIFIED IT SHALL BE THE SAME GAGE AS THE APRON.
5. THE APRON SHALL BE CONNECTED TO PIPE BY USING EITHER CONNECTING BANDS, RODS, OR STRAPS.
5. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED BY: MILFORD MILLER DATE OF ORIGINAL SIGNATURE: MARCH 4, 2005 2240 STATE OF IDAHO MILFORD MILLER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-64		6	06-84				
2	06-68		7	07-92	MSM			
3	04-70		8	11-01	MSM			
4	10-76		9	03-05	MSM			
5	07-78							

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 608-1_0305.dgn

DRAWING DATE: APRIL, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

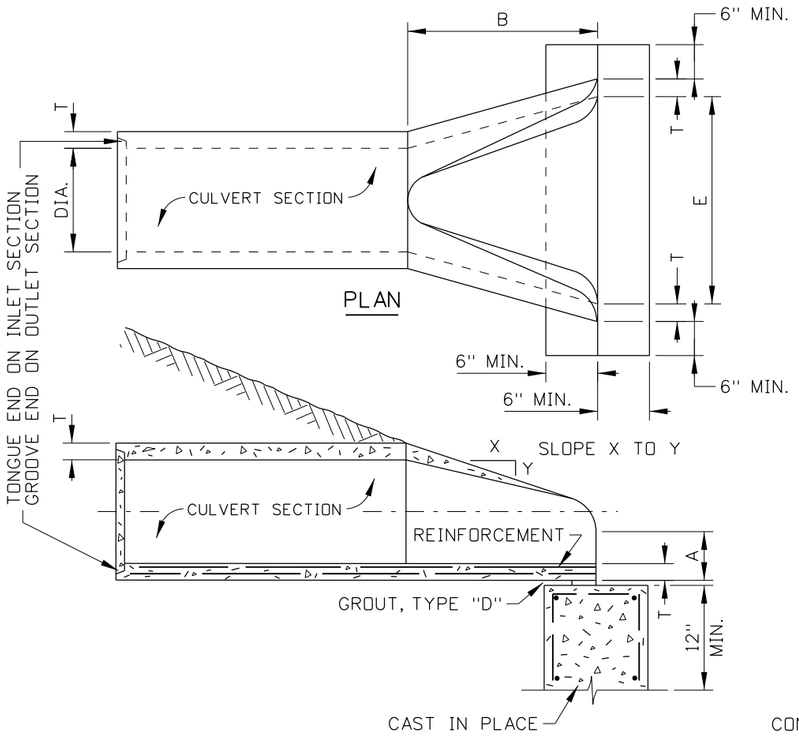
STANDARD DRAWING

GALVANIZED STEEL APRONS FOR PIPE CULVERTS

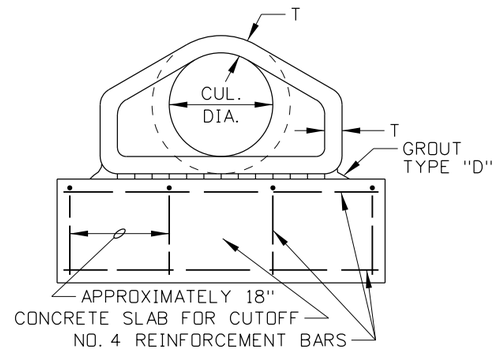
English

STANDARD DRAWING NO. 608-1

SHEET 1 OF 1

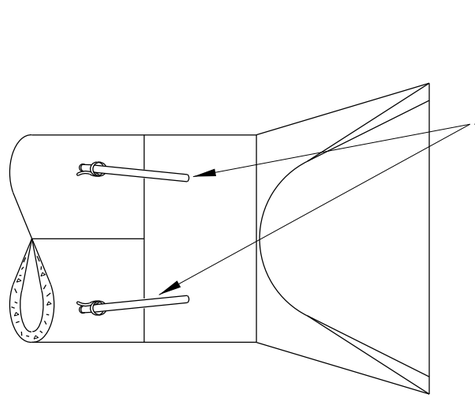


LONGITUDINAL SECTION
(FOR 12" TO 54" DIA. PIPE)



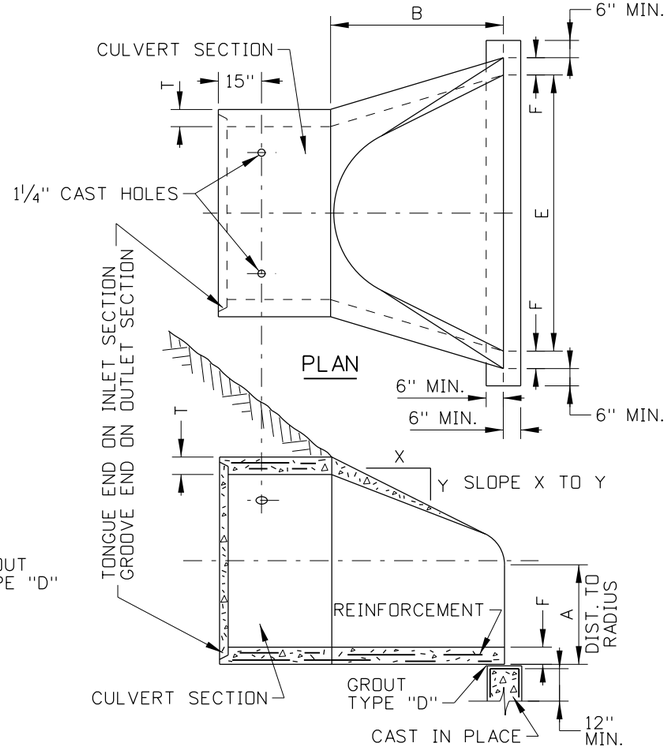
END VIEW
(FOR 12" TO 54" DIA. PIPE)

APRON DIMENSION FOR 12" TO 54" DIA. PIPE					
DIA.	A	B	E	T	SLOPE
12"	4"-5"	1'-10" - 2'-0"	2'-0"	2"	3 TO 1
15"	6"	2'-3"	2'-6"	2¼"	3 TO 1
18"	9"-10"	2'-3"	3'-0"	2½"	3 TO 1
21"	9"	3'-0"	3'-5"	2¾"	3 TO 1
24"	9½"-10"	3'-7" - 3'-7½"	4'-0"	3"	3 TO 1
27"	10½"	4'-1½"	4'-6"	3¼"	3 TO 1
30"	1'-0"	4'-6"	5'-0"	3½"	3 TO 1
36"	1'-3"	5'-3" - 5'-4"	6'-0"	4"	3 TO 1
42"	1'-9" - 1'-10"	5'-3" - 5'-4"	6'-6"	4½"	3 TO 1
48"	2'-0"	6'-0"	7'-0"	5"	3 TO 1
54"	2'-3"	5'-5"	7'-6"	5½"	2 TO 1

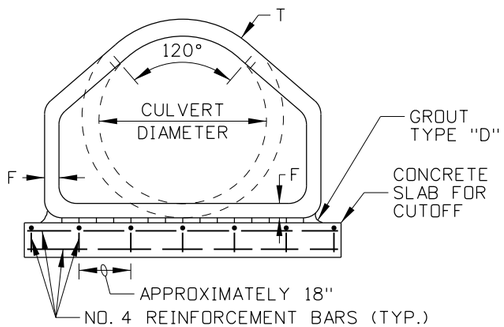


ANCHORING DETAIL

60" DIA. PIPE:
2 - 1" TIE BOLTS EACH AT 60° TO THE VERTICAL USED TO TIE THE END SECTION TO ADJACENT STRAIGHT SECTION.
72" DIA. & 84" DIA. PIPE:
2 - 1" TIE BOLTS PLACED AS SPECIFIED FOR 60" PIPE ALSO 1 - 1" TIE BOLT IS TO BE PLACED AT THE TOP.



LONGITUDINAL SECTION
(FOR 60" TO 84" DIA. PIPE)



END VIEW
(FOR 60" TO 84" DIA. PIPE)

APRON DIMENSION FOR 60" TO 84" DIA. PIPE						
DIA.	A	B	E	F	T	SLOPE
60"	2'-11"	5'-0"	8'-0"	5"	6"	2 TO 1
72"	3'-0"	6'-6"	9'-0"	6"	7"	1.86 TO 1
84"	3'-0"	7'-6½"	10'-0"	6½"	8"	1.5 TO 1

NOTES

1. TONGUE AND GROOVE JOINTS ARE SHOWN ON THE DRAWING FOR EXAMPLE ONLY. OTHER JOINTS MAY BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
2. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO DECEMBER 17, 2012 13683 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	4-66							
2	8-67							
3	2-00	MSM						
4	10-05	MSM						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 608-2_1212.dgn

DRAWING DATE: MARCH, 1966

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

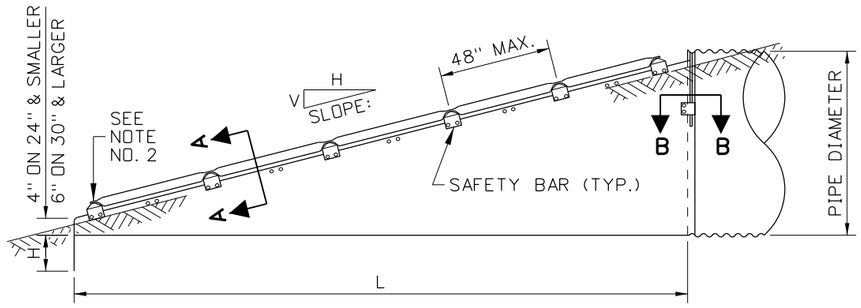
STANDARD DRAWING

CONCRETE APRONS FOR PIPE CULVERTS

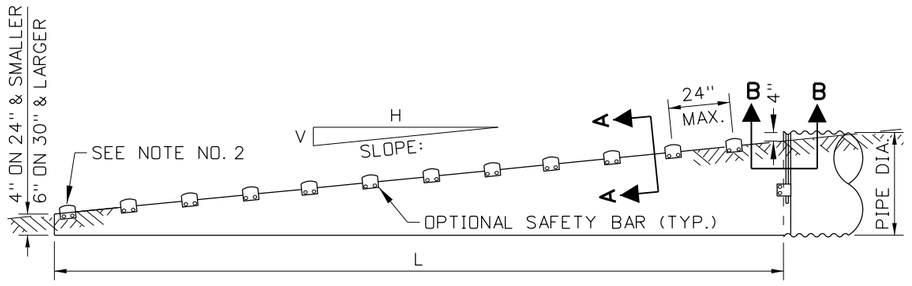
English

STANDARD DRAWING NO. 608-2

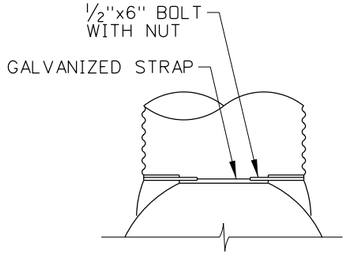
SHEET 1 OF 1



SIDE VIEW OF CROSS DRAINAGE STRUCTURE

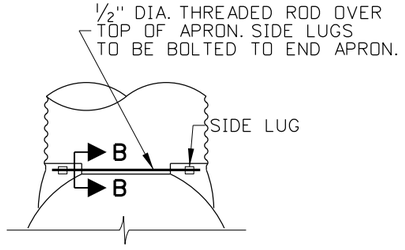


SIDE VIEW OF PARALLEL DRAINAGE STRUCTURE



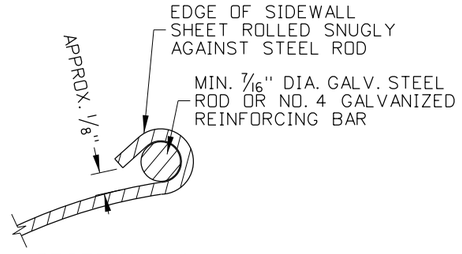
TYPE 1 CONNECTOR DETAIL

CIRCULAR POPES 15" THROUGH 24"

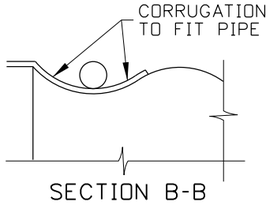


TYPE 2 CONNECTOR DETAIL

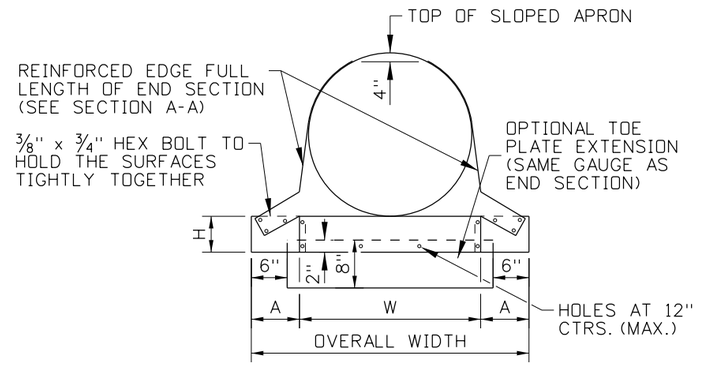
USE WITH 30" AND LARGER CIRCULAR PIPES AND ALL ARCHED PIPES



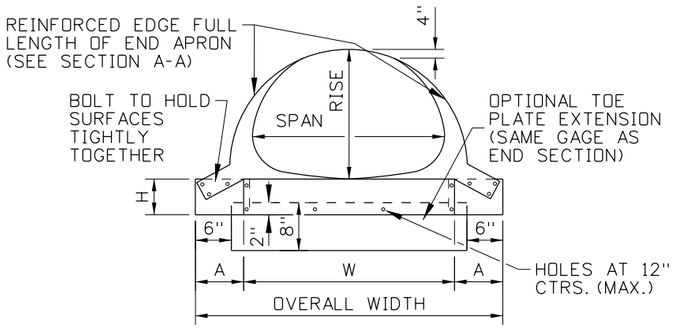
SECTION A-A



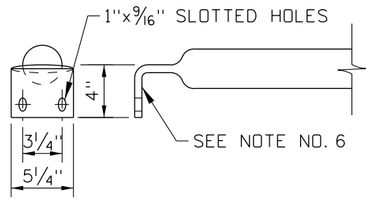
SECTION B-B



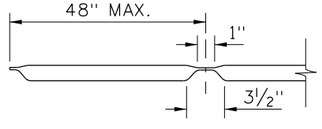
FRONT VIEW - ROUND PIPE



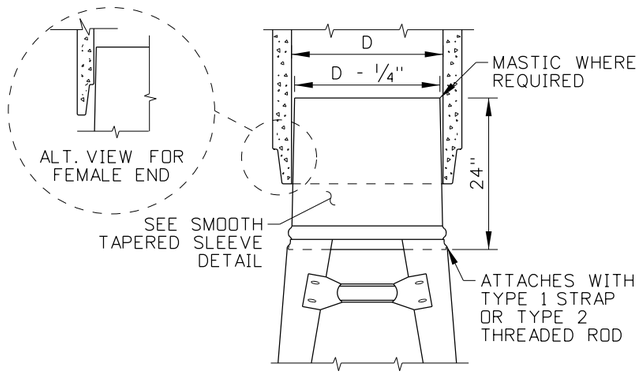
FRONT VIEW - ARCHED PIPE



SAFETY BAR DETAIL

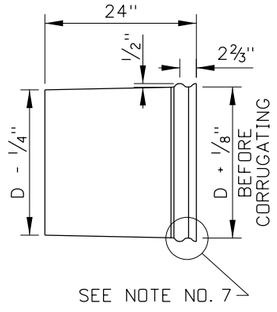


LONGITUDINAL BAR DETAIL



TAPERED SLEEVE FOR ATTACHING STEEL END SECTIONS TO CONCRETE OR SMOOTH PIPE

END SECTION WITH OPTIONAL SAFETY BAR SHOWN FOR ILLUSTRATION ONLY



SMOOTH TAPERED SLEEVE DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED BY MAY 12, 2016 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	05-16	RDL			
2	6-97	MSM						
3	11-00	MSM						
4	3-05	MSM						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 608-3_0516.dgn

DRAWING DATE: NOVEMBER, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: JESSE BARRUS

DESIGN/TRAFFIC SERVICES ENGINEER

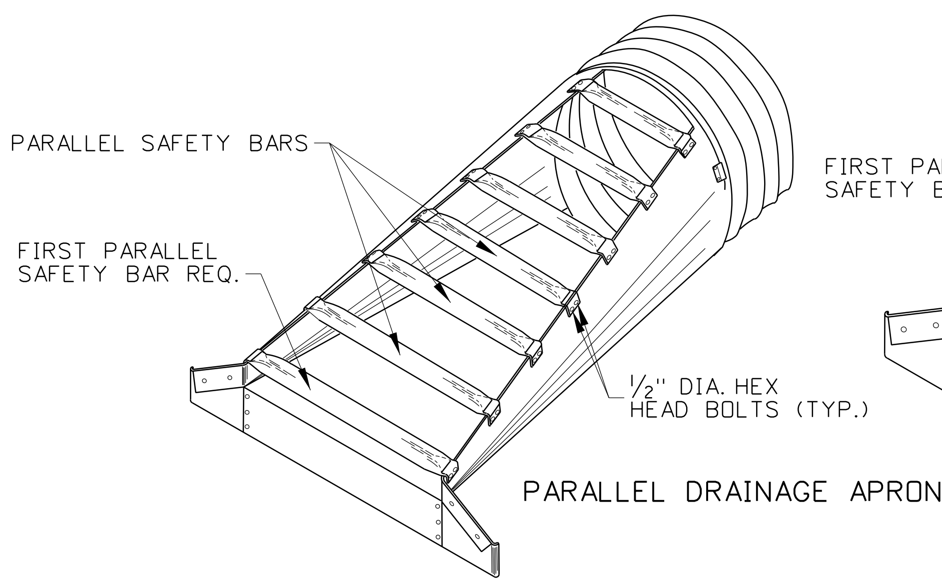
STANDARD DRAWING

METAL SAFETY SLOPE APRON

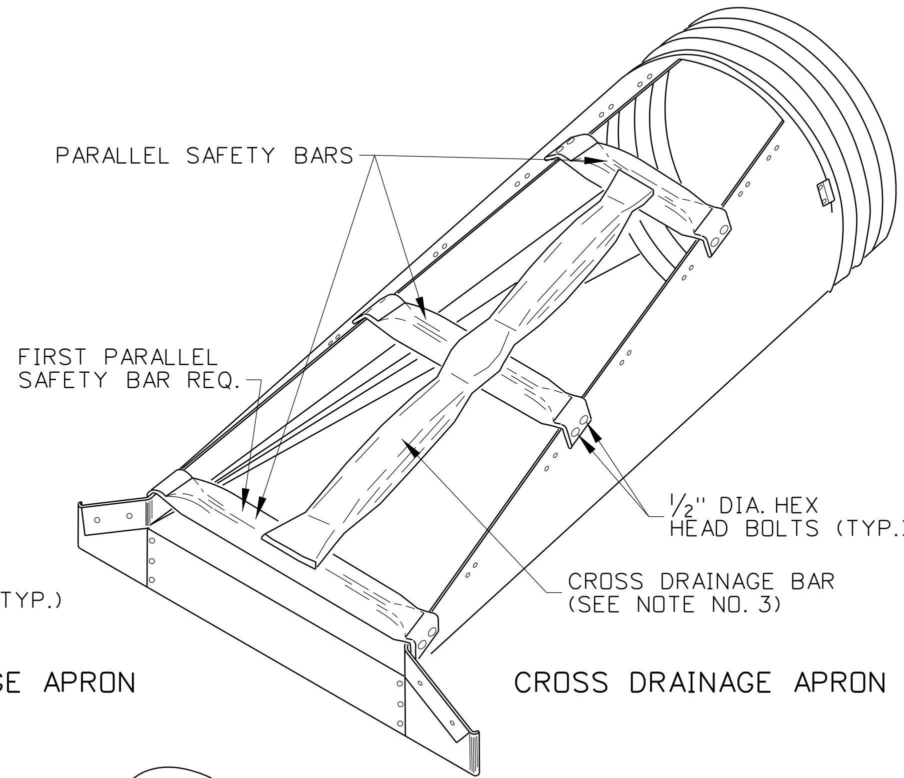
English

STANDARD DRAWING NO. 608-3

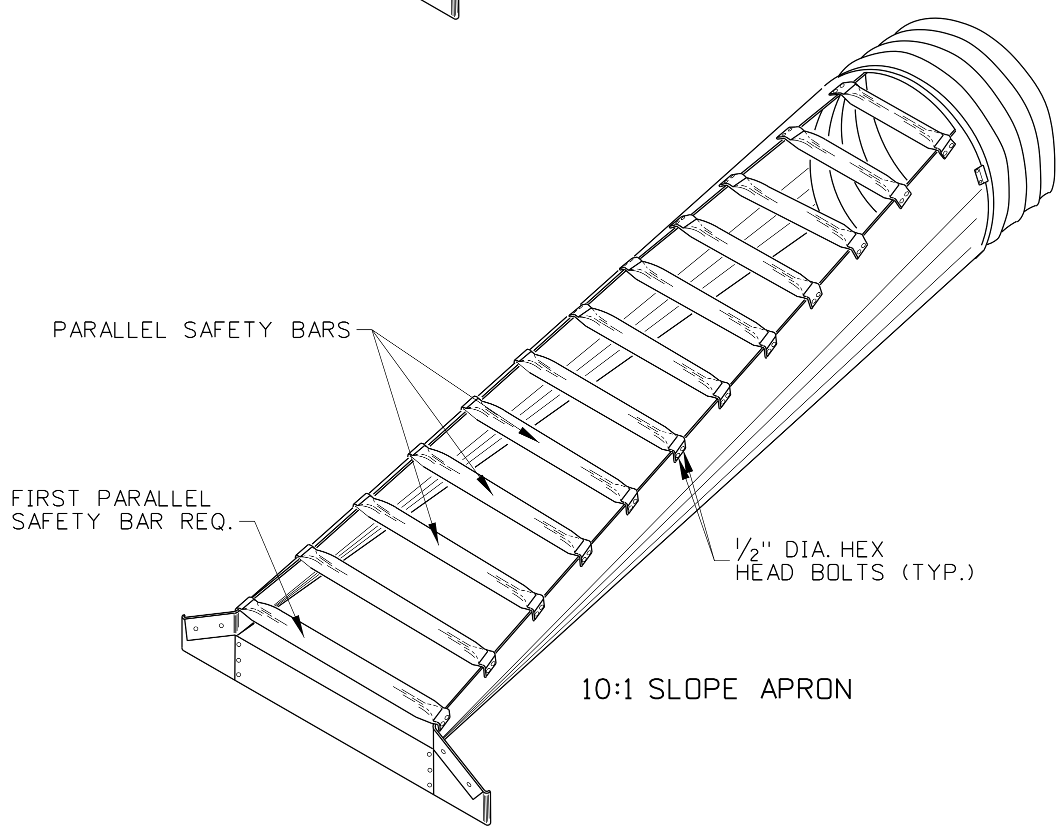
SHEET 1 OF 2



PARALLEL DRAINAGE APRON



CROSS DRAINAGE APRON



10:1 SLOPE APRON

PERSPECTIVE VIEWS - APRONS

APRONS FOR CIRCULAR PIPES

PIPE DIA. (IN.)	MIN. THICK.		DIMENSIONS (±2")				L DIMENSIONS (±2") (SEE NOTE NO. 5)					
	IN.	GAGE	A	H	W	OVERALL WIDTH	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)
15	.064	16	8	6	21	37	4:1	20	6:1	30	10:1	70
18	.064	16	8	6	24	40	4:1	32	6:1	48	10:1	100
21	.064	16	8	6	27	43	4:1	44	6:1	66	10:1	130
24	.064	16	8	6	30	46	4:1	56	6:1	84	10:1	160
30	.109	12	12	9	36	60	4:1	80	6:1	120	10:1	220
36	.109	12	12	9	42	66	4:1	104	6:1	156	10:1	280
42	.109	12	16	12	48	80	4:1	128	6:1	192	N/A	
48	.109	12	16	12	54	86	4:1	152	6:1	228	N/A	
54	.109	12	16	12	60	92	4:1	176	6:1	264	N/A	
60	.109	12	16	12	66	98	4:1	200	6:1	300	N/A	

APRONS FOR ARCHED PIPES

EQUIV. DIA. (IN.)	(INCHES)		MIN. THICK.		DIMENSIONS (±2")				L DIMENSIONS (±2") (SEE NOTE NO. 5)					
	SPAN	RISE	IN.	GAGE	A	H	W	OVERALL WIDTH	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)	SLOPE H:V	LENGTH (IN.)
18	21	15	.064	16	8	6	27	43	4:1	20	6:1	30	10:1	70
21	24	18	.064	16	8	6	30	46	4:1	32	6:1	48	10:1	100
24	28	20	.064	16	8	6	34	50	4:1	40	6:1	60	10:1	120
30	35	24	.079	14	12	9	41	65	4:1	56	6:1	84	10:1	160
36	42	29	.109	12	12	9	48	72	4:1	76	6:1	114	10:1	210
42	49	33	.109	12	16	12	55	87	4:1	92	6:1	138	N/A	
48	57	38	.109	12	16	12	63	95	4:1	112	6:1	168	N/A	
54	64	43	.109	12	16	12	70	102	4:1	132	6:1	198	N/A	
60	71	47	.109	12	16	12	77	109	4:1	148	6:1	222	N/A	
72	83	57	.109	12	16	12	89	121	4:1	188	6:1	282	N/A	

NOTES

1. PROVIDE SLOTTED HOLES FOR PARALLEL SAFETY BAR ATTACHMENT.
2. USE AT LEAST ONE PARALLEL SAFETY BAR AT THE STRUCTURE OPENING. USE PARALLEL SAFETY BARS AT THE SPACING SHOWN WHEN THE PIPE DIAMETER IS GREATER THAN 18". THE NUMBER OF BARS WILL VARY DEPENDING ON THE STRUCTURE LENGTH (L).
3. USE CROSS DRAINAGE BAR WHEN THE PIPE DIAMETER IS GREATER THAN 30". WELD CROSS DRAINAGE BAR TO PARALLEL SAFETY BARS FOR SINGLE PIECE STRUCTURE.
4. LARGE END SECTIONS MAY BE PROVIDED IN MULTIPLE PANELS. WHEN MULTIPLE PANELS ARE USED, JOIN THE PANELS WITH BOLTS AND NUTS.
5. FOR 10:1 SLOPE END SECTIONS, USE 0.109" THICK (12 GAUGE) MATERIALS.
6. USE SCHEDULE 40 3" GALVANIZED STEEL PIPE FOR SAFETY BARS. FLATTEN END, THEN BEND OUTSIDE 4" TO MATCH STRUCTURE SIDES.
7. FORM ½"x2⅔" CORRUGATIONS. MAINTAIN INSIDE DIAMETER OF SLEEVE. FINISHED END TO BE THE SAME DIAMETER AS CORRUGATED STEEL PIPE DIAMETER.
8. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED 13683 STATE OF IDAHO RYAN D. LANCASTER

ORIGINAL SIGNED BY: RYAN D. LANCASTER MAY 12, 2016

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	05-16	RDL			
2	6-97	MSM						
3	11-00	MSM						
4	3-05	MSM						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 608-3_0516.dgn

DRAWING DATE: NOVEMBER, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: JESSE BARRUS

DESIGN/TRAFFIC SERVICES ENGINEER

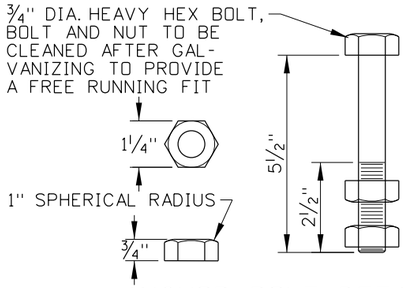
STANDARD DRAWING

METAL SAFETY SLOPE APRON

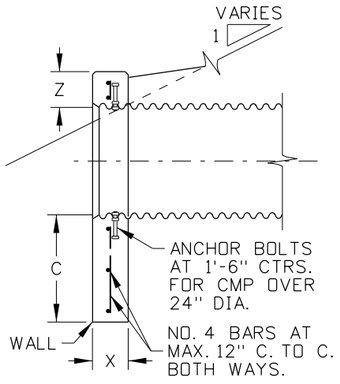
English

STANDARD DRAWING NO. 608-3

SHEET 2 OF 2

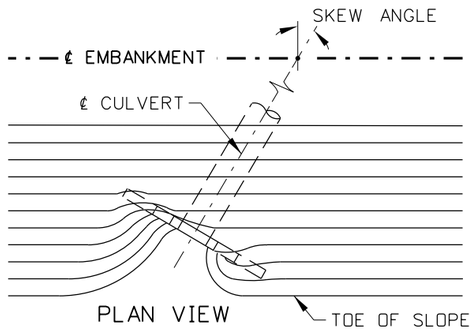


ANCHOR BOLT DETAIL



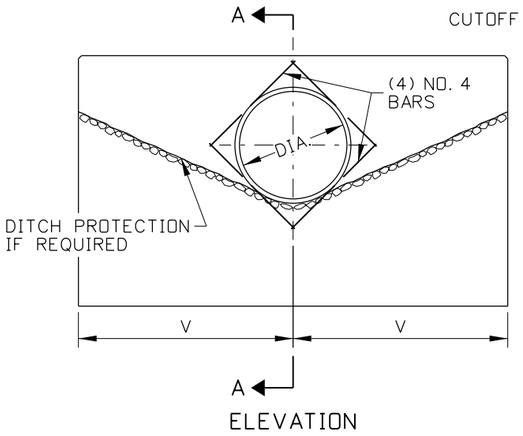
SECTION A-A

* a ADJUST WALL ENDS TO FILL SLOPE. WHEN CULVERT IS SKEWED TO EMBANKMENT, SLOPE THE ANGLE OF THE HEADWALL TO MEET THE FILL ON THE HIGH SIDE.



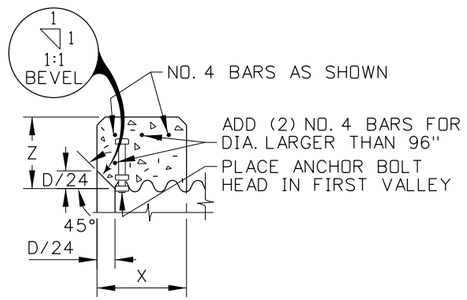
EMBANKMENT CONTOURS FOR SKEWED CULVERT

DIMENSION TABLE						
DIA. (INCHES)	C (INCHES)	V (INCHES)	W (INCHES)	X (INCHES)	Y (INCHES)	Z (INCHES)
18	24	36	4	8	5	8
24	24	48	5	9	6	9
30	24	60	6	9	8	9
36	24	54	11	10	9	10
42	24	63	13	10	11	10
48	24	72	14	10	12	10
54	24	81	15	11	14	11
60	24	90	16	11	15	11
72	36	108	19	11	18	11
84	36	126	21	11	21	11
96	36	144	24	12	24	12
108	36	162	27	14	27	14
120	36	180	30	15	30	15
144	36	216	36	18	36	18
180	36	270	45	23	45	23

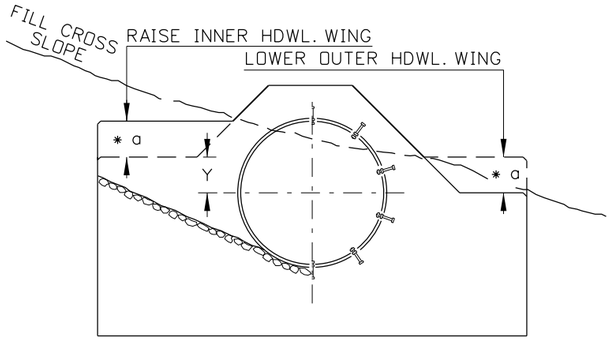


ELEVATION

INLET STRUCTURE (CULVERT SIZES 18" TO LESS THAN 36" DIA.)

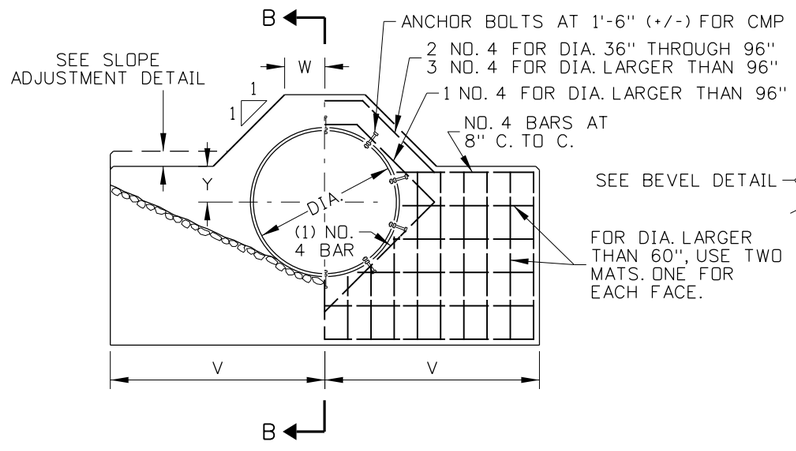


BEVEL DETAIL

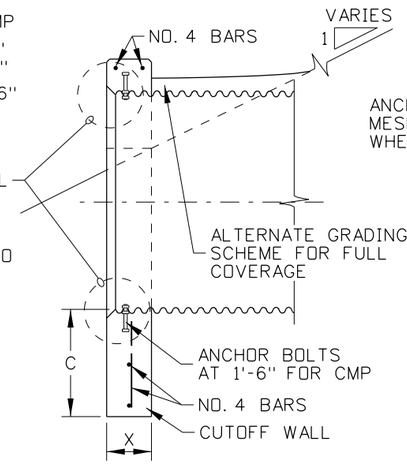


SLOPE ADJUSTMENT DETAIL

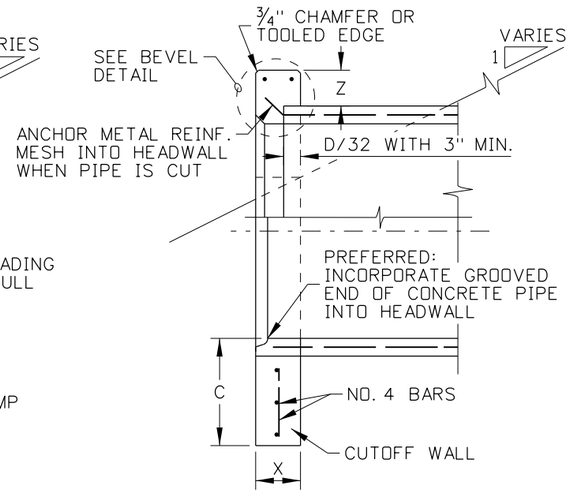
SUMMARY OF QUANTITIES					
DIA. (INCHES)	CONCRETE (CU. YD.)	METAL REINF. (LBS.)	DIA. (INCHES) CON'T.	CONCRETE (CU. YD.) CON'T.	METAL REINF. (LBS.) CON'T.
18	0.6	45			
24	0.9	65	72	4.1	435
30	1.2	85	84	5.6	535
36	1.2	75	96	6.9	640
42	1.4	90	108	9.8	795
48	1.7	105	120	12.5	955
54	2.3	125	144	20.3	1,255
60	2.6	145	180	37.6	1,820
NOTE: QUANTITIES SHOWN ARE FOR CORR. METAL PIPE (CMP)					



HALF ELEVATION



SECTION B-B (CORRUGATED METAL PIPE)



SECTION B-B (CONCRETE PIPE)

INLET STRUCTURE (CULVERT SIZES 36" TO 180" DIA.)

NOTES

1. ENSURE THAT ANCHOR BOLT AND NUT MATERIAL CONFORMS TO ASTM A307. GALVANIZE BOLTS AND NUTS AFTER FABRICATION IN ACCORDANCE WITH AASHTO M 232. ANCHOR BOLTS ARE NOT REQUIRED FOR CONCRETE PIPE.
2. THE DEPTH OF THE CUTOFF WALL SHOWN MAY BE REDUCED IF ROCK IS ENCOUNTERED AT A HIGHER ELEVATION.
3. TO PERMIT THE PLACEMENT AND TAMPING OF BACKFILL MATERIAL BETWEEN MULTIPLES PIPES, PROVIDE A CLEAR SPACE OF ONE-HALF THE DIAMETER OF THE LARGER PIPE. ENSURE THAT THE CLEAR SPACE DOES NOT EXCEED 3 FEET.
4. WHEN USING PERVIOUS BEDDING AND BACKFILL MATERIAL, PREVENT SEEPAGE AND PIPING BY PLACING IMPERVIOUS MATERIAL AT THE INLET. CUTOFF COLLARS MAY BE USED INSTEAD OF IMPERVIOUS MATERIAL.
5. USE ENTRANCE LOSS COEFFICIENT K_e=0.2 FOR BEVELED ENTRANCE.
6. WHEN CULVERT IS SKEWED TO EMBANKMENT, THE EMBANKMENT MAY BE CONTOURED AS SHOWN.
7. COVER REINFORCING STEEL WITH A MINIMUM CONCRETE DEPTH OF 2".
8. ALL EDGES TO HAVE ¾" CHAMFER OR TOOLED EDGES.
9. THIS INLET IS TO BE USED ONLY OUTSIDE OF THE CLEAR ZONE, OR BEHIND GUARDRAIL.
10. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED BY RYAN D. LANCASTER DECEMBER 17, 2020

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	01-97	MSM						
2	11-00	MSM						
3	07-02	MSM						
4	03-05	MSM						
5	12-12	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-1_1212.dgn

DRAWING DATE: JANUARY, 1989

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

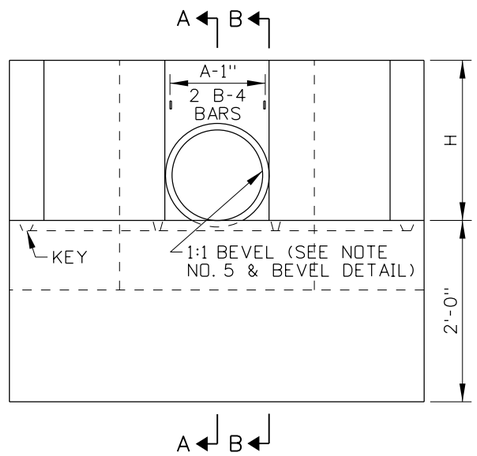
STANDARD DRAWING

CULVERT INLET HEADWALL

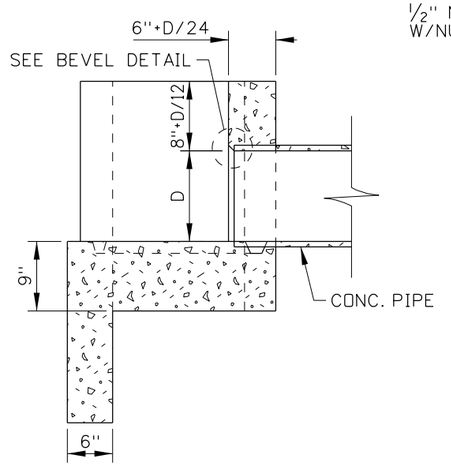
English

STANDARD DRAWING NO. 609-1

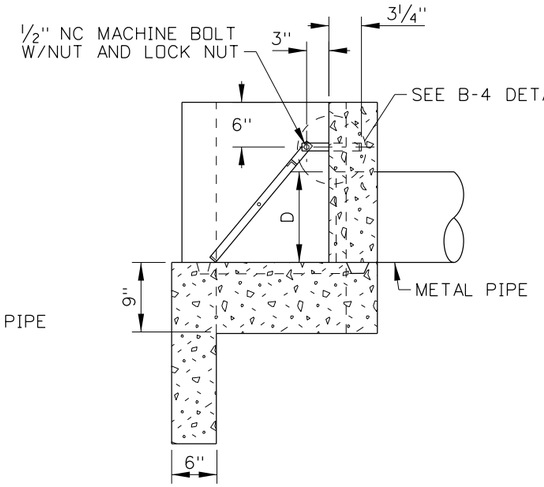
SHEET 1 OF 1



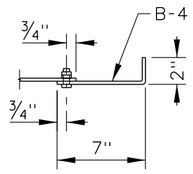
ELEVATION



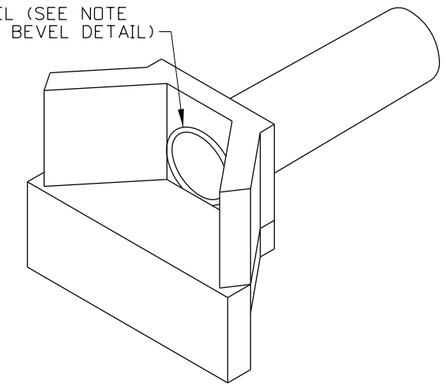
SECTION A-A



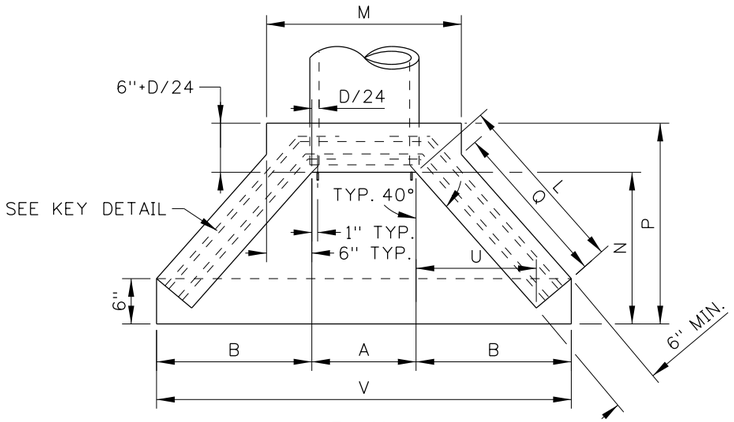
SECTION B-B



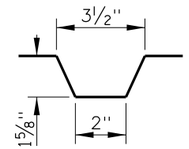
B-4 DETAIL



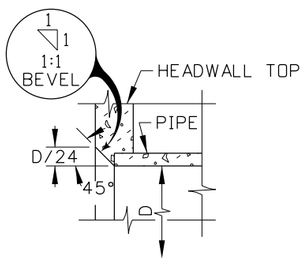
ISOMETRIC VIEW



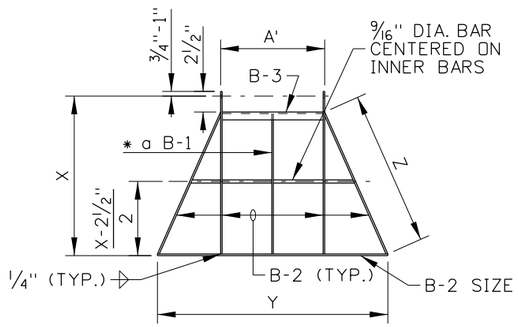
PLAN



KEY DETAIL



BEVEL DETAIL



* a BARS SHALL BE EQUALLY SPACED IN GRATE
NOT TO EXCEED 8" CENTER TO CENTER
OR LESS THAN 6" CENTER TO CENTER.

INLET GRATE DETAIL

ORIGINAL STORED
AT: ITD,
Headquarters
3311 West State
Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR
REGISTERED
ORIGINAL STORED
AT ITD OFFICE
MILFORD MILLER
ORIGINAL SIGNED
MARCH 4, 2005
STATE OF IDAHO
2240
MILFORD MILLER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-64		6	12-92	TMR			
2	02-68		7	10-01	MSM			
3	09-68		8	03-05	MSM			
4	10-69							
5	03-92	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-2_0305.dgn

DRAWING DATE: APRIL, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

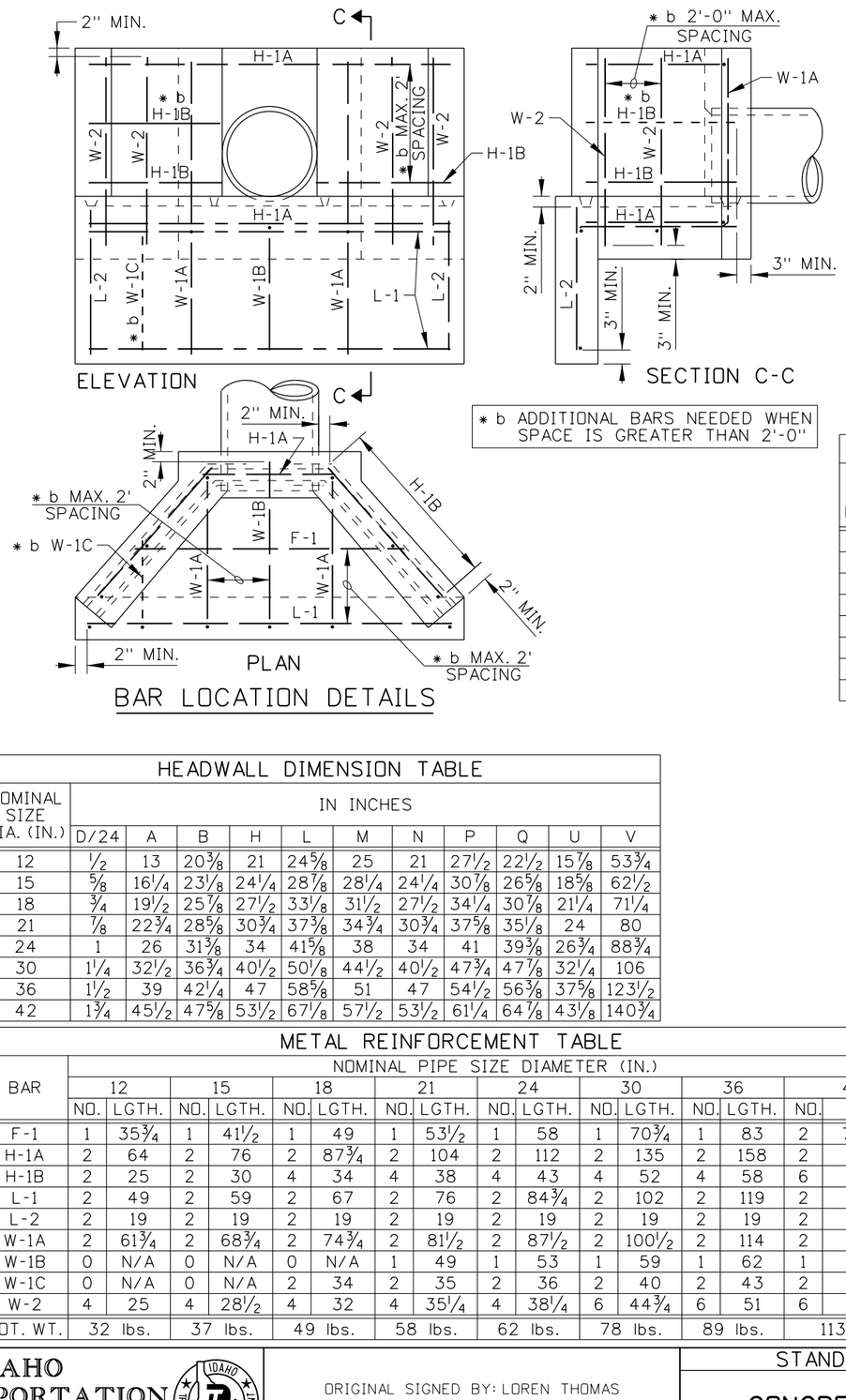
CONCRETE HEADWALL FOR SINGLE PIPE CULVERT

English

STANDARD DRAWING NO. 609-2

METAL REINFORCEMENT TABLE

MARK	LOCATION	BAR SIZE	SKETCH
F-1	FLOOR	NO. 4	
L-1	TOP & BOTOM OF INLET LIP IN FLOOR	NO. 4	
H-1A	HORIZ. IN TOP OF WING WALL & IN FLOOR BACK WALL	NO. 4	130°
H-1B	HORIZ. IN WING WALL BETWEEN H-1As' (PAIRS ONLY)	NO. 4	2" MIN., 2" MIN., PIPE, W-1A
W-1A	EACH SIDE OF PIPE IN BACKWALL, FLOOR, & INLET LIP	NO. 4	90°, 90°, 90°
W-1B	IN FLOOR, & INLET LIP	NO. 4	90°
W-1C	IN FLOOR, & INLET LIP	NO. 4	90°
L-2	VERTICAL IN FLOOR, & INLET LIP	NO. 4	
W-2	VERTICAL IN WING WALLS	NO. 4	



BAR LOCATION DETAILS

CONCRETE TABLE

NOMINAL SIZE DIA. (IN.)	CONCRETE (C.Y.)			
	WING & BCKWL.	FLOOR	LIP	TOTAL
12	0.2	0.3	0.1	0.6
15	0.3	0.3	0.1	0.7
18	0.3	0.4	0.2	0.9
21	0.4	0.5	0.2	1.1
24	0.5	0.6	0.2	1.3
30	0.8	0.8	0.2	1.8
36	1.0	1.0	0.3	2.3
42	1.3	1.3	0.3	2.9

GRATE DIMENSION & MATERIALS TABLE

NOMINAL SIZE DIA. (IN.)	IN INCHES							
	DIMENSIONS				BAR SIZES			
	A'	* c X	Y	Z	B-1	B-2	B-3	B-4
12	12	19 1/4	29 1/2	18 7/8	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
15	15 1/4	24	39 1/2	24 3/4	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
18	18 1/2	28	46 1/2	29	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
21	21 3/4	33	55 3/4	35	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
24	25	37 1/2	66 1/2	40 5/8	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
30	31 1/2	46 3/4	81 1/2	50 7/8	1 1/4x1/4	1 1/2x1/4	1 1/2x1 1/2x1/4	1 1/2x1/4x9
36	38	56	98	61 1/8	1 1/2x1/4	1 3/4x1/4	1 3/4x1 3/4x1/4	1 3/4x1/4x9
42	44 1/2	65	116	72	1 3/4x1/4	2 1/4x3/8	2 1/4x2 1/2x3/8	2 1/4x3/8x9

* c ALLOW 3/4"-1" EXTRA BAR LENGTH FOR HOLE FABRICATION

HEADWALL DIMENSION TABLE

NOMINAL SIZE DIA. (IN.)	IN INCHES										
	D/24	A	B	H	L	M	N	P	Q	U	V
12	1/2	13	20 3/8	21	24 5/8	25	21	27 1/2	22 1/2	15 7/8	53 3/4
15	5/8	16 1/4	23 1/8	24 1/4	28 7/8	28 1/4	24 1/4	30 7/8	26 5/8	18 5/8	62 1/2
18	3/4	19 1/2	25 7/8	27 1/2	33 1/8	31 1/2	27 1/2	34 1/4	30 7/8	21 1/4	71 1/4
21	7/8	22 3/4	28 5/8	30 3/4	37 3/8	34 3/4	30 3/4	37 5/8	35 1/8	24	80
24	1	26	31 3/8	34	41 5/8	38	34	41	39 3/8	26 3/4	88 3/4
30	1 1/4	32 1/2	36 3/4	40 1/2	50 1/8	44 1/2	40 1/2	47 3/4	47 7/8	32 1/4	106
36	1 1/2	39	42 1/4	47	58 5/8	51	47	54 1/2	56 3/8	37 5/8	123 1/2
42	1 3/4	45 1/2	47 5/8	53 1/2	67 1/8	57 1/2	53 1/2	61 1/4	64 7/8	43 1/8	140 3/4

METAL REINFORCEMENT TABLE

BAR	NOMINAL PIPE SIZE DIAMETER (IN.)															
	12		15		18		21		24		30		36		42	
	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.
F-1	1	35 3/4	1	41 1/2	1	49	1	53 1/2	1	58	1	70 3/4	1	83	2	79/109
H-1A	2	64	2	76	2	87 3/4	2	104	2	112	2	135	2	158	2	182
H-1B	2	25	2	30	4	34	4	38	4	43	4	52	4	58	6	67
L-1	2	49	2	59	2	67	2	76	2	84 3/4	2	102	2	119	2	136 3/4
L-2	2	19	2	19	2	19	2	19	2	19	2	19	2	19	2	19
W-1A	2	61 3/4	2	68 3/4	2	74 3/4	2	81 1/2	2	87 1/2	2	100 1/2	2	114	2	127
W-1B	0	N/A	0	N/A	0	N/A	1	49	1	53	1	59	1	62	1	68
W-1C	0	N/A	0	N/A	2	34	2	35	2	36	2	40	2	43	2	47
W-2	4	25	4	28 1/2	4	32	4	35 1/4	4	38 1/4	6	44 3/4	6	51	6	57 1/2
TOT. WT.	32 lbs.		37 lbs.		49 lbs.		58 lbs.		62 lbs.		78 lbs.		89 lbs.		113 lbs.	

NOTES

1. THIS HEADWALL SHALL BE USED ONLY WHEN PROTECTED BY GUARDRAIL OR INSTALLED OUTSIDE THE CLEAR ZONE.
2. CAST-IN-PLACE HEADWALLS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES, OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND 3" MINIMUM COVER IF CAST AGAINST EARTH.
4. ALL EDGES TO HAVE 3/4" CHAMFER OR TOOLED EDGES.
5. ALL PIPE CULVERTS WITH A CONCRETE HEADWALL SHALL HAVE THE INLET HEADWALLS BEVELED. USE ENTRANCE LOSS COEFFICIENT K_e = 0.2 FOR BEVELED ENTRANCES.
6. THE METAL FOR THE GRATE SHALL MEET THE REQUIREMENTS OF ASTM A 36. WELDING OF THE METAL GRATE SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1. GRATES FOR INLET HEADWALLS WILL BE REQUIRED ONLY WHEN SHOWN ON THE ROADWAY PLANS. GRATES NEED NOT BE PAINTED OR GALVANIZED.
7. USE CONCRETE, METAL, OR PLASTIC PIPE WITH HEADWALL (CONCRETE PIPE SHOWN ON DRAWING).
7. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL STORED AT I.T.D. HEADQUARTERS MILFORD MILLER MARCH 4, 2005 STATE OF IDAHO

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-64		6	12-92	TMR			
2	02-68		7	10-01	MSM			
3	09-68		8	03-05	MSM			
4	10-69							
5	03-92	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-2_0305.dgn

DRAWING DATE: APRIL, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

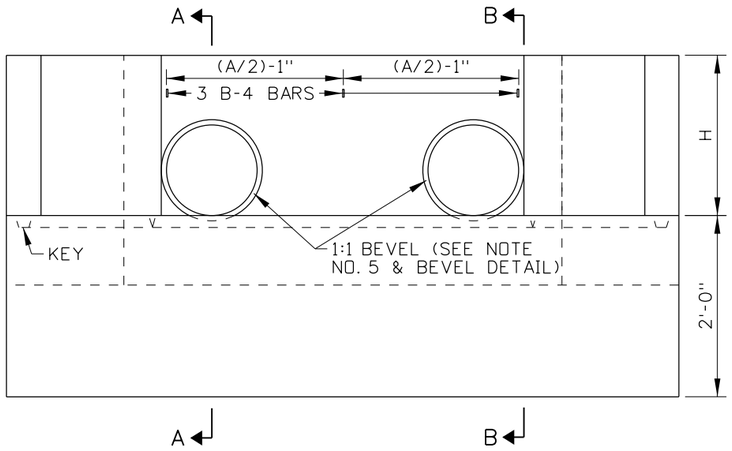
CONCRETE HEADWALL FOR SINGLE PIPE CULVERT

English

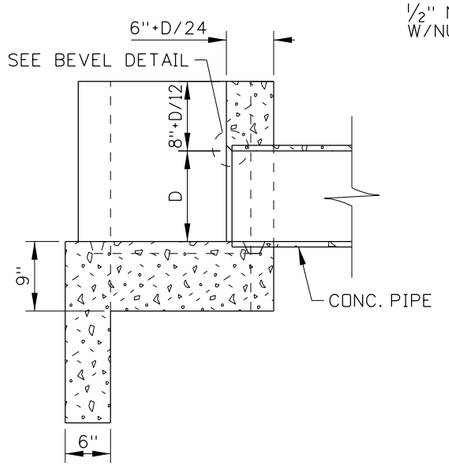
STANDARD DRAWING NO. 609-2

SHEET 2 OF 2

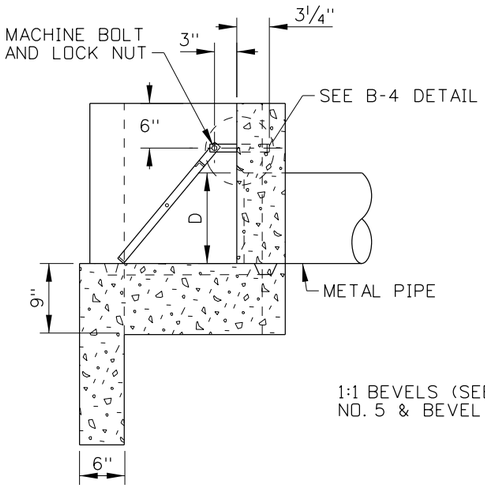
2240



ELEVATION



SECTION A-A



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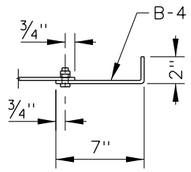
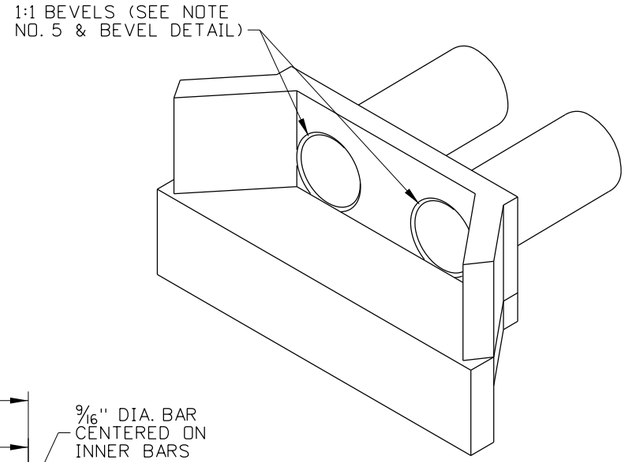
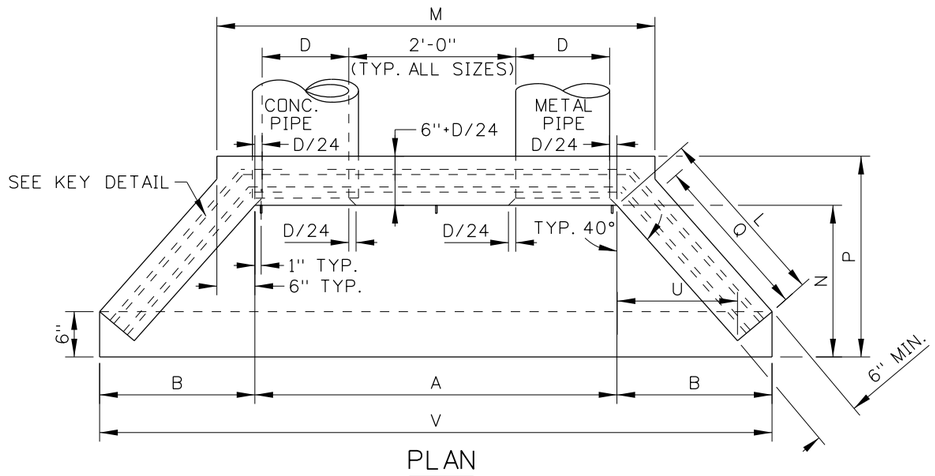


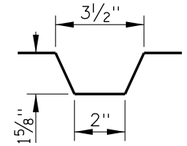
B-4 DETAIL



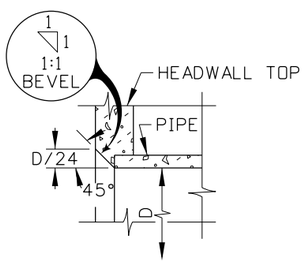
ISOMETRIC VIEW



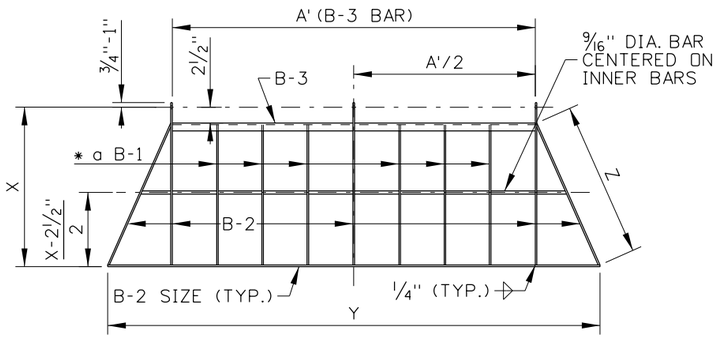
PLAN



KEY DETAIL



BEVEL DETAIL



* a BARS SHALL BE EQUALLY SPACED IN GRATE NOT TO EXCEED 8" CENTER TO CENTER OR LESS THAN 6" CENTER TO CENTER.

INLET GRATE DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REGISTERED PROFESSIONAL ENGINEER * LAND SURVEYOR
ORIGINAL SIGNED BY MILFORD MILLER
MARCH 4, 2005
STATE OF IDAHO
MILFORD MILLER

2240

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-68		6	12-92	TMR			
2	09-68		7	10-01	MSM			
3	10-69		8	06-03	MSM			
4	04-90	GB	9	03-05	MSM			
5	03-92	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-3_0305.dgn

DRAWING DATE: MAY, 1964

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

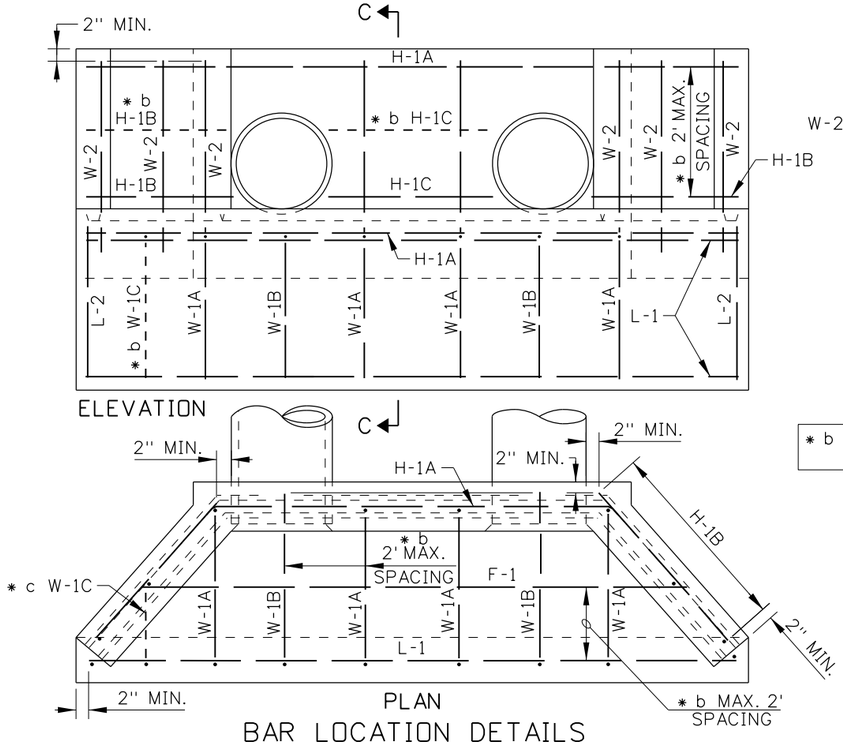
CONCRETE HEADWALL FOR TWIN PIPE CULVERTS

English

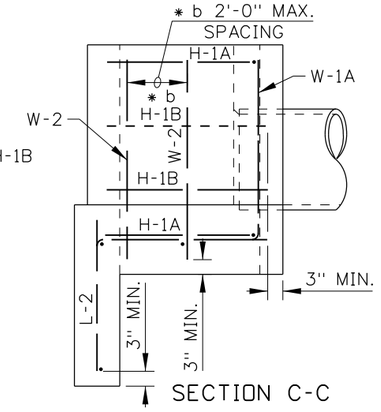
STANDARD DRAWING NO. 609-3

METAL REINFORCEMENT TABLE

MARK	LOCATION	BAR SIZE	SKETCH
F-1	FLOOR	NO. 4	
H-1A	HORIZ. IN TOP OF WING WALL & IN FLOOR BACKWALL	NO. 4	130°
H-1B	HORIZ. IN WING WALL BETWEEN H-1As' (PAIRS)	NO. 4	2" MIN., 2" MIN., 2"*TYP., PIPE, H-1C, PIPE, W-1A, 130°
H-2	VERT. IN BCKWL. WALL BETWEEN AROUND PIPE	NO. 4	2", VARIES, 2", PIPE, PIPE
L-1	TOP & BOTOM OF INLET LIP IN FLOOR	NO. 4	
L-2	VERTICAL IN FLOOR, & INLET LIP	NO. 4	
W-1A	EACH SIDE OF PIPE IN BACKWALL, FLOOR, & INLET LIP	NO. 4	90°, 90°
W-1B	IN FLOOR, & INLET LIP, UNDER PIPES	NO. 4	90°
W-1C	IN FLOOR, & INLET LIP	NO. 4	90°
W-2	VERTICAL IN WING WALLS	NO. 4	



BAR LOCATION DETAILS



* b ADDITIONAL BARS NEEDED WHEN SPACE IS GREATER THAN 2'-0"

CONCRETE QUANTITY TABLE

NOMINAL SIZE DIA. (IN.)	CONCRETE (C.Y.)			
	WING & BCKWL.	FLOOR	LIP	TOTAL
12	0.3	0.4	0.2	0.9
15	0.4	0.6	0.2	1.2
18	0.5	0.7	0.2	1.4
21	0.6	0.8	0.3	1.7
24	0.7	1.0	0.3	2.0
30	1.0	1.3	0.3	2.6
36	1.3	1.7	0.4	3.4
42	1.7	2.1	0.5	4.3

GRATE DIMENSION & MATERIALS TABLE

NOMINAL SIZE DIA. (IN.)	IN INCHES							
	DIMENSIONS				BAR SIZES			
	A'	* c X	Y	Z	B-1	B-2	B-3	B-4
12	12	19 1/4	29 1/2	18 7/8	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
15	15 1/4	24	39 1/2	24 3/4	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
18	18 1/2	28	46 1/2	29	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
21	21 3/4	33	55 3/4	35	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
24	25	37 1/2	66 1/2	40 5/8	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
30	31 1/2	46 3/4	81 1/2	50 7/8	1 1/4x1/4	1 1/2x1/4	1 1/2x1 1/2x1/4	1 1/2x1/4x9
36	38	56	98	61 1/8	1 1/2x1/4	1 3/4x1/4	1 3/4x1 3/4x1/4	1 3/4x1/4x9
42	44 1/2	65	116	72	1 3/4x1/4	2 1/4x3/8	2 1/4x2 1/2x3/8	2 1/4x3/8x9

* c ALLOW 3/4"-1" EXTRA BAR LENGTH FOR HOLE FABRICATION

HEADWALL DIMENSION TABLE

NOMINAL SIZE DIA. (IN.)	IN INCHES										
	D/24	A	B	H	L	M	N	P	Q	U	V
12	1/2	49	20 3/8	21	24 5/8	61	21	27 1/2	22 1/2	15 7/8	89 3/4
15	5/8	55 1/4	23 1/8	24 1/4	28 7/8	67 1/4	24 1/4	30 7/8	26 5/8	18 5/8	101 1/2
18	3/4	61 1/2	25 7/8	27 1/2	33 1/8	73 1/2	27 1/2	34 1/4	30 7/8	21 1/4	113 1/4
21	7/8	67 3/4	28 5/8	30 3/4	37 3/8	79 3/4	30 3/4	37 5/8	35 1/8	24	125
24	1	74	31 3/8	34	41 5/8	86	34	41	39 3/8	26 3/4	136 3/4
30	1 1/4	86 1/2	36 3/4	40 1/2	50 1/8	98 1/2	40 1/2	47 3/4	47 7/8	32 1/4	160
36	1 1/2	99	42 1/4	47	58 5/8	111	47	54 1/2	56 3/8	37 5/8	183 1/2
42	1 3/4	111 3/4	47 5/8	53 1/2	67 1/8	123 1/2	53 1/2	61 1/4	64 7/8	43 1/8	207

METAL REINFORCEMENT TABLE

BAR	NOMINAL PIPE SIZE DIAMETER (IN.)													
	12		15		18		21		24		30		36		42	
	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.
F-1	1	71 7/8	1	80	1	90	1	98	1	106	1	124	1	143	2	145/175
H-1A	2	100	2	115	2	129	2	149	2	160	2	189	2	218	2	248
H-1B	2	25	2	30	4	34	4	38	4	43	4	52	4	58	6	67
H-1C	1	22	1	28	2	22/25	2	22/23	2	22/28	2	22/32	2	21/36	3	29/20/40
L-1	2	85 7/8	2	100	2	109	2	121	2	132 3/4	2	156	2	179	2	202
L-2	2	19	2	19	2	19	2	19	2	19	2	19	2	19	2	19
W-1A	4	61 3/4	4	68 3/4	4	74 3/4	4	81 1/2	3	87 1/2	3	100 1/2	4	114	4	127
W-1B	0	N/A	0	N/A	2	N/A	2	49	2	53	2	59	2	66	2	68
W-1C	0	N/A	0	N/A	2	34	2	34	2	35	2	40	2	43	2	47
W-2	4	25	4	28 1/2	4	32	4	35 1/4	4	38 1/4	6	44 3/4	6	51	6	57 1/2
TOT. WT.	51 lbs.		58 lbs.		72 lbs.		81 lbs.		86 lbs.		105 lbs.		126 lbs.		158 lbs.	

NOTES

1. THIS HEADWALL SHALL BE USED ONLY WHEN PROTECTED BY GUARDRAIL OR INSTALLED OUTSIDE THE CLEAR ZONE.
2. CAST-IN-PLACE HEADWALLS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES, OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND 3" MINIMUM COVER IF CAST AGAINST EARTH.
4. ALL EDGES TO HAVE 3/4" CHAMFER OR TOOLED EDGES.
5. ALL PIPE CULVERTS WITH A CONCRETE HEADWALL SHALL HAVE THE INLET HEADWALLS BEVELED. USE ENTRANCE LOSS COEFFICIENT K_e = 0.2 FOR BEVELED ENTRANCES.
6. THE METAL FOR THE GRATE SHALL MEET THE REQUIREMENTS OF ASTM A 36. WELDING OF THE METAL GRATE SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1. GRATES FOR INLET HEADWALLS WILL BE REQUIRED ONLY WHEN SHOWN ON THE ROADWAY PLANS. GRATES NEED NOT BE PAINTED OR GALVANIZED.
7. USE CONCRETE, METAL, OR PLASTIC PIPE WITH HEADWALL (CONCRETE PIPE SHOWN ON DRAWING).
8. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED BY MILFORD MILLER MARCH 4, 2005 STATE OF IDAHO MILFORD MILLER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-68		6	12-92	TMR			
2	09-68		7	10-01	MSM			
3	10-69		8	06-03	MSM			
4	04-90	GB	9	03-05	MSM			
5	03-92	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-3_0305.dgn

DRAWING DATE: MAY, 1964

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

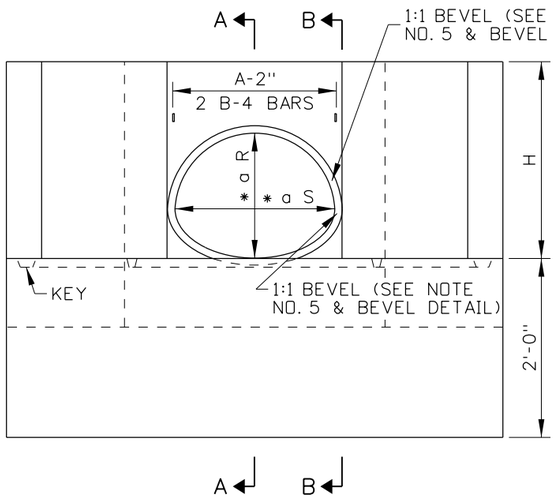
CONCRETE HEADWALL FOR TWIN PIPE CULVERTS

English

STANDARD DRAWING NO. 609-3

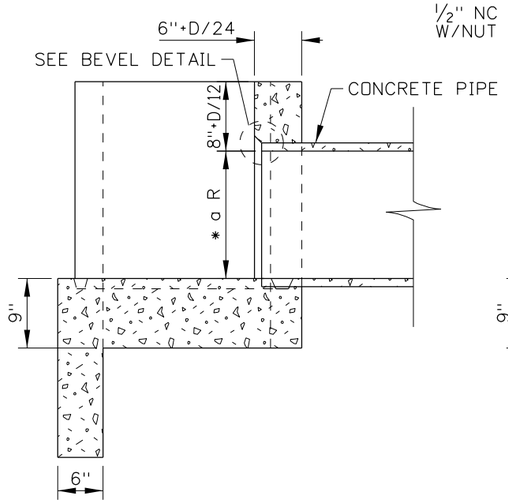
SHEET 2 OF 2

2240

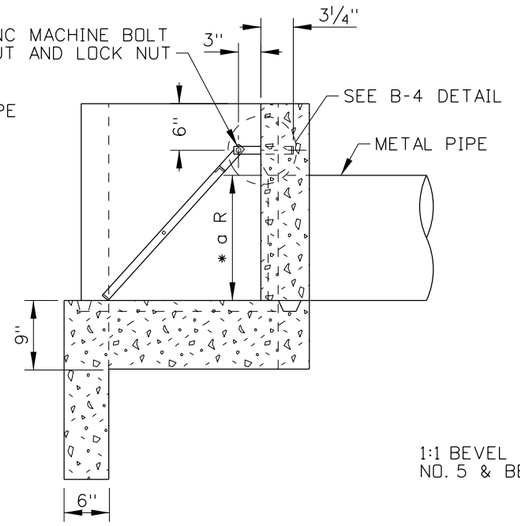


ELEVATION

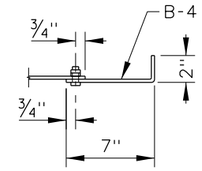
* a S=SPAN & R=RISE:
"D/24" VALUE=((S+R)/2)/24
"D/12" VALUE=((S+R)/2)/12



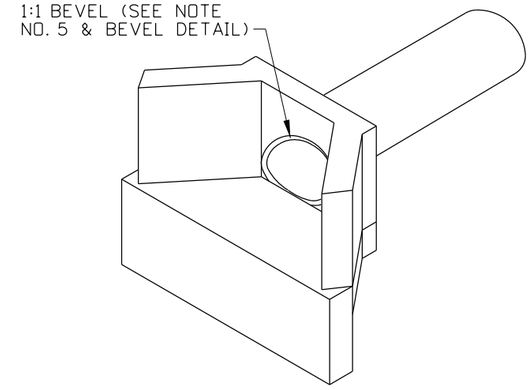
SECTION A-A



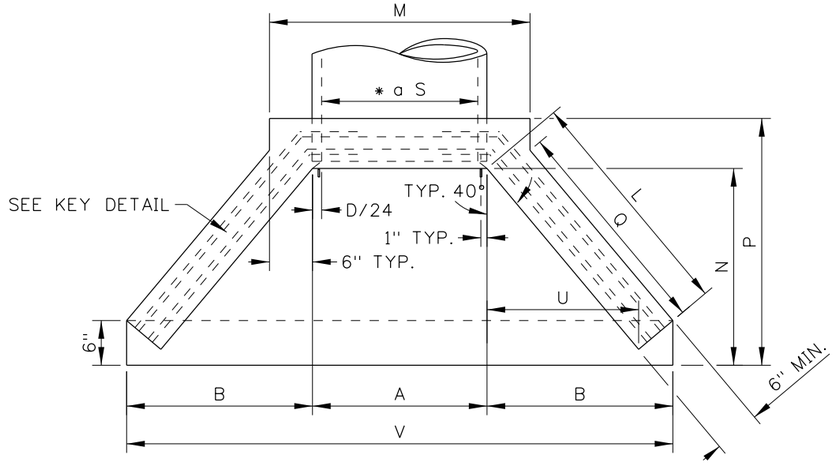
SECTION B-B



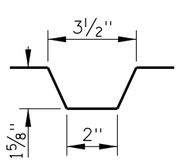
B-4 DETAIL



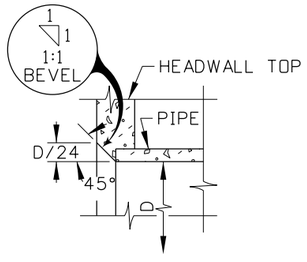
ISOMETRIC VIEW



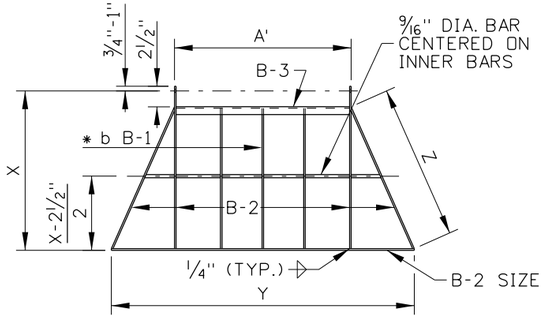
PLAN



KEY DETAIL



BEVEL DETAIL



* b BARS SHALL BE EQUALLY SPACED IN GRATE NOT TO EXCEED 8" CENTER TO CENTER OR LESS THAN 6" CENTER TO CENTER.

INLET GRATE DETAIL

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-69		6	10-01	MSM			
2	03-92	MSM	7	06-03	MSM			
3	12-92	TMR	8	03-05	MSM			
4	05-95	MSM						
5	04-99	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-4_0305.dgn

DRAWING DATE: AUGUST, 1968

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

CONCRETE HEADWALL FOR ARCH PIPE CULVERT

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

English

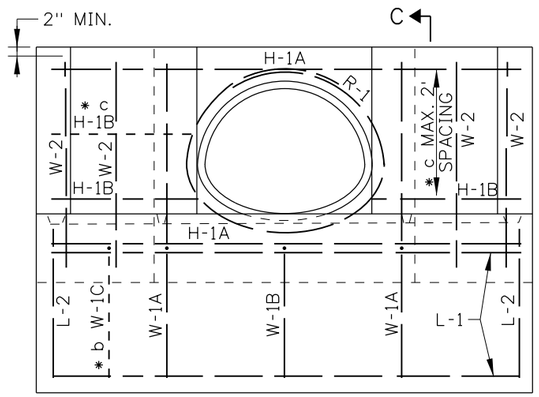
STANDARD DRAWING NO. 609-4

SHEET 1 OF 2

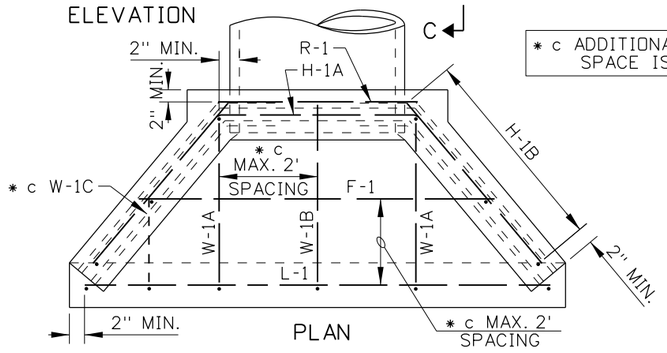
PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED MILFORD MILLER DATE OF ORIGINAL SIGNATURE: MARCH 4, 2005 2240 STATE OF IDAHO MILFORD MILLER

METAL REINFORCEMENT TABLE

MARK	LOCATION	BAR SIZE	SKETCH
F-1	FLOOR	NO. 4	
L-1	TOP & BOTOM OF INLET LIP IN FLOOR	NO. 4	
H-1A	HORIZ. IN TOP OF WING WALL & IN FLOOR BACK WALL	NO. 4	130°
H-1B	HORIZ. IN WING WALL BETWEEN H-1As'	NO. 4	2" MIN., 2" MIN., PIPE, W-1A, 130°
H-2	VERT. IN BCKWL. WALL BETWEEN AROUND PIPE	NO. 4	MIN. 12" OVERLAP
W-1A	EACH SIDE OF PIPE IN BACKWALL, FLOOR, & INLET LIP	NO. 4	90°, 90°
W-1B	IN FLOOR, & INLET LIP	NO. 4	90°
W-1C	IN FLOOR, & INLET LIP	NO. 4	90°
L-2	VERTICAL IN FLOOR, & INLET LIP	NO. 4	
W-2	VERTICAL IN WING WALLS	NO. 4	

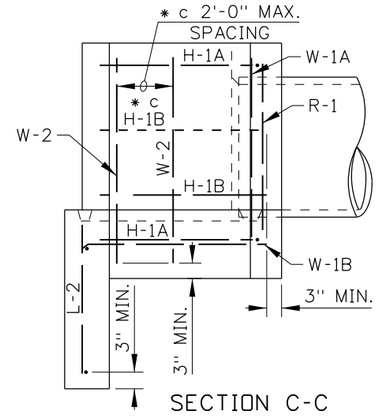


ELEVATION



PLAN

BAR LOCATION DETAILS



SECTION C-C

* c ADDITIONAL BARS NEEDED WHEN SPACE IS GREATER THAN 2'-0"

CONCRETE QUANTITY TABLE

CULVERT SIZE SPANxRISE	CONCRETE (C.Y.)			
	WING & BCKWL.	FLOOR	LIP	TOTAL
17x13	0.2	0.3	0.2	0.7
21x15	0.3	0.3	0.2	0.8
24x18	0.4	0.4	0.2	1.0
28x20	0.4	0.5	0.2	1.1
35x24	0.5	0.7	0.2	1.4
42x29	0.8	0.9	0.2	1.9
49x33	1.0	1.1	0.3	2.4

GRATE DIMENSION & MATERIALS TABLE

CULVERT SIZE SPANxRISE	IN INCHES							
	DIMENSIONS				BAR SIZES			
	A'	* d X	Y	Z	B-1	B-2	B-3	B-4
17x13	17 1/4	21	36 7/8	17 3/4	1x1/4	1 1/4x1 1/4	1 1/4x1 1/4x1/4	1x1/4x9
21x15	21 1/2	24 1/8	44 1/2	26 1/2	1x1/4	1 1/4x1 1/4	1 1/4x1 1/4x1/4	1x1/4x9
24x18	24 3/4	28 3/4	53 3/8	30 1/8	1x1/4	1 1/4x1 1/4	1 1/4x1 1/4x1/4	1x1/4x9
28x20	29	31 7/8	61 1/2	33 1/2	1x1/4	1 1/4x1 1/4	1 1/4x1 1/4x1/4	1x1/4x9
35x24	36 1/2	38 1/4	76 3/4	41	1x1/4	1 1/4x1 1/4	1 1/4x1 1/4x1/4	1x1/4x9
42x29	43 1/2	46	93	50	1 1/4x1/4	1 1/2x1/4	1 1/2x1 1/2x1/4	1 1/2x1/4x9
49x33	51 1/2	52 1/4	108	57 1/8	1 1/2x1/4	1 3/4x1/4	1 3/4x1 3/4x1/4	1 3/4x1/4x9

* d ALLOW 3/4"-1" EXTRA BAR LENGTH FOR HOLE FABRICATION

HEADWALL DIMENSION TABLE

CULVERT SIZE SPANxRISE	((S+R)/2)/24 VALUES	IN INCHES									
	D/24	A	B	H	L	M	N	P	Q	U	V
17x13	5/8	18 1/4	21 1/2	22 1/4	26 1/4	30 1/4	22 1/4	28 7/8	24	16 7/8	61 1/4
21x15	3/4	23 3/8	23 3/8	24 1/2	29 1/4	34 1/2	24 1/2	31 1/4	27	18 3/4	69 1/4
24x18	7/8	26 1/8	26 1/8	27 3/4	33 1/2	37 3/4	27 3/4	34 5/8	31 3/8	21 1/2	78
28x20	1	28	28	30	36 3/8	42	30	37	34 1/4	23 3/8	86
35x24	1 1/4	31 3/4	31 3/4	34 1/2	42 1/4	49 1/2	34 1/2	41 3/4	40	27 1/8	101
42x29	1 1/2	36 1/2	36 1/2	40	49 1/2	57	40	47 1/2	47 3/8	31 3/4	118
49x33	1 3/4	40 1/8	40 1/8	44 3/8	55 1/8	64 1/2	44 3/8	52 1/8	53	31 3/4	132 3/4

METAL REINFORCEMENT TABLE

BAR	NOMINAL PIPE SIZE DIAMETER (IN.)													
	17x13		21x15		24x18		28x20		35x24		42x29		49x33	
	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.
F-1	1	40 1/2	1	48	1	54	1	60	1	70	1	82	1	96
H-1A	2	74	2	83	2	94	2	105	2	124	2	146	2	165
H-1B	2	25	2	30	4	34	4	38	4	44	4	52	4	58
L-1	2	57	2	65	2	74	2	82	2	97	2	114	2	128
L-2	2	19	2	19	2	19	2	19	2	19	2	19	2	19
R-1	1	72	1	82	1	92	1	102	1	118	1	138	1	153
W-1A	2	61 1/2	2	67 1/2	2	74	2	79 1/2	2	87 1/2	2	98 1/2	2	107
W-1B	0	N/A	2	41 1/2	2	45	2	48	2	52	2	59 1/2	2	62
W-1C	0	N/A	1	N/A	1	32	1	33 1/2	1	36	1	39	2	40
W-2	4	26	4	29 1/2	4	32	4	34	4	38 1/2	6	44	6	48
TOT. WT.	39 lbs.		46 lbs.		58 lbs.		64 lbs.		73 lbs.		90 lbs.		101 lbs.	

NOTES

1. THIS HEADWALL SHALL BE USED ONLY WHEN PROTECTED BY GUARDRAIL OR INSTALLED OUTSIDE THE CLEAR ZONE.
2. CAST-IN-PLACE HEADWALLS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES, OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND 3" MINIMUM COVER IF CAST AGAINST EARTH.
4. ALL EDGES TO HAVE 3/4" CHAMFER OR TOOLED EDGES.
5. ALL PIPE CULVERTS WITH A CONCRETE HEADWALL SHALL HAVE THE INLET HEADWALLS BEVELED. USE ENTRANCE LOSS COEFFICIENT K_e = 0.2 FOR BEVELED ENTRANCES.
6. THE METAL FOR THE GRATE SHALL MEET THE REQUIREMENTS OF ASTM A 36. WELDING OF THE METAL GRATE SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1. GRATES FOR INLET HEADWALLS WILL BE REQUIRED ONLY WHEN SHOWN ON THE ROADWAY PLANS. GRATES NEED NOT BE PAINTED OR GALVANIZED.
7. USE CONCRETE, METAL, OR PLASTIC PIPE WITH HEADWALL (CONCRETE PIPE SHOWN ON DRAWING).
8. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL STORED AT I.T.D. ORIGINAL SIGNED BY: MILFORD MILLER MARCH 4, 2005 STATE OF IDAHO MILFORD MILLER 2240

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	10-69		6	10-01	MSM			
2	03-92	MSM	7	06-03	MSM			
3	12-92	TMR	8	03-05	MSM			
4	05-95	MSM						
5	04-99	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-4_0305.dgn

DRAWING DATE: AUGUST, 1968

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

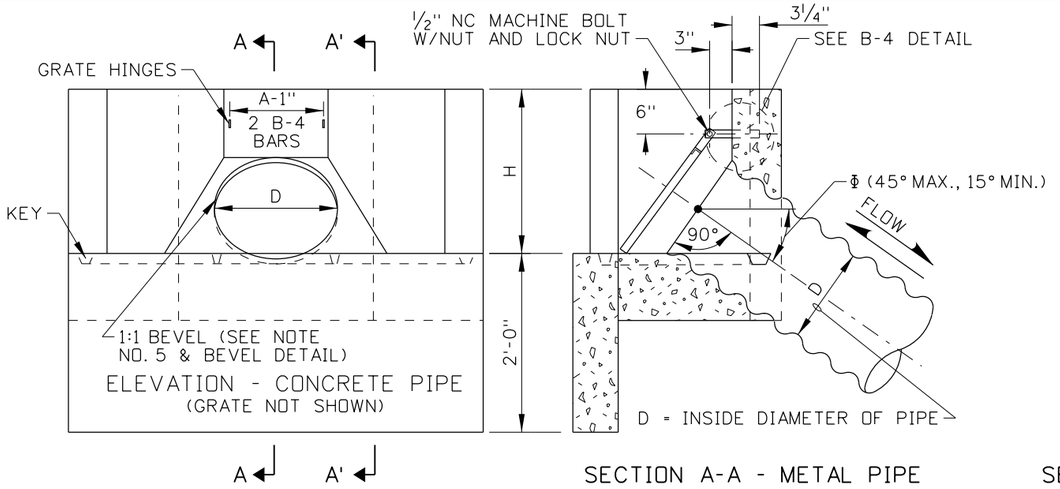
STANDARD DRAWING

CONCRETE HEADWALL FOR ARCH PIPE CULVERT

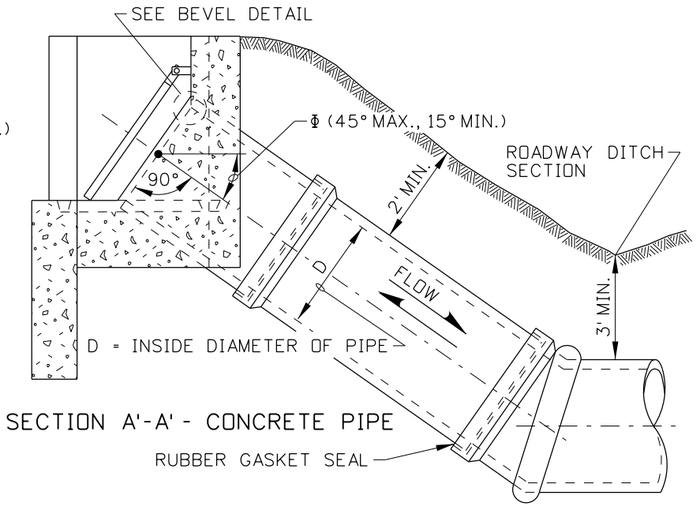
English

STANDARD DRAWING NO. 609-4

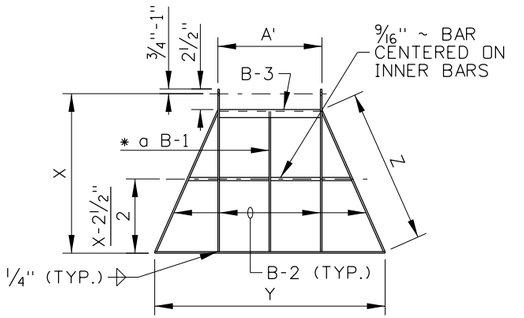
SHEET 2 OF 2



SECTION A-A - METAL PIPE

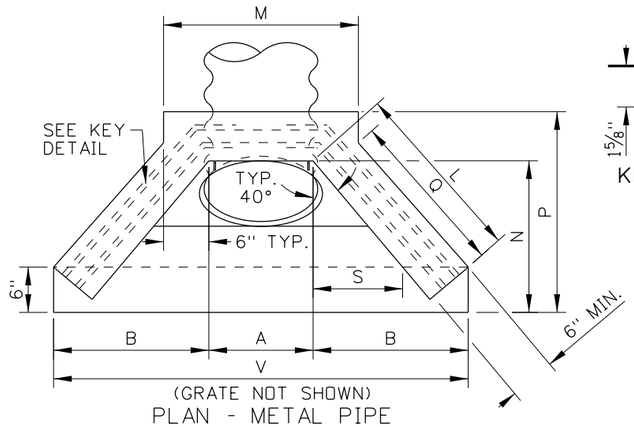


SECTION A'-A' - CONCRETE PIPE

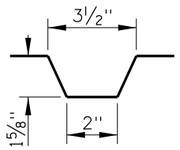


* a BARS SHALL BE EQUALLY SPACED IN GRATE NOT TO EXCEED 8" CENTER TO CENTER OR LESS THAN 6" CENTER TO CENTER.

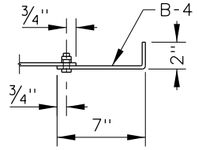
GRATE DETAIL



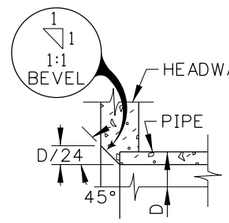
PLAN - METAL PIPE



KEY DETAIL

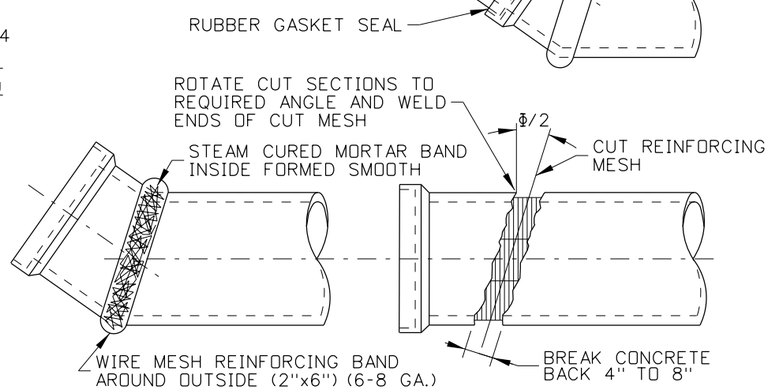


B-4 DETAIL

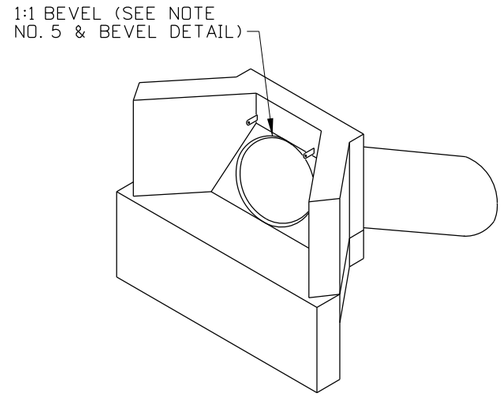


BEVEL DETAIL

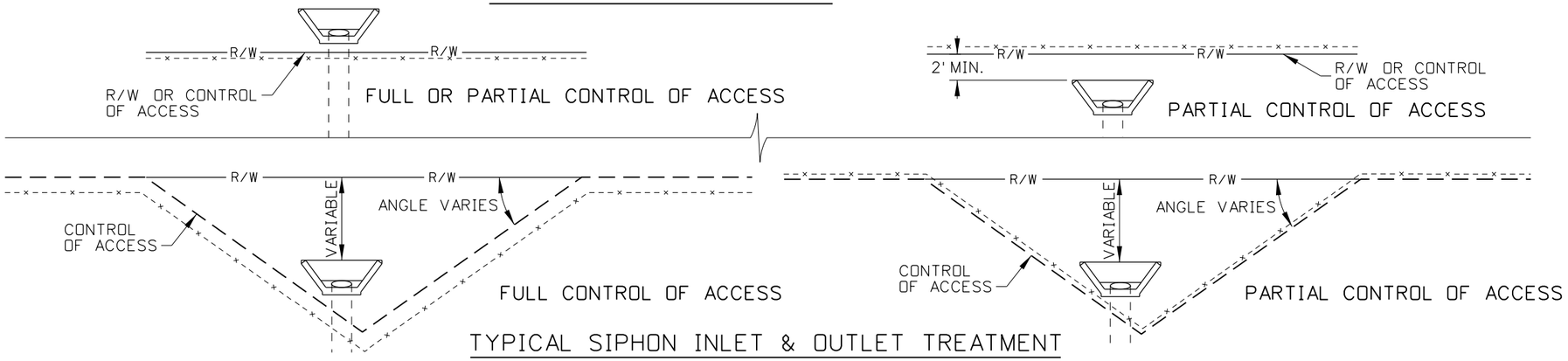
SIPHON HEADWALL DETAILS



METHOD OF FABRICATING ELBOW



ISOMETRIC VIEW



TYPICAL SIPHON INLET & OUTLET TREATMENT

(PRIVATE IRRIGATION SYSTEMS ONLY)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED MILFORD MILLER DATE ORIGINAL SIGNED DECEMBER 19, 2001 2240 STATE OF IDAHO MILFORD MILLER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-64		6	06-92	MSM			
2	02-68		7	12-92	TMR			
3	09-68		8	06-02	MSM			
4	10-69		9	12-05	MSM			
5	04-90	GB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-5_1205.dgn

DRAWING DATE:

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

CONCRETE HEADWALL FOR SIPHONS

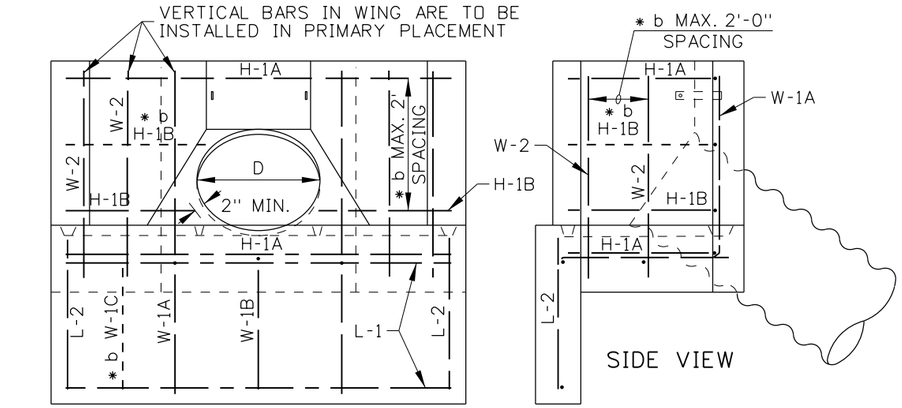
English

STANDARD DRAWING NO. 609-5

SHEET 1 OF 2

METAL REINFORCEMENT TABLE

MARK	LOCATION	BAR SIZE	(NO. BARS) HDWL. SIZE	SKETCH
F-1	FLOOR	NO. 4	(1) 12"-36" (2) 42"	
L-1	TOP & BOTOM OF INLET LIP IN FLOOR	NO. 4	(2) 12"-42"	
H-1A	HORIZ. IN TOP OF WING WALL & IN FLOOR BACK WALL	NO. 4	(2) 12"-42"	130°
H-1B	HORIZ. IN WING WALL BETWEEN H-1As' (PAIRS)	NO. 4	(2) 12"-42" (4) 30"-36" (6) 42"	PIPE, 2", 130°
W-1A	EACH SIDE OF PIPE IN BACKWALL, FLOOR, & INLET LIP	NO. 4	(2) 12"-42"	90°, 90°
W-1B	IN FLOOR, & INLET LIP, UNDER PIPES	NO. 4	(1) 12"-30" (2) 12"-42"	90°
W-1C	IN FLOOR, & INLET LIP	NO. 4	(2) 12"-42"	90°
L-2	VERTICAL IN FLOOR, & INLET LIP	NO. 4	(2) 12"-42"	
W-2	VERTICAL IN WING WALLS	NO. 4	(1) 12"-30" (2) 12"-42"	



* b ADDITIONAL BARS NEEDED WHEN SPACE IS GREATER THAN 2'-0"

METAL REINFORCEMENT DETAILS

HEADWALL DIMENSION TABLE

CULVERT SIZE DIAMETER (IN.)	IN INCHES										
	D/24	A	B	H	L	M	N	P	Q	S	V
12	1/2	13	20 7/16	21	24 5/8	25	21	27 1/2	22 7/16	12 9/16	53 13/16
15	5/8	16 1/4	23 1/8	24 1/4	28 7/8	28 1/4	24 1/4	30 7/8	26 11/16	15 3/16	62 9/16
18	3/4	19 1/2	25 7/8	27 1/2	33 1/8	31 1/2	27 1/2	34 1/4	30 15/16	18 1/16	71 1/4
21	7/8	22 3/4	28 5/8	30 3/4	37 3/8	34 3/4	30 3/4	37 5/8	35 3/16	20 3/4	79 15/16
24	1	26	31 3/8	34	41 9/16	38	34	41	39 3/8	23 1/2	88 5/8
30	1 1/4	32 1/2	36 3/4	40 1/2	50 1/16	44 1/2	40 1/2	47 3/4	47 7/8	28 15/16	106 1/16
36	1 1/2	39	42 1/4	47	58 9/16	51	47	54 1/2	56 3/8	34 3/8	123 1/2
42	1 3/4	45 1/2	47 11/16	53 1/2	67 1/16	57 1/2	53 1/2	61 1/4	64 7/8	39 5/8	140 7/8

GRATE DIMENSION & MATERIALS TABLE

CULVERT SIZE DIAMETER (IN.)	IN INCHES							
	DIMENSIONS				BAR SIZES			
	A'	* c X	Y	Z	B-1	B-2	B-3	B-4
12	11	19 3/16	28 1/2	18 7/8	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
15	14	23 3/4	36 7/8	24 3/16	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
18	17	28 3/8	45 5/16	29 1/2	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
21	20	32 15/16	53 3/4	34 13/16	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
24	23	37 9/16	62 3/16	40 1/8	1x1/4	1 1/4x1/4	1 1/4x1 1/4x1/4	1x1/4x9
30	29	46 3/4	79 1/16	50 13/16	1 1/4x1/4	1 1/2x1/4	1 1/2x1 1/2x1/4	1 1/2x1/4x9
36	35	55 7/8	92 15/16	61 1/2	1 1/2x1/4	1 3/4x1/4	1 3/4x1 3/4x1/4	1 3/4x1/4x9
42	41	65 1/16	112 3/16	72 3/16	1 3/4x1/4	2 1/4x3/8	2 1/4x2 1/2x3/8	2 1/4x3/8x9

* c ALLOW 3/4"-1" EXTRA BAR LENGTH FOR HOLE FABRICATION

CONCRETE & STEEL QUANTITY TABLE

NOMINAL SIZE DIAMETER (IN.)	CONCRETE (C.Y.)				STEEL (LBS.)
	WING & BCKWL.	FLOOR	LIP	TOTAL	
12	0.179	0.148	0.167	0.494	24.6
15	0.248	0.200	0.193	0.633	27.8
18	0.309	0.259	0.220	0.788	31.0
21	0.386	0.326	0.247	0.959	35.8
24	0.472	0.400	0.274	1.146	39.4
30	0.671	0.572	0.327	1.570	46.1
36	0.905	0.774	0.381	2.061	57.6
42	1.176	1.007	0.435	2.618	73.6

NOTES

1. THE SIPHON HEADWALL SHALL BE USED ONLY WHEN PROTECTED BY GUARDRAIL OR INSTALLED OUTSIDE THE CLEAR ZONE.
2. ALL CAST-IN-PLACE HEADWALLS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES, OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" OR 3" MINIMUM COVER IF CAST AGAINST EARTH.
4. ALL EDGES TO HAVE 3/4" CHAMFER OR TOOLED EDGES.
5. ALL PIPE INLETS/OUTLETS WITH A CONCRETE SIPHON HEADWALL SHALL HAVE THE INLET HEADWALLS BEVELED. USE ENTRANCE LOSS COEFFICIENT K_e - 0.2 FOR BEVELED ENTRANCES.
6. THE METAL FOR THE GRATE SHALL MEET THE REQUIREMENTS OF ASTM A 36. WELDING OF THE METAL GRATE SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1. GRATES FOR INLET HEADWALLS WILL BE REQUIRED ONLY WHEN SHOWN ON THE ROADWAY PLANS. GRATES NEED NOT BEPAINTED OR GALVANIZED.
7. THE USE OF CONCRETE, CORRUGATED METAL, OR CORRUGATED POLYETHYLENE PIPE WITH A SIPHON HEADWALL IS ALLOWED (CONCRETE PIPE SHOWN ON DRAWING).
8. A SIPHON SYSTEM REQUIRES A GRATE ON THE BOTH INLET AND OUTLET HEADWALL.
9. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED BY: MILFORD MILLER DATE OF ORIGINAL SIGNATURE: DECEMBER 19, 2014 2240 STATE OF IDAHO MILFORD MILLER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-64		6	06-92	MSM			
2	02-68		7	12-92	TMR			
3	09-68		8	06-02	MSM			
4	10-69		9	12-05	MSM			
5	04-90	GB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-5_1205.dgn

DRAWING DATE:

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

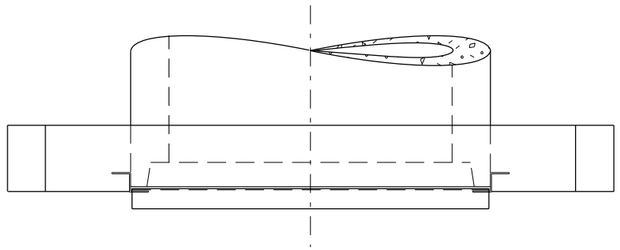
STANDARD DRAWING

CONCRETE HEADWALL FOR SIPHONS

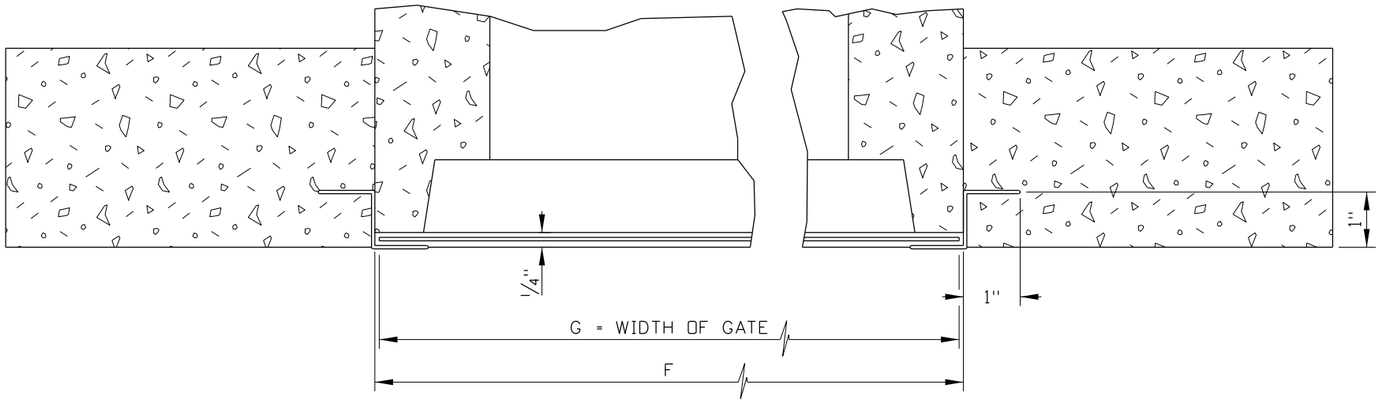
English

STANDARD DRAWING NO. 609-5

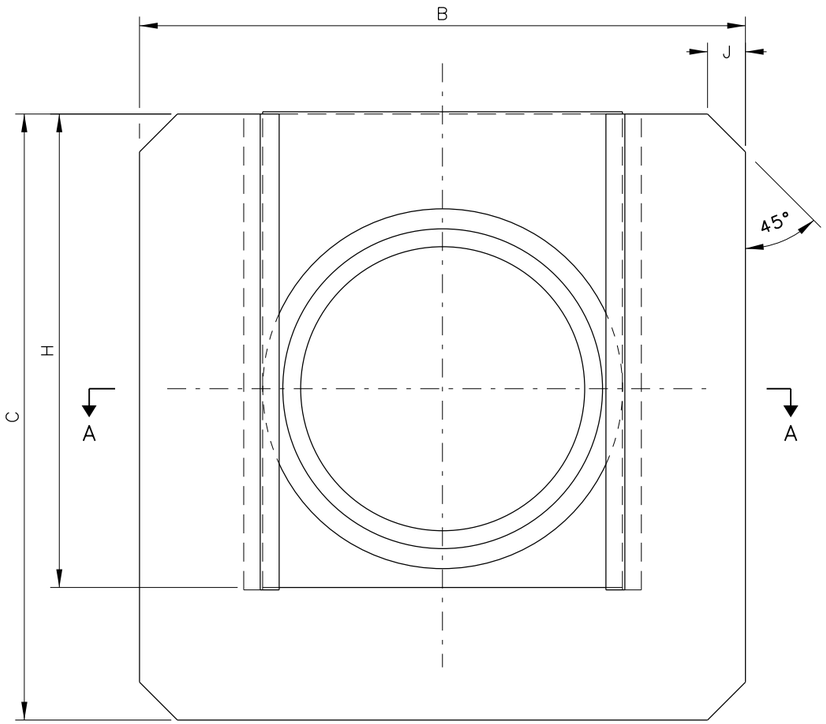
SHEET 2 OF 2



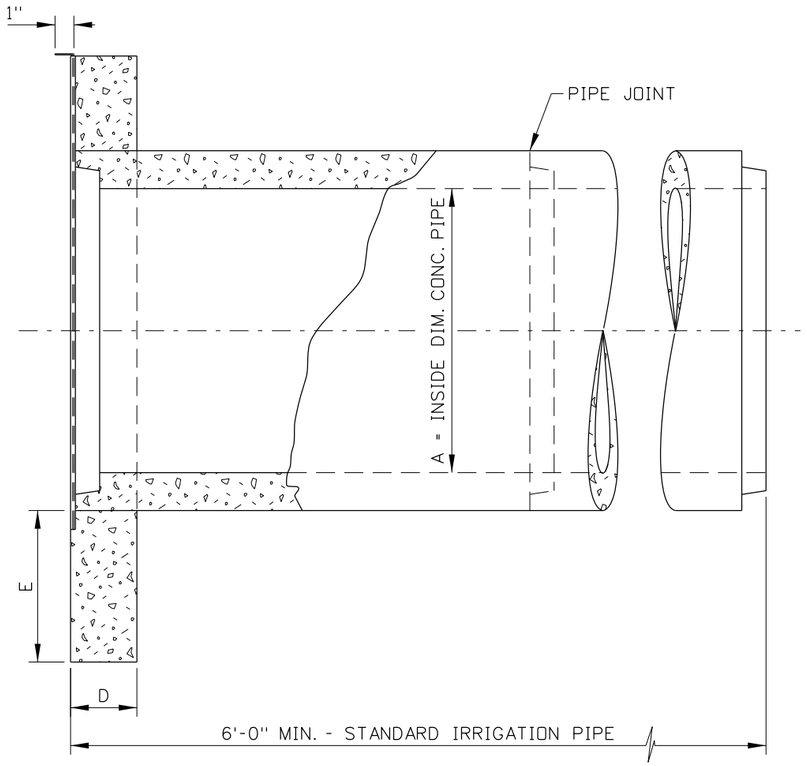
PLAN



SECTION A-A



END ELEVATION



SIDE ELEVATION

MINIMUM DIMENSIONS TABLE

PIPE DIA.	MINIMUM DIMENSIONS (INCHES)							
A	B	C	D	E	F	G	H	J
4	15	15	2½	3	8¼	8	13	24
6	15	15	2½	3	8¼	8	13	30
8	22	22	3	6	12½	12¼	17	36
10	22	22	3	6	12½	12¼	17	42
12	27	27	3	7	16¼	16	21	48
15	32	32	3½	8	19¼	19	25	60
18	36	36	4	9	23¾	23½	28	72
21	42	42	4	11	26¼	26	32	84
24	54	54	4	15	30¼	30	40	90
30	60	60	4	19	36¼	36	42	102

NOTES

1. SLIDE GATE AND GUIDES SHALL BE 16 GAGE GALVANIZED STEEL.
2. NO SCALE IS REPRESENTED ON THESE DRAWING ILLUSTRATIONS.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED MILFORD MILLER ORIGINAL SIGNED AT IF ORIGINAL SEALED AND SIGNED MARCH 4, 2005 STATE OF IDAHO MILFORD MILLER

2240

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-64							
2	11-86	GB						
3	09-01	MSM						
4	03-05	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 609-6_0305.dgn

DRAWING DATE: APRIL, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

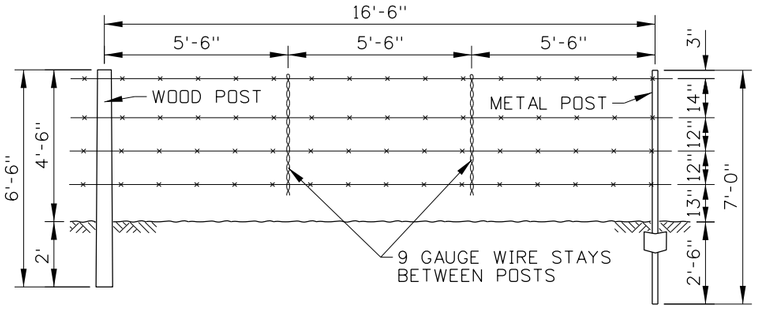
PRECAST CONCRETE HEADGATE

English

STANDARD DRAWING NO.

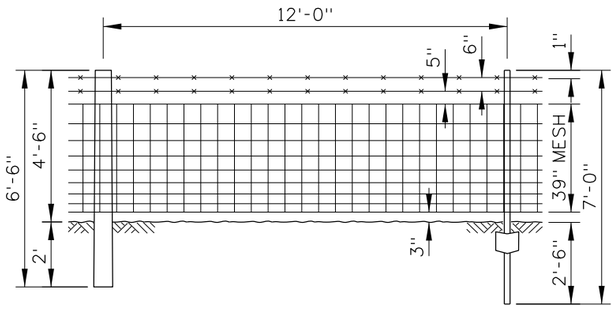
609-6

SHEET 1 OF 1



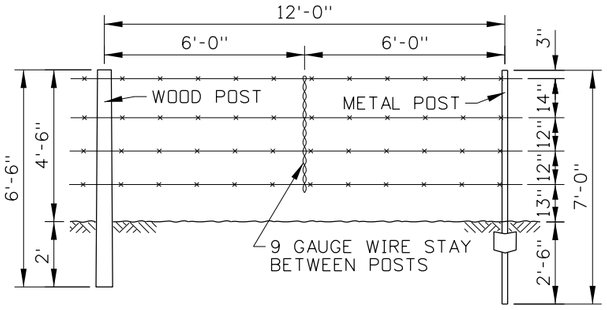
1A (WOOD) 1B (METAL)

FENCE TYPE 1



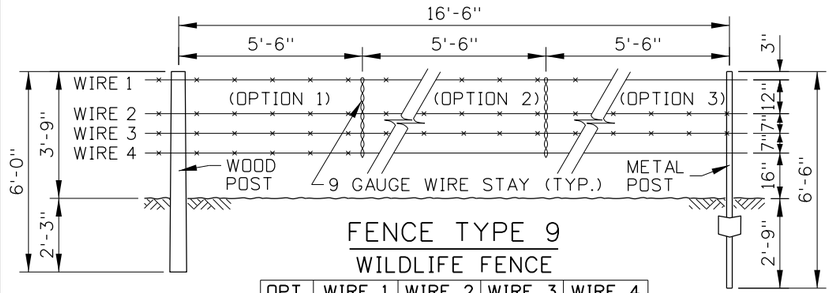
3A (WOOD) 3B (METAL)

FENCE TYPE 3



5-A (WOOD) 5-B (METAL)

FENCE TYPE 5

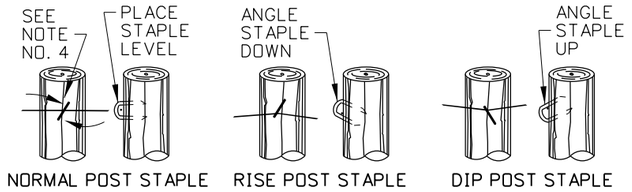


9-A (WOOD) 9-B (METAL)

FENCE TYPE 9

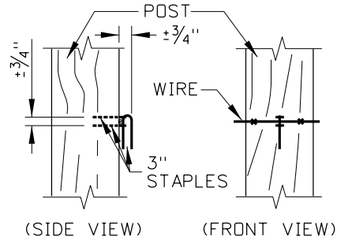
WILDLIFE FENCE

OPT.	WIRE 1	WIRE 2	WIRE 3	WIRE 4
1	BARBED	BARBED	BARBED	BARBED
2	BARBED	BARBED	BARBED	SMOOTH
3	SMOOTH	BARBED	BARBED	SMOOTH



WOOD FENCE POST STAPLE DETAILS

(SEE NOTE NO. 4)



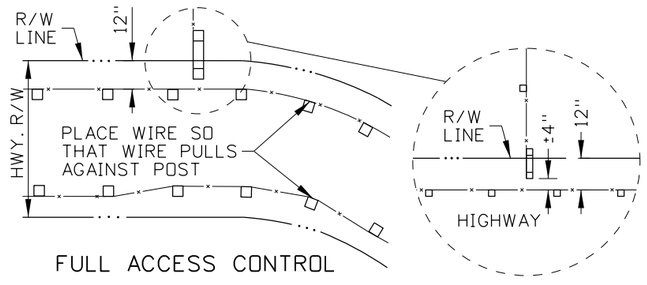
DROP FENCE STAPLE DETAIL

(SEE NOTE NO. 1)

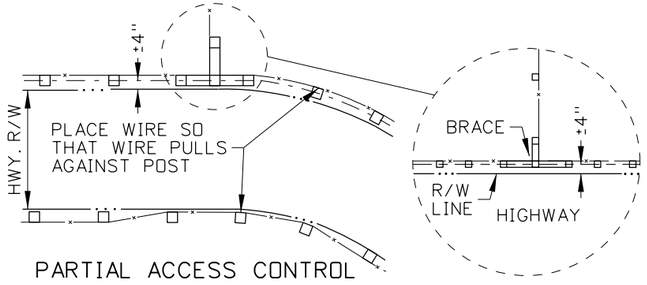
WIRE AND WIRE MESH FENCE GROUNDING TABLE			
FENCE DIST. FROM TRANSMISSION LINE	kV	POST MATERIAL	GROUNDING INTERVAL
0' - 100'	500	ALL	200'
100' - 200'	500	ALL	500'
0' - 100'	345	ALL	400'
100' - 150'	345	ALL	1,000'
50' - 100'	230	ALL	500'

BARBED OR WOVEN WIRE FENCE NOTES

1. DESIGNATE POST MATERIAL ON PROJECT PLANS. INDICATE WHETHER THE FENCE WILL BE A DROP FENCE AND THE LOCATION WHERE DROP FENCE STAPLES WILL BE USED.
2. DESIGNATE OPTION 1, 2, OR 3 FOR FENCE TYPE 9 - WILDLIFE FENCE - ON PROJECT PLANS.
3. ATTACH ANCHOR PLATES TO METAL POSTS UNLESS THE POST IS SET IN SOLID ROCK. GROUT DRILL HOLES WHEN METAL POSTS ARE SET IN SOLID ROCK.
4. STAPLE EACH WIRE TO EACH WOOD POST. STAPLE ALTERNATING WIRES ON MESH WIRE FENCES. USE TWO STAPLES ON BRACES AND IN SAG SECTIONS. ROTATE THE STAPLES TO STRADDLE ACROSS THE WOOD GRAIN. ALLOW ENOUGH SPACE FOR WIRE TO SLIDE THROUGH THE STAPLE.
5. ATTACH FENCE WIRE OR WIRE MESH TO STEEL POSTS WITH WIRE CLAMPS. USE ONE WIRE CLAMP PER WIRE. ON WIRE MESH, USE FOUR WIRE CLAMPS PER POST OR EIGHT WIRE CLAMPS PER POST IN SAG SECTIONS.
6. GROUND WIRE AND WIRE MESH FENCES THAT ARE NEAR POWER TRANSMISSION LINES OR THAT PASS UNDER TRANSMISSION LINES. SEE THE WIRE AND WIRE MESH FENCE GROUNDING TABLE AND WIRE AND WIRE MESH FENCE GROUNDING DETAILS. TO GROUND, CONNECT EACH FENCE WIRE TO 6 GAUGE BRAIDED GROUND CABLE WITH SPLIT BOLT CABLE CONNECTORS. FOR WIRE MESH FENCE, CONNECT THE BRAIDED GROUND CABLE EVERY 18". GROUND THE FENCE ONCE IF THE FENCE SECTION IS SHORTER THAN THE GROUNDING INTERVAL.
7. WHEN THE FENCE TERMINATES AT A BRIDGE, ENSURE THAT THE TOP OF THE FENCE DOES NOT EXTEND BEYOND THE TOP OF THE PARAPET OR RAILING.
8. ON THE SAG DETAIL, INSTALL CORNER BRACE IN ADDITION TO THE CONCRETE BASE WHEN THE ANGLE IS GREATER THAN 20°.

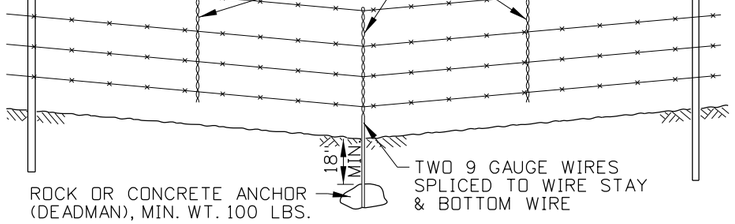


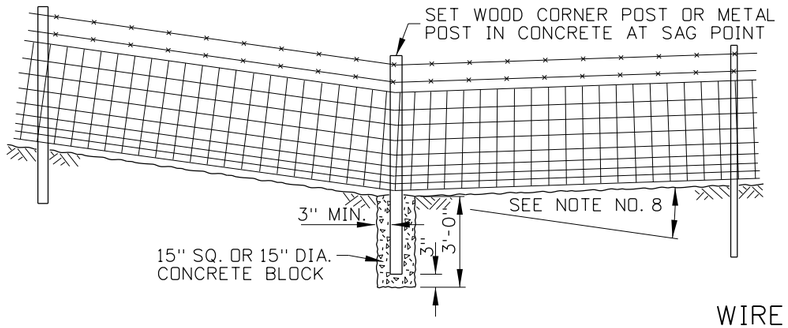
FULL ACCESS CONTROL



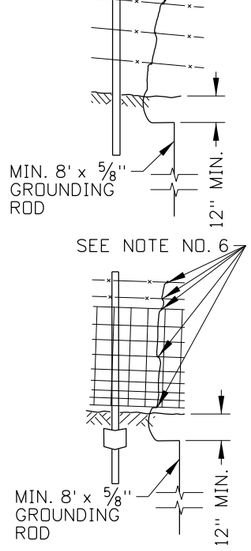
PARTIAL ACCESS CONTROL

RIGHT-OF-WAY FENCE LOCATION DETAILS





SAG DETAILS



WIRE AND WIRE MESH FENCE GROUNDING DETAILS

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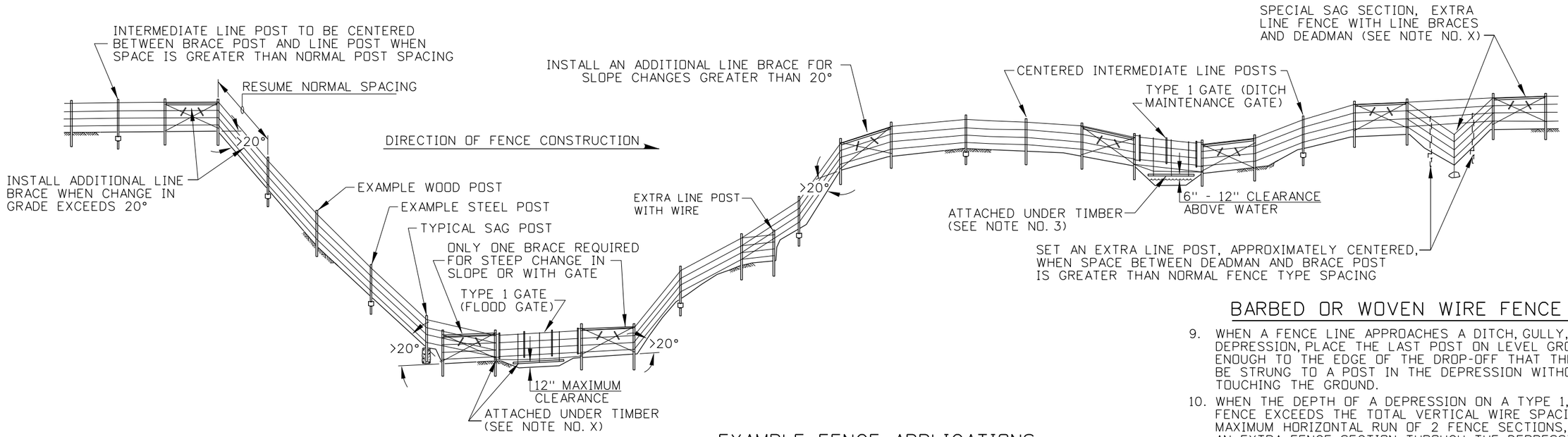
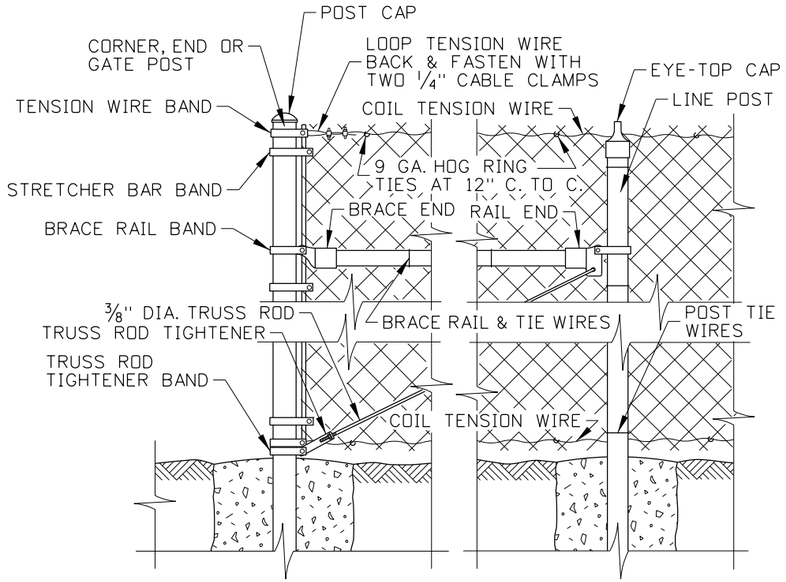


EXAMPLE FENCE APPLICATIONS

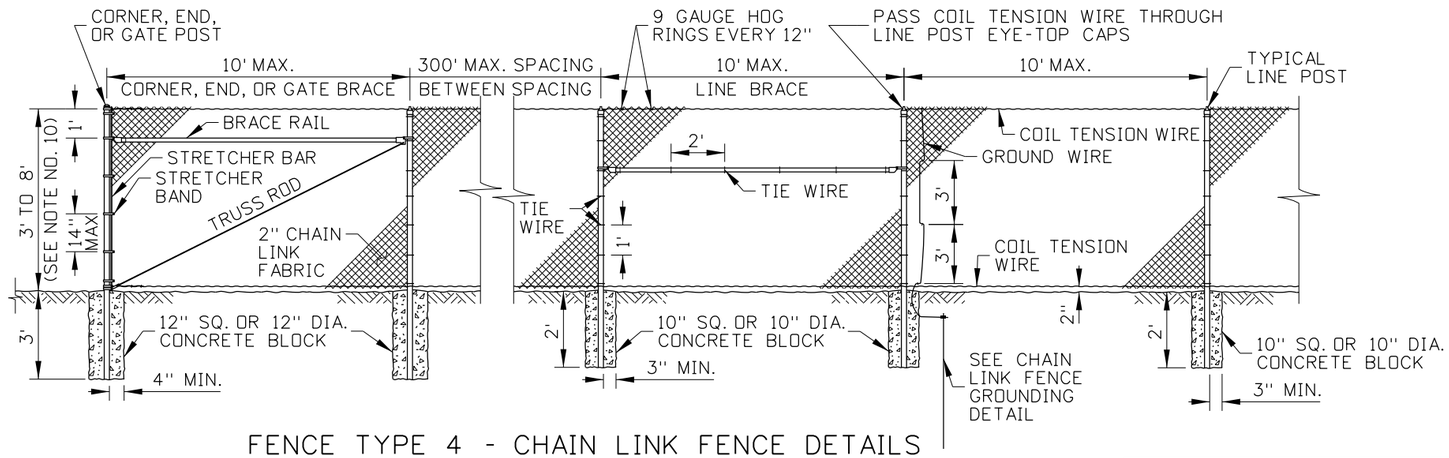
FOR FENCE TYPES 1, 3, 5, & 9

BARBED OR WOVEN WIRE FENCE NOTES

9. WHEN A FENCE LINE APPROACHES A DITCH, GULLY, OR DEPRESSION, PLACE THE LAST POST ON LEVEL GROUND CLOSE ENOUGH TO THE EDGE OF THE DROP-OFF THAT THE WIRE MAY BE STRUNG TO A POST IN THE DEPRESSION WITHOUT TOUCHING THE GROUND.
10. WHEN THE DEPTH OF A DEPRESSION ON A TYPE 1, 5, OR 9 FENCE EXCEEDS THE TOTAL VERTICAL WIRE SPACING OVER A MAXIMUM HORIZONTAL RUN OF 2 FENCE SECTIONS, CONSTRUCT AN EXTRA FENCE SECTION THROUGH THE DEPRESSION. SEE THE EXAMPLE FENCE APPLICATIONS.
11. IF THE DISTANCE BETWEEN THE GROUND AND THE BOTTOM WIRE OF A TYPE 1 GATE IS GREATER THAN 16", INSTALL AN UNDER TIMBER, ADDITIONAL WIRE, AND WIRE STAYS, AND BRACES.



FENCE TYPE 4
CHAIN LINK FENCE



FENCE TYPE 4 - CHAIN LINK FENCE DETAILS

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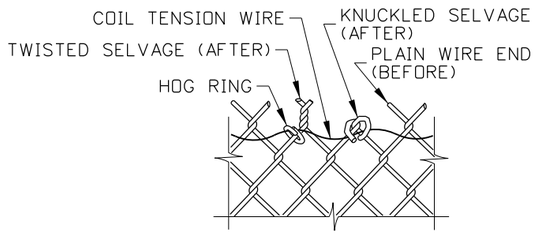
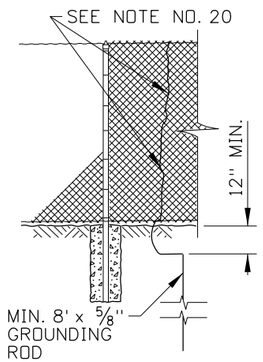
CHAIN LINK FENCE HARDWARE TABLE	
CORNER, END AND GATE POSTS	SEE STANDARD SPECIFICATIONS FOR HIGHWAY CONST.
LINE POST	SEE STANDARD SPECIFICATIONS FOR HIGHWAY CONST.
BRACE RAIL/TOP RAIL	SEE STANDARD SPECIFICATIONS FOR HIGHWAY CONST.
POST CAP	CAST NON-FERROUS ALLOY OR GALVANIZED PRESSED STEEL CAP. MUST FIT SNUGGLY ON POST.
EYE-TOP CAP	GALVANIZED PRESSED STEEL MIN. 3/32" THICKNESS OR GALVANIZED MALLEABLE FERROUS ALLOY
STRECHER BAR BAND	CLASS 1 - MIN. 1/8" x 3/4" MIN. GALVANIZED STEEL CLASS 2 - MIN. 3/32" x 5/16" MIN. GALVANIZED STEEL
TENSION WIRE/BRACE BAND	CLASS 1 - MIN. 1/8" x 3/4" MIN. GALVANIZED STEEL CLASS 2 - MIN. 3/32" x 5/16" MIN. GALVANIZED STEEL
BAND BOLT	CLASS 1 - 5/16" DIA. x 1 3/4" GALV. CARRIAGE BOLT CLASS 2 - 3/8" DIA. x 1 1/4" GALV. CARRIAGE BOLT, (LOCK WASHER & FLAT WASHER FOR EACH BAND)
RAIL END	GALVANIZED PRESSED STEEL OR GALVANIZED MALLEABLE FERROUS ALLOY MIN. 3/8" THICKNESS ON BACK BOLTING APPENDAGE
BRACE END	GALVANIZED PRESSED STEEL OR GALVANIZED MALLEABLE FERROUS ALLOY MIN. 3/8" THICKNESS ON BACK BOLTING APPENDAGE
TRUSS ROD TIGHTENER	CLASS 1 - MIN. 3/8" FORMED GALVANIZED STEEL CLASS 2 - MIN. 1/4" FORMED GALVANIZED STEEL
TRUSS ROD	3/8" GALVANIZED, NC TREADED ROD, LOCK WASHER, & FLAT WASHER WITH TWO 90° BENDS OPPOSITE OF TREADED END
TOP RAIL SLEEVE	GALVANIZED STEEL, NOT TO BE USED ON R/W FENCES, MUST MEET REQUIRED PIPE THICKNESSES
TENSION BAR	CLASS 1 - MIN. 1/8" x 3/4" GALVANIZED STEEL CLASS 2 - MIN. 1/8" x 5/16" GALVANIZED STEEL
FENCE FABRIC	2" GALVANIZED DIAMOND MESH STEEL FABRIC
TIE WIRES	MIN. 9 GAUGE ALUMINUM WITH ONE HOOKED END
COIL TENSION WIRE	MIN. 7 GAUGE
BARBED WIRE & 3-WIRE BARBARM	BARBED WIRE: 14 GAUGE SPACED GALVANIZED MEDIUM CARBON STEEL WIRE WITH BARBS SPACED AT 5" C. to C. GALVANIZING SHALL CONFORM TO APPLICABLE A.S.T.M. DES. A-121-66 FOR ZINC-COATED & AASHTO M 280 SPECIFICATIONS. 3-WIRE BARBARM: BARBWIRE ARM (ONE PIECE "Z" CUT) FITS 1 5/8" O.D. POST, 1 5/8" TOP RAIL" FITS 2" O.D. POST, 1 5/8" TOP RAIL" FITS 2 1/2" O.D. POST, 1 5/8" TOP RAIL" FITS 3" O.D. POST, 1 5/8" TOP RAIL"

CHAIN LINK FENCE GROUNDING TABLE		
FENCE DIST. FROM TRANSMISSION LINE	kV	GROUNDING INTERVAL
0' - 100'	500	200'
100' - 200'	500	500'
0' - 100'	345	400'
100' - 150'	345	1,000'
50' - 100'	230	500'

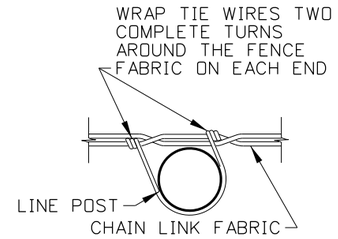


WIRE SELVAGE DETAIL

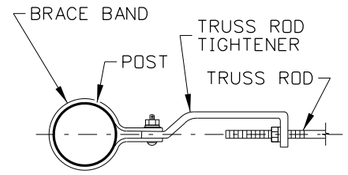
(SEE NOTE NO. 16)



CHAIN LINK FENCE GROUNDING DETAIL



CHAIN LINK FENCE TIE DETAIL



TRUSS ROD TIGHTENER DETAIL

CHAIN LINK FENCE NOTES

12. THE MINIMUM FENCE HEIGHT IS 8' WHEN BARBED WIRE AND THE 3-WIRE BARBARM ARE USED. DO NOT USE RAZOR WIRE WITH THE 3-WIRE BARBARM.
13. SPACE POSTS EQUAL DISTANCES APART, 10' MAXIMUM SPACING.
14. ADJUST THE POST TOP ELEVATIONS TO PROVIDE A SMOOTH VISUAL FENCE PROFILE. INSTALL CORNER POSTS AT HORIZONTAL BREAKS IN THE FENCE OF 15° OR MORE.
15. STRETCH THE FENCE FABRIC SMOOTH SO THAT IT HAS A UNIFORM APPEARANCE.
16. SELVAGE THE PLAIN WIRE ENDS ON THE TOP AND BOTTOM OF THE CHAIN LINK FABRIC BY THE TWISTED OR KNUCKLED METHOD. SEE WIRE SELVAGE DETAIL.
17. CHAIN LINK FENCE HARDWARE MAY VARY SOMEWHAT FROM THAT SHOWN IN THE CHAIN LINK FENCE HARDWARE TABLE. ENSURE THAT HARDWARE AND MATERIALS USED ARE UNIFORM AND COMPATIBLE.
18. INSTALL A TOP RAIL WHEN BARBED WIRE AND THE 3-WIRE BARBARM ARE USED.
19. INSTALL PRIVACY FENCE SLATS IF SHOWN ON PROJECT PLANS.
20. GROUND CHAIN LINK FENCES THAT ARE NEAR POWER TRANSMISSION LINES OR THAT INTERSECT TRANSMISSION LINES. SEE THE CHAIN LINK FENCE GROUNDING TABLE AND CHAIN LINK FENCE GROUNDING DETAILS. TO GROUND, CONNECT 6 GAUGE BRAIDED GROUND CABLE TO THE CHAIN LINK FABRIC EVERY 36". GROUND THE FENCE ONCE IF THE FENCE SECTION IS SHORTER THAN THE GROUNDING INTERVAL.
21. DRAWING NOT TO SCALE.

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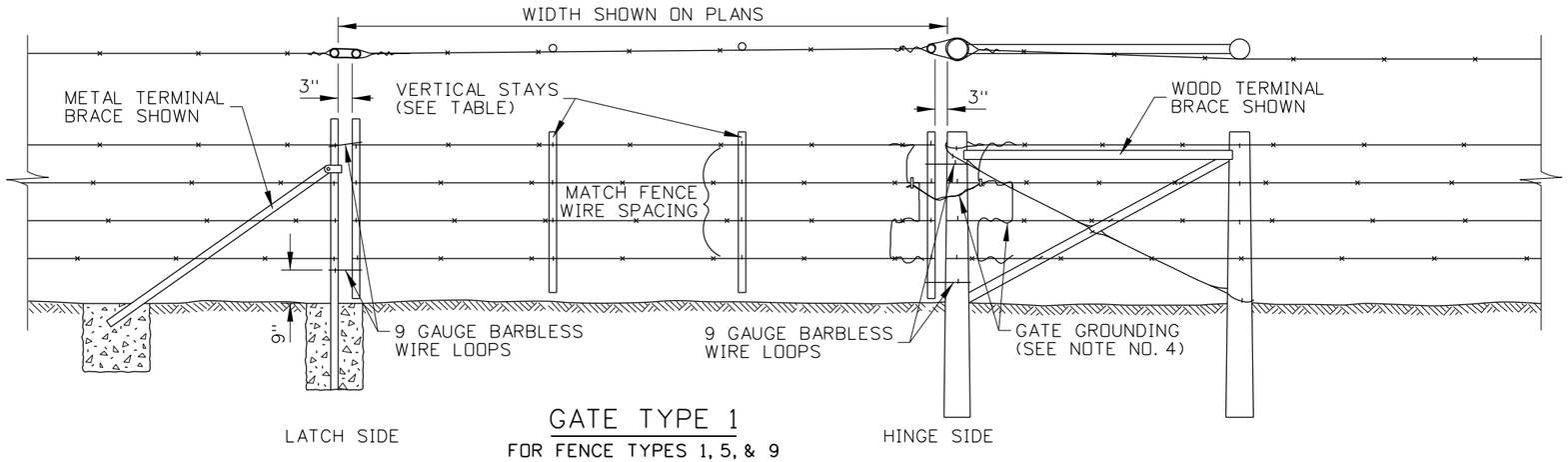
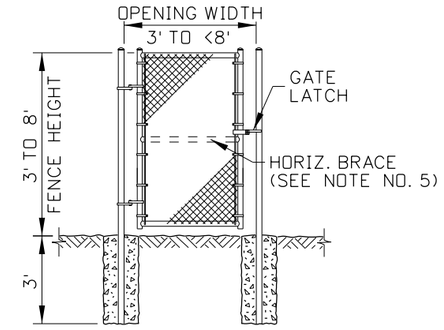
SHEET 3 OF 3

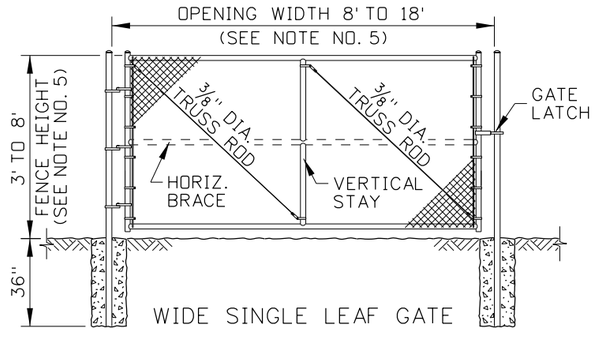


GATE TYPE 1

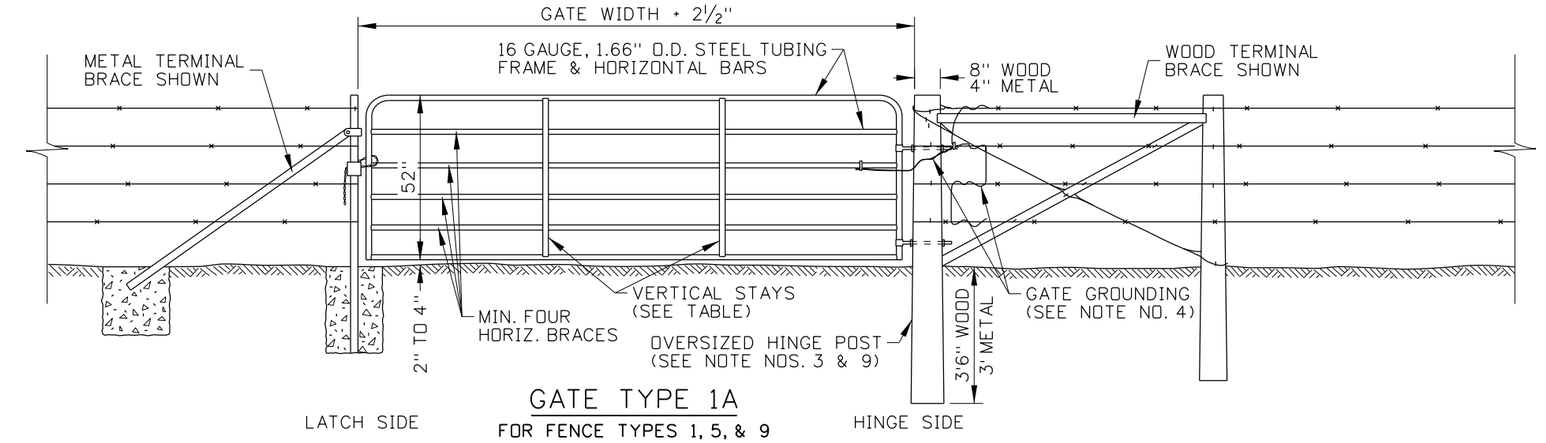
FOR FENCE TYPES 1, 5, & 9



NARROW SINGLE LEAF GATE

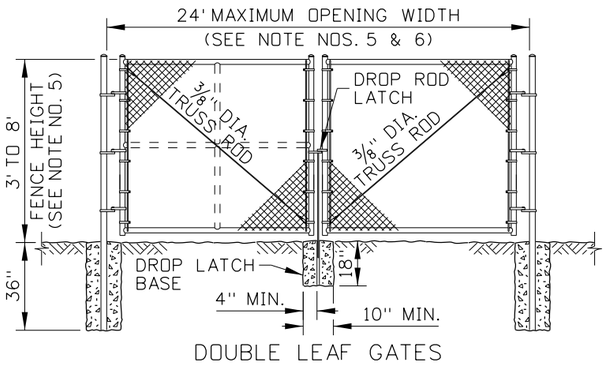


WIDE SINGLE LEAF GATE

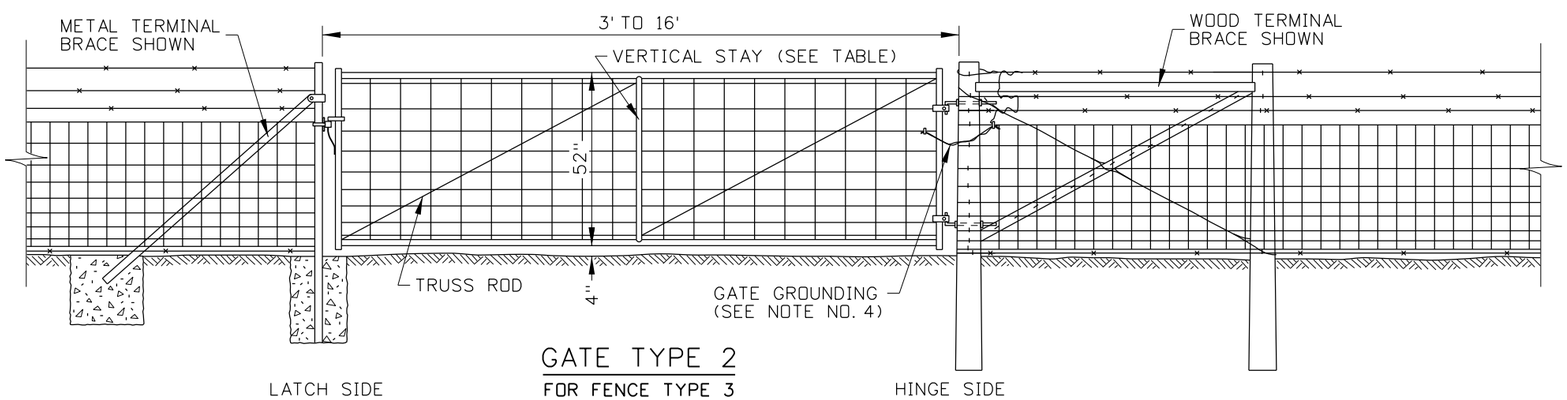


GATE TYPE 1A

FOR FENCE TYPES 1, 5, & 9



DOUBLE LEAF GATES



GATE TYPE 2

FOR FENCE TYPE 3

GATE TYPE 3

FOR FENCE TYPE 4

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GATES

REQUIRES STD. DWGS. 610-1 & 610-3

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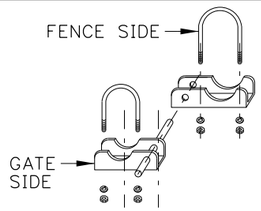
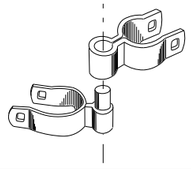
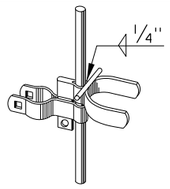
SHEET 1 OF 2

CHAIN LINK FENCE GATE HARDWARE TABLE	
GATE FORK LATCH 	MIN. 1/8" GALVANIZED PRESSED STEEL OR MALLEABLE FERROUS ALLOY. ONE LATCH PER EACH SINGLE GATE WITH BENT MIN. 3/8" DIA. ATTACHMENT BOLT, WASHER & NUT.
HEAVY GATE HINGE 	MIN. 1/8" GALVANIZED PRESSED STEEL WITH TWO 3/8" U-BOLTS, LOCK WASHER & NUTS PER HINGE. USE 2 HINGES PER GATE LEAF UP TO 8' IN WIDTH AND 3 HINGES PER GATE LEAF WIDTHS GREATER THAN 8' (THESE HINGES ARE RECOMMENDED FOR MAINTENANCE & COMMERCIAL INSTALLATIONS).
RESIDENTAL GATE HINGE 	MIN. 1/8" GALVANIZED PRESSED STEEL WITH 3/8" DIA. x 3" CARRIAGE BOLTS, LOCK WASHER & NUTS PER HINGE. USE 2 HINGES PER GATE LEAF UP TO 6' IN HEIGHT AND 3 HINGES PER GATE LEAF HEIGHTS GREATER THAN 6'.
INDUSTRIAL DROP ROD FORK & GUIDE 	MIN. 1/8" GALVANIZED PRESSED STEEL. DROP ROD GUIDE INCLUDES 3/8" x 3" CARRIAGE BOLT WITH LOCK WASHER & NUT. DROP ROD FORK IS TO BE WELDED TO ROD & PAINTED WITH AN APPROVED ZINC RICH PAINT.

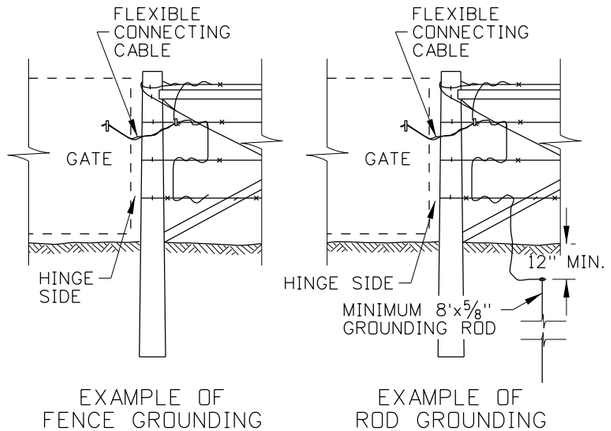
GATE GROUNDING TABLE			
FENCE DIST. FROM TRANSMISSION LINE	kV	GATE TYPE	GROUNDING TYPE
0' - 100'	500	1A, 2, 3	ROD
100' - 200'	500	1A, 2, 3	FENCE
0' - 100'	345	1A, 2, 3	ROD
100' - 150'	345	1A, 2, 3	FENCE
50' - 100'	230	1A, 2, 3	FENCE

GATE VERTICAL STAY TABLE		
GATE TYPE	GATE WIDTH	NO. OF VERT. STAYS
TYPE 1	4' TO 6'	0
	8' TO 12'	1
	14' TO 16'	2
TYPE 1A	4' TO 6'	0
	8' TO 12'	1
	14' TO 16'	2
TYPE 2	3' TO 7'	0
	8' TO 16'	1
TYPE 3	3' TO 7'	0
	8' TO 15'	1
	16' TO 18'	2

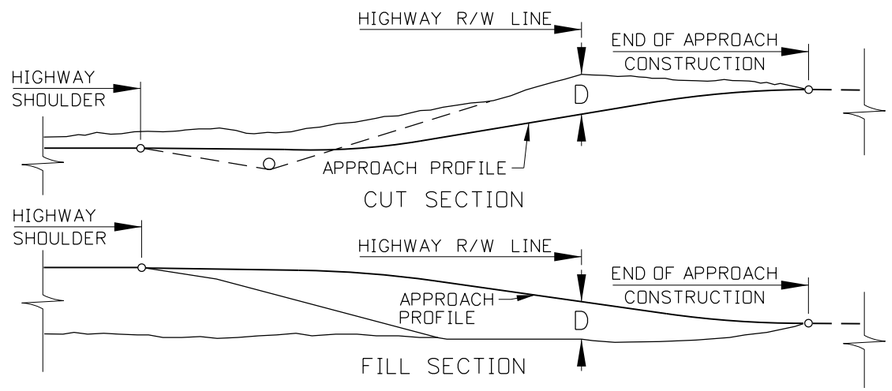
GATE HORIZONTAL BRACE TABLE		
GATE TYPE	GATE HEIGHT	NO. OF HORIZ. BRACES
TYPE 1A	4.33'	4
TYPE 3	4' TO 5'	0
	6' TO 8'	1

NOTES

1. CONSTRUCT GATES FROM THE MATERIALS SHOWN ON FENCES STANDARD DRAWING UNLESS OTHERWISE SHOWN.
2. ALTERNATE GATE DESIGNS MAY BE USED WITH ENGINEER APPROVAL.
3. CONSTRUCT MATCHING METAL OR WOOD TERMINAL BRACES ON BOTH SIDES OF THE GATE OPENING. MODIFY THE TERMINAL BRACE ON THE HINGE SIDE OF TYPE 1A GATES.
4. GROUND GATES THAT ARE NEAR POWER TRANSMISSION LINES OR THAT PASS UNDER TRANSMISSION LINES. GROUND BY CONNECTING THE HINGE SIDE OF THE GATE TO THE FENCE OR TO THE FENCE AND A GROUNDING ROD. SEE THE GATE GROUNDING TABLE AND GATE GROUNDING DETAILS. ENSURE THAT THE GATE IS GROUNDED WITH A FLEXIBLE COPPER CABLE. TYPE 1 GATES DO NOT NEED TO BE GROUNDED.
5. CONSTRUCT VERTICAL STAYS AND HORIZONTAL BRACES IN ACCORDANCE WITH THE GATE VERTICAL STAY TABLE AND THE GATE HORIZONTAL BRACE TABLE.
6. WHERE TWO TYPE 1A, TYPE 2, OR TYPE 3 GATES ARE USED IN A SINGLE OPENING, PROVIDE A DROP ROD TO SECURE THE GATES.
7. ON THE GATE LOCATION DETAIL, WHEN D IS 5' OR LESS, INSTALL GATES AT THE RIGHT-OF-WAY LINE. WHEN D IS GREATER THAN 5', INSTALL GATES AT THE END OF THE APPROACH CONSTRUCTION OR AS OTHERWISE DIRECTED BY THE ENGINEER. IF INSTALLED AT THE END OF THE APPROACH, ANGLE AND INSTALL RIGHT-OF-WAY FENCE ALONG THE EDGE OF THE APPROACH CUT OR FILL SLOPE.
8. TYPE 1 GATES:
   A. CONSTRUCT GATE ENDS AND VERTICAL STAYS FROM A SECTION OF METAL FENCE POST OR ROUND WOOD POST 2 1/2" TO 3" IN DIAMETER. PLACE LARGER WOODEN STAYS AT THE GATE ENDS.
   B. ATTACH WIRE LOOPS MADE WITH A DOUBLE WOVEN 9 GAUGE BARBLESS WIRE OR A SUITABLE CHAIN. ADJUST THE LOOPS SO THAT THE GATE IS TAUT WHEN CLOSED. FASTEN THE LOOPS TO THE ADJACENT LATCH/HINGE POST.
   C. STAPLE THE STAYS AND END POSTS TO THE CONNECTING WIRES.
9. TYPE 1A GATES:
   A. USE A MODIFIED METAL OR WOOD POST ON THE HINGE SIDE. USE A 4" DIAMETER, 7'-6" METAL TUBE OR A 8" DIAMETER, 8' WOOD POST. IF THE METAL POST IS USED, SET THE POST IN AN 18" SQUARE OR ROUND FOUNDATION.
   B. ENSURE THAT HINGES ON GATES WIDER THAN 10' HAVE LEVELING THREADS ON A 3/4" DIAMETER OR LARGER ROD.
   C. ENSURE THAT LATCHES ARE LOCKABLE.
   D. CLEAR THE GROUND NEAR THE GATE SO THAT THE GATE CAN SWING 90° IN EACH DIRECTION.
10. TYPE 2 GATES:
   A. FABRICATE GATE FRAMES WITH 1.05" O.D. GALVANIZED STEEL TUBING WITH 0.095" WALL THICKNESS OR 1" DIAMETER GALVANIZED PIPE.
   B. USE 12.5 GAUGE OR HEAVIER GALVANIZED WIRE MESH.
   C. EQUIP GATE WITH AN ADJUSTABLE DIAGONAL TRUSS ROD. THE TRUSS ROD TIGHTENER AND NON-TIGHTENING END OF THE TRUSS ROD MAY BE WELDED TO THE GATE.
   D. USE GALVANIZED MALLEABLE STEEL HINGES AND LATCHES.
   E. PAINT WELDS WITH ITD PAINT FORMULA NO. 2.
   F. CLEAR THE GROUND NEAR THE GATE SO THAT THE GATE CAN SWING 90° IN EACH DIRECTION.
11. TYPE 3 GATES:
   A. CHAIN LINK FENCE HARDWARE MAY VARY SOMEWHAT FROM THAT SHOWN. ENSURE THAT THE HARDWARE AND MATERIALS USED ARE UNIFORM AND COMPATIBLE.
   B. PAINT WELDS WITH ITD PAINT FORMULA NO. 2.
   C. CLEAR THE GROUND NEAR THE GATE SO THAT THE GATE CAN SWING 90° IN EACH DIRECTION.
12. DRAWING NOT TO SCALE.



GATE GROUNDING DETAILS



GATE LOCATION DETAIL
(SEE NOTE NO. 7)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED DECEMBER 6, 2016 STATE OF IDAHO 13683 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 610-2_1216.dgn

DRAWING DATE: NOVEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED MASON

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

GATES

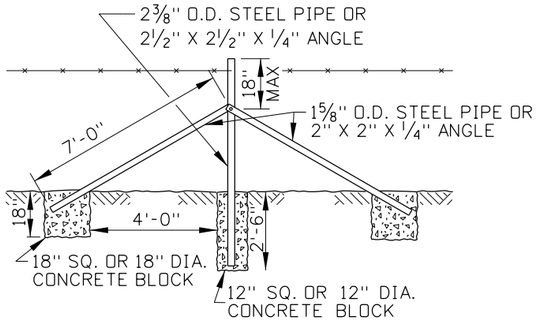
REQUIRES STD. DWGS. 610-1 & 610-3

English

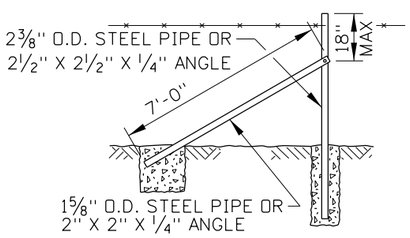
STANDARD DRAWING NO.

610-2

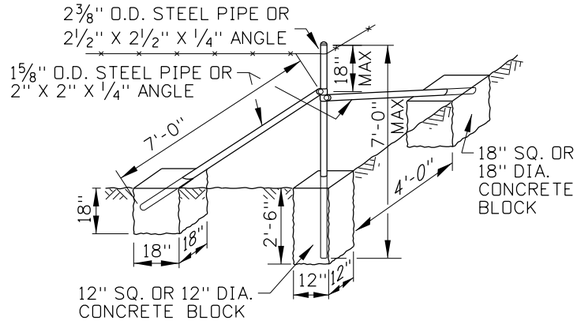
SHEET 2 OF 2



LINE BRACE



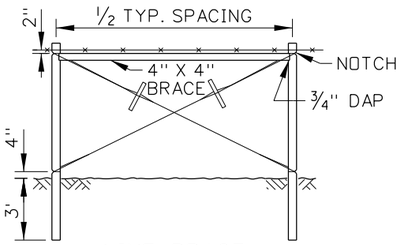
TERMINAL BRACE



CORNER BRACE

BRACE SPACING TABLE			
FENCE TYPE	DISTANCE BETWEEN BRACES	METAL BRACES	WOOD BRACES
1, 5, & 9	<66'	NONE	NONE
	66' TO 660'	SINGLE	SINGLE
	660' TO 990'	DO NOT EXCEED 660'	DOUBLE
3	<33'	NONE	NONE
	33' TO 330'	SINGLE	SINGLE
	330' TO 660'	DO NOT EXCEED 330'	DOUBLE
4	INTEGRATED INTO CHAIN LINK FENCE		

METAL BRACES



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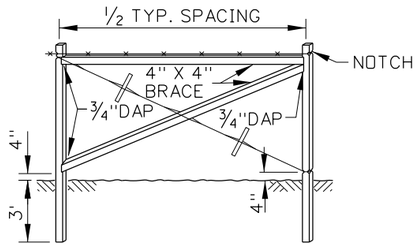
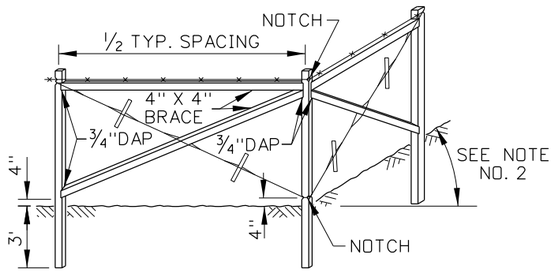
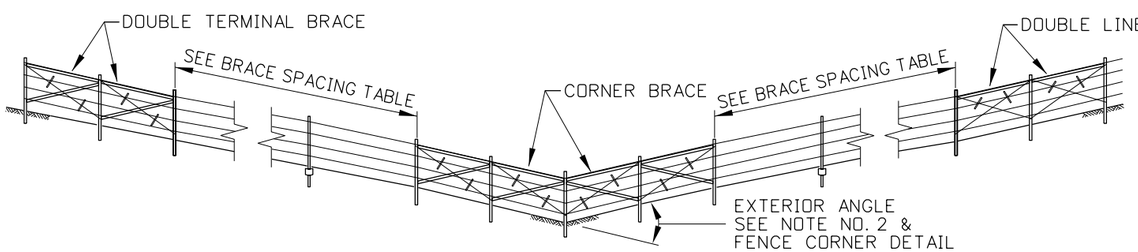


TERMINAL BRACE

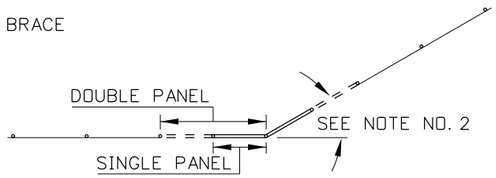


CORNER BRACE

WOOD BRACES



WOOD DOUBLE BRACE PANELS



FENCE CORNER DETAIL

NOTES

1. USE METAL BRACES WHEN METAL FENCE POSTS ARE USED. USE WOOD BRACES WHEN WOOD FENCE POSTS ARE USED.
2. USE DOUBLE WOOD CORNER BRACES WHEN THE EXTERIOR FENCE CORNER ANGLE EXCEEDS 30°. INSTALL DOUBLE LINE AND TERMINAL BRACES IN ACCORDANCE WITH THE FENCE BRACE TABLE.
3. SEE THE BRACE SPACING TABLE FOR THE MAXIMUM DISTANCES BETWEEN BRACES.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED BY
RYAN D. LANCASTER
DECEMBER 6, 2016
13683
STATE OF IDAHO
RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 610-3_1216.dgn

DRAWING DATE: NOVEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED MASON

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

FENCE BRACES

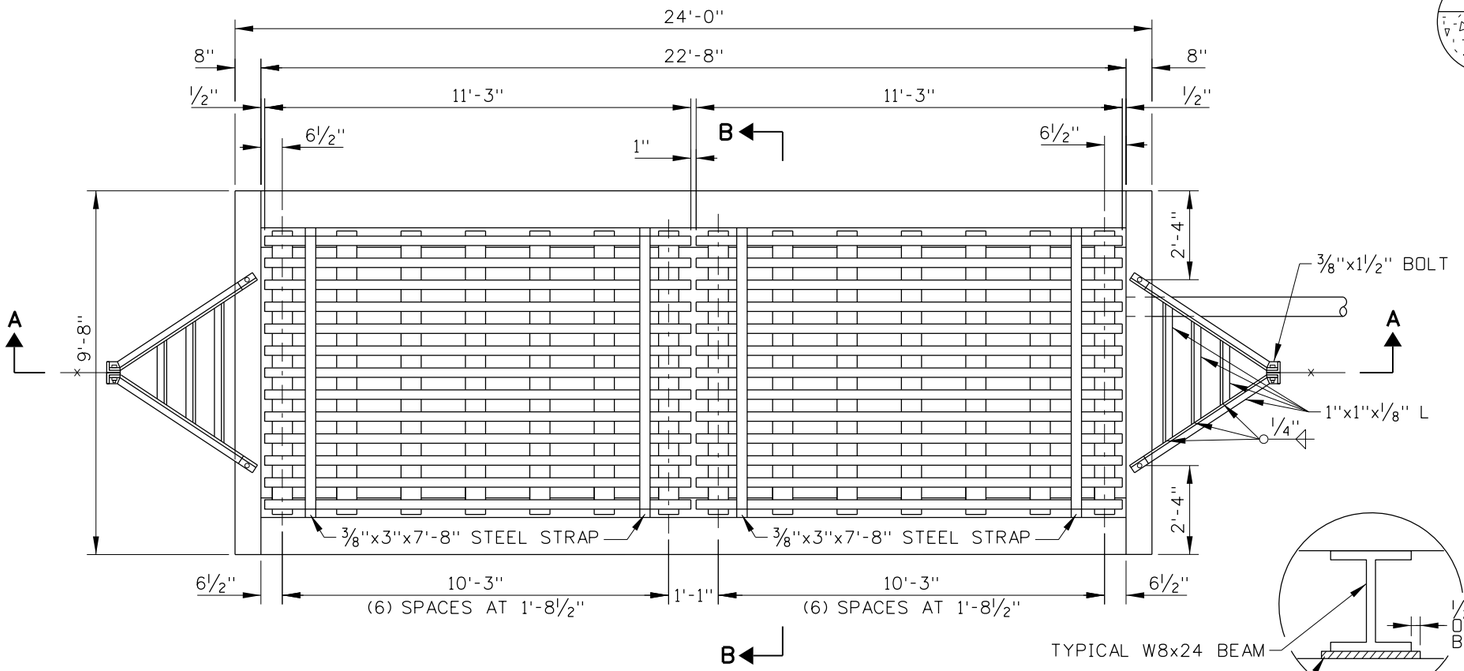
REQUIRES STD. DWG. 610-1

English

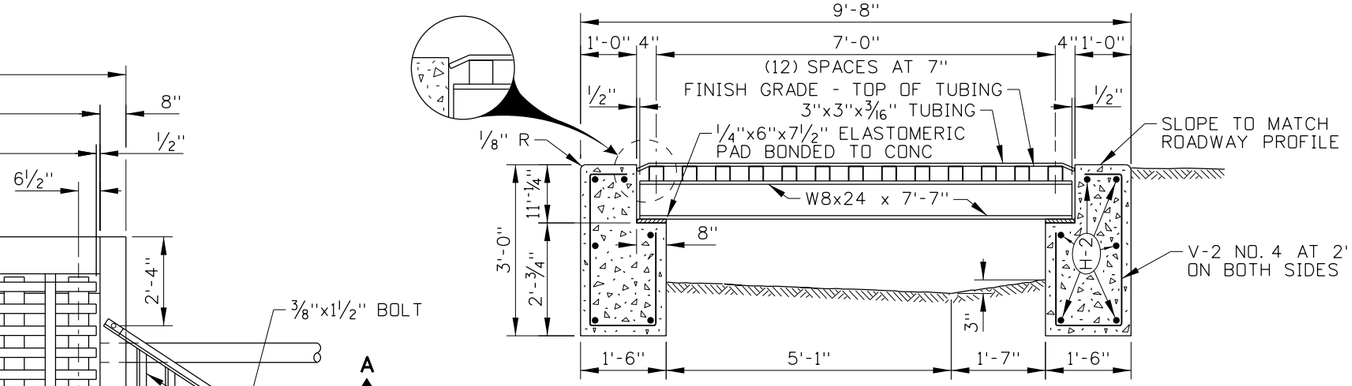
STANDARD DRAWING NO.

610-3

SHEET 1 OF 1



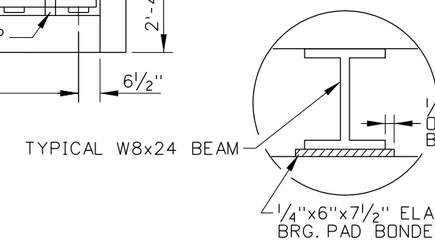
PLAN



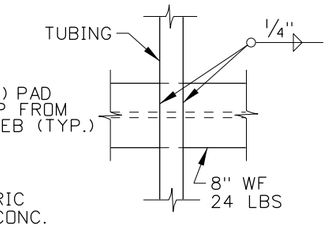
SECTION B-B

REINFORCEMENT STEEL				
MARK	LOCATION	SIZE NO.	BAR LENGTH	NO. REQ'D
V-1	END WALLS	4	2'-8"	18
V-2	SIDE WALLS	4	6'-0"	11
H-1	END WALLS	4	9'-4"	6
H-2	SIDE WALLS (TIE BARS)	4	23'-8"	12
454 LIN. FT. NO.4 BARS @ 0.668 LB./FT.= 304 LB.				

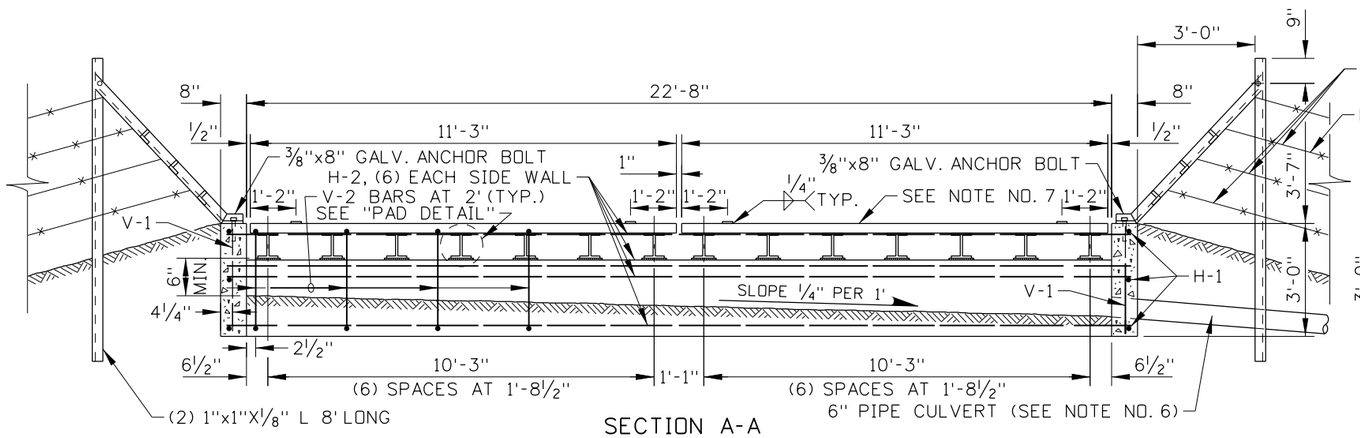
BILL OF MATERIALS	
CONCRETE, CLASS 30	8.2 C.Y.
METAL REINFORCEMENT	304 LBS
STRUCTURAL STEEL	4600 LBS



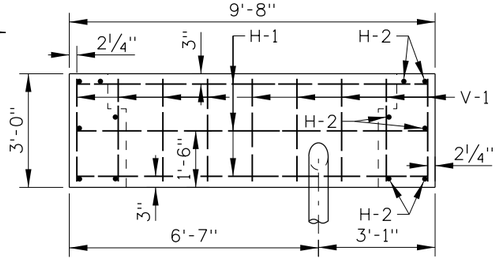
PAD DETAIL
(SEE NOTE NO. 3)



TYPICAL WELD DETAIL



SECTION A-A



END VIEW

NOTES

1. ENSURE THAT CATTLE GUARD MEETS THE REQUIREMENTS OF SECTION 611 - CATTLE GUARDS OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
2. ENSURE THAT THE EXPOSED STEEL SURFACES ARE BLASTED CLEAN TO AN SSPC SP-10 AND PAINTED WITH PAINT SYSTEM D IN ACCORDANCE WITH SECTION 627 - PAINTING OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. ENSURE THAT THE CATTLE GUARD AND SUPPORTS ARE DESIGNED FOR HS-25 LOADING. ENSURE THAT THE ELASTOMERIC BEARING PADS ARE 50 DUROMETER IN HARDNESS.
4. PLACE THE CATTLE GUARD ON BASE AGGREGATE, 3" MINIMUM THICKNESS OVER HAND LEVELED SOIL COMPACTED TO 95% DENSITY.
5. GALVANIZE CATTLE GUARD HARDWARE FASTENERS.
6. GRADE TO DRAIN.
7. PLACE THE CATTLE GUARD TO MATCH THE ROADWAY SLOPE, CROWN, OR BOTH.
8. ALTERNATE CATTLE GUARD DESIGNS MAY BE USED. PRIOR APPROVAL, BY THE ENGINEER, OF SHOP DRAWINGS IS REQUIRED FOR THE USE OF ALTERNATE CATTLE GUARDS.
9. NOT TO SCALE.

ORIGINAL STORED AT: ITD. Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE ORIGINAL SIGNED DECEMBER 17, 2012 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-72		6	5-95	IJR	11	12-12	RDL
2	12-73		7	1-00	MSM			
3	2-74		8	9-02	MSM			
4	3-81		9	10-05	MSM			
5	6-81		10	08-11	RSC			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 611-1_1212.dgn

DRAWING DATE: JANUARY, 1971

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

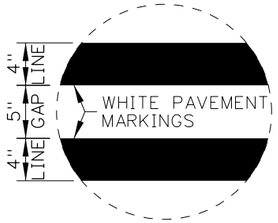
CATTLE GUARD TYPE A

English

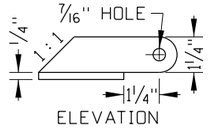
STANDARD DRAWING NO.

611-1

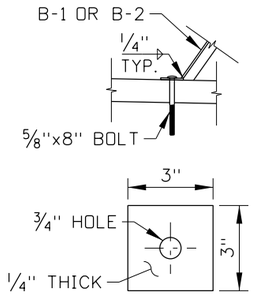
SHEET 1 OF 1



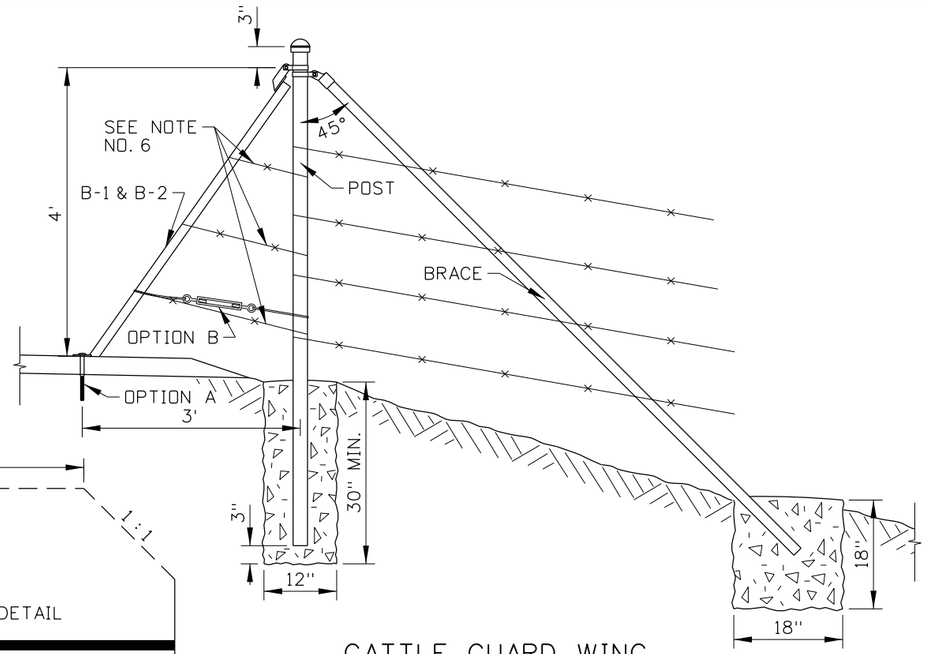
MARKINGS DETAIL



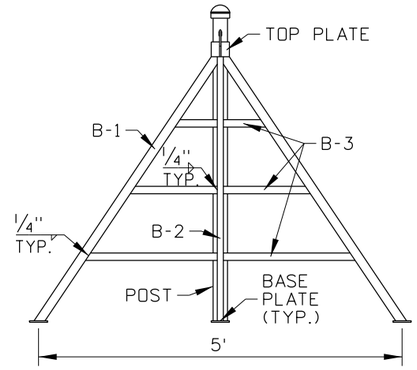
WING TOP PLATE DETAIL



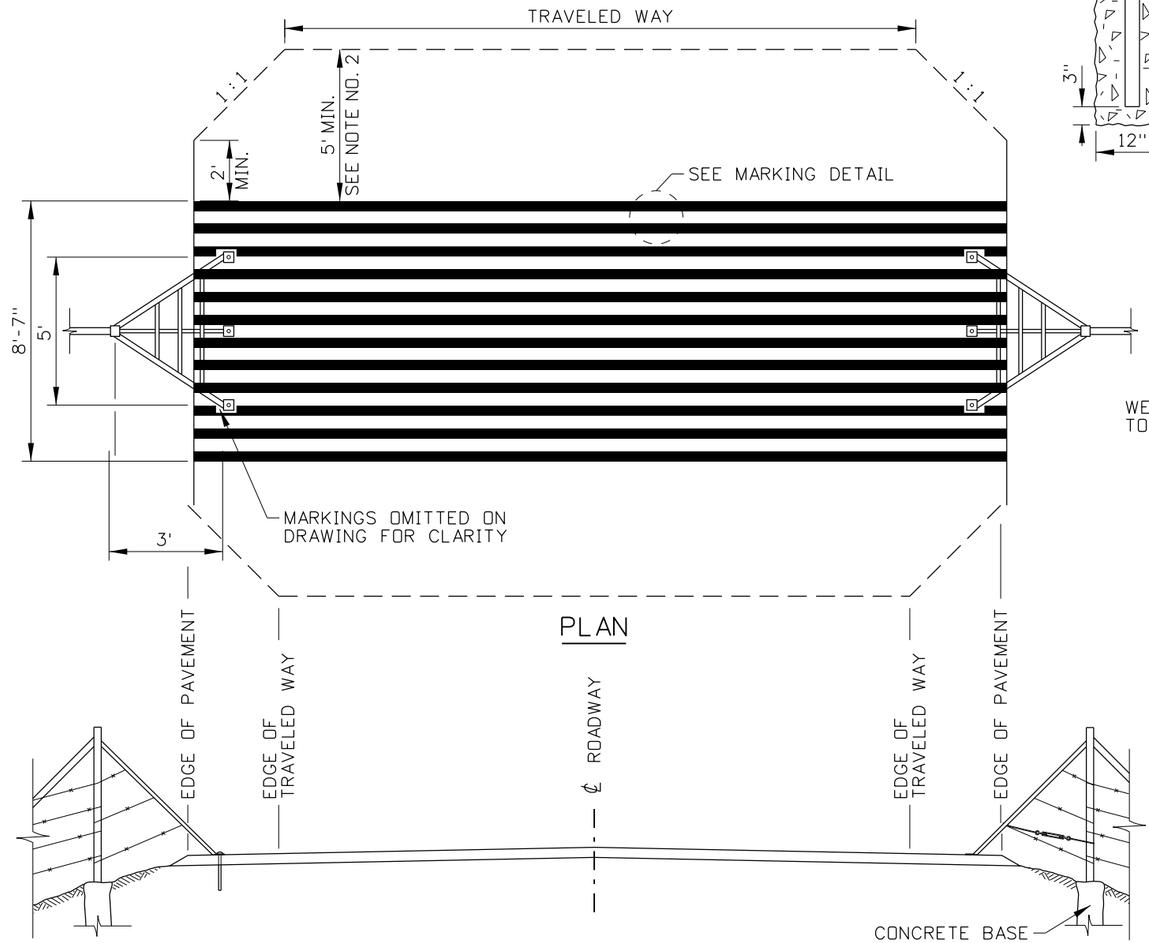
WING BASE PLATE DETAIL



CATTLE GUARD WING



CATTLE GUARD WING ELEVATION

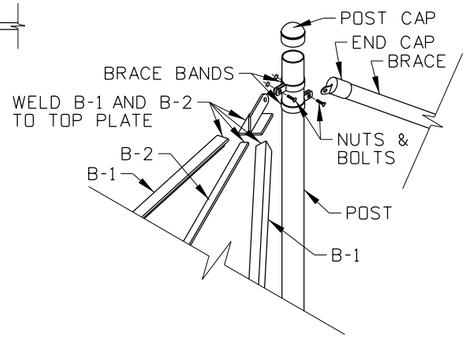


PLAN

ELEVATION

OPTION A SHOWN

OPTION B SHOWN



ISOMETRIC VIEW

MATERIALS TABLE		
COMPONENT	QUANTITY	SIZE
POST	2	2 3/8" DIA. x 8'-0"
BRACE	2	1 5/8" DIA. x 10'-0"
B-1: WING SIDE LEGS	4	1 1/2"x1 1/2"x1/4"x68" ANGLE
B-2: WING CENTER LEG	2	1"x1/4"x60" FLAT
B-3: WING CROSS BARS	2	1 1/2"x1 1/2"x1/4" ANGLE 16", 31", & 46" LENGTHS
WING BASE PLATE	6	3"x3"x1/4"
WING TOP PLATE	2	SEE DETAIL
BRACE BAND	4	2 3/8" DIA.
POST CAP	2	2 3/8" DIA.
BRACE END CAP	2	1 5/8" DIA.
NUTS & BOLTS	4	5/16"x1 1/4" BOLT AND NUT
BASE BOLTS (OPTION A)	6	5/8"x8"
TURNBUCKLE (OPTION B)	2	3/8"

NOTES

1. IF THE CATTLE GUARD IS CONSTRUCTED ON A PAVED ROAD WITH PAVEMENT MARKINGS, TERMINATE OR OBLITERATE THE LONGITUDINAL PAVEMENT MARKINGS 25 FEET FROM THE CATTLE GUARD MARKINGS.
2. IF THE CATTLE GUARD IS CONSTRUCTED ON AN UNPAVED ROAD, PAVE THE CATTLE GUARD AREA AND EXTEND PAVEMENT A MINIMUM OF FIVE FEET BEYOND WHERE THE CATTLE GUARD IS TO BE MARKED.
3. MARK THE CATTLE GUARD PRIOR TO ATTACHING THE CATTLE GUARD WINGS. USE WHITE WATERBORNE PAINT OR THERMOPLASTIC PAVEMENT MARKINGS. MARK A MINIMUM OF EIGHT LINES.
4. SECURE THE CATTLE GUARD WINGS TO PAVEMENT WITH ONE OF THE FOLLOWING OPTIONS:
   OPTION A:
   INSERT 5/8"x8" BOLTS INTO PRE-DRILLED HOLES IN THE PAVEMENT. ENSURE THAT THE BOLT HEAD IS FLUSH WITH THE BASE PLATE.
   OPTION B:
   PLACE A 3/8" TURNBUCKLE FASTENED WITH 10 GAUGE OR THICKER WIRE BETWEEN THE WING CENTER MEMBER (B-2) AND THE BRACE POST. TIGHTEN TURNBUCKLE TO PRESS WING FEET TO ROADWAY PAVEMENT.
5. PAINT THE CATTLE GUARD WINGS YELLOW WITH ITD PAINT SYSTEM C.
6. TIE A MINIMUM OF THREE BARBED WIRES FROM THE POST TO THE INTERSECTIONS OF THE WING B-1 AND B-3 ANGLE BARS.
7. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE OF ORIGINAL SIGNATURE JUNE 27, 2016 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-04	MSM	6	06-18	HEB			
2	10-05	MSM						
3	12-12	RDL						
4	12-15	RDL						
5	05-16	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 611-2_0618.dgn

DRAWING DATE: JANUARY, 2004

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

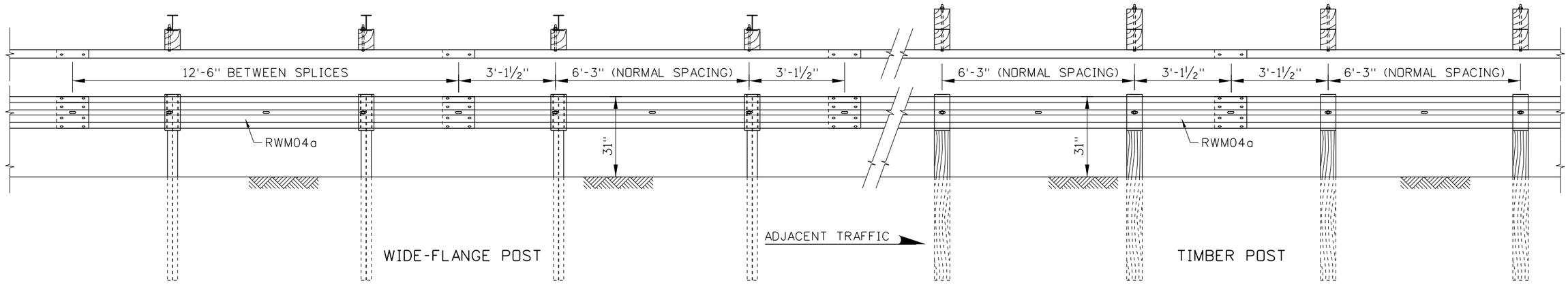
CATTLE GUARD PAVEMENT MARKINGS

English

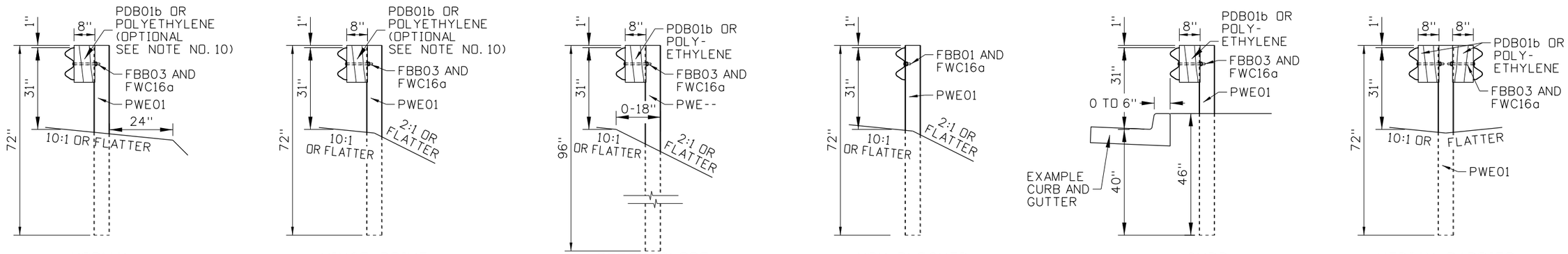
STANDARD DRAWING NO.

611-2

SHEET 1 OF 1

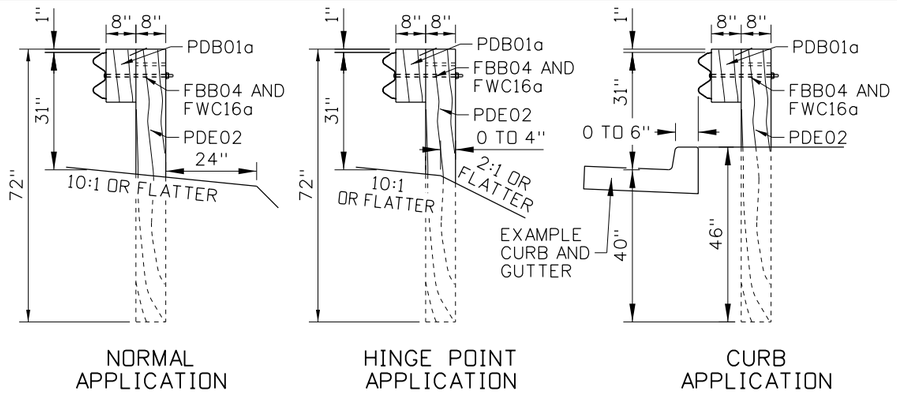


31" W-BEAM GUARDRAIL



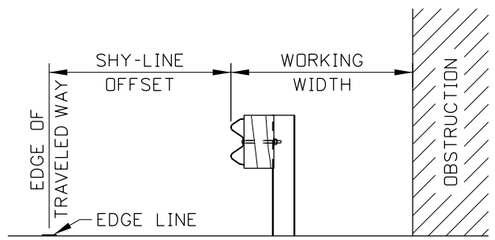
WIDE-FLANGE POST APPLICATIONS

SEE NOTE NOS. 3 AND 11



TIMBER POST APPLICATIONS

SEE NOTE NOS. 3 AND 11



PLACEMENT DETAIL

SEE NOTE NOS. 4 THROUGH 7

SHY-LINE OFFSET AND FLARE RATE TABLE			
DESIGN SPEED (MPH)	SHY-LINE OFFSET (FT)	BARRIER FLARE RATE	
		INSIDE SHY LINE	AT OR BEYOND SHY LINE
80	12	30:1	15:1
70	9	30:1	15:1
60	8	26:1	14:1
55	7	24:1	12:1
50	6.5	21:1	11:1
45	6	18:1	10:1
40	5	16:1	8:1
30	4	13:1	7:1

DEFLECTION TABLE		
APPLICATION	POST SPACING	WORKING WIDTH
NORMAL SPACING	6'-3"	54"
½ SPACING	3'-1½"	46"
¼ SPACING	1'-6¾"	38"
STEEP SLOPE	6'-3"	56"
HINGE POINT	6'-3"	78"
LONG SPAN	≤ 25'	96"

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE ORIGINAL SIGNED MARCH 10, 2020 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	03-19	RDL						
3	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-1_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

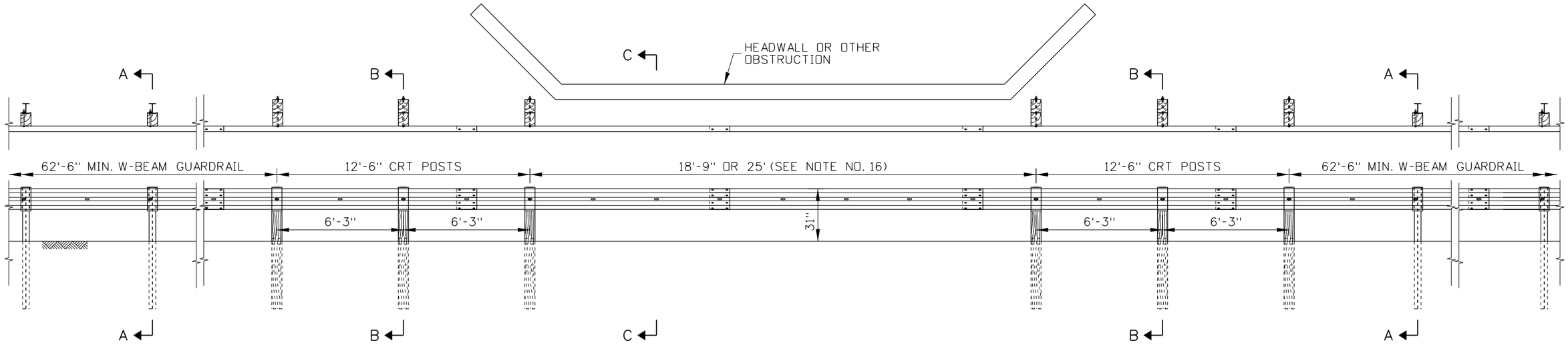
31" W-BEAM GUARDRAIL

English

STANDARD DRAWING NO.

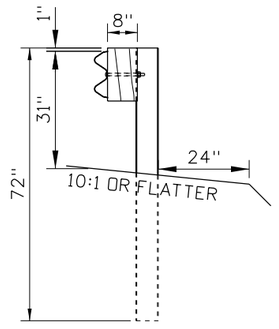
612-1

SHEET 1 OF 5

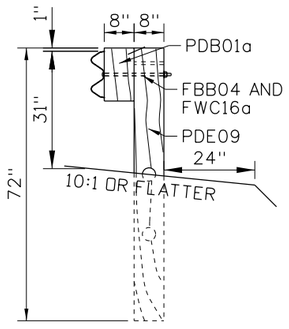


31" LONG-SPAN APPLICATION

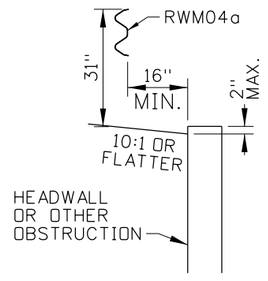
SEE NOTE NOS. 17 AND 18



SECTION A-A
WIDE-FLANGE OR TIMBER POST



SECTION B-B



SECTION C-C

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED BY RYAN D. LANCASTER
DATE ORIGINAL SIGNED MARCH 10, 2021
13683
STATE OF IDAHO
RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	03-19	RDL						
3	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-1_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

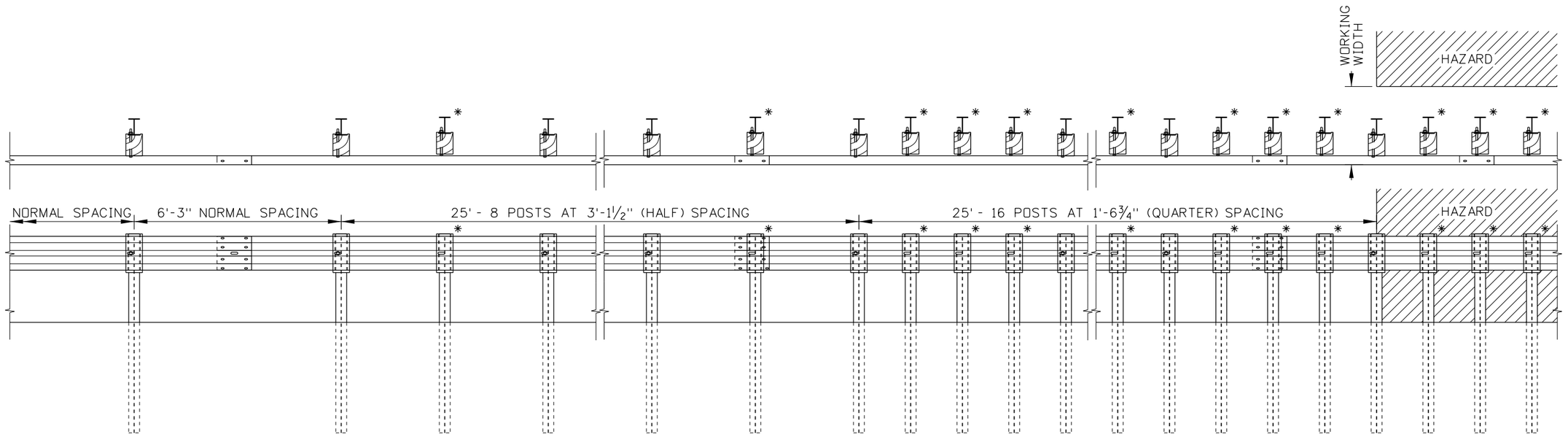
ORIGINAL SIGNED BY: KEVIN SABLAN
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

31" W-BEAM GUARDRAIL

English

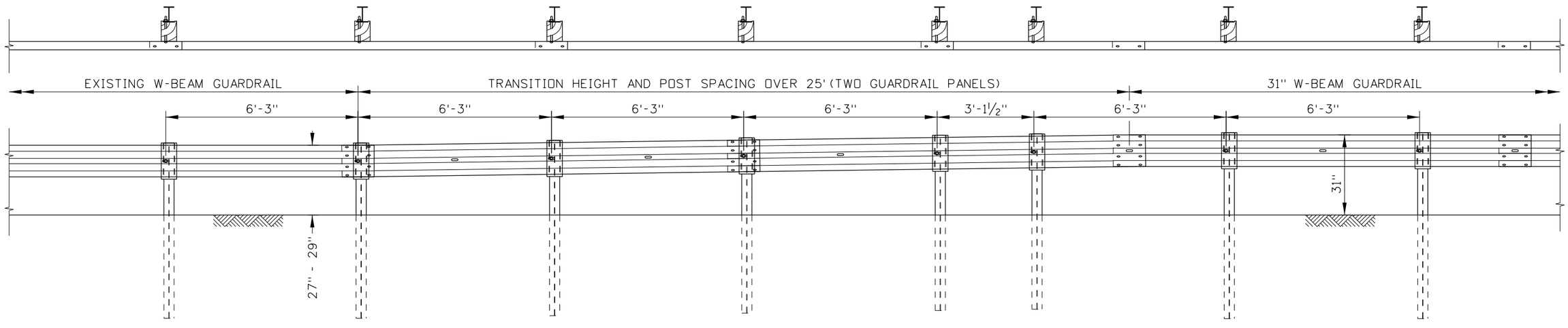
STANDARD DRAWING NO.
612-1



REDUCED POST SPACING

SEE NOTE NO. 7

LEGEND:
* EXTRA POSTS.
BOLT BLOCKOUT TO POST, BUT DO NOT BOLT TO GUARDRAIL



TRANSITION TO 31" W-BEAM GUARDRAIL

SEE NOTE NO. 19

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER DATE OF ORIGINAL SIGNATURE MARCH 10, 2020 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	03-19	RDL						
3	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-1_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

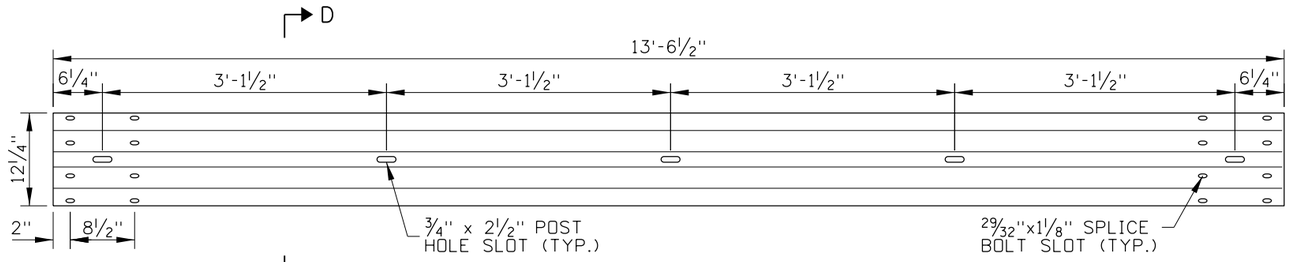
31" W-BEAM GUARDRAIL

English

STANDARD DRAWING NO.

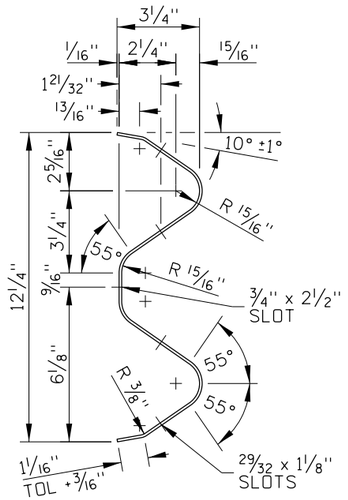
612-1

SHEET 3 OF 5



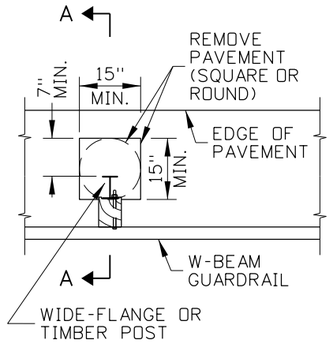
4-SPACE W-BEAM GUARDRAIL

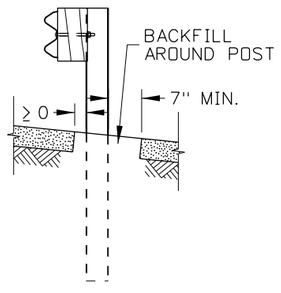
RWM04a



SECTION D-D

31" W-BEAM GUARDRAIL HARDWARE COMPONENTS TABLE		
COMPONENT DESCRIPTION	WIDE-FLANGE POST	TIMBER POST
4-SPACE W-BEAM GUARDRAIL	RWM04a	RWM04a
WIDE-FLANGE GUARDRAIL POSTS	PWE01, PWE--	-
TIMBER GUARDRAIL POSTS	-	PDE02
CRT TIMBER GUARDRAIL POST	-	PDE09
W-BEAM BLOCKOUT	PDB01b OR POLYETHYLENE	PDB01a
⅝" GUARDRAIL SPLICE BOLT AND RECESSED NUT	FBB01	FBB01
⅝" GUARDRAIL BOLT AND RECESSED NUT	FBB03	FBB04
⅝" PLAIN ROUND WASHER	FWC16a	FWC16a
16D GALVANIZED NAIL	-	N/A

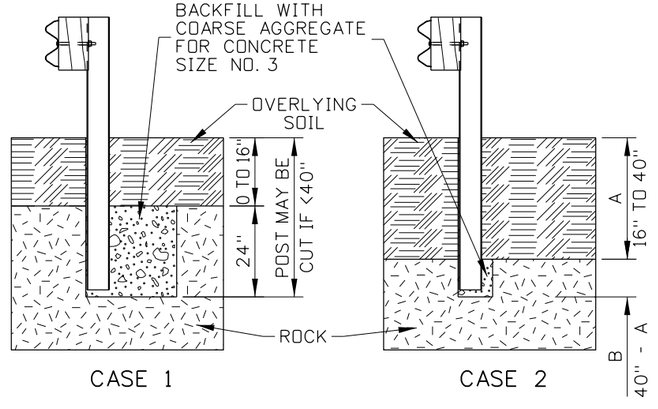




SECTION A-A

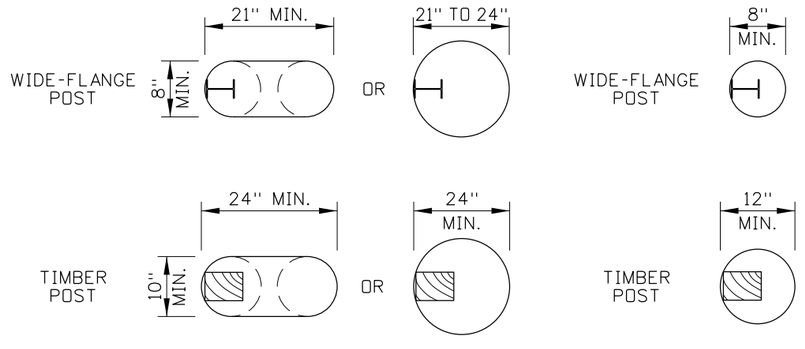
GUARDRAIL POST IN PAVEMENT

SEE NOTE NO. 9



GUARDRAIL POST IN ROCK FORMATION

SEE NOTE NO. 9



REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	03-19	RDL						
3	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-1_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

31" W-BEAM GUARDRAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

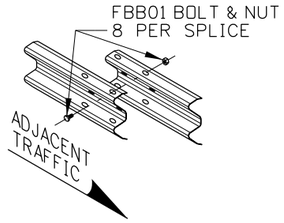
English

STANDARD DRAWING NO.

612-1

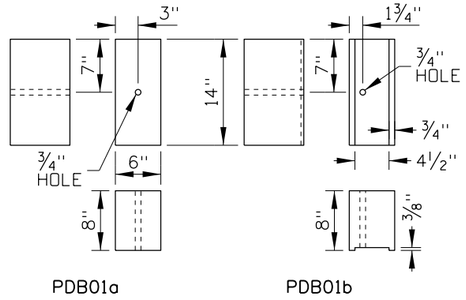
SHEET 4 OF 5

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED AND DATED BY RYAN D. LANCASTER ON MARCH 10, 2021
13683
STATE OF IDAHO
RYAN D. LANCASTER

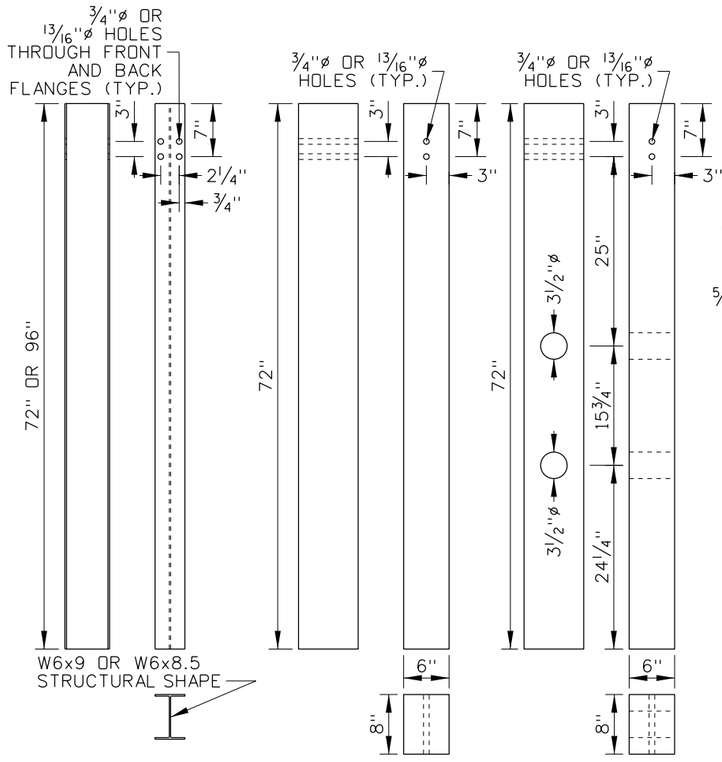


W-BEAM SPLICE DETAIL

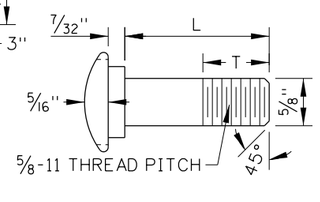
SEE NOTE NO. 14

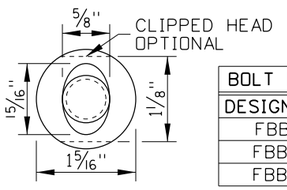


W-BEAM TIMBER BLOCKOUTS



GUARDRAIL POSTS

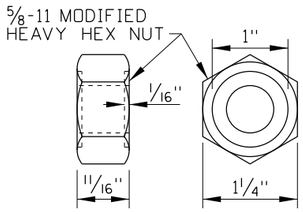




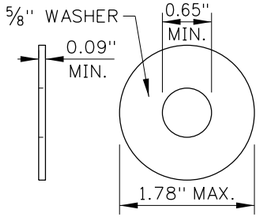
BOLT DIMENSION TABLE		
DESIGNATOR	L	T
FBB01	1 1/4"	1 1/8"
FBB03	10"	1 3/4"
FBB04	18"	4"

GUARDRAIL BOLT (BUTTON-HEADED)

FBB01, FBB03, FBB04



RECESSED NUT



PLAIN ROUND WASHER

FWC16a

NOTES

1. THE 31" W-BEAM GUARDRAIL SYSTEM SHOWN IS A MASH TEST LEVEL 3 BARRIER SYSTEM.
2. PROVIDE BARRIER HARDWARE AS SHOWN AND AS SPECIFIED IN THE PUBLICATION "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE." WHERE THE GUIDE AND PLANS CONFLICT, PROVIDE HARDWARE COMPONENTS AS SHOWN ON THE PLANS.
3. INSTALL GUARDRAIL AS SHOWN IN THE NORMAL APPLICATION UNLESS OTHERWISE INDICATED ON THE PROJECT PLANS. THE CURB APPLICATIONS CAN BE USED WITH ANY OF THE CURB AND GUTTER OR CURB TYPES SHOWN ON THE CURB AND GUTTER STANDARD DRAWING.
4. PLACE 31" W-BEAM GUARDRAIL AS FAR FROM THE TRAVELED WAY AS PRACTICAL. WHERE PRACTICAL PROVIDE THE SHY-LINE OFFSET DISTANCE SHOWN IN THE SHY-LINE OFFSET TABLE.
5. WHERE PRACTICAL, FLARE THE 31" W-BEAM GUARDRAIL AWAY FROM THE TRAVELED WAY. SEE THE SHY-LINE OFFSET AND FLARE RATE TABLE.
6. PROVIDE ADEQUATE DEFLECTION DISTANCE TO OBSTRUCTIONS BEHIND THE GUARDRAIL BY PROVIDING THE WORKING WIDTH SHOWN ON THE PLACEMENT DETAIL AND IN THE DEFLECTION TABLE.
7. DECREASE DEFLECTION BY REDUCING POST SPACING. INTRODUCE EACH REDUCTION IN POST SPACING OVER 25' OR MORE. DO NOT BOLT THE GUARDRAIL TO THE EXTRA POSTS.
8. WIDE-FLANGE OR TIMBER POSTS MAY BE USED UNLESS OTHERWISE INDICATED ON THE PROJECT PLANS. USE THE SAME POST MATERIAL FOR THE PROJECT LENGTH (EXCEPT IN THE 31" LONG-SPAN APPLICATION).
9. REMOVE PAVEMENT AND ROCK AROUND GUARDRAIL POSTS.
10. USE TIMBER OR POLYETHYLENE BLOCKOUTS WITH WIDE-FLANGE POSTS. USE TIMBER BLOCKOUTS WITH TIMBER POSTS. USE THE SAME BLOCKOUT MATERIAL FOR THE PROJECT LENGTH (EXCEPT IN THE 31" LONG-SPAN APPLICATION). THE WIDE-FLANGE POST NORMAL APPLICATON CAN BE CONSTRUCTED WITHOUT BLOCKOUTS IF INDICATED ON THE PROJECT PLANS OR IF APPROVED BY THE ENGINEER.
11. INSTALL THE BLOCKOUT AND W-BEAM GUARDRAIL USING THE HOLE 7" FROM THE TOP OF THE POST. THE HIGHER HOLE IS RESERVED FOR FUTURE GUARDRAIL HEIGHT ADJUSTMENT.
12. NAIL TIMBER BLOCKOUTS TO TIMBER POSTS TO RESTRICT BLOCK ROTATION. NAIL THROUGH THE SIDES OF THE BLOCKOUT AND POST.
13. WHEN WIDE-FLANGE POSTS ARE USED AND WHEN PRACTICAL, INSTALL THE BOLT (FBB03) ON THE UPSTREAM SIDE OF THE POST IN RELATION TO THE ADJACENT TRAFFIC.
14. SPLICE 31" W-BEAM GUARDRAIL BETWEEN POSTS. OVERLAP SPLICES SO THAT THE EXPOSED W-BEAM EDGE IS DOWNSTREAM OF THE ADJACENT TRAFFIC.
15. BEGIN AND END 31" W-BEAM GUARDRAIL WITH A TERMINAL, ANCHOR, OR TRANSITION. CONSTRUCT TERMINALS OR TRANSITIONS USING THE SAME POST MATERIAL AS THE GUARDRAIL WHEN PRACTICAL. SOME ANCHORS AND TERMINALS ARE ONLY AVAILABLE WITH TIMBER OR WIDE-FLANGE POSTS.
16. DELINEATE GUARDRAILS WITH TYPE 9 DELINEATORS. SEE THE DELINEATOR STANDARD DRAWING FOR DELINEATOR SPACING.
17. ONE POST CAN BE OMITTED WITHOUT OTHER MODIFICATION IF APPROVED BY THE ENGINEER. THE LONG-SPAN APPLICATION CAN BE USED WHERE TWO POSTS (18'-9" SPAN) OR THREE POSTS (25' SPAN) ARE OMITTED.
18. WHEN THE LONG-SPAN APPLICATION (18'-9", OR 25') IS USED, INSTALL THREE CRT TIMBER POSTS (PDE09) WITH TIMBER BLOCKOUTS ADJACENT TO THE UPSTREAM AND DOWNSTREAM ENDS OF THE UNSUPPORTED SECTION. DO NOT NEST THE 4-SPACE W-BEAM GUARDRAIL IN THE UNSUPPORTED SECTION. INSTALL AT LEAST 62'-6" OF 31" W-BEAM GUARDRAIL UPSTREAM AND DOWNSTREAM OF THE CRT POSTS.
19. WHEN CONNECTING TO EXISTING GUARDRAIL, TRANSITION THE GUARDRAIL HEIGHT TO 31". REPLACE THE EXISTING W-BEAM GUARDRAIL IF THE TOP OF GUARDRAIL HEIGHT IS LESS THAN 27".
20. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 10, 2020

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	03-19	RDL						
3	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-1_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

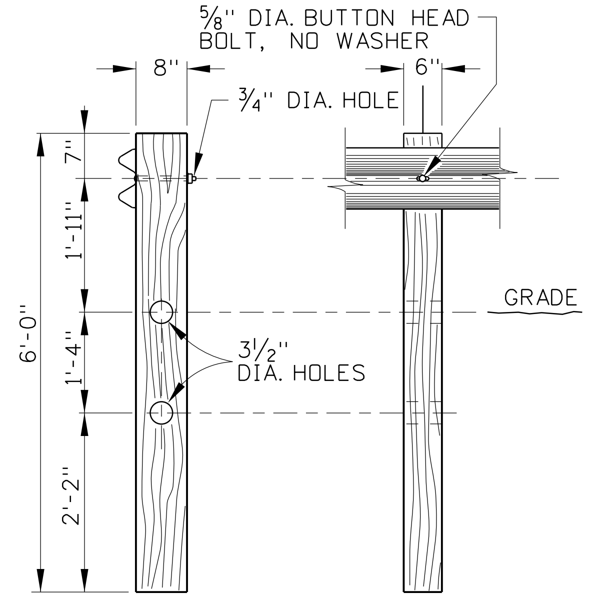
31" W-BEAM GUARDRAIL

English

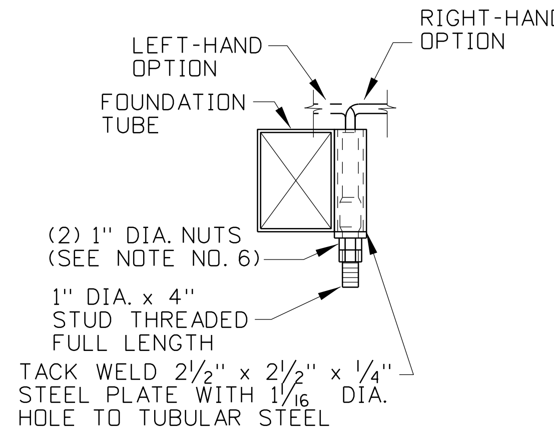
STANDARD DRAWING NO.

612-1

SHEET 5 OF 5



MODIFIED CRT TIMBER POST



ANCHOR DETAIL

(SEE NOTE NO. 9)

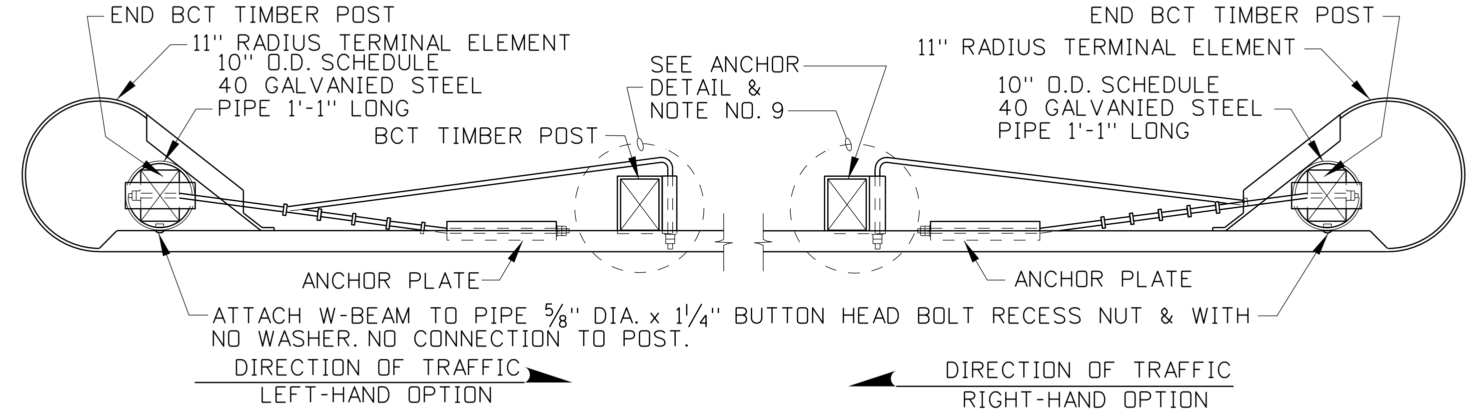


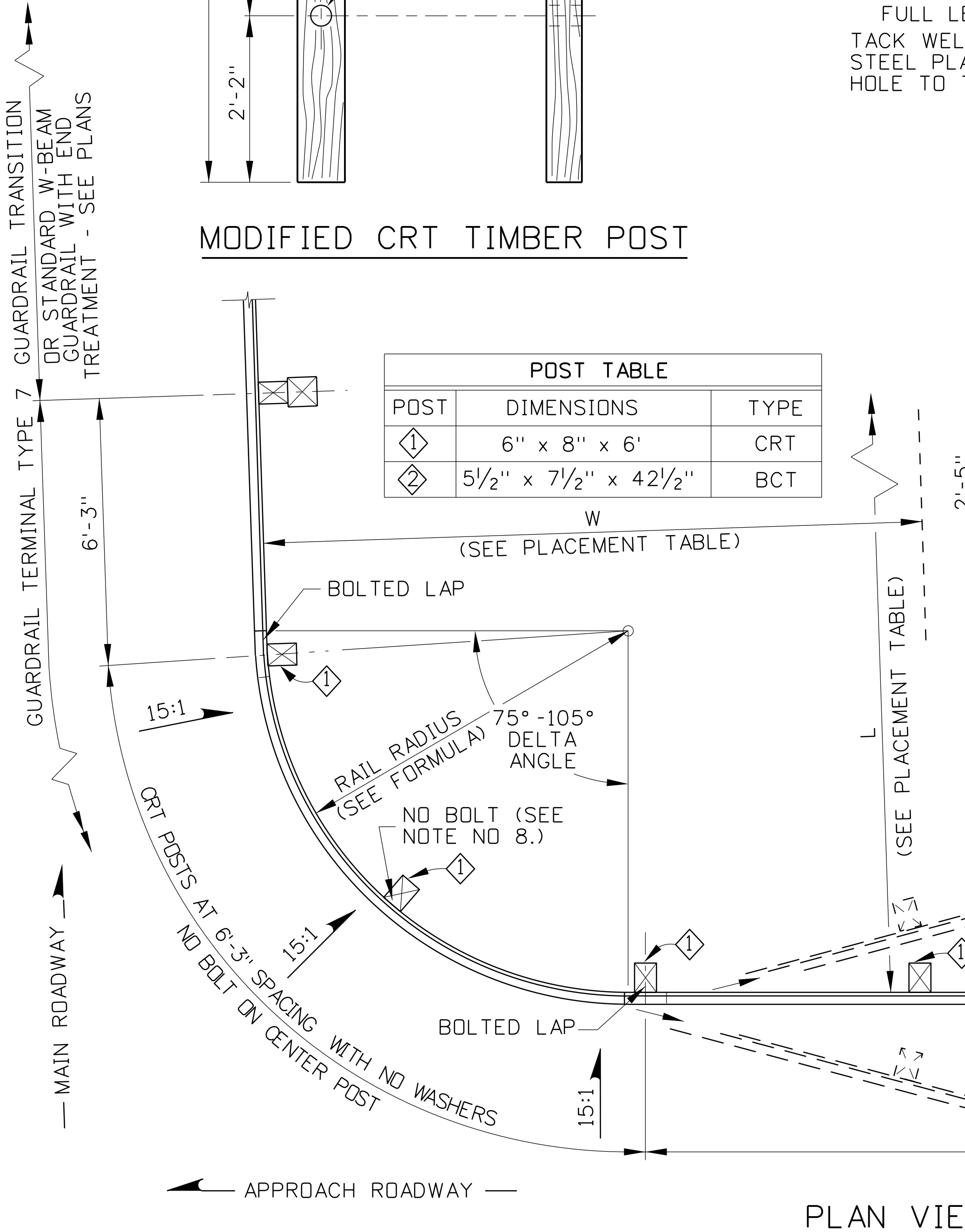
TABLE OF MAXIMUM TAPERS	
DESIGN SPEED	TAPER
70	15:1
60	13:1
50	11:1
40	9:1

PLACEMENT TABLE

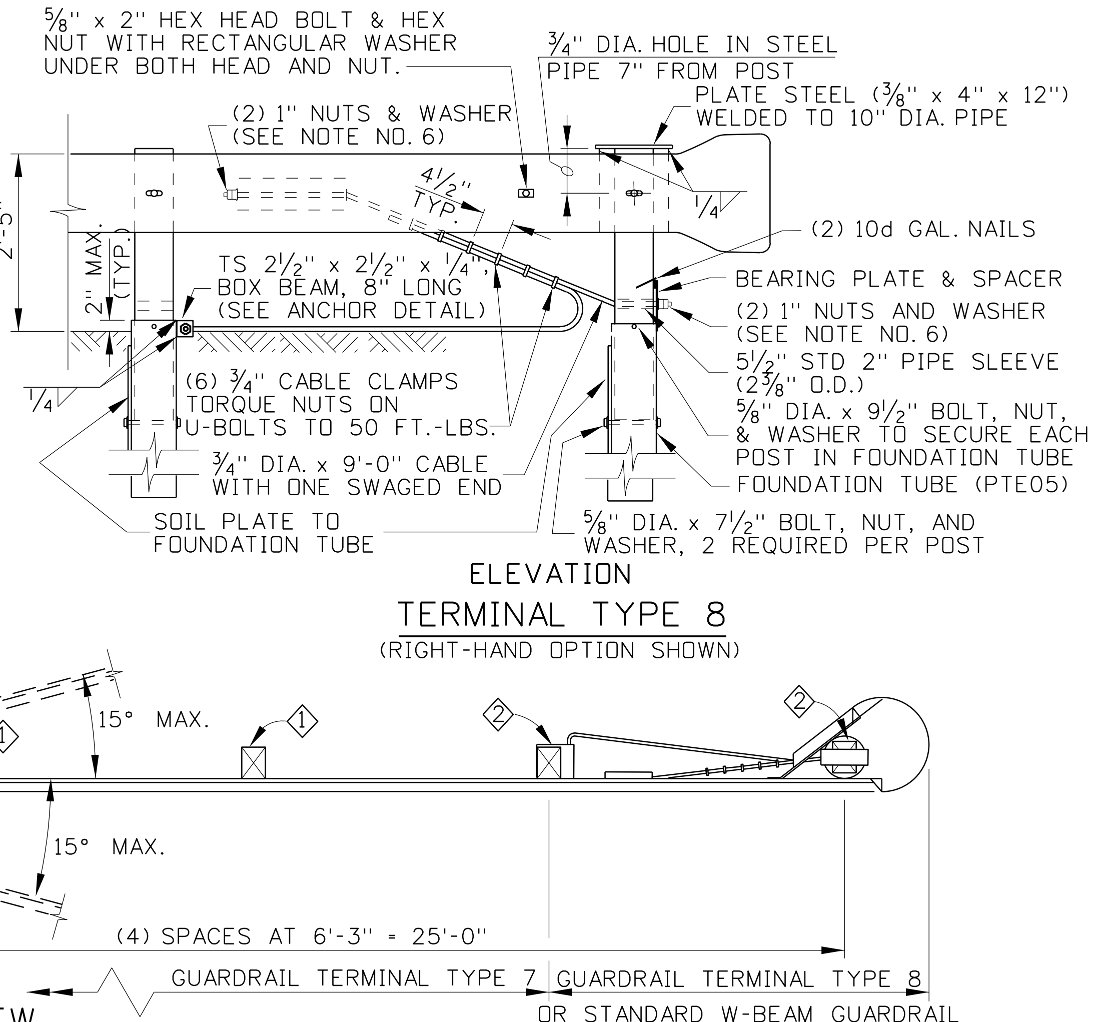
DELTA ANGLE	RAIL RADIUS	NO. RAIL SECTIONS	NO. CRT POSTS	AREA FREE OF FIXED OBJECTS L	AREA FREE OF FIXED OBJECTS W
75° -105°	8'	1	5	25'	15'
75° -105°	16'	2	7	30'	15'
75° -105°	24'	3	9	40'	20'
75° -80°	32'	3	9	40'	20'
>80° -100°	32'	4	11	40'	20'
>100° -105°	32'	5	13	40'	20'

POST	DIMENSIONS	TYPE
1	6" x 8" x 6'	CRT
2	5 1/2" x 7 1/2" x 42 1/2"	BCT

Caption: POST TABLE



PLAN VIEW



ELEVATION

TERMINAL TYPE 8

(RIGHT-HAND OPTION SHOWN)

NOTES

1. THE TYPE 8 TERMINAL SHALL ONLY BE USED OUTSIDE THE CLEAR ZONE OR WHEN THE APPROACH ROADWAY SPEED IS 35 MPH OR LESS. OTHERWISE AN APPROPRIATE NCHRP 350 TERMINAL IS REQUIRED.

2. THE GUARDRAIL ALONG THE APPROACH ROADWAY MAY BE ANGLED 15° TO EITHER SIDE OF THE PERPENDICULAR AXIS TO THE MAIN ROADWAY. HOWEVER, FLARE RATES ALONG ROADWAYS WITH 35 MPH OR GREATER SPEEDS MUST FOLLOW STANDARD TAPER RATES (SEE "TABLE OF MAXIMUM TAPERS").

3. THE ROADWAY IN FRONT THE CURVED PORTION OF THE TERMINAL SHALL BE 15:1 OR FLATTER. GRADE TERRAIN TO A 10:1 SLOPE OR FLATTER FOR 2' BEYOND THE GUARDRAIL POST, THEN A 2:1 OR FLATTER SLOPE. A 6:1 OR FLATTER SLOPE IS DESIRABLE. IF THE FILL HEIGHT IS GREATER THAN 30' OTHER SOLUTIONS SHOULD BE CONSIDERED. AN AREA FREE OF FIXED OBJECTS SHALL BE MAINTAINED BEHIND THE GUARDRAIL.

4. THIS DRAWING REQUIRES STANDARD DRAWING 612-1 AND IS SUBJECT TO THE W-BEAM GUARDRAIL INSTALLATION REQUIREMENTS AND HARDWARE/ACCESSORY SPECIFICATIONS.

5. ALL TERMINAL HARDWARE ITEMS SHALL MEET THE SPECIFICATIONS IN THE "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" (CURRENT EDITION). ALL WELDING SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY.

6. WHEN FASTENING THE CABLE ENDS THE OUTSIDE NUTS SHALL BE TORQUED AGAINST INSIDE NUTS A MINIMUM OF 100 FT.-LBS.

7. ALL CURVED GUARDRAIL SHALL BE SHOP BENT, FIELD BENDING WILL NOT BE ALLOWED.

8. ALL CURVED RAIL SECTIONS SHALL BE 12'-6" IN LENGTH AND BOLTED TO THE POSTS ONLY AT THE LAPS.

9. THE ANCHOR CABLE FROM POST #1 TO POST #2 MUST BE ATTACHED ON THE FAR SIDE OF THE FOUNDATION TUBE FOR LEFT-HAND INSTALLATIONS.

10. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER — REGISTERED 6506 — ORIGINAL SIGNED TED E. MASON OCTOBER 26, 2010 — STATE OF IDAHO — TED E. MASON

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	05-90	GB	6	05-06	MSM			
2	04-93	MSM	7	11-06	MSM			
3	04-99	MSM	8	09-10	MGL			
4	03-03	MSM						
5	12-04	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-3_1010.dgn

DRAWING DATE: MAY, 1989

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS

ASSISTANT CHIEF ENGINEER (DEVELOPMENT)

ORIGINAL SIGNED BY: TOM COLE

CHIEF ENGINEER

STANDARD DRAWING

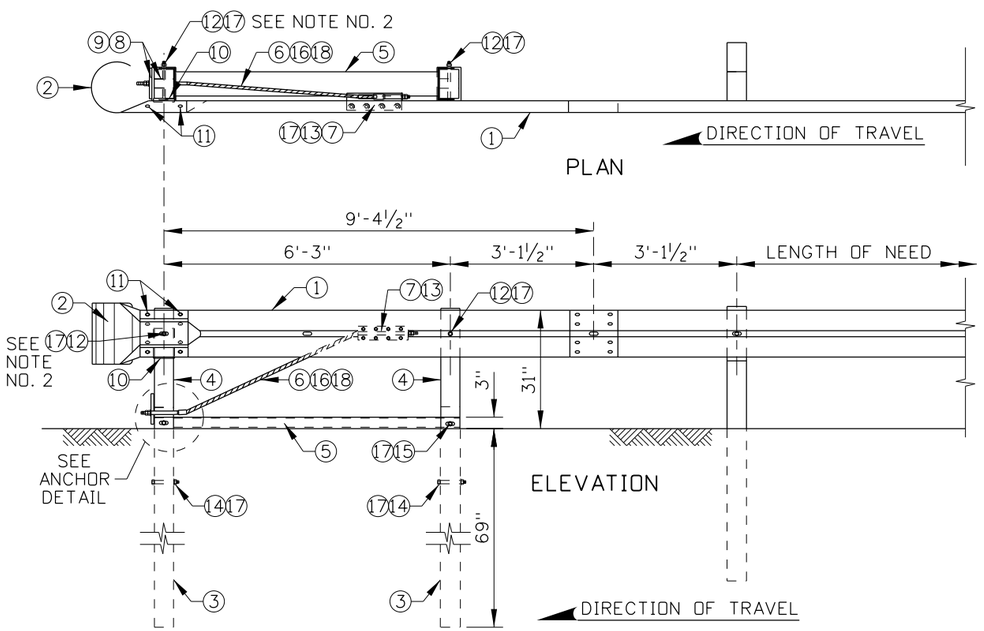
GUARDRAIL TERMINAL TYPES 7 & 8

REQUIRES STD. DWG. 612-1

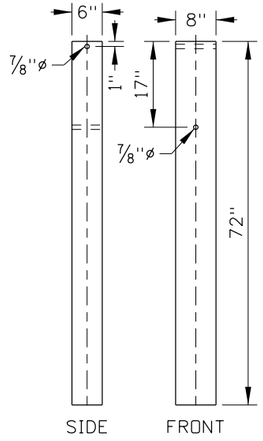
English

STANDARD DRAWING NO. 612-3

SHEET 1 OF 1

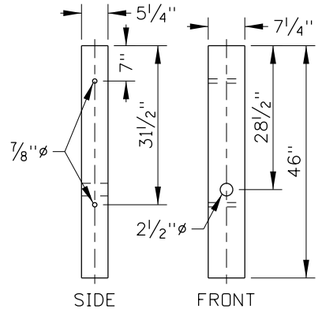


GUARDRAIL ANCHOR



③ FOUNDATION TUBE DETAIL

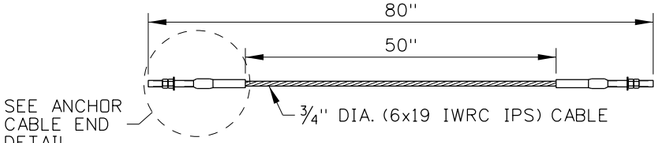
PTE06



④ BCT TIMBER POST DETAIL

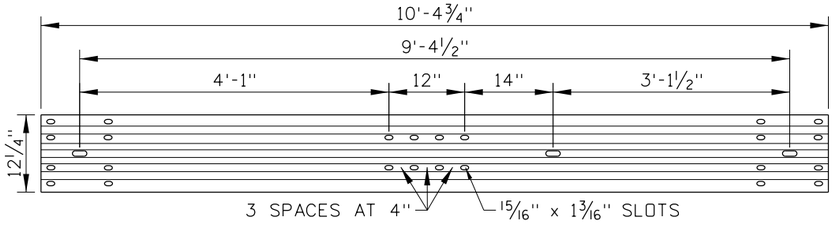
PDF--

ANCHOR HARDWARE COMPONENTS TABLE			
ITEM NO.	COMPONENT DESCRIPTION	QTY.	TF-13 NAME
①	W-BEAM ANCHOR GUARDRAIL	1	RWM14a (MOD)
②	W-BEAM END SECTION (ROUNDED)	1	RWE03a
③	FOUNDATION TUBE	2	PTE06
④	BCT TIMBER POST	2	PDF--
⑤	STRUT AND YOKE ASSEMBLY	1	PFP02
⑥	BCT CABLE ANCHOR ASSEMBLY	1	FCA01
⑦	GUARDRAIL ANCHOR BRACKET	1	FPA01
⑧	BCT POST SLEEVE	1	FMM02
⑨	BCT BEARING PLATE	1	FPB01
⑩	SHELF ANGLE BRACKET	1	FPP02
⑪	⅝" GUARDRAIL SPLICE BOLT AND RECESSED NUT	4	FBB01
⑫	10" GUARDRAIL BOLT & RECESSED NUT	2	FBB03
⑬	⅝" X 2" HEX HEAD BOLT & NUT	8	FBX16a
⑭	⅝" X 8" HEX HEAD BOLT & NUT	2	FBX16a
⑮	⅝" X 10" HEX HEAD BOLT & NUT	2	FBX16a
⑯	1" HEX NUTS	4	FNX24a
⑰	⅝" FLAT WASHER	22	FWC16a
⑱	1" FLAT WASHER	2	FWC24a
⑲	16D GALVANIZED NAIL	2	N/A



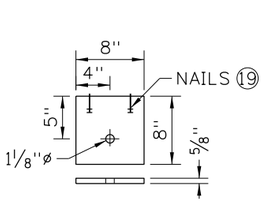
⑥ BCT ANCHOR ASSEMBLY DETAIL

FCA01



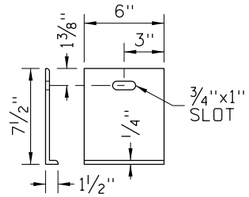
① W-BEAM ANCHOR GUARDRAIL

RWM14a (MODIFIED)



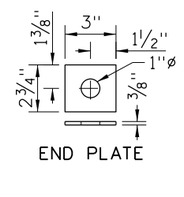
⑨ BCT BEARING PLATE DETAIL

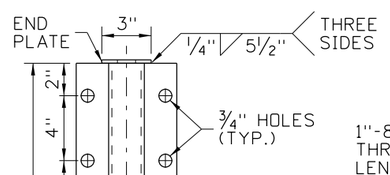
FPB01

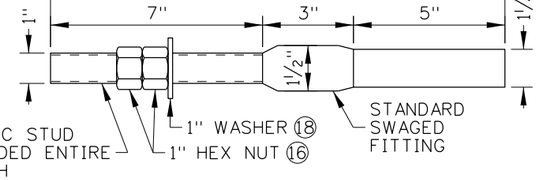


⑩ SHELF ANGLE BRACKET DETAIL

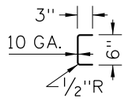
FPP02



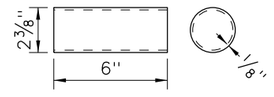




ANCHOR CABLE END DETAIL



SEC A-A

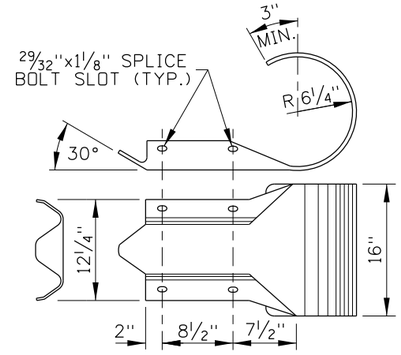


⑧ BCT POST SLEEVE DETAIL

FMM02

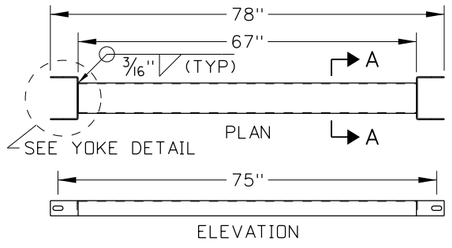
NOTES

1. INSTALL THE ANCHOR SYSTEM ON THE TRAILING END OF 31" W-BEAM GUARDRAIL, OUTSIDE OF THE CLEAR ZONE FOR APPROACHING TRAFFIC, OR BOTH.
2. SUPPORT THE W-BEAM ANCHOR GUARDRAIL AT THE END POST WITH THE SHELF ANGLE BRACKET. DO NOT BOLT THE W-BEAM GUARDRAIL TO THE POST.
3. ENSURE THAT THE FOUNDATION TUBES DO NOT EXTEND MORE THAN 3¾" ABOVE THE FINISHED GRADE.
4. INSTALL AN EXTRA HEX NUT ON EACH END OF THE BCT CABLE ANCHOR ASSEMBLY.
5. AFFIX A TYPE 3 OBJECT MARKER TO THE W-BEAM END SECTION WHEN THE ANCHOR IS USED ON AN UNDIVIDED HIGHWAY.
6. DRAWING NOT TO SCALE.



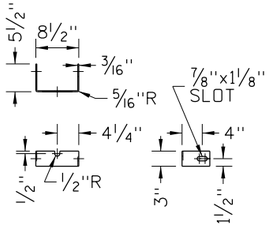
② W-BEAM END SECTION DETAIL

RWE03a

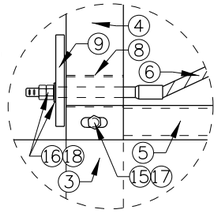


⑤ STRUT AND YOKE ASSEMBLY DETAIL

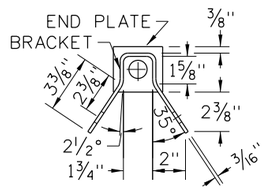
PFP02



YOKE DETAIL



ANCHOR DETAIL



⑦ GUARDRAIL ANCHOR BRACKET DETAIL

FPA01

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER — LICENSED — ORIGINAL SIGNED BY RYAN D. LANCASTER — JULY 25, 2017 — STATE OF IDAHO — 13683 — RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

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CADD FILE NAME: 612-5_0617.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

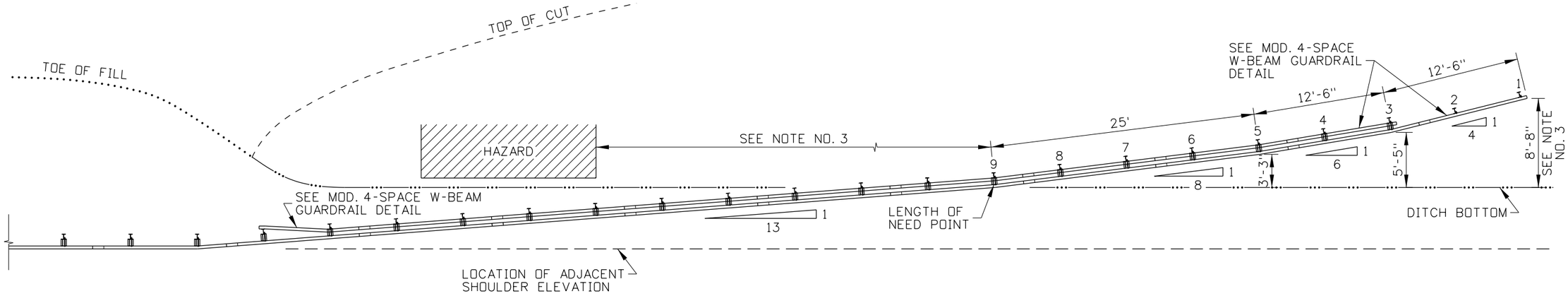
STANDARD DRAWING

GUARDRAIL ANCHOR

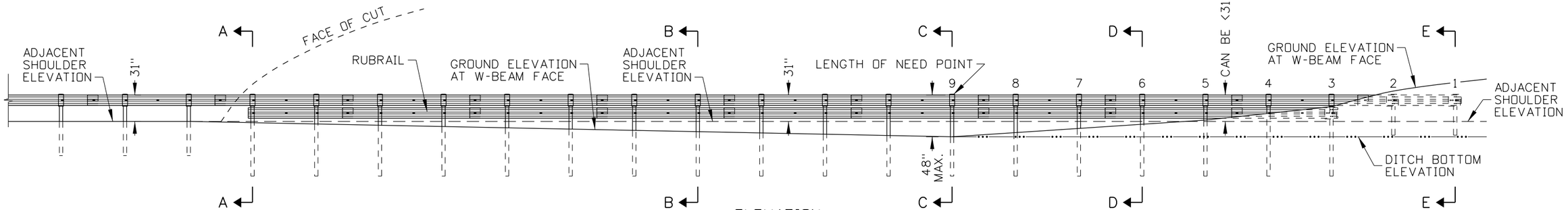
English

STANDARD DRAWING NO. 612-5

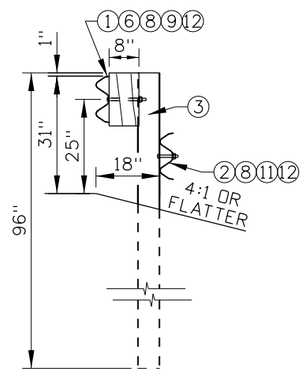
SHEET 1 OF 1



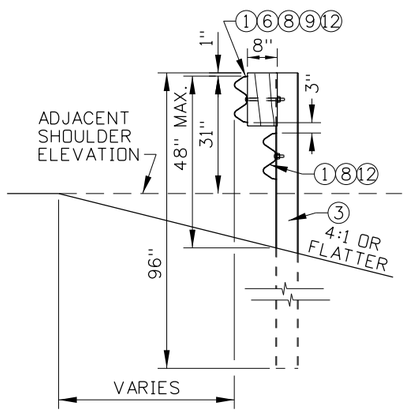
PLAN



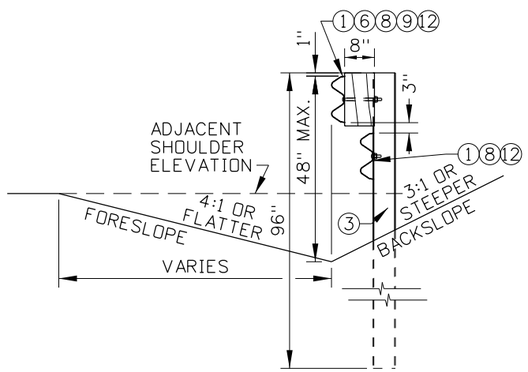
ELEVATION



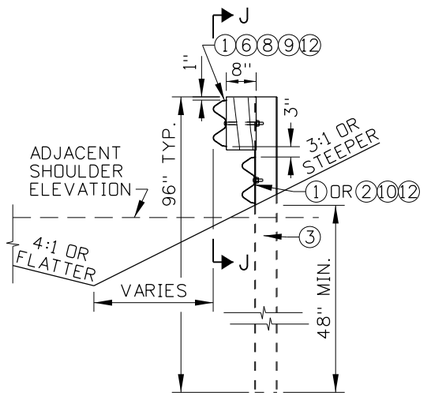
SECTION A-A



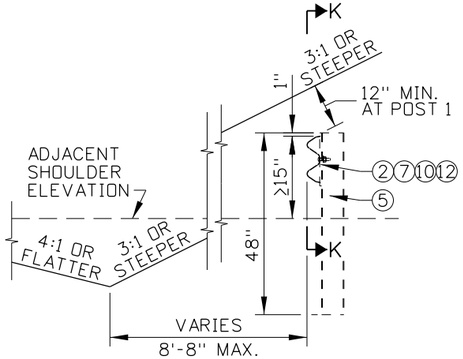
SECTION B-B



SECTION C-C
POST 9



SECTION D-D
POSTS 3 TO 8
(SEE NOTE NO. 7)



SECTION E-E
POSTS 1 TO 2

USE WHEN DITCH FORESLOPE IS 4:1 OR FLATTER

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO

ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 17, 2020

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-20	PBH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-6_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

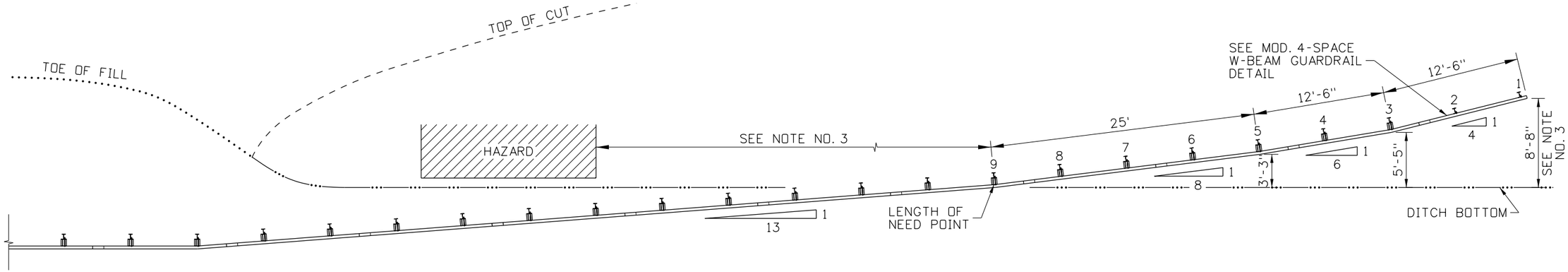
GUARDRAIL TERMINAL BURIED-IN-BACKSLOPE

English

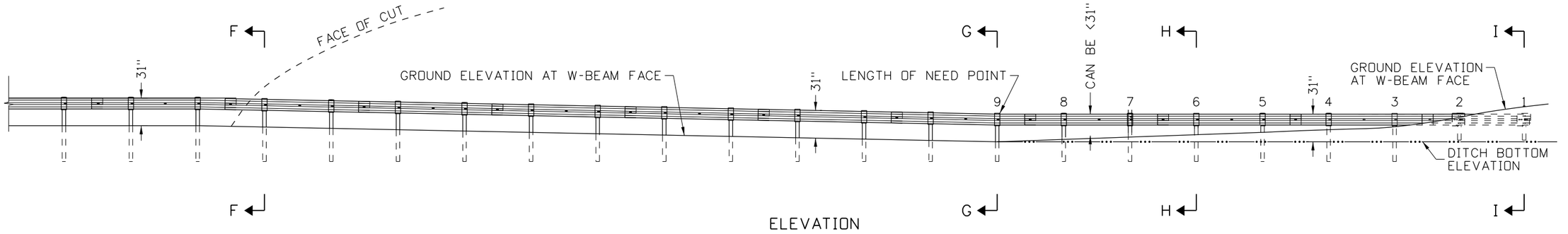
STANDARD DRAWING NO.

612-6

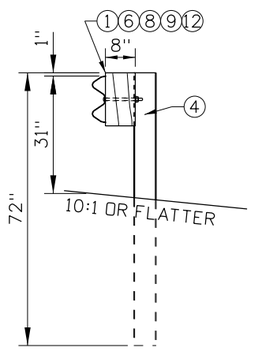
SHEET 1 OF 3



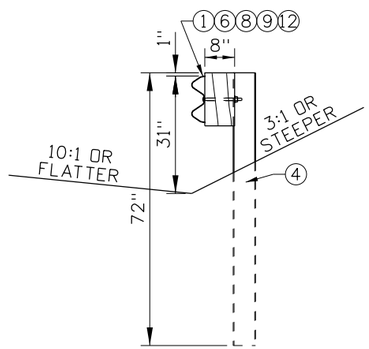
PLAN



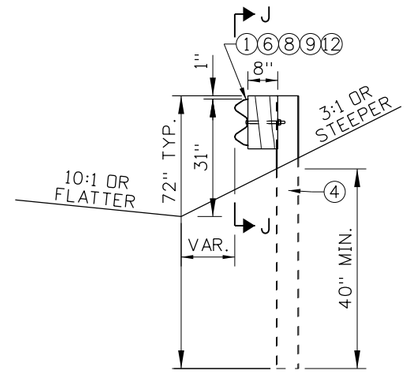
ELEVATION



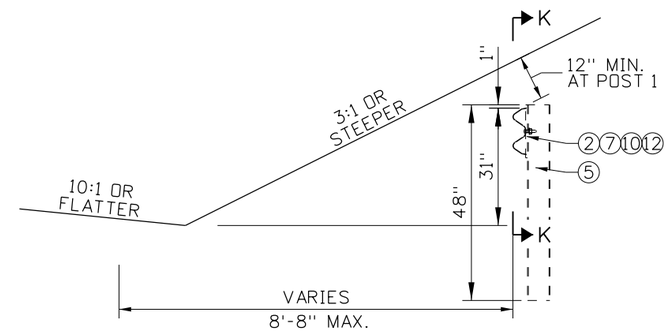
SECTION F-F



SECTION G-G
POST 9



SECTION H-H
POSTS 3 TO 8
(SEE NOTE NO. 7)



SECTION I-I
POSTS 1 TO 2

USE WHEN DITCH FORESLOPE IS 10:1 OR FLATTER

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 17, 2020 ORIGINAL SIGNED

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-20	PBH						

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DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

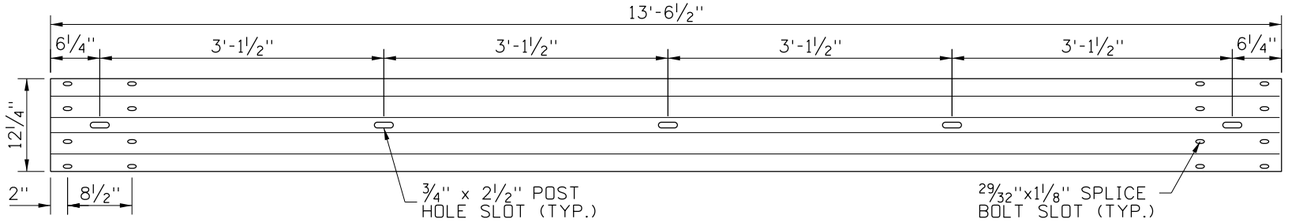
STANDARD DRAWING

GUARDRAIL TERMINAL BURIED-IN-BACKSLOPE

English

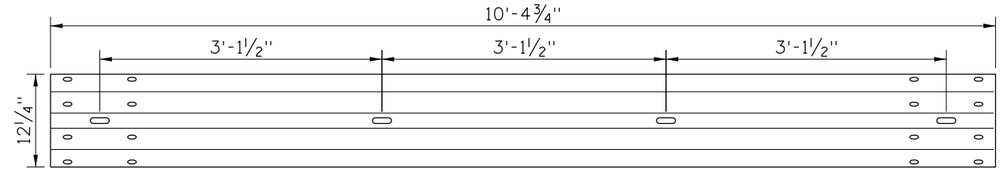
STANDARD DRAWING NO.

612-6



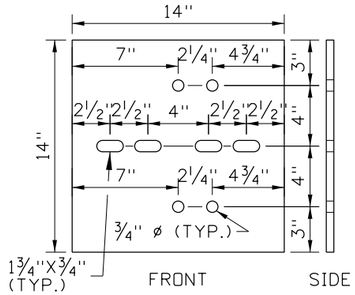
① 4-SPACE W-BEAM GUARDRAIL

RWM04a



② MODIFIED 4-SPACE W-BEAM GUARDRAIL DETAIL

RWM04a (MODIFIED)
(DIMENSIONS NOT SHOWN ARE UNMODIFIED FROM RWM04a)

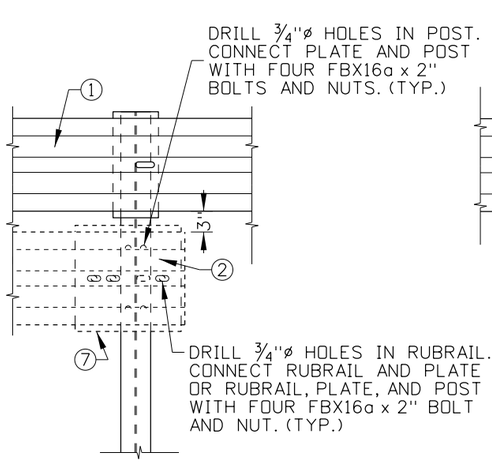


⑦ GALVANIZED STEEL PLATE DETAIL

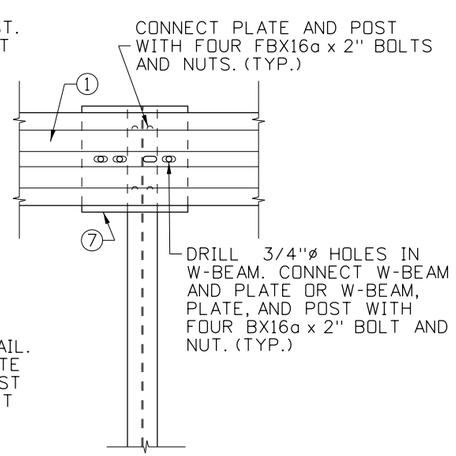
BURIED-IN-BACKSLOPE TERMINAL HARDWARE COMPONENTS TABLE		
ITEM NO.	COMPONENT DESCRIPTION	TF-13 NAME
①	4-SPACE W-BEAM GUARDRAIL (W-BEAM)	RWM04a
②	MOD. 4-SPACE W-BEAM GUARDRAIL (RUBRAIL)	RWM04a
③	96" WIDE-FLANGE GUARDRAIL POSTS	PWE--
④	72" WIDE-FLANGE GUARDRAIL POSTS	PWE01
⑤	48" WIDE-FLANGE GUARDRAIL POSTS	PWE--
⑥	W-BEAM BLOCKOUT	PDB01b OR POLYETHYLENE
⑦	GALVANIZED STEEL PLATE	-
⑧	⅝" GUARDRAIL SPLICE BOLT AND RECESSED NUT	FBB01
⑨	⅝" GUARDRAIL BOLT AND RECESSED NUT	FBB03
⑩	⅝" X 2" HEX HEAD BOLT & NUT	FBX16a
⑪	⅝" X 5" HEX HEAD BOLT & NUT	FBX16a
⑫	⅝" FLAT WASHER	FWC16a

NOTES

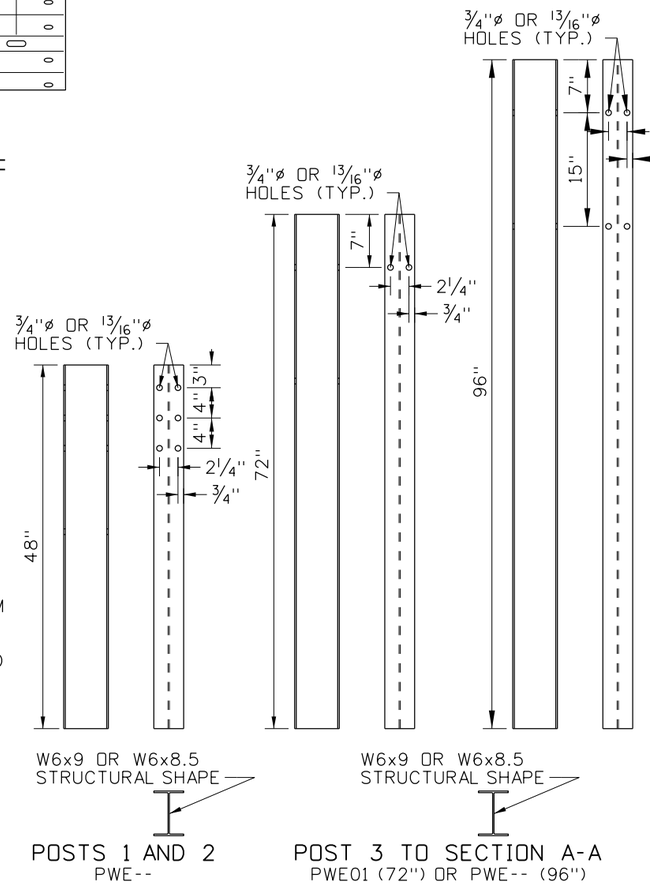
1. USE THE BURIED-IN-BACKSLOPE GUARDRAIL TERMINAL WHERE A BACKSLOPE IS REASONABLY CLOSE TO THE POINT WHERE THE BARRIER IS INTRODUCED OR TERMINATED. THE BURIED-IN-BACKSLOPE GUARDRAIL TERMINAL ELIMINATES THE POSSIBILITY OF AN END-ON IMPACT WITH THE GUARDRAIL END AND REDUCES THE LIKELIHOOD OF VEHICULAR INTRUSION BEHIND THE BARRIER. THE BURIED-IN-BACKSLOPE TERMINAL DESIGNS SHOWN ARE MASH TEST LEVEL 3 TERMINAL DESIGNS.
2. THE SHEET 1 DESIGN CAN BE USED WHENEVER THE DITCH FORESLOPE IS 4:1 OR FLATTER. THE SHEET 2 DESIGN CAN BE USED WHEN THE DITCH FORESLOPE IS 10:1 OR FLATTER.
3. THE HAZARD MAY BE THE SLOPE EMBANKMENT OR OTHER ROADSIDE HAZARD. PROVIDE THE FOLLOWING TERMINAL LENGTHS BETWEEN THE LENGTH OF NEED POINT AND THE HAZARD FOR THE FOLLOWING BACKSLOPE CONDITIONS:
   A. 2:1 BACKSLOPE - 75' OR MORE TO HAZARD
   B. 2.5:1 OR FLATTER BACKSLOPE - PROVIDE LENGTH OF NEED CALCULATED BY FORMULA
   C. 1:1 OR STEEPER BACKSLOPE - ANCHOR AS SOON AS PRACTICAL
4. THE FLARE RATES SHOWN CAN BE FLATTENED IF POST 1 CAN BE BURIED 12" DEEP WHILE KEEPING THE TOP OF THE W-BEAM RAIL PARALLEL TO THE ROADWAY (OR DITCH) ELEVATION.
5. SPACE POSTS 6'-3". SPLICE W-BEAM AND RUBRAIL SECTIONS (WHEN APPLICABLE) BETWEEN POSTS.
6. INSTALL THE GUARDRAIL TERMINAL AT THE FOLLOWING HEIGHTS:
   A. 4:1 OR FLATTER DITCH FORESLOPE DESIGN (SHEET 1) - ENSURE THAT THE TOP OF THE GUARDRAIL IS 31" ABOVE THE ADJACENT SHOULDER ELEVATION UNTIL THE DISTANCE BETWEEN THE TOP OF THE GUARDRAIL AND THE DITCH SURFACE DIRECTLY BENEATH THE GUARDRAIL IS 48". BEYOND THAT POINT, REDUCE THE HEIGHT OF THE GUARDRAIL RELATIVE TO THE SHOULDER ELEVATION TO ENSURE 48" MAXIMUM GUARDRAIL HEIGHT. THE HEIGHT OF THE GUARDRAIL BETWEEN POSTS 8 AND 1 MAY BE REDUCED, IF NECESSARY AND ON A STRAIGHT TAPER, TO ENSURE THE GUARDRAIL IS BURIED 12" DEEP AT POST 1 AND THE RUBRAIL END IS BURIED AT POST 3.
   B. 10:1 OR FLATTER DITCH FORESLOPE DESIGN (SHEET 2) - ENSURE THAT THE TOP OF GUARDRAIL IS 31" ABOVE THE SURFACE DIRECTLY BENEATH THE GUARDRAIL UNTIL CROSSING THE DITCH BOTTOM AT POST 9. FOR POSTS 8 THROUGH 1, INSTALL THE GUARDRAIL PARALLEL WITH THE DITCH BOTTOM AND ENSURE THAT THE GUARDRAIL IS BURIED 12" DEEP AT POST 1.
7. POSTS 3 THROUGH 8 CAN BE SHORTENED IF THE GUARDRAIL HEIGHT IS IN ACCORDANCE WITH NOTE NO. 5 AND AT LEAST 40" OF THE POST IS EMBEDDED IN SOIL.
8. WHEN APPLICABLE, FIELD BEND AND ATTACH THE RUBRAIL TO THE BACK OF THE LAST 96" POST.
9. PAINT DRILLED HOLES WITH TWO THICK APPLICATIONS OF ZINC-RICH PAINT THAT MEETS MIL-P-21035.
10. DRAWING NOT TO SCALE.



SECTION J-J
POST 3 ONLY
NO BOLTS SHOWN FOR CLARITY
(OMIT RUBRAIL FOR SHEET 2 DESIGN)



SECTION K-K
POSTS 1 AND 2
NO BOLTS SHOWN FOR CLARITY



POSTS 1 AND 2
PWE--

POST 3 TO SECTION A-A
PWE01 (72") OR PWE-- (96")

③④⑤ WIDE-FLANGE POST DETAILS

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PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE ORIGINAL SIGNED MARCH 17, 2021 DATE ELECTRONIC SIGNED 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS								
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1	03-20	PBH						

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DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

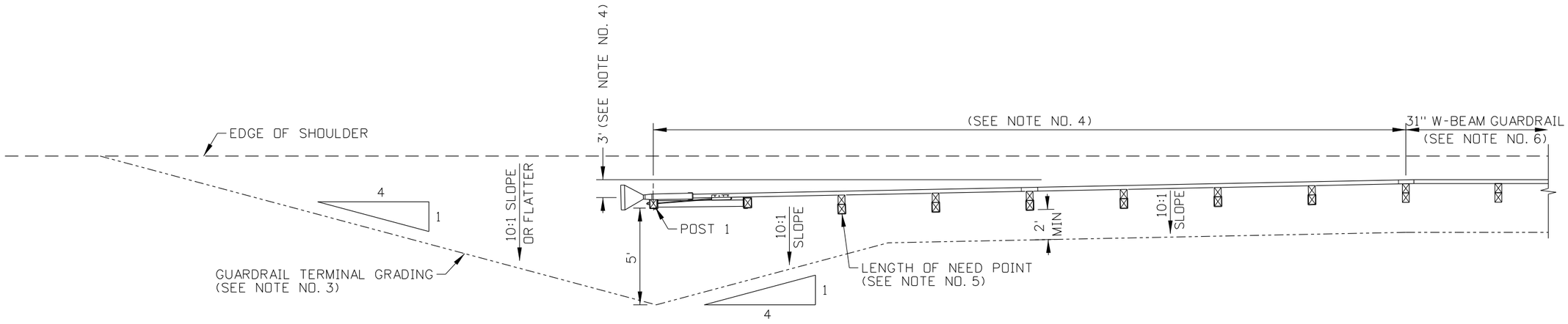
ORIGINAL SIGNED BY: KEVIN SABLAN
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

GUARDRAIL TERMINAL BURIED-IN-BACKSLOPE

English

STANDARD DRAWING NO. 612-6



NOTES

1. THE FLARED TERMINAL SHOWN IS AN EXAMPLE ONLY. FLARED TERMINAL DESIGNS VARY BY PRODUCT AND MANUFACTURER.
2. DISTANCES SHOWN FROM THE TERMINAL POSTS TO THE GRADING EXTENTS ARE MEASURED FROM THE BACK OF THE POST.
3. PROVIDE A 4:1 OR FLATTER SLOPE BEYOND THE GRADING EXTENTS WHERE PRACTICAL.
4. INSTALL THE TERMINAL IN ACCORDANCE WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS. REFER TO THE INSTRUCTIONS FOR SYSTEM LENGTH, OFFSET, NUMBER OF POSTS, POST SPACING, AND WHEN A FLARED TERMINAL IS TO BE INSTALLED ON A HORIZONTAL CURVE.
5. VERIFY THE LENGTH OF NEED POINT WITH MANUFACTURER INSTRUCTIONS FOR A SPECIFIC PRODUCT. ELEMENTS OF THE GUARDRAIL TERMINAL DOWNSTREAM OF THE LENGTH OF NEED POINT CAN BE INCLUDED AS PART OF THE LENGTH OF NEED.
6. PROVIDE A MINIMUM OF 12'-6" OF 31" W-BEAM GUARDRAIL BETWEEN THE GUARDRAIL TERMINAL AND A GUARDRAIL TRANSITION.
7. IF THE FLARED TERMINAL DESIGN USES AN ANCHOR CABLE, INSTALL AN EXTRA HEX NUT ON EACH END OF THE CABLE.
8. AFFIX A TYPE 3 OBJECT MARKER TO THE TERMINAL END SECTION.
9. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED MARCH 18, 2021 RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	03-21	PBH						

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CADD FILE NAME: 612-7_0421.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

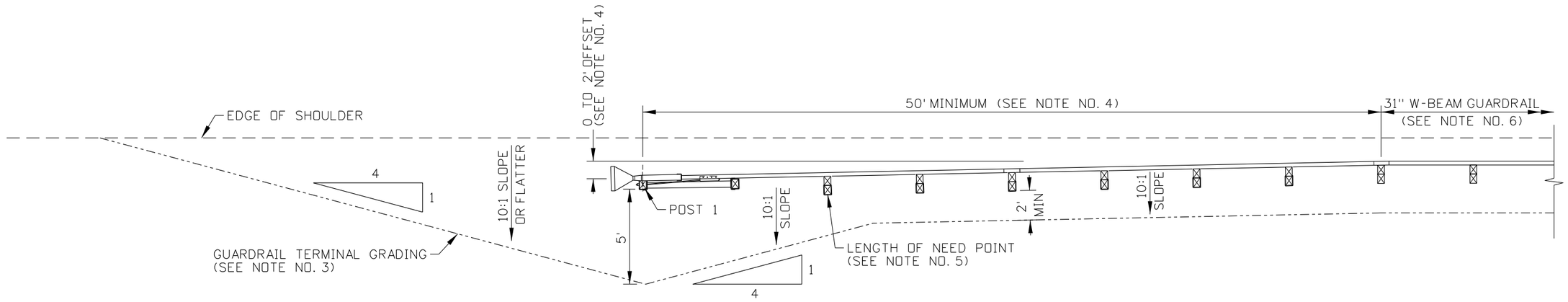
GUARDRAIL TERMINAL FLARED

English

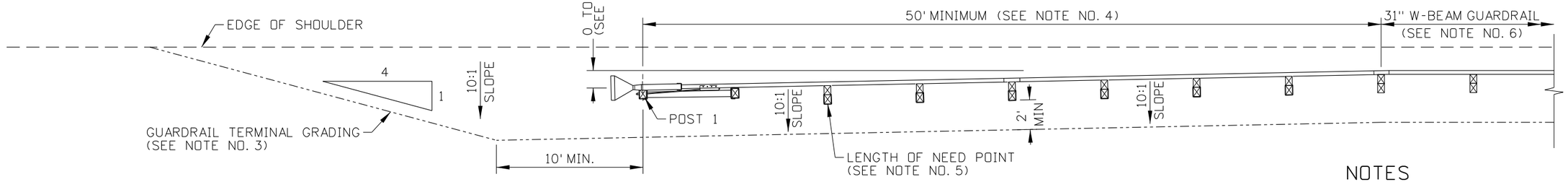
STANDARD DRAWING NO.

612-7

SHEET 1 OF 1



PREFERRED GRADING



ALTERNATIVE GRADING

NOTES

1. THE TANGENT TERMINAL SHOWN IS AN EXAMPLE ONLY. TANGENT TERMINAL DESIGNS VARY BY PRODUCT AND MANUFACTURER.
2. USE THE PREFERRED GRADING LAYOUT WHEN PRACTICAL. THE ALTERNATIVE GRADING LAYOUT MAY BE USED WHEN UPGRADING AN EXISTING TERMINAL WITH SITE LIMITATIONS. DISTANCES SHOWN FROM THE TERMINAL POSTS TO THE GRADING EXTENTS ARE MEASURED FROM THE BACK OF THE POST.
3. PROVIDE A 4:1 OR FLATTER SLOPE OUTSIDE OF THE GUARDRAIL TERMINAL GRADING EXTENTS WHERE PRACTICAL.
4. INSTALL THE TERMINAL IN ACCORDANCE WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS. REFER TO THE INSTRUCTIONS FOR SYSTEM LENGTH, OFFSET, NUMBER OF POSTS, POST SPACING, AND WHEN A TANGENT TERMINAL IS TO BE INSTALLED ON A HORIZONTAL CURVE.
5. VERIFY THE LENGTH OF NEED POINT WITH MANUFACTURER INSTRUCTIONS FOR A SPECIFIC PRODUCT. ELEMENTS OF THE GUARDRAIL TERMINAL DOWNSTREAM OF THE LENGTH OF NEED POINT CAN BE INCLUDED AS PART OF THE LENGTH OF NEED.
6. PROVIDE A MINIMUM OF 12'-6" OF 31" W-BEAM GUARDRAIL BETWEEN THE GUARDRAIL TERMINAL AND A GUARDRAIL TRANSITION.
7. IF THE TANGENT TERMINAL DESIGN USES AN ANCHOR CABLE, INSTALL AN EXTRA HEX NUT ON EACH END OF THE CABLE.
8. AFFIX A TYPE 3 OBJECT MARKER TO THE TERMINAL END SECTION.
9. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED MARCH 18, 2021 RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	03-21	PBH						

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IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

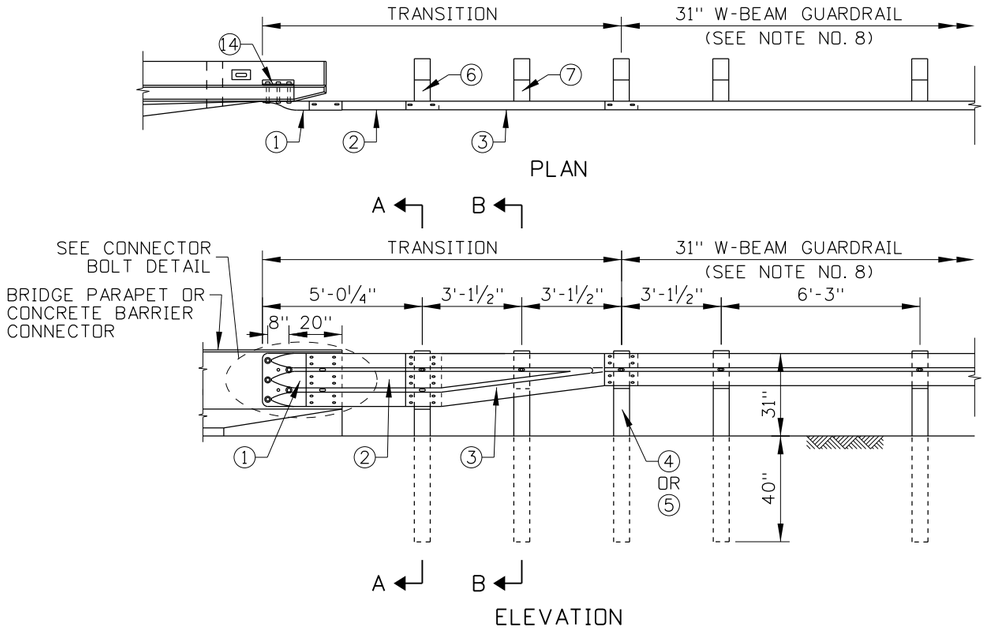
GUARDRAIL TERMINAL TANGENT

English

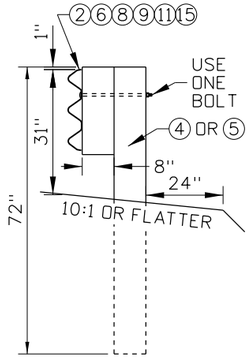
STANDARD DRAWING NO.

612-8

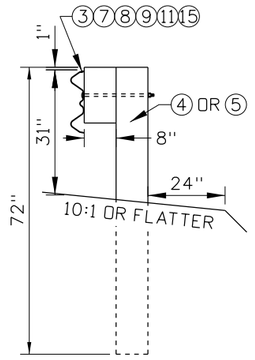
SHEET 1 OF 1



LOW SPEED GUARDRAIL TRANSITION



SECTION A-A



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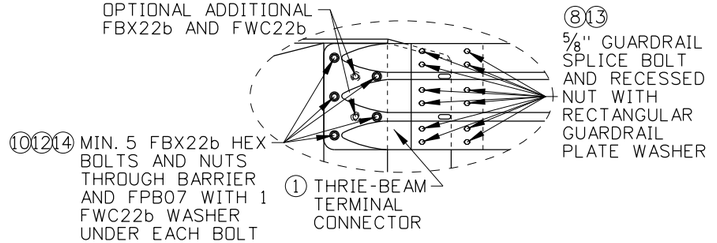
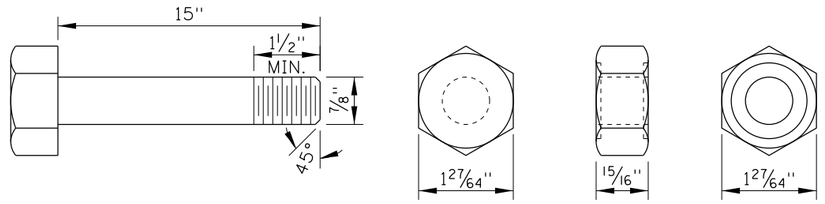
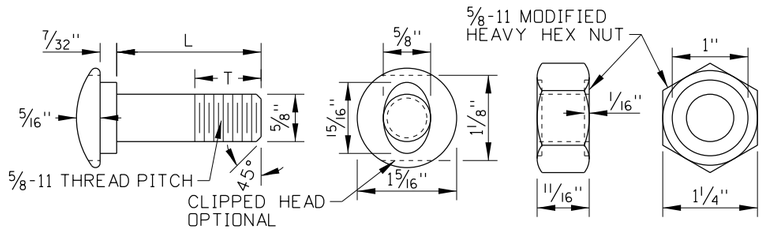


CONNECTOR BOLT DETAIL



⑩ STRUCTURAL HEX BOLT AND NUT

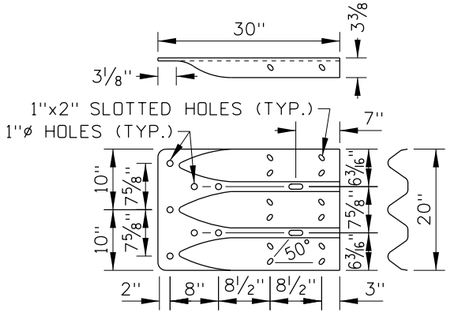
FBX22b



BOLT DIMENSION TABLE		
DESIGNATOR	L	T
FBB01	1¼"	1⅛"
FBB03	10"	4"
FBB04	18"	4"

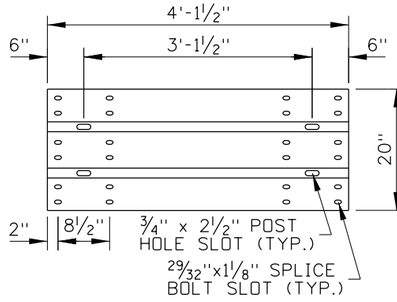
⑧⑨ GUARDRAIL BOLT AND RECESSED NUT

FBB01, FBB03, FBB04



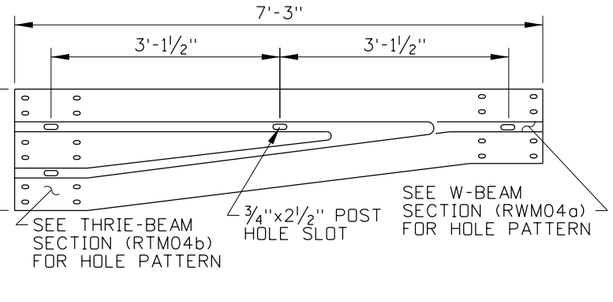
THRIE-BEAM ① TERMINAL CONNECTOR

RTE01b (10 GAUGE)



4-SPACE THRIE-BEAM ② GUARDRAIL

RTM04b (10 GAUGE)



ASYMMETRICAL W-THRIE BEAM TRANSITION SECTION ③

RWT01b (10 GAUGE)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE OF ORIGINAL SIGNATURE MARCH 10, 2020 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	02-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-10_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

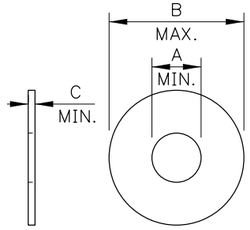
STANDARD DRAWING

GUARDRAIL TRANSITION LOW SPEED

English

STANDARD DRAWING NO. 612-10

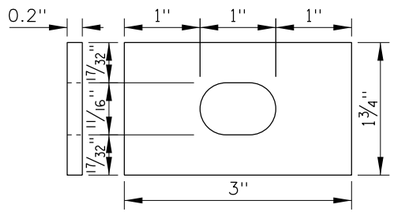
SHEET 1 OF 2



WASHER DIMENSION TABLE			
DESIGNATOR	A	B	C
FWC16a	0.649"	1.780"	0.090"
FWC22b	0.938"	1.780"	0.136"

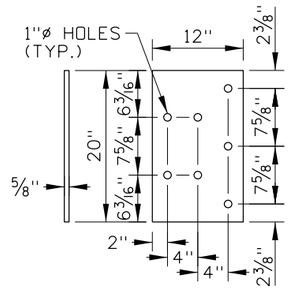
⑪⑫ ROUND WASHERS

FWC16a, FWC22b



⑬ RECTANGULAR GUARDRAIL PLATE WASHER

FWR03



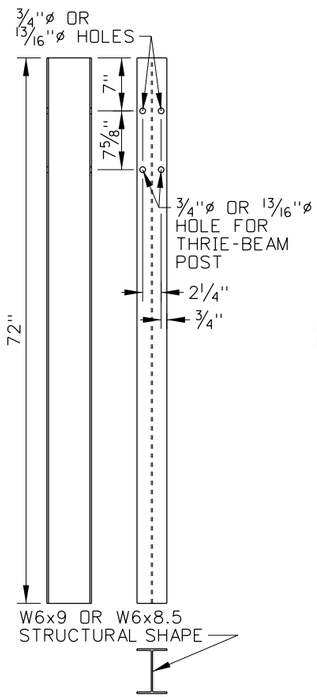
⑭ THRIE-BEAM TERMINAL CONNECTOR PLATE

FPB07

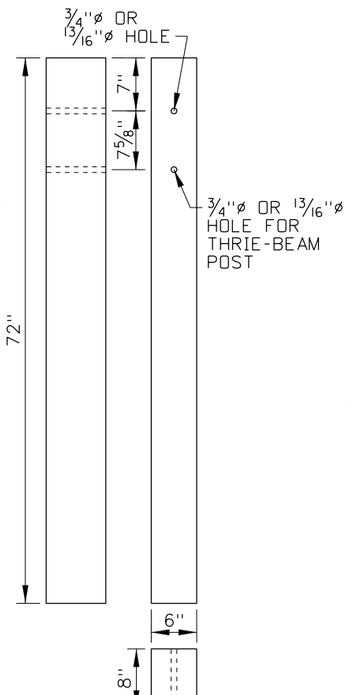
LOW SPEED GUARDRAIL TRANSITION HARDWARE COMPONENTS TABLE				
ITEM NO.	COMPONENT DESCRIPTION	QTY.	WIDE-FLANGE POST	TIMBER POST
①	THRIE-BEAM TERMINAL CONNECTOR	1	RTE01b	RTE01b
②	4-SPACE THRIE-BEAM GUARDRAIL	1	RTM04b	RTM04b
③	ASYMMETRICAL W-THRIE BEAM TRANSITION SECTION	1	RWT01b	RWT01b
④	72" WIDE-FLANGE GUARDRAIL POST	3	PWE01	-
⑤	72" TIMBER GUARDRAIL POST	3	-	PDE02
⑥	THRIE-BEAM BLOCKOUT	1	PDB02b OR POLYETHYLENE	PDB02a
⑦	W-BEAM BLOCKOUT	2	PDB01b OR POLYETHYLENE	PDB01a
⑧	5/8" GUARDRAIL SPLICE BOLT AND RECESSED NUT	32	FBB01	FBB01
⑨	5/8" GUARDRAIL BOLT AND RECESSED NUT	3	FBB03	FBB04
⑩	7/8" X 15" STRUCTURAL HEX BOLT & NUT	5	FBX22b	FBX22b
⑪	5/8" PLAIN ROUND WASHER	3	FWC16a	FWC16a
⑫	7/8" HARDENED ROUND WASHER	10	FWC22b	FWC22b
⑬	RECTANGULAR GUARDRAIL PLATE WASHER	12	FWR03	FWR03
⑭	THRIE-BEAM TERMINAL CONNECTOR PLATE	1	FPB07	FPB07
⑮	16D GALVANIZED NAIL	6	-	N/A

NOTES

1. THE GUARDRAIL TRANSITION SHOWN IS A MASH TEST LEVEL 2 TRANSITION. USE THE TRANSITION ON HIGHWAYS WHERE THE POSTED SPEED LIMIT IS 40 MPH OR LESS AND WHERE A SEMI-RIGID GUARDRAIL, SUCH AS 31" W-BEAM GUARDRAIL, JOINS A RIGID BARRIER, SUCH AS A BRIDGE RAIL, BRIDGE PARAPET OR CONCRETE BARRIER.
2. PROVIDE BARRIER HARDWARE AS SHOWN AND AS SPECIFIED IN THE PUBLICATION "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE." WHERE THE GUIDE AND PLANS CONFLICT, PROVIDE HARDWARE COMPONENTS AS SHOWN ON THE PLANS.
3. WIDE-FLANGE OR TIMBER POSTS MAY BE USED UNLESS OTHERWISE INDICATED. USE THE SAME POST MATERIAL AS IN THE ADJOINING 31" W-BEAM GUARDRAIL.
4. USE TIMBER OR POLYETHYLENE BLOCKOUTS WITH WIDE-FLANGE POSTS. USE TIMBER BLOCKOUTS WITH TIMBER POSTS.
5. NAIL TIMBER BLOCKOUTS TO TIMBER POSTS TO RESTRICT BLOCK ROTATION.
6. WHEN WIDE-FLANGE POSTS ARE USED AND WHEN PRACTICAL, INSTALL THE BOLT (FBB03) ON THE UPSTREAM SIDE OF THE POST IN RELATION TO THE ADJACENT TRAFFIC.
7. OVERLAP SPLICES SO THAT THE EXPOSED W-BEAM EDGE IS DOWNSTREAM OF THE ADJACENT TRAFFIC.
8. PROVIDE A MINIMUM OF 12'-6" OF 31" W-BEAM GUARDRAIL BETWEEN THE GUARDRAIL TRANSITION AND A GUARDRAIL TERMINAL OR ANCHOR.
9. INSTALL RECTANGULAR GUARDRAIL PLATE WASHERS UNDER GUARDRAIL NUTS AT THE SPLICE BETWEEN THE THRIE-BEAM GUARDRAIL AND THRIE-BEAM TERMINAL CONNECTOR.
10. A CONNECTOR PLATE TO KEEP THE THRIE-BEAM TERMINAL CONNECTOR IN A VERTICAL PLANE IS OPTIONAL. SEE THE DETAIL ON THE HIGH SPEED GUARDRAIL TRANSITION STANDARD DRAWING.
11. DELINEATE THE TRANSITION. SEE THE DELINEATOR STANDARD DRAWING.
12. DRAWING NOT TO SCALE.

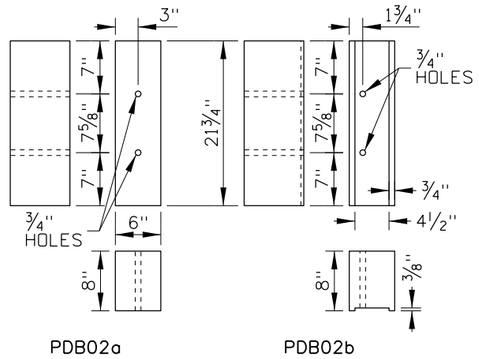


④ WIDE-FLANGE
PWE01



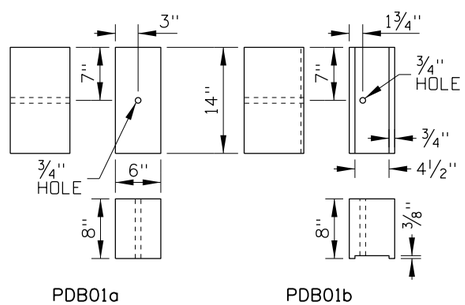
⑤ TIMBER
PDE02

GUARDRAIL POSTS



PDB02a PDB02b

⑥ THRIE-BEAM TIMBER BLOCKOUTS



PDB01a PDB01b

⑦ W-BEAM TIMBER BLOCKOUTS

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REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-18	RDL						
2	02-20	RDL						

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CADD FILE NAME: 612-10_0420.dgn

DRAWING DATE: JUNE, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

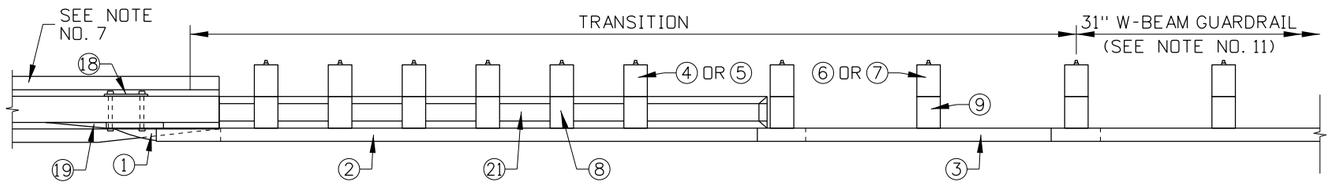
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

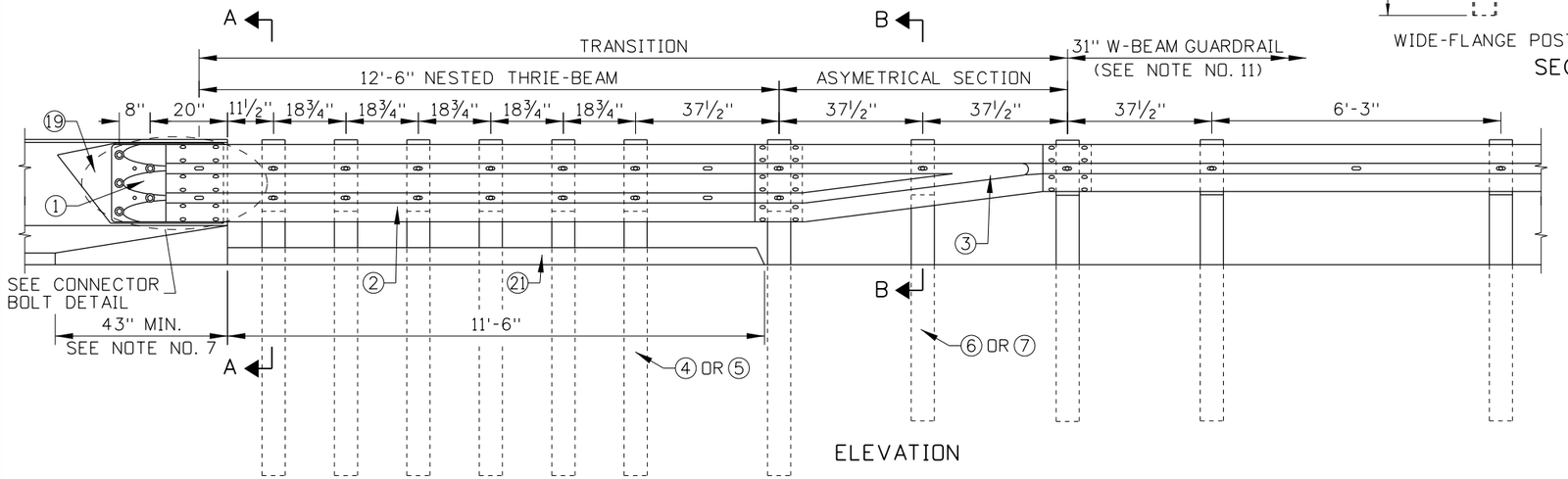
GUARDRAIL TRANSITION LOW SPEED

English

STANDARD DRAWING NO. 612-10

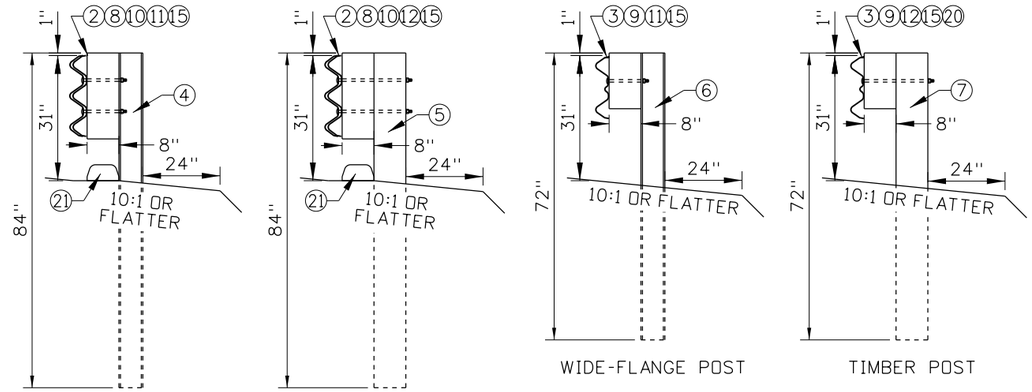


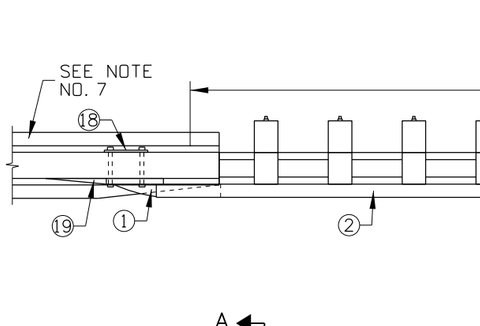
PLAN



ELEVATION

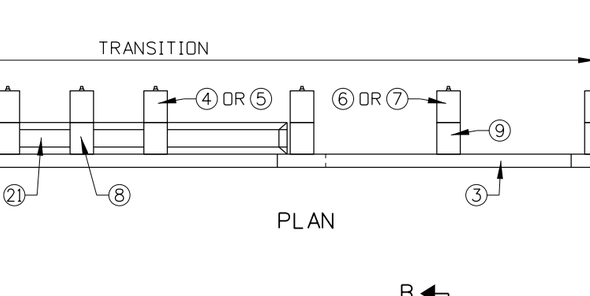
HIGH SPEED GUARDRAIL TRANSITION





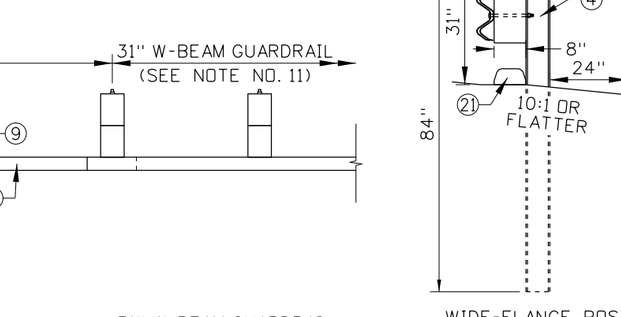
① THRIE-BEAM TERMINAL CONNECTOR

RTE01b (10 GAUGE)



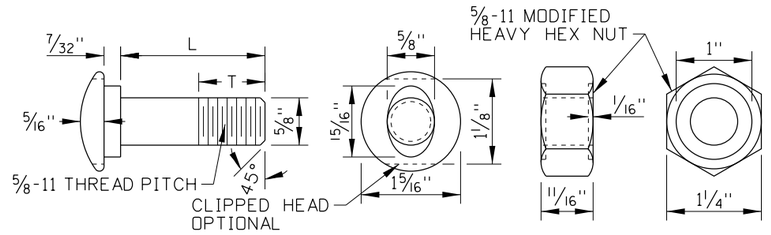
② 8-SPACE THRIE-BEAM GUARDRAIL

RTM08a OR b (12 or 10 GAUGE)



③ ASYMMETRICAL W-THRIE BEAM TRANSITION SECTION

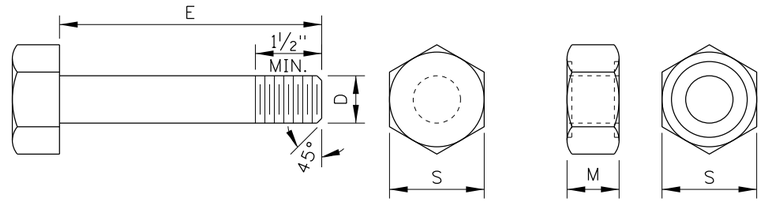
RWT01b (10 GAUGE)



GUARDRAIL BOLT DIMENSION TABLE		
DESIGNATOR	L	T
FBB01	1¼"	1⅛"
FBB03	10"	4"
FBB04	18"	4"

⑩⑪⑫ GUARDRAIL BOLT AND RECESSED NUT

FBB01, FBB03, FBB04



HEX BOLT DIMENSION TABLE				
DESIGNATOR	D	E	M	S
FBX16b	5/8"	1½"	11/16"	1 1/16"
FBX22b	7/8"	15"	15/16"	1 27/64"

⑬⑭ STRUCTURAL HEX BOLT AND NUT

FBX16b, FBX22b

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PROFESSIONAL ENGINEER — LICENSED — ORIGINAL SIGNED AND SEALED — RYAN D. LANCASTER — STATE OF IDAHO — 13683 — MARCH 10, 2021

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
6	05-02	MSM	11	04-06	MSM	16	08-11	RSC
7	09-03	MSM	12	11-06	MSM	17	06-17	RDL
8	11-03	MSM	13	05-07	MSM	18	08-18	RDL
9	06-04	MSM	14	11-08	JRV	19	03-19	RDL
10	11-04	MSM	15	09-10	PLR	20	02-20	RDL

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CADD FILE NAME: 612-11_0420.dgn

DRAWING DATE: JUNE, 1988

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

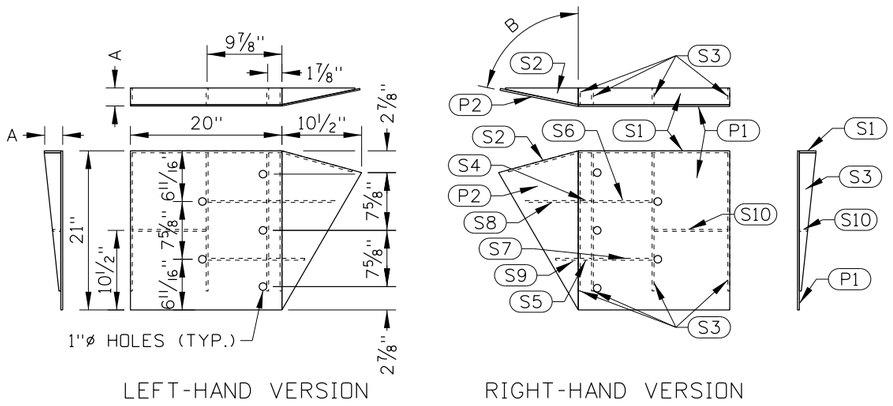
GUARDRAIL TRANSITION HIGH SPEED

REQUIRES STANDARD DRAWING 615-1

English

STANDARD DRAWING NO. 612-11

SHEET 1 OF 3

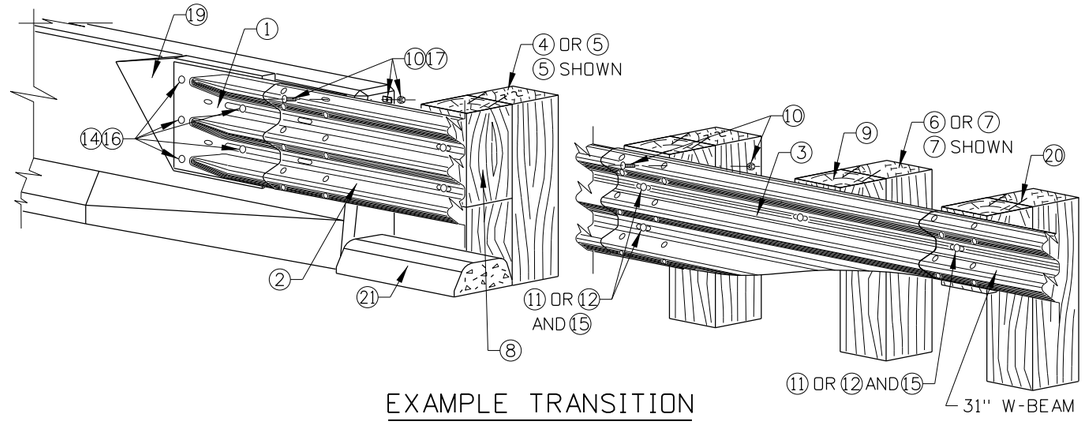


LEFT-HAND VERSION

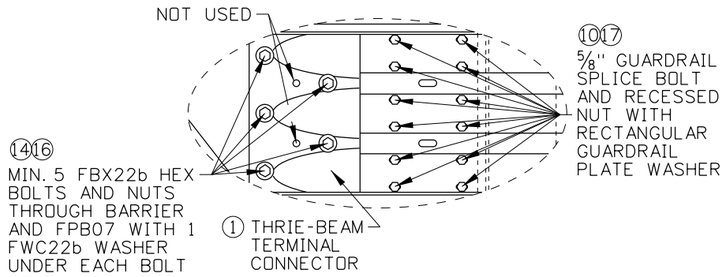
RIGHT-HAND VERSION

⑲ CONCRETE BARRIER TO THRIE-BEAM TRANSITION CONNECTOR PLATE

FPB--, ASTM A36, SEE NOTE NO. 8

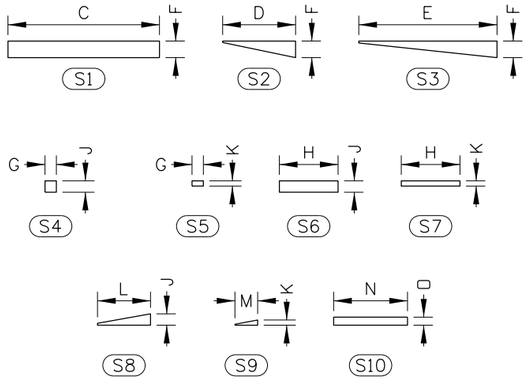


EXAMPLE TRANSITION



CONNECTOR BOLT DETAIL

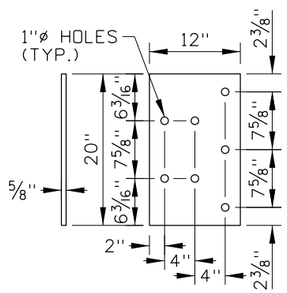
HIGH SPEED GUARDRAIL TRANSITION HARDWARE COMPONENTS TABLE				
ITEM NO.	COMPONENT DESCRIPTION	QTY.	WIDE-FLANGE POST	TIMBER POST
①	THRIE-BEAM TERMINAL CONNECTOR	1	RTE01b	RTE01b
②	8-SPACE NESTED THRIE-BEAM GUARDRAIL	2	RTM08a OR b	RTM08a OR b
③	ASYMMETRICAL W-THRIE BEAM TRANSITION SECTION	1	RWT01b	RWT01b
④	84" WIDE-FLANGE GUARDRAIL POST	7	PWE--	-
⑤	84" TIMBER GUARDRAIL POST	7	-	PDE--
⑥	72" WIDE-FLANGE GUARDRAIL POST	2	PWE01	-
⑦	72" TIMBER GUARDRAIL POST	2	-	PDE02
⑧	MODIFIED THRIE-BEAM BLOCKOUT	7	PDB-- OR POLYETHYLENE	PDB--
⑨	W-BEAM BLOCKOUT	2	PDB01b OR POLYETHYLENE	PDB01a
⑩	⅝" X 1¼" GUARDRAIL SPLICE BOLT AND RECESSED NUT	32	FBB01	FBB01
⑪	⅝" X 10" GUARDRAIL BOLT AND RECESSED NUT	16	FBB03	-
⑫	⅝" X 18" GUARDRAIL BOLT AND RECESSED NUT	16	-	FBB04
⑬	⅝" X 1½" STRUCTURAL HEX BOLT & NUT	14	FBX16b	-
⑭	⅞" X 15" STRUCTURAL HEX BOLT & NUT	5	FBX22b	FBX22b
⑮	⅝" PLAIN ROUND WASHER	16	FWC16a	FWC16a
⑯	⅞" HARDENED ROUND WASHER	10	FWC22b	FWC22b
⑰	RECTANGULAR GUARDRAIL PLATE WASHER	12	FWR03	FWR03
⑱	THRIE-BEAM TRANSITION CONNECTOR PLATE	1	FPB07	FPB07
⑲	CONCRETE BARRIER TO THRIE-BEAM TRANSITION CONNECTOR PLATE	1	FPB--	FPB--
⑳	16D GALVANIZED NAIL	4	-	N/A
㉑	CURB	1	N/A	N/A



STIFFENER DIMENSION TABLE		
DIM.	F-SHAPE / NJ SHAPE	SINGLE SLOPE SHAPE
A	2⅜"	4"
B	78°	69°
C	20"	20"
D	9⅝"	9⅝"
E	18¼"	18¼"
F	2 3/16"	3 13/16"
G	1½"	1½"
H	7¾"	7¾"
J	1½"	2 7/16"
K	11/16"	1⅛"
L	7"	7"
M	3"	3"
N	9¾"	9¾"
O	1 1/16"	1 13/16"

CONNECTOR PLATE STIFFENER DETAIL

SEE NOTE NO. 8



⑱ THRIE-BEAM TRANSITION CONNECTOR PLATE

FPB07

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
6	05-02	MSM	11	04-06	MSM	16	08-11	RSC
7	09-03	MSM	12	11-06	MSM	17	06-17	RDL
8	11-03	MSM	13	05-07	MSM	18	08-18	RDL
9	06-04	MSM	14	11-08	JRV	19	03-19	RDL
10	11-04	MSM	15	09-10	PLR	20	02-20	RDL

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IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

GUARDRAIL TRANSITION HIGH SPEED

REQUIRES STANDARD DRAWING 615-1

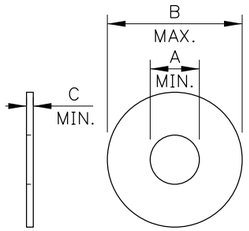
English

STANDARD DRAWING NO.

612-11

SHEET 2 OF 3

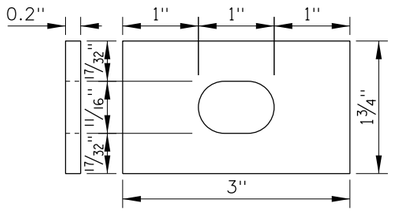
PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER DATE OF ORIGINAL SIGNATURE MARCH 10, 2020 13683 STATE OF IDAHO RYAN D. LANCASTER



WASHER DIMENSION TABLE			
DESIGNATOR	A	B	C
FWC16a	0.649"	1.780"	0.090"
FWC22b	0.938"	1.780"	0.136"

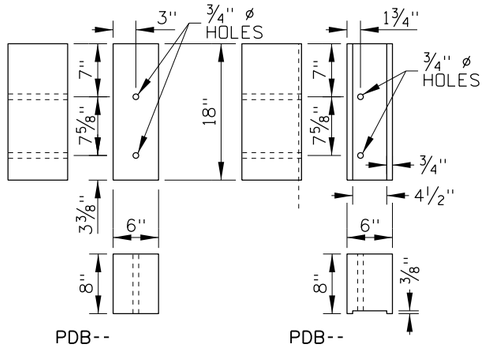
⑮⑯ ROUND WASHERS

FWC16a, FWC22b

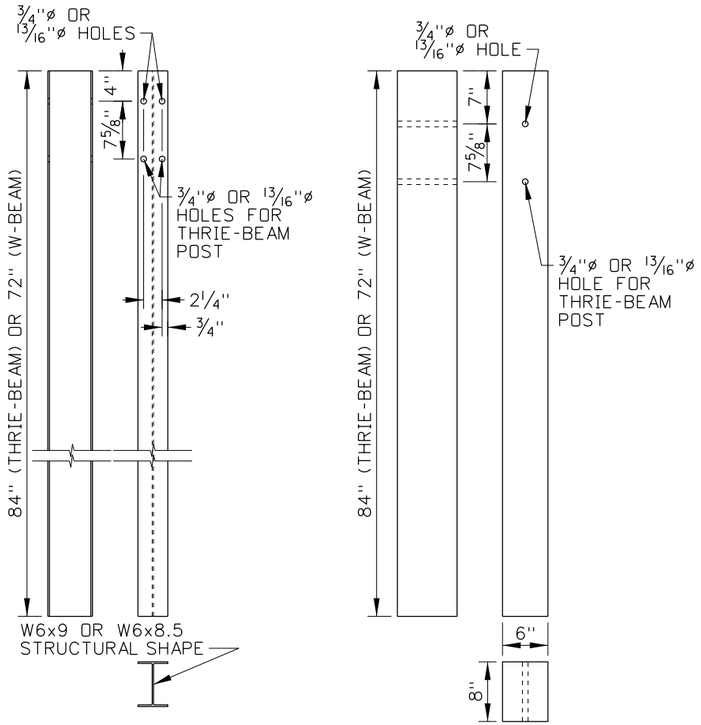


⑰ RECTANGULAR GUARDRAIL PLATE WASHER

FWR03
SEE NOTE NO. 12



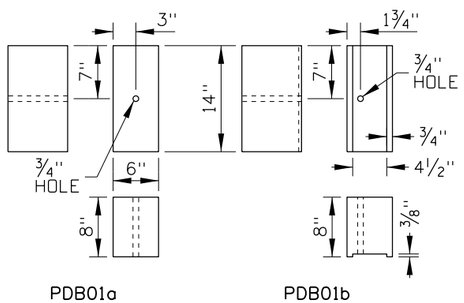
⑧ MODIFIED THRIE-BEAM TIMBER BLOCKOUTS



④⑥ WIDE-FLANGE
PWE--, PWE01

⑤⑦ TIMBER
PDE--, PDE02

TRANSITION POSTS



⑨ W-BEAM TIMBER BLOCKOUTS

NOTES

1. USE THE TRANSITION ON HIGHWAYS WHERE THE POSTED SPEED LIMIT IS 45 MPH OR HIGHER AND WHERE 31" W-BEAM GUARDRAIL JOINS A BRIDGE RAIL OR PARAPET, CAST-IN-PLACE CONCRETE BARRIER, OR PRECAST CONCRETE BARRIER. THE GUARDRAIL TRANSITION SHOWN IS CONSIDERED TO BE A MASH TEST LEVEL 3 TRANSITION.
2. PROVIDE BARRIER HARDWARE AS SHOWN AND AS SPECIFIED IN THE PUBLICATION "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE." WHERE THE GUIDE AND PLANS CONFLICT, PROVIDE HARDWARE COMPONENTS AS SHOWN ON THE PLANS.
3. WIDE-FLANGE OR TIMBER POSTS MAY BE USED UNLESS OTHERWISE INDICATED. USE THE SAME POST MATERIAL AS IN THE ADJOINING 31" W-BEAM GUARDRAIL.
4. USE TIMBER OR POLYETHYLENE BLOCKOUTS WITH WIDE-FLANGE POSTS. USE TIMBER BLOCKOUTS WITH TIMBER POSTS. USE THE SAME BLOCKOUT MATERIAL AS IN THE ADJOINING 31" W-BEAM GUARDRAIL. NAIL W-BEAM TIMBER BLOCKOUTS TO TIMBER POSTS TO RESTRICT BLOCK ROTATION.
5. WHEN WIDE-FLANGE POSTS ARE USED AND WHEN PRACTICAL, INSTALL THE BOLTS (FBB02) ON THE UPSTREAM SIDE OF THE POST IN RELATION TO THE ADJACENT TRAFFIC.
6. CONSTRUCT CURB TYPE 5 BENEATH THE THRIE-BEAM SECTION AS SHOWN. THE CURB CAN BE CAST-IN-PLACE OR PRECAST.
7. THE FOLLOWING APPLY TO VARYING BARRIER CONNECTIONS:
   A. BRIDGE RAIL OR PARAPET: SEE BRIDGE PLANS.
   B. CAST-IN-PLACE CONCRETE BARRIER: USE THE CONCRETE BARRIER TO THRIE-BEAM TRANSITION CONNECTOR PLATE.
   C. PRECAST CONCRETE BARRIER:
      I. USE THE CONCRETE BARRIER TO THRIE-BEAM TRANSITION CONNECTOR PLATE.
      II. CHAMFER THE THE FIRST 43½ INCHES OF THE BARRIER THAT EXTENDS BEYOND THE FACE OF THE CURB BENEATH THE TRANSITION.
      III. USE ANCHOR PINS TO PIN DOWN THE FIRST THREE BARRIER SECTIONS.
8. THE FOLLOWING APPLY TO THE CONCRETE BARRIER TO THRIE-BEAM TERMINAL CONNECTOR PLATE:
   A. USE ASTM A36 STEEL.
   B. USE 3/16" THICK STEEL FOR FLAT PLATES P1 AND P2. USE 1/4" THICK STEEL FOR STIFFENERS S1 THROUGH S10.
   C. WELD COMPONENTS WITH E60 ROD.
   D. WELD STIFFENERS LOCATED ON THE OUTSIDE EDGES OF THE COVER PLATES WITH 3/16" CONTINUOUS BACK WELD ON EXTERNAL SIDES AND 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
   E. WELD STIFFENERS LOCATED ON THE INSIDE OF THE COVER PLATES WITH 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
   F. WELD RECTANGULAR AND TRIANGULAR COVER PLATES TOGETHER WITH A 3/16" CONTINUOUS BACK WELD ON BOTH SIDES.
   G. GALVANIZE CONNECTOR PLATES AFTER PUNCHING AND ASSEMBLY.
9. GALVANIZE THE THRIE-BEAM TERMINAL CONNECTOR PLATE.
10. OVERLAP SPLICES SO THE EXPOSED W-BEAM EDGE IS DOWNSTREAM OF THE ADJACENT TRAFFIC.
11. PROVIDE A MINIMUM OF 12'-6" OF 31" W-BEAM GUARDRAIL BETWEEN THE GUARDRAIL TRANSITION AND A GUARDRAIL TERMINAL OR ANCHOR.
12. INSTALL RECTANGULAR GUARDRAIL PLATE WASHERS UNDER GUARDRAIL NUTS AT THE SPLICE BETWEEN THE THRIE-BEAM GUARDRAIL AND THRIE-BEAM TERMINAL CONNECTOR.
13. DELINEATE THE TRANSITION WITH TYPE 9 DELINEATORS. SEE THE DELINEATOR STANDARD DRAWING FOR DELINEATOR SPACING.
14. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 10, 2022 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
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7	09-03	MSM	12	11-06	MSM	17	06-17	RDL
8	11-03	MSM	13	05-07	MSM	18	08-18	RDL
9	06-04	MSM	14	11-08	JRV	19	03-19	RDL
10	11-04	MSM	15	09-10	PLR	20	02-20	RDL

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-11_0420.dgn

DRAWING DATE: JUNE, 1988

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

GUARDRAIL TRANSITION HIGH SPEED

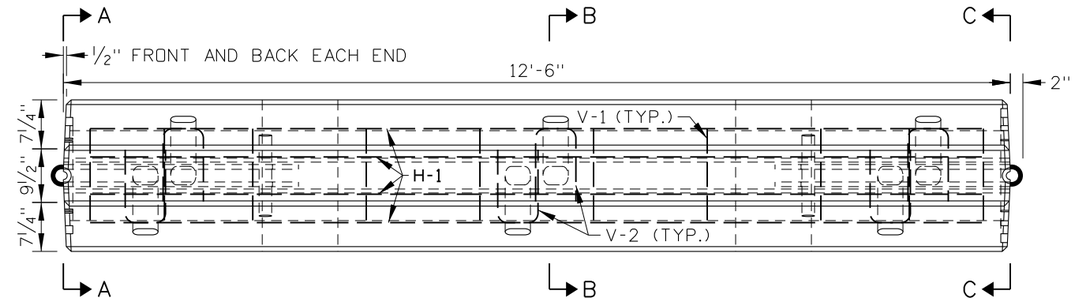
REQUIRES STANDARD DRAWING 615-1

English

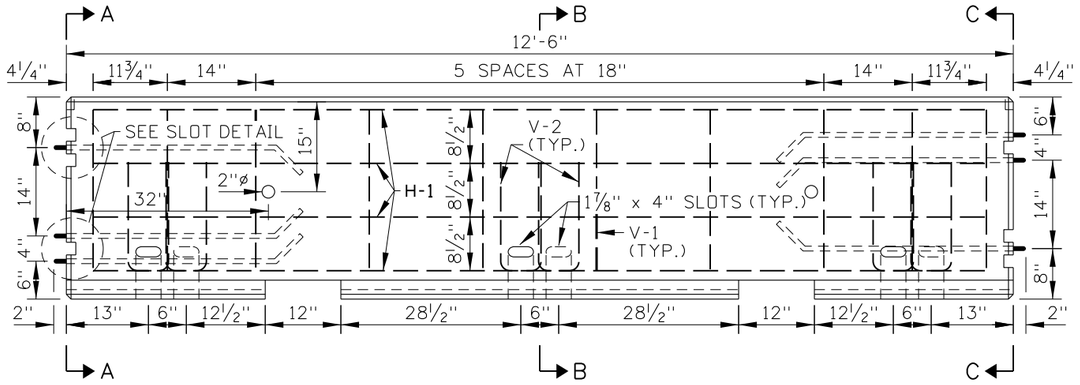
STANDARD DRAWING NO.

612-11

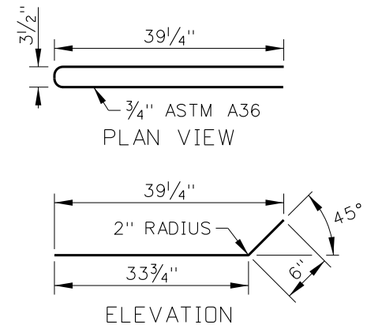
SHEET 3 OF 3



PLAN

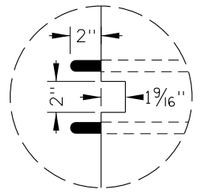


ELEVATION

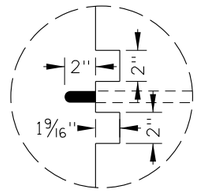


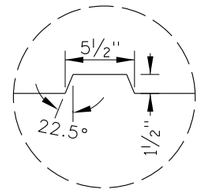
END LOOP BAR DETAIL

REINFORCING STEEL TABLE				
MARK	LOCATION	BAR SIZE	NUMBER OF BARS	SKETCH
H-1	HORIZONTAL BAR. TIED INSIDE V-1 BARS.	NO. 4	8	11'-10"
V-1	VERTICAL BAR.	NO. 4	10	6⅜", 10¾", 6½", 3"ø (TYP.), 10¾", 14⅞", 27" — 7' TOTAL BAR LENGTH
V-2	VERTICAL BAR AROUND SLOTS.	NO. 4	6	22", 6⅜", 3"ø — 4' TOTAL BAR LENGTH

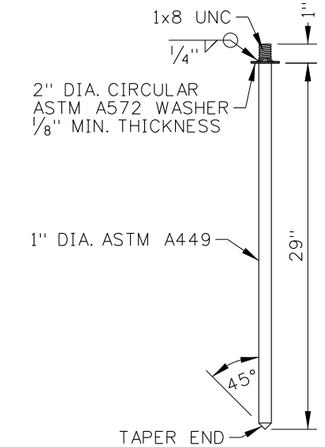


SLOT DETAIL

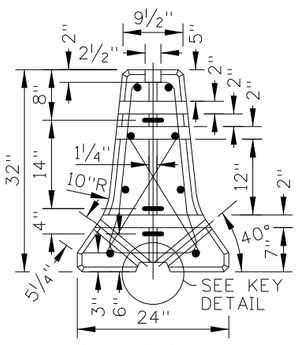




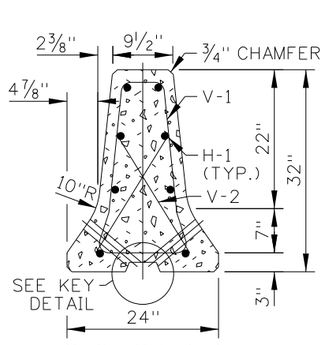
KEY DETAIL



CONNECTING PIN DETAIL



SECTION A-A



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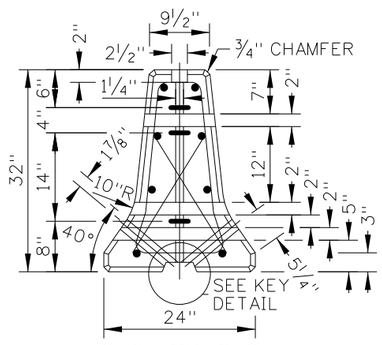

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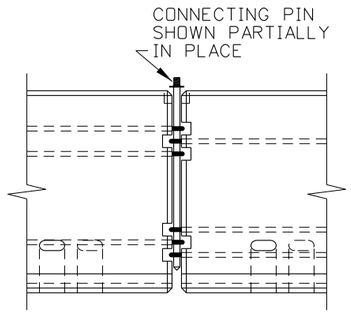

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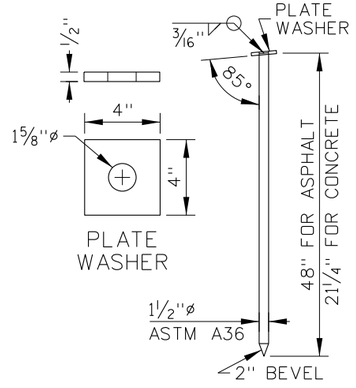


ANCHOR PIN DETAIL

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-20	RDL						
2	03-21	PBH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-18_0421.dgn

DRAWING DATE: MARCH, 2019

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

PRECAST CONCRETE BARRIER

English

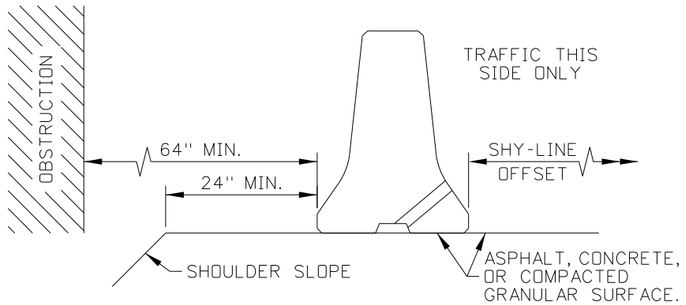
STANDARD DRAWING NO.

612-18

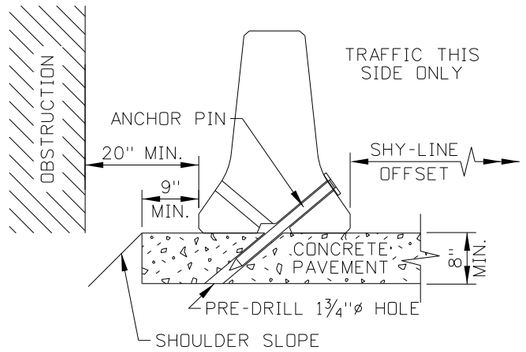
SHEET 1 OF 3

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

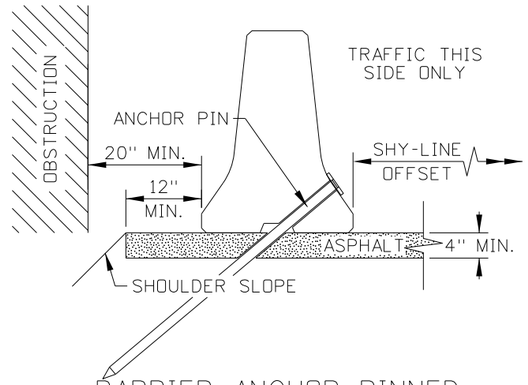
PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE ORIGINAL SIGNED MARCH 18, 2021 13683 STATE OF IDAHO RYAN D. LANCASTER



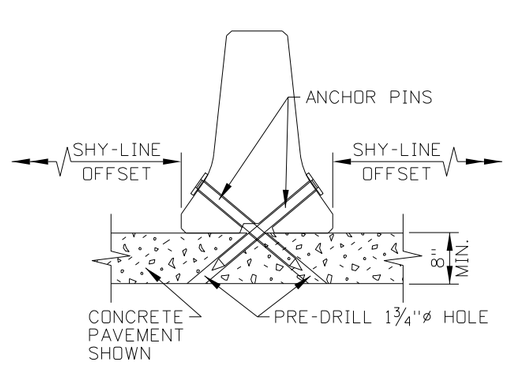
FREE-STANDING BARRIER



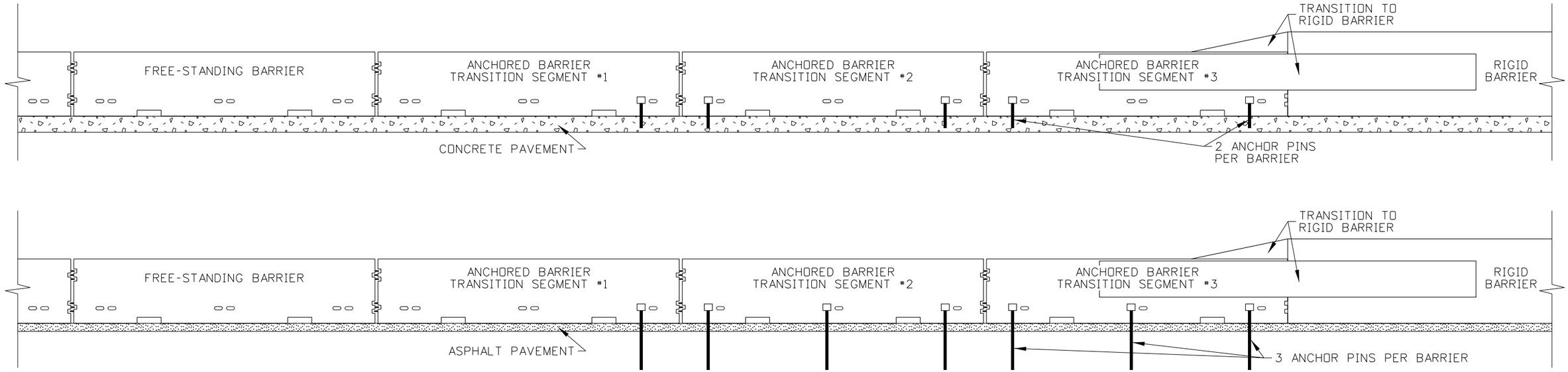
BARRIER ANCHOR PINNED TO CONCRETE PAVEMENT



BARRIER ANCHOR PINNED TO ASPHALT PAVEMENT



MEDIAN BARRIER ANCHOR PINNED



TRANSITION FROM FREE-STANDING TO ANCHOR PINNED AND FROM ANCHOR PINNED TO RIGID BARRIER

(SEE NOTE NOS. 5 THROUGH 8)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED AND DATED STATE OF IDAHO RYAN D. LANCASTER 13683 MARCH 18, 2021

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-20	RDL						
2	03-21	PBH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-18_0421.dgn

DRAWING DATE: MARCH, 2019

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

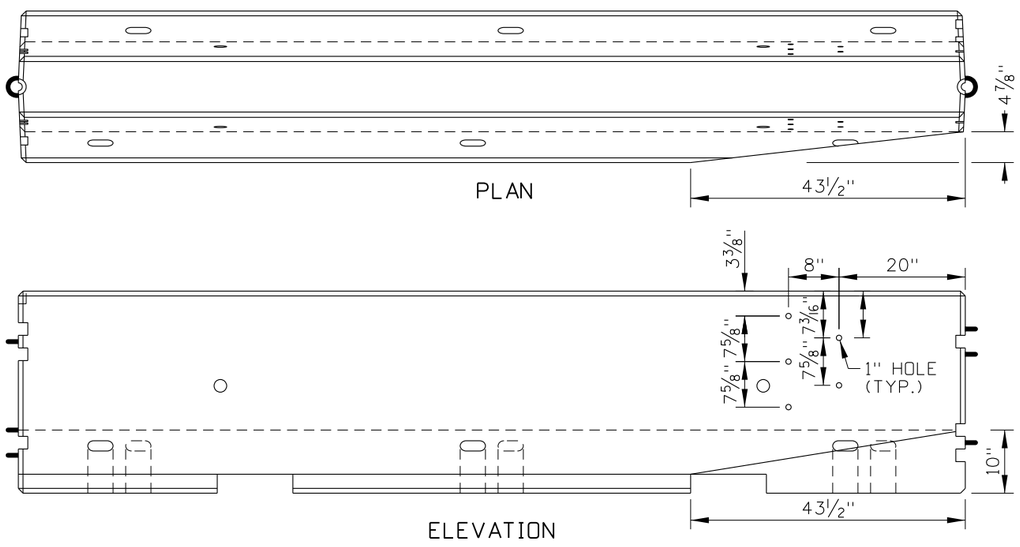
STANDARD DRAWING

PRECAST CONCRETE BARRIER

English

STANDARD DRAWING NO. 612-18

CONCRETE BARRIER SHY-LINE OFFSET AND FLARE RATE TABLE				
DESIGN SPEED (MPH)	SHY-LINE OFFSET (FT)	BARRIER FLARE RATE		
		INSIDE SHY LINE	AT OR BEYOND SHY LINE	
			NOT STAKED	STAKED
70	9	30:1	15:1	20:1
60	8	26:1	14:1	18:1
55	7	24:1	12:1	16:1
50	6.5	21:1	11:1	14:1
45	6	18:1	10:1	12:1
40	5	16:1	8:1	10:1
30	4	13:1	7:1	8:1



CHAMFERED BARRIER FOR GUARDRAIL TRANSITIONS

(SEE NOTE NO. 8)

NOTES

1. THE PRECAST CONCRETE BARRIER SHOWN IS A MASH TEST LEVEL 3 LONGITUDINAL BARRIER SYSTEM. THE BARRIER USES THE F-SHAPE CROSS SECTION.
2. PRECAST USING CLASS 50AF CONCRETE. CHAMFER TOP, BOTTOM, AND ENDS ¾". PROVIDE 2" MINIMUM CONCRETE COVER OVER REINFORCING STEEL. A 2" WHITE PVC SLEEVE MAY BE USED TO FORM THE LIFTING HOLE. IF USED, LEAVE THE PVC SLEEVE IN PLACE.
3. PIN CONNECT BARRIER UNITS. PRECAST CONCRETE BARRIERS MAY BE ANGLED APPROXIMATELY 7° AT CONNECTIONS.
4. PROVIDE THE CALCULATED LENGTH OF NEED UPSTREAM FROM HAZARDS AND PROVIDE AT LEAST THREE PRECAST CONCRETE BARRIER SEGMENTS DOWNSTREAM OF HAZARDS. DO NOT INSTALL FEWER THAN SIX BARRIER SEGMENTS.
5. THE PRECAST CONCRETE BARRIER CAN BE INSTALLED FREE-STANDING OR ANCHOR PINNED TO PAVEMENT.
   A. IF FREE-STANDING, ANCHOR THE TWO BARRIER SEGMENTS NEAREST THE END (NOT COUNTING A CONCRETE BARRIER TERMINAL) WITH ANCHOR PINS AS DESCRIBED IN NOTE 5B.
   B. IF ANCHOR PINNED, USE TWO PINS IN EACH BARRIER SEGMENT INSTALLED ON CONCRETE PAVEMENT AND USE THREE PINS IN EACH BARRIER SEGMENT INSTALLED ON ASPHALT PAVEMENT. IF ANCHOR PINNED IN A MEDIAN, INSTALL ANCHOR PINS ON BOTH SIDES OF THE BARRIER (4 TOTAL ON CONCRETE PAVEMENT, 6 TOTAL ON ASPHALT PAVEMENT). PRE-DRILL ANCHOR PIN HOLES IN CONCRETE PAVEMENT USING THE SLOT AS A GUIDE.
6. WHEN TRANSITIONING FROM FREE-STANDING TO ANCHOR PINNED BARRIER, INSTALL ONE ANCHOR PIN IN THE SLOT OF THE LAST FREE-STANDING SEGMENT CLOSEST TO THE FIRST ANCHOR PINNED SEGMENT.
7. WHEN TRANSITIONING FROM FREE-STANDING BARRIER TO RIGID BARRIER (SUCH AS CAST-IN-PLACE CONCRETE BARRIER OR BRIDGE RAIL/PARAPET), TRANSITION FIRST TO ANCHOR PINNED PRECAST BARRIER (MINIMUM THREE SEGMENTS), THEN TO THE RIGID BARRIER. CUT OFF THE END LOOPS OF THE LAST SEGMENT OF PRECAST BARRIER IN THE F-SHAPE TO SINGLE SLOPE TRANSITION.
8. WHEN TRANSITIONING FROM FREE-STANDING BARRIER TO W-BEAM GUARDRAIL, ANCHOR PIN THE LAST THREE PRECAST CONCRETE BARRIER SEGMENTS AND CONNECT TO A GUARDRAIL TRANSITION. CHAMFER THE LAST 43½ INCHES OF THE BARRIER AND DRILL FIVE 1" DIAMETER HOLES AS SHOWN.
9. FLARE THE UPSTREAM END OF THE BARRIER IN ACCORDANCE WITH THE CONCRETE BARRIER SHY-LINE OFFSET AND FLARE RATE TABLE.
10. TERMINATE THE BARRIER WITH A CRASHWORTHY END TREATMENT OR TRANSITION TO ANOTHER BARRIER SYSTEM. ACCEPTABLE END TREATMENTS INCLUDE TAPERING THE BARRIER OUTSIDE OF THE CLEAR ZONE, TRANSITIONING TO W-BEAM GUARDRAIL, A CRASH CUSHION, A PRECAST CONCRETE BARRIER TERMINAL, OR TRANSITION TO A BRIDGE RAIL OR PARAPET. WHEN CONNECTING THE F-SHAPE PRECAST CONCRETE BARRIER TO A NEW JERSEY SHAPE PRECAST CONCRETE BARRIER, USE THE F-SHAPE TO NEW JERSEY SHAPE TRANSITION.
11. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO 13683 MARCH 18, 2021 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY	
1	02-20	RDL							
2	03-21	PBH							

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-18_0421.dgn

DRAWING DATE: MARCH, 2019

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

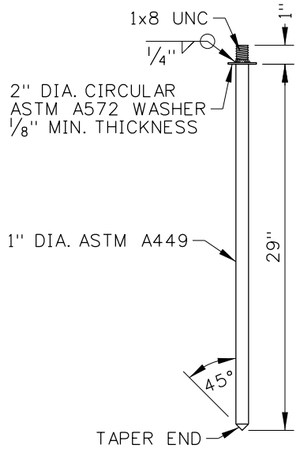
STANDARD DRAWING

PRECAST CONCRETE BARRIER

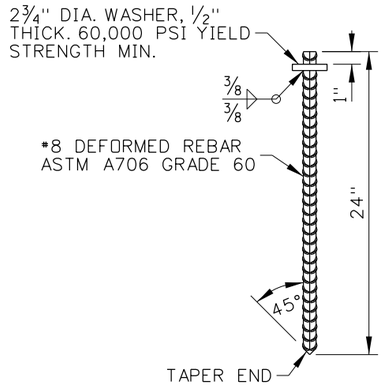
English

STANDARD DRAWING NO. 612-18

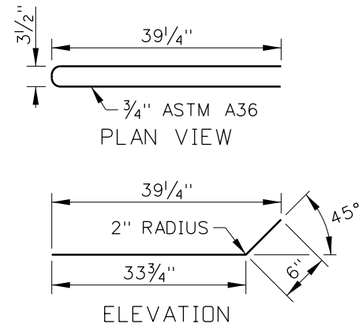
SHEET 3 OF 3



CONNECTING PIN DETAIL

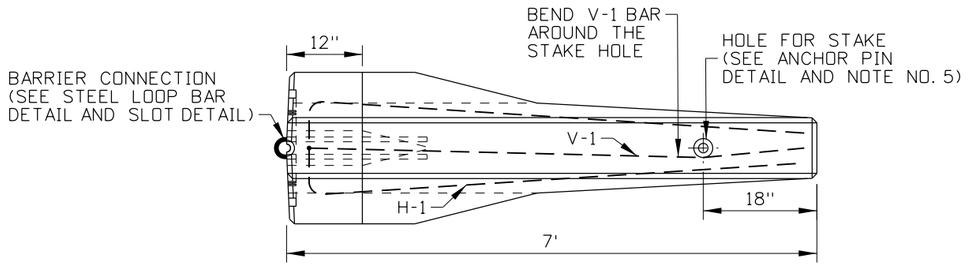


ANCHOR PIN DETAIL



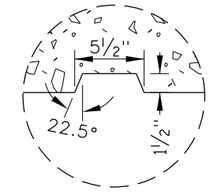
END LOOP BAR DETAIL

TERMINAL TYPE A REINFORCING STEEL TABLE				
MARK	LOCATION	BAR SIZE	NUMBER OF BARS	SKETCH
H-1	HORIZONTAL BAR.	NO. 5	1	6'-2", 10", 14'-6" TOTAL BAR LENGTH
V-1	VERTICAL BAR.	NO. 5	1	8", 28", 6'-3", 9'-2" TOTAL BAR LENGTH

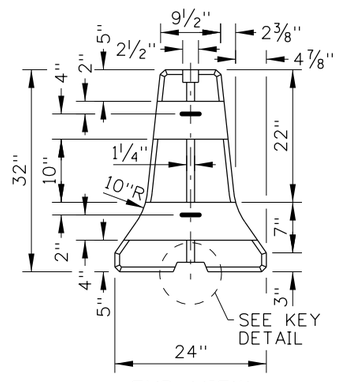


PLAN

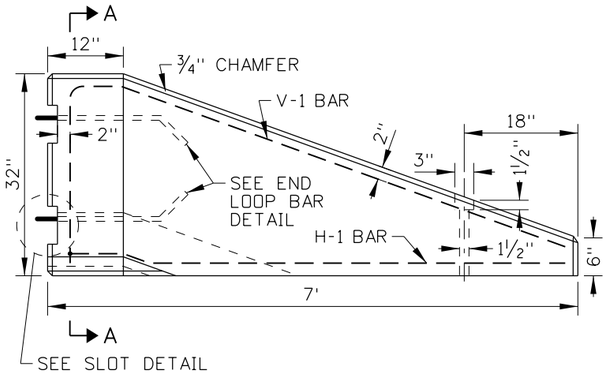
SLOT DETAIL



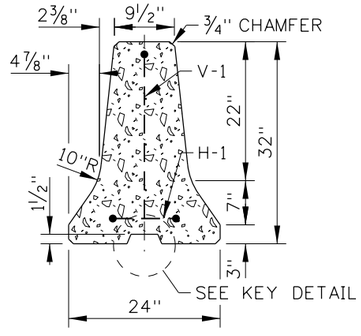
KEY DETAIL



END VIEW



ELEVATION



SECTION A-A

TERMINAL TYPE A

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	01-86	GB	6	12-92	MSM	11	09-10	PLR
2	08-86	GB	7	09-93	MSM	12	11-14	RDL
3	06-87	GB	8	02-96	MSM	13	03-19	RDL
4	04-89	GB	9	01-00	MSM	14	02-20	PBH
5	01-91	GB	10	12-04	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-20_0420.dgn

DRAWING DATE: NOVEMBER, 1974

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

PRECAST CONCRETE BARRIER TERMINALS

English

STANDARD DRAWING NO.

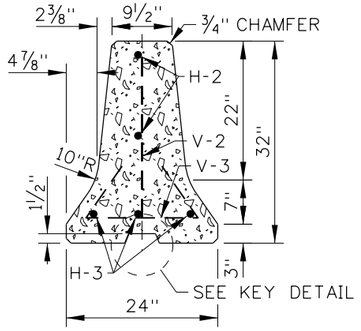
612-20

SHEET 1 OF 2

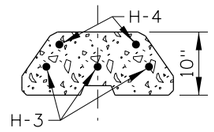
ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO

ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 10, 2020 STATE OF IDAHO

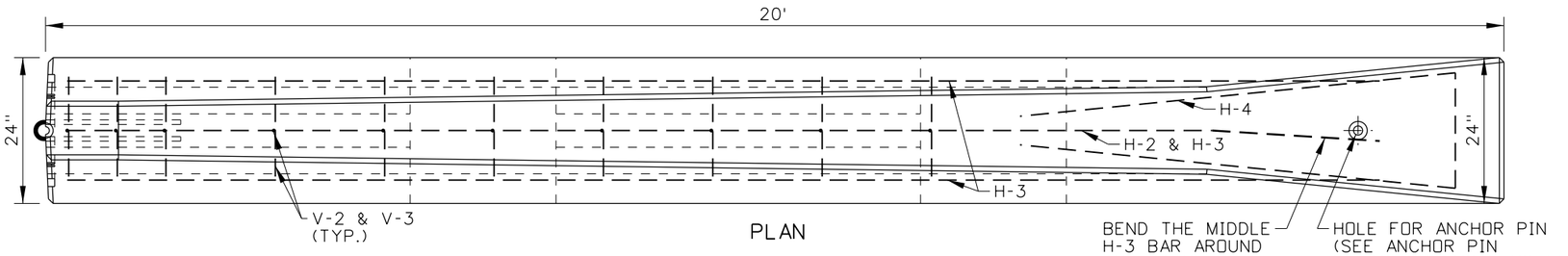


SECTION B-B
ALSO SEE END VIEW ON SHEET 1

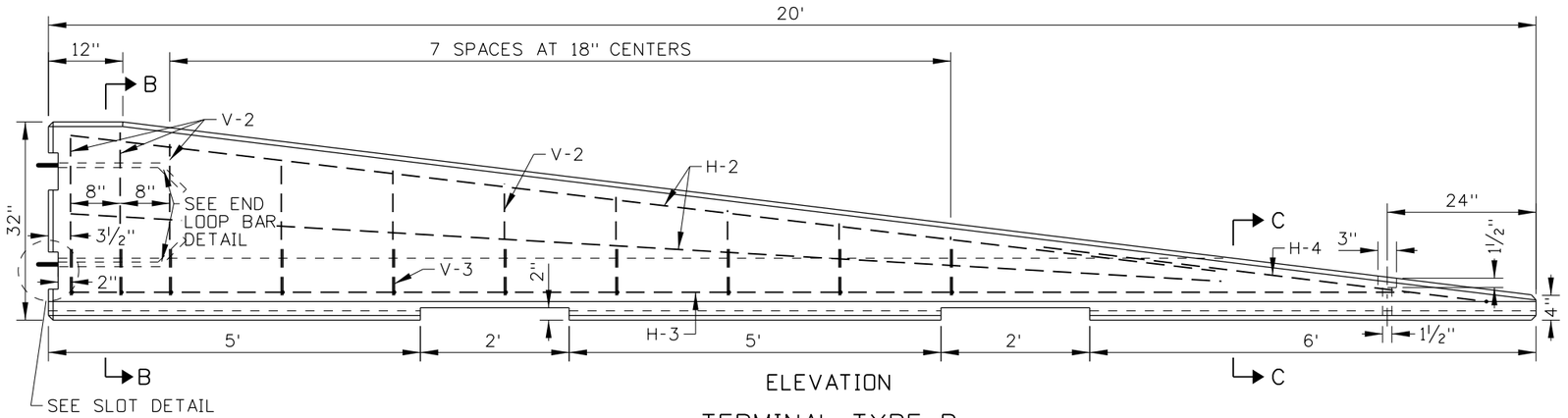


SECTION C-C

TERMINAL TYPE B REINFORCING STEEL TABLE				
MARK	LOCATION	BAR SIZE	NUMBER OF BARS	SKETCH
H-2	HORIZONTAL BAR. TIED TO V-1 BARS.	NO. 5	2	15'-6"
H-3	HORIZONTAL BAR. TIED TO V2 BARS.	NO. 5	3	18'
H-4	HORIZONTAL BAR. AT END OF BARRIER ALONG TOP SLOPE.	NO. 5	1	6'-0", 85°, 22", 13'-10" TOTAL BAR LENGTH
V-2	VERTICAL BAR.	NO. 5	10	L (IN.) / QTY.: 26/2, 25/1, 23/1, 21/1, 18/1, 16/1, 14/1, 12/1, 10/1; L
V-3	VERTICAL BAR. TIE TO V-1 AND H-2 BARS.	NO. 5	10	3'-2" TOTAL BAR LENGTH; 55°, 10", 18"



PLAN



ELEVATION

TERMINAL TYPE B

NOTES

1. THE TYPE A TERMINAL MAY BE USED ON THE TRAILING END OF PRECAST CONCRETE BARRIER IF THE TERMINAL IS OUTSIDE OF THE CLEAR-ZONE OF TRAVEL LANES IN THE OPPOSING DIRECTION.
2. THE TYPE B TERMINAL MAY BE USED WITHIN THE CLEAR-ZONE WHEN TRAFFIC SPEEDS ARE 40 MPH OR LESS AND THE AVAILABLE SPACE IS LIMITED BY RIGHT-OF-WAY CONSTRAINTS OR THE OTHER ROADSIDE FEATURES THAT PRECLUDE USING A GUARDRAIL TERMINAL OR CRASH CUSHION.
3. PRECAST TYPE A TERMINAL WITH CLASS 30AF OR HIGHER STRENGTH CONCRETE. PRECAST TYPE B TERMINAL WITH CLASS 50AF CONCRETE. CHAMFER TOP, BOTTOM, AND ENDS 3/4". PROVIDE 2" MINIMUM CONCRETE COVER OVER REINFORCING STEEL.
4. PIN CONNECT THE TERMINALS TO CONCRETE BARRIERS.
5. ANCHOR PIN THE TERMINALS AT THE TAPERED END. ENSURE THE ANCHOR PIN DOES NOT PROTRUDE BEYOND THE EXTERIOR OF THE TERMINAL SURFACE.
6. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE OF ORIGINAL SIGNATURE MARCH 10, 2020 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	01-86	GB	6	12-92	MSM	11	09-10	PLR
2	08-86	GB	7	09-93	MSM	12	11-14	RDL
3	06-87	GB	8	02-96	MSM	13	03-19	RDL
4	04-89	GB	9	01-00	MSM	14	02-20	PBH
5	01-91	GB	10	12-04	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-20_0420.dgn

DRAWING DATE: NOVEMBER, 1974

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN
DESIGN/TRAFFIC SERVICES ENGINEER

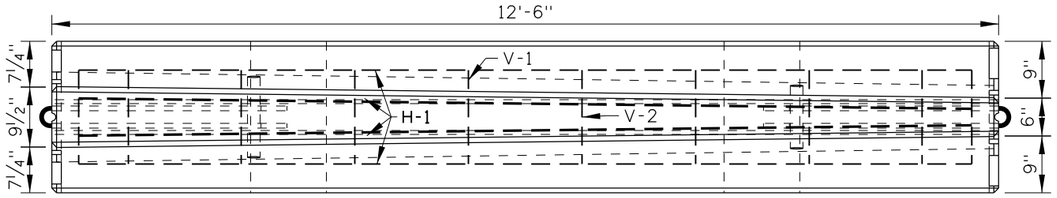
STANDARD DRAWING

PRECAST CONCRETE BARRIER TERMINALS

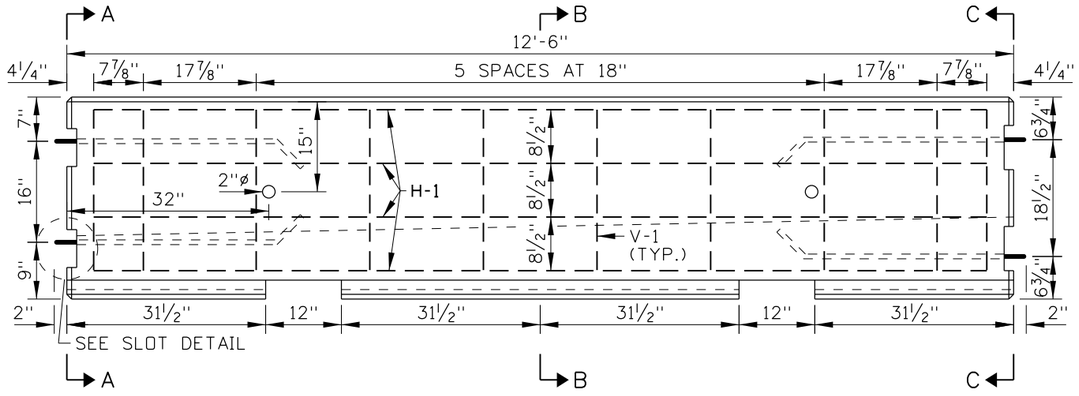
English

STANDARD DRAWING NO.

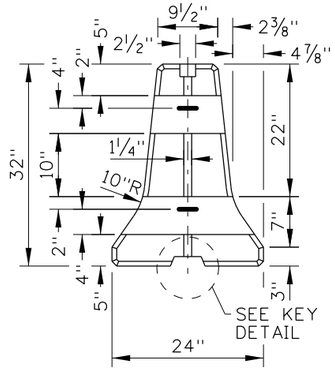
612-20



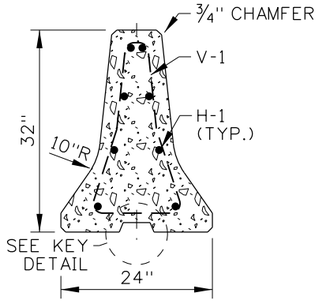
PLAN



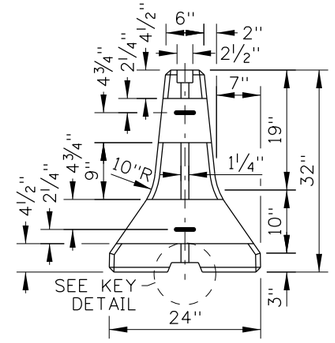
ELEVATION



SECTION A-A
F-SHAPE

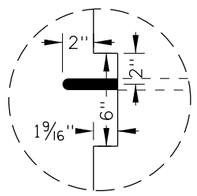


SECTION B-B

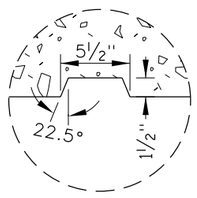


SECTION C-C
NEW JERSEY SHAPE

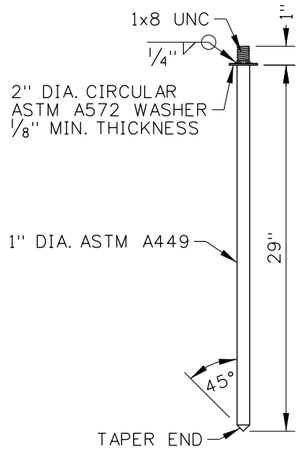
REINFORCING STEEL TABLE				
MARK	LOCATION	BAR SIZE	NUMBER OF BARS	SKETCH
H-1	HORIZONTAL BAR. TIED INSIDE V-1 BARS.	NO. 4	8	11'-10"
V-1	VERTICAL BAR.	NO. 4	10	6¼" 3½" 13¼" 3"ø (TYP.) 10¾" 14⅞" 27" 6'-9" TOTAL BAR LENGTH



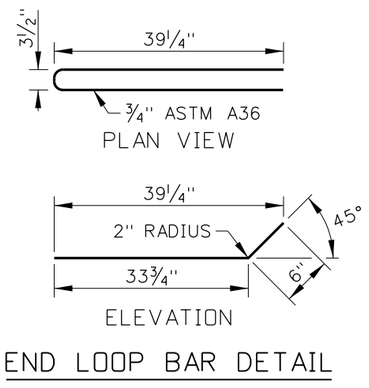
SLOT DETAIL



KEY DETAIL



CONNECTING PIN DETAIL



END LOOP BAR DETAIL

NOTES

1. USE THE F-SHAPE TO NEW JERSEY SHAPE TRANSITION TO CONNECT F-SHAPE PRECAST CONCRETE BARRIER TO NEW JERSEY SHAPE PRECAST CONCRETE BARRIER. A 2" WHITE PVC SLEEVE MAY BE USED TO FORM THE LIFTING HOLE. IF USED, LEAVE THE PVC SLEEVE IN PLACE.
2. PRECAST WITH CLASS 50 AF CONCRETE. CHAMFER TOP, BOTTOM, AND ENDS ¾". PROVIDE 2" MINIMUM CONCRETE COVER OVER REINFORCING STEEL.
3. PIN CONNECT THE TRANSITION TO THE ADJACENT PRECAST CONCRETE BARRIERS.
4. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED AND DATED ORIGINAL SIGNED MARCH 21, 2019 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-24_0419.dgn

DRAWING DATE: MARCH, 2019

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

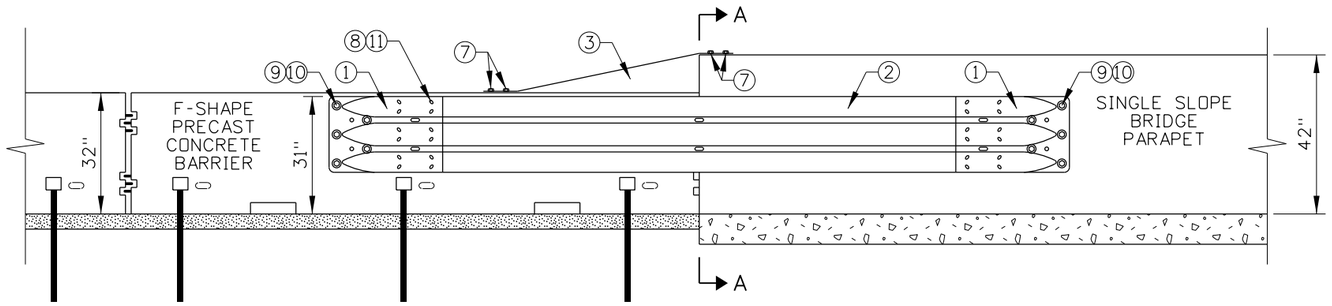
F-SHAPE TO NEW JERSEY SHAPE TRANSITION

English

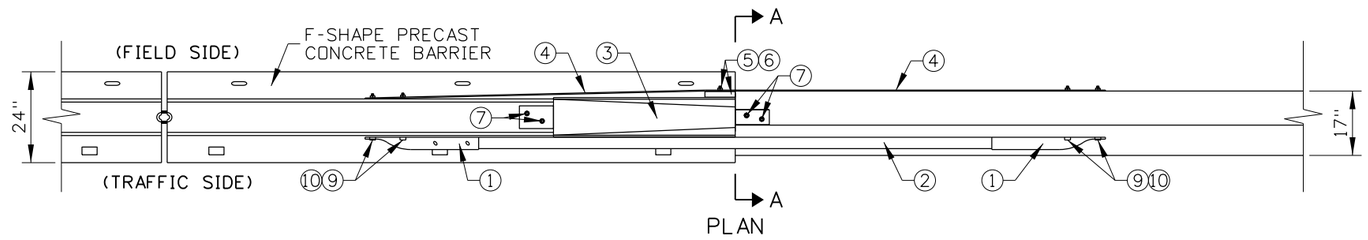
STANDARD DRAWING NO.

612-24

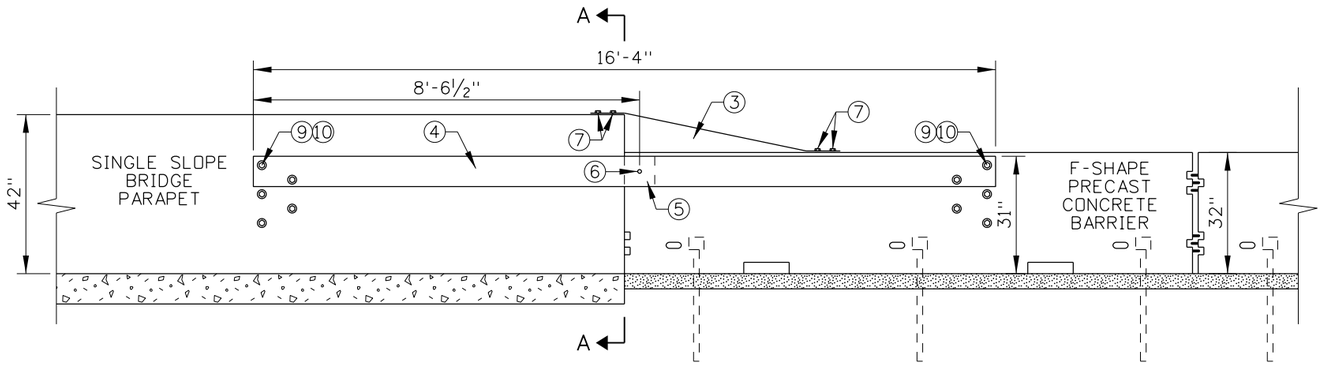
SHEET 1 OF 1



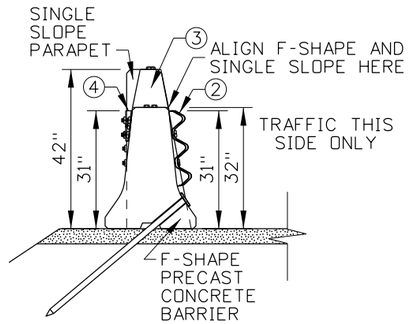
ELEVATION
(TRAFFIC SIDE)



PLAN

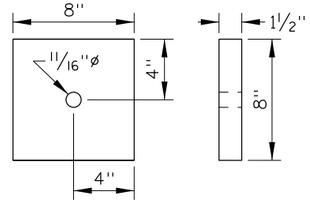


ELEVATION
(FIELD SIDE)

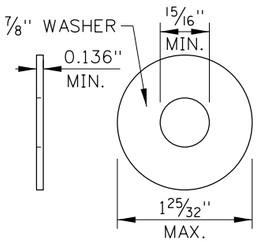


SECTION A-A

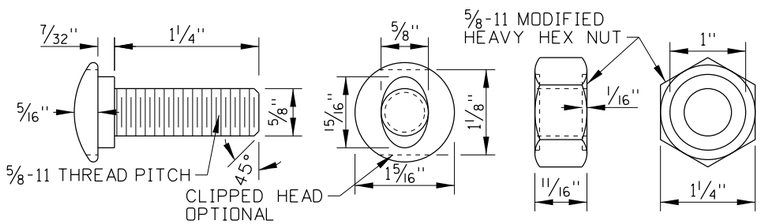
F-SHAPE TO SINGLE SLOPE TRANSITION HARDWARE COMPONENTS TABLE			
ITEM NO.	COMPONENT DESCRIPTION	QTY.	TF-13 NAME
①	THRIE-BEAM TERMINAL CONNECTOR	2	RTE01b
②	2-SPACE NESTED THRIE-BEAM GUARDRAIL	2	RTM02b
③	TRANSITION CAP	1	-
④	FIELD SIDE STRAP	1	-
⑤	8" x 8" x 1½" WOOD SPACER BLOCK	1	-
⑥	⅝" x 4" CARRIAGE BOLT AND NUT (NOT SHOWN)	1	-
⑦	½" x 6½" ANCHOR BOLT (NOT SHOWN)	4	-
⑧	⅝" GUARDRAIL SPLICE BOLT AND RECESSED NUT	24	FBB01
⑨	⅞" x 16" STRUCTURAL HEX BOLT & NUT	10	FBX22b
⑩	⅞" HARDENED ROUND WASHER	10	FWC22b
⑪	RECTANGULAR GUARDRAIL PLATE WASHER	24	FWR03



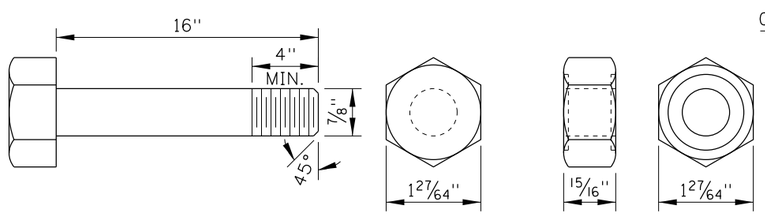
WOOD SPACER
⑤ BLOCK DETAIL



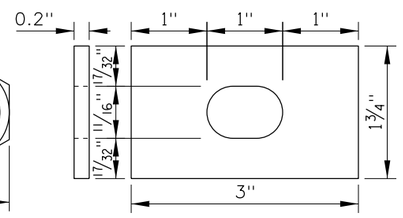
HARDENED
⑩ ROUND WASHER
FWC22b



⑧ GUARDRAIL BOLT AND RECESSED NUT
FBB01



⑨ STRUCTURAL HEX BOLT AND NUT
FBX22b



⑪ RECTANGULAR GUARDRAIL PLATE WASHER
FWR03, SEE NOTE NO. 7

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO MARCH 22, 2019

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-25_0419.dgn

DRAWING DATE: MARCH, 2019

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

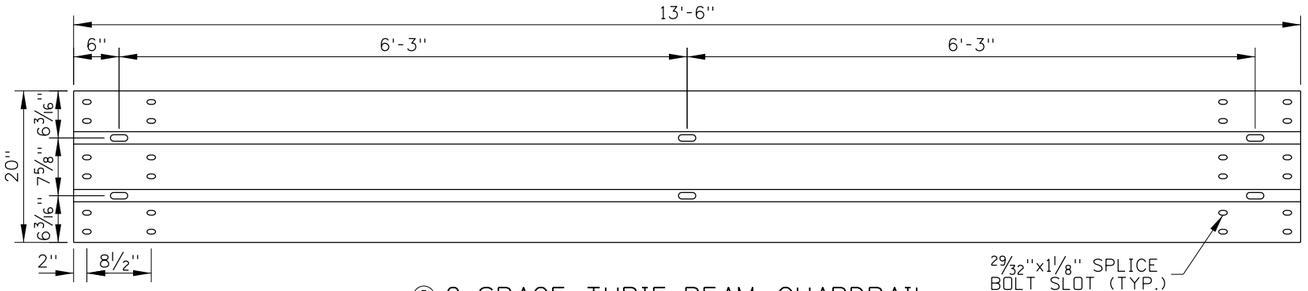
F-SHAPE TO SINGLE SLOPE TRANSITION

English

STANDARD DRAWING NO.

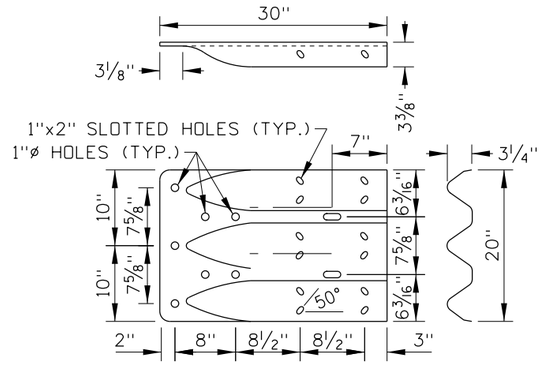
612-25

SHEET 1 OF 2



② 2-SPACE THRIE-BEAM GUARDRAIL

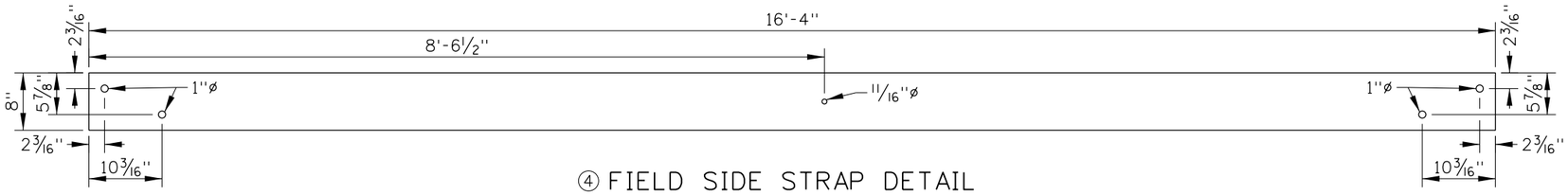
RTM02b



THRIE-BEAM

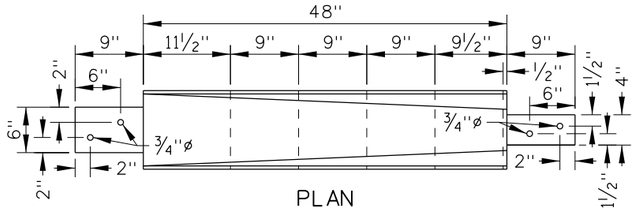
① TERMINAL CONNECTOR

RTE01b (10 GAUGE)

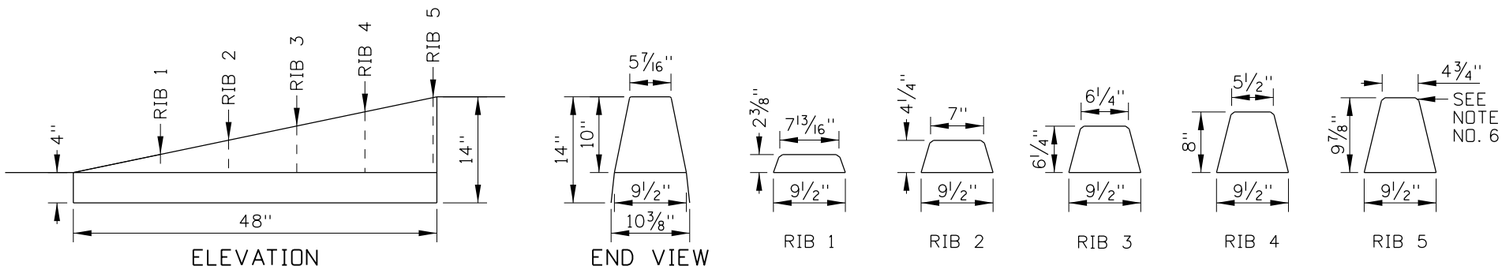


④ FIELD SIDE STRAP DETAIL

SEE NOTE NO. 5



PLAN



ELEVATION

END VIEW

RIB 1

RIB 2

RIB 3

RIB 4

RIB 5

③ TRANSITION CAP DETAIL

SEE NOTE NOS. 4 THROUGH 6

RIB DETAIL

SEE NOTE NO. 6

NOTES

1. USE THE TRANSITION TO CONNECT F-SHAPE PRECAST CONCRETE BARRIER TO 42" SINGLE SLOPE BRIDGE PARAPET. THE F-SHAPE TO SINGLE SLOPE TRANSITION SHOWN IS A MASH TEST LEVEL 3 SYSTEM.
2. ANCHOR PIN THE LAST THREE F-SHAPE PRECAST CONCRETE BARRIER. THE PAVEMENT BENEATH THE PRECAST CONCRETE BARRIER CAN BE ASPHALT OR CONCRETE. SEE THE PRECAST CONCRETE BARRIER STANDARD DRAWING.
3. CUT THE END LOOPS OFF OF THE PRECAST CONCRETE BARRIER CLOSEST TO THE SINGLE SLOPE BRIDGE PARAPET. BUTT THE PRECAST CONCRETE BARRIER UP AGAINST THE SINGLE SLOPE BRIDGE PARAPET AND ALIGN THE BARRIER FACES AT THE TOP TRAFFIC SIDE CORNER OF THE PRECAST CONCRETE BARRIER.
4. THE TOP AND SIDES OF THE TRANSITION CAP MAY BE MANUFACTURED FROM SEPARATE PLATES AND WELDED TOGETHER AT THE JOINTS, A SINGLE BENT PLATE (BEND RADII 1/4" MAX.), OR A COMBINATION OF THE TWO.
5. FABRICATE THE TRANSITION CAP AND FIELD SIDE STRAP FROM ASTM A36 STEEL. FABRICATE THE TRANSITION CAP WITH 1/8" THICK STEEL. FABRICATE THE FIELD SIDE STRAP WITH 1/4" THICK STEE. GALVANIZE FABRICATED PARTS AFTER ASSEMBLY.
6. CHAMFER THE TOP CORNERS OF RIBS WITH A 3/8" CHAMFER.
7. INSTALL RECTANGULAR GUARDRAIL PLATE WASHERS UNDER GUARDRAIL NUTS AT THE SPLICE BETWEEN THE THRIE-BEAM GUARDRAIL AND THRIE-BEAM TERMINAL CONNECTOR. INSTALL UNDER THE BOLT HEAD ON UPSTREAM END AND UNDER NUT ON DOWNSTREAM END.
8. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER — LICENSED — ORIGINAL SIGNED — RYAN D. LANCASTER — 13683 — STATE OF IDAHO — MARCH 22, 2019

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 612-25_0419.dgn

DRAWING DATE: MARCH, 2019

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

F-SHAPE TO SINGLE SLOPE TRANSITION

English

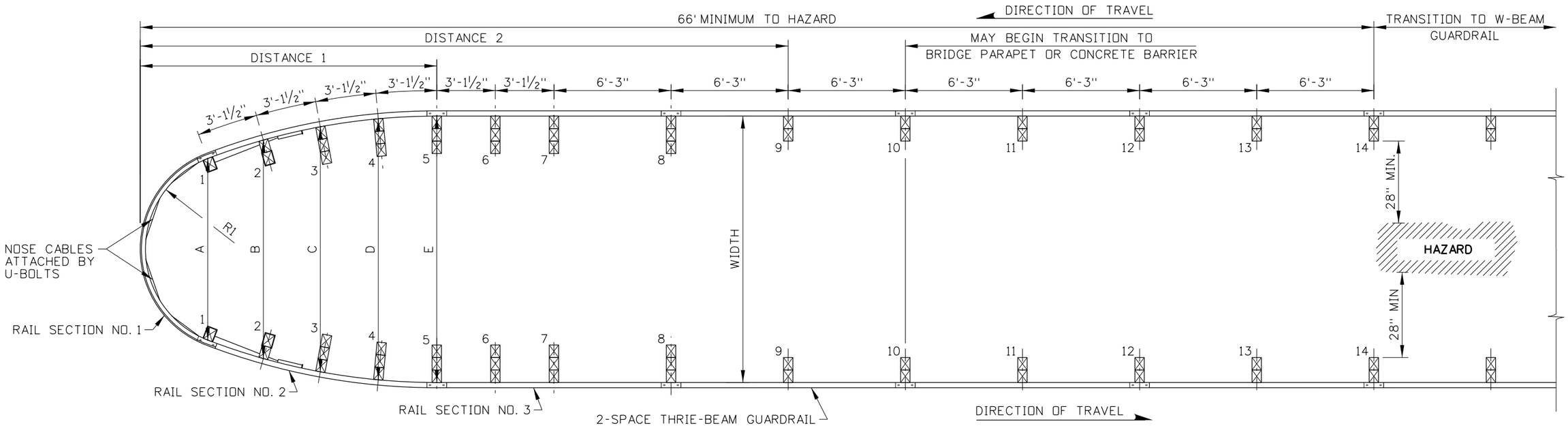
STANDARD DRAWING NO.

612-25

SHEET 2 OF 2

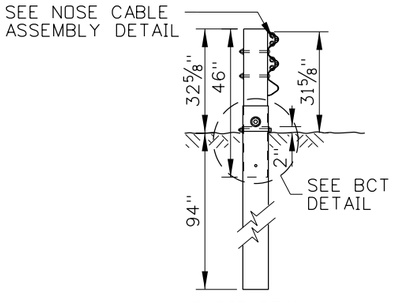
BULLNOSE DIMENSION TABLE

	DESIGN	WIDTH	A	B	C	D	E	DIST 1	DIST 2	R1	CABLE
SYMMETRICAL	1	14'-9 1/8"	9'-8"	11'-8"	13'-1"	13'-11"	14'-2 1/2"	15'-10"	34'-7"	5'-2 3/16"	14'-6"
	2	19'-5/8"	14'-6 3/8"	16'-6"	17'-11"	18'-9 1/8"	19'-5/8"	17'-6"	36'-3"	7'-9 5/16"	20'-9 5/8"
	3	23'-10 3/4"	19'-4 3/8"	21'-4"	22'-9"	23'-7"	23'-10 3/4"	19'-2"	37'-11"	10'-4 3/8"	27'-1"
ASYMMETRICAL	1	VARIES	9'-8"	11'-6"	13'-11/16"	14'-3 7/8"	15'3 11/16"	15'-10"	34'-7"	5'-2 3/16"	14'-6"
	2	VARIES	9'-8"	11'-3"	12'-6 11/16"	13'-6 7/8"	14'-3 11/16"	15'-10"	34'-7"	5'-2 3/16"	14'-6"



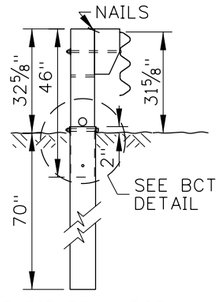
SYMMETRICAL DESIGNS 1, 2, & 3

POST NO. 1



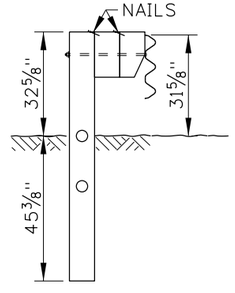
THRIE BEAM BCT POST (PDF04) WITH 96" FOUNDATION TUBE (PTE07)

POST NO. 2



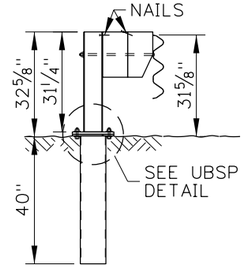
THRIE BEAM BCT POST (PDF04) WITH 72" FOUNDATION TUBE (PTE06) & 14 1/4" TAPERED BLOCK (PDB12)

POST NOS. 3 THROUGH 8



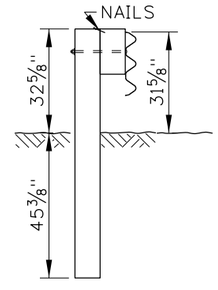
TIMBER POST OPTION: THRIE BEAM CRT POST 78" LONG (PDB16) WITH 14 1/4" BLOCK (PDB01) & 14 1/4" TAPERED BLOCK (PDB12)

OR



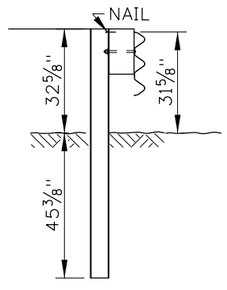
WIDE-FLANGE POST OPTION: UBSP POST WITH 14 1/4" BLOCK (PDB01) & 14 1/4" TAPERED BLOCK (PDB12)

POST NO. 9 TO NO. 14



TIMBER POST OPTION: THRIE BEAM POST 78" LONG (PDE02) WITH 14 1/4" BLOCK (PDB01)

OR



WIDE-FLANGE POST OPTION: W6X8.5 OR W6X9 POST WITH 14 1/4" BLOCK (PDB01)

POST ASSEMBLY DETAILS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 10, 2021 ORIGINAL SIGNATURE AND SEAL ON FILE

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-02	MSM	6	09-15	RDL			
2	10-03	MSM	7	02-20	PBH			
3	12-04	MSM						
4	05-06	MSM						
5	09-10	MGL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 613-1_0420.dgn

DRAWING DATE: NOVEMBER, 2001

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED E. MASON *for*

DESIGN/TRAFFIC SERVICES ENGINEER

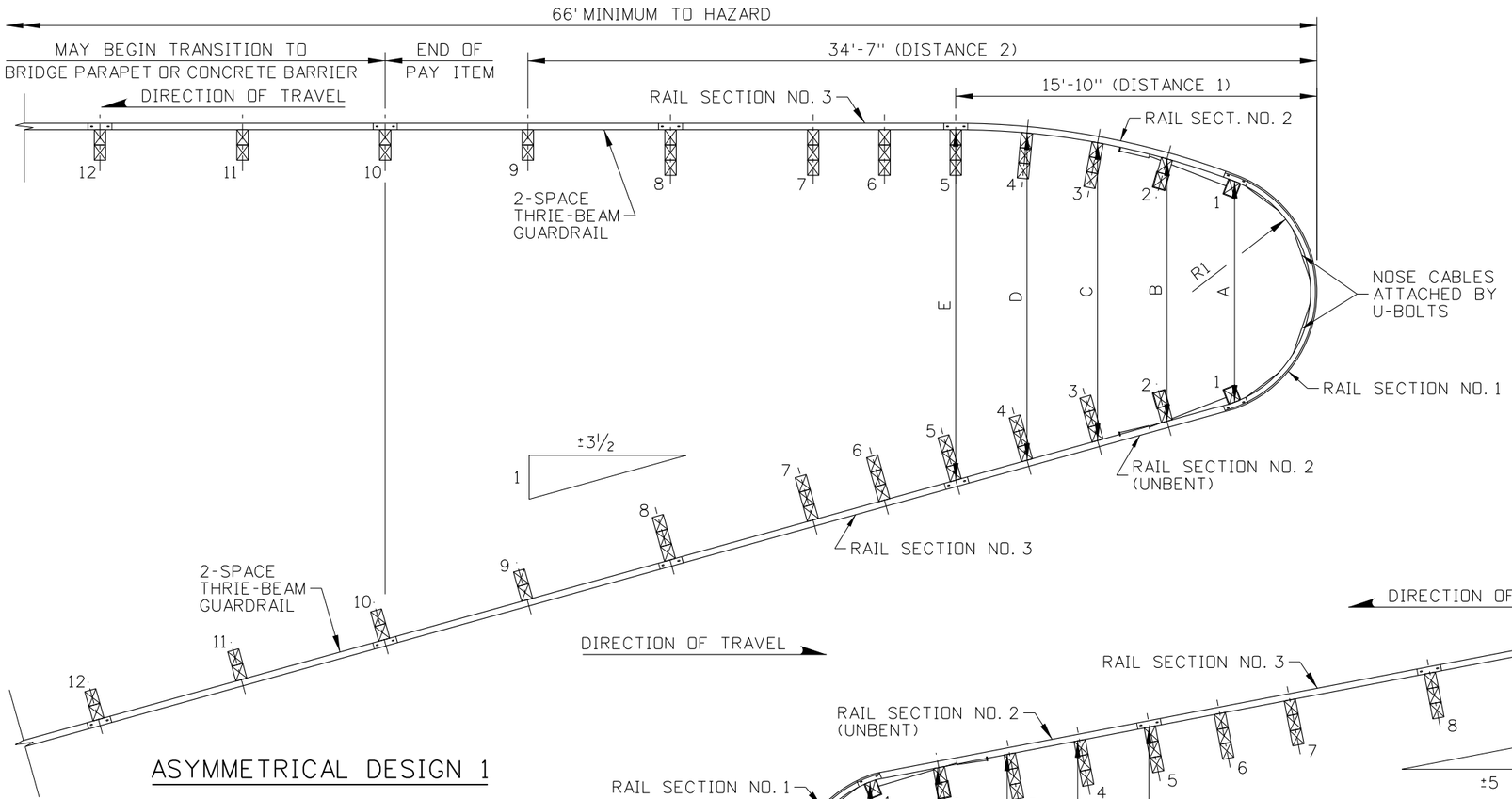
STANDARD DRAWING

BULLNOSE CRASH CUSHION

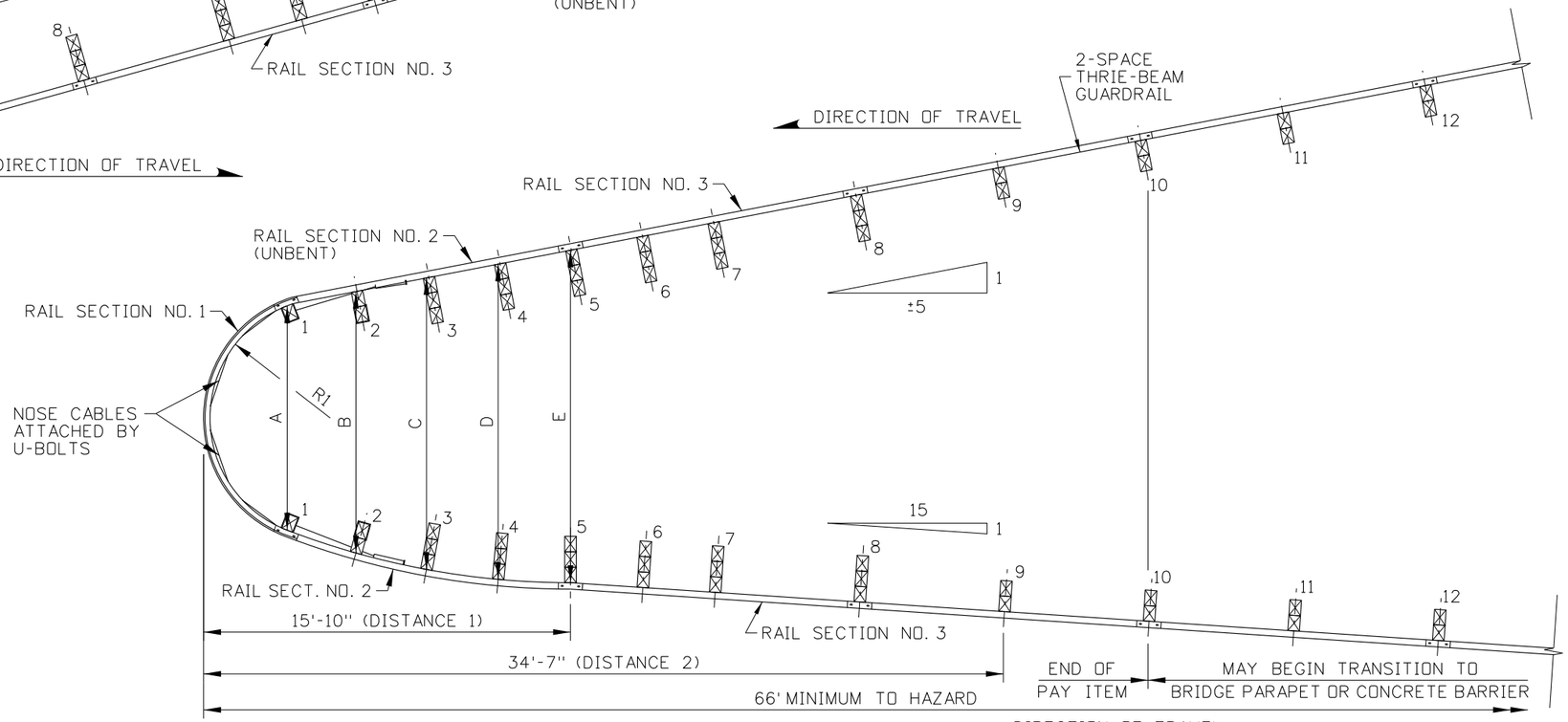
English

STANDARD DRAWING NO.

613-1



ASYMMETRICAL DESIGN 1



ASYMMETRICAL DESIGN 2

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REVISIONS								
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2	10-03	MSM	7	02-20	PBH			
3	12-04	MSM						
4	05-06	MSM						
5	09-10	MGL						

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STANDARD DRAWING NO.
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SHEET 2 OF 7

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED BY
RYAN D. LANCASTER
DATE ORIGINAL SIGNED
MARCH 10, 2021
13683
STATE OF IDAHO
RYAN D. LANCASTER

BULLNOSE CRASH CUSHION HARDWARE COMPONENTS TABLE (SEE NOTE NO. 6)

COMPONENT DESCRIPTION	QUANTITY										TASK FORCE 13 HARDWARE GUIDE DESIGNATOR	MATERIAL SPECIFICATION
	WOOD POST					STEEL POST						
	SYMMETRICAL			ASYMMETRICAL		SYMMETRICAL			ASYMMETRICAL			
	1	2	3	1	2	1	2	3	1	2		
SLOTTED AND BENT 12'-6" THRIE-BEAM GUARDRAIL SECTION NO. 1 - RADIUS 5'-2 3/16"	1	-	-	1	1	1	-	-	1	1	RTM07a	12 GUAGE AASHTO M 180
SLOTTED AND BENT 9'-4 1/2" THRIE-BEAM GUARDRAIL SECTION NO. 1 - RADIUS 7'-9 5/16"	-	2	-	-	-	-	2	-	-	-	-----	12 GUAGE AASHTO M 180
SLOTTED AND BENT 12'-6" THRIE-BEAM GUARDRAIL SECTION NO. 1 - RADIUS 10'-4 3/8"	-	-	2	-	-	-	-	2	-	-	-----	12 GUAGE AASHTO M 180
SLOTTED AND BENT 12'-6" THRIE-BEAM GUARDRAIL SECTION NO. 2 - RADIUS 34'-1 7/16"	2	2	2	1	1	2	2	2	1	1	RTM07b	12 GUAGE AASHTO M 180
SLOTTED 12'-6" THRIE-BEAM GUARDRAIL SECTION NO. 2	-	-	-	1	1	-	-	-	1	1	RTM07b	12 GUAGE AASHTO M 180
SLOTTED 12'-6" THRIE-BEAM GUARDRAIL SECTION NO. 3	2	2	2	2	2	2	2	2	2	2	RTM07c	12 GUAGE AASHTO M 180
12'-6" 2-SPACE THRIE-BEAM GUARDRAIL	2	2	2	2	2	2	2	2	2	2	RTM02a	12 GUAGE AASHTO M 180
46" THRIE-BEAM GUARDRAIL BCT POST	4	4	4	4	4	4	4	4	4	4	PDF04	SYP GRADE NO. 1 OR BETTER
96" FOUNDATION TUBE	2	2	2	2	2	2	2	2	2	2	PTE07	ASTM A500 GRADE B
72" FOUNDATION TUBE	2	2	2	2	2	2	2	2	2	2	PTE06	ASTM A500 GRADE B
78" THRIE-BEAM GUARDRAIL CRT POST	12	12	12	12	12	-	-	-	-	-	PDB16	SYP GRADE NO. 1 OR BETTER
78" THRIE-BEAM GUARDRAIL TIMBER POST	4	4	4	4	4	-	-	-	-	-	PDE02	SYP GRADE NO. 1 OR BETTER
UBSP POST - TOP ASSEMBLY	-	-	-	-	-	12	12	12	12	12	-----	ASTM A36
UBSP POST - BOTTOM ASSEMBLY	-	-	-	-	-	12	12	12	12	12	-----	ASTM A36 (SHEAR PLATE), ASTM A500 GRADE B (TUBE)
78" W6X8.5X78" OR W6X9X78" WIDE-FLANGE POST	-	-	-	-	-	4	4	4	4	2	-----	ASTM A36
6"x8"x14 1/4" GUARDRAIL TIMBER BLOCKOUT (HOLE CENTERED FOR TIMBER POST)	14	14	14	14	14	-	-	-	-	-	PDB01 (PDB09)	SYP GRADE NO. 1 OR BETTER
6"x8"x14 1/4" GUARDRAIL TIMBER BLOCKOUT (HOLES OFFSET FOR STEEL POST)	-	-	-	-	-	14	14	14	14	14	PDB01 (PDB09)	SYP GRADE NO. 1 OR BETTER
6"x8"x14 1/4" TAPERED GUARDRAIL TIMBER BLOCKOUT (HOLE CENTERED FOR TIMBER POST)	14	14	14	14	14	2	2	2	2	2	PDB12	SYP GRADE NO. 1 OR BETTER
6"x8"x14 1/4" TAPERED GUARDRAIL TIMBER BLOCKOUT (HOLES OFFSET FOR WIDE-FLANGE POST)	-	-	-	-	-	12	12	12	12	12	PDB12 MODIFIED	SYP GRADE NO. 1 OR BETTER
6'-6" BCT ANCHOR CABLE	2	2	2	2	2	2	2	2	2	2	FCA01	6x19 OR 6x25 CABLE IWRC IPS
GUARDRAIL ANCHOR BRACKET AND BEARING PLATE	2	2	2	2	2	2	2	2	2	2	FPA01	ASTM A36
8"x8"x 5/8" BCT BEARING PLATE	2	2	2	2	2	2	2	2	2	2	FPB01	ASTM A36
2 3/8" O.D. X 6" LONG BCT POST SLEEVE	2	2	2	2	2	2	2	2	2	2	FMM02	ASTM A53 GRADE B SCHEDULE 40
12 5/8" X 5 13/16" NOSE CABLE ANCHOR PLATE	4	4	4	4	4	4	4	4	4	4	-----	ASTM A36
5/8" DIA. x 14'-6" NOSE CABLE (6x19 OR 6x25)	2	-	-	2	2	2	-	-	2	2	-----	SEE NOSE CABLE DETAIL
5/8" DIA. x 20'-9 5/8" NOSE CABLE (6x19 OR 6x25)	-	2	-	-	-	-	2	-	-	-	-----	SEE NOSE CABLE DETAIL
5/8" DIA. x 27'-1" NOSE CABLE (6x19 OR 6x25)	-	-	2	-	-	-	-	2	-	-	-----	SEE NOSE CABLE DETAIL
16D DOUBLE HEAD NAIL	56	56	56	56	56	40	40	40	40	40	-----	N/A
1/4" DIA. U-BOLT (TO ATTACH NOSE CABLE TO RAIL SECTION NO. 1)	6	6	6	6	6	6	6	6	6	6	-----	ASTM A307 GALVANIZED
U-BOLT PLATE WASHER (TO ATTACH NOSE CABLE TO RAIL SECTION NO. 1)	6	6	6	6	6	6	6	6	6	6	-----	ASTM A307 GALVANIZED
1/4" DIA. HEX NUT (TO ATTACH NOSE CABLE TO RAIL SECTION NO. 1)	12	12	12	12	12	12	12	12	12	12	-----	ASTM A307 GALVANIZED
7/16" DIA. UNC-14 x 2 1/2" LONG HEX FULLY THREADED TAP BOLTS (FOR UBSP POSTS)	-	-	-	-	-	48	48	48	48	48	-----	SAE GRADE 5/ASTM A325
7/16" DIA. HEX NUT (FOR UBSP POSTS)	-	-	-	-	-	48	48	48	48	48	-----	ASTM A563DH GALVANIZED
7/16" DIA. FLAT WASHER (FOR UBSP POSTS)	-	-	-	-	-	192	192	192	192	192	-----	ASTM F436 GRADE 1 GALVANIZED
5/8" DIA. x 1 1/2" LONG GUARDRAIL BOLT AND RECESSED NUT	72	84	84	72	72	72	84	84	72	72	FBB01	ASTM A307 GALVANIZED
5/8" DIA. x 10" LONG GUARDRAIL BOLT AND RECESSED NUT	4	4	4	4	4	8	8	8	8	8	FBB03	ASTM A307 GALVANIZED
5/8" DIA. x 18" LONG GUARDRAIL BOLT AND RECESSED NUT	6	6	6	6	6	14	14	14	14	14	FBB04	ASTM A307 GALVANIZED
5/8" DIA. x 25" LONG GUARDRAIL BOLT AND RECESSED NUT	12	12	12	12	12	-	-	-	-	-	FBB05	ASTM A307 GALVANIZED
5/8" DIA. X 1 1/2" LONG HEX HEAD BOLT (FOR ANCHOR BRACKET)	16	16	16	16	16	16	16	16	16	16	FBX16a	GRADE A307 GALVANIZED
5/8" DIA. x 10" LONG HEX HEAD BOLT AND NUT (FOR BCT POSTS)	4	4	4	4	4	4	4	4	4	4	FBX16a	GRADE A307 GALVANIZED
5/8" DIA. FLAT WASHER	174	198	198	174	174	174	198	198	174	174	FWC16a	GRADE A307 GALVANIZED
7/8" DIA. x 7 1/2" LONG HEX HEAD BOLT AND NUT	4	4	4	4	4	4	4	4	4	4	FBX22a	GRADE A307 GALVANIZED
7/8" DIA. FLAT WASHER	8	8	8	8	8	8	8	8	8	8	FWC22a	GRADE A307 GALVANIZED
1" DIA. HEX NUT (FOR ANCHOR CABLE)	8	8	8	8	8	8	8	8	8	8	-----	ASTM A563DH
1" DIA. FLAT WASHER (FOR ANCHOR CABLE)	4	4	4	4	4	4	4	4	4	4	FWC24a	ASTM F436 GRADE 1 GALVANIZED

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO ORIGINAL SIGNED BY RYAN D. LANCASTER MARCH 10, 2021 13683 RYAN D. LANCASTER

REVISIONS

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3	12-04	MSM						
4	05-06	MSM						
5	09-10	MGL						

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IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED E. MASON *for*

DESIGN/TRAFFIC SERVICES ENGINEER

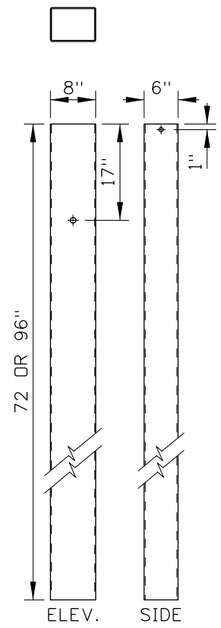
STANDARD DRAWING

BULLNOSE CRASH CUSHION

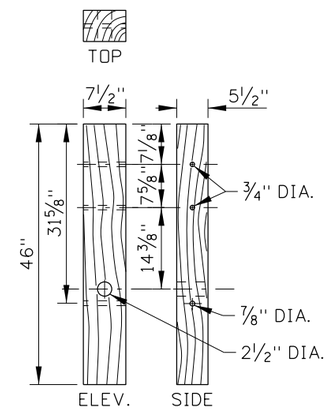
English

STANDARD DRAWING NO.

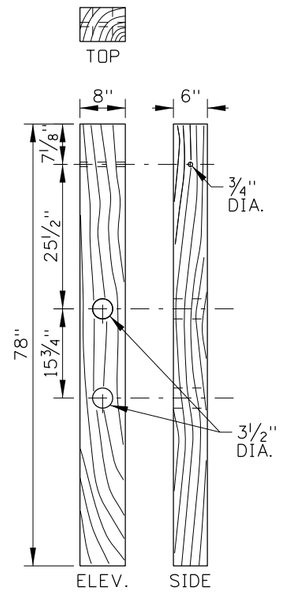
613-1



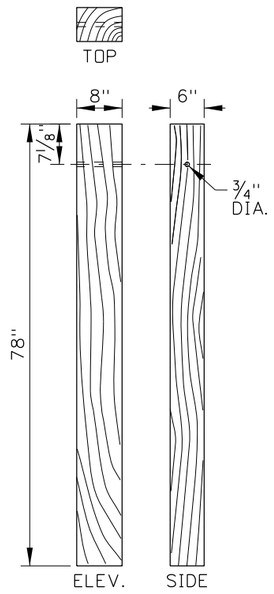
FOUNDATION TUBES
POSTS 1 & 2
(PTE06 & PTE07)



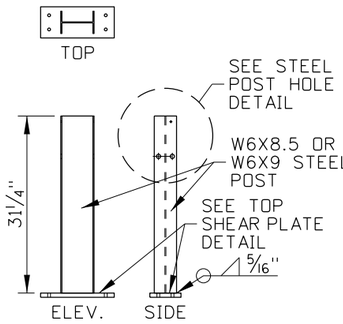
THRIE BEAM BCT POST
POSTS 1 & 2
(PDF04)



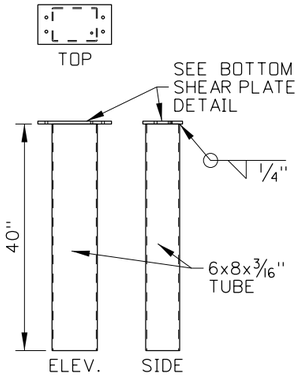
THRIE BEAM CRT POST
POSTS 3 THROUGH 8
(PDB16)



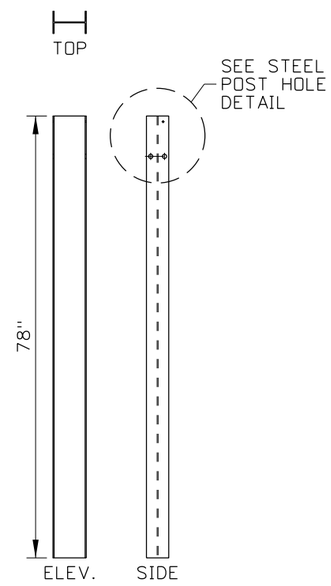
THRIE BEAM TIMBER POST
POST 9 AND BEYOND
(PDE02)



UBSP TOP ASSEMBLY
POSTS 3 THROUGH 8

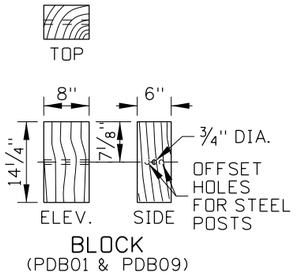


UBSP BOTTOM ASSEMBLY
POSTS 3 THROUGH 8

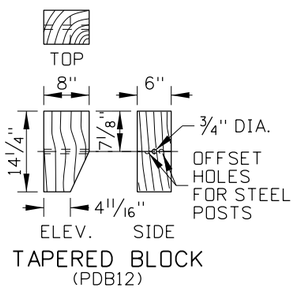


THRIE BEAM
W6X8.5 OR W6X9
WIDE-FLANGE POST
POST 9 AND BEYOND

POST DETAILS

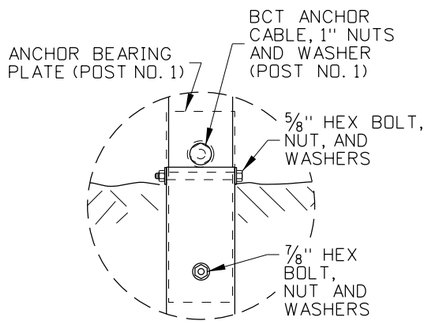


BLOCK
(PDB01 & PDB09)

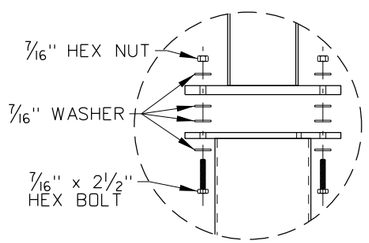


TAPERED BLOCK
(PDB12)

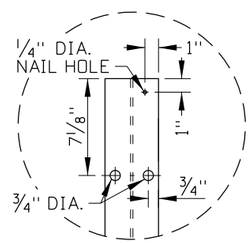
BLOCK DETAILS



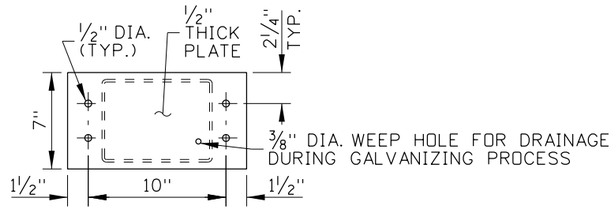
BCT DETAIL



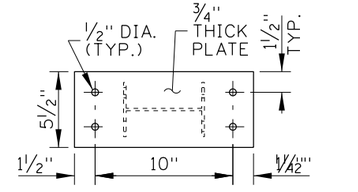
UBSP DETAIL



WIDE-FLANGE
POST HOLE DETAIL



BOTTOM SHEAR PLATE DETAIL



TOP SHEAR PLATE DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED BY DATE OF ORIGINAL SIGNATURE MARCH 10, 2022 13683 STATE OF IDAHO RYAN D. LANCASTER

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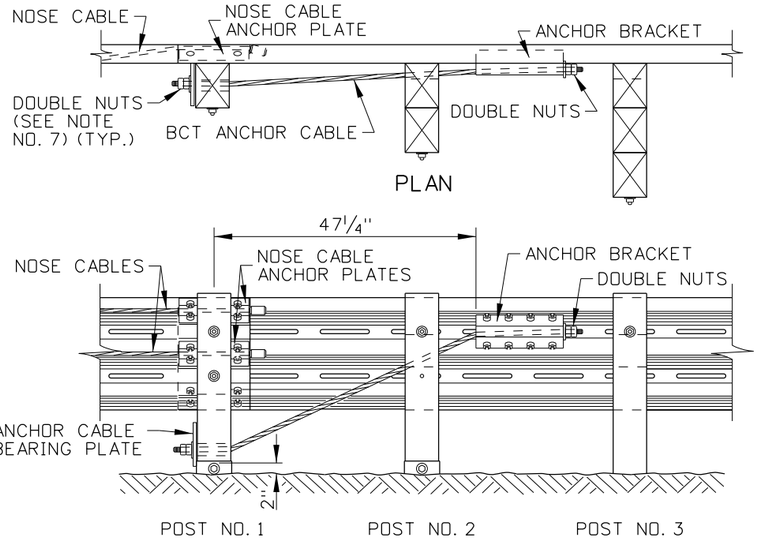
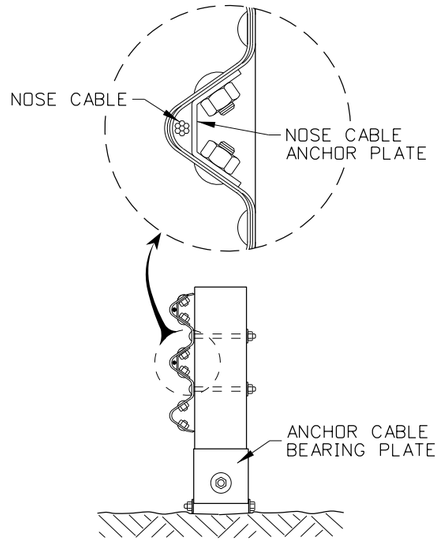
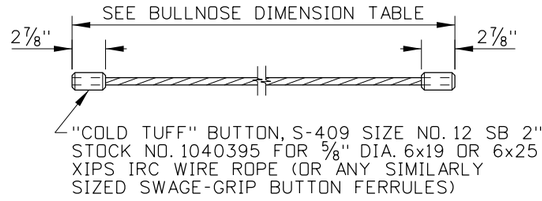


BCT ANCHOR CABLE ASSEMBLY

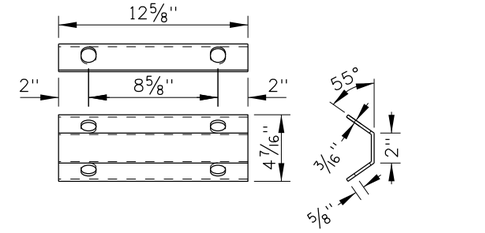


NOSE CABLE ASSEMBLY DETAIL

POST 1

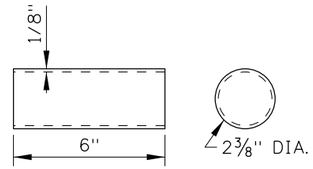


NOSE CABLE DETAIL



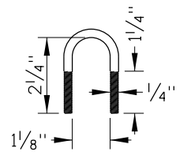
NOSE CABLE ANCHOR PLATE DETAIL

12⅝" x 5¹³⁄₁₆" x ⅜" UNBENT STEEL PLATE
ASTM A36 STEEL



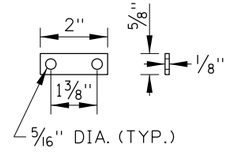
BCT POST SLEEVE

ASTM A 53 GRADE B
SCHEDULE 40
(FMM02)



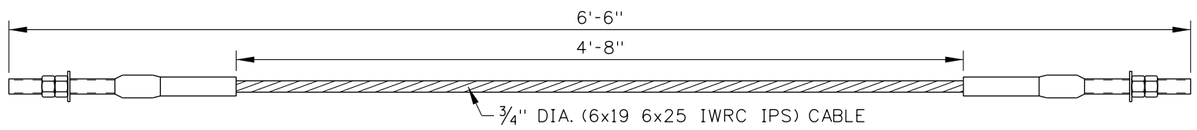
U-BOLT DETAIL

USED TO ATTACH NOSE CABLE TO RAIL SECTION NO. 1
GALVANIZED ASTM A307



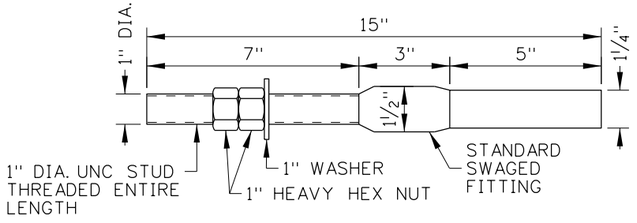
U-BOLT PLATE WASHER DETAIL

GALVANIZED ASTM A307

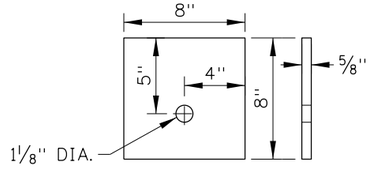


BCT ANCHOR CABLE DETAIL

(FCA01)

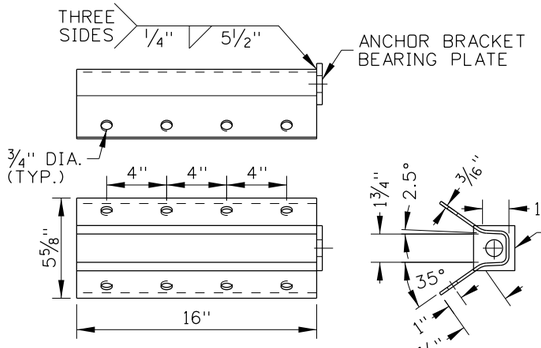


ANCHOR CABLE END DETAIL



ANCHOR CABLE BEARING PLATE DETAIL

(FPB01)



ANCHOR BRACKET ASSEMBLY DETAIL

BRACKET: 16"x12½"x³⁄₁₆" UNBENT STEEL PLATE
BEARING PLATE: 3"x2¾"x⅜"
ASTM A36 STEEL
(FPA01)

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO
ORIGINAL SIGNED DATE OF ORIGINAL SIGNATURE MARCH 10, 2021

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-02	MSM	6	09-15	RDL			
2	10-03	MSM	7	02-20	PBH			
3	12-04	MSM						
4	05-06	MSM						
5	09-10	MGL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 613-1_0420.dgn

DRAWING DATE: NOVEMBER, 2001

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

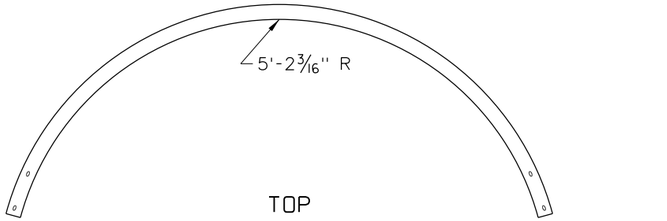
ORIGINAL SIGNED BY: TED E. MASON *for*
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

BULLNOSE CRASH CUSHION

English

STANDARD DRAWING NO. 613-1



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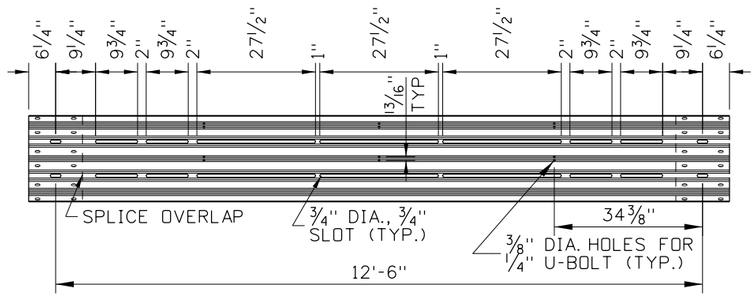
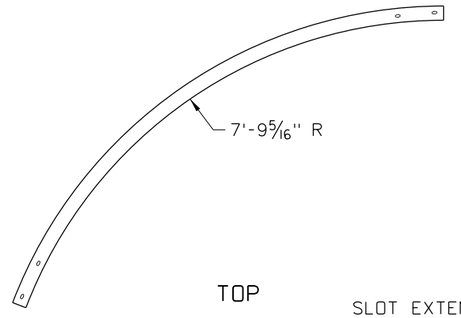


ELEVATION (UNBENT)

RAIL SECTION NO. 1
SYMMETRICAL DESIGN 1
ASYMMETRICAL DESIGNS 1 & 2
(RTM07a)



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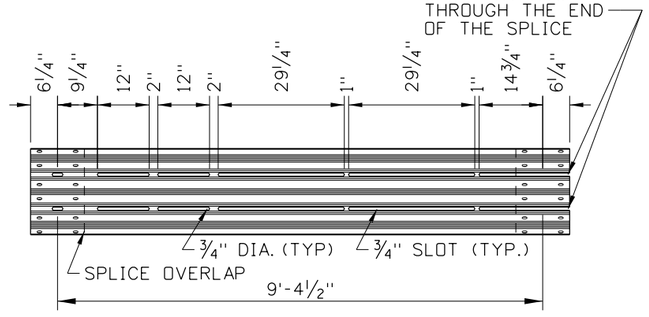
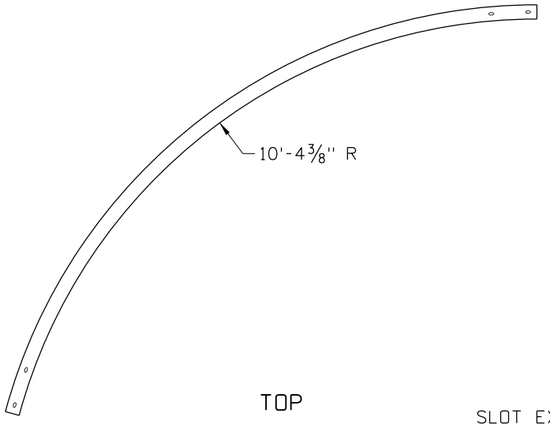


ELEVATION (UNBENT)

RAIL SECTION NO. 1
SYMMETRICAL DESIGN 2
(2 PIECES)



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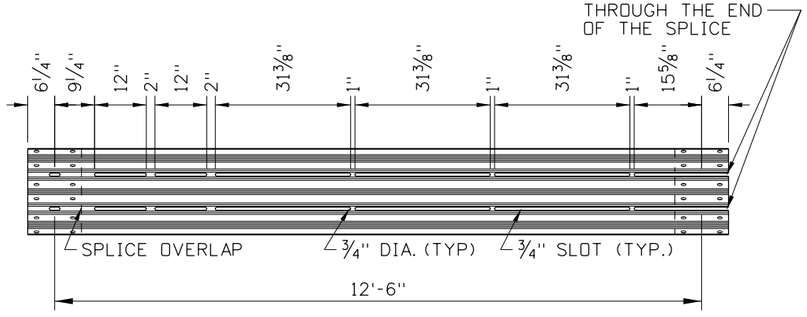

ELEVATION (UNBENT)

RAIL SECTION NO. 1
SYMMETRICAL DESIGN 3
(2 PIECES)

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PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO MARCH 10, 2021 ORIGINAL SIGNED 13683 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-02	MSM	6	09-15	RDL			
2	10-03	MSM	7	02-20	PBH			
3	12-04	MSM						
4	05-06	MSM						
5	09-10	MGL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 613-1_0420.dgn

DRAWING DATE: NOVEMBER, 2001

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

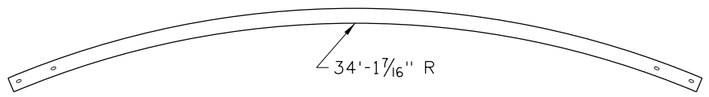
ORIGINAL SIGNED BY: TED E. MASON *for*
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

BULLNOSE CRASH CUSHION

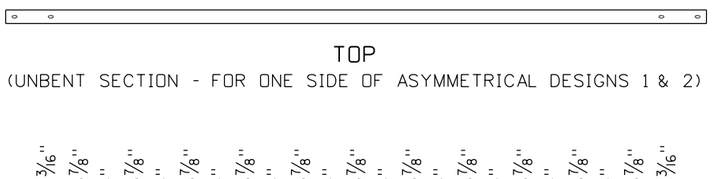
English

STANDARD DRAWING NO.
613-1



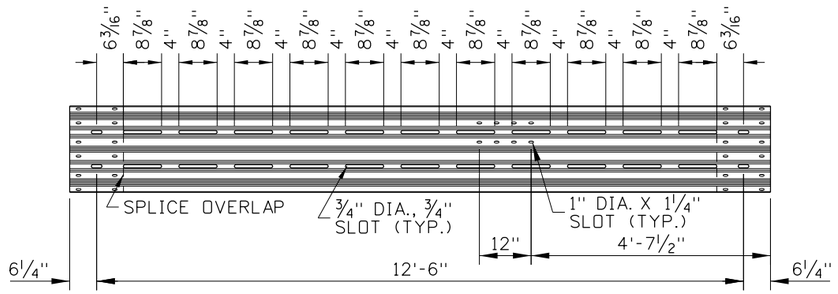
TOP

(BENT SECTION - FOR SYMMETRICAL DESIGNS 1, 2, & 3
AND ONE SIDE OF ASYMMETRICAL DESIGNS 1 & 2)



TOP

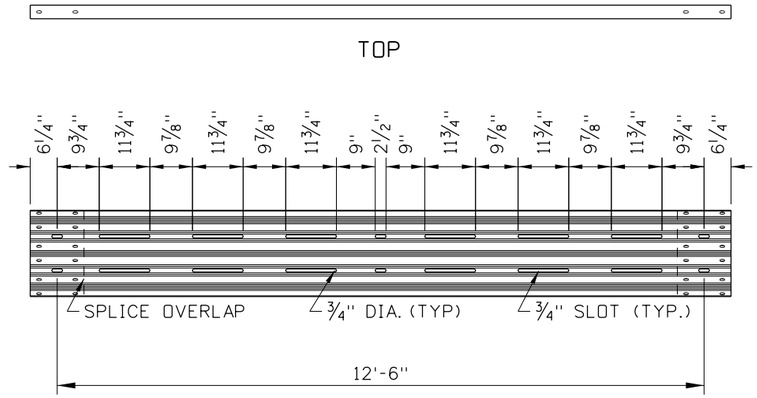
(UNBENT SECTION - FOR ONE SIDE OF ASYMMETRICAL DESIGNS 1 & 2)



ELEVATION (UNBENT)

RAIL SECTION NO. 2

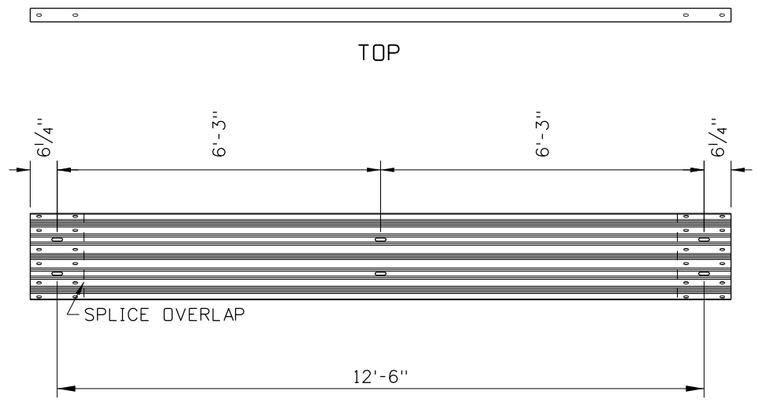
SYMMETRICAL DESIGNS 1, 2, & 3
ASYMMETRICAL DESIGNS 1 & 2
(RTM07b)



ELEVATION (UNBENT)

RAIL SECTION NO. 3

SYMMETRICAL DESIGNS 1, 2, & 3
ASYMMETRICAL DESIGNS 1 & 2
(RTM07c)



ELEVATION (UNBENT)

2-SPACE THRIE-BEAM GUARDRAIL

SYMMETRICAL DESIGNS 1, 2, & 3
ASYMMETRICAL DESIGNS 1 & 2
(RTM02a)

DEFINITIONS

BCT POST - BREAKAWAY CABLE TERMINAL POST - A NON-PROPRIETARY WOOD POST USED IN GUARDRAIL ANCHORS.

CRT POST - CONTROLLED-RELEASE TERMINAL POST - A NON-PROPRIETARY, WEAKENED WOOD POST.

UBSP - UNIVERSAL BREAKAWAY STEEL POST - A NON-PROPRIETARY FRACTURING-BOLT STEEL POST.

TASK FORCE 13 - A JOINT AASHTO, AGC, AND ARTBA SUBCOMMITTEE ON NEW HIGHWAY MATERIALS AND TECHNOLOGIES. THE TASK FORCE ASSIGNS COMPONENT AND SYSTEM NUMBERS, AND MAINTAINS A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.

NOTES

1. THE BULLNOSE CRASH CUSHION IS TYPICALLY USED TO SHIELD NARROW MEDIAN HAZARDS SUCH AS BRIDGE PIERS OR OVERHEAD SIGNS, TO SHIELD THE GAP BETWEEN TWIN BRIDGES, AND FOR GORE AREA PROTECTION.
2. SYMMETRICAL OR ASYMMETRICAL DESIGNS MAY BE USED.
3. EITHER THE WOOD OR THE STEEL POST OPTION MAY BE CHOSEN. DO NOT MIX WOOD AND STEEL POSTS (POST NOS. 1 AND 2 ARE WOOD IN BOTH THE WOOD AND STEEL POST OPTIONS).
4. ENSURE THAT GRADING UNDER, AROUND, AND IN FRONT OF THE BULLNOSE CRASH CUSHION IS 10:1 OR FLATTER. ENSURE THAT THE GRADING BEHIND THE NOSE OF THE CRASH CUSHION IS 10:1 OR FLATTER UP TO AT LEAST POST NO. 9.
5. POST NOS. 1 THROUGH 7 ARE SPACED AT 3'-1 1/2" INTERVALS. POSTS BEYOND POST NO. 7 ARE SPACED AT 6'-3" INTERVALS.
6. QUANTITIES SHOWN IN THE BULLNOSE CRASH CUSHION HARDWARE COMPONENTS TABLE ARE FOR RAIL SECTION NOS. 1 THROUGH 3 AND THE FIRST TWO 2-SPACE THRIE-BEAM GUARDRAIL SECTIONS AND POST NOS. 1 THROUGH 10.
7. TORQUE THE OUTSIDE NUTS ON EACH END OF THE ANCHOR CABLE A MINIMUM OF 100 FT.-LBS. AGAINST THE INSIDE NUTS.
8. DRAWING NOT TO SCALE.

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PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO MARCH 10, 2021 13683 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-02	MSM	6	09-15	RDL			
2	10-03	MSM	7	02-20	PBH			
3	12-04	MSM						
4	05-06	MSM						
5	09-10	MGL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 613-1_0420.dgn

DRAWING DATE: NOVEMBER, 2001

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED E. MASON *for*
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

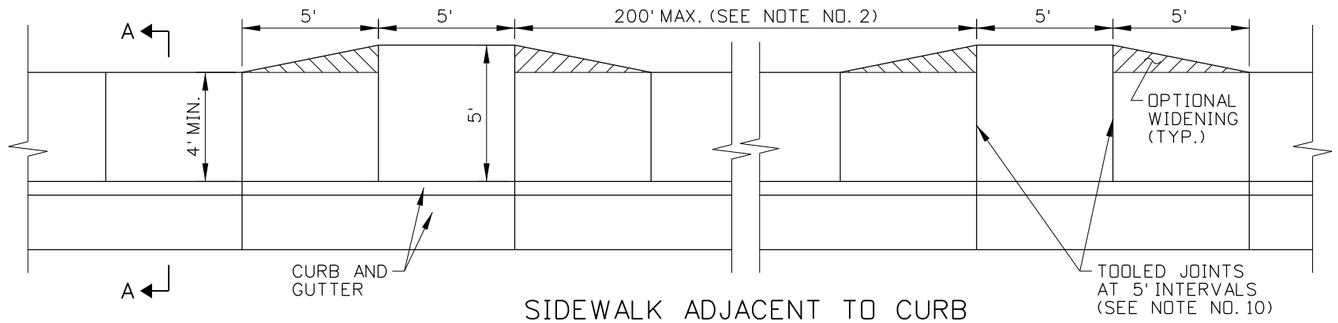
BULLNOSE CRASH CUSHION

English

STANDARD DRAWING NO.

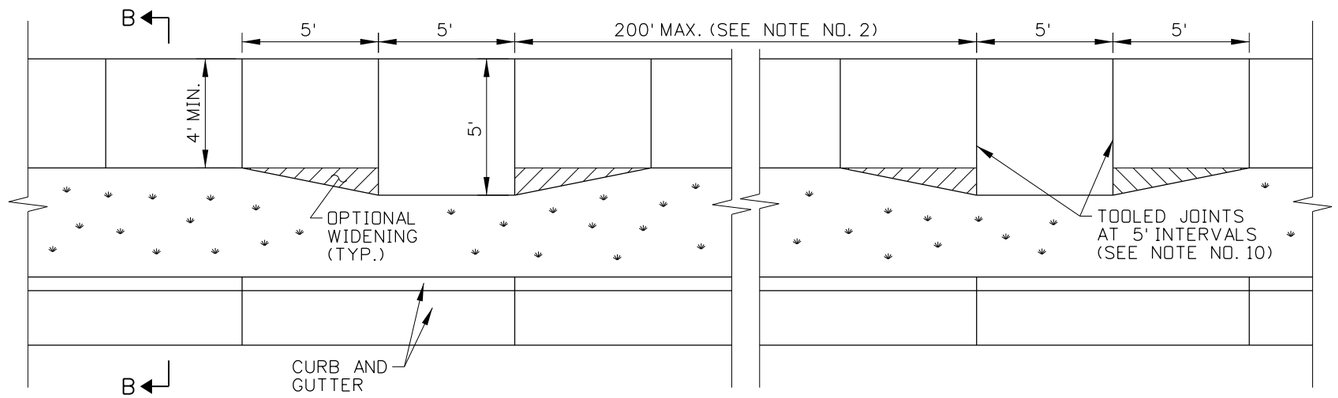
613-1

SHEET 7 OF 7



SIDEWALK ADJACENT TO CURB

SEE NOTE NO. 9

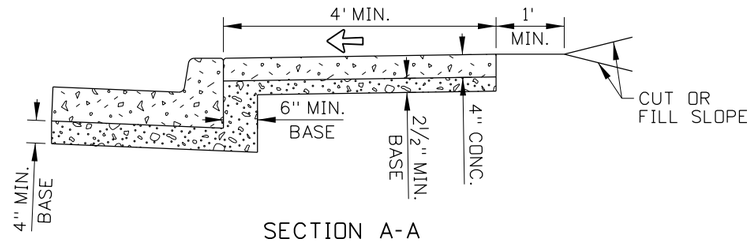


DETACHED SIDEWALK

SYMBOL LEGEND

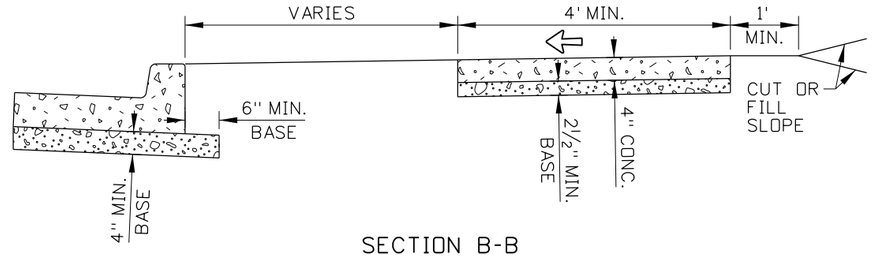
1.0% TO 2.0% SLOPE

5.0% TO 8.3% RUNNING SLOPE, 2.0% OR FLATTER CROSS SLOPE

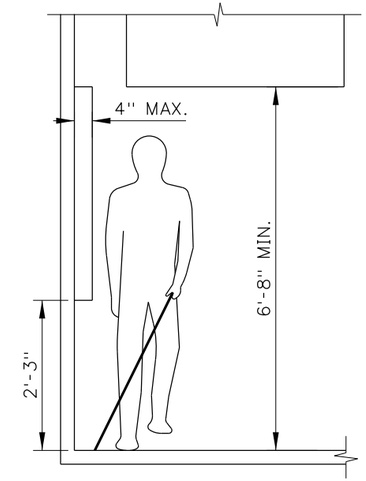


SECTION A-A

SEE NOTE NO. 9

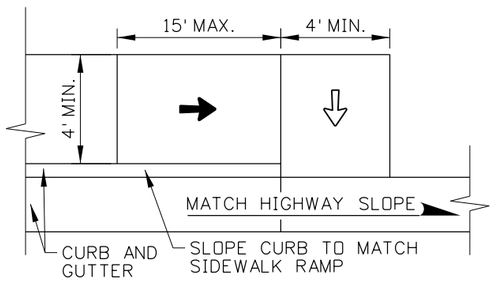


SECTION B-B

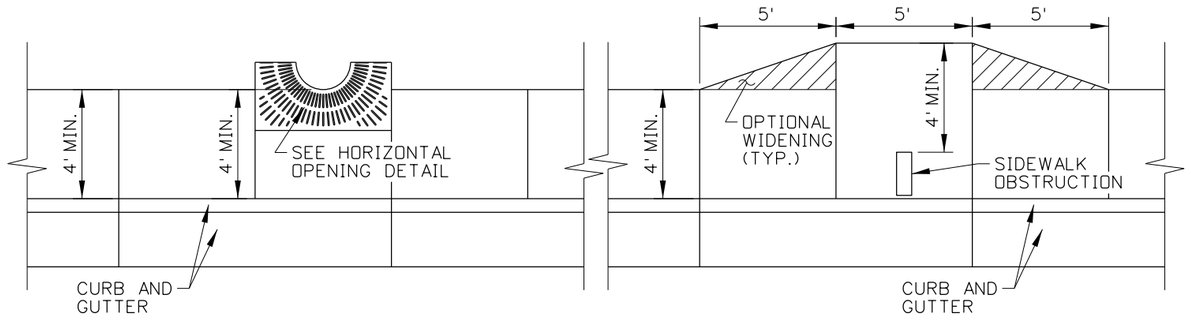


PROTRUDING OBJECT DETAIL

SEE NOTE NO. 7



SIDEWALK TERMINATION DETAIL



WIDENING AROUND OBSTRUCTIONS DETAIL

SEE NOTE NOS. 6 & 7

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO 13683 JUNE 15, 2015 ORIGINAL SIGNED

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-1_0615.dgn

DRAWING DATE: MAY, 2015

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

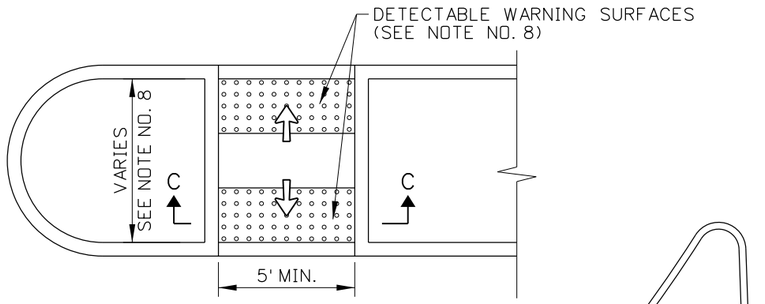
SIDEWALKS

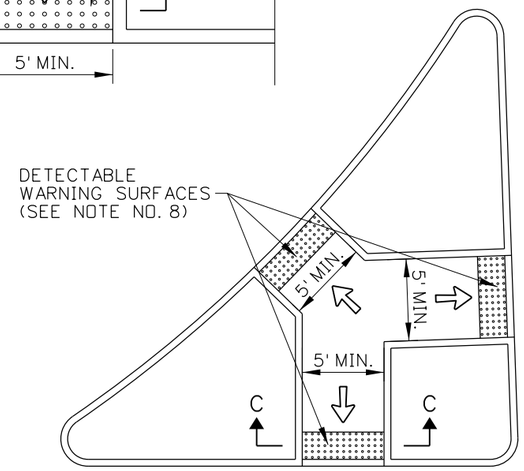
English

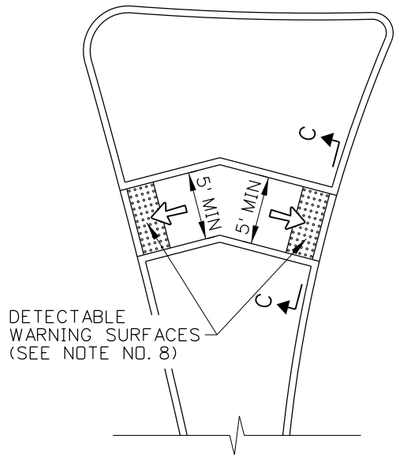
STANDARD DRAWING NO.

614-1

SHEET 1 OF 2





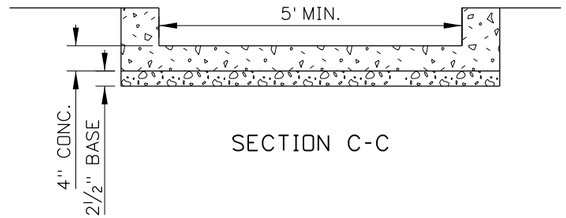


PEDESTRIAN REFUGE ISLAND DETAILS

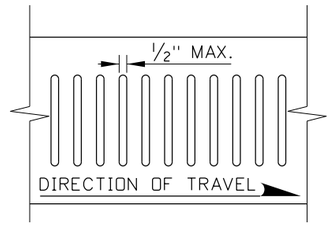
SYMBOL LEGEND

1.0% TO 2.0% SLOPE

5.0% TO 8.3% RUNNING SLOPE,
2.0% OR FLATTER CROSS SLOPE

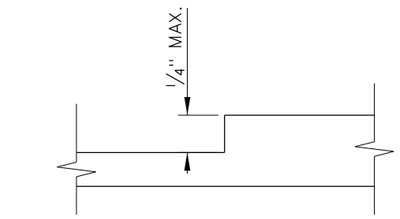


SECTION C-C

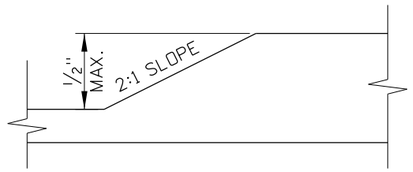


HORIZONTAL OPENING DETAIL

SEE NOTE NO. 6



VERTICAL DISCONTINUITY OF ¼" OR LESS



VERTICAL DISCONTINUITY BETWEEN ¼" AND ½"

VERTICAL SURFACE DISCONTINUITY DETAIL

SEE NOTE NO. 5

NOTES

1. SIDEWALKS MAY CONSIST OF A PEDESTRIAN CIRCULATION PATH AND A PEDESTRIAN ACCESS ROUTE. THE PEDESTRIAN CIRCULATION PATH IS A PREPARED SURFACE PROVIDED FOR PEDESTRIAN TRAVEL IN THE PUBLIC RIGHT-OF-WAY. THE PEDESTRIAN ACCESS ROUTE IS A CONTINUOUS AND UNOBSTRUCTED PATH OF TRAVEL PROVIDED FOR PEDESTRIANS WITH DISABILITIES WITHIN OR COINCIDING WITH A PEDESTRIAN CIRCULATION PATH.
2. PROVIDE AT LEAST 4' OF CONTINUOUS CLEAR WIDTH OF PEDESTRIAN ACCESS ROUTE, EXCLUSIVE OF THE CURB WIDTH. WHERE SIDEWALKS ARE WIDER THAN 4', ONLY A PORTION OF THE SIDEWALK IS REQUIRED TO BE PART OF THE PEDESTRIAN ACCESS ROUTE.

   PROVIDE A PASSING SPACE AT 200' OR SHORTER INTERVALS WHEN THE CLEAR WIDTH OF THE PEDESTRIAN ACCESS ROUTE IS LESS THAN 5'. ENSURE THAT THE DIMENSIONS OF THE PASSING SPACE ARE AT LEAST 5' BY 5'. INTERSECTING SIDEWALKS, DRIVEWAYS, AND ALLEYS MAY BE USED AS PASSING SPACES.
3. ENSURE THAT THE GRADE OF THE PEDESTRIAN ACCESS ROUTE DOES NOT EXCEED THE GENERAL GRADE ESTABLISHED FOR THE ADJACENT HIGHWAY.
4. ENSURE THAT THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE WITHIN THE SIDEWALK DOES NOT EXCEED TWO PERCENT.
5. VERTICAL SURFACE DISCONTINUITIES MAY OCCASIONALLY OCCUR AT EXPANSION JOINTS, UTILITY COVERS, VAULT FRAMES, AND GRATINGS WITHIN THE SIDEWALK. ENSURE THAT VERTICAL SURFACE DISCONTINUITIES DO NOT EXCEED ½". BEVEL VERTICAL SURFACE DISCONTINUITIES BETWEEN ¼" AND ½" WITH A 2:1 SLOPE ACROSS THE ENTIRE VERTICAL SURFACE DISCONTINUITY.
6. ENSURE THAT HORIZONTAL OPENINGS IN GRATINGS AND JOINTS DO NOT PERMIT PASSAGE OF A SPHERE MORE THAN ½" IN DIAMETER.
7. OBJECTS PROTRUDING INTO OR OVERHANGING A PEDESTRIAN CIRCULATION PATH MUST NOT REDUCE THE MINIMUM CLEAR WIDTH OF THE PEDESTRIAN ACCESS ROUTE. PROTRUDING OBJECTS INCLUDE STREET FURNITURE, STREET LIGHTS, UTILITY POLES, EQUIPMENT CABINETS, SIGN POSTS AND SIGNS, PARKING METERS, TRASH RECEPTACLES, PUBLIC TELEPHONES, MAILBOXES, NEWSPAPER VENDING MACHINES, BENCHES, TRANSIT SHELTERS, KIOSKS, BICYCLE RACKS, PLANTERS AND PLANTED TREES, AND STREET SCULPTURES.

   ENSURE THAT OBJECTS WITH LEADING EDGES BETWEEN 2'-3" AND 6'-8" ABOVE THE FINISH SURFACE DO NOT PROTRUDE MORE THAN 4" HORIZONTALLY INTO THE PEDESTRIAN CIRCULATION PATH.
8. PROVIDE DETECTABLE WARNING SURFACES ON PEDESTRIAN REFUGE ISLANDS WITH CURB RAMPS OR WHEN CUT-THROUGH AT STREET LEVEL AND REFUGE ISLAND WIDTHS ARE GREATER THAN SIX FEET IN THE DIRECTION OF PEDESTRIAN TRAVEL. DO NOT INSTALL DETECTABLE WARNING SURFACES AT PEDESTRIAN REFUGE ISLANDS THAT ARE CUT-THROUGH AT STREET LEVEL AND ARE LESS THAN SIX FEET IN WIDTH IN THE DIRECTION OF PEDESTRIAN TRAVEL. SEE STANDARD DRAWING 614-3 FOR DETECTABLE WARNING SURFACE DETAILS.
9. USE A BOND PREVENTATIVE BETWEEN THE SIDEWALK AND CURB WHEN CONSTRUCTED SEPARATELY AND PLACED ADJACENT TO EACH OTHER.
10. ALIGN CURB AND SIDEWALK JOINTS. CONSTRUCT JOINTS AT 5' INTERVALS THAT ARE APPROXIMATELY ⅛" WIDE AND ¾" IN DEPTH. CONSTRUCT A LONGITUDINAL JOINT WHEN THE SIDEWALK IS 8' WIDE OR WIDER. INSTALL A PREFORMED EXPANSION JOINT FILLER EVERY 40'.
11. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
RYAN D. LANCASTER
ORIGINAL SIGNED BY
JUNE 15, 2015
13683
STATE OF IDAHO
RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-1_0615.dgn

DRAWING DATE: MAY, 2015

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

SIDEWALKS

English

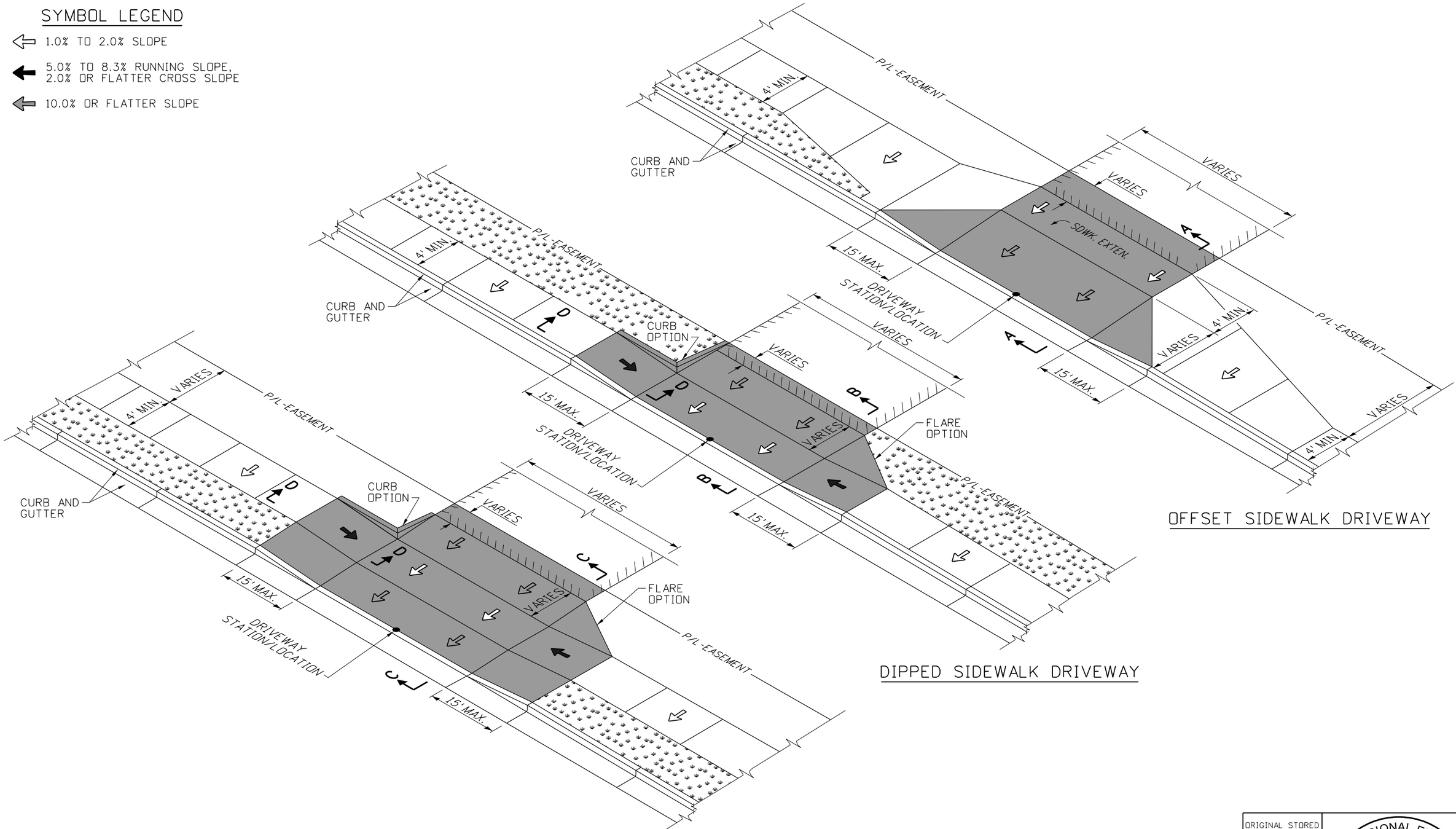
STANDARD DRAWING NO.

614-1

SHEET 2 OF 2

SYMBOL LEGEND

- 1.0% TO 2.0% SLOPE
- 5.0% TO 8.3% RUNNING SLOPE, 2.0% OR FLATTER CROSS SLOPE
- 10.0% OR FLATTER SLOPE



OFFSET SIDEWALK DRIVEWAY

DIPPED SIDEWALK DRIVEWAY

COMBINATION DRIVEWAY

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO JUNE 15, 2015 13683 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	11-90	GB	6	05-06	MSM			
2	09-93	MSM	7	05-07	MSM			
3	12-94	MSM	8	07-10	JAW			
4	09-02	MSM	9	04-15	EG			
5	06-04	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-2_0615.dgn

DRAWING DATE: APRIL, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

DRIVEWAYS

English

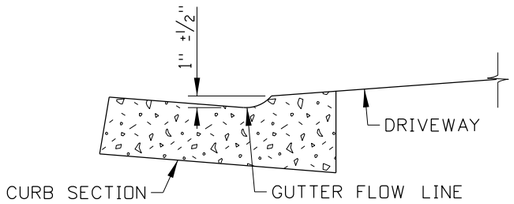
STANDARD DRAWING NO.

614-2

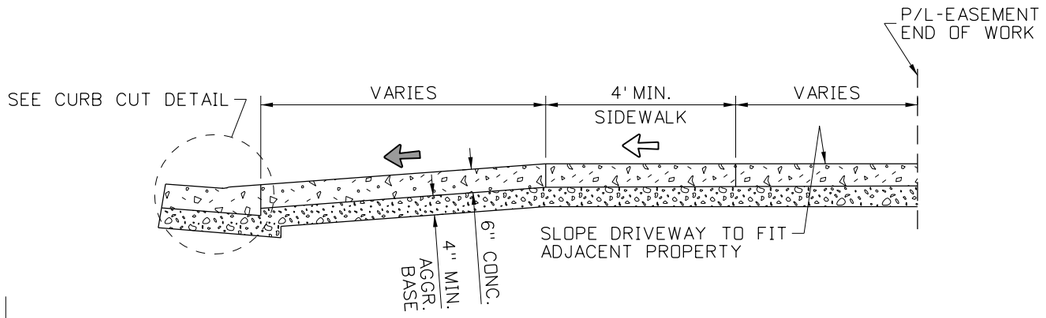
SHEET 1 OF 2

SYMBOL LEGEND

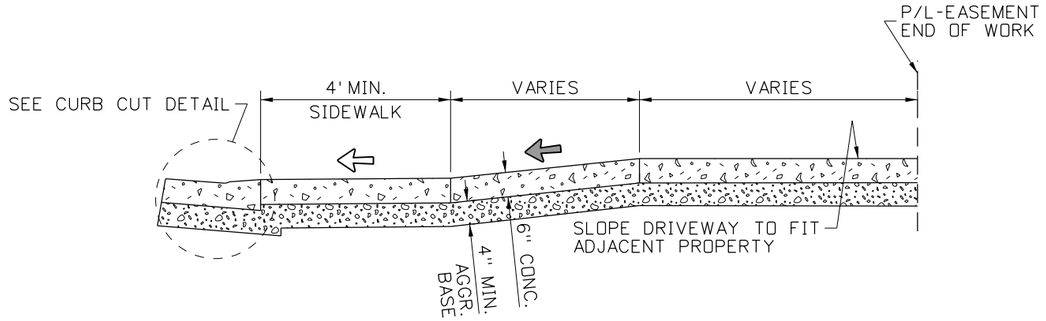
- 1.0% TO 2.0% SLOPE
- 5.0% TO 8.3% RUNNING SLOPE, 2.0% OR FLATTER CROSS SLOPE
- 10.0% OR FLATTER SLOPE



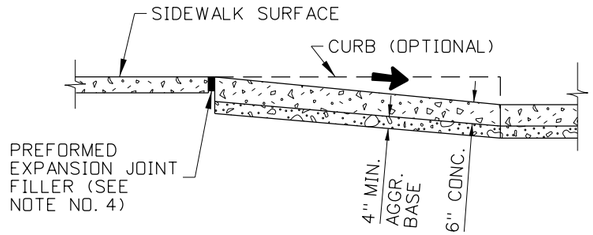
CURB CUT DETAIL



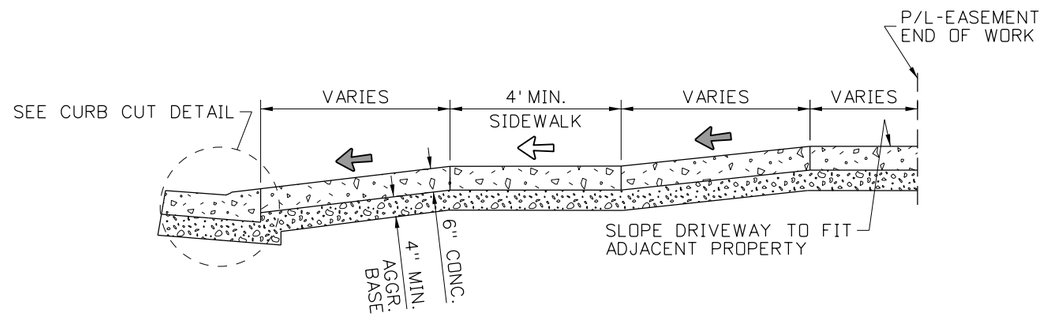
SECTION A-A



SECTION B-B



SECTION D-D



SECTION C-C

NOTES

1. EXTENTS OF DRIVEWAY PAY ITEMS ARE SHOWN IN GRAY SHADING.
2. SEE THE SIDEWALKS STANDARD DRAWING FOR NOTES RELATED TO THE PEDESTRIAN ACCESS ROUTE.
3. DO NOT PLACE DETECTABLE WARNING SURFACES ON DRIVEWAYS.
4. USE A BOND PREVENTATIVE BETWEEN THE DRIVEWAY OR SIDEWALK AND CURB WHEN CONSTRUCTED SEPARATELY AND PLACED ADJACENT TO EACH OTHER.
5. ALIGN ALTERNATING CURB AND SIDEWALK JOINTS. CONSTRUCT DRIVEWAY AND SIDEWALK JOINTS AT 5' INTERVALS THAT ARE APPROXIMATELY 1/8" WIDE AND 3/4" IN DEPTH.
6. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER JUNE 15, 2015 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	11-90	GB	6	05-06	MSM			
2	09-93	MSM	7	05-07	MSM			
3	12-94	MSM	8	07-10	JAW			
4	09-02	MSM	9	04-15	EG			
5	06-04	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-2_0615.dgn

DRAWING DATE: APRIL, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

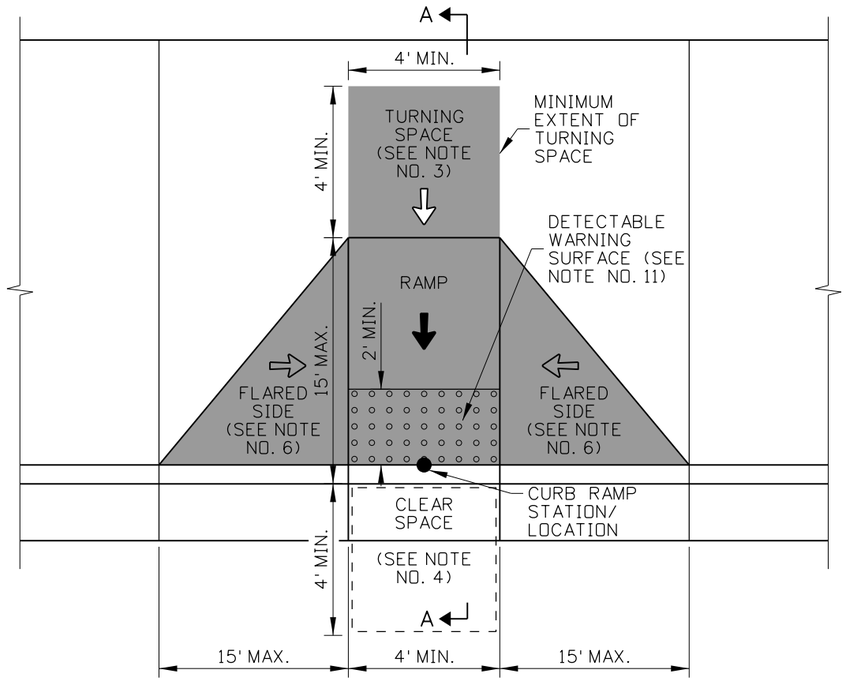
DRIVEWAYS

English

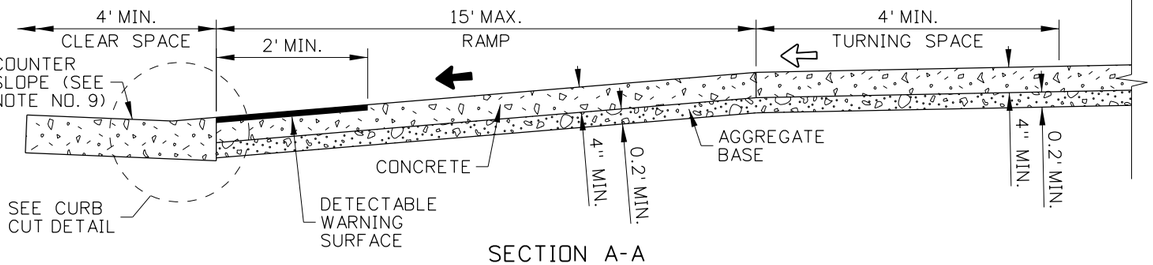
STANDARD DRAWING NO.

614-2

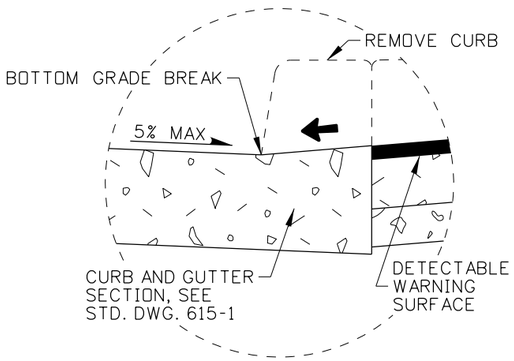
SHEET 2 OF 2



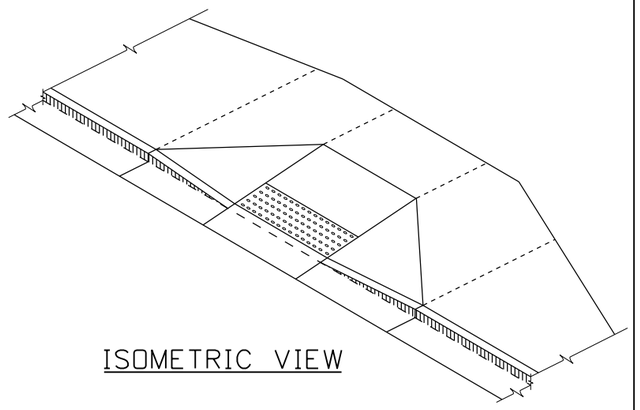
PERPENDICULAR CURB RAMP



SECTION A-A



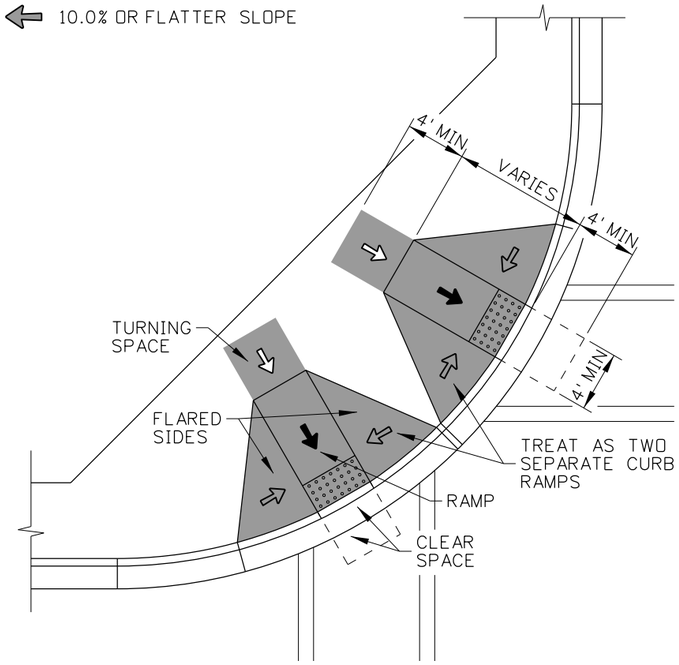
CURB CUT DETAIL

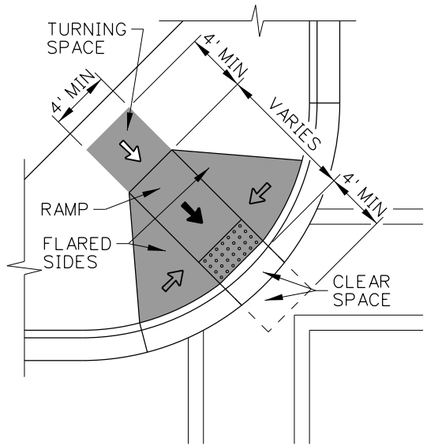


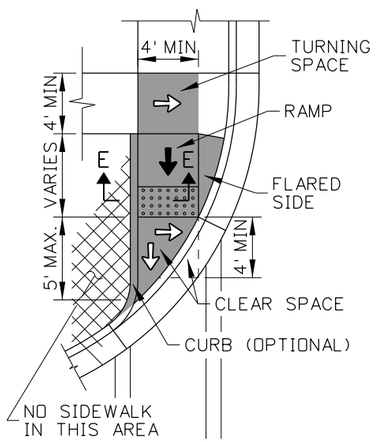
ISOMETRIC VIEW

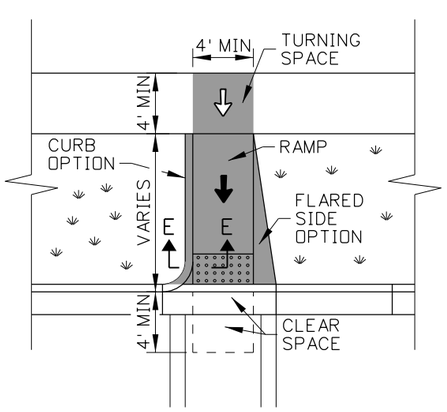
SYMBOL LEGEND

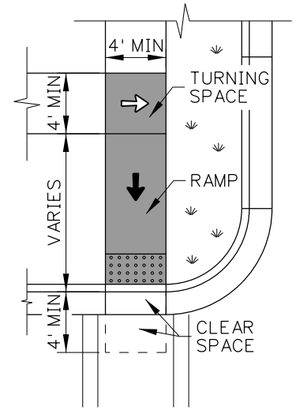
- 1.0% TO 2.0% SLOPE
- 5.0% TO 8.3% RUNNING SLOPE, 2.0% OR FLATTER CROSS SLOPE
- 10.0% OR FLATTER SLOPE











EXAMPLE APPLICATIONS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE ORIGINAL SIGNED JUNE 15, 2015 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-93	MSM	6	07-03	MSM	11	07-10	JAW
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3	06-98	MSM	8	06-05	MSM	13	05-15	RDL
4	08-01	MSM	9	05-06	MSM			
5	10-02	MSM	10	05-07	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-3_0615.dgn

DRAWING DATE: JUNE, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

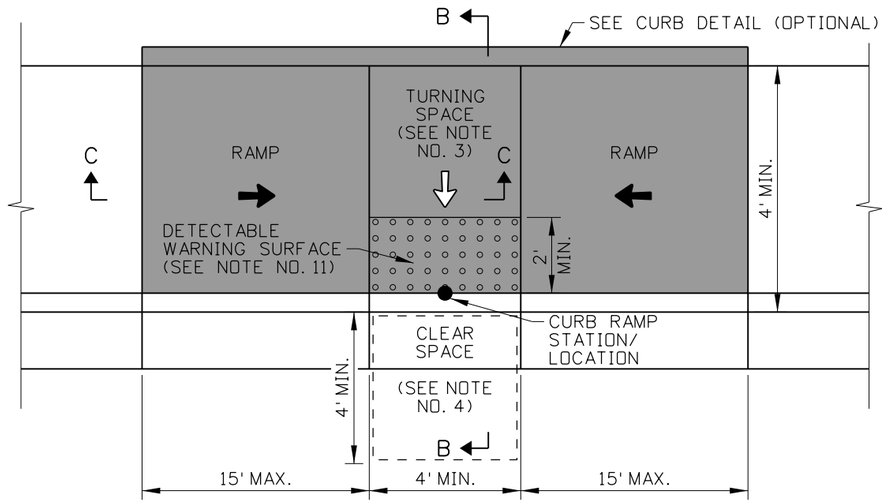
STANDARD DRAWING

CURB RAMPS

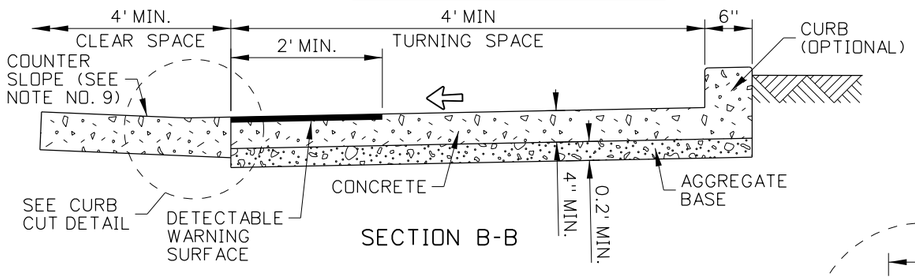
English

STANDARD DRAWING NO.

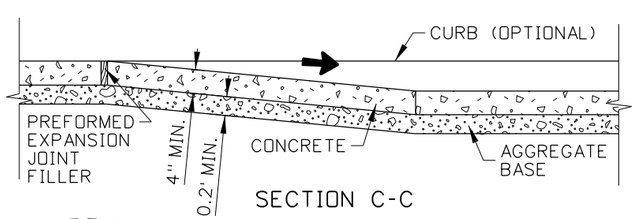
614-3



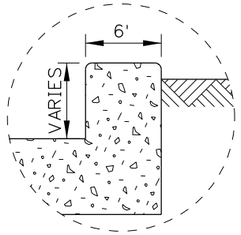
PARALLEL CURB RAMP



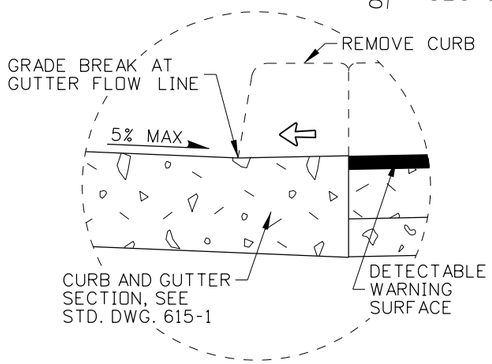
SECTION B-B



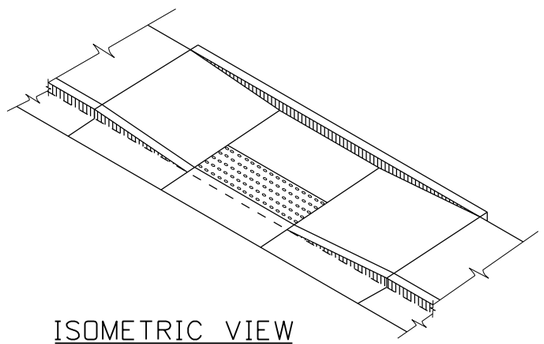
SECTION C-C



CURB DETAIL



CURB CUT DETAIL



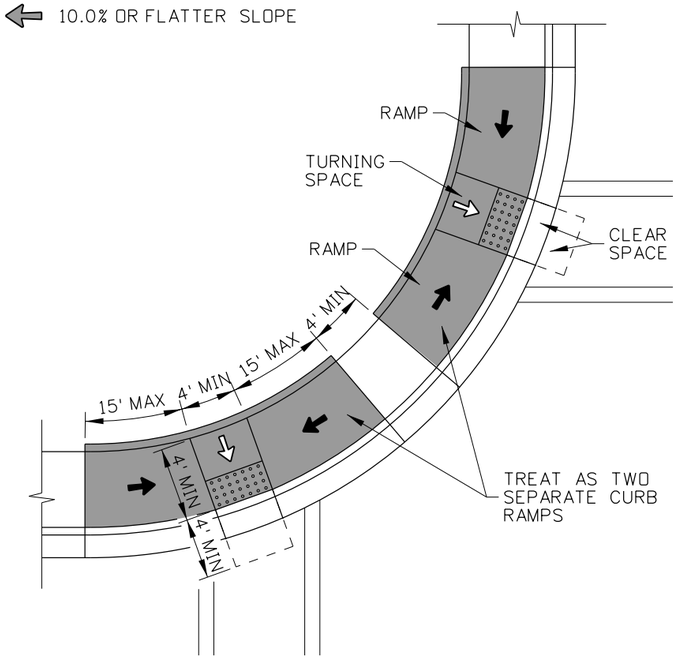
ISOMETRIC VIEW

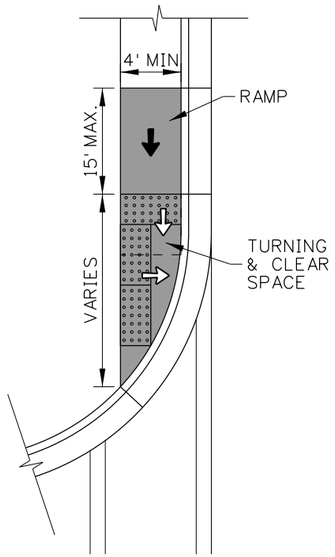
SYMBOL LEGEND

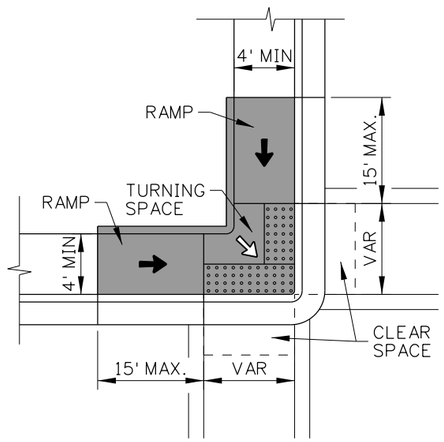
1.0% TO 2.0% SLOPE

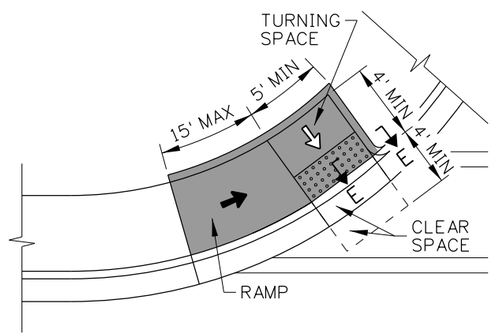
5.0% TO 8.3% RUNNING SLOPE, 2.0% OR FLATTER CROSS SLOPE

10.0% OR FLATTER SLOPE









EXAMPLE APPLICATIONS

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PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE OF ORIGINAL SIGNATURE JUNE 15, 2015 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-93	MSM	6	07-03	MSM	11	07-10	JAW
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4	08-01	MSM	9	05-06	MSM			
5	10-02	MSM	10	05-07	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-3_0615.dgn

DRAWING DATE: JUNE, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

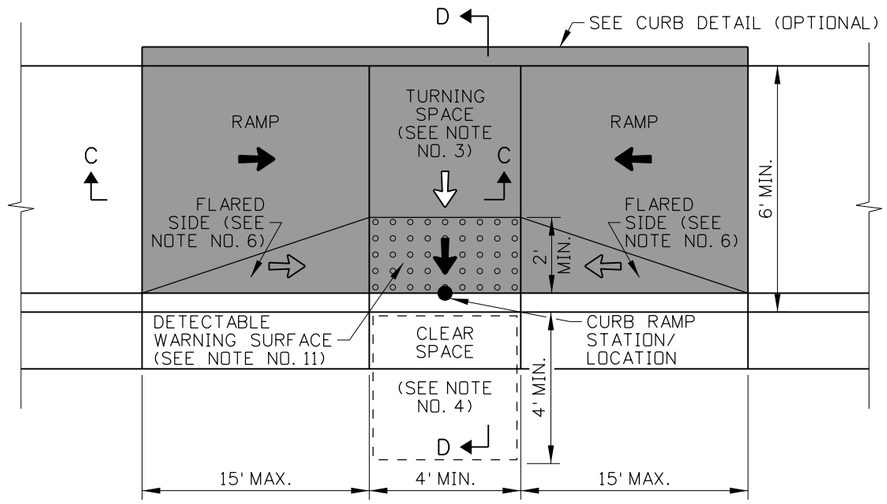
STANDARD DRAWING

CURB RAMPS

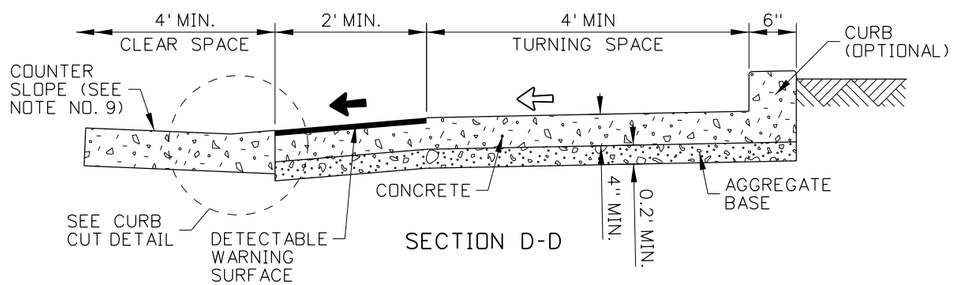
English

STANDARD DRAWING NO.

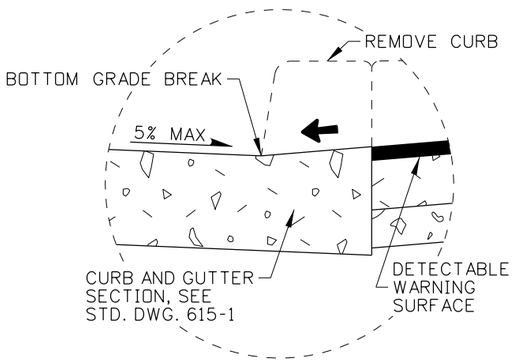
614-3



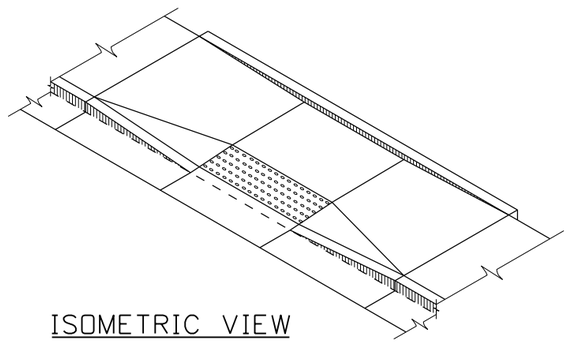
COMBINATION CURB RAMP



SECTION D-D



CURB CUT DETAIL



ISOMETRIC VIEW

SYMBOL LEGEND

- 1.0% TO 2.0% SLOPE
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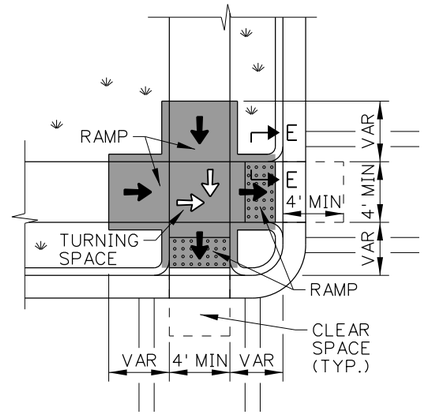
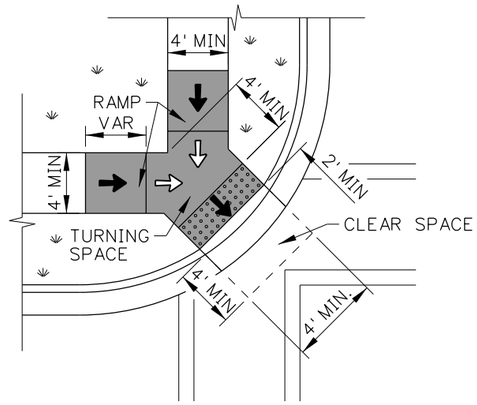
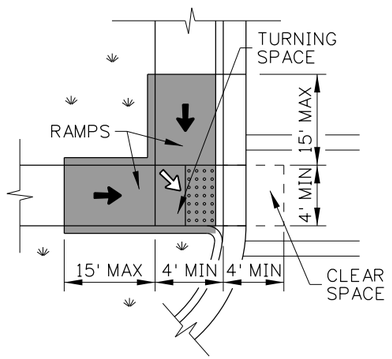
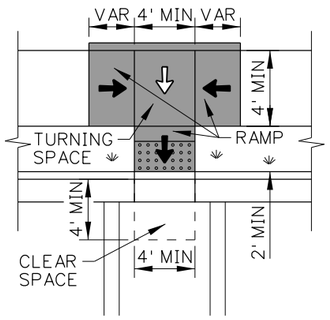
- 10.0% OR FLATTER SLOPE









EXAMPLE APPLICATIONS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER JUNE 15, 2015 STATE OF IDAHO 13683 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-93	MSM	6	07-03	MSM	11	07-10	JAW
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3	06-98	MSM	8	06-05	MSM	13	05-15	RDL
4	08-01	MSM	9	05-06	MSM			
5	10-02	MSM	10	05-07	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-3_0615.dgn

DRAWING DATE: JUNE, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

CURB RAMPS

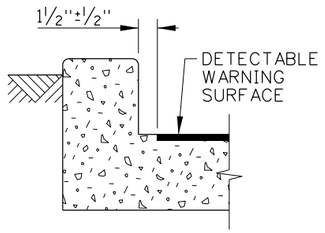
English

STANDARD DRAWING NO.

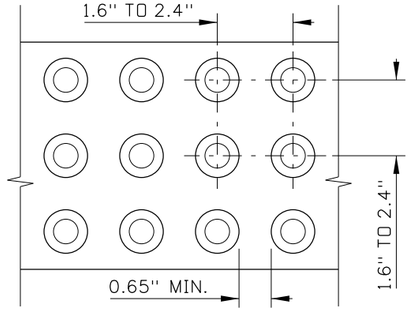
614-3

SYMBOL LEGEND

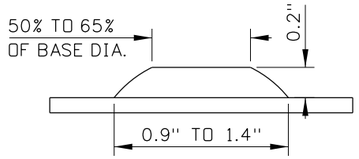
- 1.0% TO 2.0% SLOPE
- 5.0% TO 8.3% RUNNING SLOPE, 2.0% OR FLATTER CROSS SLOPE
- 10.0% OR FLATTER SLOPE



SECTION E-E

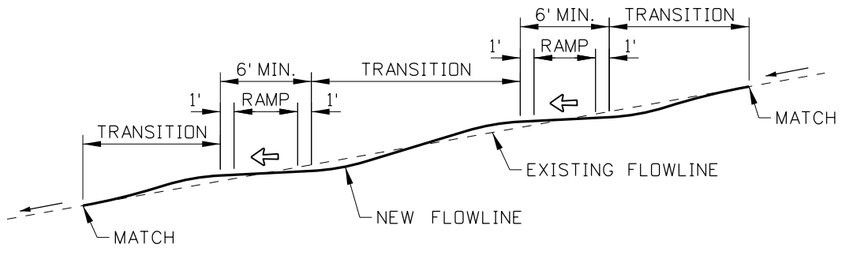


DOME SPACING



DOME SIZE

PLAN



PROFILE

FLOWLINE PROFILE DETAIL
SEE NOTE NO. 5

DETECTABLE WARNING SURFACE DETAILS
SEE NOTE NO. 11

NOTES

1. EXTENTS OF CURB RAMP PAY ITEMS ARE SHOWN IN GRAY SHADING.
2. CURB RAMPS CAN BE PERPENDICULAR, PARALLEL, OR A COMBINATION OF PARALLEL AND PERPENDICULAR RAMPS. EXAMPLE APPLICATIONS OF EACH ARE SHOWN ON SHEETS 1, 2, AND 3.
   PERPENDICULAR CURB RAMPS HAVE A RAMP THAT CUTS THROUGH THE CURB AT RIGHT ANGLES OR MEETS THE GUTTER GRADE BREAK AT RIGHT ANGLES WHEN THE CURB IS CURVED.
   PARALLEL CURB RAMPS HAVE A RAMP OR RAMPS IN-LINE WITH THE DIRECTION OF SIDEWALK TRAVEL AND LOWER THE SIDEWALK TO A LEVEL TURNING SPACE WHERE A TURN IS MADE TO ENTER THE PEDESTRIAN STREET CROSSING.
   COMBINATION CURB RAMPS HAVE FEATURES FROM PERPENDICULAR AND PARALLEL CURB RAMPS.
3. PROVIDE A TURNING SPACE WITH A 2.0% OR FLATTER SLOPE IN EACH DIRECTION. TURNING SPACES MAY OVERLAP WITH OTHER TURNING SPACES AND CLEAR SPACES.
   PERPENDICULAR CURB RAMP:
   PROVIDE A 4' BY 5' MINIMUM TURNING SPACE WHEN THE TURNING SPACE IS CONSTRAINED AT THE BACK-OF-SIDEWALK.
   PARALLEL CURB RAMP:
   PROVIDE A 4' BY 5' TURNING SPACE WHEN THE TURNING SPACE IS CONSTRAINED ON TWO OR MORE SIDES. ENSURE THAT THE 5' DIMENSION IS PROVIDED IN THE DIRECTION OF THE PEDESTRIAN STREET CROSSING.
4. PROVIDE A CLEAR SPACE BEYOND THE BOTTOM OF THE GRADE BREAK THAT IS WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAFFIC LANE.
5. CROSS SLOPE IS THE SLOPE PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL. ENSURE THAT THE CROSS SLOPE OF THE RAMP AND TURNING SPACE DOES NOT EXCEED TWO PERCENT. AT PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL AND AT MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE MAY MATCH THE STREET OR HIGHWAY GRADE. FLATTEN THE GUTTER FLOWLINE THROUGH CURB RAMPS TO TWO PERCENT OR FLATTER WHEN NEEDED. WHEN THE PAVEMENT IS SAWCUT TO FLATTEN THE FLOWLINE, VARY THE WIDTH OF THE SAWCUT SO THAT THE PAVEMENT PATCH SMOOTHLY MATCHES THE EXISTING PAVEMENT.
6. PROVIDE FLARED SIDES ON PERPENDICULAR CURB RAMPS, OR COMBINATION CURB RAMPS WHERE A PEDESTRIAN CIRCULATION PATH CROSSES THE CURB RAMP. THE FLARED SIDES ARE PART OF THE PEDESTRIAN CIRCULATION PATH, BUT ARE NOT PART OF THE PEDESTRIAN ACCESS ROUTE. THE SLOPE OF THE FLARED SIDES IS MEASURED PARALLEL TO THE CURB LINE. FLARED SIDES ARE NOT NEEDED OR MAY BE STEEPER WHEN THE PEDESTRIAN CIRCULATION PATH DOES NOT CROSS THE CURB RAMP.
7. THE PEDESTRIAN CIRCULATION PATH IS A PREPARED SURFACE PROVIDED FOR PEDESTRIAN TRAVEL IN THE PUBLIC RIGHT-OF-WAY. THE PEDESTRIAN ACCESS ROUTE IS A CONTINUOUS AND UNOBSTRUCTED PATH OF TRAVEL PROVIDED FOR PEDESTRIANS WITH DISABILITIES WITHIN OR COINCIDING WITH A PEDESTRIAN CIRCULATION PATH.
8. ENSURE THAT GRADE BREAKS ARE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN AND ARE FLUSH. DO NOT CREATE GRADE BREAKS ON THE SURFACE OF RAMP RUNS AND TURNING SPACES.
9. ENSURE THAT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMPS RUNS DOES NOT EXCEED FIVE PERCENT.
10. WHERE PRACTICAL, PLACE UTILITY COVERS, VAULT FRAMES, AND GRATINGS OUTSIDE RAMP RUNS, TURNING SPACES, OR GUTTER AREAS. LOCATE CATCH BASINS AND INLETS OUTSIDE OF RAMP RUNS.
11. DETECTABLE WARNING SURFACES CONSIST OF TRUNCATED DOMES ALIGNED IN A SQUARE OR RADIAL GRID PATTERN. PROVIDE DETECTABLE WARNING SURFACES THAT CONTRAST VISUALLY WITH ADJACENT GUTTER, HIGHWAY, OR PEDESTRIAN ACCESS ROUTE SURFACE, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT. ENSURE THAT THE DETECTABLE WARNING SURFACE EXTENDS THE FULL WIDTH OF THE RAMP RUN (EXCLUDING FLARED SIDES) OR TURNING SPACE.
    PERPENDICULAR AND COMBINATION CURB RAMPS:
    WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE IN FRONT OF THE BACK OF CURB, PLACE THE DETECTABLE WARNING SURFACE AT THE BACK OF CURB.
    WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB, PLACE THE DETECTABLE WARNING SURFACE ON THE RAMP RUN WITHIN ONE DOME SPACING OF THE BOTTOM GRADE BREAK AND WITHIN 5' OF THE BACK OF CURB.
    PARALLEL CURB RAMP:
    PLACE DETECTABLE WARNING SURFACE ON THE TURNING SPACE AT THE BACK OF CURB.
12. USE A BOND PREVENTATIVE BETWEEN THE CURB RAMP OR SIDEWALK AND CURB WHEN CONSTRUCTED SEPARATELY AND PLACED ADJACENT TO EACH OTHER.
13. ALIGN ALTERNATING CURB AND SIDEWALK JOINTS. CONSTRUCT JOINTS APPROXIMATELY ⅛" WIDE AND ¾" IN DEPTH.
14. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO 13683 JUNE 15, 2015 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-93	MSM	6	07-03	MSM	11	07-10	JAW
2	12-95	MSM	7	12-04	MSM	12	09-11	TEM
3	06-98	MSM	8	06-05	MSM	13	05-15	RDL
4	08-01	MSM	9	05-06	MSM			
5	10-02	MSM	10	05-07	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 614-3_0615.dgn

DRAWING DATE: JUNE, 1990

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

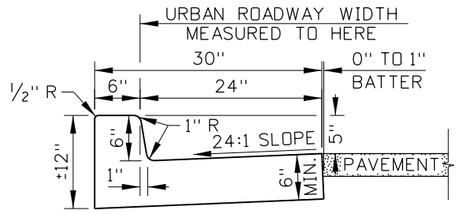
CURB RAMPS

English

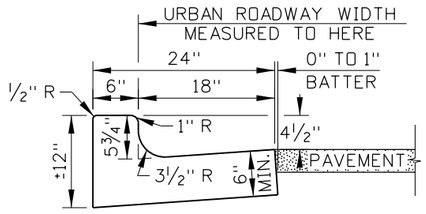
STANDARD DRAWING NO.

614-3

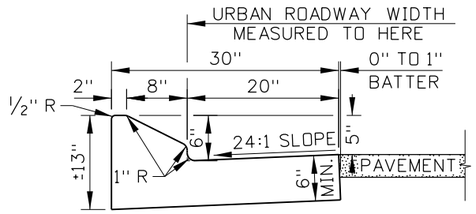
SHEET 4 OF 4



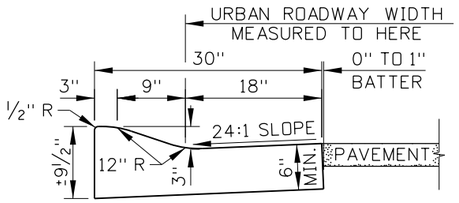
CURB AND GUTTER TYPE 1



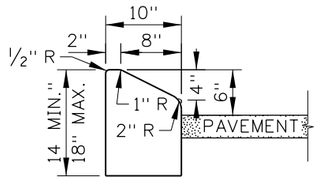
CURB AND GUTTER TYPE 2
(SEE NOTE NO. 4)



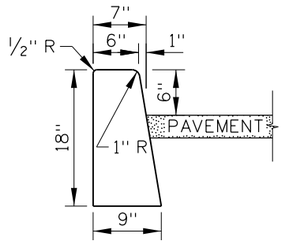
CURB AND GUTTER TYPE 3



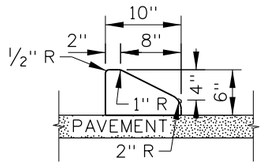
CURB AND GUTTER TYPE 4



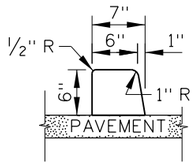
CURB TYPE 1



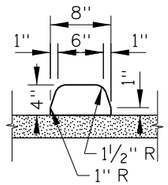
CURB TYPE 2



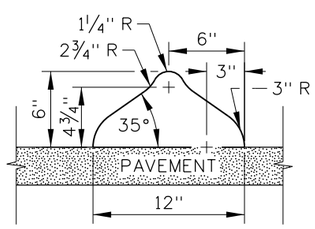
CURB TYPE 3
(SEE NOTE NO. 3)



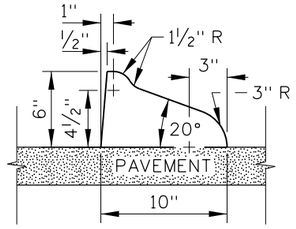
CURB TYPE 4
(SEE NOTE NO. 3)



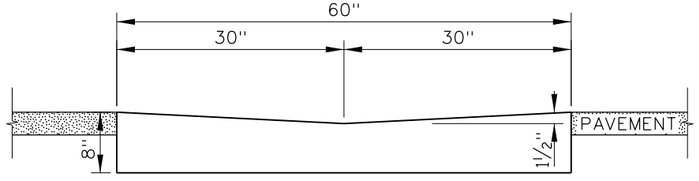
CURB TYPE 5
(SEE NOTE NO. 3)



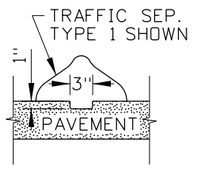
TRAFFIC SEPARATOR TYPE 1
(SEE NOTE NO. 3)



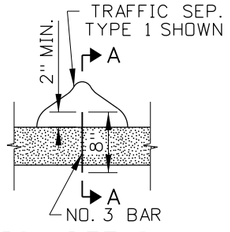
TRAFFIC SEPARATOR TYPE 2
(SEE NOTE NO. 3)



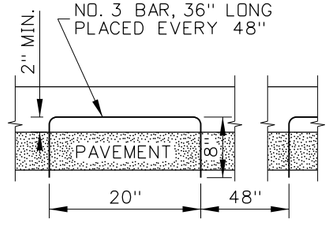
GUTTER TYPE 1



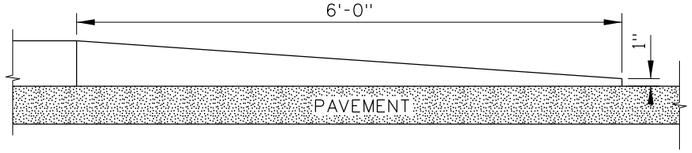
KEY DETAIL
(SEE NOTE NO. 3)



PIN DETAIL
(SEE NOTE NO. 3)



SECTION A-A



CURB TERMINUS DETAIL
(SEE NOTE NO. 5)

NOTES

1. TRANSITION BETWEEN DIFFERENT TYPES OVER 10 FEET.
2. PROVIDE 4 INCHES OF AGGREGATE BASE UNDER CURB AND GUTTER, CURB, OR GUTTER UNLESS THE CURB IS PLACED ON PAVEMENT.
3. PORTLAND CEMENT CONCRETE CURB OR TRAFFIC SEPARATOR ON ASPHALT CONCRETE PAVEMENT:

   PROVIDE A KEY IN THE PAVEMENT AT THE CENTERLINE OF THE CURB OR TRAFFIC SEPARATOR. SEE THE KEY DETAIL.

   CONCRETE CURBS OR TRAFFIC SEPARATORS MAY BE PINNED TO THE PAVEMENT STRUCTURE IN LIEU OF THE KEY. DRILL THE PAVEMENT AND PLACE PINS BEFORE THE CURB OR TRAFFIC SEPARATOR IS CONSTRUCTED. SEE THE PIN DETAIL.

   PORTLAND CEMENT CONCRETE CURB OR TRAFFIC SEPARATOR ON PORTLAND CEMENT CONCRETE PAVEMENT:

   USE AN EPOXY BONDING AGENT. NO KEY IS NEEDED.

   ASPHALT CONCRETE CURB OR TRAFFIC SEPARATOR ON ASPHALT CONCRETE PAVEMENT:

   NO KEY IS NEEDED. ENSURE THAT THE CURB IS BONDED TO THE PAVEMENT.
4. ENSURE THAT THE GUTTER SLOPE DOES NOT EXCEED 5 PERCENT AT CURB RAMPS.
5. TAPER THE LAST 6 FEET OF CURB AND GUTTER TYPES 1, 2, 3, AND 4 AND CURB TYPES 1 AND 2 DOWN TO A 1 INCH HEIGHT. TAPER CURB TYPES 3, 4, AND 5 AND TRAFFIC SEPARATORS TYPES 1 AND 2 DOWN TO A 1 INCH HEIGHT AT A 1:1 SLOPE.
6. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED
RYAN D. LANCASTER
AUGUST 22, 2018
13683
STATE OF IDAHO

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-76		6	12-04	MSM	11	07-18	RDL
2	12-90	GB	7	06-05	MSM			
3	09-93	MSM	8	07-10	JAW			
4	12-94	MSM	9	11-14	RDL			
5	12-01	MSM	10	06-17	RDL			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 615-1_0818.dgn

DRAWING DATE: APRIL, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

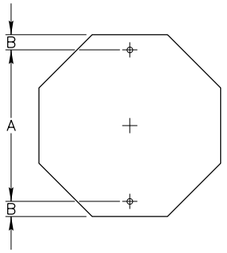
CURB AND GUTTER

English

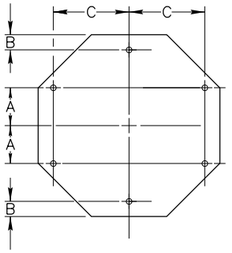
STANDARD DRAWING NO.

615-1

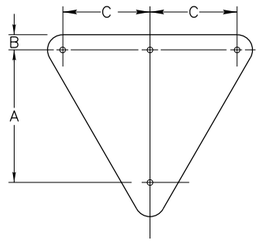
SHEET 1 OF 1



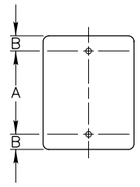
SIGN SIZE	A	B
30"X30"	24"	3"



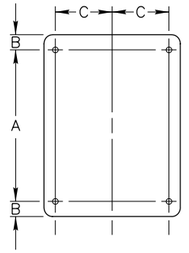
SIGN SIZE	A	B	C
36"X36"	8"	3"	12"
48"X48"	10"	—	20"



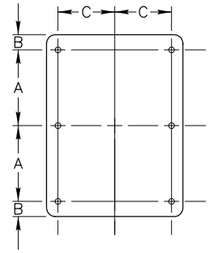
SIGN SIZE	A	B	C
30"X30"	18"	3"	—
36"X36"	23"	3"	—
48"X48"	25"	3"	17"
60"X60"	35"	4"	23"



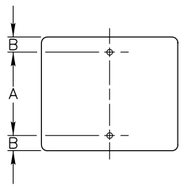
SIGN SIZE	A	B
6"X12"	9"	1½"
6"X18"	15"	1½"
9"X12"	9"	1½"
12"X18"	15"	1½"
12"X30"	24"	3"
12"X36"	32"	2"
18"X24"	18"	3"
24"X30"	24"	3"
24"X36"	30"	3"
30"X36"	30"	3"



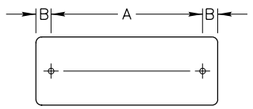
SIGN SIZE	A	B	C
36"X36"	30"	3"	15"
36"X48"	42"	3"	15"
48"X30"	24"	3"	15"
48"X36"	30"	3"	15"
60"X36"	30"	3"	21"



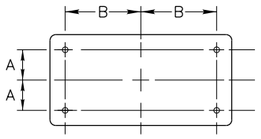
SIGN SIZE	A	B	C
48"X60"	27"	3"	15"



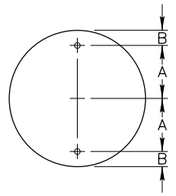
SIGN SIZE	A	B
12"X6"	3"	1½"
18"X9"	6"	1½"
18"X12"	9"	1½"
18"X18"	15"	1½"
21"X15"	12"	1½"
24"X6"	3"	1½"
24"X10"	7"	1½"
24"X12"	9"	1½"
24"X18"	15"	1½"
24"X24"	18"	3"
30"X18"	12"	3"
30"X24"	18"	3"
30"X30"	24"	3"
36"X24"	18"	3"
36"X30"	24"	3"
42"X24"	18"	3"
42"X30"	24"	3"
42"X36"	30"	3"



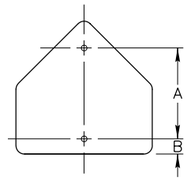
SIGN SIZE	A	B
30"X15"	24"	3"
36"X12"	30"	3"
36"X18"	24"	6"
48"X12"	42"	3"
48"X18"	42"	3"
54"X18"	48"	3"



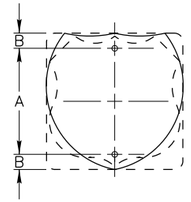
SIGN SIZE	A	B
48"X24"	9"	20"



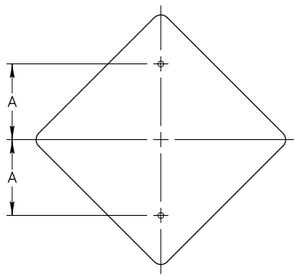
SIGN SIZE	A	B
36"	15"	3"
48"	21"	3"



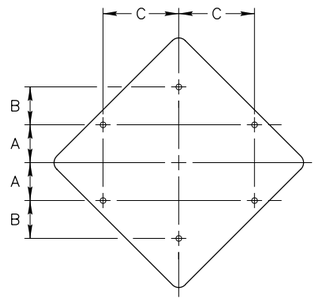
SIGN SIZE	A	B
30"X30"	21"	3"
36"X36"	24"	3"



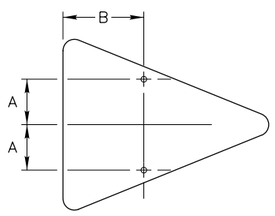
SIGN SIZE	A	B
24"X24"	18"	3"
30"X24"	18"	3"



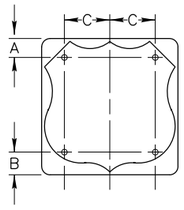
SIGN SIZE	A
18"X18"	10"
24"X24"	12"
30"X30"	15"



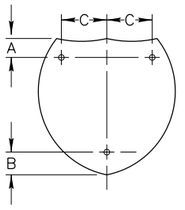
SIGN SIZE	A	B	C
36"X36"	8"	10"	12"
48"X48"	10"	—	20"



SIGN SIZE	A	B
36"X48"	9"	16"



SIGN SIZE	A	B	C
36"X36"	5"	6"	12"



SIGN SIZE	A	B	C
36"X36"	5"	6"	12"
45"X36"	5"	6"	16"

NOTES:

1. ALL MOUNTING HOLES SHALL BE ⅜" DIAMETER.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO 13683 MANUAL SIGNATURE OR AUTHENTICATED DIGITAL SIGNATURE JULY 1, 2017 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-01	NQB						
2	06-07	HEB						
3	07-14	HEB						
4	05-17	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-1_0517.dgn

DRAWING DATE: DECEMBER, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

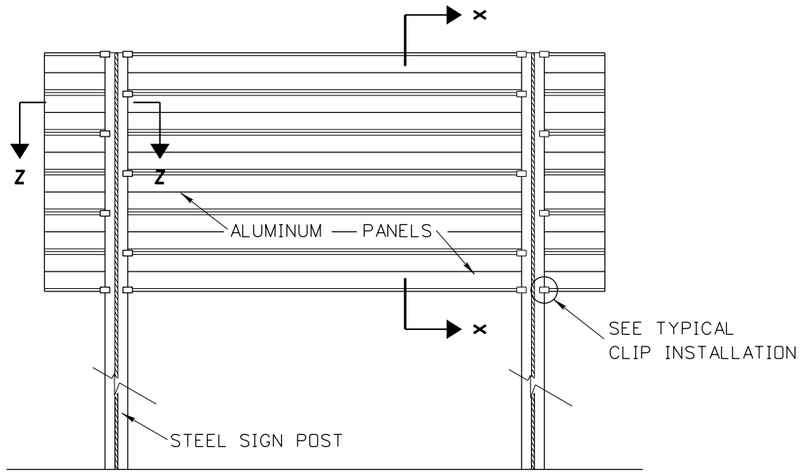
STANDARD DRAWING

PUNCHING SCHEDULE FOR TYPE "B" OR TYPE "E" SIGNS

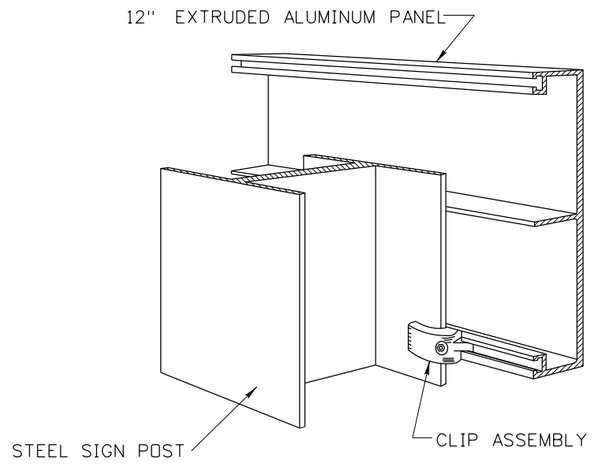
English

STANDARD DRAWING NO. 616-1

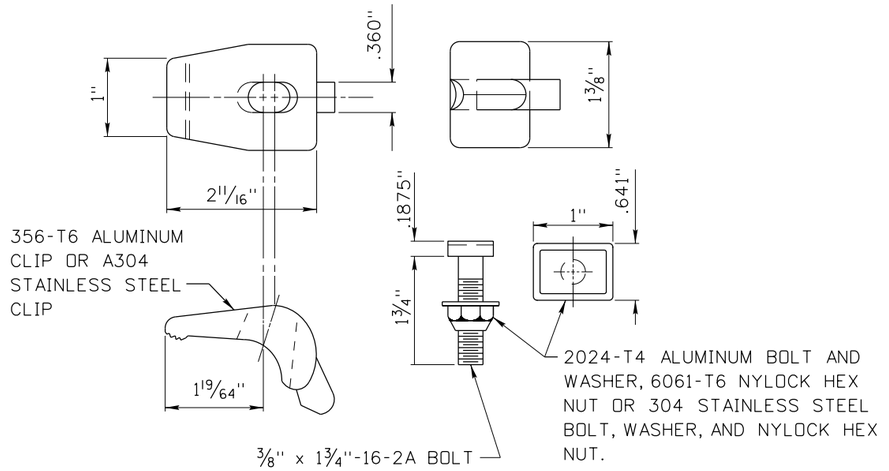
SHEET 1 OF 1



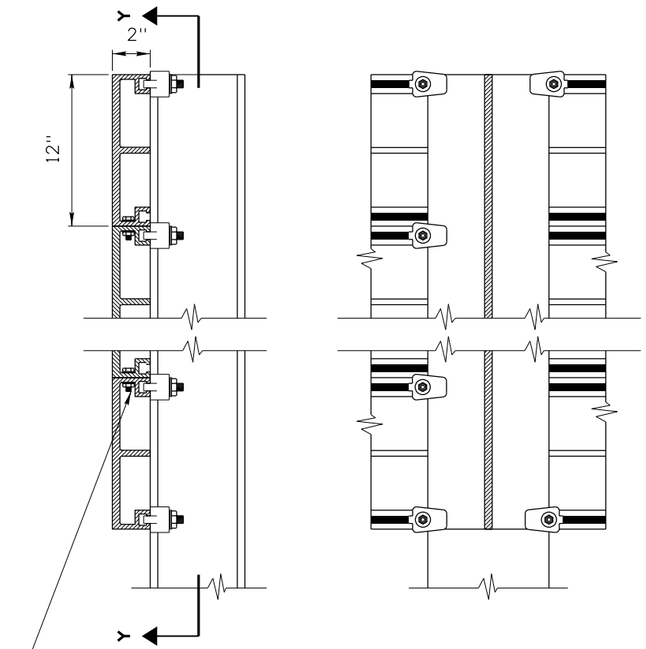
EXTRUDED ALUMINUM SIGN



TYPICAL CLIP INSTALLATION

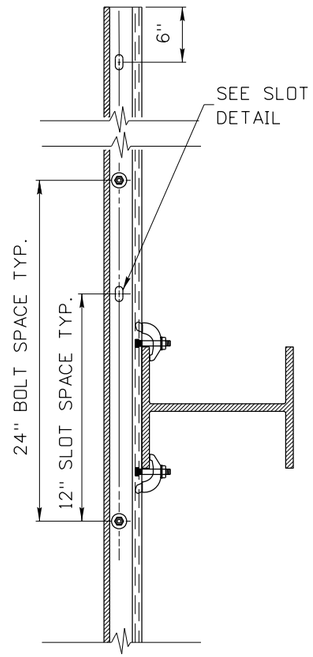


POST CLIPS AND POST CLIP BOLT DETAIL



SECTION X-X

SECTION Y-Y

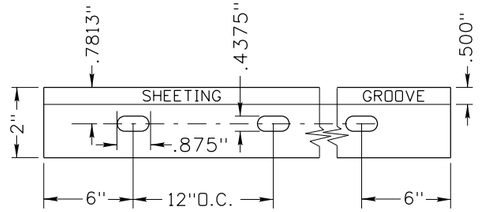


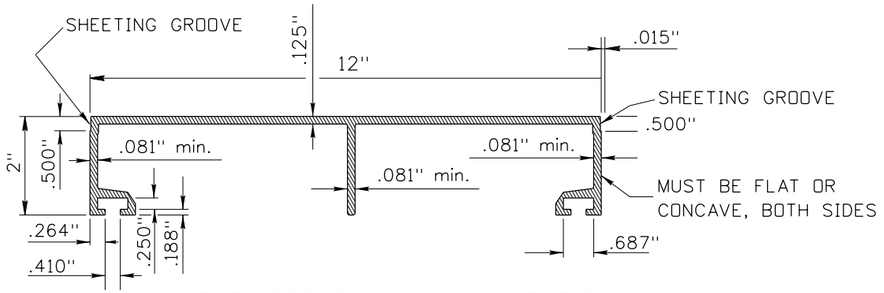
SECTION Z-Z

3/8" DIA. X 3/4" LENGTH
2024-T4 ALUMINUM BOLT AND
TWO FLAT WASHERS, ONE
7075-T6 LOCK WASHER, AND A
6061-T6 HEX NUT OR 304
STAINLESS STEEL BOLT, WASHER,
AND NYLOCK HEX NUT.

Sign Height	No. of 12" Panels	No. of Clip Assem.
2'-0"	2	10
3'-0"	3	12
4'-0"	4	14
5'-0"	5	16
6'-0"	6	18
7'-0"	7	20
8'-0"	8	22
9'-0"	9	24
10'-0"	10	26
11'-0"	11	28
12'-0"	12	30
13'-0"	13	32
14'-0"	14	34
15'-0"	15	36
16'-0"	16	38
17'-0"	17	40

SLOT HOLE DETAIL





12" EXTRUDED PANEL CROSS SECTION

NOTES:

1. ASSEMBLE EXTRUDED ALUMINUM SIGN PANELS STARTING WITH THE TOP PANEL. CENTER THE PANEL ON THE SIGN POSTS. ENSURE PANELS ARE HORIZONTAL AND ATTACHED TO THE POSTS WITH POST CLIPS AND POST CLIP BOLTS. STAGGER THE POST CLIPS AND BOLTS ON BOTH SIDES OF EACH POST AS SHOWN. ENSURE THAT ADJOINING PANELS ARE FLUSH BEFORE TIGHTENING PANEL BOLTS.
2. TORQUE NYLOCK NUTS ON THE POST CLIP BOLTS TO 225 INCH POUNDS WITH DRY CLEAN UNLUBRICATED THREADS.
3. WHEN MODIFYING AN EXISTING SIGN AND ADDITIONAL POST CLIPS ARE TO BE INSTALLED TO THE INSIDE OF THE SIGN POST, THE CONTRACTOR IS PERMITTED TO FIELD DRILL FOR A POST CLIP INSERTION HOLE IN EXISTING EXTRUSIONS.
4. THE CLIP ASSEMBLY IS TO BE ALL ALUMINUM OR ALL STAINLESS STEEL.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO JUNE 16, 2017 13683 RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-94	HEB	6	07-12	HEB			
2	08-96	HEB	7	12-13	SCH			
3	12-01	HEB	8	11-14	SCH			
4	05-12	HEB	6	06-17	HEB			
5	06-12	SCH						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-2_0617.dgn

DRAWING DATE: DECEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

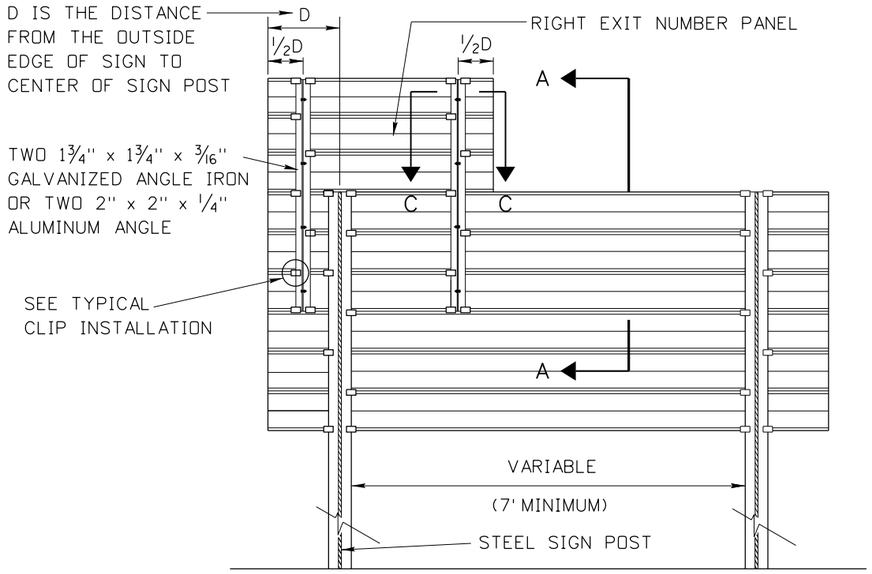
STANDARD DRAWING

EXTRUDED ALUMINUM SIGNS

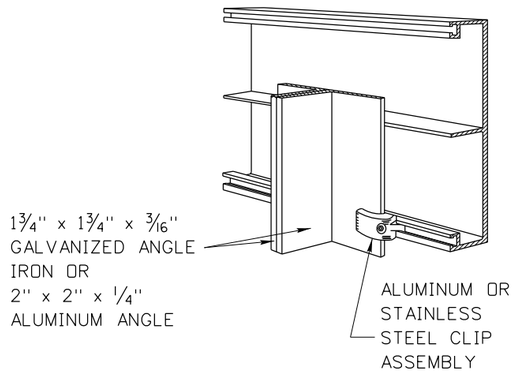
English

STANDARD DRAWING NO. 616-2

SHEET 1 OF 2



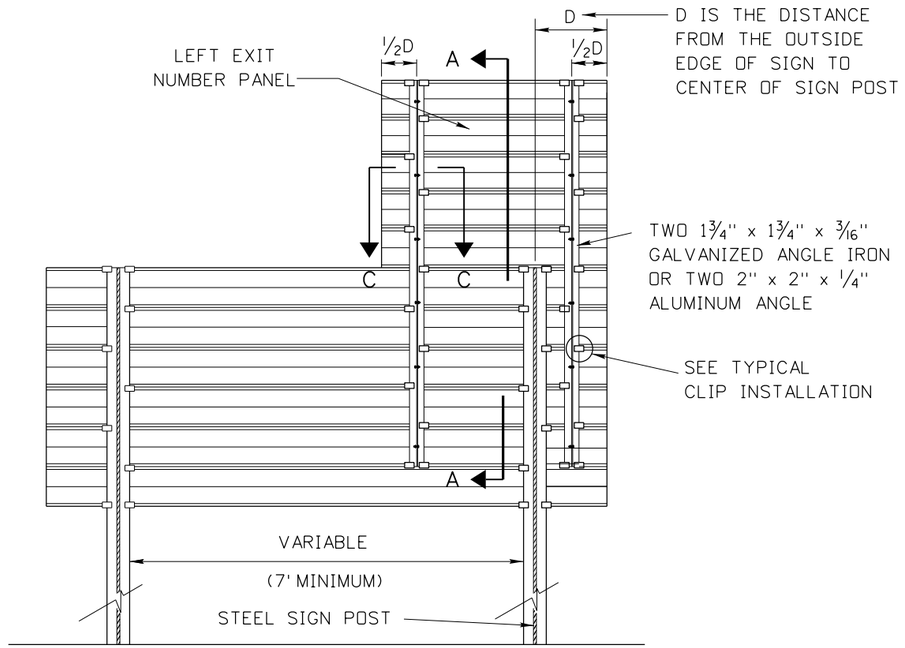
RIGHT EXIT PANEL



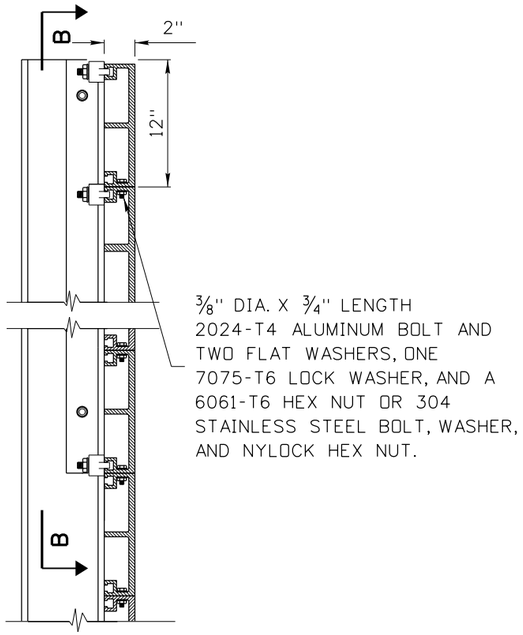
TYPICAL CLIP INSTALLATION

NOTES:

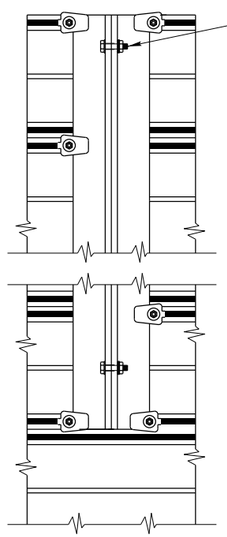
5. 1¾" x 1¾" x 3/16" ANGLE IRON WEIGHS 2.12 LBS/FT. WEIGHT OF ANGLE IRON DOES NOT INCLUDE GALVANIZING.
6. 2" x 2" x ¼" ALUMINUM ANGLE WEIGHS 1.11 LBS/FT.
7. DRAWING NOT TO SCALE



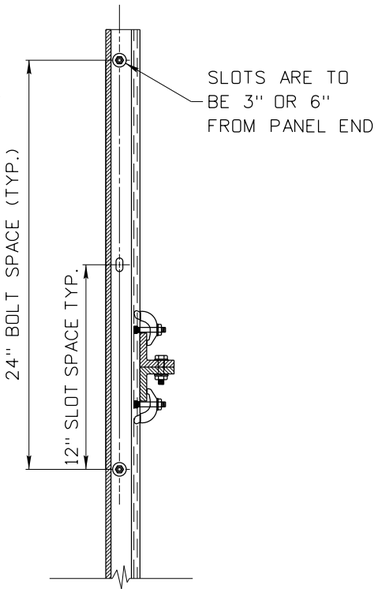
LEFT EXIT PANEL



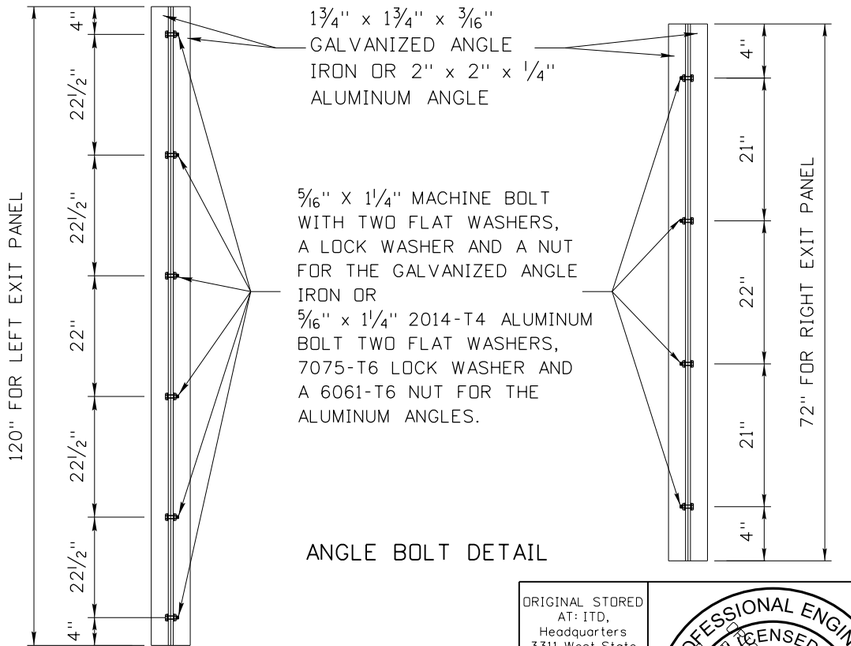
SECTION A-A



SECTION B-B



SECTION C-C



ANGLE BOLT DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-01	NQB	6	06-17	HEB			
2	01-04	HEB						
3	12-07	HEB						
4	07-12	HEB						
5	11-14	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-2_0617.dgn

DRAWING DATE: DECEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

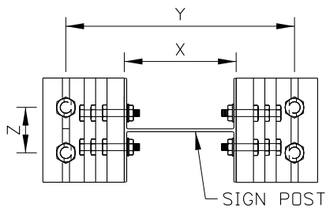
STANDARD DRAWING

EXTRUDED ALUMINUM SIGNS

English

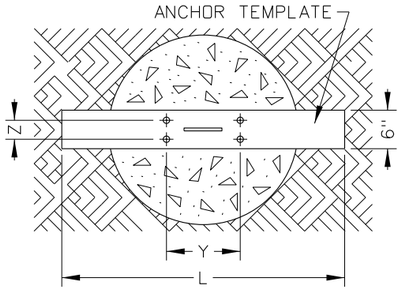
STANDARD DRAWING NO. 616-2

SHEET 2 OF 2

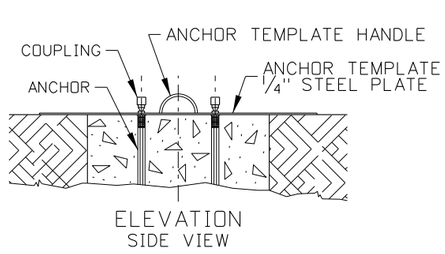


PLAN VIEW

BREAKSAFE BASE DETAIL

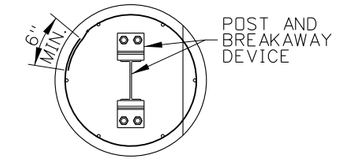


PLAN VIEW



ELEVATION
SIDE VIEW

ANCHOR TEMPLATE DETAIL



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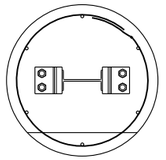
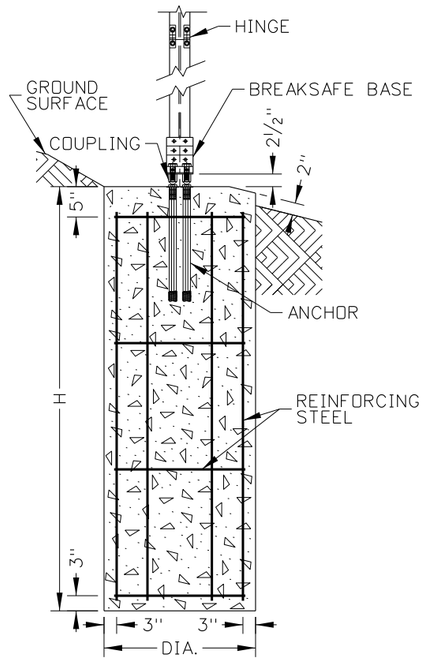
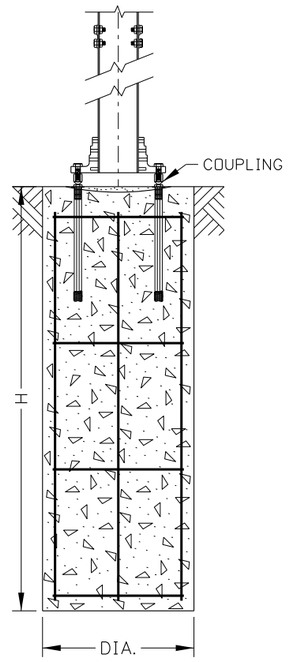


PLAN VIEW

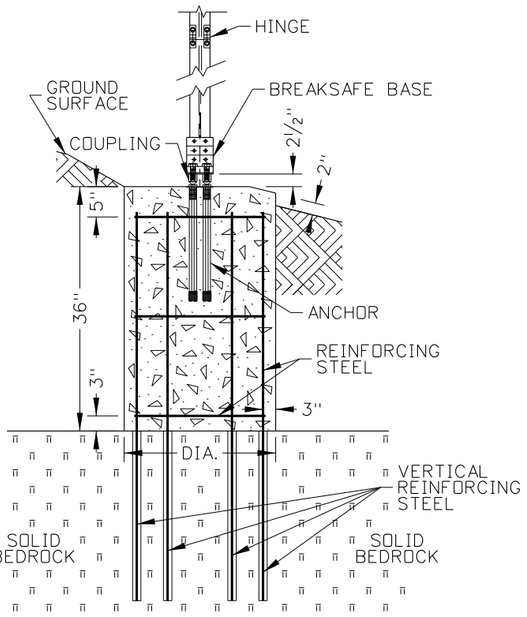


ELEVATION
FRONT VIEW



ELEVATION
SIDE VIEW

FOUNDATION



ELEVATION
FRONT VIEW

FOUNDATION IN BEDROCK

SEE NOTE NO. 4

SIGN POST AND BASE ASSEMBLY TABLE

POST TYPE	WIDE FLANGE POST SIZE	WEIGHT (LB/FT)	BREAKSAFE ASSEMBLY MODEL	FOUNDATION SIZE (DIAxH) (INCHxINCH)	X (INCH)	Y (INCH)	Z (INCH)	L (INCH)
A-1	W6x9	9	AI6	24x60	5 7/8	9 3/8	4 1/4	36
A-2	W8x10	10	B525	30x84	7 7/8	15 7/8	3	40
A-3	W8x13	13	B525	30x84	8	16	3	40
A-4	W8x18	18	B525	30x84	8 1/8	16 1/8	3	40
A-8	W12x19	19	B650	36x96	12 1/8	20 1/8	4	48
A-9	W14x22	22	B650	36x96	13 3/4	21 3/4	4	48

FOUNDATION MATERIAL TABLE

FOUNDATION SIZE (DIAxH) (INCHxINCH)	CONCRETE (CU. YD.)	VERTICAL REINFORCING STEEL			REINFORCING STEEL HOOPS		
		BAR SIZE	NUMBER OF BARS	LENGTH (FEET)	BAR SIZE	NUMBER OF BARS	LENGTH (FEET)
24x60	0.6	4	6	26	4	4	21
30x84	1.3	4	6	38	4	4	28
36x96	2.1	4	8	60	4	5	42

FOUNDATION IN SOLID BEDROCK MATERIAL TABLE

FOUNDATION SIZE (DIAxH) (INCHxINCH)	CONCRETE (CU. YD.)	VERTICAL REINFORCING STEEL			REINFORCING STEEL HOOPS		
		BAR SIZE	NUMBER OF BARS	LENGTH (FEET)	BAR SIZE	NUMBER OF BARS	LENGTH (FEET)
24x36	0.4	4	6	26	4	3	16
30x36	0.45	4	6	38	4	3	21
36x36	0.5	4	8	60	4	3	25

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-21	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-5_0421.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

BREAKAWAY STEEL SIGN POST AND FOUNDATION TYPE A - WIDE FLANGE

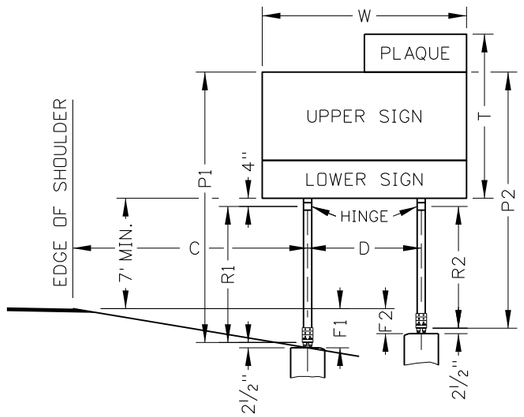
English

STANDARD DRAWING NO.

616-5

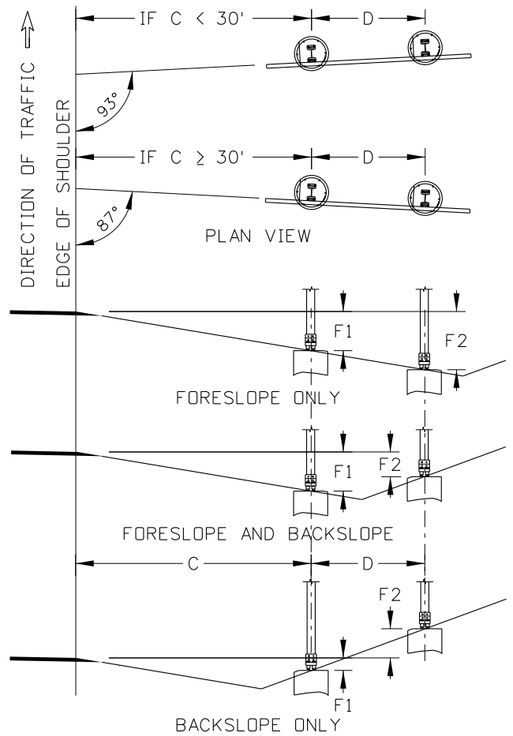
SHEET 1 OF 2

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED MARCH 18, 2021 STATE OF IDAHO 13683 RYAN D. LANCASTER



SIGN DIMENSIONS

SEE NOTE NO. 2



FOUNDATION LOCATIONS

SEE NOTE NO. 2

LEGEND

C	DISTANCE FROM EDGE OF SHOULDER TO CENTER OF FIRST POST
D	DISTANCE BETWEEN POSTS
F1, F2	VERTICAL DISTANCE FROM TOP OF THE FOUNDATION TO THE PAVEMENT ELEVATION AT THE EDGE OF THE SHOULDER
P1, P2	TOTAL POST LENGTH
R1, R2	POST LENGTH UP TO THE HINGE
T	OVERALL HEIGHT OF SIGN
W	OVERALL WIDTH OF SIGN

NOTES

1. USE TYPE A - WIDE FLANGE POSTS WITH EXTRUDED ALUMINUM SIGNS WHERE ONE B POST IS INSUFFICIENT. USE TYPE A - WIDE FLANGE POSTS IN PAIRS.
2. SEE PROJECT SIGN SUMMARY FOR SIGN ASSEMBLY DIMENSIONS.
3. CAST FOUNDATION IN NATIVE SOILS IN AN AUGERED HOLE. IF AN AUGURED HOLE IS IMPRACTICAL, CAST THE FOUNDATION IN A CORRUGATED METAL PIPE FORM AND BACKFILLED IN ACCORDANCE WITH SECTION 210 IF APPROVED BY THE ENGINEER.
4. IF SOLID BEDROCK IS ENCOUNTERED, SOCKET VERTICAL REINFORCING STEEL FOR THE DEPTH SHOWN IN POLE FOUNDATION MATERIAL QUANTITIES. DRILL 2 INCH MINIMUM DIAMETER HOLES. FILL DRILLED HOLES WITH GROUT, TYPE B, CLASS 1. NOTIFY THE ENGINEER IF THE DEPTH TO SOLID BEDROCK IS LESS THAN 36". IF LESS THAN 36", REDESIGN OF THE FOUNDATION MAY BE REQUIRED.
5. ENSURE THE FOUNDATION AND NON-BREAKAWAY PARTS OF THE BASE DO NOT PROTRUDE MORE THAN 4 INCHES ABOVE THE GROUND SURFACE.
6. INSTALL BREAKAWAY SUPPORT SYSTEM IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. USE ANCHOR TEMPLATE TO HOLD ANCHORS SOLID AND LEVEL.
7. DRAWING NOT TO SCALE.

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-21	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-5_0421.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

BREAKAWAY STEEL SIGN POST AND FOUNDATION TYPE A - WIDE FLANGE

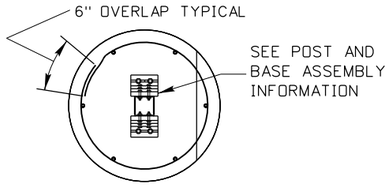
English

STANDARD DRAWING NO.

616-5

SHEET 2 OF 2

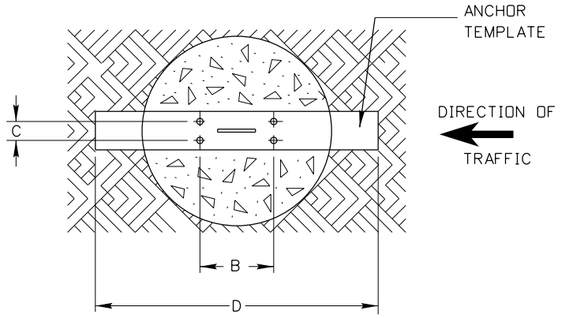
PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED
AND DATED
MARCH 18, 2021
RYAN D. LANCASTER
13683
STATE OF IDAHO

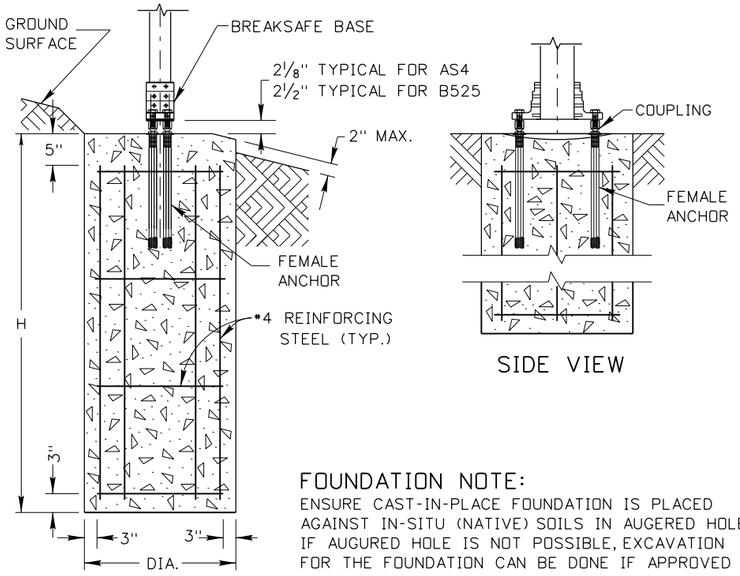


TYPICAL FOUNDATION TOP VIEW

GENERAL NOTES:

1. SEE SIGNING ERECTION SPECIFICATIONS FOR DIMENSIONS OF EACH SIGN INSTALLATION.
2. INSTALL BREAKAWAY SUPPORT SYSTEM PER MANUFACTURERS INSTRUCTIONS.
3. USE ANCHOR TEMPLATE TO HOLD ANCHORS SOLID AND LEVEL.
4. NO PART OF THE FOUNDATION OR NON-BREAKAWAY PART OF THE BASE SHOULD PROTRUDE MORE THAN 2" ABOVE THE GROUND SURFACE.
5. FOUNDATION REINFORCING STEEL CAGES MAY BE WELDED IF THE REINFORCING STEEL CONFORMS TO ASTM A706/A706M AND ALL WELDING CONFORMS TO ANSI/AWS D1.4 (STRUCTURAL WELDING CODE - REINFORCING STEEL).
6. CURE FOUNDATIONS FOR A MINIMUM OF 7 DAYS BEFORE ANY LOADING IS APPLIED.
7. THE COST OF BOLTS, NUTS, WASHERS, AND ALUMINUM CLIP ASSEMBLIES NEEDED TO MOUNT THE SIGN(S) IS INCIDENTAL TO BREAKAWAY SIGN POST INSTALLATION TYPE B.
8. DRAWING NOT TO SCALE.



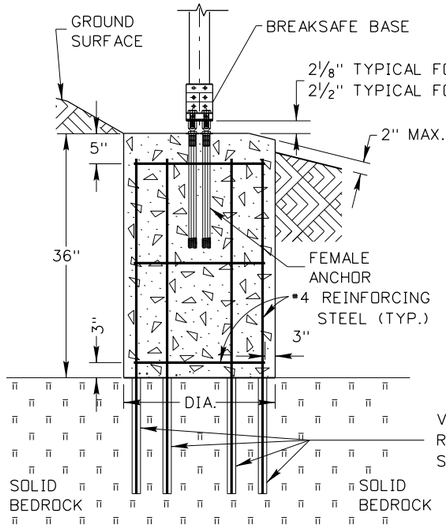


SIDE VIEW

FRONT VIEW

FOUNDATION NOTE:

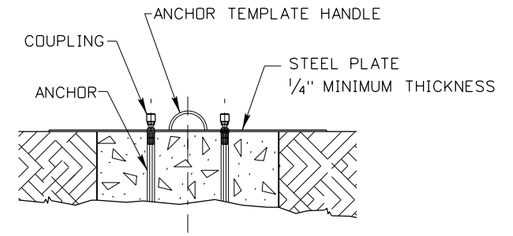
ENSURE CAST-IN-PLACE FOUNDATION IS PLACED AGAINST IN-SITU (NATIVE) SOILS IN AUGERED HOLE. IF AUGURED HOLE IS NOT POSSIBLE, EXCAVATION FOR THE FOUNDATION CAN BE DONE IF APPROVED BY THE ENGINEER. USE CORRUGATED METAL PIPE AS FORM FOR THE FOUNDATION. PLACE AND COMPACT BACKFILL IN ACCORDANCE TO SUBSECTION 210.03 OF THE IDAHO TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION



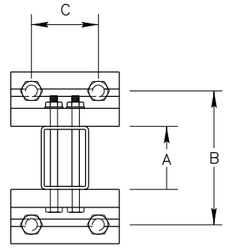
SOLID BEDROCK FRONT VIEW

FOUNDATION IN SOLID BEDROCK NOTES:

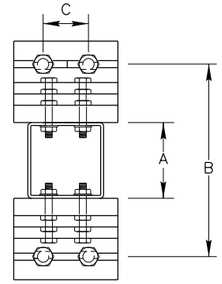
A. IF DEPTH TO BEDROCK IS LESS THAN 36", NOTIFY THE ENGINEER. REDESIGN OF THE FOUNDATION MAY BE REQUIRED.
B. SOCKET VERTICAL REINFORCING STEEL FOR THE DEPTH SHOWN IN POLE FOUNDATION MATERIAL QUANTITIES. DRILL 2 INCH MINIMUM DIAMETER HOLES. FILL DRILLED HOLES WITH GROUT, TYPE "B", CLASS 1.



TYPICAL ANCHOR TEMPLATE FOR TYPE B SIGN POSTS



AS4



B525

FOUNDATION MATERIAL QUANTITIES

FOUNDATION SIZE	CONCRETE	VERTICAL REINFORCING STEEL		REINFORCING STEEL HOOPS	
		QTY.	LN. FT.	QTY.	LN. FT.
24" X 60"	0.6 CU. YDS.	6	26	4	20.85
30" X 60"	0.9 CU. YDS.	6	26	4	27.13

FOUNDATION IN SOLID BEDROCK MATERIAL QUANTITIES

FOUNDATION SIZE	CONCRETE	VERTICAL REINFORCING STEEL		REINFORCING STEEL HOOPS	
		QTY.	LN. FT.	QTY.	LN. FT.
24" X 36"	0.38 CU. YDS.	6	26	3	15.65
30" X 36"	0.44 CU. YDS.	6	38	3	20.35

SIGN POST AND BASE ASSEMBLY INFORMATION

POST TYPE	TUBULAR STEEL POST SIZE	WEIGHT LBS. PER FOOT	BREAKSAFE ASSEMBLY MODEL	FOUNDATION SIZE DIA. X H	A DIMENSION	B DIMENSION	C DIMENSION	D ANCHOR TEMPLATE DIMENSIONS
B-2	4" X 3" X 3/16"	8.15	AS4	24" X 60"	4"	7 11/16"	4¼"	6" x 36" x ¼"
B-3	5" X 5" X 3/16"	11.96	B525	30" X 60"	2"	13"	3"	6" x 40" x ¼"
B-4	6" X 6" X 3/16"	14.51	B525	30" X 60"	6"	14"	3"	6" x 40" x ¼"

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO ORIGINAL SIGNED BY RYAN D. LANCASTER DECEMBER 6, 2016

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-6_1216.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED MASON

DESIGN/TRAFFIC SERVICES ENGINEER

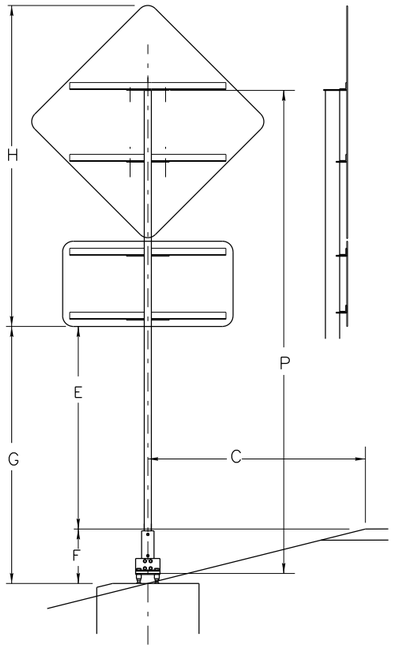
STANDARD DRAWING

BREAKAWAY STEEL SIGN POST INSTALLATION TYPE B

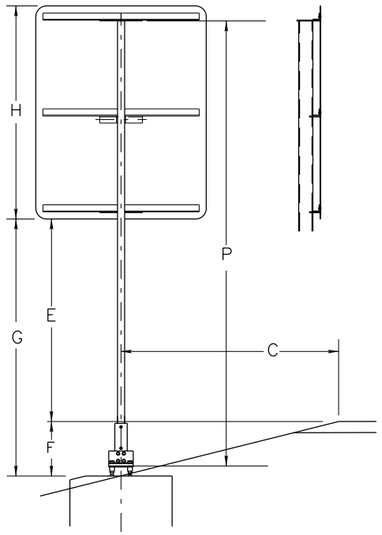
English

STANDARD DRAWING NO. 616-6

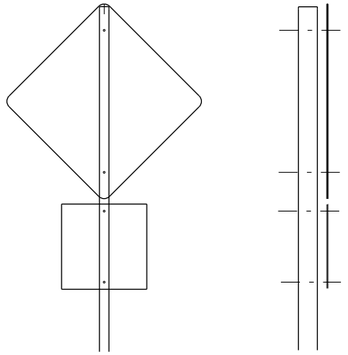
SHEET 1 OF 2



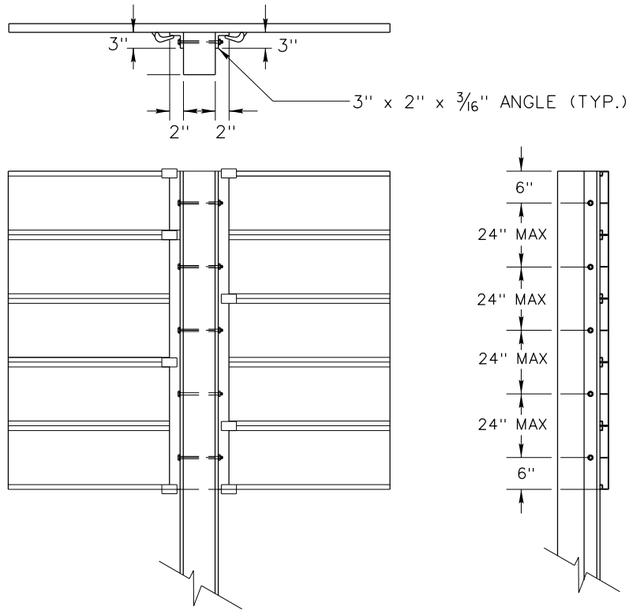
TYPICAL INSTALLATION OF
MULTIPLE SIGNS
WITH BRACE ANGLES



TYPICAL INSTALLATION OF SIGNS
WITH BRACE ANGLES



TYPICAL INSTALLATION OF SIGNS
WITHOUT BRACE ANGLES



TYPICAL INSTALLATION
EXTRUDED ALUMINUM SIGNS

LEGEND

C DISTANCE FROM EDGE OF SHOULDER TO CENTER LINE OF FIRST POST.

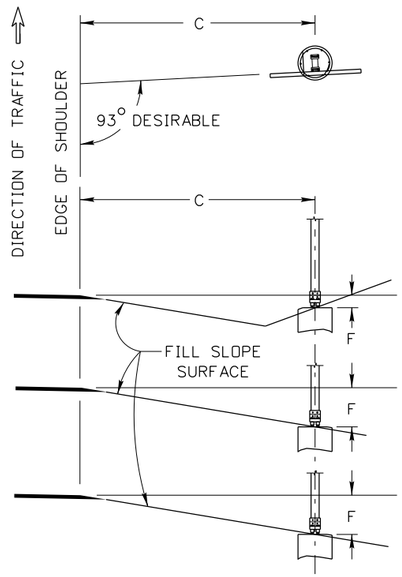
E THE HEIGHT ABOVE THE EDGE OF FINISHED SHOULDER TO THE BOTTOM OF LOWER SIGN.

F VERTICAL DISTANCE FROM TOP OF FOUNDATION TO THE ELEVATION OF THE EDGE OF THE SHOULDER.

G THE DISTANCE FROM THE TOP OF THE FOUNDATION TO THE BOTTOM OF THE LOWER SIGN.

H THE OVERALL HEIGHT OF SIGNS.

P TOTAL POST LENGTH.



TYPICAL SIGN ORIENTATION

NOTES (CONTINUED)

9. REFER TO STANDARD DRAWINGS 616-15, 616-16, 616-17 FOR CLIP AND BRACE ANGLE DETAILS.
10. REFER TO STANDARD DRAWING 616-2 FOR INSTALLATION OF EXTRUDED ALUMINUM SIGN PANELS.
11. REFER TO STANDARD DRAWING 616-1 FOR HOLE SPACING.
12. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO RYAN D. LANCASTER
ORIGINAL SIGNED BY RYAN D. LANCASTER DECEMBER 6, 2016

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-6_1216.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED MASON

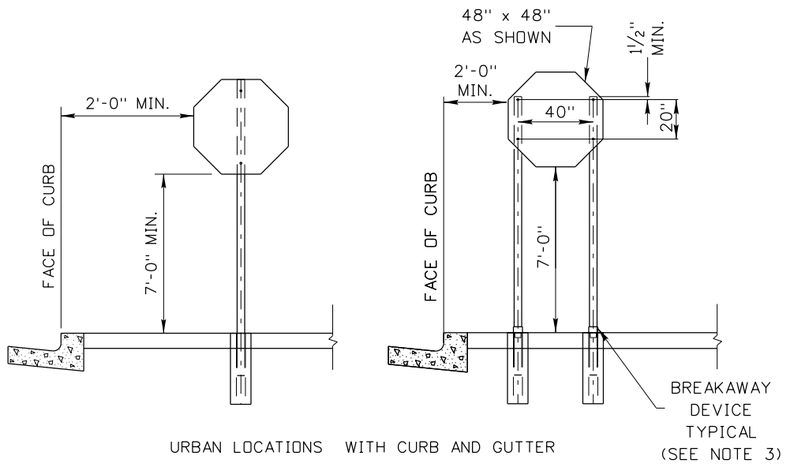
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

BREAKAWAY STEEL SIGN POST INSTALLATION TYPE B

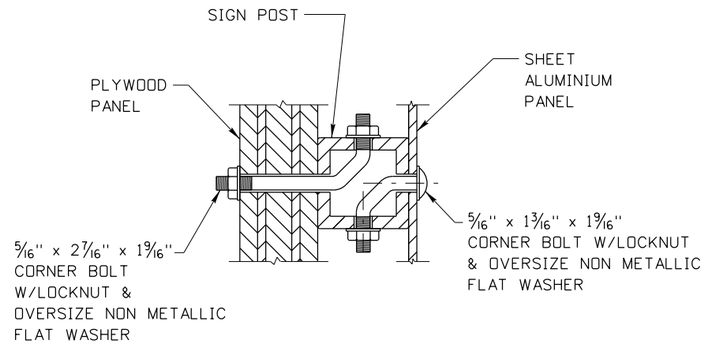
English

STANDARD DRAWING NO. 616-6



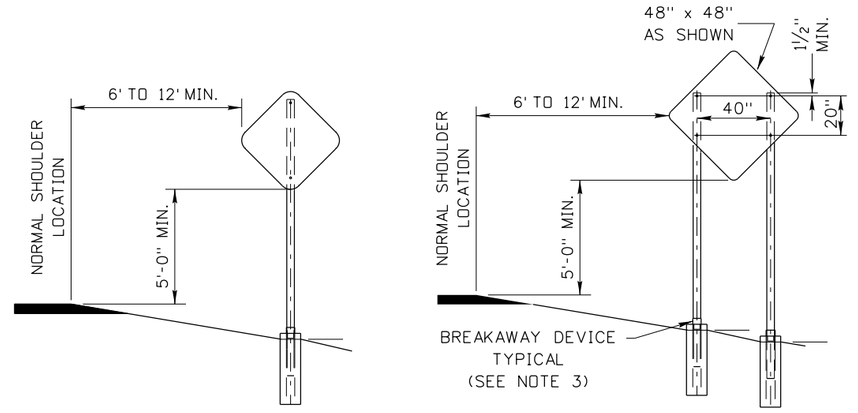
URBAN LOCATIONS WITH CURB AND GUTTER

SIGN HEIGHT AND LATERAL LOCATION



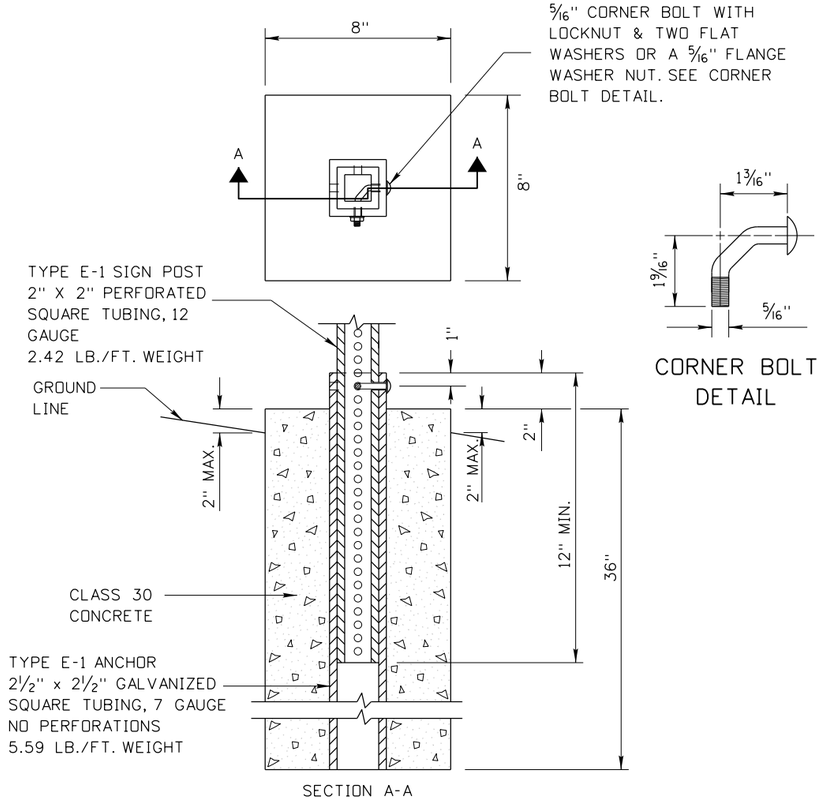
CORNER BOLTS MAY BE USED WITH BACK TO BACK INSTALLATIONS

BACK TO BACK SIGN MOUNTING DETAILS



RURAL LOCATION
(SEE NOTE 2 WHEN SOLID ROCK IS ENCOUNTERED)

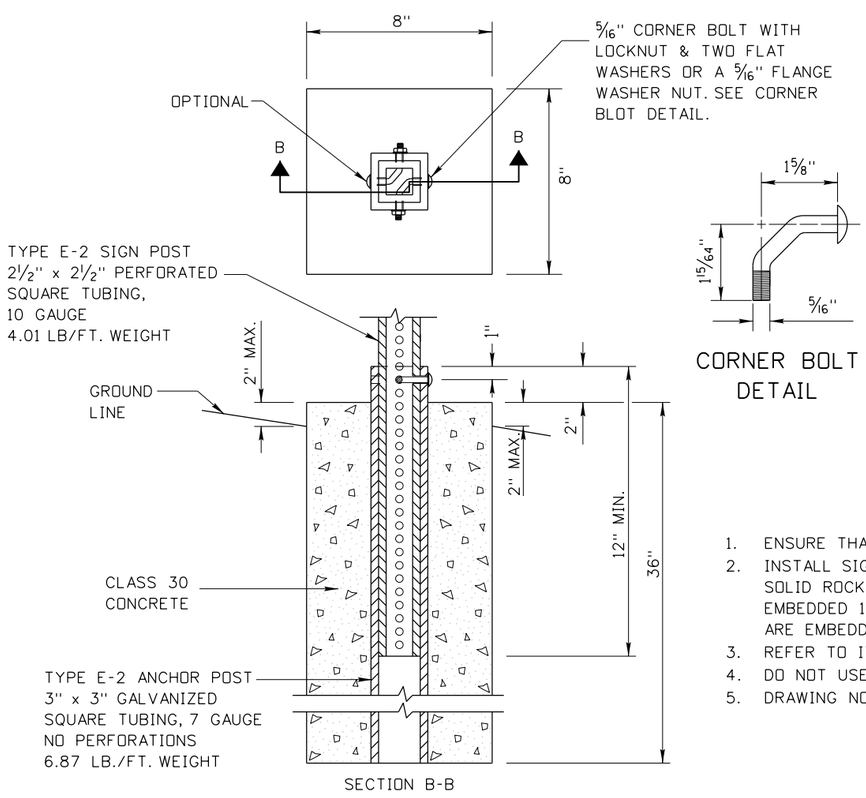
SIGN HEIGHT AND LATERAL LOCATION



CORNER BOLT DETAIL

SECTION A-A

2" X 2" SIGN POST INSTALLATION DETAILS



CORNER BOLT DETAIL

SECTION B-B

2½" X 2½" SIGN POST INSTALLATION DETAILS

NOTES

1. ENSURE THAT THE BOTTOM OF ANCHOR IS BE KEPT OPEN TO DRAIN.
2. INSTALL SIGN POST AND ANCHOR IN FOUNDATION OR GROUT INTO SOLID ROCK. ENSURE THAT THE 2" X 2" POST INSTALLATIONS ARE EMBEDDED 18" ONTO SOLID ROCK AND 2½" X 2½" POST INSTALLATIONS ARE EMBEDDED 24" INTO SOLID ROCK.
3. REFER TO ITD QUALIFIED PRODUCTS LIST FOR BREAKAWAY DEVICES.
4. DO NOT USE BRACE ANGLES.
5. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED BY JANUARY 9, 2018 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-92	JEC	6	05-15	HEB			
2	12-94	HEB	7	12-16	HEB			
3	06-99	HEB						
4	12-01	NQB						
5	12-13	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-7_1216.dgn

DRAWING DATE: JULY, 1991

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED MASON

DESIGN/TRAFFIC SERVICES ENGINEER

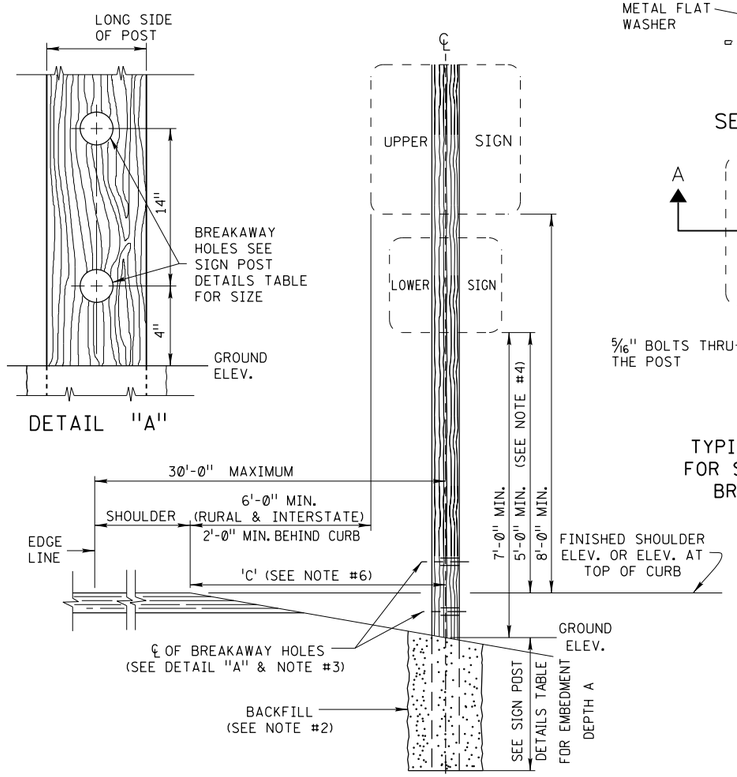
STANDARD DRAWING

BREAKAWAY STEEL SIGN POSTS TYPE E

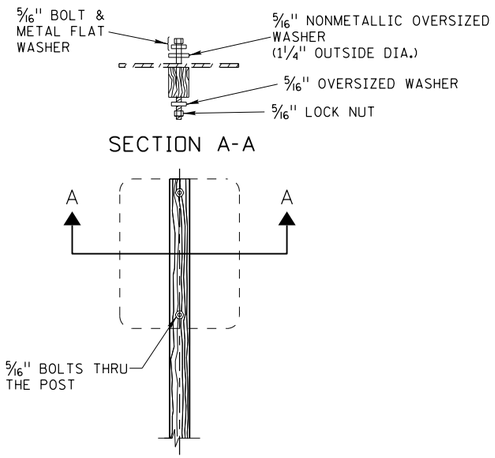
English

STANDARD DRAWING NO. 616-7

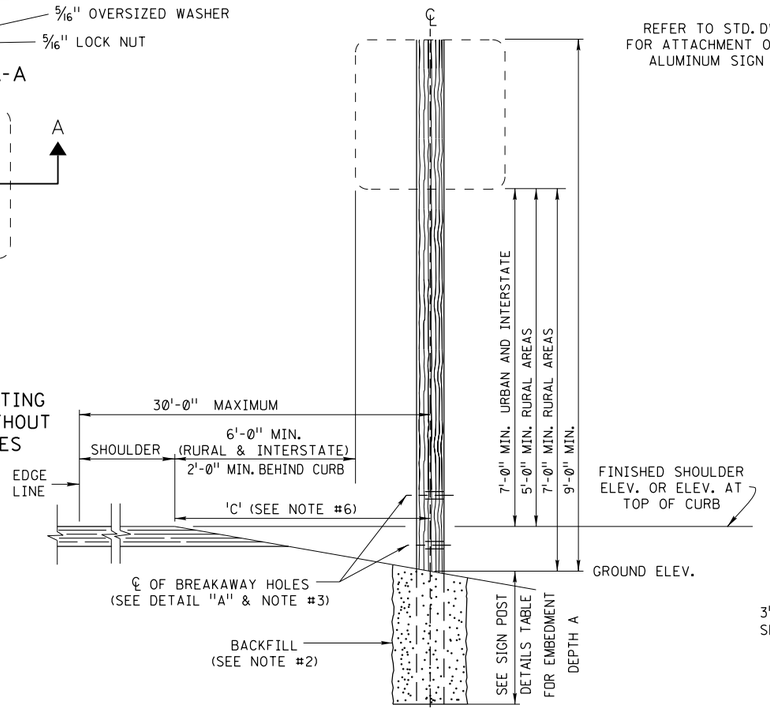
SHEET 1 OF 1



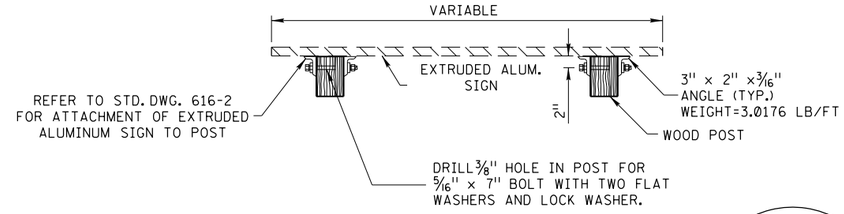
INSTALLATION DETAIL



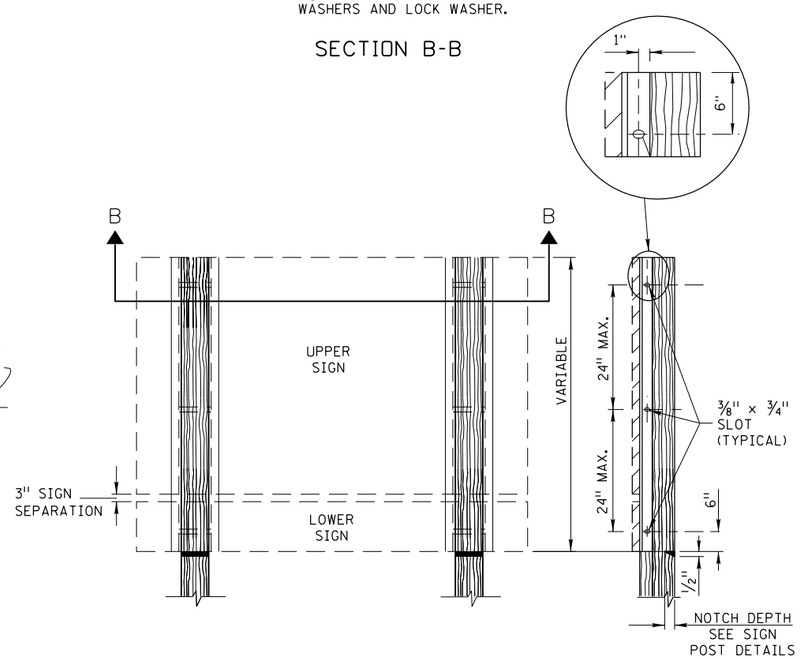
TYPICAL MOUNTING FOR SIGNS WITHOUT BRACE ANGLES



INSTALLATION DETAIL



SECTION B-B



TYPICAL EXTRUDED ALUMINUM SIGN MOUNTED ON WOOD POSTS

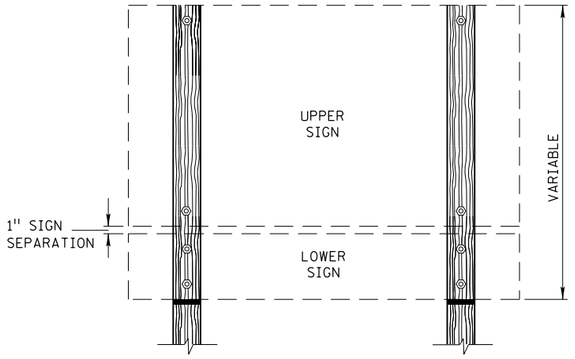
ANGLES ARE REQUIRED FOR MOUNTING EXTRUDED ALUMINUM PANEL SIGNS.

SIGN POST DETAILS TABLE

POST TYPE	POST SIZE	EMBEDMENT DEPTH A	NOTCH DEPTH	BREAKAWAY HOLE SIZE
D-1	4"x4"	3'-6"	——	————
D-2	4"x6"	4'-0"	1¾"	1½" DIA.
D-3	6"x6"	5'-0"	1¾"	2" DIA.
D-4	6"x8"	6'-0"	2½"	3" DIA.
D-5	8"x8"	6'-0"	——	SEE NOTE 2

SIGN POST DETAILS TABLE NOTES:

1. 7'-0" MIN. CLEAR DISTANCE BETWEEN 6"x 6" POSTS OR LARGER. FULL WIDTH SAW CUT NOTCHES ARE REQUIRED ON ALL TWO POST INSTALLATIONS. OMIT NOTCH FOR SINGLE POST INSTALLATIONS.
2. NON-BREAKAWAY POST: THE D-5 (8" x 8") POST IS ONLY APPROVED FOR USE OUTSIDE THE CLEAR ZONE OR WITHIN CLEAR ZONE WHEN PROTECTED BY GUARD RAIL OR OTHER NCHRP-350 OR MASH DEVICES.



TYPICAL SHEET ALUMINUM OR PLYWOOD SIGNS MOUNTED ON WOOD POSTS

SHEET ALUMINUM SIGNS MAY REQUIRE THE BRACE ANGLES.

NOTES:

1. PLACE LONG DIMENSION OF POST CROSS SECTION PERPENDICULAR TO THE SIGN FACE.
2. BACKFILL SHALL BE APPROVED GRANULAR BORROW.
3. BREAKAWAY HOLES SHALL BE FIELD DRILLED. POSTS 4"x6" AND LARGER REQUIRE BREAKAWAY HOLES. THE BREAKAWAY HOLES SHALL BE DRILLED PARALLEL TO THE SIGN FACE.
4. IF THE LOWER SIGN IS AN OBJECT MARKER, THE DIMENSION SHALL BE 4'-0".
5. POSTS SHALL BE PRESSURE TREATED ACCORDING TO SECTION 710.09.
6. SEE SIGNING ERECTION SPECIFICATIONS SHEET IN PLANS FOR 'C' DIMENSION.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED CARL D. MAIN STATE OF IDAHO
THE ORIGINAL SIGNED AND SEALED DOCUMENT IS ON FILE AT THE DEPARTMENT. DECEMBER 6, 2013

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-96	HEB						
2	12-13	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-10_1213.dgn

DRAWING DATE: NOVEMBER, 1991

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: RYAN LANCASTER *for*
DESIGN/TRAFFIC SERVICES ENGINEER

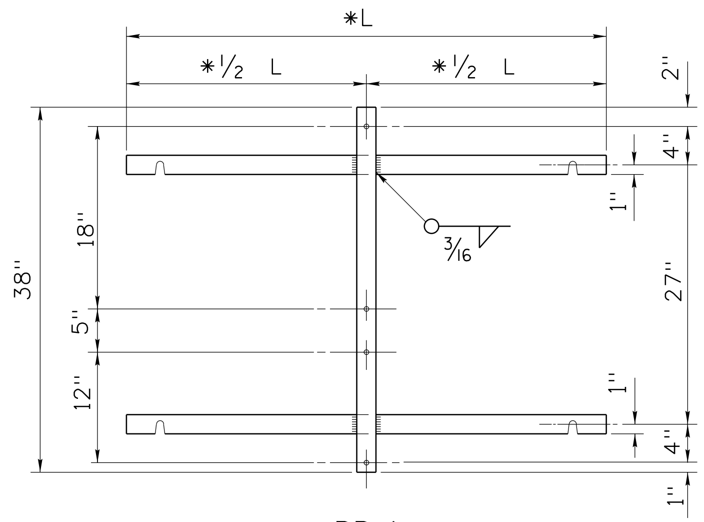
STANDARD DRAWING

BREAKAWAY SIGN POSTS TYPE D

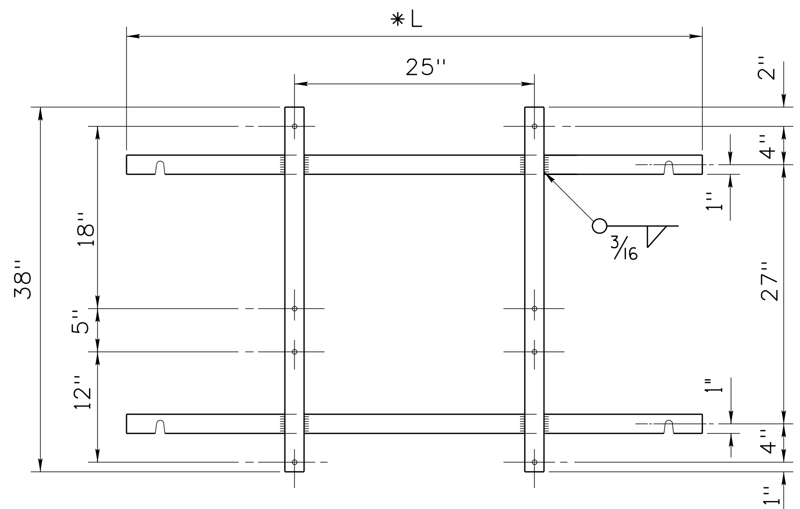
English

STANDARD DRAWING NO. 616-10

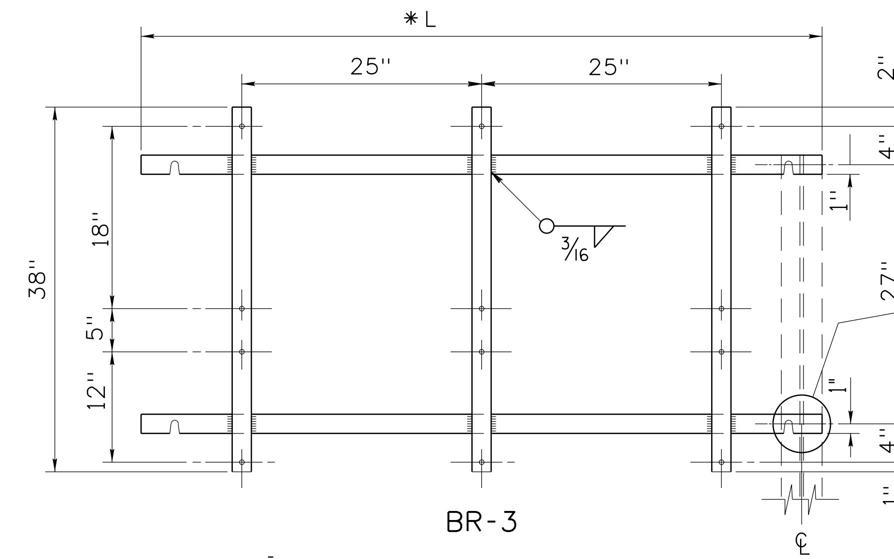
SHEET 1 OF 1



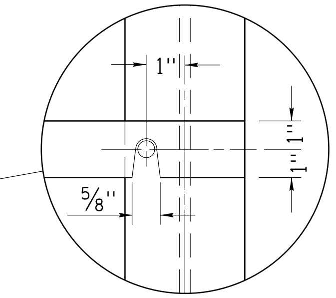
BR-1



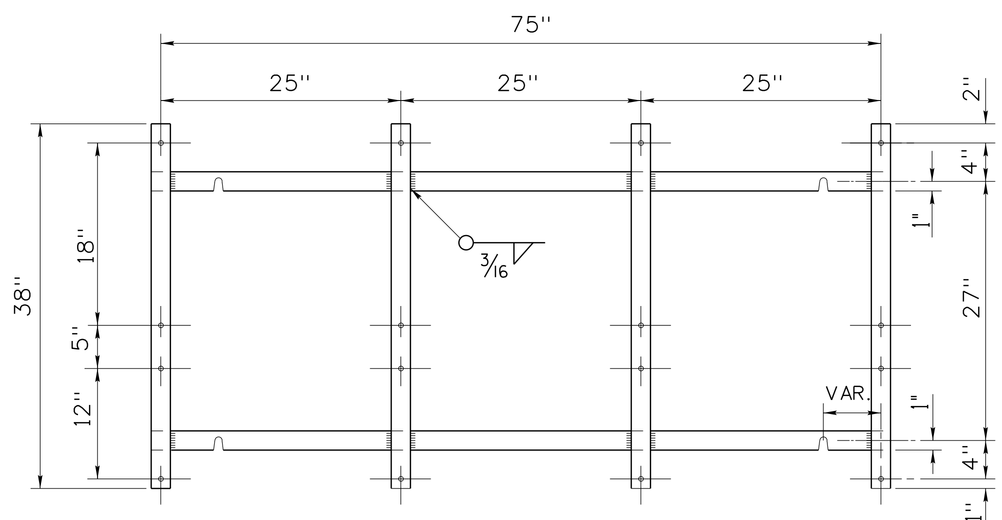
BR-2



BR-3



DETAIL OF MOUNTING SLOT TYPICAL

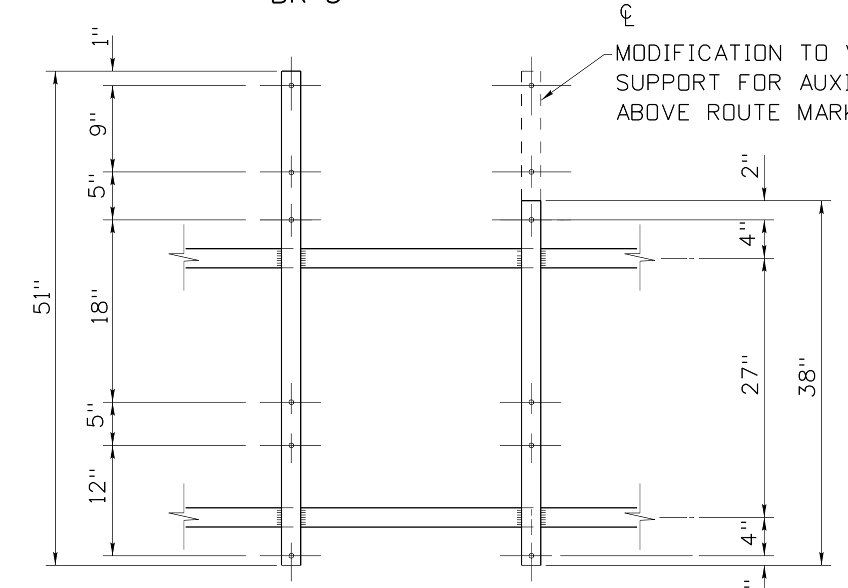


BR-4

NOTES:

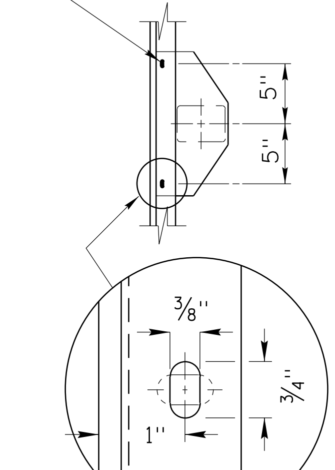
1. BRACKETS BR-1 THRU BR-4 MOUNT ON TYPE A POSTS.
2. BRACKETS BR-5 THRU BR-7 MOUNT ON TYPE B POSTS.
3. BRACKET MATERIALS:
   ¼" x 2" BAR AT 1.70 LBS/FT. FOR ALL VERTICAL SUPPORTS AND FOR HORIZONTAL MEMBERS, BR-1 THRU BR-4.
   1 ¾" x 1 ¾" x ¼" ANGLE AT 2.77 LBS/FT. FOR HORIZONTAL MEMBERS, BR-5 THRU BR-7.
4. ALL SIGN MOUNTING HOLES SHALL BE ⅜" DIA.
5. BRACKETS SHALL BE ATTACHED TO THE POST BY 5⁄16" DIA. HEX HEAD BOLTS & NUTS WITH TWO FLAT WASHERS AND ONE LOCK WASHER.
6. ✳ L BRACKET LENGTH FOR BR-1 THRU BR-3 = ℄ TO ℄ POST SPACING PLUS ONE POST WIDTH.

MODIFICATION TO VERTICAL SUPPORT FOR AUXILIARY SIGN ABOVE ROUTE MARKER

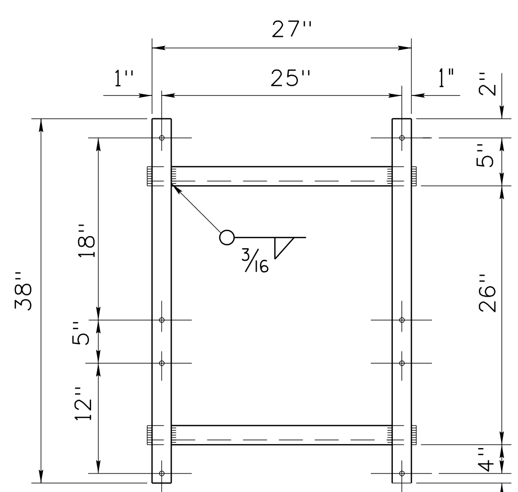


MODIFIED BRACKET

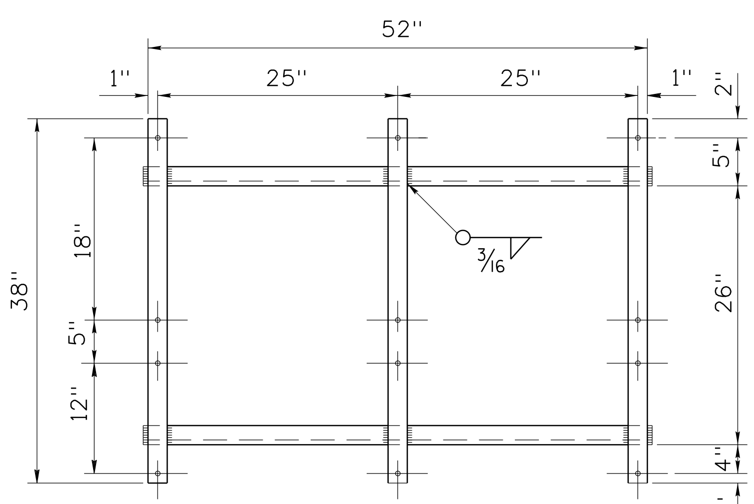
(TYPICAL FOR ALL BRACKETS)



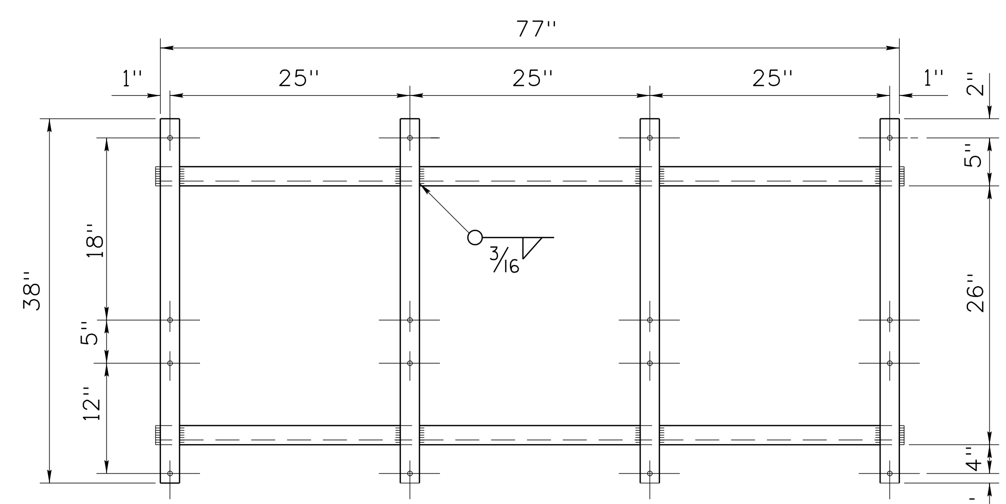
NOTE: FOR BRACKETS THAT REQUIRE THE ABOVE MODIFICATION ADD AN "A" TO THE BRACKET NUMBER: EXAMPLE BR-3A



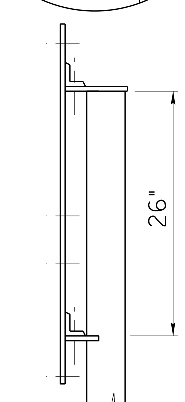
BR-5



BR-6



BR-7



TYP. MOUNTING BR-5, BR-6, BR-7

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED 6260 STATE OF IDAHO CARL D. MAIN

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-01	NQB						
2	12-13	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-15_1213.dgn

DRAWING DATE: AUGUST, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: RYAN LANCASTER *for* DESIGN/TRAFFIC SERVICES ENGINEER

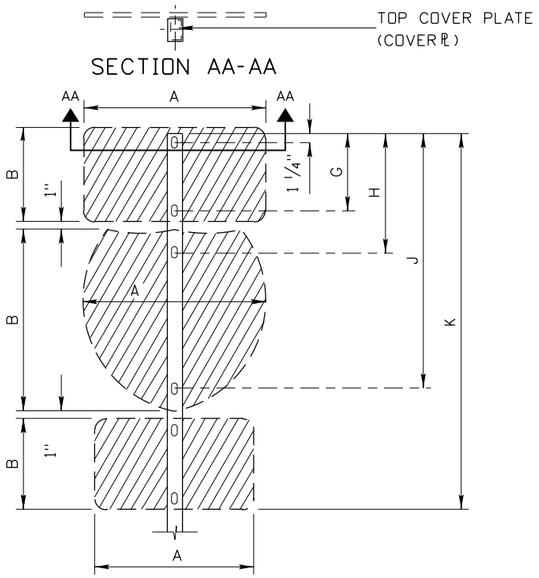
STANDARD DRAWING

ROUTE MARKER BRACKET DETAILS

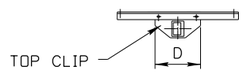
English

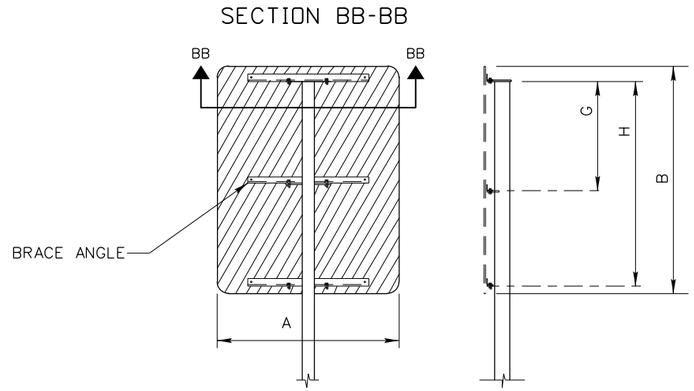
STANDARD DRAWING NO. 616-15

SHEET 1 OF 1



4" x 3" POST DETAILS



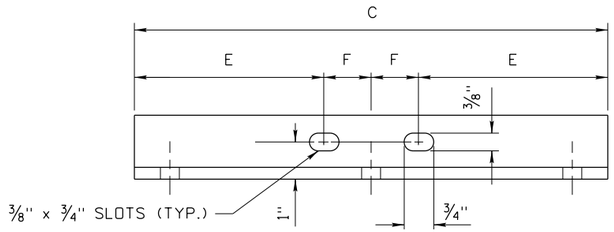


POST AND BRACE ANGLES
4" x 3", 5" x 5", 6" x 6" POSTS

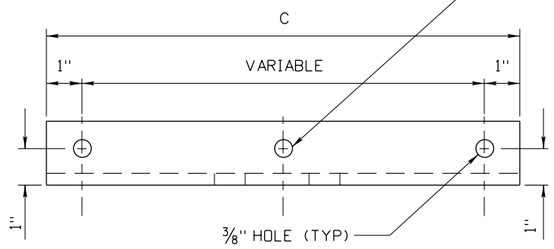
POST AND BRACE ANGLES FOR 4" X 3", 5" X 5", 6" X 6" POSTS									
SIGN DESCRIPTION	SIGN SIZE A	SIGN SIZE B	C	D	E	F	G	H	WEIGHT IN LBS.
STOP	36"	36"	32"	12"	11"	5"	30"	N/A	14.80
	48"	48"	42"	12"	16"	5"	20"	N/A	19.40
YIELD	60" TRIANGLE		48"	12"	19"	5"	N/A	N/A	13.90
			12"	12"	1"	5"	35"		
SQUARE AND RECTANGULAR SIGNS	36"	48"	32"	12"	11"	5"	42"	N/A	14.80
	48"	60"	32"	12"	11"	5"	27"	54"	22.20
	36"	36"	32"	12"	11"	5"	30"	N/A	14.80
	48"	48"	44"	12"	17"	5"	42"	N/A	22.30
	48"	36"	32"	12"	11"	5"	30"	N/A	14.80
	72"	36"	62"	12"	26"	5"	18"	N/A	28.60
	72"	48"	62"	12"	26"	5"	30"	N/A	28.60
	48"	30"	32"	12"	11"	5"	24"	N/A	14.80
	72"	30"	62"	12"	26"	5"	24"	N/A	28.60
	36"	24"	32"	12"	11"	5"	18"	N/A	14.80
	36"	30"	32"	12"	11"	5"	24"	N/A	14.80
WARNING & AUXL. SIGNS	36" DIAMOND		26"	12"	8"	5"	16"	N/A	12.00
	18"	18"	*	*	*	*	*		
	48" DIAMOND		42"	12"	16"	5"	20"	N/A	19.40
	24"	24"	*	*	*	*	*		
WARNING	36" DIAMOND		26"	12"	8"	5"	16"	N/A	12.00
	48" DIAMOND		42"	12"	16"	5"	20"	N/A	19.40
WARNING LARGE ARROW	48"	24"	42"	12"	16"	5"	18"	N/A	19.40
	60"	36"	44"	12"	17"	5"	30"	N/A	20.40
JUNCTION ASSEMBLY	21"	15"	*	*	*	*	POST TOP CLIP NOT REQ'D-COVER ℄ ONLY		
	2-24"ROUTE MARKERS		27"	12"	8½"	5"	20"	38"	12.50
SINGLE CARDINAL DIRECT'L ASSY.	30"	15"	26"	12"	8"	5"	N/A	N/A	15.20
	36"	36"	26"	12"	8"	5"	13½"	N/A	
			12"	12"	1"	5"	N/A	38½"	
JUNCTION ASSEMBLY	21"	15"	*	*	*	*	POST TOP CLIP NOT REQ'D-COVER ℄ ONLY		
	3-24"ROUTE MARKERS		54"	12"	21"	5"	20"	38"	25.00

NOTES:
1. WEIGHTS OF BRACE ANGLES DO NOT INCLUDE GALVANIZING.
2. ALL BRACE ANGLES SHALL BE 1¾" x 1¾" x ¼" AT 2.77 LBS./FT.
* 3. THE AUXILIARY SIGNS SHALL BE ATTACHED BY DRILLING THE POST WITH TWO HOLES AND FLUSH MOUNT THE SIGN TO THE FACE OF THE POST.
4. REFER TO STANDARD DRAWING 616-6.
5. WHEN ONLY ONE BRACE IS REQUIRED, PLACE IN THE CENTER OF THE SIGN.

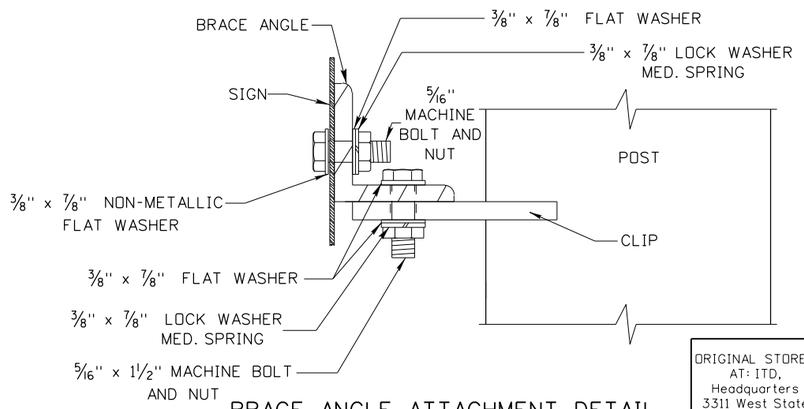
POST DETAILS FOR 4"x3" POSTS						
SIGN DESCRIPTION	SIGN SIZE A	SIGN SIZE B	G	H	J	K
STOP	30"	30"	25¼"	N/A	N/A	28¼"
	36"	36"	31¼"	N/A	N/A	34¼"
YIELD	36"TRIANGLE		25¼"	N/A	N/A	30¼"
SQUARE AND RECTANGULAR SIGNS	12"	30"	25¼"	N/A	N/A	28¼"
	24" / 36"	18"	N/A	N/A	N/A	
	24" / 30"	24"	19¼"	N/A	N/A	22¼"
	24"	30"	25¼"	N/A	N/A	28¼"
	30"	30"	25¼"	N/A	N/A	28¼"
	30"	36"	31¼"	N/A	N/A	34¼"
	36"	24"	19¼"	N/A	N/A	22¼"
	36"	30"	25¼"	N/A	N/A	28¼"
WARNING	18" DIAMOND		21¼"	N/A	N/A	23½"
	30" DIAMOND		31¼"	N/A	N/A	37¼"
WARNING & AUXL. SIGNS	30" DIAMOND		31¼"	N/A	N/A	56¼"
	18"	18"	N/A	39¾"	54¾"	
NO PASS. ZONE	48"	36"	19¼"	N/A	N/A	21½"
TRAIL BLAZER ASSEMBLY (ASSY.)	24"	12"	10¼"	N/A	N/A	51¼"
	24"	24"	N/A	15¾"	33¾"	
	21"	15"	N/A	N/A	N/A	
ADV. ROUTE MARKER ASSY.	24"	24"	19¼"	N/A	N/A	38¼"
	24"	15"	N/A	24¾"	36¾"	
SINGLE JCT. ASSY.	21"	15"	13¼"	N/A	N/A	39¾"
	24"	24"	N/A	18¾"	36¾"	
HOSPITAL, CAMPING ASSY.	24"	24"	19¼"	N/A	N/A	29¼"
	24"	6"	N/A	24¾"	27¾"	



NOTE:
CENTER HOLES IN THE BRACE ANGLES ARE REQUIRED ONLY FOR THOSE SIGNS WHERE "A" IS 72" OR GREATER.



BRACE ANGLE DETAIL



BRACE ANGLE ATTACHMENT DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO CARL D. MAIN
ORIGINAL SIGNED BY: CARL D. MAIN P.E.
DECEMBER 6, 2011
6200

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-96	HEB	6	12-13	HEB			
2	12-01	NQB						
3	12-07	HEB						
4	07-10	HEB						
5	09-11	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-16_1213.dgn

DRAWING DATE: DECEMBER, 2007

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: RYAN LANCASTER *for*
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

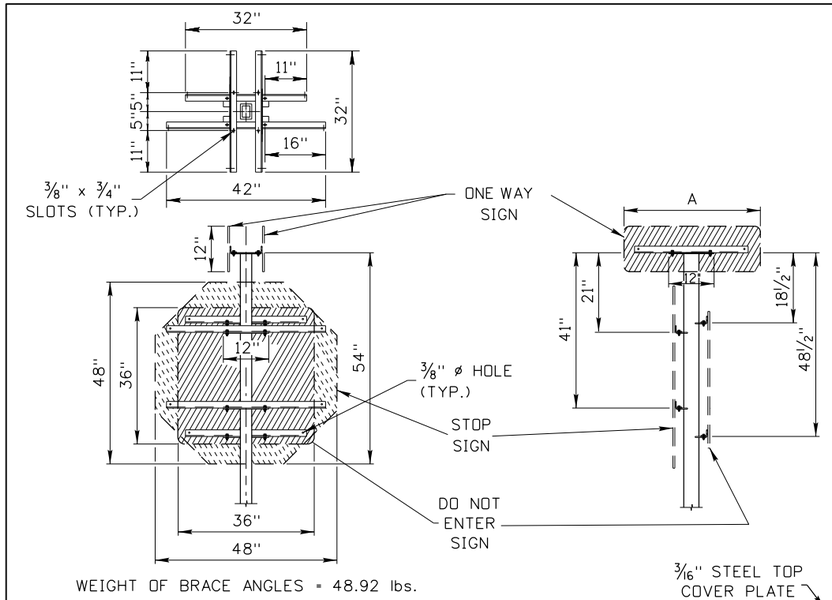
B POST AND BRACE ANGLE DETAIL

English

STANDARD DRAWING NO.

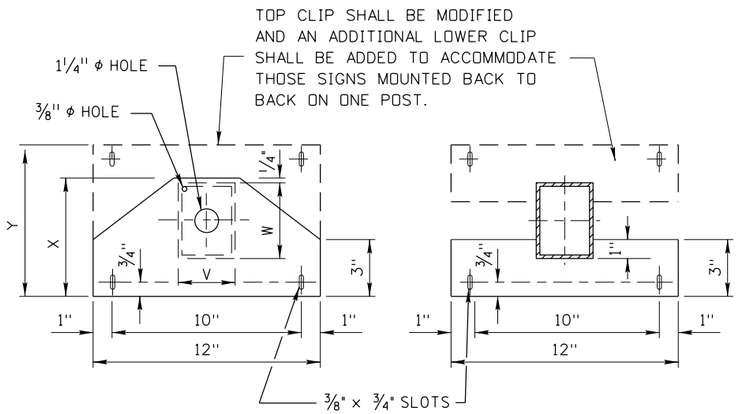
616-16

SHEET 1 OF 2



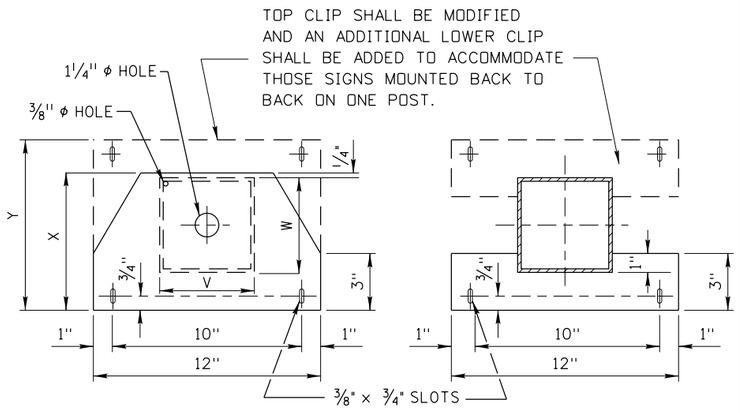
WEIGHT OF BRACE ANGLES = 48.92 lbs.

RAMP TERMINAL
ASSEMBLY "A"



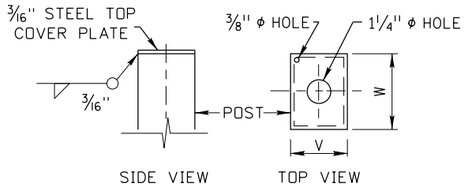
B-2 POST TOP CLIP DETAIL
TOP VIEW

B-2 POST LOWER CLIP DETAIL
SECTION A-A



B-3 & B-4 POST TOP CLIP DETAIL
TOP VIEW

B-3 & B-4 POST LOWER CLIP DETAIL
SECTION A-A



SIDE VIEW TOP VIEW

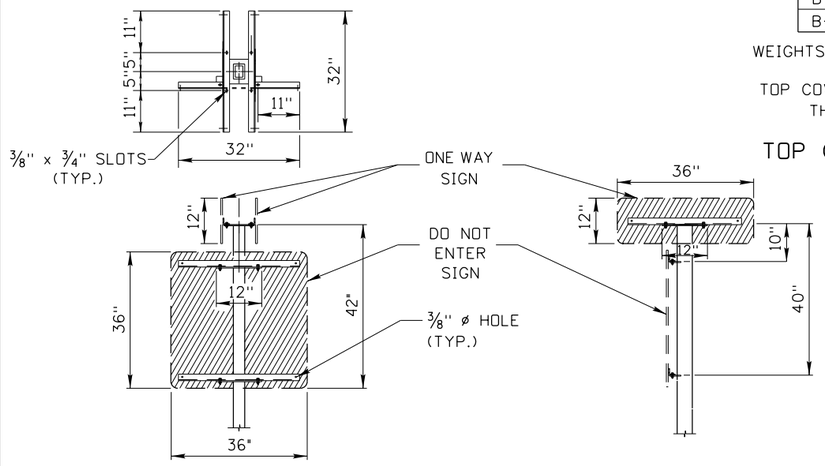
Post Type	Post		Top Clip	
	V	W	X	Y
B-2	3"	4"	6 1/4"	8"

Post Type	Post		Weight. in Lbs. for cover plate
	V	W	
B-2	3"	4"	0.55
B-3	4"	6"	1.25
B-4	4"	8"	1.80

WEIGHTS DO NOT INCLUDE GALVANIZING

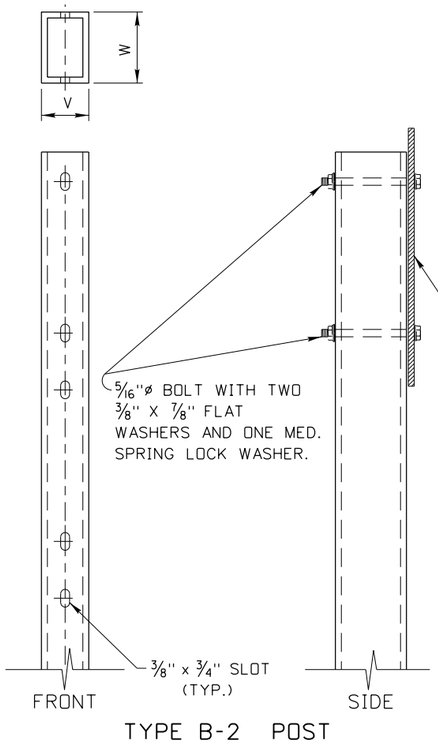
TOP COVER PLATE IS REQUIRED WHEN THERE IS NOT A TOP CLIP

TOP COVER PLATE DETAILS

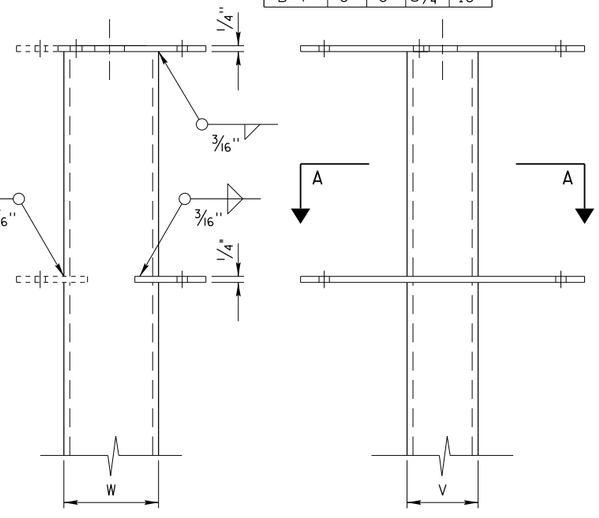


WEIGHT OF BRACE ANGLES = 29.56 lbs.

RAMP TERMINAL
ASSEMBLY "B"



TYPE B-2 POST



SIDE FRONT

TYPE B-2, B-3, B-4 POSTS

Post Type	Post		Top Clip	
	V	W	X	Y
B-3	5"	5"	7 1/4"	9"
B-4	6"	6"	8 1/4"	10"

WEIGHT SCHEDULE			
Post Type	Wt. in Lbs. for lower clip - each	Weight. in Lbs. for top clip - each	Weight for modified top clip - each
B-2	2.55	5.32	6.82
B-3	2.55	6.18	7.67
B-4	2.55	7.03	8.52

WEIGHTS DO NOT INCLUDE GALVANIZING

NOTES:
1. REFER TO STANDARD DRAWING 616-6.
2. POST WEIGHTS SHALL INCLUDE THE WEIGHT OF THE CLIPS OR COVER PLATES IF USED.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED 6260 STATE OF IDAHO CARL D. MAIN
ORIGINAL SIGNED BY: CARL D. MAIN
DECEMBER 6, 2007

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-96	HEB	6	09-11	HEB			
2	02-98	HEB	7	12-13	HEB			
3	12-01	NQB						
4	12-07	HEB						
5	07-10	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-16_1213.dgn

DRAWING DATE: DECEMBER, 2007

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: RYAN LANCASTER *for*
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

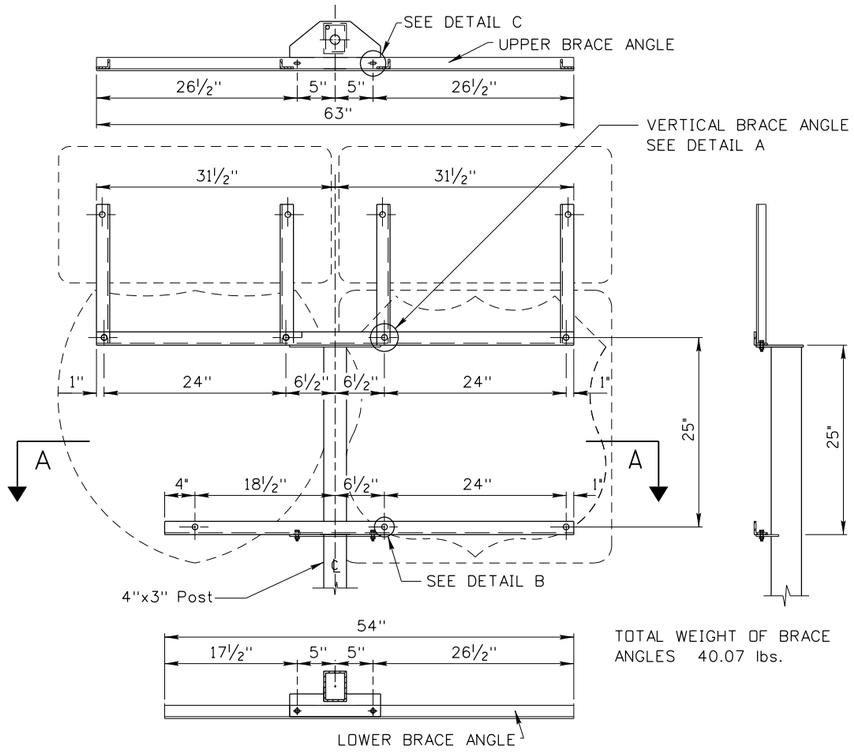
B POST AND BRACE ANGLE DETAIL

English

STANDARD DRAWING NO.
616-16

SHEET 2 OF 2

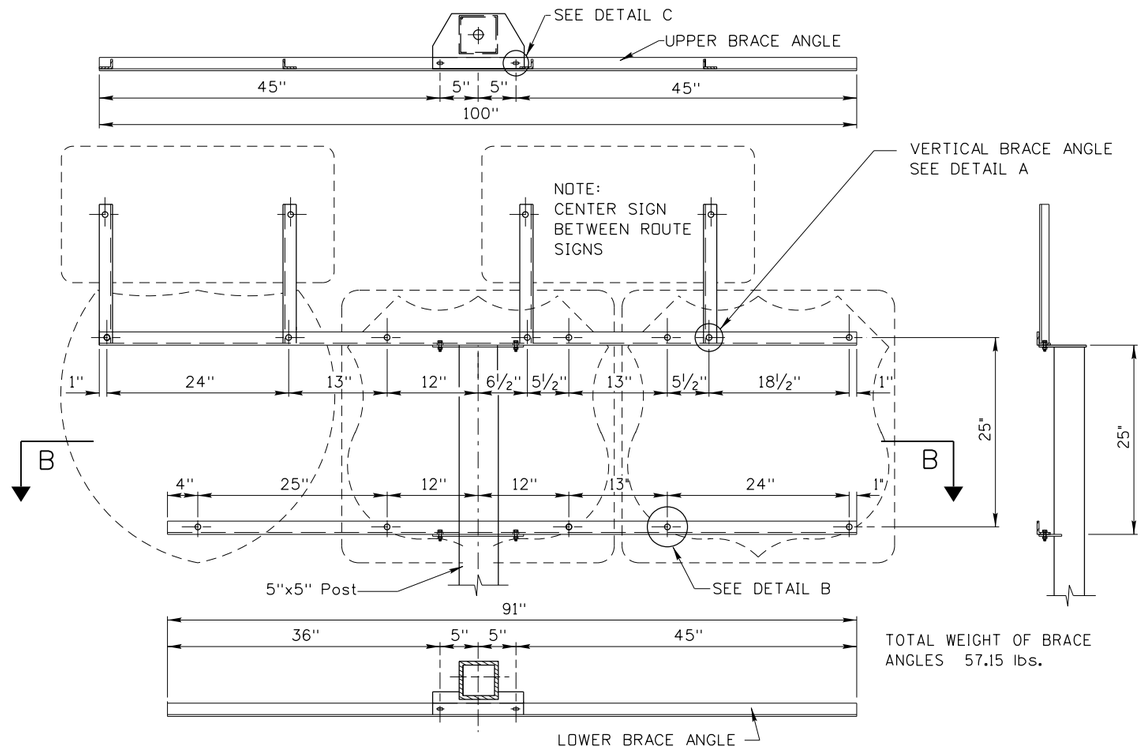
TOP VIEW



TOTAL WEIGHT OF BRACE ANGLES 40.07 lbs.

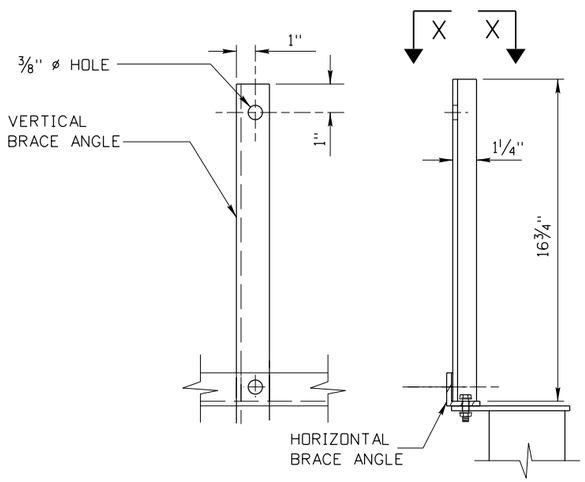
SEC. AA

TOP VIEW

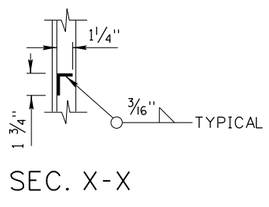


TOTAL WEIGHT OF BRACE ANGLES 57.15 lbs.

SEC. B-B

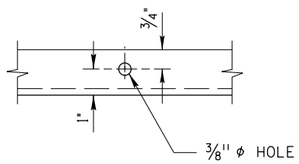


DETAIL A

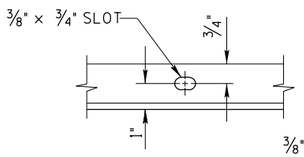


SEC. X-X

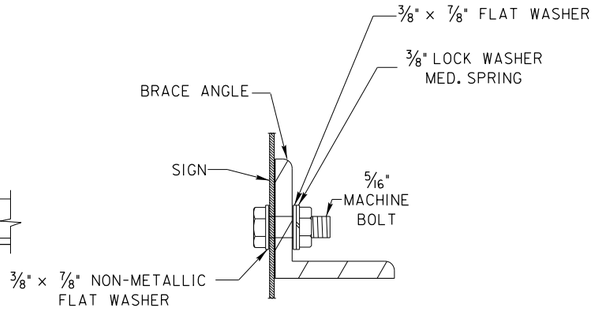
NOTE:
THESE BRACE ANGLE ASSEMBLIES MAY BE MODIFIED TO ACCOMMODATE ADDITIONAL CARDINAL ROUTE MARKERS ABOVE EACH ROUTE SHIELD AS SHOWN ON THE PLANS. CONFIRMING ROUTE MARKERS DO NOT REQUIRE THE VERTICAL BRACE ANGLES.



DETAIL B



DETAIL C



TYPICAL SIGN ATTACHMENT DETAIL

NOTES:

1. WEIGHTS OF BRACE ANGLES DO NOT INCLUDE GALVANIZING.
2. ALL BRACE ANGLES SHALL BE 1¾"x1¾"x¼" AT 2.77 LBS./FT WITH THE EXCEPTION OF THE VERTICAL BRACE ANGLE WHICH SHALL BE 1¾"x1¼"x¼" AT 2.34 LBS./FT.
3. DRAWING IS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO MAY 1, 2017 13683 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-01	NQB						
2	07-03	NQB						
3	09-10	HEB						
4	05-17	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 616-17_0517.dgn

DRAWING DATE: AUGUST, 1992

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

36" ROUTE AND AUXILIARY SIGN BRACE ANGLE ASSEMBLIES

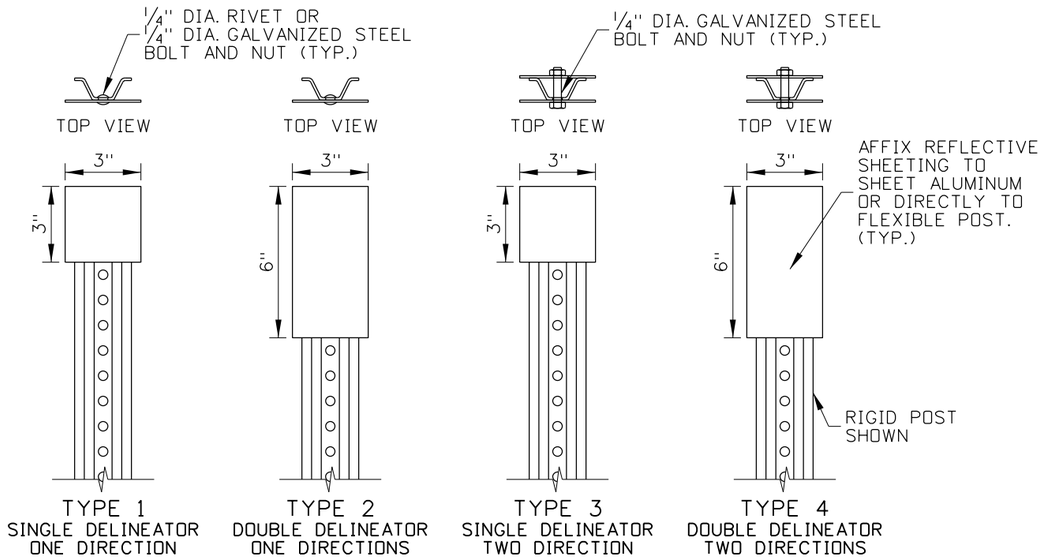
REQUIRES STD. DWG. 616-6

English

STANDARD DRAWING NO.

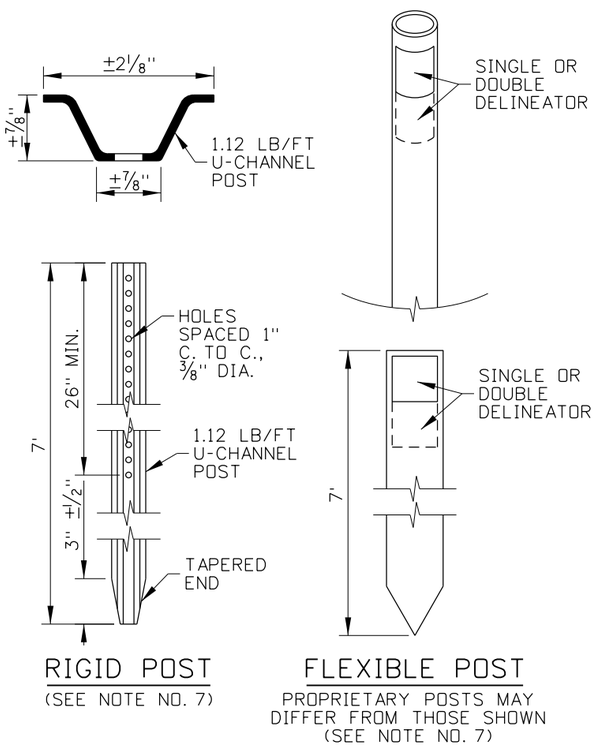
616-17

SHEET 1 OF 1



DELINEATOR TYPES

TYPE 9 NOT SHOWN
(SEE NOTE NO. 9)

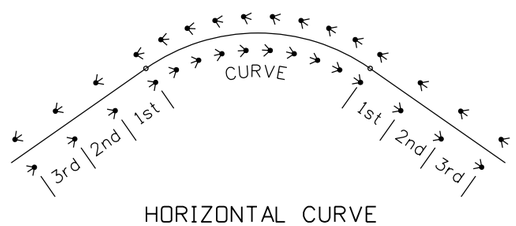


RIGID POST

(SEE NOTE NO. 7)

FLEXIBLE POST

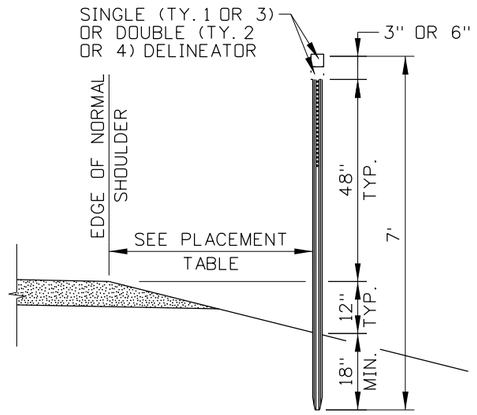
PROPRIETARY POSTS MAY
DIFFER FROM THOSE SHOWN
(SEE NOTE NO. 7)



HORIZONTAL CURVE

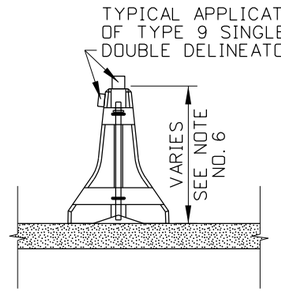
(SEE NOTE NO. 2)

HORIZONTAL CURVE SPACING TABLE				
RADIUS OF CURVE (FEET)	APPROXIMATE SPACING ON CURVE (FEET)	1st SPACE FROM CURVE (FEET)	2nd SPACE FROM CURVE (FEET)	3rd SPACE FROM CURVE (FEET)
50	20	40	60	120
115	25	50	75	150
180	35	70	105	210
250	40	80	120	240
300	50	100	150	300
400	55	110	165	300
500	65	130	195	300
600	70	140	210	300
700	75	150	225	300
800	80	160	240	300
900	85	170	255	300
1,000	90	180	270	300
1,500	115	230	300	300
2,500	150	300	300	300
5,000	210	300	300	300
10,000	300	300	300	300
> 10,000	528	528	528	528



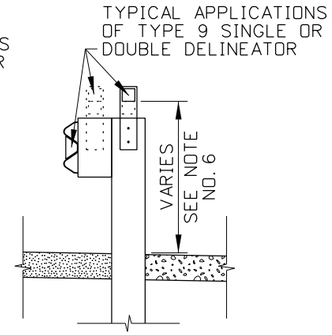
SHOULDER SLOPE INSTALLATION

(TYPES 1, 2, 3, OR 4)



CONCRETE BARRIER

(TYPE 9)



W-BEAM GUARDRAIL

(TYPE 9)

DELINEATOR INSTALLATIONS

PLACEMENT TABLE	
SHOULDER TYPE	OFFSET
2:1 SLOPE	2'
4:1 SLOPE	4'
6:1 OR FLATTER	6' TO 8'
CURB SECTION	6' TO 8'
GUARDRAIL OR CONCRETE BARRIER	VARIES

NOTES

1. MATCH THE DELINEATOR COLOR TO THE ADJACENT PAVEMENT MARKINGS. USE RED DELINEATORS ON TRUCK ESCAPE RAMPS OR ON THE REVERSE SIDE OF A DELINEATOR TO INDICATE TRAVEL IN THE WRONG DIRECTION ON DIVIDED OR ONE-WAY HIGHWAYS.
2. SPACE DELINEATORS 528 FEET (0.1 MI.) APART ON MAINLINE TANGENT SECTIONS. SPACE DELINEATORS ON CURVES IN ACCORDANCE WITH THE HORIZONTAL CURVE SPACING TABLE. SPACE DELINEATORS 100 FEET APART ON RAMP TANGENT SECTIONS. SPACE RED DELINEATORS ON TRUCK ESCAPE RAMPS AT 50 FOOT INTERVALS.
3. DELINEATE ACCELERATION AND DECELERATION LANES WITH DOUBLE DELINEATORS SPACED AT 100 FOOT INTERVALS.
4. DELINEATE GUARDRAIL AND CONCRETE BARRIERS. SPACING MAY BE REDUCED ON GUARDRAIL AND CONCRETE BARRIER TO FORM A CONTINUOUS OR NEARLY CONTINUOUS "RIBBON" OF DELINEATION.
5. WHEN UNIFORM SPACING IS INTERRUPTED BY DRIVEWAYS, INTERSECTIONS, OR OTHER FEATURES, RELOCATE THE DELINEATOR NOT FURTHER THAN ONE QUARTER OF THE UNIFORM SPACING. DELINEATORS CAN BE OMITTED WHEN STILL FALLING WITHIN THESE FEATURES.
6. MEASURE DELINEATOR HEIGHT VERTICALLY FROM THE BOTTOM OF THE LOWEST REFLECTIVE DEVICE TO THE ELEVATION OF THE EDGE OF NORMAL SHOULDER. DELINEATORS ATTACHED TO GUARDRAIL, GUARDRAIL POSTS, OR CONCRETE BARRER CAN BE INSTALLED LOWER THAN 48".
7. USE RIGID OR FLEXIBLE POSTS FOR TYPES 1, 2, 3, AND 4. SEE PROJECT PLANS FOR SPECIFIC INSTRUCTIONS.
8. ON GUARDRAIL AND CONCRETE BARRIERS, USE TYPE 9 DELINEATORS OR TYPE 1, 2, 3, OR 4 DELINEATORS BEHIND THE BARRIER.
9. TYPE 9 DELINEATORS VARY IN SHAPE AND CAN BE ATTACHED TO THE TOP OR SIDE OF W-BEAM GUARDRAIL, GUARDRAIL POSTS, OR CONCRETE BARRIER. IF "BUTTERFLY" STYLE GUARDRAIL DELINEATORS ARE USED, ENSURE THE DELINEATORS ARE PLASTIC.
10. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
RYAN D. LANCASTER
STATE OF IDAHO
13683
ORIGINAL SIGNED
RYAN D. LANCASTER
MARCH 9, 2022
ORIGINAL SIGNED
STATE OF IDAHO
RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	06-05	MSM	6	05-18	RDL			
2	11-11	TEM	7	03-21	RDL			
3	04-14	RDL	8	02-22	RDL			
4	03-15	PJF						
5	05-16	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 617-1_0422.dgn

DRAWING DATE: DECEMBER, 2002

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

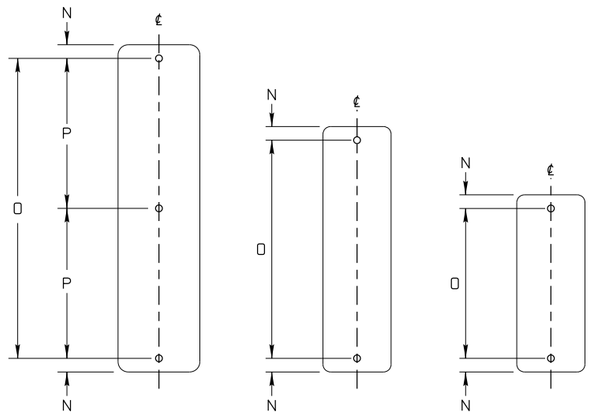
DELINEATORS

English

STANDARD DRAWING NO.

617-1

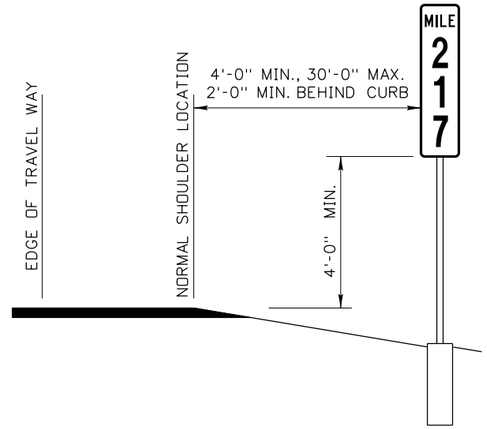
SHEET 1 OF 1



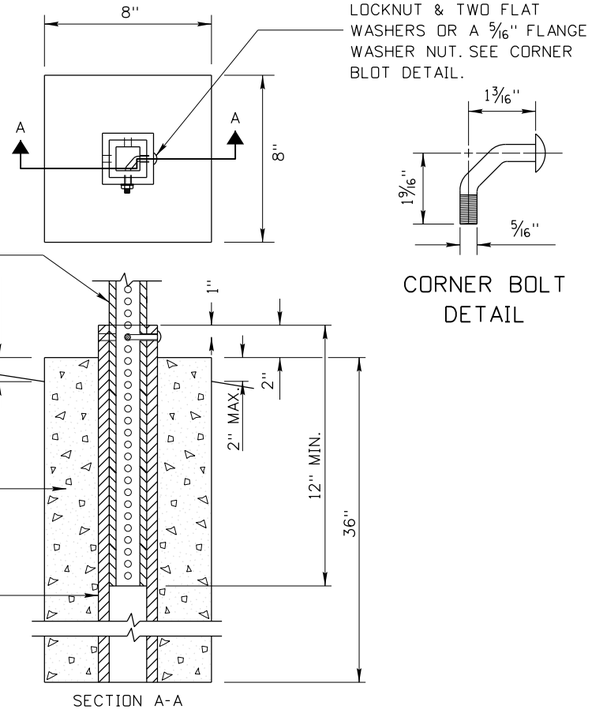
3/8" ø HOLES TYPICAL

MILEPOST SIGNS

	TYPE 1			TYPE 2 AND 3		
	MILE 2	MILE 24	MILE 245	MILE 2	MILE 25	MILE 245
SIZE	12" X 24"	12" X 36"	12" X 48"	10" X 18"	10" X 27"	10" X 36"
NO. OF HOLES	2	2	3	2	2	2
N	2"	2"	2"	2"	2"	2"
O	20"	32"	44"	14"	23"	32"
P	–	–	22"	–	–	–



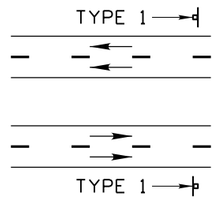
SIGN HEIGHT AND LATERAL LOCATION



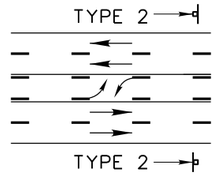
SECTION A-A

SIGN POST INSTALLATION DETAILS

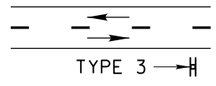
CORNER BOLT DETAIL



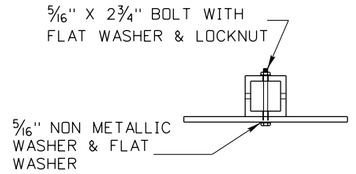
EXPRESSWAY OR FREEWAY



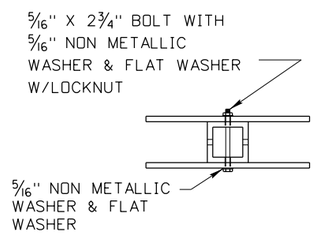
UNDIVIDED MULTI-LANE HIGHWAY



TWO LANE HIGHWAYS



TYPE 1 & 2 MILEPOST SIGN



TYPE 3 MILEPOST SIGN

NOTES

1. ON EXPRESSWAYS, FREEWAYS OR MULTI-LANE HIGHWAYS, PLACE A MILEPOST ASSEMBLY IN EACH DIRECTION OF TRAVEL. ON TWO LANE ROADWAYS, BACK TO BACK MILEPOST ASSEMBLIES MAY BE INSTALLED ON THE ON THE RIGHT SIDE OF THE ROADWAY IN THE DIRECTION OF ASCENDING MILE POSTS.
2. INSTALL SIGN POST AND ANCHOR OR GROUT INTO SOLID ROCK. IF INSTALLED IN ROCK, ENSURE THE ANCHOR POST IS EMBEDDED 18" INTO SOLID ROCK.
3. DO NOT ATTACH MILEPOST SIGNS UNTIL THE CONCRETE HAS SET WHEN FOUNDATIONS ARE CAST IN PLACE.
4. ENSURE THAT THE BOTTOM OF ANCHOR IS LEFT OPEN TO DRAIN.
5. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO ORIGINAL SIGNED DECEMBER 4, 2015 13683 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	05-15	HEB						
2	12-15	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 617-2_1215.dgn

DRAWING DATE: MAY, 2015

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

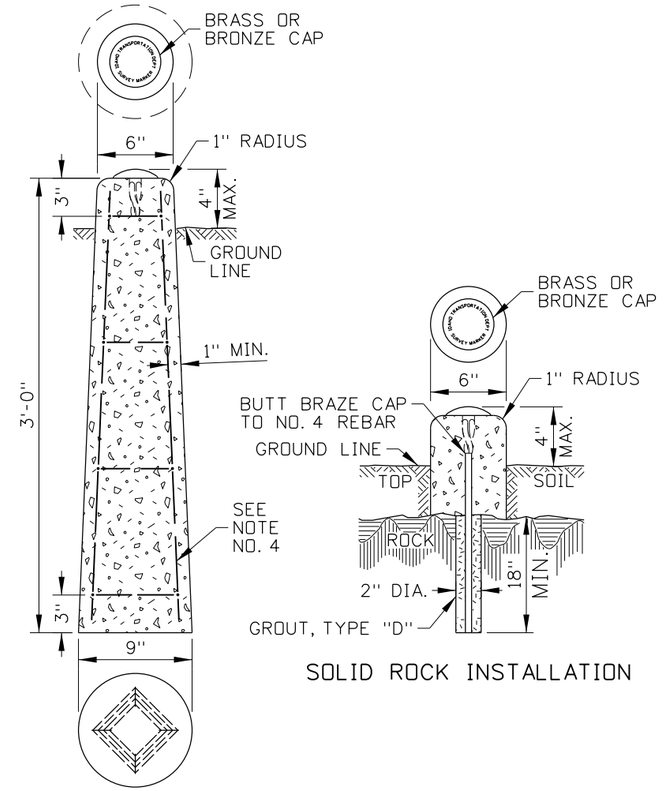
STANDARD DRAWING

MILEPOST ASSEMBLIES

English

STANDARD DRAWING NO. 617-2

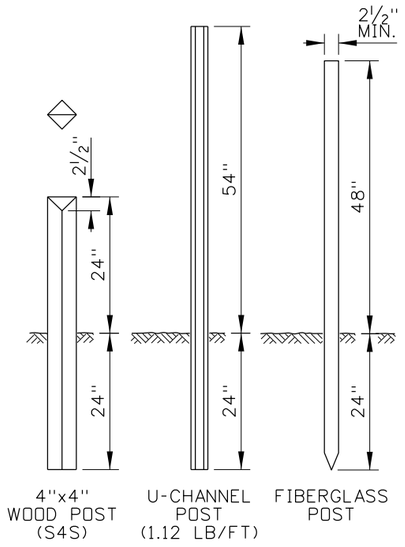
SHEET 1 OF 1



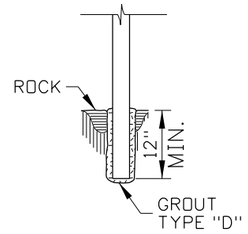
EARTH INSTALLATION

SOLID ROCK INSTALLATION

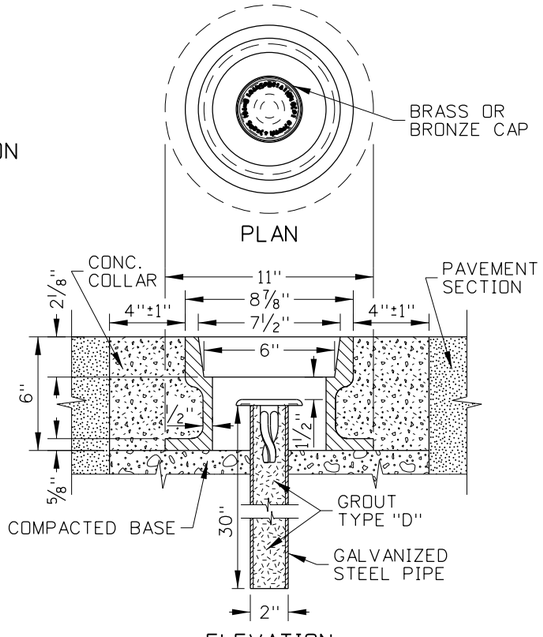
MONUMENT MARKER



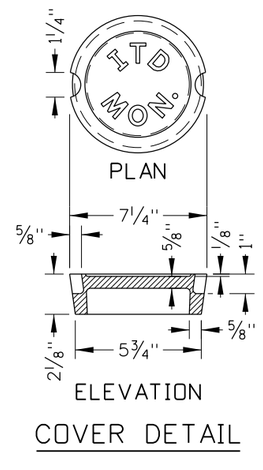
WITNESS POSTS



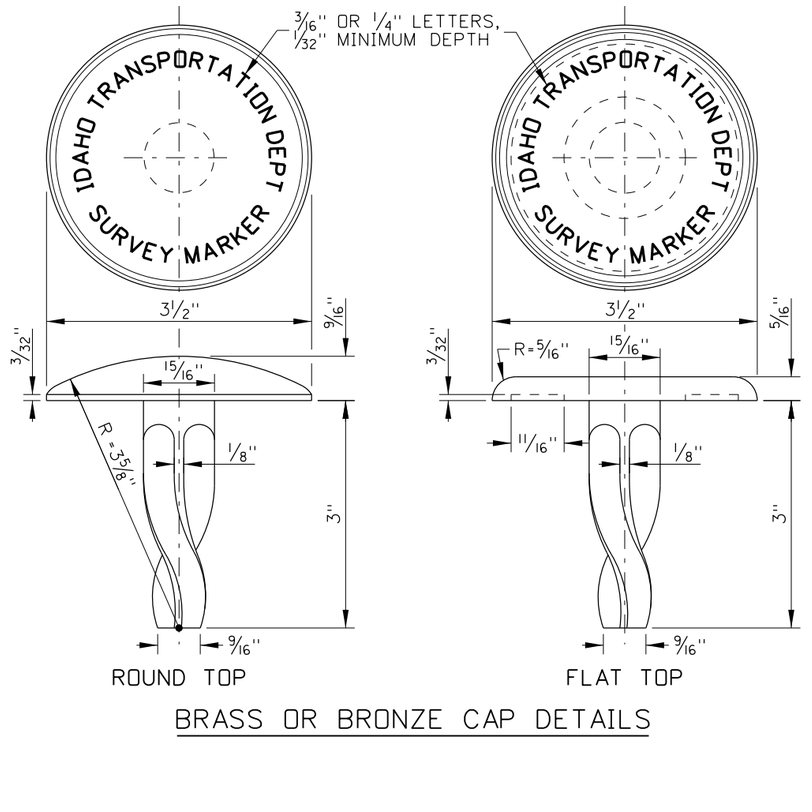
WITNESS POST SOLID ROCK INSTALLATION DETAIL



CASING



COVER DETAIL



BRASS OR BRONZE CAP DETAILS

NOTES

1. SURVEY MONUMENTS CAN BE PRECAST OR CAST-IN-PLACE. SET THE BRASS CAP IN THE TOP CENTER OF THE MONUMENT.
2. USE ROUND TOP MARKERS FOR VERTICAL CONTROL, HORIZONTAL CONTROL, OR BOTH. USE FLAT TOP MARKERS FOR HORIZONTAL CONTROL.
3. ENSURE THAT HORIZONTAL CONTROL MARKERS ARE PLACED WITHIN ½" OF THE POINT ESTABLISHED. THE VERTICAL CONTROL POINT IS THE HIGHEST POINT OF THE ROUND TOP CAP.
4. REINFORCE EARTH INSTALLATION MONUMENT MARKER WITH FOUR NO. 2 BARS, 33½" LONG, AND PLACED AN EQUAL DISTANCE APART. TIE WITH NO. 8 WIRE AT 10" INTERVALS.
5. USE CASING WHEN THE MONUMENT IS PLACED IN PAVEMENT. THE MONUMENT MAY BE PLACED CLOSER TO THE GROUND OR IN CASING IN AREAS THAT ARE MOWED. OTHER CASING DESIGNS MAY BE USED WITH APPROVAL FROM THE ENGINEER.
6. MACHINE COVER AND CASING CONTACT SURFACES TO A TRUE BEARING ALL AROUND.
7. THE MONUMENT MARKER MAY BE USED AS A RIGHT-OF-WAY MARKER, PROJECT MARKER, REFERENCE MARKER, CONTROL POINT, OR PROPERTY CORNER.
8. STAMP THE MONUMENT CAP ACCORDING TO ITS PURPOSE. "ROW" FOR RIGHT-OF-WAY MARKER, "PRJ" FOR PROJECT MARKER, "REF" FOR REFERENCE MARKER, "CTL" FOR CONTROL POINT, OR "COR" FOR PROPERTY CORNER.
9. PLACE THE WITNESS POSTS AS CLOSE TO THE MARKERS AS PRACTICAL. WHEN SOLID ROCK IS ENCOUNTERED, GROUT THE WITNESS POST AS SHOWN IN THE WITNESS POST SOLID ROCK INSTALLATION DETAIL.
10. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED BY
RYAN D. LANCASTER
DECEMBER 8, 2021
13683
STATE OF IDAHO
RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	05-62		6	01-68		11	06-02	MSM
2	06-62		7	09-72		12	12-04	MSM
3	05-65		8	07-90	GB	13	11-06	MSM
4	09-66		9	09-93	MSM	14	12-12	RDL
5	04-67		10	05-95	MSM	15	11-15	RDL

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 618-1_1215.dgn

DRAWING DATE: APRIL, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: TED E. MASON *for*

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

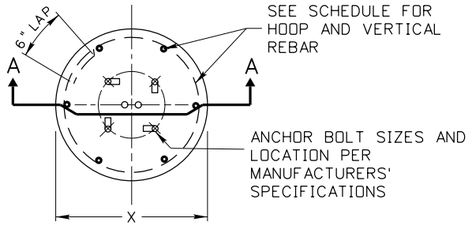
MARKER POSTS, WITNESS POSTS, AND STREET MONUMENTS

English

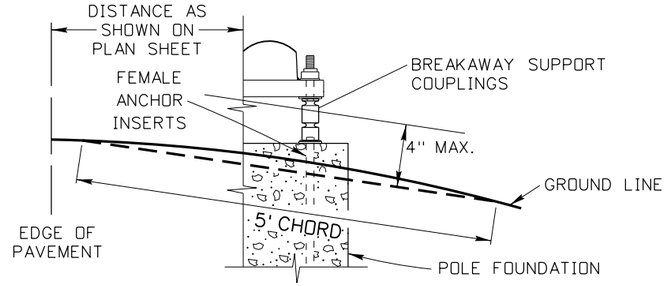
STANDARD DRAWING NO.

618-1

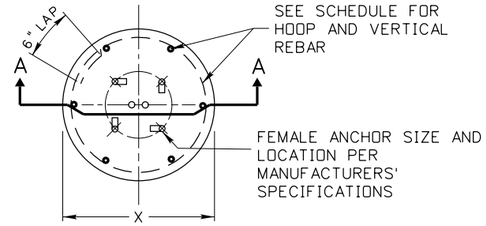
SHEET 1 OF 1



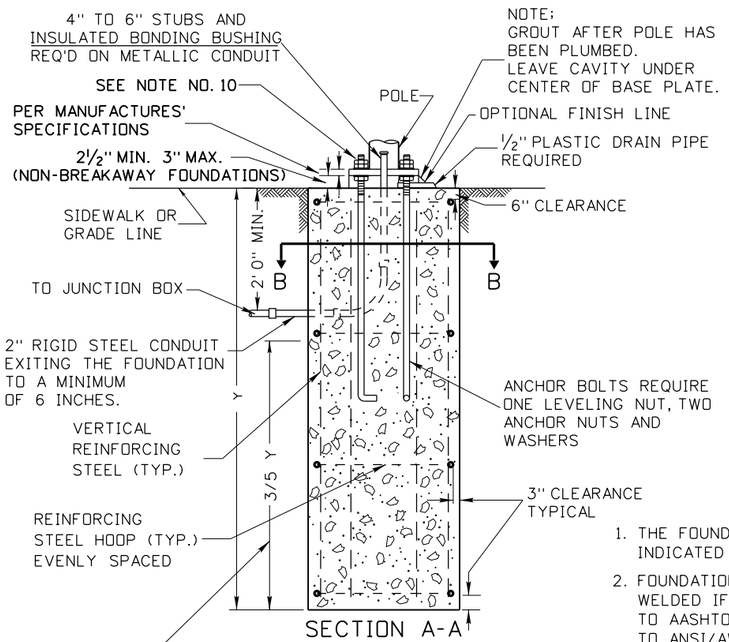
SECTION B-B



BREAKAWAY SUPPORT CLEARANCE DIAGRAMS

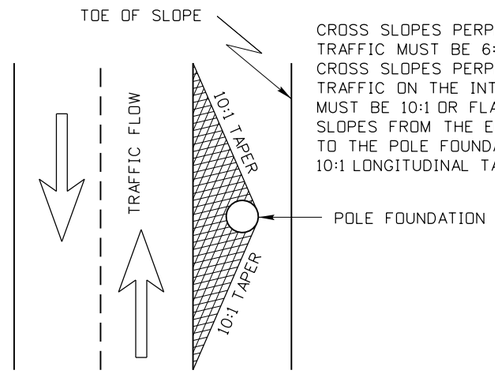


SECTION B-B

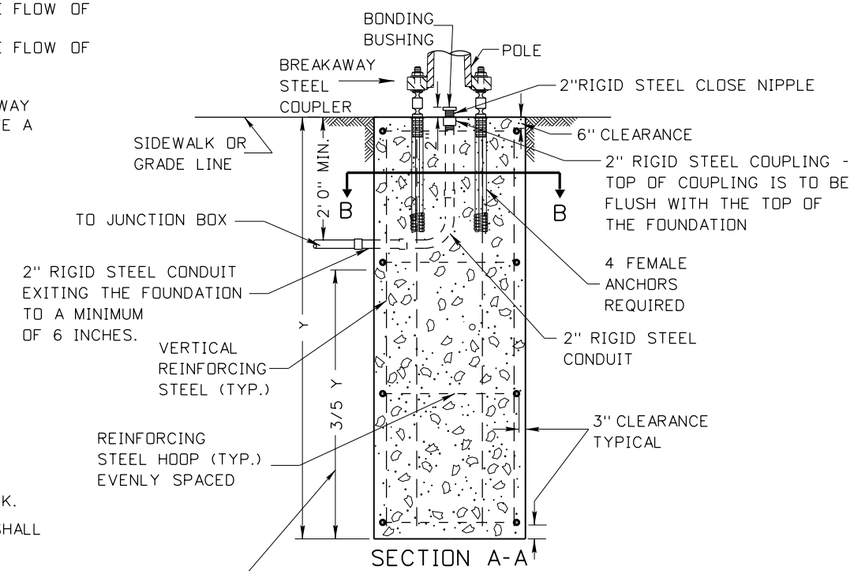


SECTION A-A

TYPICAL POLE FOUNDATION
IN DRILLED HOLE
ANCHOR BASE



FOUNDATION GRADING/SLOPE TREATMENT



SECTION A-A

TYPICAL POLE FOUNDATION
IN DRILLED HOLE
BREAKAWAY BASE

GENERAL NOTES:

1. THE FOUNDATIONS SHALL BE LOCATED AS INDICATED ON THE PROJECT PLAN SHEETS.
2. FOUNDATION REINFORCING STEEL CAGES MAY BE WELDED IF THE REINFORCING STEEL CONFORMS TO AASHTO M 31 AND ALL WELDING CONFORMS TO ANSI/AWS D1.4 (STRUCTURAL WELDING CODE - REINFORCING STEEL).
3. REINFORCING STEEL IN POLE FOUNDATIONS SHALL BE 60 KSI STEEL.
4. STEEL TEMPLATE REQUIRED FOR ANCHOR BOLT PLACEMENT.
5. CLASS 40A CONCRETE SHALL BE USED IN POLE FOUNDATIONS.
6. FOUNDATION CONCRETE SHALL ACHIEVE 100% STRENGTH AND CURE FOR A MINIMUM OF 7 DAYS BEFORE ANY LOADING IS APPLIED.
7. FILLER JOINT MATERIAL WILL BE PLACED AROUND POLE FOUNDATION WHEN POLE FOUNDATION IS IN CONTACT WITH SIDEWALK.
8. ELEVATION OF TOP OF POLE FOUNDATION SHALL MATCH THE ADJACENT PAVEMENT EDGE OR SIDEWALK ELEVATION.
9. ANCHOR BASE ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED IN ACCORDANCE WITH SUBSECTION 619.03 OF THE ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND THE SUPPLEMENTAL SPECIFICATIONS.
10. DRAWING NOT TO SCALE.

POLE FOUNDATION SCHEDULE

POLE TYPE	MOUNTING HEIGHT	MASTARM LENGTH	FOUNDATION TYPE	X	Y	REINFORCING STEEL HOOPS			VERTICAL REINFORCING STEEL			CUBIC YARDS CONCRETE
						QTY.	SIZE	LIN.FT.	QTY.	SIZE	LIN.FT.	
LIGHT POLE	30'	ALL	A	2'-0"	5'-0"	4	#4	20'-10"	6	#4	25'-6"	0.6
LIGHT POLE	35'	ALL	B	2'-6"	7'-0"	4	#4	27'-2"	6	#6	37'-6"	1.3
LIGHT POLE	40'-50'	ALL	C	3'-0"	8'-0"	5	#4	41'-10"	8	#6	58'-0"	2.1

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REGISTERED PROFESSIONAL ENGINEER
THE ORIGINAL SEAL WAS AFFIXED ON MAY 1, 2017
STATE OF IDAHO
4115
TRI BUD

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 619-1_0517.dgn

DRAWING DATE: MAY, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

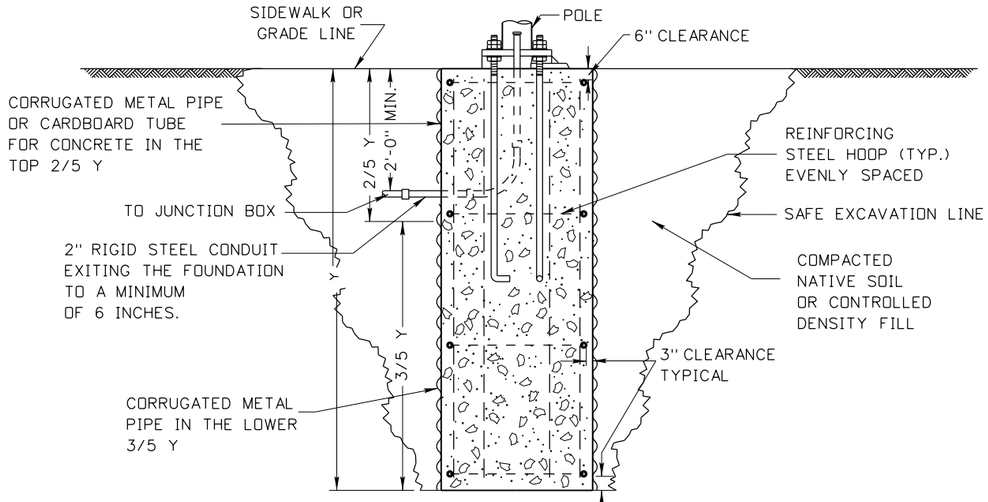
LIGHT POLE FOUNDATION DETAILS

English

STANDARD DRAWING NO.

619-1

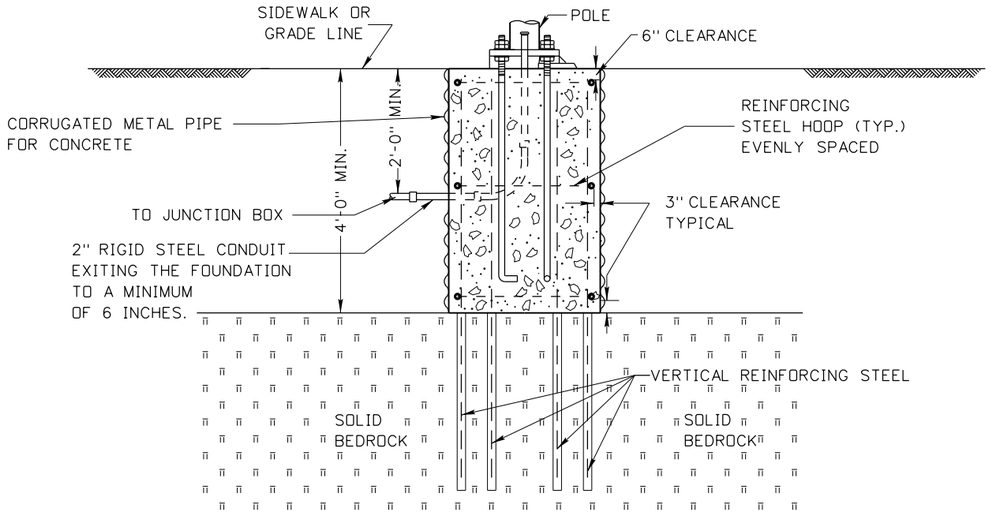
SHEET 1 OF 2



TYPICAL ANCHOR BASE
POLE FOUNDATION
IN EXCAVATION

EXCAVATION NOTES:

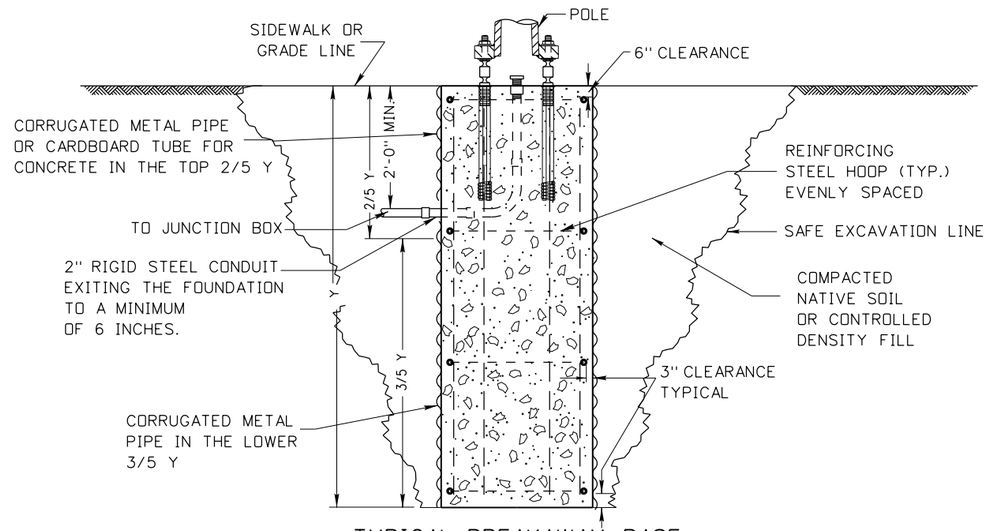
1. IF CORRUGATED METAL PIPE IS USED UP TO SIDEWALK OR GRADE LINE, CUT OUT HOLE FOR THE CONDUITS WILL BE EQUAL TO THE DIAMETER OF CONDUIT OR CONDUIT PLUS ONE INCH.
2. WHEN NATIVE SOIL IS USED FOR BACKFILL, IT SHALL BE COMPACTED IN ACCORDANCE WITH SUBSECTION 210.03 OF THE IDAHO STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND SUPPLEMENTAL SPECIFICATIONS.
3. IF CONTROL DENSITY FILL IS USED FOR BACK FILL, IT SHALL HAVE A COMPRESSIVE STRENGTH OF 100 PSI TO 300 PSI.
4. DRAWING NOT TO SCALE.



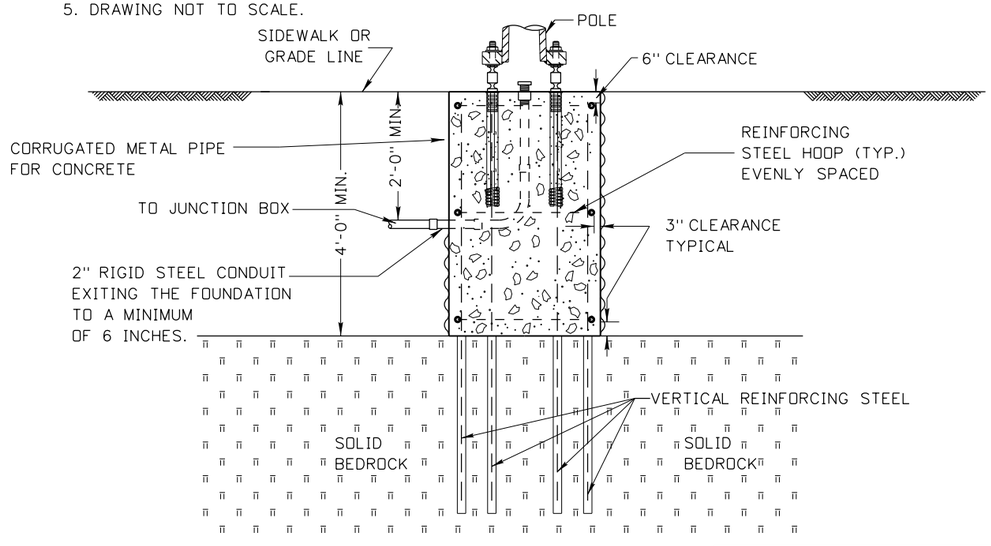
TYPICAL ANCHOR BASE
POLE FOUNDATION
IN SOLID BEDROCK

SOLID BEDROCK NOTES:

1. IF DEPTH TO BEDROCK IS LESS THAN 4', NOTIFY THE ENGINEER AND REDESIGN OF THE FOUNDATION MAY BE REQUIRED
2. THREE REINFORCING STEEL HOOPS TO BE EVENLY SPACED ARE REQUIRED.
3. SOCKET ALL VERTICAL REINFORCING STEEL FULL LENGTH AS SHOWN IN POLE FOUNDATION SCHEDULE ON SHEET 1 IN BEDROCK. DIAMETERS OF DRILLED HOLES FOR VERTICAL REINFORCING STEEL SHALL BE AT LEAST 2 INCHES. FILL DRILLED HOLES WITH GROUT, 705.02, TYPE B, CLASS 1.
4. EXCAVATION NOTES APPLY TO THIS APPLICATION.
5. DRAWING NOT TO SCALE.



TYPICAL BREAKAWAY BASE
POLE FOUNDATION
IN EXCAVATION



TYPICAL BREAKAWAY BASE
POLE FOUNDATION
IN SOLID BEDROCK

SEE STANDARD DRAWING 619-1 SHEEET 1 FOR DETAILS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REGISTERED PROFESSIONAL ENGINEER
THE ORIGINAL SEAL WAS SIGNED ON MAY 1, 2017
4115
STATE OF IDAHO
TRI BUD

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 619-1_0517.dgn

DRAWING DATE: MAY, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

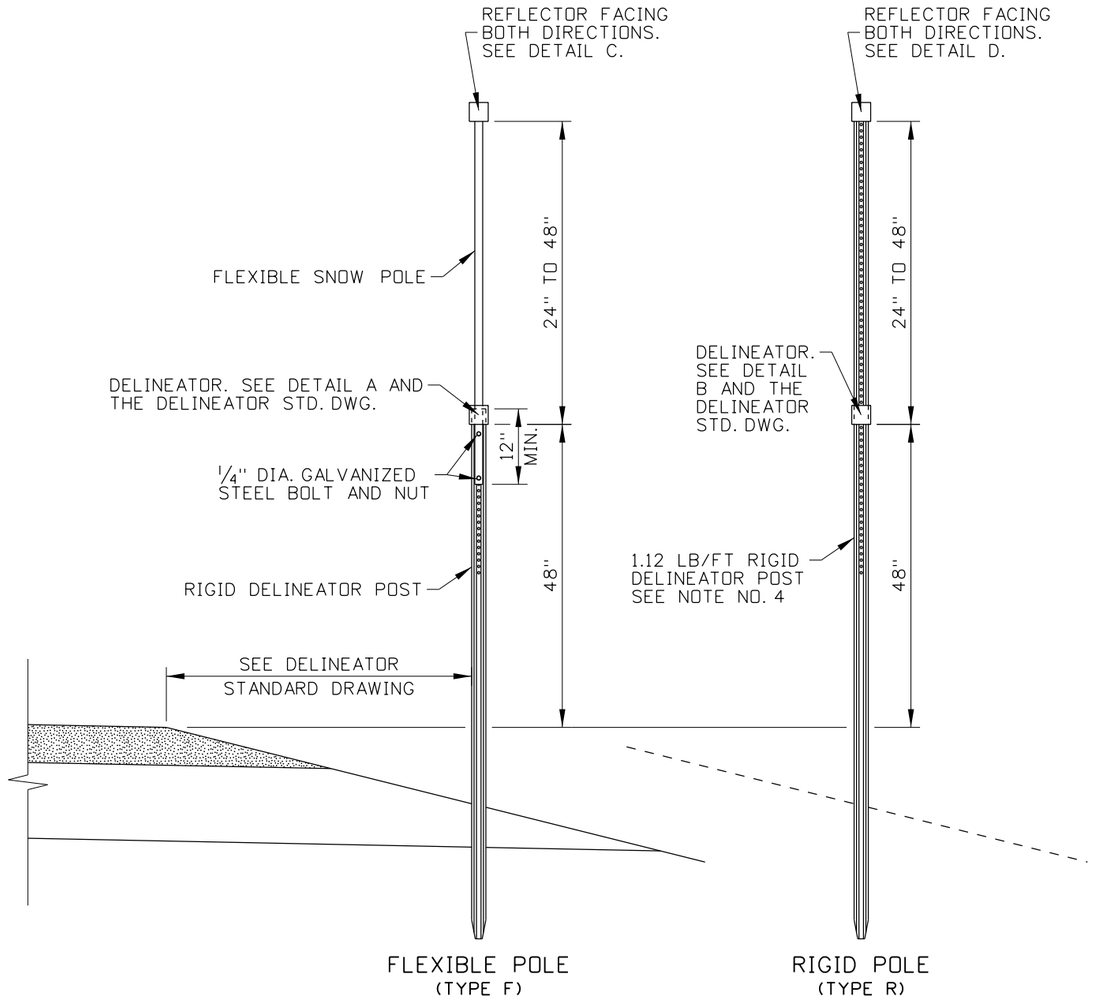
LIGHT POLE FOUNDATION DETAILS

English

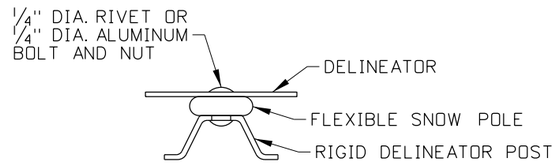
STANDARD DRAWING NO.

619-1

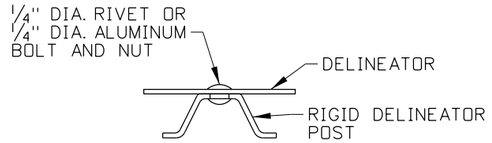
SHEET 2 OF 2



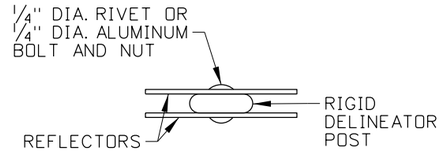
SNOW POLE INSTALLATION



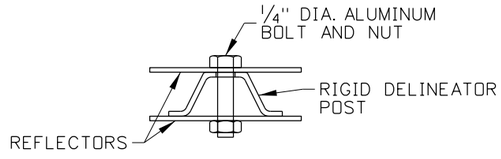
DETAIL A



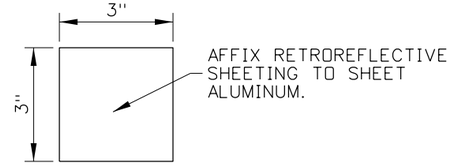
DETAIL B



DETAIL C



DETAIL D



REFLECTOR DETAIL

SEE NOTE NOS. 2 AND 3

NOTES

1. ATTACH FLEXIBLE SNOW POLES TO DELINEATOR POLES OR INSTALL RIGID POLE DELINEATORS AND SNOWPOLES AT THE SPACING SHOWN ON THE DELINEATOR STANDARD DRAWING.
2. THE REFLECTOR CAN BE MADE OF THE SAME MATERIAL AND HAVE THE SAME DIMENSIONS AS SINGLE DELINEATORS, OR THEY CAN BE RETROREFLECTIVE SHEETING ATTACHED DIRECTLY TO THE FLEXIBLE SNOW POLE.
3. USE WHITE RETROREFLECTIVE MATERIAL FOR THE REFLECTOR.
4. DO NOT CONNECT MULTIPLE SECTIONS OF RIGID DELINEATOR POLES TO ACHIEVE THE SNOW POLE HEIGHT.
5. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER DATE ORIGINAL SIGNED DECEMBER 28, 2018 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	05-05	MSM						
2	04-14	RDL						
3	12-18	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 628-1_1218.dgn

DRAWING DATE: DECEMBER, 2002

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

SNOW POLES

REQUIRES STD. DWG. 617-1

English

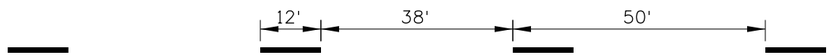
STANDARD DRAWING NO. 628-1

SHEET 1 OF 1

LONGITUDINAL PAVEMENT MARKING LINES

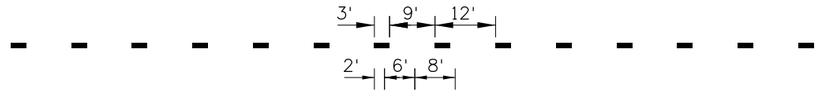
SOLID LINE
COLOR: WHITE OR YELLOW
WIDTH: NORMAL (4" TO 6") OR WIDE (2X NORMAL WIDTH)

DOUBLE LINE
COLOR: WHITE OR YELLOW
WIDTH: NORMAL (4" TO 6" LINE, 3" GAP, 4" TO 6" LINE)



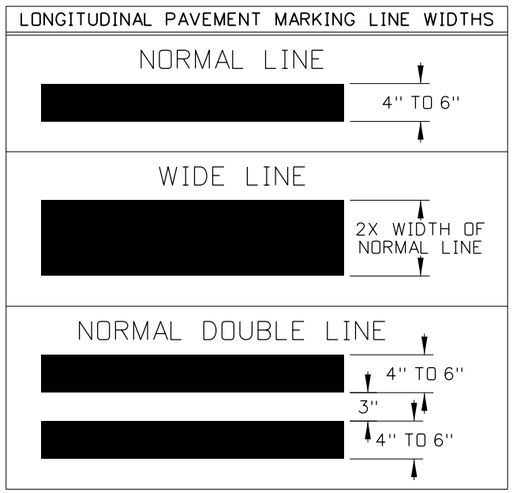
BROKEN LINE
COLOR: WHITE OR YELLOW
WIDTH: NORMAL (4" TO 6")

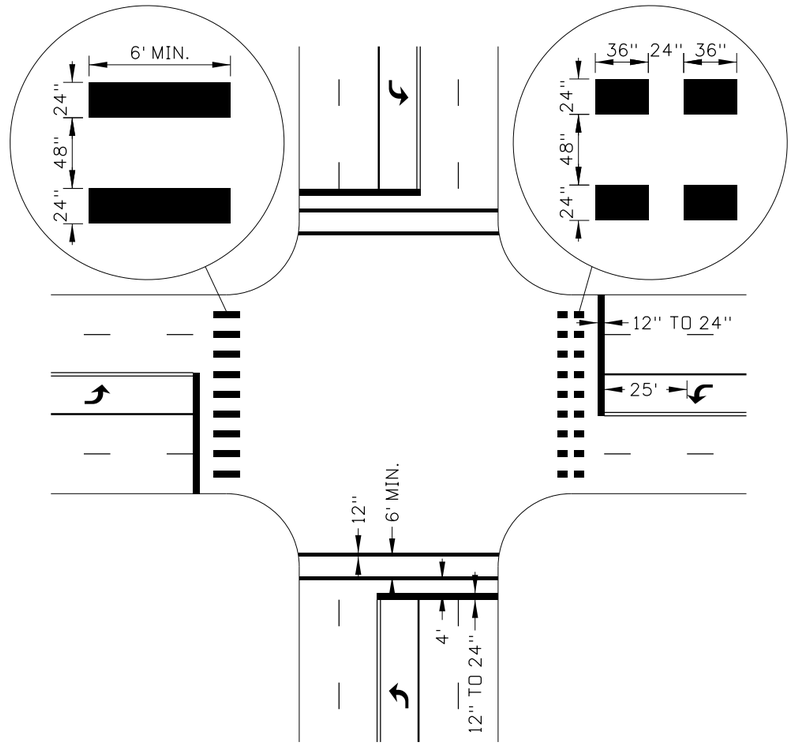
COMBINATION SOLID AND BROKEN LINE
COLOR: YELLOW
WIDTH: NORMAL (4" TO 6" LINE, 3" GAP, 4" TO 6" LINE)



DOTTED LINE
3' LINE SEGMENT, 9' GAP OR 2' LINE SEGMENT, 6' GAP (SEE NOTE NO. 2)
COLOR: WHITE OR YELLOW
WIDTH: NORMAL (4" TO 6") OR WIDE (2X NORMAL WIDTH)

LONGITUDINAL PAVEMENT MARKING LINE WIDTHS





EXAMPLE STOP LINE AND CROSSWALK DETAIL

NOTES

1. USE WHITE AND YELLOW PAVEMENT MARKINGS AS FOLLOWS:
   WHITE:
   A. THE SEPARATION OF TRAFFIC TRAVELING IN THE SAME DIRECTION.
   B. THE RIGHT-HAND EDGE OF THE HIGHWAY.
   YELLOW:
   A. THE SEPARATION OF TRAFFIC TRAVELING IN OPPOSITE DIRECTIONS.
   B. THE LEFT-HAND EDGE DIVIDED HIGHWAYS, ONE-WAY STREETS, OR RAMPS.
   C. TWO-WAY LEFT-TURN LANES.
2. USE LONGITUDINAL PAVEMENT MARKINGS AS FOLLOWS:
   A. USE SOLID LINES TO INDICATE THE LEFT OR RIGHT EDGE OF TRAVEL WAY OR TO DISCOURAGE LANE CHANGING.
   B. USE DOUBLE LINES TO PROHIBIT PASSING OR LANE CHANGING.
   C. USE BROKEN LINES TO INDICATE PASSING OR LANE CHANGING ARE PERMITTED. USE THE 12' LINE SEGMENT, 38' GAP PATTERN FOR ALL SPEEDS.
   D. USE COMBINATION SOLID AND BROKEN LINES TO PROHIBIT PASSING IN ONE DIRECTION WHILE PERMITTING PASSING IN THE OPPOSITE DIRECTION OR TO INDICATE A TWO-WAY LEFT-TURN LANE.
   E. USE DOTTED LINES AS FOLLOWS:
      3' LINE SEGMENT, 9' GAP:
      I. TO SEPARATE A THROUGH LANE AND A LANE THAT BECOMES A MANDATORY EXIT OR TURN LANE (DROPPED LANE).
      II. TO SEPARATE THROUGH LANES AND TURN LANES OR RAMPS.
      III. TO SEPARATE A THROUGH LANE AND AN AUXILIARY LANE 2 MILES OR LESS IN LENGTH BETWEEN FREEWAY ENTRANCE RAMP AND EXIT RAMPS OR 1 MILE OR LESS IN LENGTH BETWEEN INTERSECTIONS.
      2' LINE SEGMENT, 6' GAP:
      I. AS A LANE LINE EXTENSION THROUGH AN INTERSECTION.
3. USE 12' VEHICULAR TRAVEL LANES UNLESS OTHERWISE INDICATED. MEASURE LANE WIDTHS FROM THE CENTER OF LINE TO THE CENTER OF LINE.
4. THE PAVEMENT MARKING APPLICATION EXAMPLES PRESENTED SHOW COMMON APPLICATION. MODIFY AS NEEDED TO ACCOMODATE OTHER SITUATIONS.
5. METHODS FOR DETERMINING TURN-LANE LENGTH ARE DESCRIBED IN THE ITD TRAFFIC MANUAL.
6. USE 15W FOR POSTED SPEED LIMITS OF 45 MPH OR GREATER. USE 8W FOR POSTED SPEED LIMITS OF 40 MPH OR LESS. W IS THE OFFSET WIDTH IN FEET.
7. USE DISTANCE L WHEN PRACTICAL. USE THE FOLLOWING EQUATION TO DETERMINE L:
   L = WS
   WHERE:
   W = OFFSET WIDTH IN FEET
   S = POSTED SPEED LIMIT
8. USE LANE-USE ARROWS AND WORD PAVEMENT MARKINGS AS SHOWN. SOME MARKINGS ARE OPTIONAL.
   A. USE TWO OR MORE LANE-USE ARROWS UNLESS THE TURN-LANE LENGTH IS LESS THAN 75 FEET. IF SHORTER THAN 75 FEET, THE DOWNSTREAM ARROW CAN BE OMITTED.
   B. USE TWO-WAY LEFT-TURN ARROW MARKINGS NEAR THE BEGINNING OF A TWO-WAY LEFT-TURN LANE AND EVERY ½ MILE THEREAFTER.
9. BREAK EDGE AND LANE LINES AT INTERSECTIONS WITH MINOR ROADS. CONTINUE EDGE AND LANE LINES THROUGH DRIVEWAY APPROACHES.
10. ON TWO-LANE HIGHWAYS, PAINT THE CENTERLINE IN ONE DIRECTION IN ASCENDING STATION/MILEPOST DIRECTION AS SHOWN.
11. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED BY MARCH 17, 2020 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 630-1_0420.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

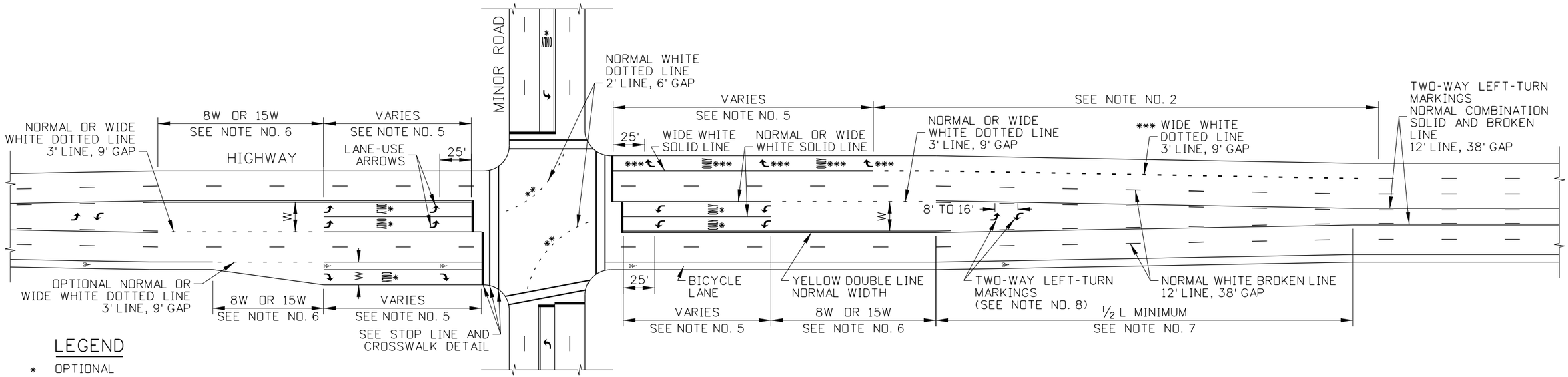
STANDARD DRAWING

PAVEMENT MARKINGS

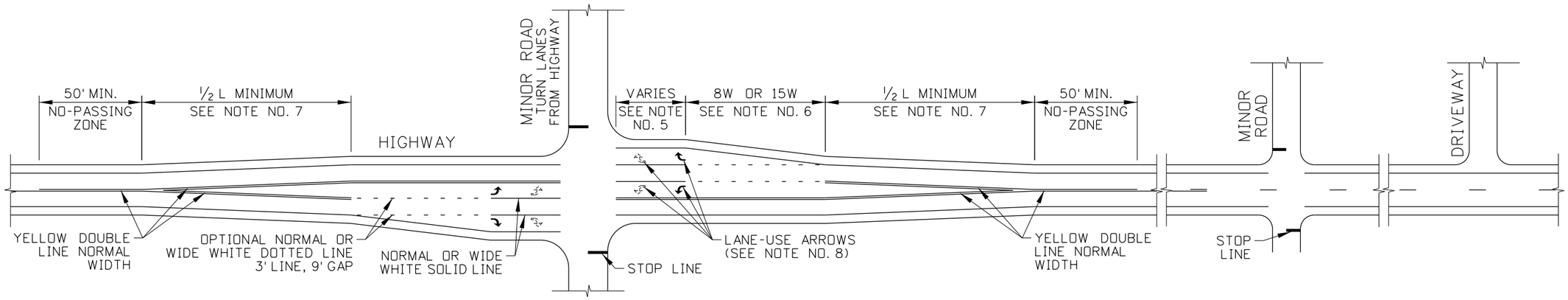
English

STANDARD DRAWING NO.

630-1



EXAMPLE URBAN HIGHWAY PAVEMENT MARKINGS



EXAMPLE RURAL HIGHWAY PAVEMENT MARKINGS

SEE NOTE NO. 9

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO 13683 ORIGINAL SIGNED MARCH 17, 2020

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 630-1_0420.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

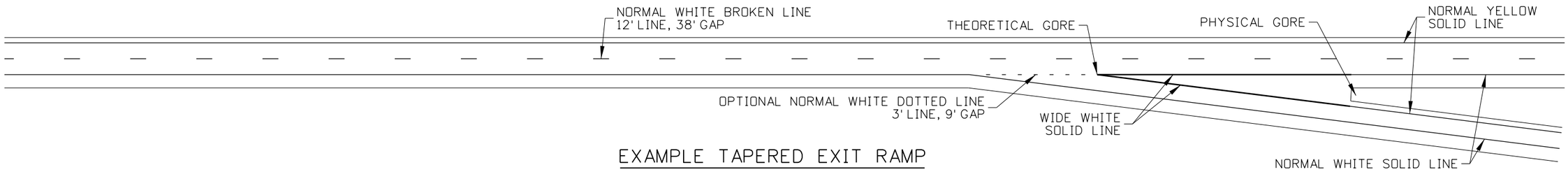
STANDARD DRAWING

PAVEMENT MARKINGS

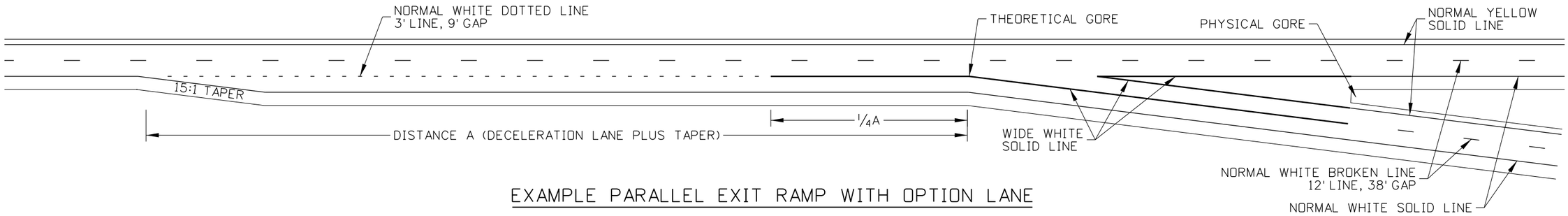
English

STANDARD DRAWING NO.

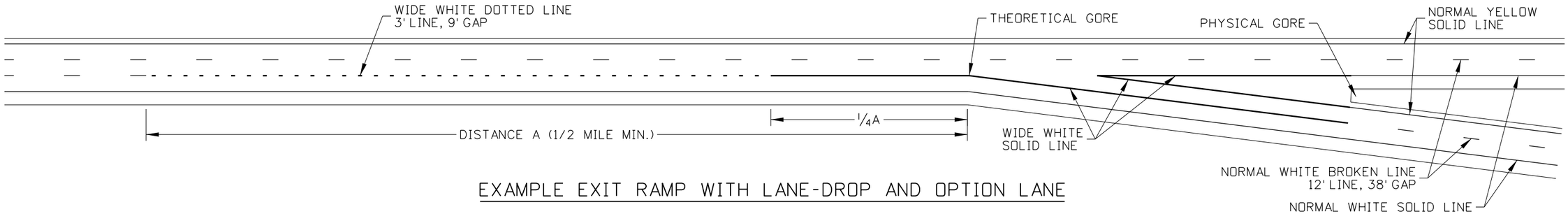
630-1



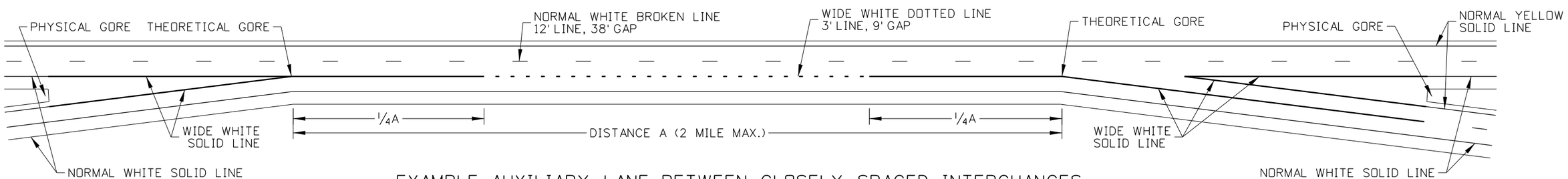
EXAMPLE TAPERED EXIT RAMP



EXAMPLE PARALLEL EXIT RAMP WITH OPTION LANE



EXAMPLE EXIT RAMP WITH LANE-DROP AND OPTION LANE



EXAMPLE AUXILIARY LANE BETWEEN CLOSELY SPACED INTERCHANGES

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER
LICENSED
ORIGINAL SIGNED
RYAN D. LANCASTER
STATE OF IDAHO
MARCH 17, 2020
13683
RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 630-1_0420.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

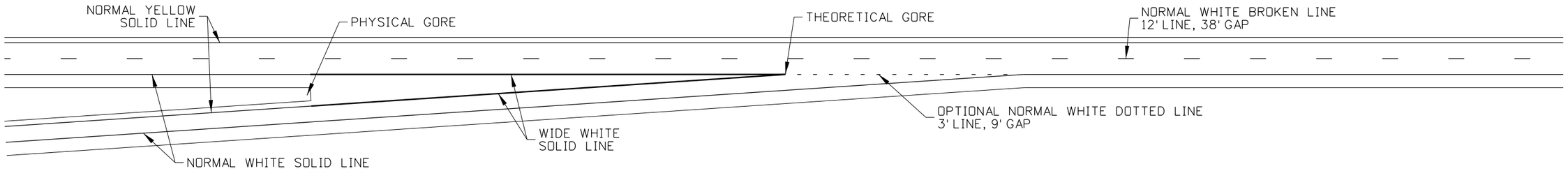
STANDARD DRAWING

PAVEMENT MARKINGS

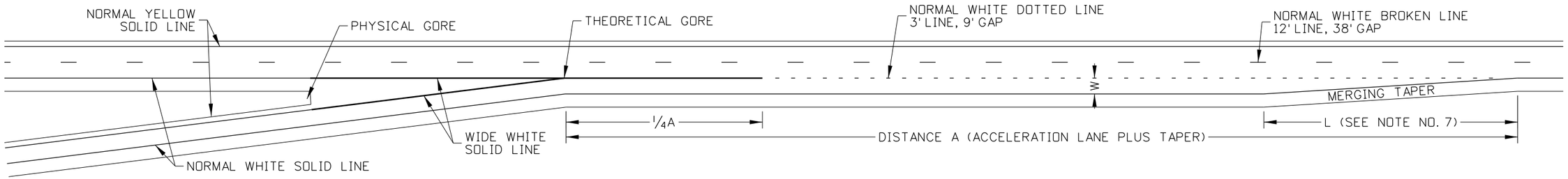
English

STANDARD DRAWING NO.

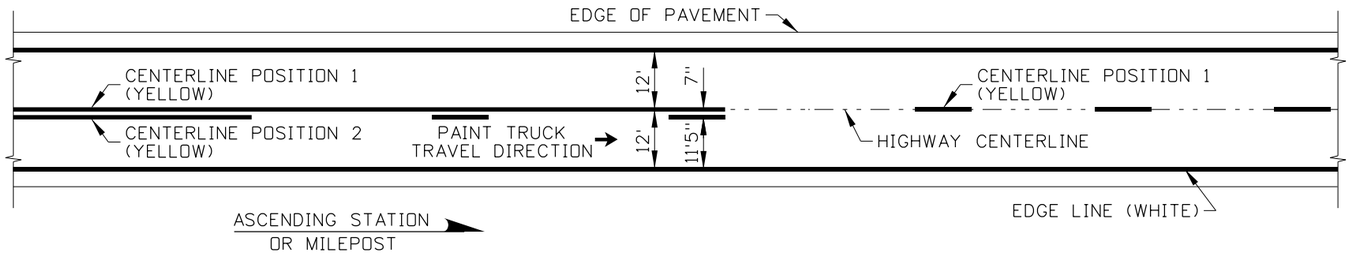
630-1



EXAMPLE TAPERED ENTRANCE RAMP

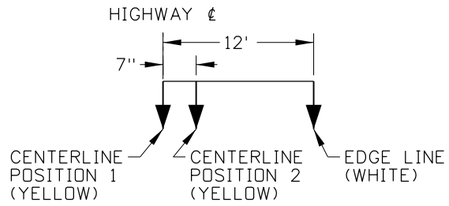


EXAMPLE PARALLEL ENTRANCE RAMP



PAVEMENT MARKINGS
ON TWO-WAY HIGHWAYS

SEE NOTE NO. 10 AND
PAINT TRUCK SETUP DETAIL



PAINT TRUCK SETUP DETAIL

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED RYAN D. LANCASTER STATE OF IDAHO MARCH 17, 2021 13683 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-20	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 630-1_0420.dgn

DRAWING DATE: DECEMBER, 2016

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

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STANDARD DRAWING

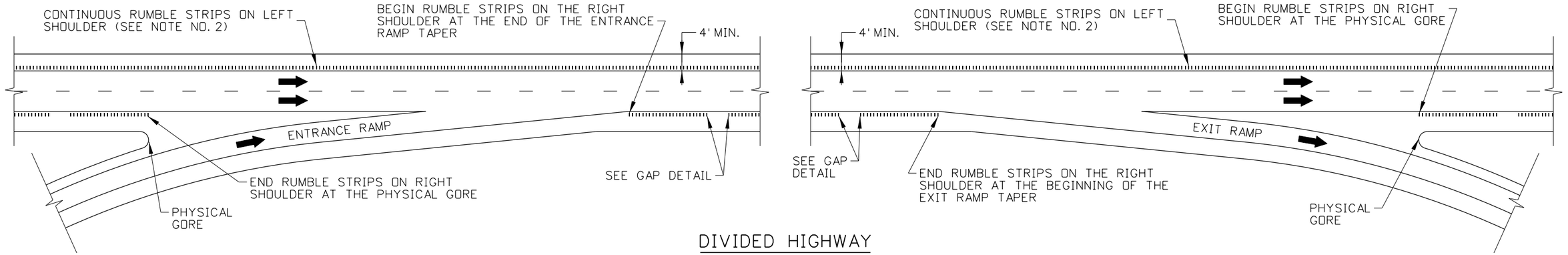
PAVEMENT MARKINGS

English

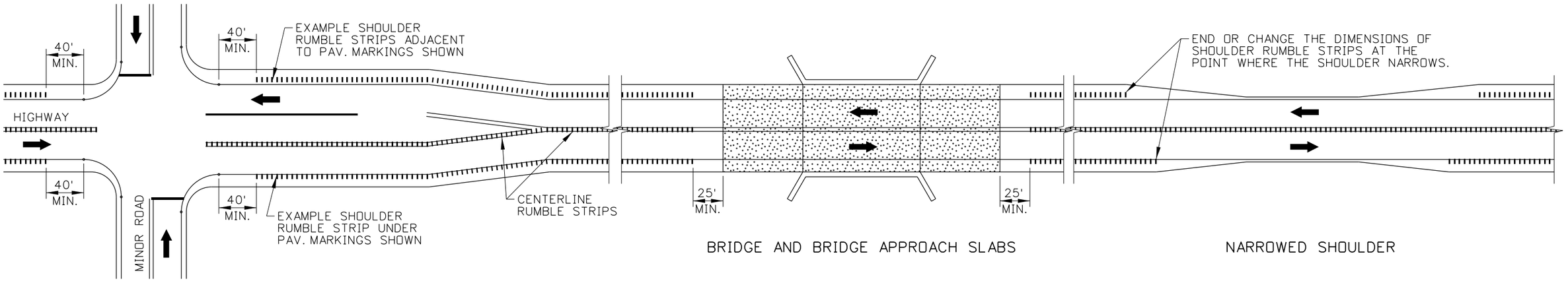
STANDARD DRAWING NO.

630-1

SHEET 4 OF 4



DIVIDED HIGHWAY

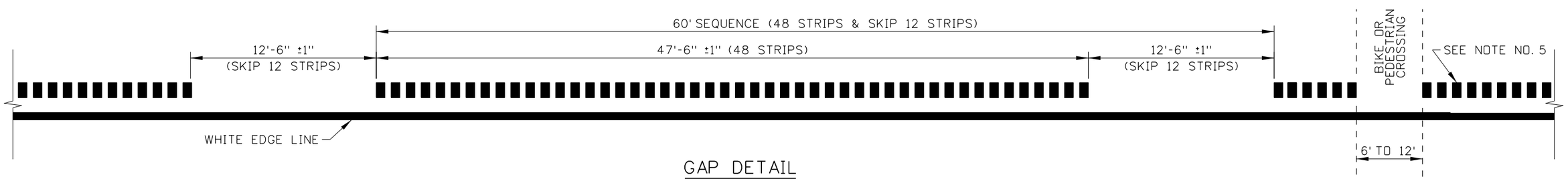


INTERSECTION

BRIDGE AND BRIDGE APPROACH SLABS

NARROWED SHOULDER

TWO-LANE HIGHWAY



GAP DETAIL

(SEE NOTE NOS. 2, 3, & 5)

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PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER STATE OF IDAHO ORIGINAL SIGNED BY JUNE 5, 2017 13683 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-02	HEB						
2	12-04	MSM						
3	09-11	JDA						
4	04-14	RDL						
5	01-17	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 631-1_0517.dgn

DRAWING DATE: NOVEMBER, 2000

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

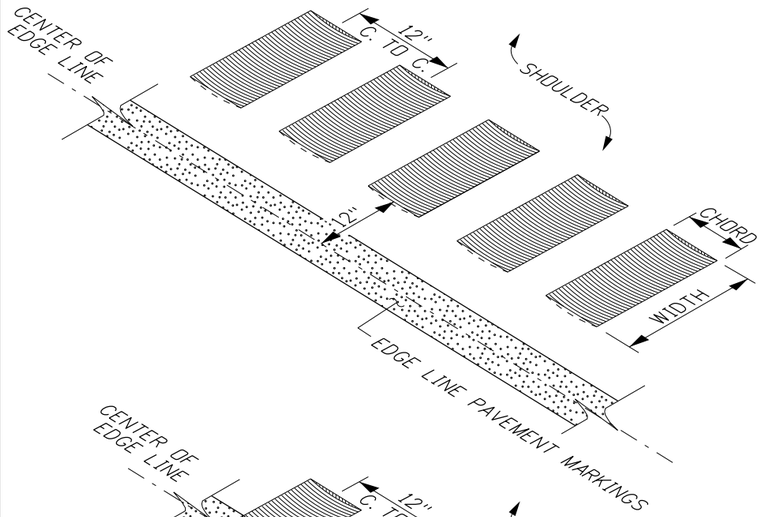
STANDARD DRAWING

RUMBLE STRIPS

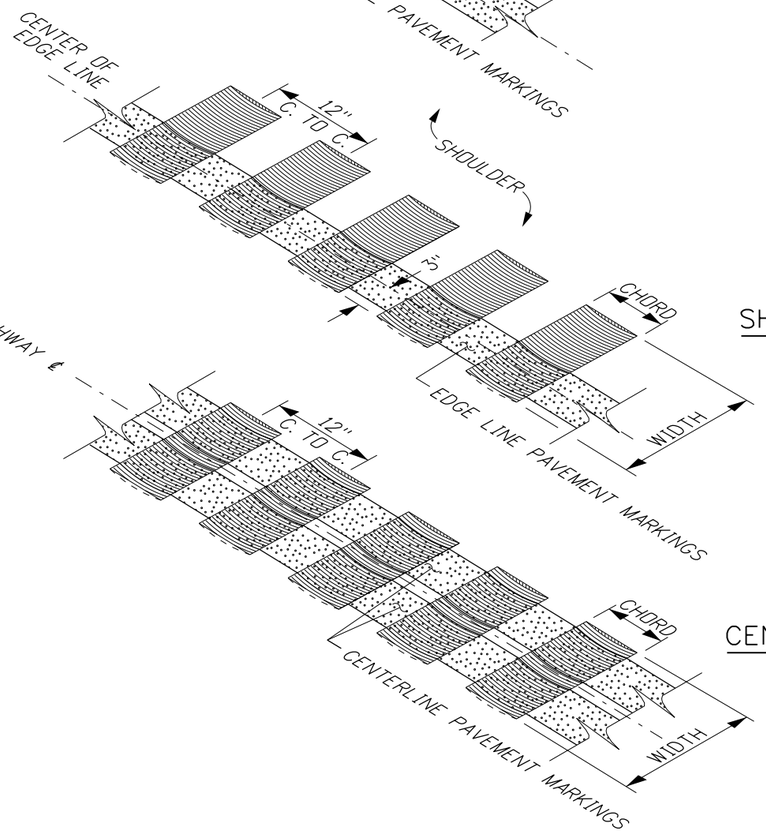
English

STANDARD DRAWING NO.

631-1

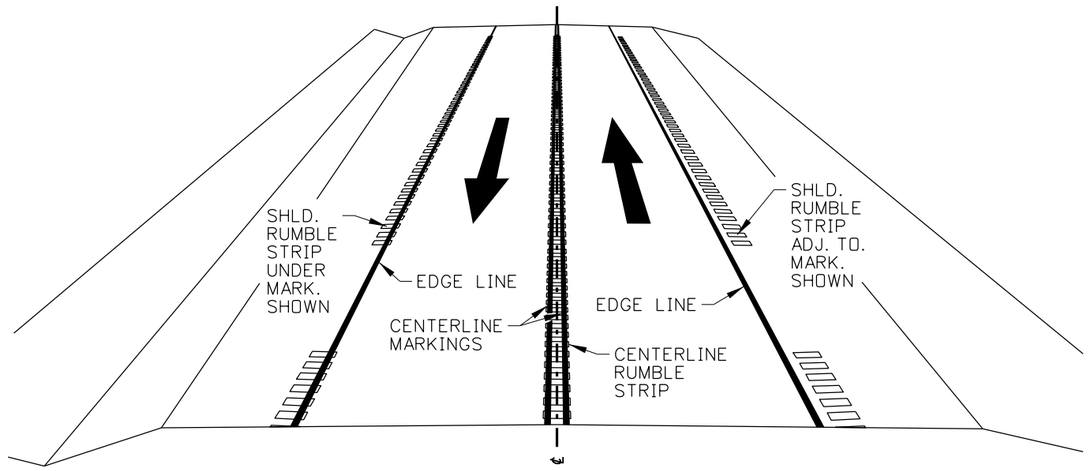


SHOULDER RUMBLE STRIP
ADJACENT TO PAVEMENT MARKINGS

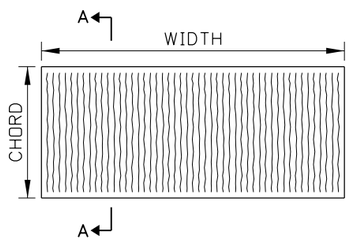


SHOULDER RUMBLE STRIP
UNDER PAVEMENT MARKINGS

CENTERLINE RUMBLE STRIP
UNDER PAVEMENT MARKINGS

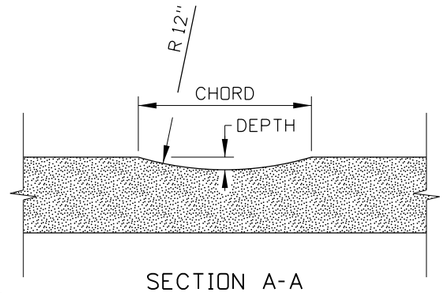


EXAMPLE TWO-LANE HIGHWAY

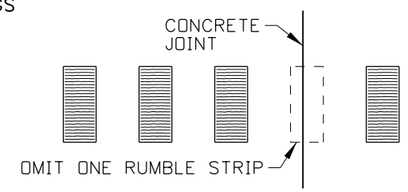


RUMBLE STRIP DETAIL

RUMBLE STRIP DIMENSION TABLE							
	SHOULDER WIDTH	ADJ. TO PAV. MARKINGS			UNDER PAV. MARKINGS		
		WIDTH	DEPTH	CHORD	WIDTH	DEPTH	CHORD
SHOULDER RUMBLE STRIPS	2' TO <4'	N/A	N/A	N/A	6"	3/8" TYP. 1/2" MAX.	±6"
	4' TO 8'	12"	1/2" TYP. 5/8" MAX.	±7"	12"	3/8" TYP. 1/2" MAX.	±6"
	>8'	16"	1/2" TYP. 5/8" MAX.	±7"	16"	3/8" TYP. 1/2" MAX.	±6"
CENTERLINE RUMBLE STRIPS	N/A	N/A	N/A	N/A	12"	1/2" TYP. 5/8" MAX.	±7"



SECTION A-A



CONCRETE PAVEMENT JOINT DETAIL
(SEE NOTE NO. 4)

NOTES

1. CONSTRUCT RUMBLE STRIPS AS SHOWN ON THE PROJECT PLANS AND IN THE RUMBLE STRIP DIMENSION TABLE.
2. PROVIDE CONTINUOUS RUMBLE STRIPS ON THE LEFT SHOULDER (ADJACENT TO OR UNDER THE YELLOW EDGE LINE) OF DIVIDED HIGHWAYS. PROVIDE PERIODIC GAPS ON RIGHT SHOULDERS (ADJACENT TO OR UNDER WHITE EDGE LINE) TO ACCOMMODATE BICYCLE CROSSING OF THE RUMBLE STRIP PATTERN.
3. IN AREAS WHERE BICYCLISTS OR PEDESTRIANS ARE EXPECTED TO CROSS THE RUMBLE STRIP, PROVIDE A 6 FOOT TO 12 FOOT GAP.
4. OMIT RUMBLE STRIPS ON LONGITUDINAL AND LATERAL CONCRETE PAVEMENT JOINTS. OMIT RUMBLE STRIPS ON BRIDGES AND BRIDGE APPROACH SLABS. RUMBLE STRIPS ARE NOT NORMALLY OMITTED AT PRIVATE APPROACHES.
5. RESTART THE RUMBLE STRIP AND GAP PATTERN IF THE PATTERN IS INTERRUPTED.
6. CLEAN THE RUMBLE STRIPS AND APPLY CSS-1 EMULSIFIED ASPHALT AT THE RATE OF 0.08 GAL/SY TO THE RUMBLE STRIPS.
7. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER JUNE 5, 2017 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	09-02	HEB						
2	12-04	MSM						
3	09-11	JDA						
4	04-14	RDL						
5	01-17	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 631-1_0517.dgn

DRAWING DATE: NOVEMBER, 2000

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

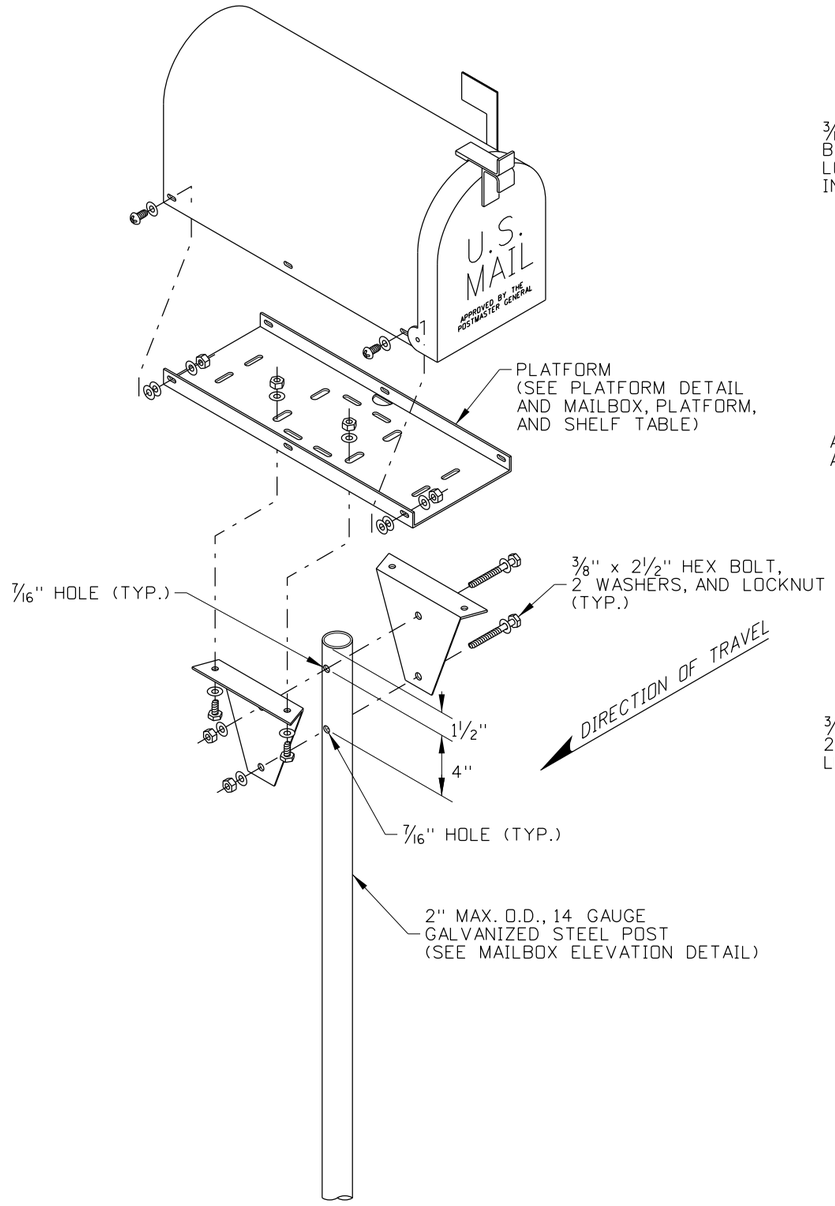
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

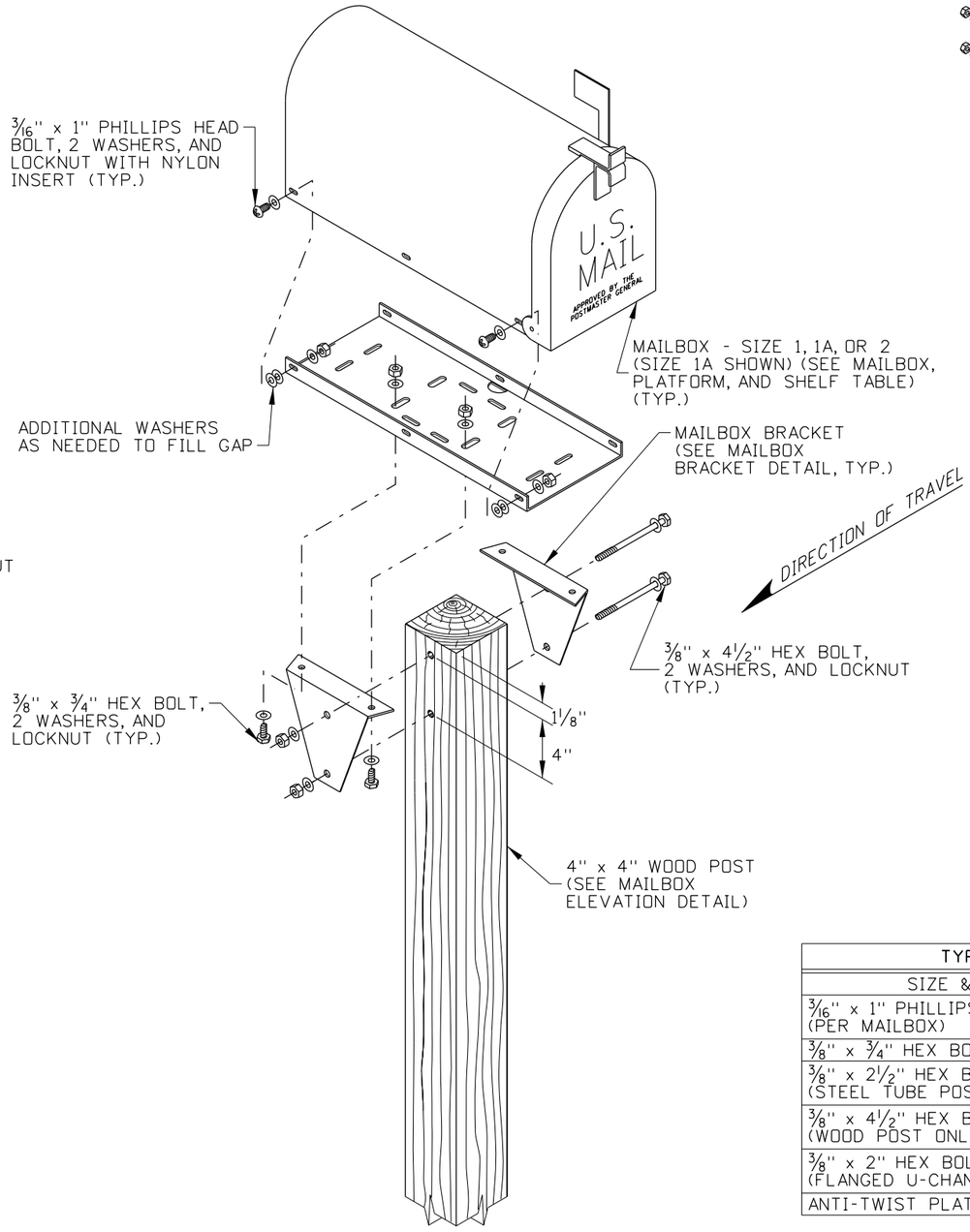
RUMBLE STRIPS

English

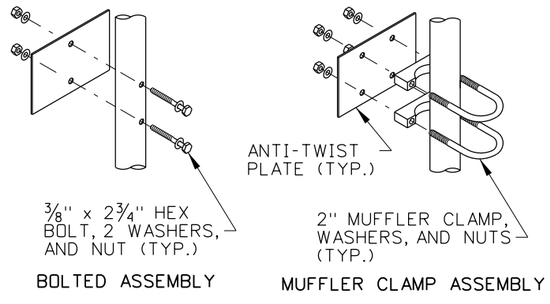
STANDARD DRAWING NO. 631-1

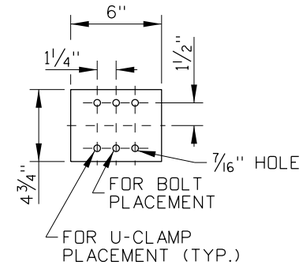


TYPE A ASSEMBLY
STEEL TUBE POST



TYPE A ASSEMBLY
WOOD POST





ANTI-TWIST PLATE DETAIL

TYPE A ASSEMBLY FASTENERS TABLE			
SIZE & TYPE	QUANTITY	WASHERS	LOCKNUTS
3/16" x 1" PHILLIPS HEAD BOLTS (PER MAILBOX)	4 MIN.	8 MIN.	4 MIN.
3/8" x 3/4" HEX BOLT (BRACKET)	4	8	4
3/8" x 2 1/2" HEX BOLT (STEEL TUBE POST ONLY)	2	4	2
3/8" x 4 1/2" HEX BOLT (WOOD POST ONLY)	2	4	2
3/8" x 2" HEX BOLT (FLANGED U-CHANNEL POST ONLY)	2	4	2
ANTI-TWIST PLATE ASSEMBLY	SEE ANTI-TWIST PLATE DETAIL		

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

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REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	7-10	MGL			
2	7-02	MSM	7	11-11	TEM			
3	7-05	MSM	8	01-13	RDL			
4	12-05	MSM						
5	10-08	JRV						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 634-1_0113.dgn

DRAWING DATE: SEPTEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

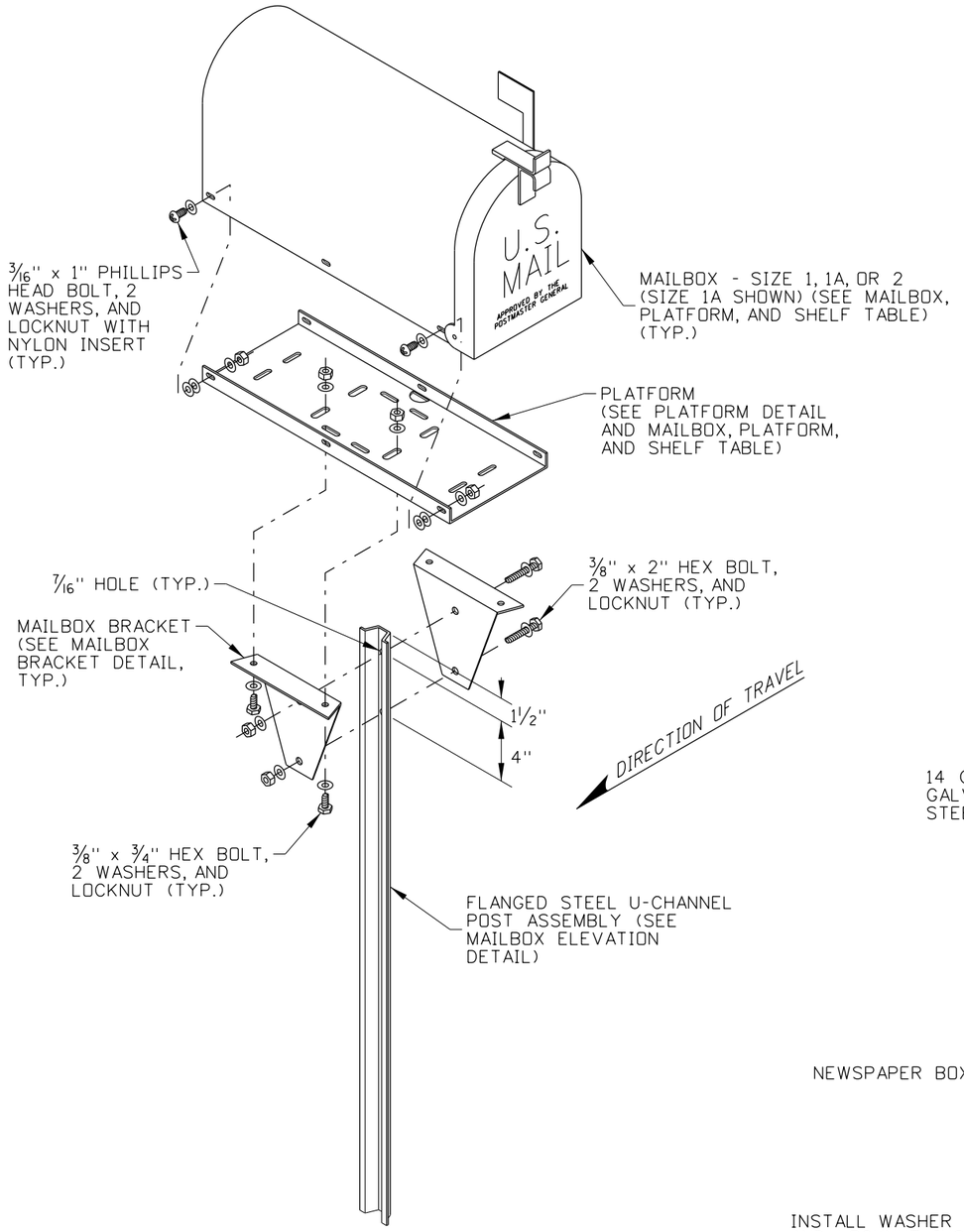
MAILBOXES

English

STANDARD DRAWING NO.

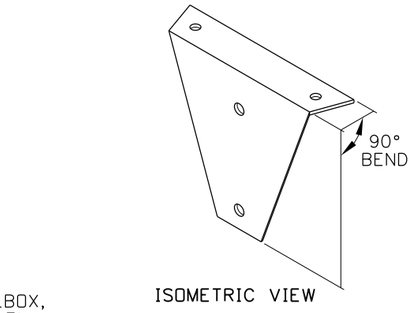
634-1

SHEET 1 OF 5

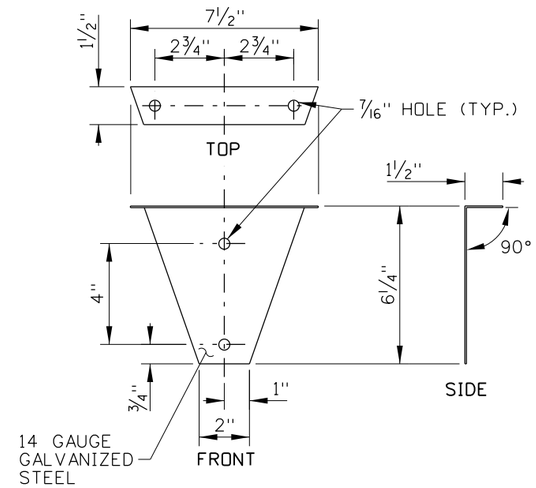


TYPE A ASSEMBLY

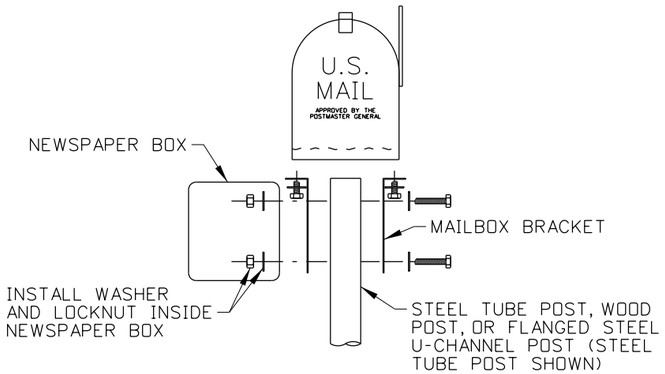
FLANGED STEEL U-CHANNEL POST (2 LB/FT)



ISOMETRIC VIEW

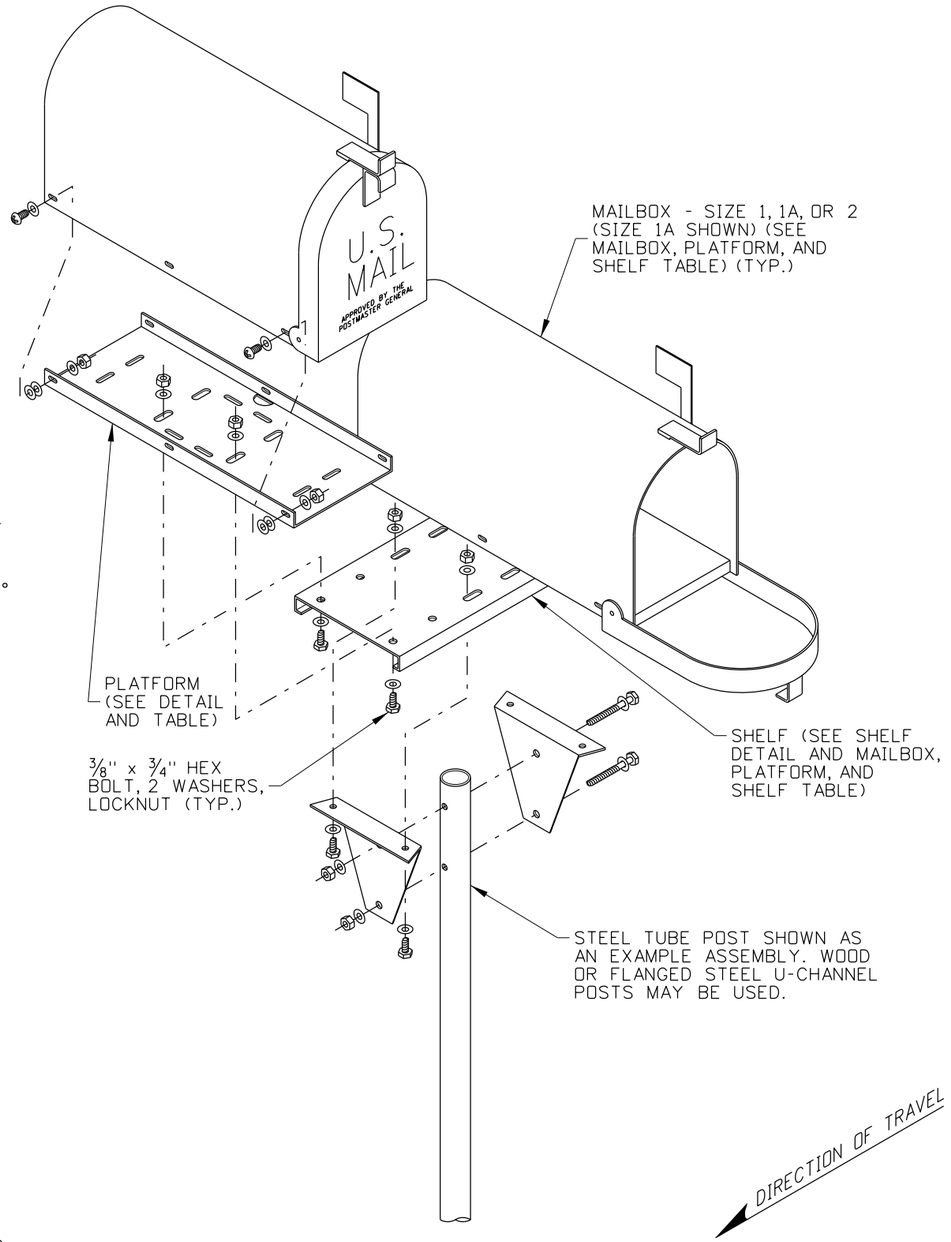


MAILBOX BRACKET DETAIL



NEWSPAPER BOX DETAIL

TYPE A ASSEMBLY



TYPE A ASSEMBLY

DOUBLE MAILBOX ASSEMBLY

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO 13683 JANUARY 31, 2008 RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	7-10	MGL			
2	7-02	MSM	7	11-11	TEM			
3	7-05	MSM	8	01-13	RDL			
4	12-05	MSM						
5	10-08	JRV						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 634-1_0113.dgn

DRAWING DATE: SEPTEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

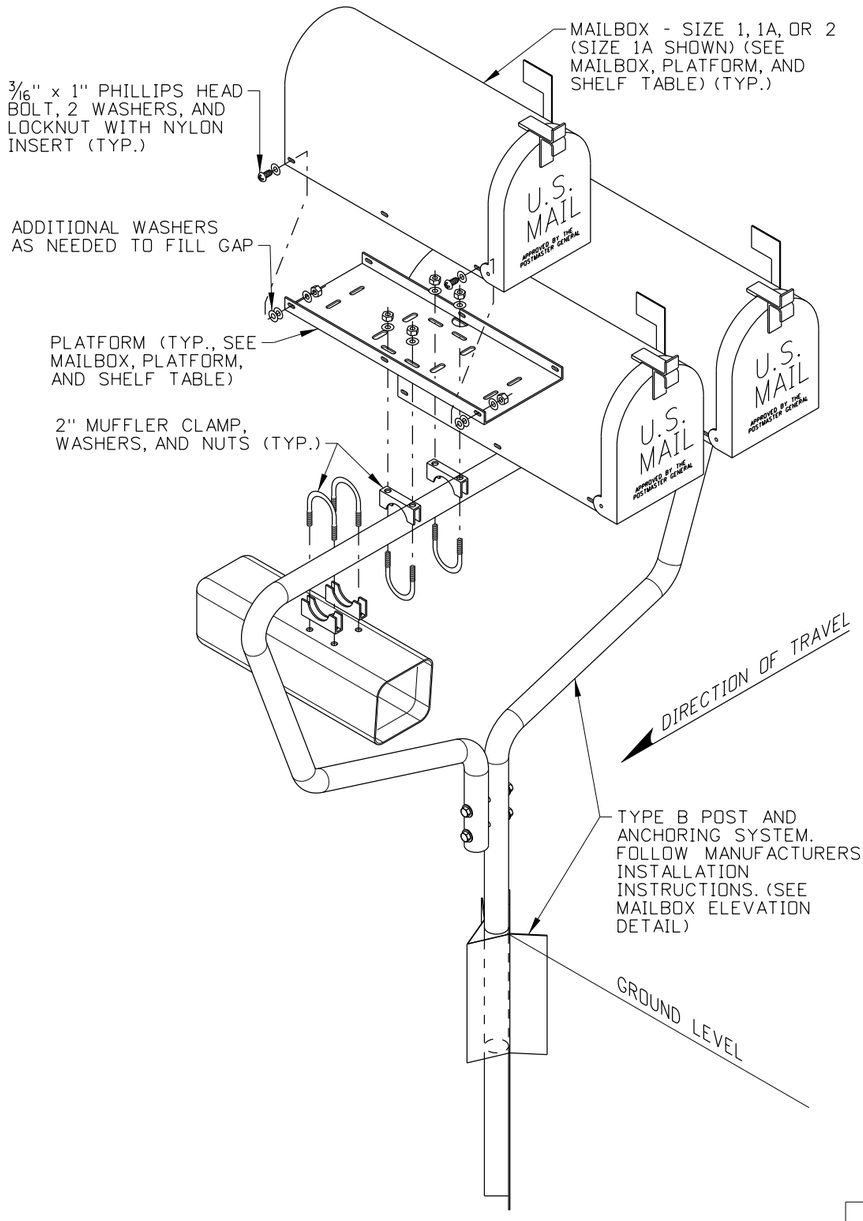
STANDARD DRAWING

MAILBOXES

English

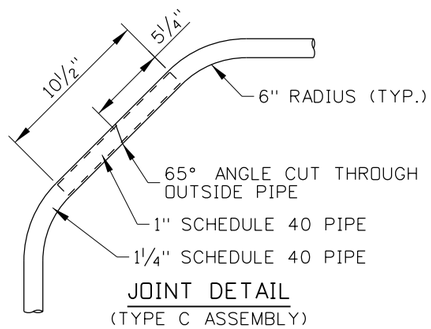
STANDARD DRAWING NO.

634-1

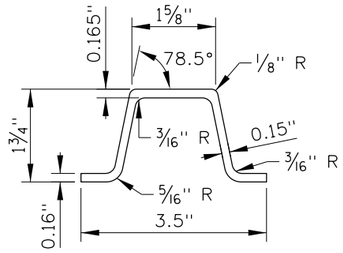


TYPE B ASSEMBLY

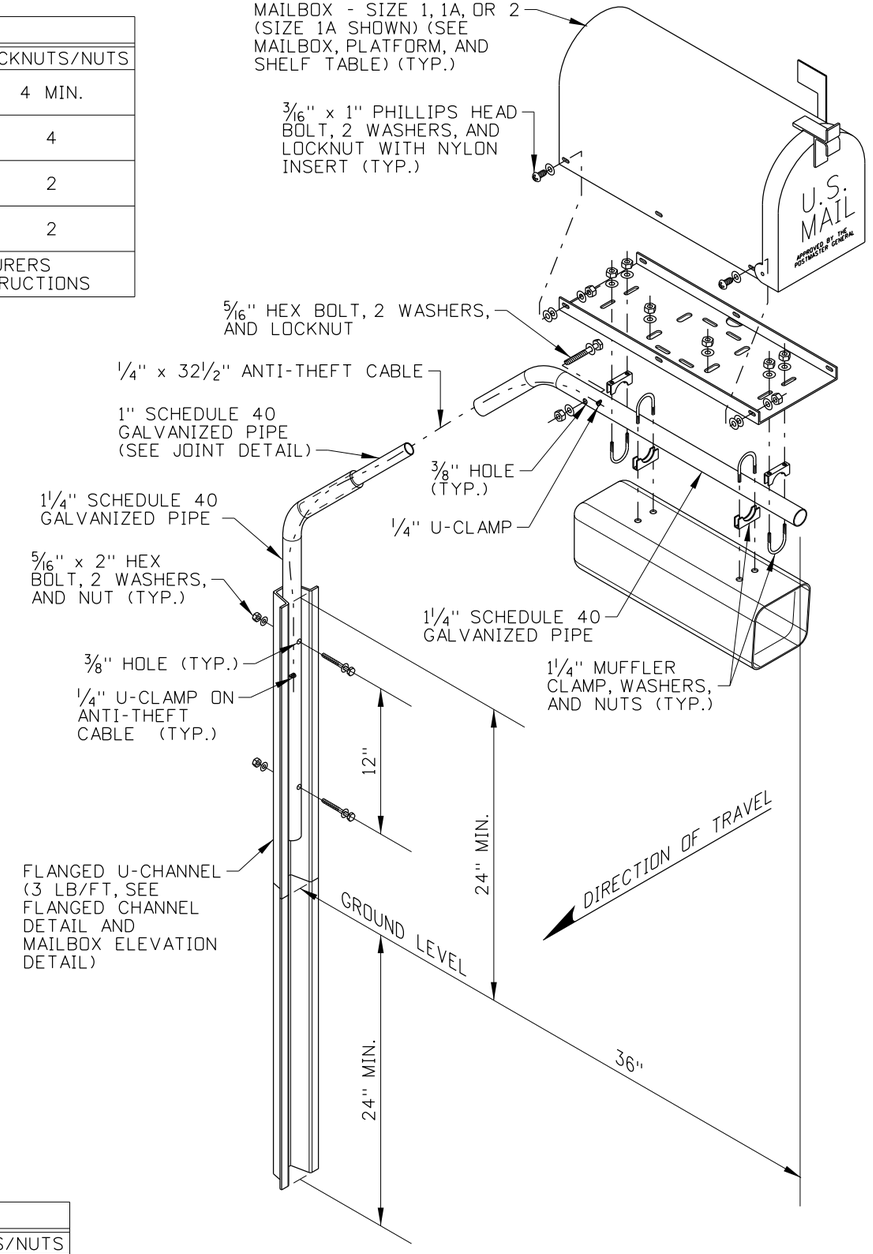
TYPE B ASSEMBLY FASTENERS TABLE			
SIZE & TYPE	QUANTITY	WASHERS	LOCKNUTS/NUTS
3/16" x 1" PHILLIPS HEAD BOLT (PER MAILBOX)	4 MIN.	8 MIN.	4 MIN.
2" MUFFLER CLAMP (PER MAILBOX)	2	4	4
2" MUFFLER CLAMP (PER NEWSPAPER BOX)	2	4	2
3/8" x 4 3/4" HEX BOLT (WOOD POST ONLY)	2	4	2
TYPE 2 POST AND ANCHORING SYSTEM	SEE MANUFACTURERS INSTALLATION INSTRUCTIONS		



JOINT DETAIL
(TYPE C ASSEMBLY)



FLANGED CHANNEL DETAIL
3 LB/FT
(TYPE C ASSEMBLY)



TYPE C ASSEMBLY

TYPE C ASSEMBLY FASTENERS TABLE			
SIZE & TYPE	QUANTITY	WASHERS	LOCKNUTS/NUTS
3/16" x 1" PHILLIPS HEAD BOLT	4 MIN.	8 MIN.	4 MIN.
1 1/4" MUFFLER CLAMP	2	4	4
5/16" x 2" HEX BOLT	3	6	3
1/4" U-CLAMP	2	0	4

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER ORIGINAL SIGNED JANUARY 31, 2013 13683 STATE OF IDAHO

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	7-10	MGL			
2	7-02	MSM	7	11-11	TEM			
3	7-05	MSM	8	01-13	RDL			
4	12-05	MSM						
5	10-08	JRV						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 634-1_0113.dgn

DRAWING DATE: SEPTEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

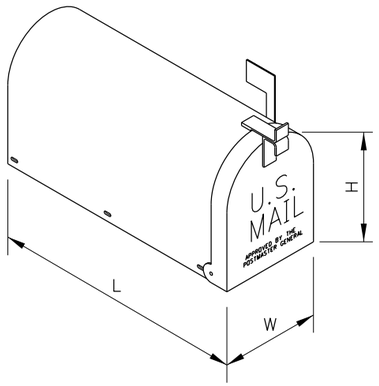
MAILBOXES

English

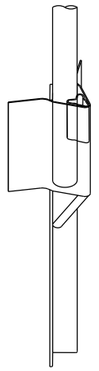
STANDARD DRAWING NO. 634-1

SHEET 3 OF 5

MAILBOX, PLATFORM, AND SHELF TABLE						
MAILBOX SIZE	MAILBOX DIMENSIONS			PLATFORM DIMENSION		SHELF DIM.
	L	W	H	L_P	W_P	L_S
1	19''	6½''	8½''	17''	6''	15''
1-A	21''	8''	10½''	19''	7½''	16½''
2	23½''	11½''	13½''	21''	11''	20''

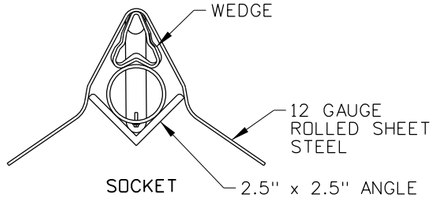


MAILBOX DIMENSIONS



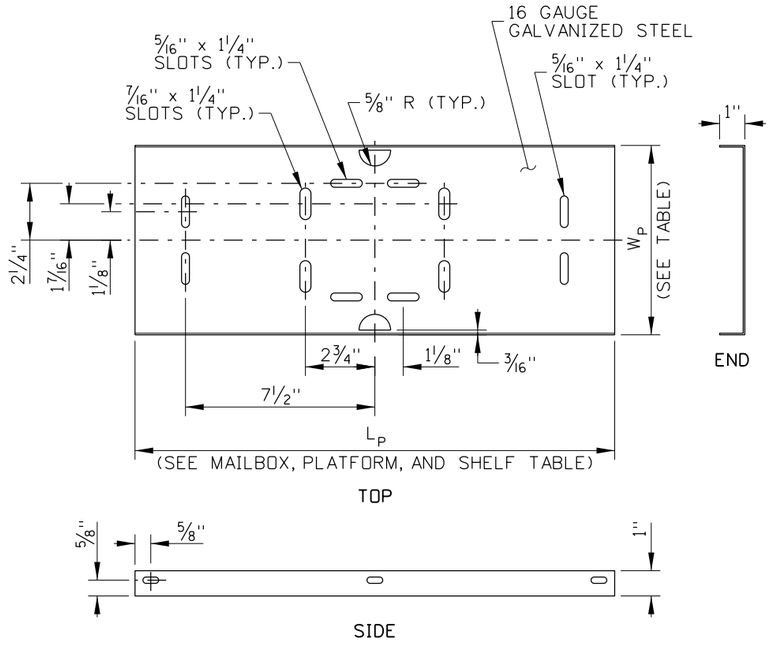
ISOMETRIC VIEW

WEDGE

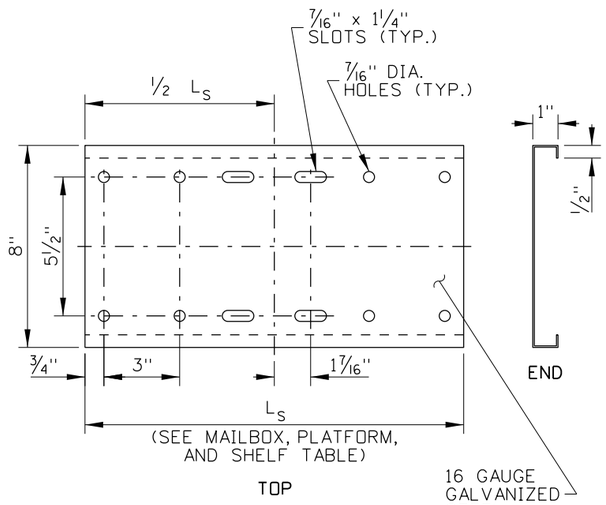


SOCKET AND WEDGE MAILBOX SUPPORT SYSTEM DETAIL

FOR USE WITH TYPE B ASSEMBLY
MAY BE USED WITH TYPE A - STEEL TUBE POST ASSEMBLY
(SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS)



PLATFORM DETAIL
(ONE-PIECE)



SHELF DETAIL
(FOR TYPE A DOUBLE MAILBOX ASSEMBLIES)

NOTES

1. CONSTRUCT MAILBOX ASSEMBLIES IN ACCORDANCE WITH SECTION 634 - MAILBOX OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

2. SEE STANDARD DRAWING 405-2 FOR MAILBOX PLACEMENT.

3. INSTALL THE MAILBOXES AND ASSEMBLIES WITH THE FASTENERS SHOWN IN THE ASSEMBLY FASTENER TABLES. SOME PLATFORM SLOTS AND HOLES MAY REMAIN UNUSED.

4. CENTER THE MAILBOX ON THE PLATFORM AND ENSURE THAT THE MAILBOX DOOR OPENS. SPACING OF MAILBOX MOUNTING HOLES MAY VARY BETWEEN MANUFACTURERS AND ADDITIONAL HOLES MAY BE DRILLED IN THE MAILBOX, PLATFORM, OR BOTH TO ATTACH THE MAILBOX TO THE PLATFORM.

5. COMMERCIALLY AVAILABLE MAILBOXES AND MAILBOX ASSEMBLIES MAY BE SUBSTITUTED FOR THOSE SHOWN IF THEY MEET THE REQUIREMENTS OF THE U.S. POSTMASTER GENERAL AND HAVE SUCCESSFULLY PASSED THE TESTING REQUIREMENTS OF MASH OR NCHRP 350. ADJUSTABLE PLATFORM ALTERNATIVES AND THE SOCKET AND WEDGE MAILBOX SUPPORT SYSTEM ARE EXAMPLES OF COMMERCIALLY AVAILABLE PROPRIETARY SYSTEMS THAT MAY BE ACCEPTABLE ALTERNATIVES. OBTAIN THE ENGINEER'S APPROVAL BEFORE INSTALLING ALTERNATIVE MAILBOXES OR ASSEMBLIES AND INSTALL IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.

6. USE AN ANTI-TWIST PLATE, SHOWN ON THE ANTI-TWIST PLATE DETAIL. A SOCKET AND WEDGE MAILBOX SUPPORT SYSTEM MAY BE USED IN LIEU OF AN ANTI-TWIST PLATE. IF THE SOCKET AND WEDGE SYSTEM IS USED, FOLLOW THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

7. THE TYPE C ASSEMBLY SHOULD BE USED IN HEAVY SNOW AREAS OR AREAS WHERE SNOW PLOW DAMAGE TO MAILBOXES HAS BEEN OBSERVED OR IS ANTICIPATED.

8. WHEN USED IN HEAVY SNOW AREAS, ONLY ONE MAILBOX IS RECOMMENDED FOR TYPE A ASSEMBLIES. THE TYPE A ASSEMBLY WITH WOOD POSTS IS RECOMMENDED FOR USE IN HEAVY SNOW AREAS. A SNOW SHIELD MAY BE INSTALLED AS SHOWN ON STANDARD DRAWING 634-2.

9. MAILBOX SIZES 1, 1A, AND 2, SHOWN IN THE MAILBOX, PLATFORM, AND SHELF TABLE MAY BE INSTALLED ON THE TYPE A DOUBLE MAILBOX ASSEMBLY IN ANY COMBINATION OF SIZES. WHEN MORE THAN ONE SIZE IS TO BE INSTALLED, USE THE SHELF SIZE FOR THE LARGER MAILBOX.

10. THE TYPE B ASSEMBLY IS A PROPRIETARY SYSTEM THAT MAY BE USED FOR THE INSTALLATION OF TWO OR MORE MAILBOXES. ON TYPE B MAILBOX ASSEMBLIES, INSTALL A MAXIMUM OF FIVE SIZE 1 MAILBOXES, FOUR SIZE 1A MAILBOXES, OR THREE SIZE 2 MAILBOXES. WHEN MORE THAN ONE SIZE IS TO BE INSTALLED, LIMIT THE NUMBER OF MAILBOXES TO THE MAXIMUM NUMBER FOR THE LARGEST SIZE USED.

11. DO NOT INSTALL THE MAILBOX ASSEMBLY IN A CONCRETE FOUNDATION. AN EXCEPTION MAY BE MADE FOR MASH OR NCHRP 350 APPROVED ALTERNATIVE MAILBOX ASSEMBLIES IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

12. ENSURE THAT PLATFORM, SHELF, AND BRACKETS ARE GALVANIZED IN ACCORDANCE WITH AASHTO M 232.

13. IF USED, ATTACH THE NEWSPAPER BOX TO THE SUPPORT, DIRECTLY UNDER THE MAILBOX. ENSURE THAT NEWSPAPER BOXES DO NOT EXTEND BEYOND THE FRONT OF THE MAILBOX WHEN THE MAILBOX DOOR IS CLOSED. IN HEAVY SNOW AREAS, LOCATE THE NEWSPAPER BOX ON THE TRAILING SIDE OF THE MAILBOX POST. SEE THE NEWSPAPER BOX DETAIL FOR INSTALLATIONS ON TYPE A MAILBOX ASSEMBLIES.

14. ROUND OR GRIND THE CORNERS OF PLATFORMS, SHELVES, BRACKETS, OR OTHER HARDWARE THAT HAS SHARP PROTRUDING EDGES.

15. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO JANUARY 31, 2014 13683 RYAN D. LANCASTER

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	7-10	MGL			
2	7-02	MSM	7	11-11	TEM			
3	7-05	MSM	8	01-13	RDL			
4	12-05	MSM						
5	10-08	JRV						

SCALES SHOWN ARE FOR 11'' X 17'' PRINTS ONLY

CADD FILE NAME: 634-1_0113.dgn

DRAWING DATE: SEPTEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

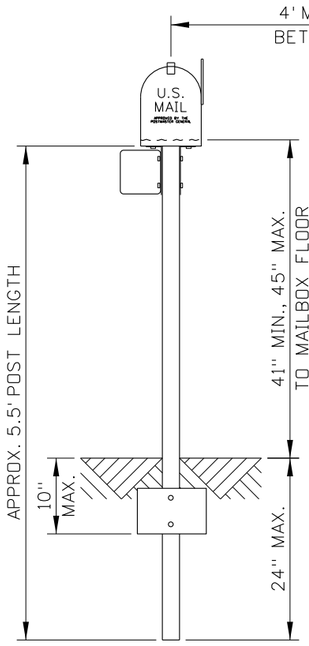
STANDARD DRAWING

MAILBOXES

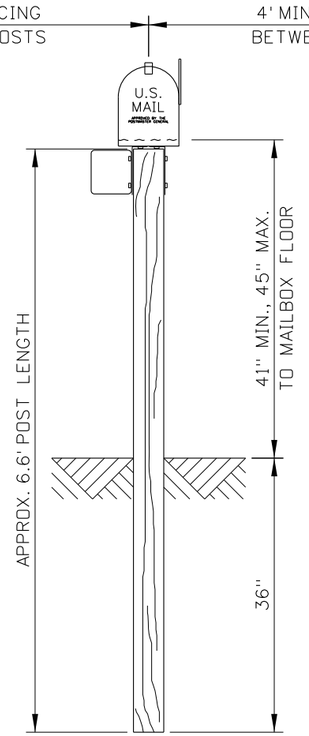
English

STANDARD DRAWING NO. 634-1

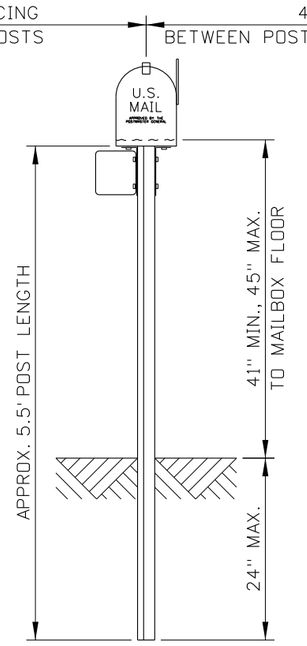
SHEET 4 OF 5



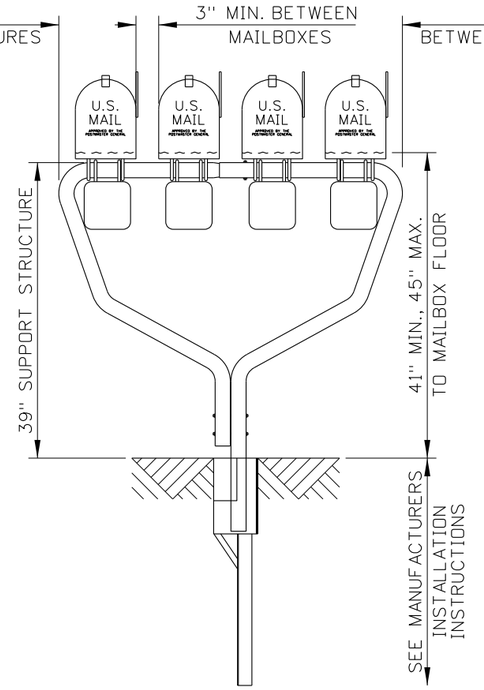
TYPE A ASSEMBLY
STEEL TUBE POST



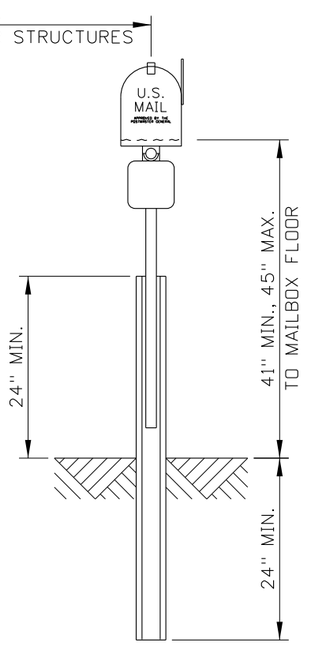
TYPE A ASSEMBLY
WOOD POST



TYPE A ASSEMBLY
FLANGED STEEL U-CHANNEL POST



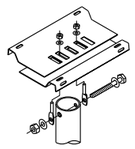
TYPE B ASSEMBLY



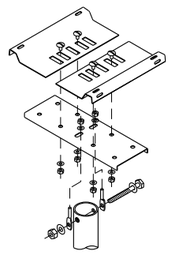
TYPE C ASSEMBLY

DIRECTION OF TRAVEL

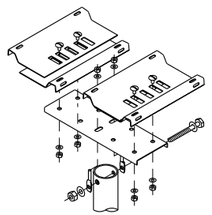
MAILBOX ELEVATION DETAIL



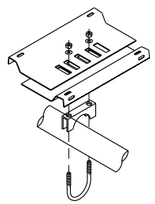
SINGLE MAILBOX ASSEMBLY
(FOR MAILBOXES
SIZES 1 AND 1A)



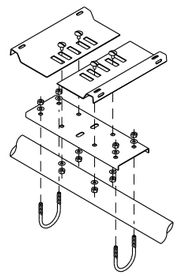
SINGLE MAILBOX ASSEMBLY
(FOR MAILBOX SIZE 2)



DOUBLE MAILBOX ASSEMBLY
(FOR MAILBOXES
SIZES 1 AND 1A)



SINGLE MAILBOX ASSEMBLY
(FOR MAILBOXES
SIZES 1 AND 1A ON
TYPE B ASSEMBLIES)



SINGLE MAILBOX ASSEMBLY
(FOR MAILBOX
SIZE 2 ON TYPE B
ASSEMBLIES)

ADJUSTABLE PLATFORM ALTERNATIVES

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED AT THE OFFICIAL CAPACITY OF RYAN D. LANCASTER JANUARY 31, 2013 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	7-92	MSM	6	7-10	MGL			
2	7-02	MSM	7	11-11	TEM			
3	7-05	MSM	8	01-13	RDL			
4	12-05	MSM						
5	10-08	JRV						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 634-1_0113.dgn

DRAWING DATE: SEPTEMBER, 1993

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

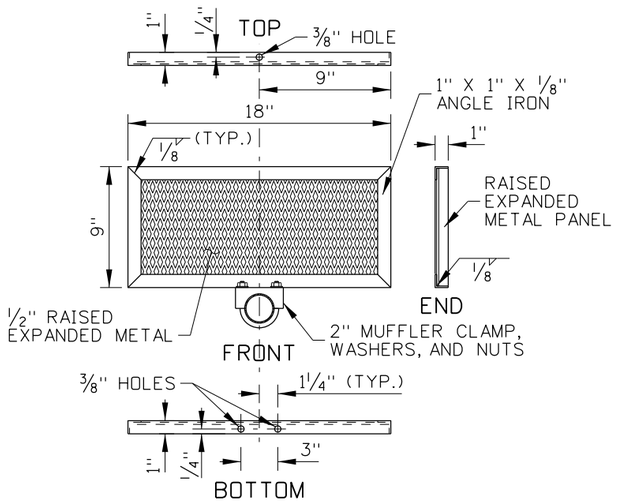
MAILBOXES

English

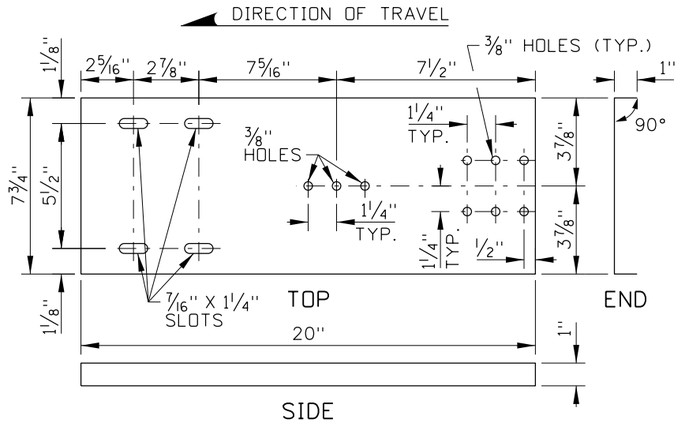
STANDARD DRAWING NO.

634-1

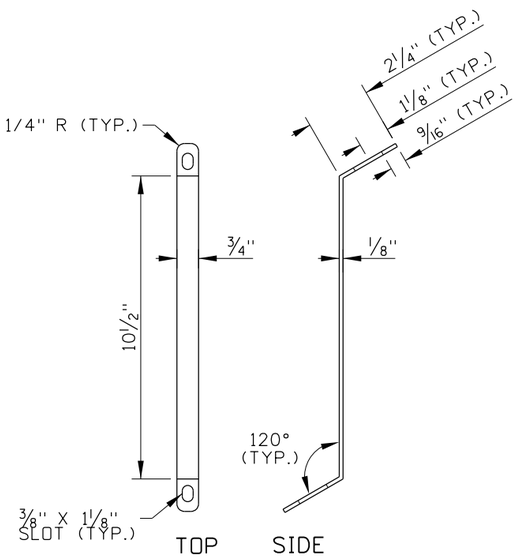
SHEET 5 OF 5



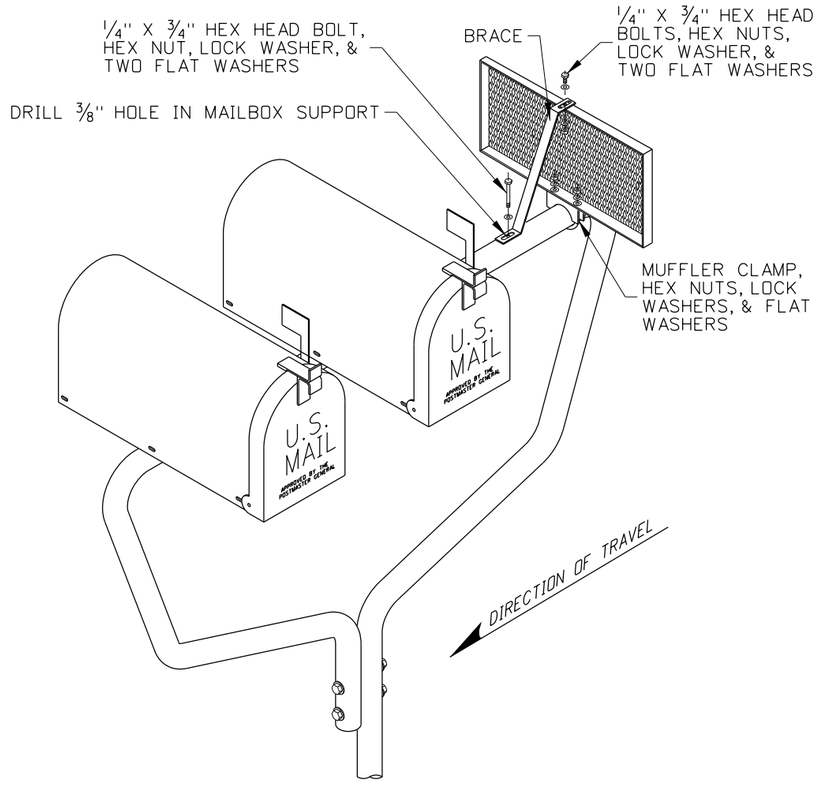
SNOW SHIELD DETAIL



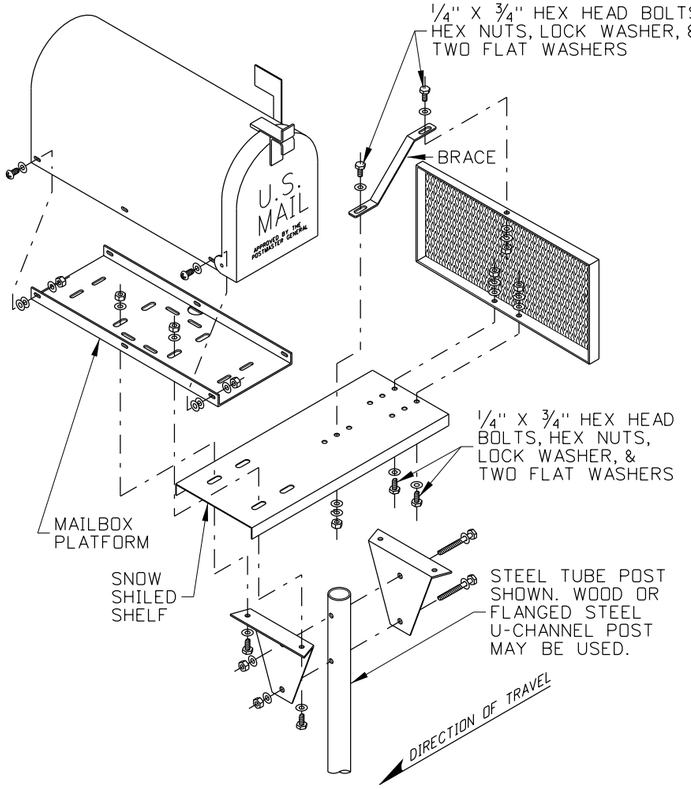
SNOW SHILED SHELF DETAIL



BRACE DETAIL



MULTIPLE MAILBOX INSTALLATION



SINGLE MAILBOX INSTALLATION

NOTES

1. SEE THE MAILBOX STANDARD DRAWING FOR MAILBOX INSTALLATION DETAILS
2. ROUND OR GRIND THE SHARP CORNERS OF THE PLATFORM, SNOW SHIELD SHELF, AND BRACE.
3. WHEN A NEWSPAPER BOX IS INSTALLED, ENSURE THAT BOX IS ON THE TRAILING SIDE OF THE POST.
4. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	07-10	MGL						
2	08-11	RSC						
3	05-15	RDL						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 634-2_0515.dgn

DRAWING DATE: NOVEMBER, 2005

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

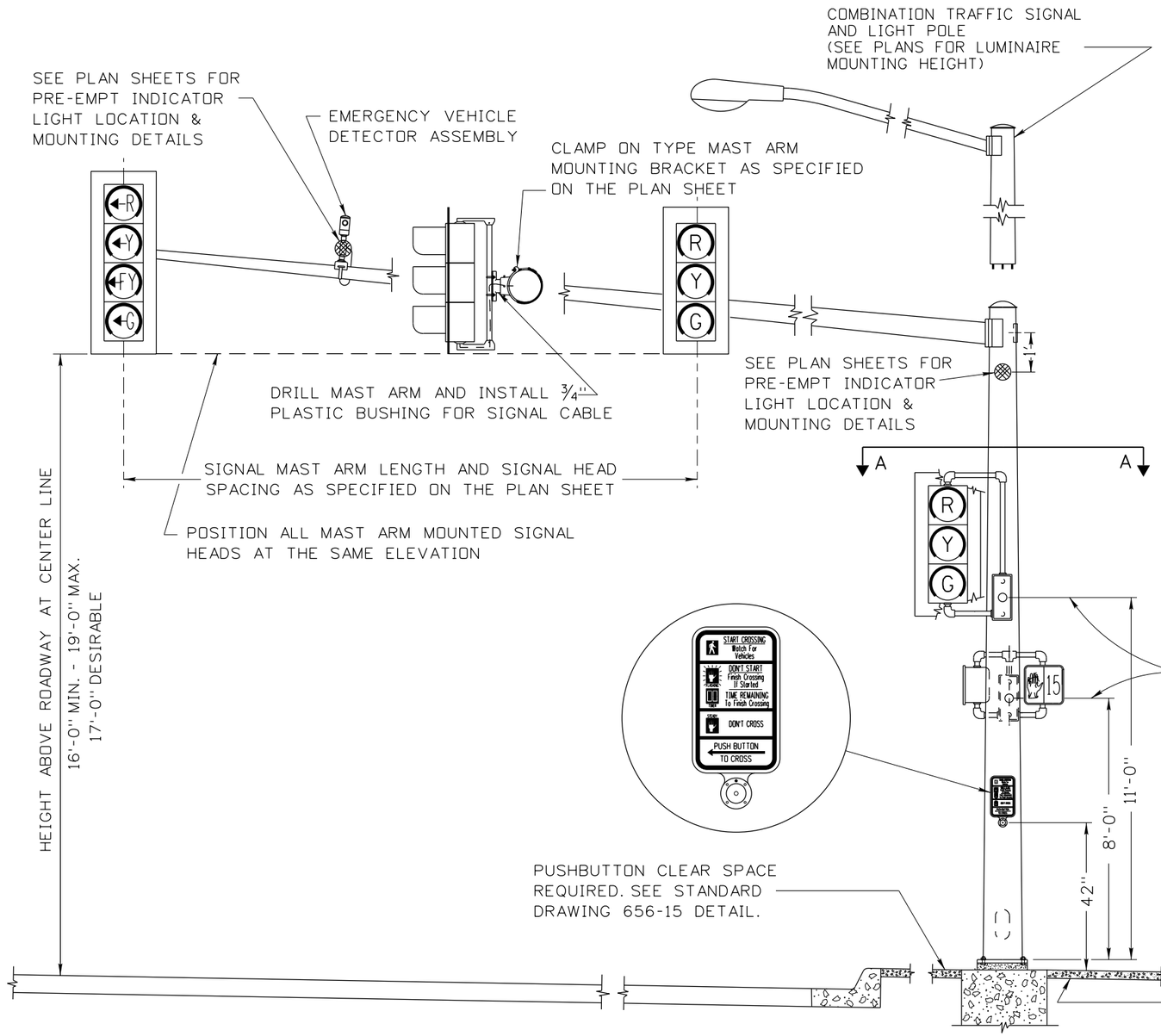
MAILBOX SNOW SHIELD

REQUIRES STD. DWG. 634-1

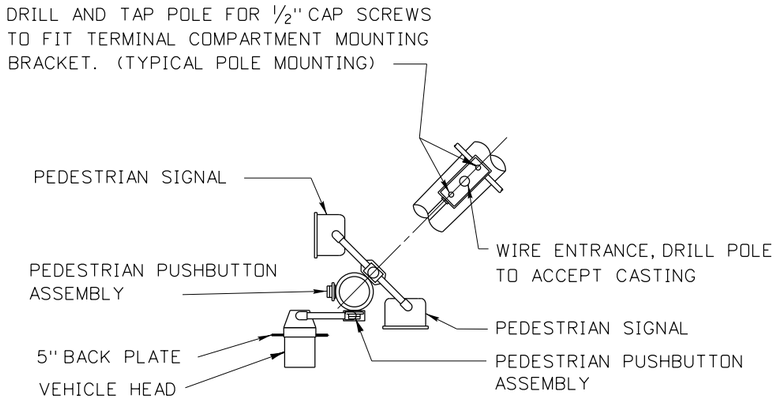
English

STANDARD DRAWING NO. 634-2

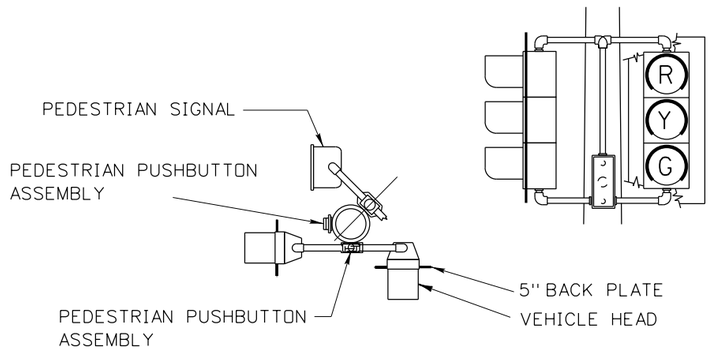
SHEET 1 OF 1



SINGLE MAST ARM POLE



VIEW A-A



POLE MOUNTED HEADS FOR DUAL VEHICLE SIGNAL HEAD INSTALLATION

PEDESTRIAN PUSHBUTTON MOUNTING

1. PEDESTRIAN PUSHBUTTON ASSEMBLIES ARE TO BE MOUNTED AS PER MANUFACTURER'S INSTRUCTIONS.

NOTES:

1. THIS DRAWING SHOWS TYPICAL INSTALLATION DETAILS ONLY. SEE PLAN SHEETS FOR QUANTITY OF SIGNAL AND LIGHTING COMPONENTS TO BE INSTALLED.
2. ORIENTATION OF SIGNAL COMPONENTS SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED ON THE PLAN SHEETS.
3. SEE STANDARD DRAWING 656-3 FOR FOUNDATION DETAILS.
4. ALL SIGNAL COMPONENTS SHALL BE LEVELED AFTER THE POLE HAS BEEN PLUMBED.
5. SPECIFIC LOCATION OF EACH POLE INSTALLATION SHALL BE AS INDICATED ON THE PROJECT PLAN SHEETS.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY: ROBERT KOEBERLEIN STATE OF IDAHO APRIL 25, 2014 ROBERT KOEBERLEIN

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-94	HEB	6	04-14	HEB			
2	12-01	NQB						
3	07-05	HEB						
4	08-06	HEB						
5	07-10	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 656-1_0414.dgn

DRAWING DATE: AUGUST, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: CARL D. MAIN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

MAST ARM TRAFFIC SIGNAL POLES

REQUIRES STD. DWG. 656-15

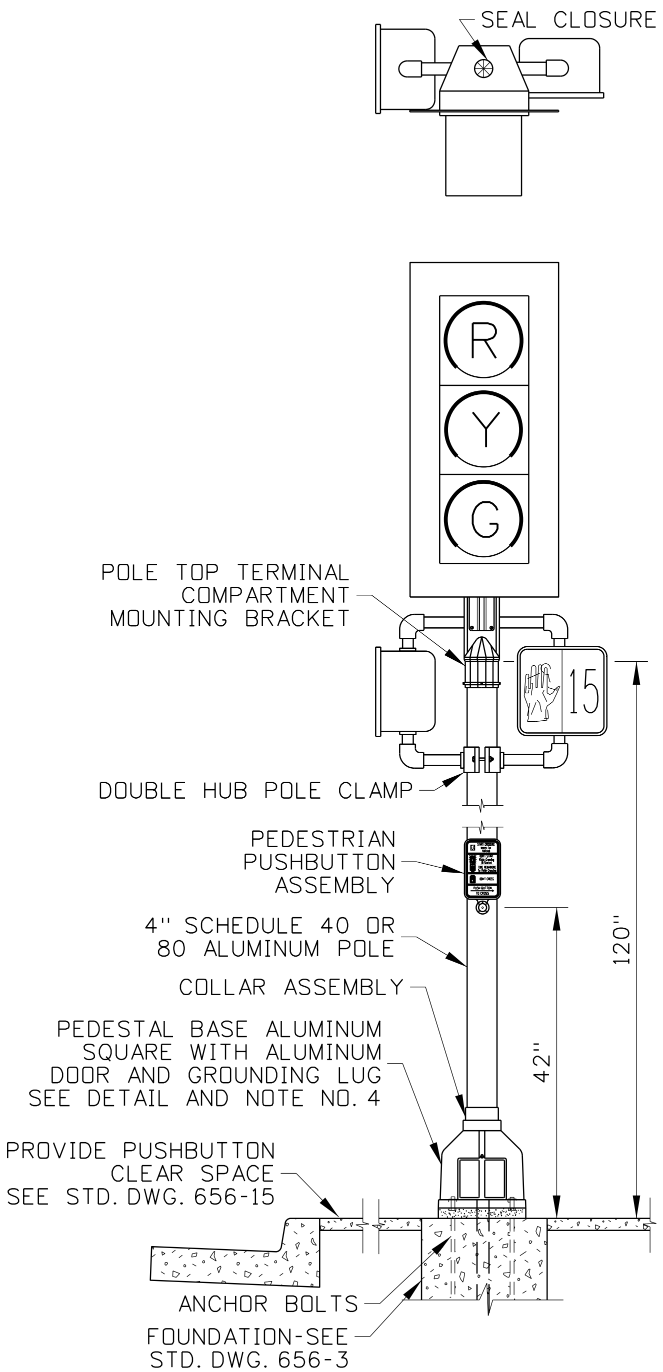
English

STANDARD DRAWING NO.

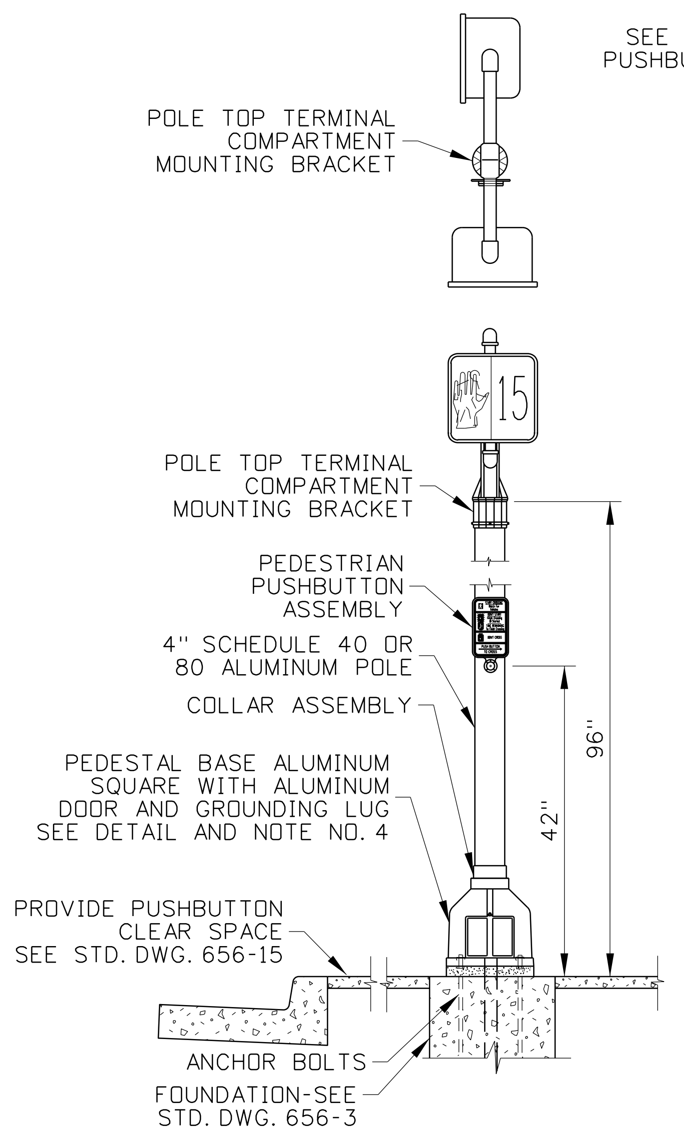
656-1

SHEET 1 OF 1

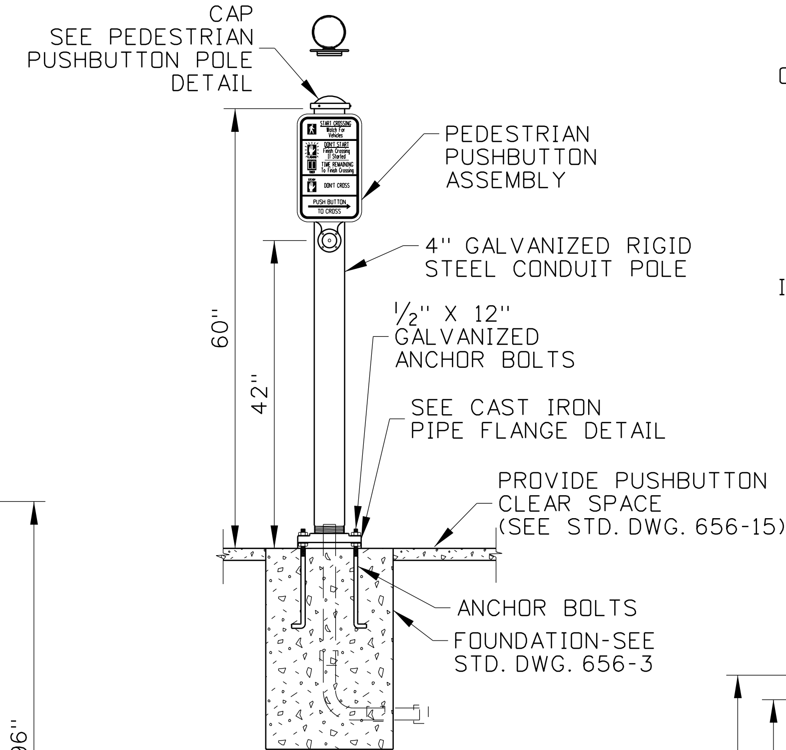
8401



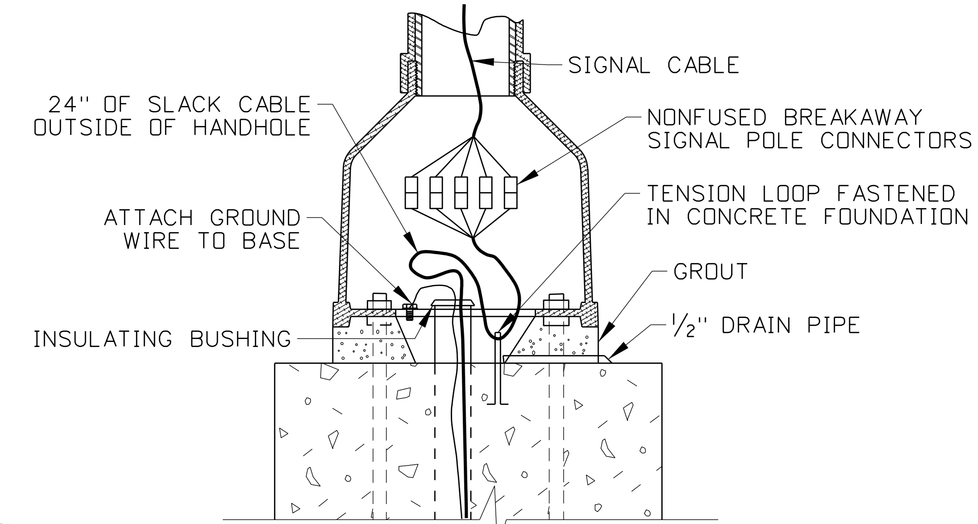
VEHICLE AND PEDESTRIAN SIGNAL



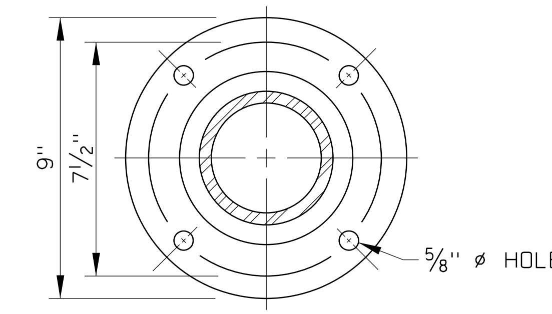
PEDESTRIAN SIGNAL



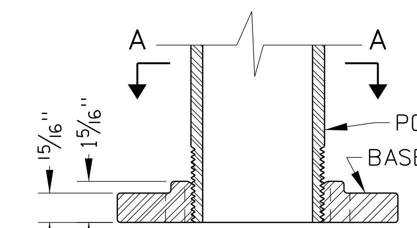
PEDESTRIAN PUSHBUTTON POLE



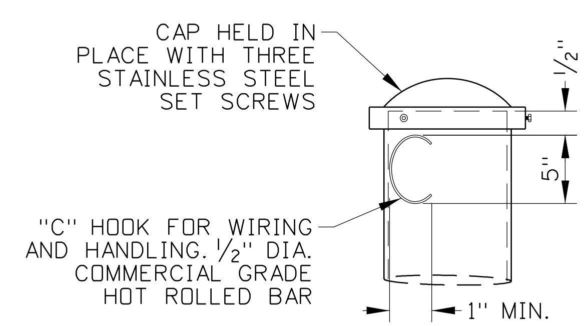
FRANGIBLE ALUMINUM BASE DETAIL



SECTION A-A



CAST IRON PIPE FLANGE DETAIL



PEDESTRIAN PUSHBUTTON POLE DETAIL

NOTES

1. THIS DRAWING SHOWS TYPICAL SIGNAL INSTALLATION DETAILS. THE DETAILS FOR COMPONENTS FROM DIFFERENT SUPPLIERS AND FOR QPL APPROVED PROPRIETARY SYSTEMS MAY VARY.
2. LOCATE POLES AS SHOWN IN THE PLANS AND IN ACCORDANCE WITH STANDARD DRAWING 656-15.
3. ORIENT SIGNAL COMPONENTS AS SHOWN UNLESS OTHERWISE SHOWN ON PLANS.
4. USE STEEL CONDUIT TO EXTEND CONDUIT BEYOND CONCRETE FOUNDATION AND STEEL CONDUIT ELBOWS IN THE FOUNDATION.
5. TERMINATE SPARE STUB OUTS WITH A STEEL COUPLING AND PLASTIC PUSH PLUG AT BOTH ENDS.
6. A FRANGIBLE COUPLING SYSTEM BASE CAN BE SUBSTITUTED FOR A FRANGIBLE CAST ALUMINUM BASE.
7. LEVEL SIGNAL COMPONENTS AFTER THE POLE HAS BEEN PLUMBED.
8. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED 13683 STATE OF IDAHO RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-94	HEB	6	04-14	HEB			
2	08-06	NQB	7	12-16	HEB			
3	12-07	HEB	8	03-20	RDL			
4	07-09	HEB	9	02-22	RDL			
5	07-10	HEB						

SCALES SHOWN ARE FOR 11'' X 17'' PRINTS ONLY

CADD FILE NAME: 656-2_0422.dgn

DRAWING DATE: AUGUST, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

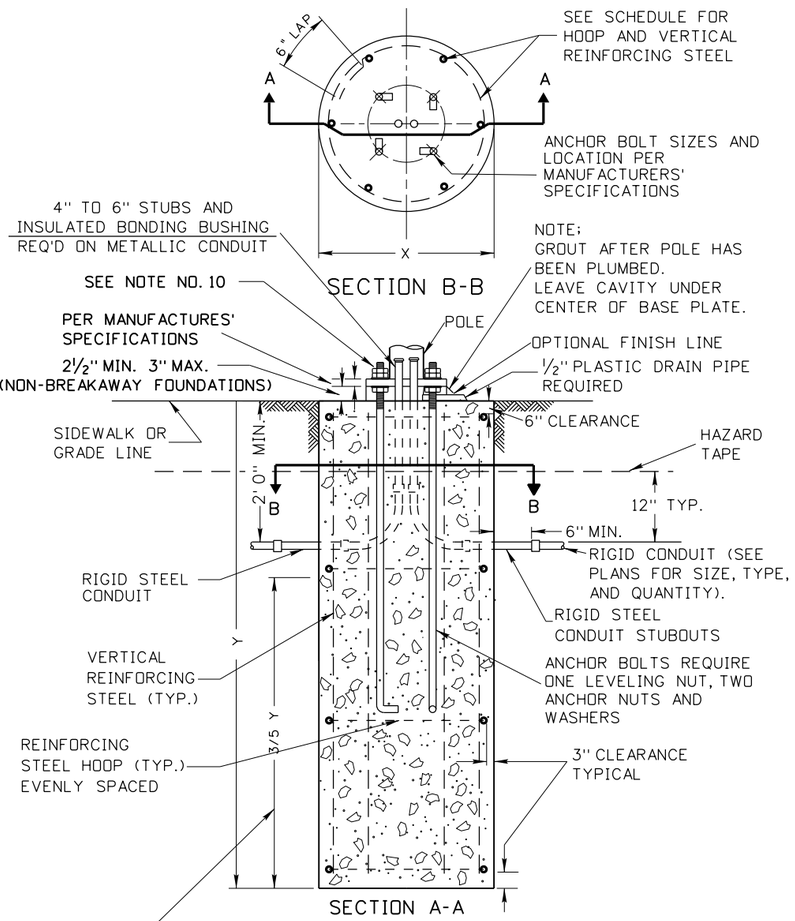
FRANGIBLE BASE TRAFFIC SIGNAL POLES

REQUIRES STD. DWG. 656-3 AND 656-15

English

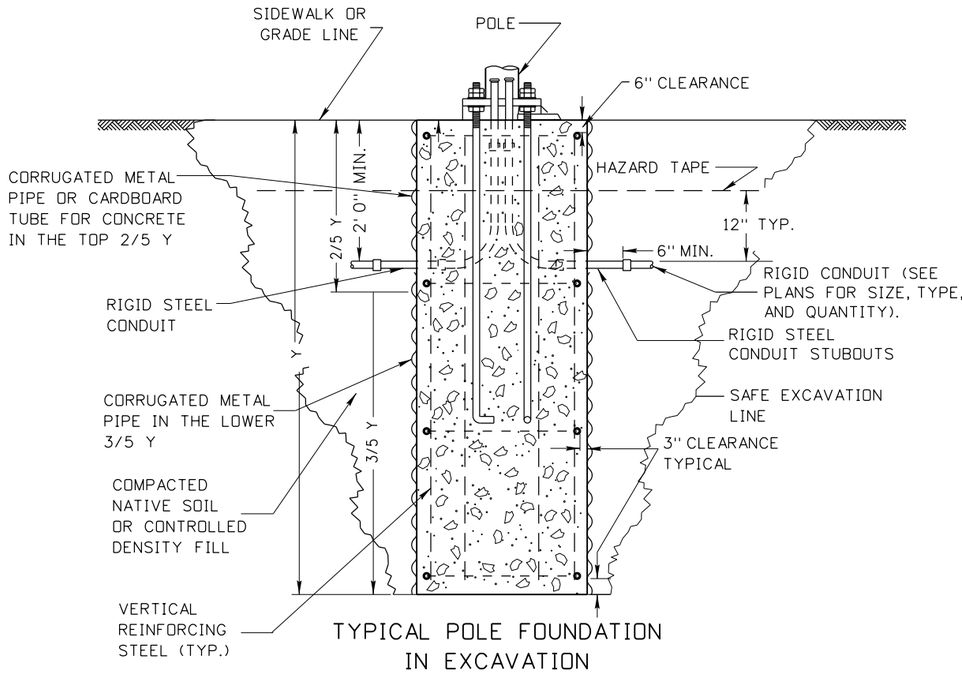
STANDARD DRAWING NO. 656-2

SHEET 1 OF 1



GENERAL NOTES:

1. THE FOUNDATIONS SHALL BE LOCATED AS INDICATED ON THE PROJECT PLAN SHEETS.
2. FOUNDATION REINFORCING STEEL CAGES MAY BE WELDED IF THE REINFORCING STEEL CONFORMS TO AASHTO M 31 AND ALL WELDING CONFORMS TO ANSI/AWS D1.4 (STRUCTURAL WELDING CODE - REINFORCING STEEL).
3. REINFORCING STEEL IN POLE FOUNDATIONS SHALL BE 60 KSI STEEL.
4. STEEL TEMPLATE REQUIRED FOR ANCHOR BOLT PLACEMENT.
5. SPARE STUBOUTS WHEN SHOWN ON PLAN SHEETS SHALL BE TERMINATED WITH A STEEL COUPLING AND FOAM PLUG AT BOTH ENDS.
6. CLASS 40A CONCRETE SHALL BE USED IN POLE FOUNDATIONS.
7. FOUNDATION CONCRETE SHALL ACHIEVE 100% STRENGTH AND CURE FOR A MINIMUM OF 7 DAYS BEFORE ANY LOADING IS APPLIED.
8. FILLER JOINT MATERIAL WILL BE PLACED AROUND POLE FOUNDATION WHEN POLE FOUNDATION IS IN CONTACT WITH SIDEWALK.
9. ELEVATION OF TOP OF POLE FOUNDATION SHALL MATCH THE ADJACENT PAVEMENT EDGE OR SIDEWALK ELEVATION.
10. ANCHOR BASE ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED IN ACCORDANCE WITH SUBSECTION 619.03 OF THE ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND THE SUPPLEMENTAL SPECIFICATIONS.
11. DRAWING NOT TO SCALE.



EXCAVATION NOTES:

1. IF CORRUGATED METAL PIPE IS USED UP TO SIDEWALK OR GRADE LINE, CUT OUT HOLE FOR THE CONDUITS WILL BE EQUAL TO THE DIAMETER OF CONDUIT OR CONDUITS PLUS ONE INCH.
2. WHEN NATIVE SOIL IS USED FOR BACKFILL, IT SHALL BE COMPACTED IN ACCORDANCE WITH SUBSECTION 210.03 OF THE IDAHO STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND SUPPLEMENTAL SPECIFICATIONS.
3. IF CONTROL DENSITY FILL IS USED FOR BACK FILL, IT SHALL HAVE A COMPRESSIVE STRENGTH OF 100 PSI TO 300 PSI.
4. DRAWING NOT TO SCALE.

POLE FOUNDATION SCHEDULE

POLE TYPE	MT.HT.	MASTARM LENGTH	FOUNDATION TYPE	X	Y	REINFORCING STEEL HOOPS			VERTICAL REINFORCING STEEL			CUBIC YARDS CONCRETE
						QTY.	SIZE	LIN.FT.	QTY.	SIZE	LIN.FT.	
PEDESTRIAN SIGNAL POLE	-	-	A	2'-0"	5'-0"	4	#4	20'-10"	6	#4	25'-6"	.6
SIGNAL POLE		20' - 45'	D	3'-0"	9'-0"	5	#4	41'-10"	8	#6	66'-0"	2.4
PEDESTRIAN PUSHBUTTON POLE	4'-0"	-	E	1'-6"	2'-6"	-	-	-	-	-	-	0.2
DUAL MAST ARM SIGNAL POLE	-	ALL	F	3'-0"	12'-0"	8	#5	66'-10"	12	#6	135'-0"	3.1
SIGNAL POLE	-	50' - 55'	F	3'-0"	12'-0"	8	#5	66'-10"	12	#6	135'-0"	3.1

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REGISTERED PROFESSIONAL ENGINEER — 4115 — STATE OF IDAHO — TRI BUD — ORIGINAL SIGNED MAY 1, 2017

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 656-3_0517.dgn

DRAWING DATE: MAY, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

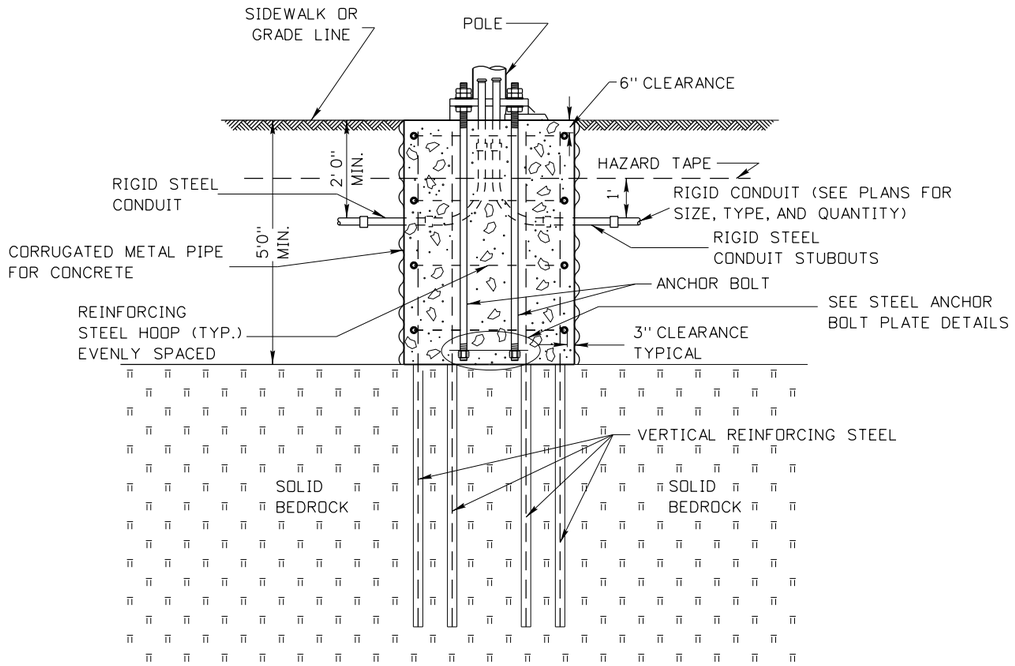
STANDARD DRAWING

MASTARM SIGNAL POLE AND PEDESTRIAN POLE FOUNDATION DETAILS

English

STANDARD DRAWING NO. 656-3

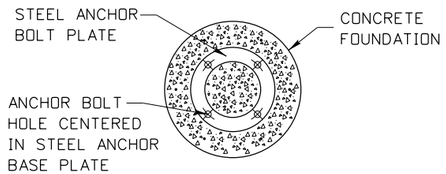
SHEET 1 OF 2



TYPICAL POLE FOUNDATION
IN SOLID BEDROCK

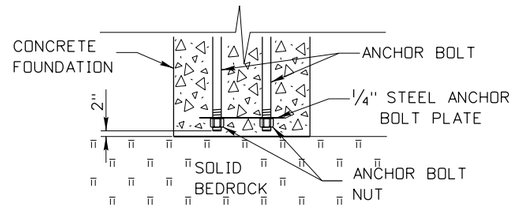
SOLID BEDROCK NOTES:

1. IF DEPTH TO BEDROCK IS LESS THAN 5', NOTIFY THE ENGINEER AND REDESIGN OF THE FOUNDATION MAY BE REQUIRED
2. FOUR REINFORCING STEEL HOOPS TO BE EVENLY SPACED ARE REQUIRED.
3. SOCKET ALL VERTICAL REINFORCING STEEL FULL LENGTH AS SHOWN IN POLE FOUNDATION SCHEDULE ON SHEET 1 IN BEDROCK. DIAMETERS OF DRILLED HOLES FOR VERTICAL REINFORCING STEEL SHALL BE AT LEAST 2 INCHES. FILL DRILLEDHOLES WITH GROUT, 705.02, TYPE B, CLASS 1.
4. EXCAVATION NOTES ON SHEET 1 APPLY TO THIS APPLICATION.
5. DRAWING NOT TO SCALE.



TOP VIEW

ANCHOR BOLT PLATE SCHEDULE		
BOLT CIRCLE	OUTSIDE DIAMETER	INSIDE DIAMETER
17½"	21¼"	13¾"
18½"	22¼"	14¾"
22"	26¼"	17¾"



SIDE VIEW

STEEL ANCHOR BOLT PLATE DETAILS

SEE STANDARD DRAWING 656-3 SHEEET 1 FOR DETAILS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

REGISTERED PROFESSIONAL ENGINEER
4115
STATE OF IDAHO
TRI BUD
ORIGINAL SIGNED BY: KEVIN SABLAN
MAY 1, 2017
DESIGN/TRAFFIC SERVICES ENGINEER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 656-3_0517.dgn

DRAWING DATE: MAY, 2017

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

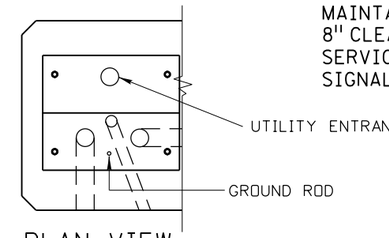
STANDARD DRAWING

MASTARM SIGNAL POLE AND PEDESTRIAN POLE FOUNDATION DETAILS

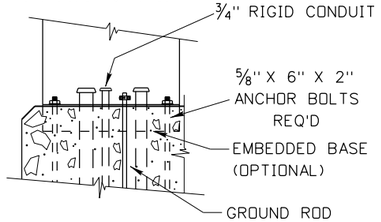
English

STANDARD DRAWING NO. 656-3

SHEET 2 OF 2

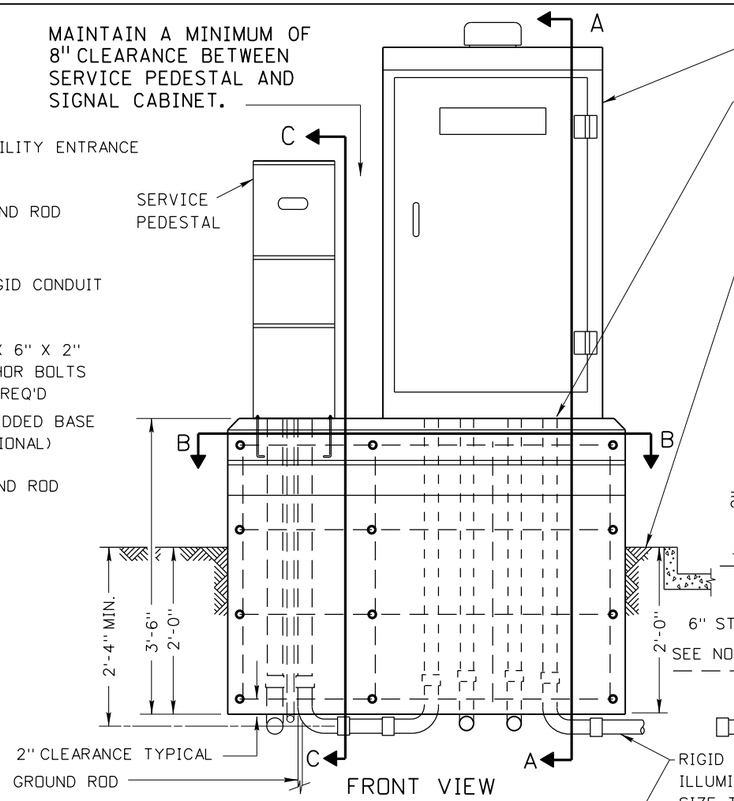


PLAN VIEW

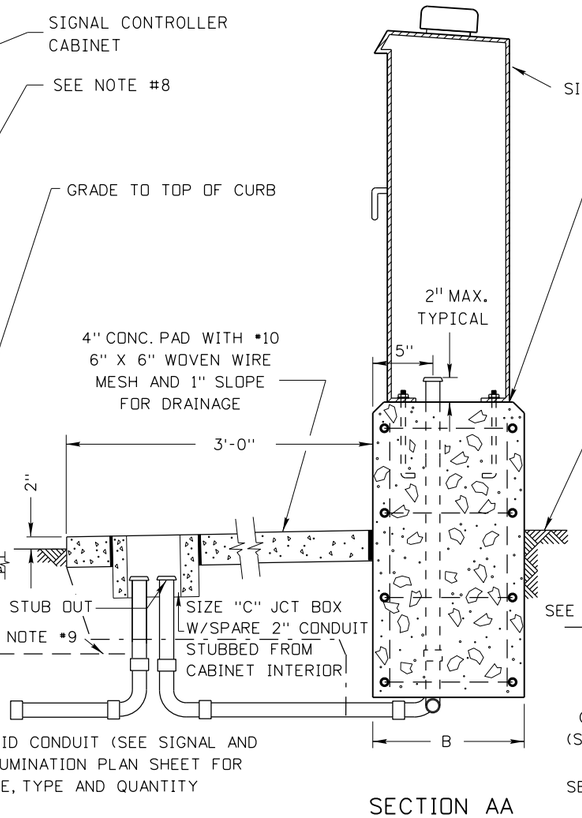


FRONT VIEW
PEDESTAL
INSTALLATION
DETAIL

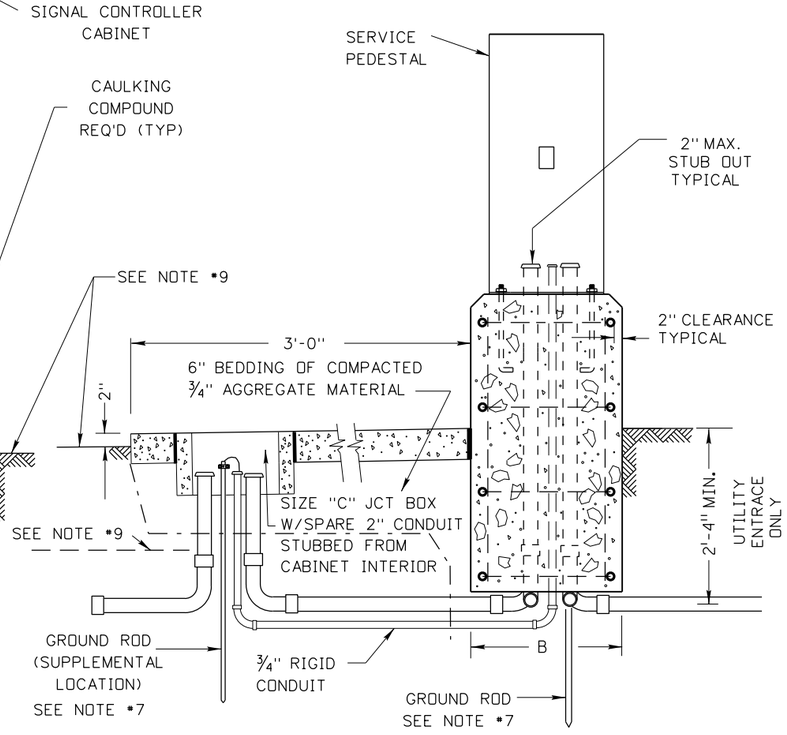
MAINTAIN A MINIMUM OF 8" CLEARANCE BETWEEN SERVICE PEDESTAL AND SIGNAL CABINET.



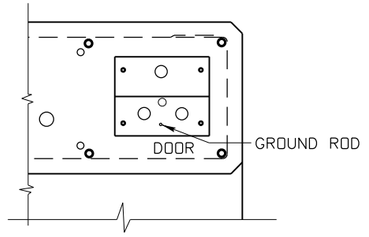
FRONT VIEW



SECTION AA

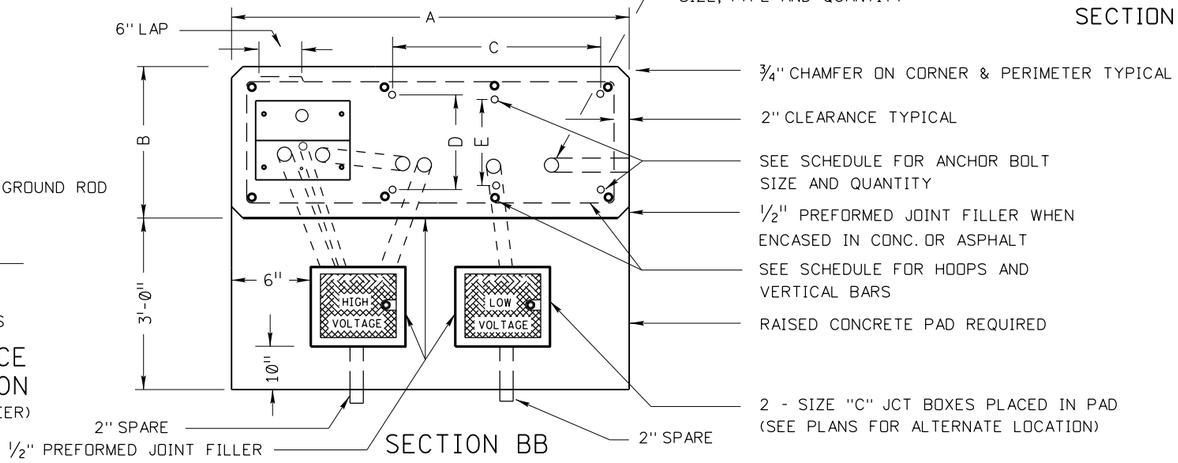


SECTION CC



VERIFY PLACEMENT OF
5/8" X 6" X 2" ANCHOR BOLTS

ALTERNATE SERVICE
PEDESTAL LOCATION
(TO BE APPROVED BY ENGINEER)



SECTION BB

NOTES:

1. THE FOUNDATION SHALL BE LOCATED AS INDICATED ON THE PROJECT PLAN SHEETS.
2. FOUNDATION REBAR CAGES MAY BE WELDED IF THE REBAR CONFORMS TO ASTM A706/A706M AND ALL WELDING CONFORMS TO ANSI/AWS D1.4 (STRUCTURAL WELDING CODE - REINFORCING STEEL).
3. ALL CONDUITS, ELBOWS, AND COUPLINGS WITHIN AND PROTRUDING FROM THE FOUNDATION SHALL BE RIGID STEEL. THE REMAINING CONDUITS SHALL BE AS SHOWN ON THE PLANS.
4. STUBOUTS SHALL BE TERMINATED WITH A STEEL BONDING BUSHING.
5. FOAM PLUG REQUIRED AT BOTH ENDS OF SPARE CONDUITS.
6. GROUND IN ACCORDANCE WITH N.E.C.
7. CONDUIT SHALL BE INSTALLED IN SUCH A MANNER AS TO NOT CAUSE MODIFICATION OF THE CABINETS.
8. GRADE AREA TO PROVIDE DRAINAGE AWAY FROM CABINET FOUNDATION.
9. 6" WIDE ELECTRICAL HAZARD TAPE INSTALLED 1'-0" ABOVE CONDUIT (TYPICAL OF ALL CONDUIT PLACED IN GROUND).
10. IF SUPPLIED, USE SERVICE PEDESTAL BASE FOR ANCHOR BASE TEMPLATE.
11. NOT TO SCALE

FOUNDATION SCHEDULE
CABINET AND SERVICE PEDESTAL

CABINET TYPE	FOUNDATION TYPE	A	B	C	D	E	HOOPS			VERTICAL RODS			CU. YDS. CONC.		CABINET ANCHOR BOLTS		SERVICE PEDESTAL ANCHOR BOLTS	
							NO.	SIZE	LIN. FT.	NO.	SIZE	LIN. FT.	FOUNDATION	PAD	QNTY.	SIZE	QNTY.	SIZE
SIGNAL	M	5'-6"	1'-8"	—	—	1'-0"	4	#4	54'-0"	8	#4	25'-4"	1.2	.2	2	3/4" X 18" X 2 1/4"	4	5/8" X 6" X2
	P & R	6'-8"	2'-5"	3'-4 3/4"	1'-6 1/2"	—	4	#4	69'-4"	8	#4	25'-4"	2.1	.25	4	3/4" X 18" X 2 1/4"	4	5/8" X 6" X2

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	08-96	NQB						
2	12-04	HEB						
3	05-05	HEB						
4	05-14	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 656-5_0614.dgn

DRAWING DATE: DECEMBER, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: CARL D. MAIN
DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

SIGNAL CABINET & SERVICE PEDESTAL FOUNDATION DETAILS

English

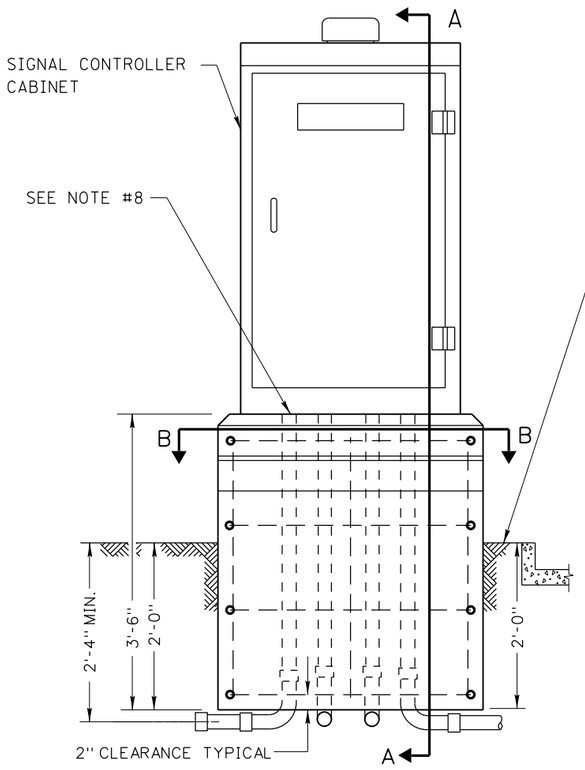
STANDARD DRAWING NO.

656-5

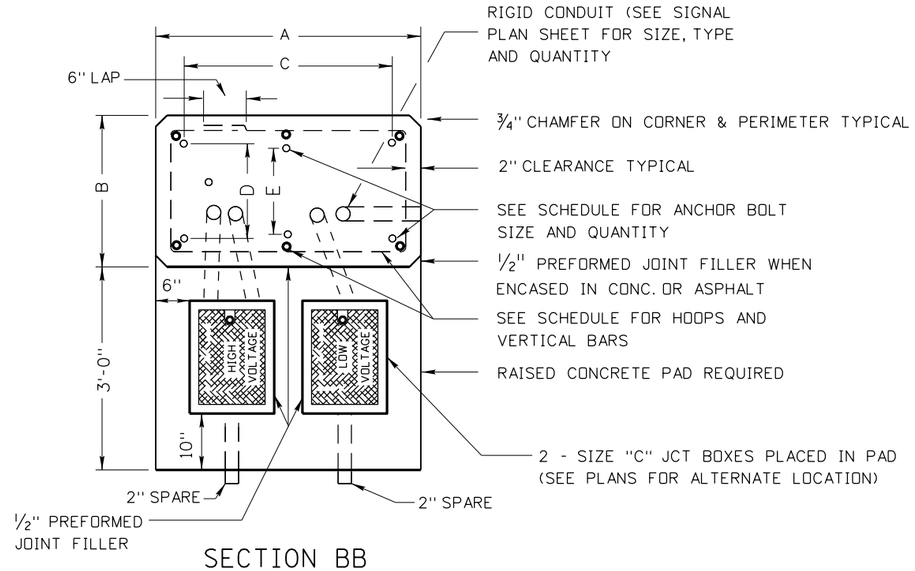
SHEET 1 OF 1

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

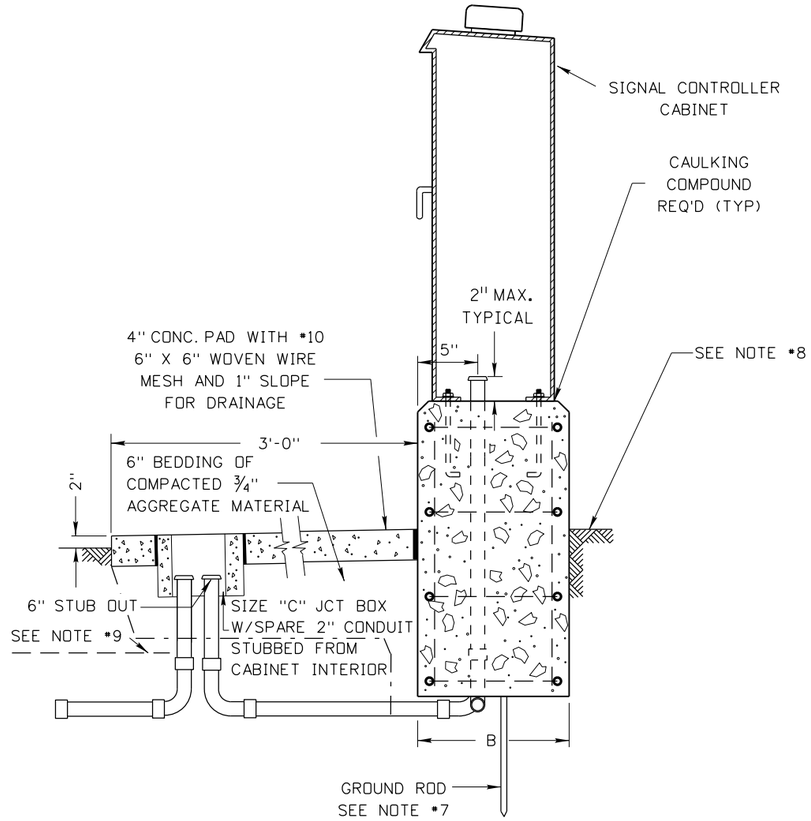
PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY ROBERT A. KOEBERLEIN STATE OF IDAHO JUNE 19, 2014 8401 ROBERT KOEBERLEIN



FRONT VIEW



SECTION BB



SECTION AA

CABINET FOUNDATION SCHEDULE

CABINET TYPE	FOUNDATION TYPE	A	B	C	D	E	HOOPS			VERTICAL RODS			CU. YDS. CONC.		CABINET ANCHOR BOLT	
							NO.	SIZE	LIN. FT.	NO.	SIZE	LIN. FT.	FOUNDATION	PAD	QNTY.	SIZE
SIGNAL	M	2'-9"	1'-8"	–	–	1'-0"	4	#4	32'-0"	6	#4	19'-0"	.6	.14	2	3/4" X 18" X 2 1/4"
	P & R	3'-11"	2'-5"	3'-4 3/4"	1'-6 1/2"	–	4	#4	47'-4"	6	#4	19-'0"	1.23	.14	4	3/4" X 18" X 2 1/4"

NOTES:

1. THE FOUNDATION SHALL BE LOCATED AS INDICATED ON THE PROJECT PLAN SHEETS.
2. FOUNDATION REBAR CAGES MAY BE WELDED IF THE REBAR CONFORMS TO ASTM A706/A706M AND ALL WELDING CONFORMS TO ANSI/AWS D1.4 (STRUCTURAL WELDING CODE - REINFORCING STEEL).
3. ALL CONDUITS, ELBOWS, AND COUPLINGS WITHIN AND PROTRUDING FROM THE FOUNDATION SHALL BE RIGID STEEL. THE REMAINING CONDUITS SHALL BE AS SHOWN ON THE PLANS.
4. STUBOUTS SHALL BE TERMINATED WITH A STEEL BONDING BUSHING.
5. FOAM PLUG REQUIRED AT BOTH ENDS OF SPARE CONDUITS.
6 GROUND IN ACCORDANCE WITH N.E.C.
7. CONDUIT SHALL BE INSTALLED IN SUCH A MANNER AS TO NOT CAUSE MODIFICATION OF THE CABINETS.
8. GRADE AREA TO PROVIDE DRAINAGE AWAY FROM CABINET FOUNDATION.
9. 6" WIDE ELECTRICAL HAZARD TAPE INSTALLED 1'-0" ABOVE CONDUIT (TYPICAL OF ALL CONDUIT PLACED IN GROUND).
10. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNED BY: ROBERT KOEBERLEIN STATE OF IDAHO JUNE 19, 2014 ROBERT KOEBERLEIN

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 656-6_0614.dgn

DRAWING DATE: MAY, 2014

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: CARL D. MAIN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

SIGNAL CABINET FOUNDATION DETAIL

English

STANDARD DRAWING NO.

656-6

SHEET 1 OF 1

8401

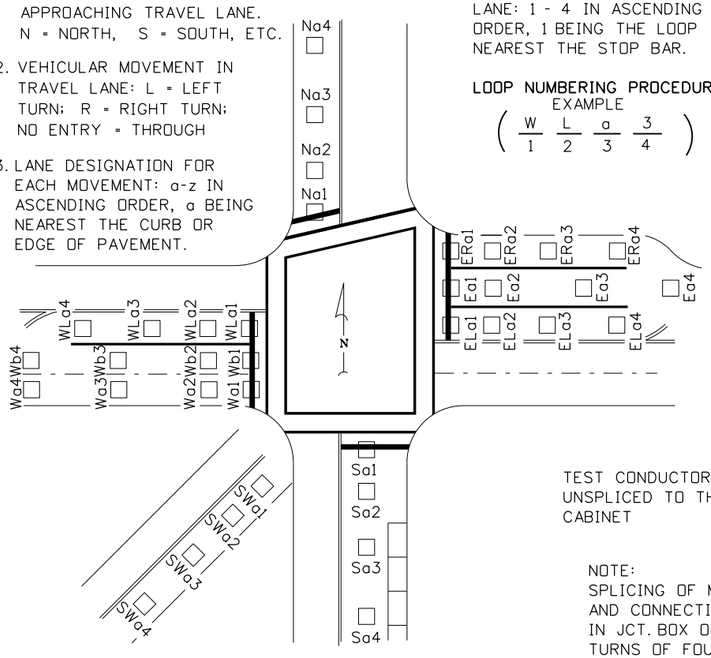
POSITION

1. MAGNETIC ORIENTATION OF APPROACHING TRAVEL LANE. N = NORTH, S = SOUTH, ETC.
2. VEHICULAR MOVEMENT IN TRAVEL LANE: L = LEFT TURN; R = RIGHT TURN; NO ENTRY = THROUGH
3. LANE DESIGNATION FOR EACH MOVEMENT: a-z IN ASCENDING ORDER, a BEING NEAREST THE CURB OR EDGE OF PAVEMENT.
4. LOOP NUMBER IN EACH TRAVEL LANE: 1 - 4 IN ASCENDING ORDER, 1 BEING THE LOOP NEAREST THE STOP BAR.

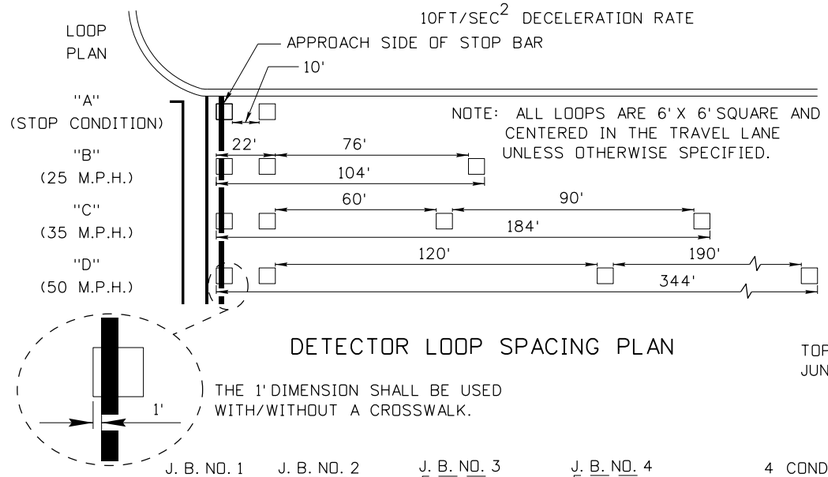
LOOP NUMBERING PROCEDURE

EXAMPLE

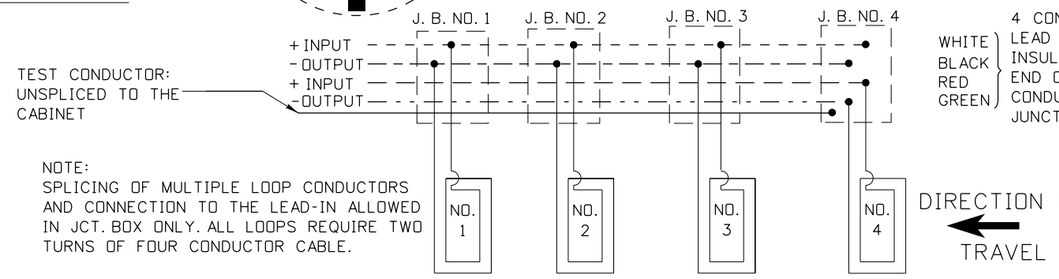
(W/1 L/2 a/3 3/4)



LOOP NUMBERING SYSTEM



DETECTOR LOOP SPACING PLAN



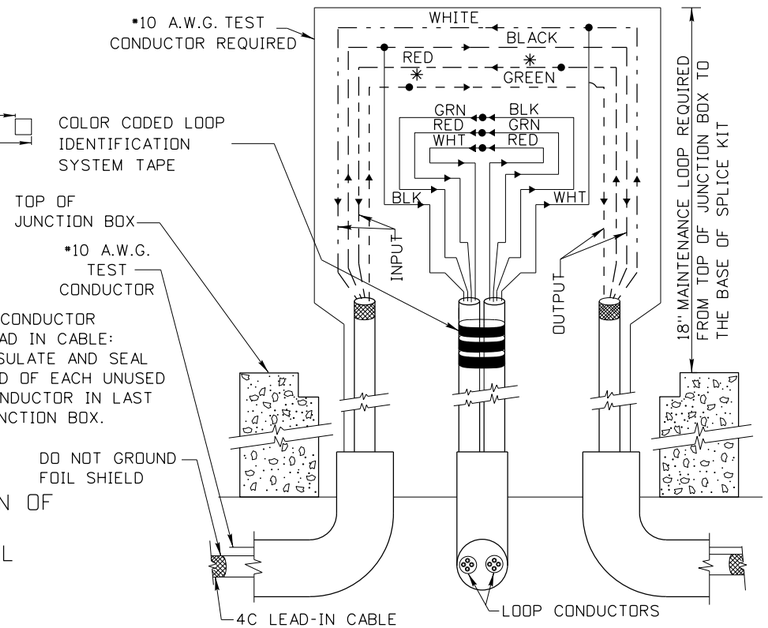
NOTE:
SPLICING OF MULTIPLE LOOP CONDUCTORS AND CONNECTION TO THE LEAD-IN ALLOWED IN JCT. BOX ONLY. ALL LOOPS REQUIRE TWO TURNS OF FOUR CONDUCTOR CABLE.

THE LOOPS IN EACH LANE SHALL BE WOUND IN THE SAME DIRECTION.

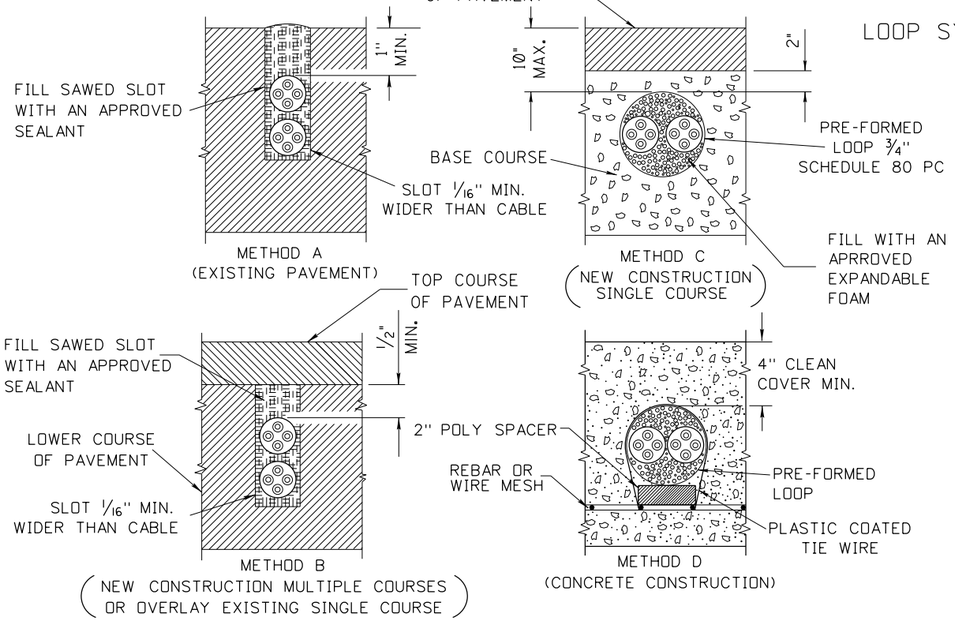
WHITE
BLACK
RED
GREEN

4 CONDUCTOR LEAD IN CABLE: INSULATE AND SEAL END OF EACH UNUSED CONDUCTOR IN LAST JUNCTION BOX.

NOTES:
1. ALL CONDUCTOR SPLICES SHALL BE SOLDERED AND WATERPROOFED WITH AN APPROVED SPLICE KIT.
2. THE FOIL SHIELD SHALL BE INSULATED TO PREVENT GROUNDING AT THE JUNCTION BOX.
3. ✳ SPLICE DUAL PURPOSE LOOPS TO THE RED AND GREEN CONDUCTORS.



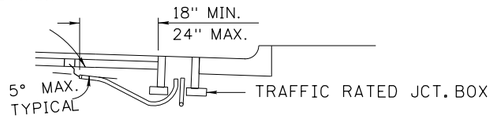
LOOP SPLICE DETAIL AT JUNCTION BOX



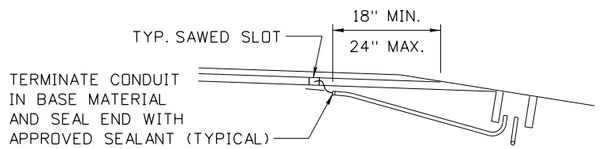
LOOP SYSTEM AND JUNCTION BOX WIRING DIAGRAM

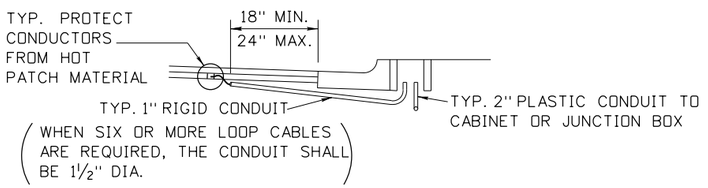
LOOP CONDUCTOR INSTALLATION

NOTES:
1. METHOD "C" MAY BE USED ONLY WITH PRE-FORMED LOOPS.
2. HYDRO CLEAN AND AIR DRY SLOTS AFTER CUTTING AND PRIOR TO CABLE INSTALLATION.
3. BED LOOP CONDUCTORS IN SEALANT FOR TOTAL ENCAPSULATION.
4. SEAT LOOP CONDUCTORS IN SLOT WITH A BLUNT INSTRUMENT.



USE ONLY WHEN PLACEMENT BEHIND THE CURB IS NOT POSSIBLE





(WHEN SIX OR MORE LOOP CABLES ARE REQUIRED, THE CONDUIT SHALL BE 1½" DIA.)

JUNCTION BOX AND CONDUIT LOCATION

LANE NO.	TAPE COLOR
1	BLACK
2	WHITE
3	RED
4	GREEN
5	ORANGE
6	BLUE

IN ASCENDING ORDER - BLACK SHALL BE USED FOR THE LANE NEAREST THE CURB OR EDGE OF PAVEMENT.

EXAMPLE:
CONDUCTORS FOR LOOP 1 LANE 1 REQUIRE 1 BAND OF BLACK TAPE.

CONDUCTORS FOR LOOP 3 LANE 4 REQUIRE 3 BANDS OF GREEN TAPE.

COLOR CODED LOOP IDENTIFICATION SYSTEM

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER REGISTERED ORIGINAL SIGNATURE OF CARL D. MAIN JUNE 12, 2010 STATE OF IDAHO 6260 CARL D. MAIN

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	12-93	HEB	6	08-08	NQB			
2	12-94	HEB	7	07-10	HEB			
3	03-96	HEB						
4	07-03	HEB						
5	08-06	HEB						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 656-10_0710.dgn

DRAWING DATE: DECEMBER, 1994

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

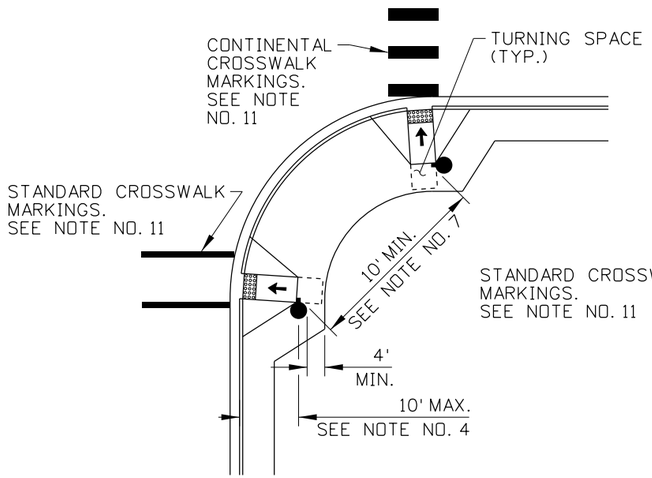
STANDARD DRAWING

LOOP DETECTORS
10FT/SEC² DECELERATION RATE

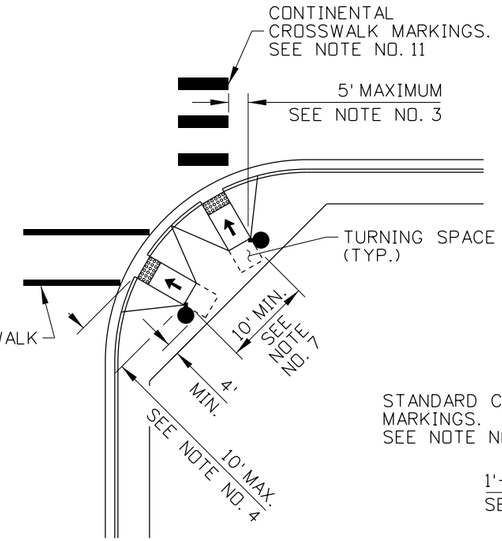
English

STANDARD DRAWING NO.
656-10

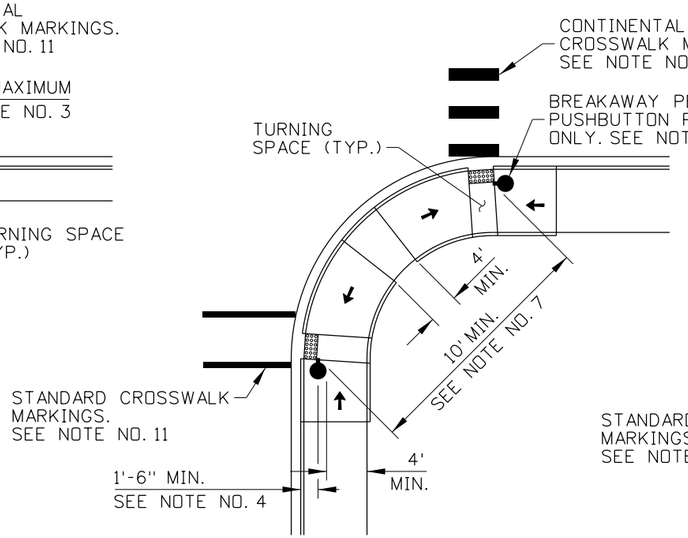
SHEET 1 OF 1



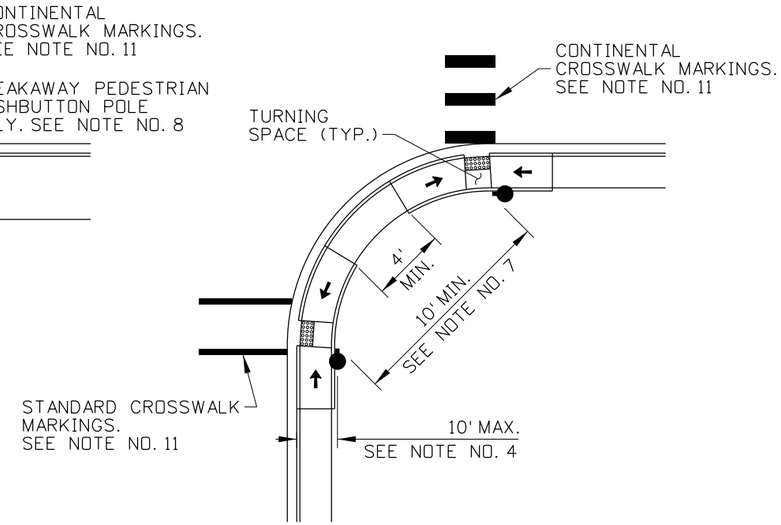
PERPENDICULAR CURB RAMP
WITH CROSSWALKS FAR APART



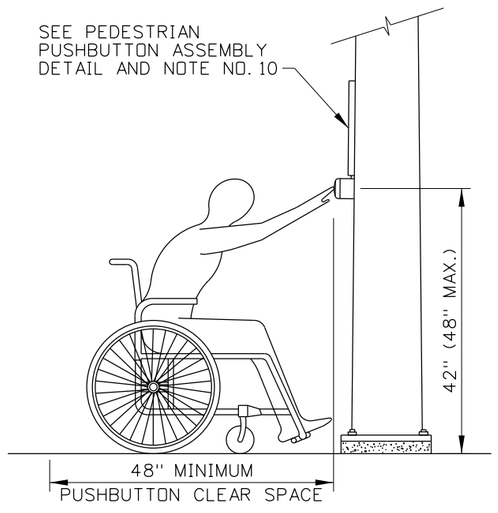
PERPENDICULAR CURB RAMP
WITH CROSSWALKS CLOSE TOGETHER



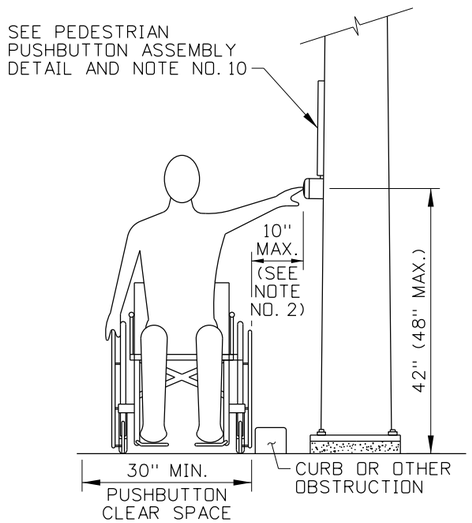
PARALLEL OR
COMBINATION CURB RAMP
WITH WIDE SIDEWALK



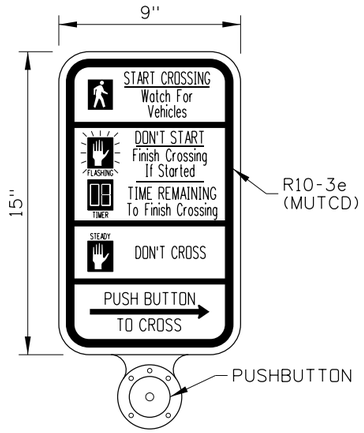
PARALLEL CURB RAMP
WITH NARROW SIDEWALK



FORWARD APPROACH
SEE NOTE NOS. 2 & 6



PARALLEL APPROACH
SEE NOTE NOS. 2 & 6



PEDESTRIAN PUSHBUTTON
ASSEMBLY DETAIL
SEE NOTE NO. 10

NOTES

1. FOUR TYPICAL CONFIGURATIONS ARE SHOWN. FOR OTHER CONFIGURATIONS, THE MAXIMUM AND MINIMUM DIMENSIONS SHOWN REMAIN APPLICABLE. WHERE CURB AND CURB RAMPS ARE NOT PRESENT, MEASURE FROM THE EDGE OF TRAVELED WAY.
2. PROVIDE A PUSHBUTTON CLEAR SPACE, WITH 30" BY 48" MINIMUM DIMENSIONS, ADJACENT TO PEDESTRIAN PUSHBUTTONS. ENSURE THAT THE CLEAR SPACE SURFACE IS FIRM, STABLE, AND SLIP RESISTANT. POSITION THE CLEAR SPACE SO THE PUSHBUTTON CAN BE ACCESSED WITH EITHER A FORWARD OR PARALLEL APPROACH. AN OBSTRUCTION, UP TO 10" IN DEPTH, BETWEEN THE CLEAR SPACE AND THE PUSHBUTTON IS PERMITTED FOR A PARALLEL APPROACH. WHERE CURB RAMPS ARE USED, THE TURNING SPACE FOR THE CURB RAMP MAY DOUBLE AS THE CLEAR SPACE.
3. PLACE PUSHBUTTON BETWEEN THE EDGE OF THE CROSSWALK LINE (EXTENDED) FARTHEST FROM THE CENTER OF THE INTERSECTION AND THE SIDE OF A CURB RAMP (IF PRESENT), BUT NOT MORE THAN 5' FROM THE SAID CROSSWALK LINE.
4. PLACE PUSHBUTTON BEHIND THE FACE OF CURB OR OUTSIDE THE EDGE OF TRAVELED WAY A MINIMUM DISTANCE OF 1'-6" AND A MAXIMUM DISTANCE OF 10'.
5. ENSURE THAT THE FACE OF THE PUSHBUTTON IS PARALLEL TO THE CROSSWALK TO BE USED.
6. MOUNT THE PUSHBUTTON 42" ABOVE THE CLEAR SPACE. THE MAXIMUM MOUNTING HEIGHT IS 48".
7. PROVIDE A MINIMUM DISTANCE OF 10' BETWEEN PEDESTRIAN PUSHBUTTONS. WHERE THERE ARE PHYSICAL CONSTRAINTS ON A PARTICULAR CORNER THAT MAKE IT IMPRACTICAL TO PROVIDE THE 10' SEPARATION BETWEEN THE TWO PEDESTRIAN PUSHBUTTONS, THE PUSHBUTTONS MAY BE PLACED CLOSER TOGETHER OR ON THE SAME POLE.
8. PUSHBUTTONS MAY BE INSTALLED ON A SIGNAL POLE OR PEDESTRIAN PUSHBUTTON POLES. ENSURE THAT POLES WITHIN 10' OF THE FACE OF CURB OR EDGE OF TRAVELED WAY HAVE BREAKAWAY FEATURES.
9. INSTALL ACCESSIBLE PEDESTRIAN SIGNALS WHEN RECOMMENDED BY AN ENGINEERING STUDY.
10. USE MODULAR OR CAST PEDESTRIAN PUSHBUTTON ASSEMBLIES. DO NOT USE H FRAME PEDESTRIAN PUSHBUTTON ASSEMBLIES. USE THE R10-3e(MUTCD) SIGN ON THE PUSHBUTTON ASSEMBLY.
11. CROSSWALK MARKINGS MAY VARY.
12. DRAWINGS NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED ORIGINAL SIGNED BY RYAN D. LANCASTER STATE OF IDAHO JUNE 17, 2014 13683 RYAN D. LANCASTER

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 656-15_0614.dgn

DRAWING DATE: MAY, 2014

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: CARL D. MAIN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

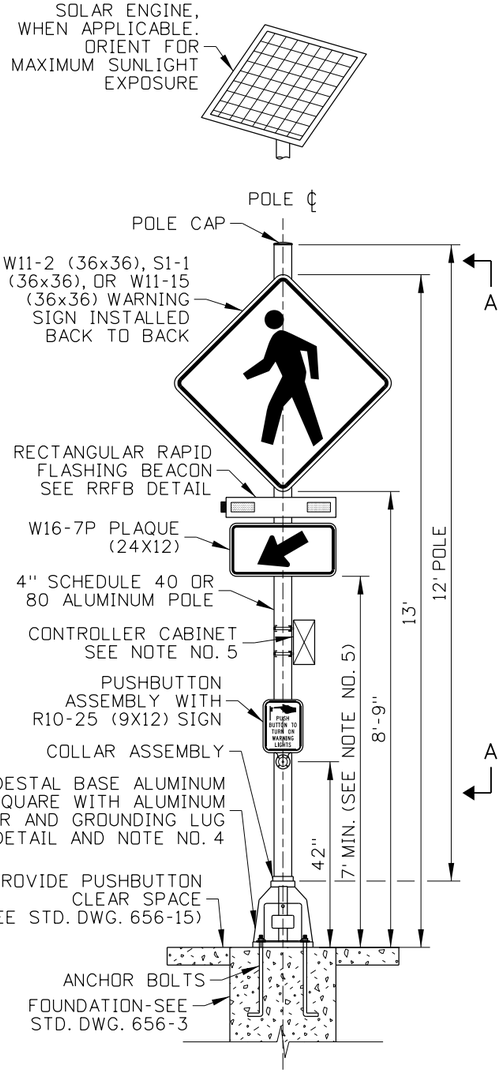
PEDESTRIAN PUSHBUTTON PLACEMENT

English

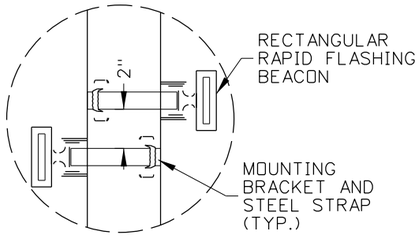
STANDARD DRAWING NO.

656-15

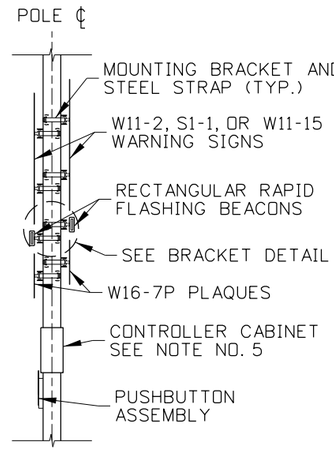
SHEET 1 OF 1



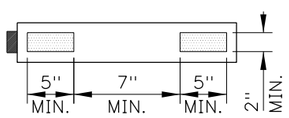
RECTANGULAR RAPID FLASHING BEACON (RRFB)



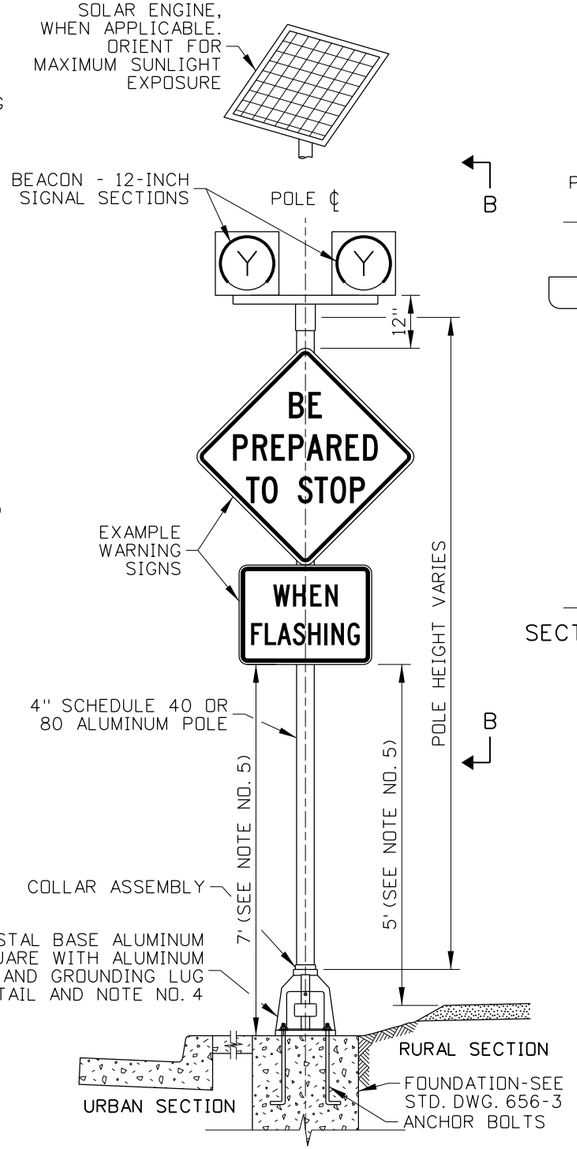
BRACKET DETAIL



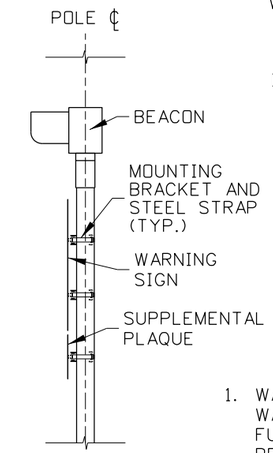
SECTION A-A



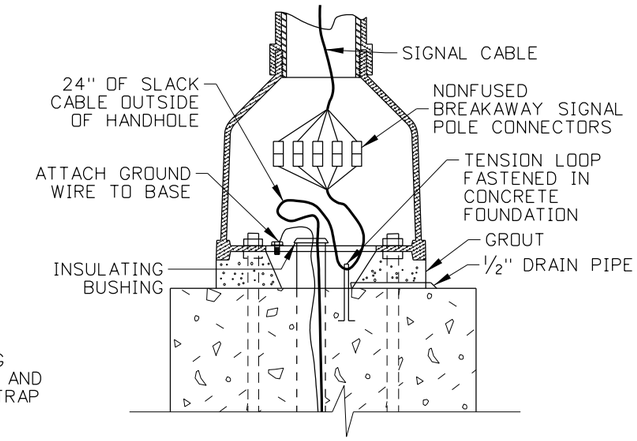
RRFB DETAIL



WARNING BEACON



SECTION B-B



FRANGIBLE ALUMINUM BASE DETAIL

NOTES

1. WARNING BEACONS PROVIDE SUPPLEMENTAL EMPHASIS TO WARNING SIGNS. RECTANGULAR RAPID FLASHING BEACONS FUNCTION AS WARNING BEACONS SPECIFICALLY FOR PEDESTRIAN, SCHOOL, AND TRAIL WARNING SIGNS AT MARKED CROSSWALKS ACROSS UNCONTROLLED APPROACHES. LED UNITS IN A SIGN OR SUPPLEMENTAL PLAQUE LEGEND OR BORDER DO NOT CONSTITUTE A WARNING BEACON.
2. THIS DRAWING SHOWS TYPICAL BEACON INSTALLATION DETAILS. THE DETAILS FOR QPL APPROVED PROPRIETARY SYSTEMS MAY VARY.
3. LOCATE RRFB POLES AS SHOWN IN THE PLANS AND IN ACCORDANCE WITH STANDARD DRAWING 656-15. LOCATE WARNING BEACON POLES AS SHOWN IN THE PLANS.
4. A FRANGIBLE COUPLING SYSTEM BASE CAN BE SUBSTITUTED FOR A FRANGIBLE CAST ALUMINUM BASE.
5. ENSURE PUSHBUTTON ASSEMBLY, CONTROLLER CABINET, AND SECONDARY SIGNS DO NOT PROTRUDE MORE THAN 4 INCHES HORIZONTALLY INTO ADJACENT PEDESTRIAN CIRCULATION PATHS IN ACCORDANCE WITH STANDARD DRAWING 614-1.
6. THE HEIGHT TO THE BOTTOM OF A SECONDARY SIGN MOUNTED BELOW ANOTHER SIGN MAY BE 1 FOOT LESS THAN THE HEIGHT SHOWN PROVIDED THE CONDITIONS IN NOTE NO. 4 ARE MET.
7. USE STEEL CONDUIT ELBOWS IN CONCRETE BASES AND TO EXTEND ELBOWS BEYOND CONCRETE FOUNDATION.
8. TERMINATE SPARE STUB OUTS WITH A STEEL COUPLING AND PLASTIC PUSH PLUG AT BOTH ENDS.
9. PROVIDE CONTROLLER CABINET ENCLOSURE APPROPRIATE FOR THE WARNING BEACON OR RRFB SYSTEM. LOCATE CABINET AS SHOWN IN THE PLANS.
10. INSTALL PEDESTRIAN PUSHBUTTONS IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS.
11. DRAWING NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER LICENSED RYAN D. LANCASTER 13683 STATE OF IDAHO ORIGINAL SIGNED MARCH 9, 2022

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 657-1_0422.dgn

DRAWING DATE: JANUARY 2022

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING

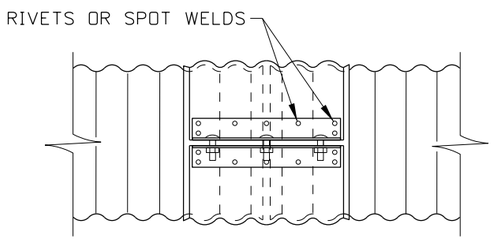
FLASHING BEACONS

REQ. STANDARD DRAWINGS 656-3 & 656-15

English

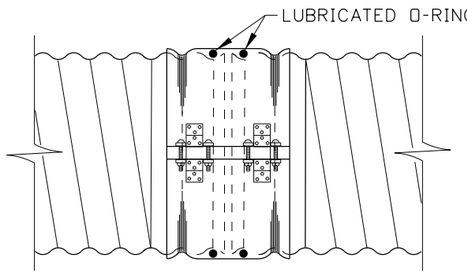
STANDARD DRAWING NO. 657-1

SHEET 1 OF 1



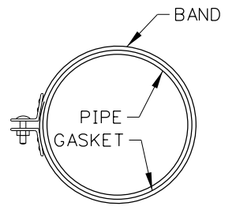
TYPES 1-A & 2-A

ANNULAR COUPLING BAND



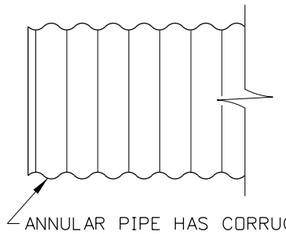
DOUBLE BAR AND STRAP-TYPE 3

HUGGER COUPLING BAND

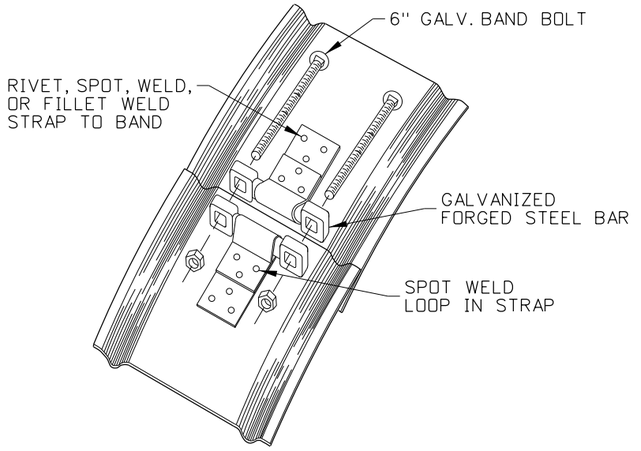


TYPE 1

SINGLE PIECE BAND



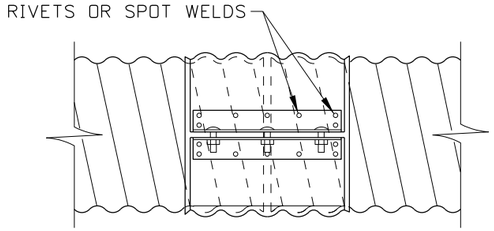
ANNULAR CMP



BAND TYPE 3

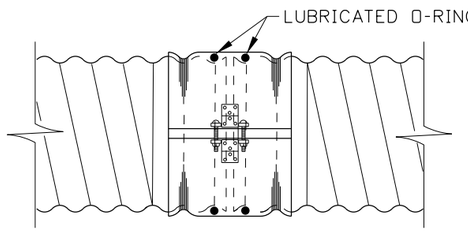
BAR & STRAP COUPLING

(SINGLE STRAP)



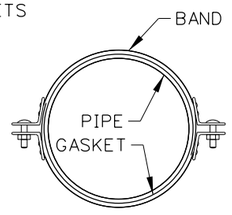
TYPES 1-B & 2-B

HELICAL COUPLING BAND



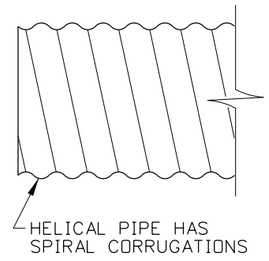
SINGLE BAR AND STRAP-TYPE 3

HUGGERL COUPLING BAND



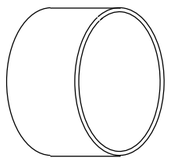
TYPE 2

TWO PIECE BAND

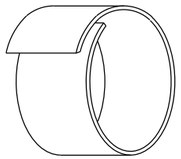


HELICAL CMP

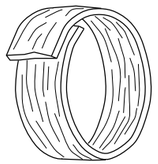
O-RING GASKET



SLEEVE GASKET

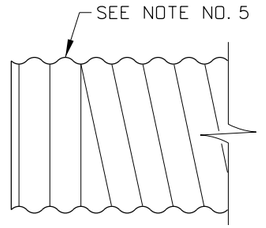


STRIP GASKET



MASTIC SEALANT GASKET

STANDARD CORRUGATED STEEL PIPE GASKET TYPES



REFORMED HELICAL CMP

NOTES

1. THE REFORMED ENDS OF HELICAL CORRUGATED METAL PIPE MADE TO ACCEPT ANNULAR COUPLING BANDS SHALL BE UNIFORM AND SMOOTH IN APPEARANCE. PIPE WITH IRREGULAR REFORMED ENDS ARE NOT ACCEPTABLE.
2. SLEEVE AND STRIP GASKETS FOR COUPLING BANDS TYPE 1-A AND 1-B SHALL EXCEED THE WIDTH OF THE BAND BY A MINIMUM OF 1/4" ON BOTH EDGES. THE GASKETS SHALL FIT SNUGGLY AROUND THE PIPES PRIOR TO INSTALLATION OF THE BAND.
3. ALL WELDS AND/OR EXPOSED FERROUS METAL ON COUPLING BANDS AND BAND CONNECTING HARDWARE SHALL BE REPAIRED IN ACCORDANCE WITH AASHTO M 36.
4. STEEL BAND THICKNESS SHALL BE AT LEAST 1/2 THE THICKNESS OR GAUGE OF THE PIPE. ALUMINUM BANDS SHALL BE THE SAME THICKNESS AS THE PIPE.
5. THE JOINTS FOR SIPHONS AND SEWERS SHALL BE WATERTIGHT AND PRESSURE TESTED PRIOR TO ACCEPTANCE, AS REQUIRED IN THE STANDARD SPECIFICATIONS.
6. TO PREVENT GALVANIC ACTION WHEN BANDS AND PIPES ARE OF AN UNLIKE METAL, THE BANDS SHALL BE ASPHALT COATED.
7. GASKET MATERIALS ARE NOT TO BE ALTERED, SEWN, OR PATCHED. THE USE OF SEALANTS AND/OR LUBRICANTS WITH BAND GASKETS MUST BE AS THE MANUFACTURER SPECIFIES. THE QUALITY AND CHEMICAL COMPOSITION OF SEAL ANTS AND LUBRICANTS WILL BE AS THE MANUFACTURER REQUIRES. CONTACT THE MANUFACTURER FOR DETAILS.
8. SPOT WELDED OR FILLET WELDED STRAPS ON BANDS SHALL BE OF EQUAL STRENGTH TO RIVETED STRAPS.
9. ALL RECOMMENDATIONS IN THE PIPE COUPLING BAND TABLE ARE TO BE CONSIDERED MINIMAL.
10. NOT TO SCALE.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED MILFORD MILLER ORIGINAL SIGNED MARCH 4, 2005 STATE OF IDAHO 2240 MILFORD MILLER

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	02-76		6	03-05	MSM			
2	02-77							
3	09-93	MSM						
4	12-95	MSM						
5	06-02	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: 706-6_0305.dgn

DRAWING DATE: APRIL, 1961

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: STEVEN HUTCHINSON
CHIEF ENGINEER

STANDARD DRAWING

CORRUGATED METAL PIPE WATERTIGHT COUPLING BANDS

English

STANDARD DRAWING NO. 706-6

SHEET 1 OF 2

PIPE COUPLING BAND TABLE						PIPE CORRUGATION STYLE			SIPHON	CULVERT *	IRRIGATION	SEWER	UNDERDRAIN
COUPLING TYPE	CORRUGATIONS	PIPE SIZE	COUPLING WIDTH	COUPLING BOLTS (NO.) DIA.	GASKET TYPE	ANNULAR PIPE	REFORMED HELICAL	HELICAL PIPE					
TYPE 1-A ANNULAR COUPLING BAND	1½" x ¼" & 2⅜" x ½"	6"-10"	7" (1 PIECE)	(3) ⅜"	SLEEVE	X	X		X	X	X	X	X
	2⅜" x ½" & 3" x 1"	12"-15"	7" (1 PIECE)	(3) ½"	SLEEVE	X	X		X	X	X	X	X
	2⅜" x ½" & 3" x 1"	18"-24"	12" (1 PIECE)	(3) ½"	SLEEVE	X	X		X	X	X	X	X
	2⅜" x ½" & 3" x 1"	30"-42"	24" (1 PIECE)	(5) ⅝"	SLEEVE	X	X			X	X		X
TYPE 1-B HELICAL COUPLING BAND	1½" x ¼" & 2⅜" x ½"	6"-10"	7" (1 PIECE)	(3) ⅜"	SLEEVE OR STRIP			X		X	X		X
	2⅜" x ½" & 3" x 1"	12"-15"	7" (1 PIECE)	(3) ½"	SLEEVE OR STRIP			X		X	X		X
	2⅜" x ½" & 3" x 1"	18"-24"	12" (1 PIECE)	(3) ½"	SLEEVE OR STRIP			X		X	X		X
	2⅜" x ½" & 3" x 1"	30"-42"	24" (1 PIECE)	(5) ⅝"	SLEEVE OR STRIP			X		X	X		X
TYPE 2-A ANNULAR COUPLING BAND	1½" x ¼" & 2⅜" x ½"	6"-10"	7" (1 PIECE)	(4) ⅜"	SLEEVE, STRIP OR MASTIC	X	X		X	X	X	X	X
	2⅜" x ½" & 3" x 1"	12"-15"	7" (1 PIECE)	(4) ⅜"	SLEEVE, STRIP OR MASTIC	X	X		X	X	X	X	X
	2⅜" x ½" & 3" x 1"	18"-24"	12" (1 PIECE)	(6) ½"	SLEEVE, STRIP OR MASTIC	X	X		X	X	X	X	X
	2⅜" x ½" & 3" x 1"	30"-42"	24" (1 PIECE)	(8) ½"	SLEEVE, STRIP OR MASTIC	X	X		X	X	X	X	X
TYPE 2-B HELICAL COUPLING BAND	1½" x ¼" & 2⅜" x ½"	6"-10"	7" (1 PIECE)	(4) ⅜"	SLEEVE, STRIP OR MASTIC			X		X	X		X
	2⅜" x ½" & 3" x 1"	12"-15"	7" (1 PIECE)	(4) ⅜"	SLEEVE, STRIP OR MASTIC			X		X	X		X
	2⅜" x ½" & 3" x 1"	18"-24"	12" (1 PIECE)	(6) ½"	SLEEVE, STRIP OR MASTIC			X		X	X		X
	2⅜" x ½" & 3" x 1"	30"-42"	24" (1 PIECE)	(8) ½"	SLEEVE, STRIP OR MASTIC			X		X	X		X
TYPE 3 HUGGER COUPLING BAND	2⅜" x ½" & 3" x 1"	12"-48" (GALV.)	7½" (STRAP)	(2) 6" x ½"	O-RING	X	X			X	X	X	X
	2⅜" x ½" & 3" x 1"	54"-96" (GALV.)	10½" (2 STRAP)	(4) 6" x ⅝"	O-RING	X	X			X	X	X	X
	2⅜" x ½" & 3" x 1"	102"-144" (GALV.)	12" (3 STRAP)	(6) 6" x ⅞"	O-RING	X	X			X	X	X	X

* WATERTIGHT BANDS ARE NOT REQUIRED ON CULVERT INSTALLATIONS UNLESS SPECIFIED BY THE PLANS OR SPECIAL PROVISIONS

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

PROFESSIONAL ENGINEER * LAND SURVEYOR REGISTERED ORIGINAL SIGNED BY MILFORD MILLER MARCH 4, 2005 ORIGINAL SIGNED STATE OF IDAHO 2240 MILFORD MILLER

REVISIONS									SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY	IDAHO TRANSPORTATION DEPARTMENT	ORIGINAL SIGNED BY: LOREN THOMAS ASSISTANT CHIEF ENGINEER (DEVELOPMENT) ORIGINAL SIGNED BY: STEVEN HUTCHINSON CHIEF ENGINEER	STANDARD DRAWING	English
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY	CADD FILE NAME: 706-6_0305.dgn	BOISE IDAHO		CORRUGATED METAL PIPE WATERTIGHT COUPLING BANDS	STANDARD DRAWING NO. 706-6
1	02-76		6	03-05	MSM				DRAWING DATE: APRIL, 1961				SHEET 2 OF 2
2	02-77												
3	09-93	MSM											
4	12-95	MSM											
5	06-02	MSM											