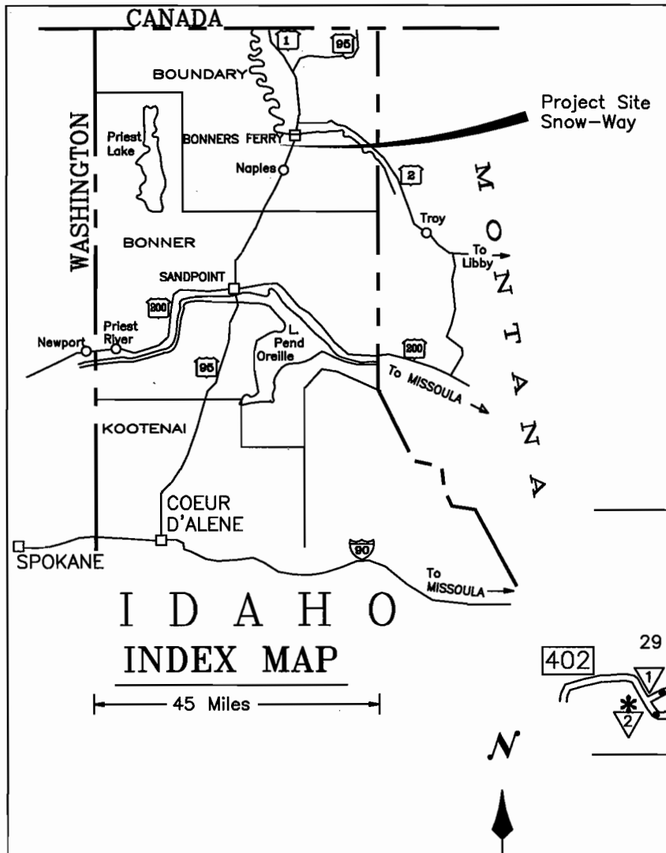
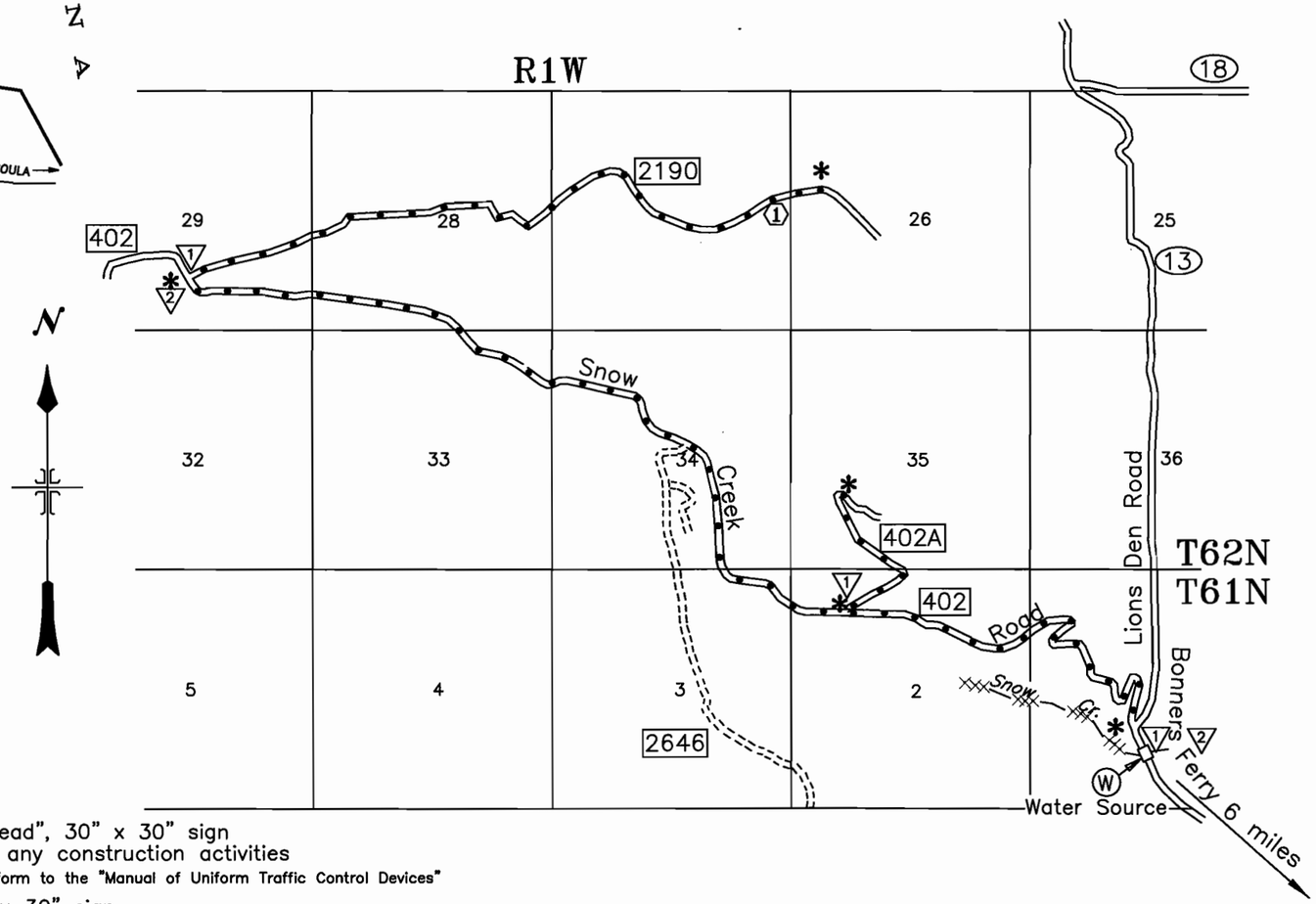
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION ONE
DRAWINGS FOR PROPOSED FOREST DEVELOPMENT ROADS

SNOW-WAY
FOREST ROADS
IDAHO PANHANDLE NATIONAL FORESTS – BONNERS FERRY RANGER DISTRICT – BOUNDARY COUNTY, IDAHO





VICINITY MAP
SCALE: ONE SECTION EQUALS ONE SQUARE MILE

INDEX TO SHEETS

LEGEND:

- Existing Roads
- Reconstruction Roads
- (1) "Road Construction Ahead", 30" x 30" sign. Place at beginning of any construction activities. Traffic Control signs shall conform to the "Manual of Uniform Traffic Control Devices"
- (2) "Trucks Hauling", 30" x 30" sign. Place at beginning of haul routes and associated junctions. Traffic Control signs shall conform to the "Manual of Uniform Traffic Control Devices"
- (1) Borrow Source
- (W) Water Source
- * Beginning and end of road work

The following certify that this project is in conformance with environmental assessment requirements.

Recommended and certified to be technically correct

Project Team Leader

Approved and certified to be in conformance with sound engineering practice for safety, structural integrity, and operational requirements.

Forest Engineer

Approved:

District Ranger

28 FEB 08
Date

ESTIMATE OF QUANTITIES

ROAD NUMBER	402	402A	2190		
MILE POST (MILES)	5.50	0.90	3.20		

ITEM NO.	DESCRIPTION	METHOD OF MEASURE	UNIT	COMPONENT CODE	QUANTITIES						REMARKS
201A(01)	Roadway Brushing	A.Q.	Mile	2		0.90					
203(09)	Excavation, Type: turn out, Placement Method 1	L.S.Q.	L.S.	1			2.00				
203(09)a	Excavation, Type: turn around, Placement Method 1	L.S.Q.	L.S.	1		1.00	1.00				
203(20)	Drainage Excavation, Type Rolling Dip	A.Q.	Each	1		2.00	3.00				
304(10)	Crushed Aggregate, Type Surface, Grading D, Compaction B	D.Q.	C.Y.	2	335.00		383.00				
304A(08)	Sodium Bentonite Binder, Powdered Form, Corrected to 0% Moisture	A.Q.	Ton	2	42.00						
306(01)	Reconditioning of Roadbed, Compaction A	A.Q.	Mile	2	4.20	0.90	3.20				
412(16)	Calcium Chloride Flake @77% Min. Concentration Preparation Method 1	A.Q.	Ton	2	68.00						
601(01)	Mobilization	L.S.Q.	L.S.	2	1.00	1.00	1.00				
603(01)18C	18" CMP (incl culv exc), Thickness: Steel 0.064 Thickness: Aluminum 0.060, Method C	A.Q.	L.F.	3	400.00		60.00				
603(01)24C	24" CMP (incl culv exc), Thickness: Steel 0.064 Thickness: Aluminum 0.060, Method C	A.Q.	L.F.	3	40.00						
640(01)	Furnish and Install Road Closure Device, Type FS, Size Adj	A.Q.	Each	2		1.00					

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Drawn Ned Davis
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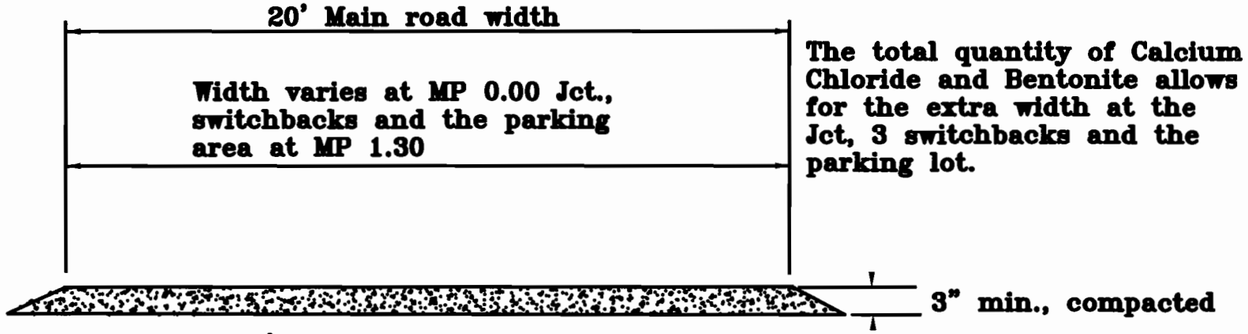
Forest
Idaho Panhandle
Project Name
Snow-Way

Sheet Title
Summary of Quanities
Sheet 2 of 11

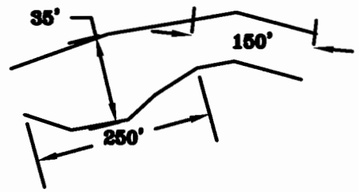


BENTONITE/CHLORIDE TYPICAL SECTION

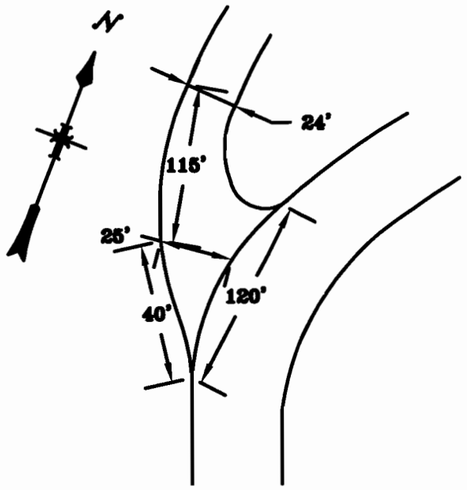
Items 304A(08)/412(16)

Road 402 MP 0.00 to 1.30

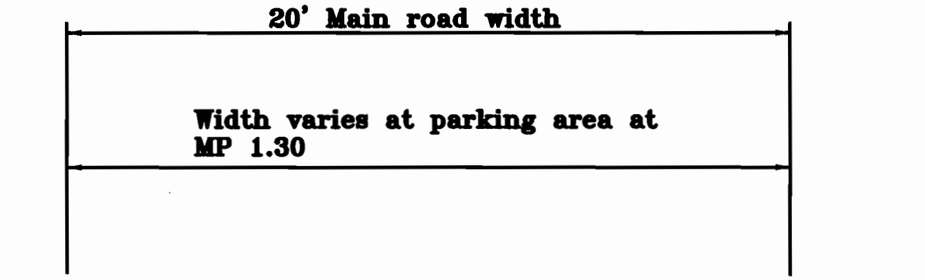
(not to scale)



MP 1.30 Parking Lot dimensions



MP 0.00 Intersection dimensions



Crushed aggregate shall be placed and processed prior to Calcium Chloride and Bentonite treatment.

TYPICAL SECTION

Road 402 MP 1.10 to 1.30

(not to scale)

Snow Creek Road Stabilization

Construction Work

Stabilization Materials or Additives. Bentonite may be purchased from Black Hills Bentonite in Worland Wyoming or other commercial supplier. Calcium Chloride mini pellet (94%) manufactured by Dow Chemical shall come from a commercial source.

Reconditioning. Reconditioning of aggregate surfaced roads is required prior to mixing to ensure there is adequate aggregate thickness and that road crowns are appropriate for good surface drainage. Reconditioning involves cutting out washboards and potholes where the road surfacing has adequate depth. A mixing depth of 3.0 inches shall be obtained for a minimum of 20' wide and 1.3 miles long.

Additive Application for Stabilization. Use one distributor truck to place the bentonite and another for the calcium chloride. The bentonite shall be placed first, and the chloride placed on top just prior to mixing. The products shall be mixed into the surface within one half-hour.

Mixing. Mixing shall be done with a road-recycling machine or equivalent mounted on grader, loader or other appropriate machine. Moisture content during mixing should range from 3.0 to 5.0 percent.

Watering. Some watering may be necessary to raise moisture content on road segments that have dried out after mixing. Light rains are acceptable if the aggregate moisture content does not go over the optimum moisture percentage.

Initial Compaction. Initial compaction shall be done with a steel vibratory roller immediately after mixing to preserve moisture and provide a solid platform for shaping.

Initial Shaping. Shaping shall be done shortly after initial compaction to rebuild crowns obtained during reconditioning.

Compaction – A vibratory steel roller or equivalent shall be used for final compaction, if moisture contents became high enough to cause material to stick to the drum work may have to be stopped long enough to allow the surface to dry out. If drying the material out is impractical the water and distributor truck may be used in place of the vibratory steel roller. Truck rolling has the added benefit of bringing fines to the surface, which tends to create a tougher crust that is more resistant to ravelling during dry weather. Using a combination of vibratory steel and rubber tire rollers may provide the best compaction and performance.

Final Blading. Touch up blading shall be done to remove wheel marks where necessary.

Chloride Surface Application. After stabilization is complete, a surface application of 0.82 lbs/SY of Calcium Chloride (94% concentration) shall be applied. The surface application will improve performance by (1) eliminating areas that did not obtain adequate amounts of chloride during stabilization and (2) increases the concentration of chloride on the road surface which appears to improve the surface crust durability.

Surface Watering. An application of water over the topcoat shall be applied if weather conditions are dry.

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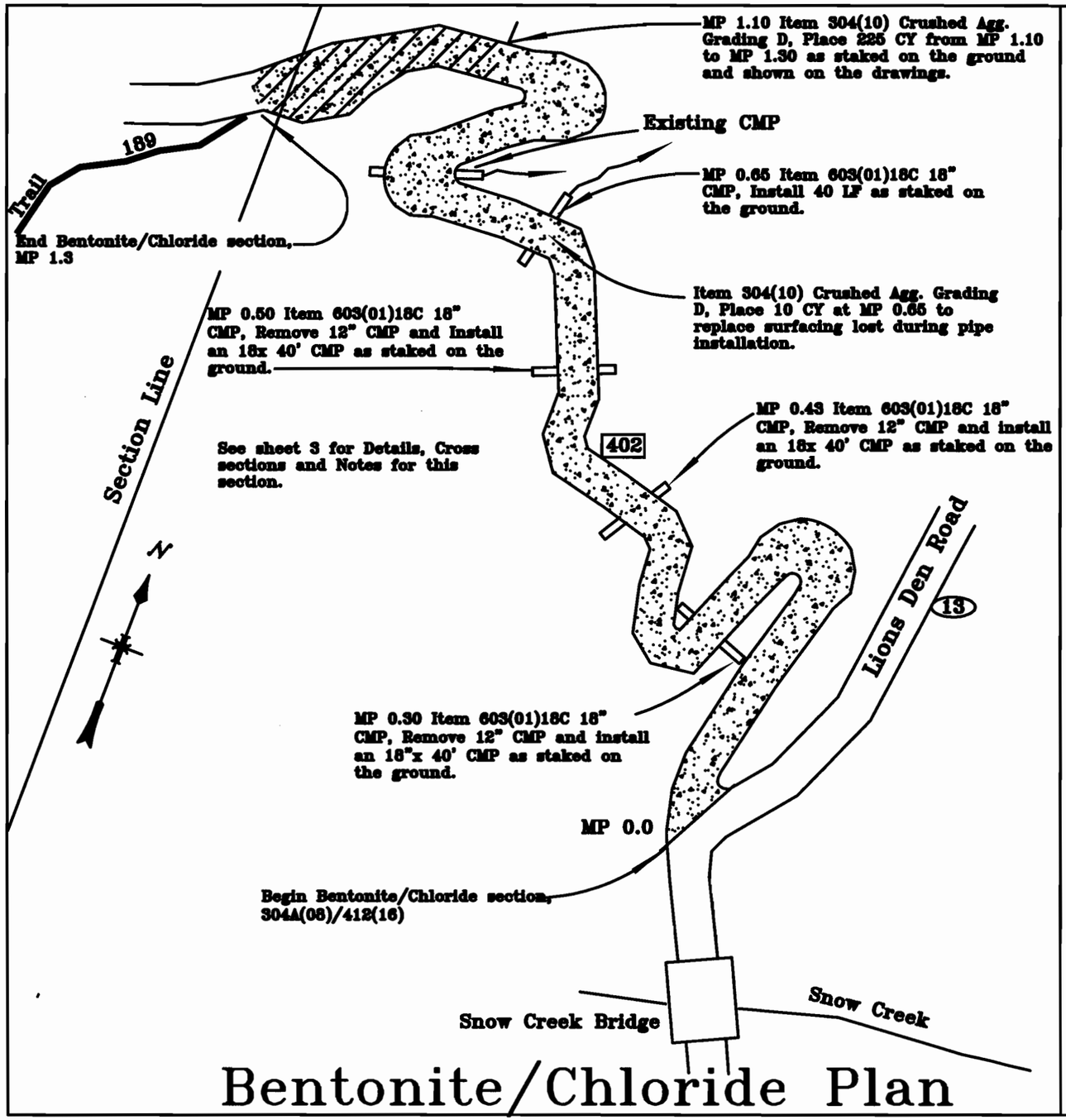
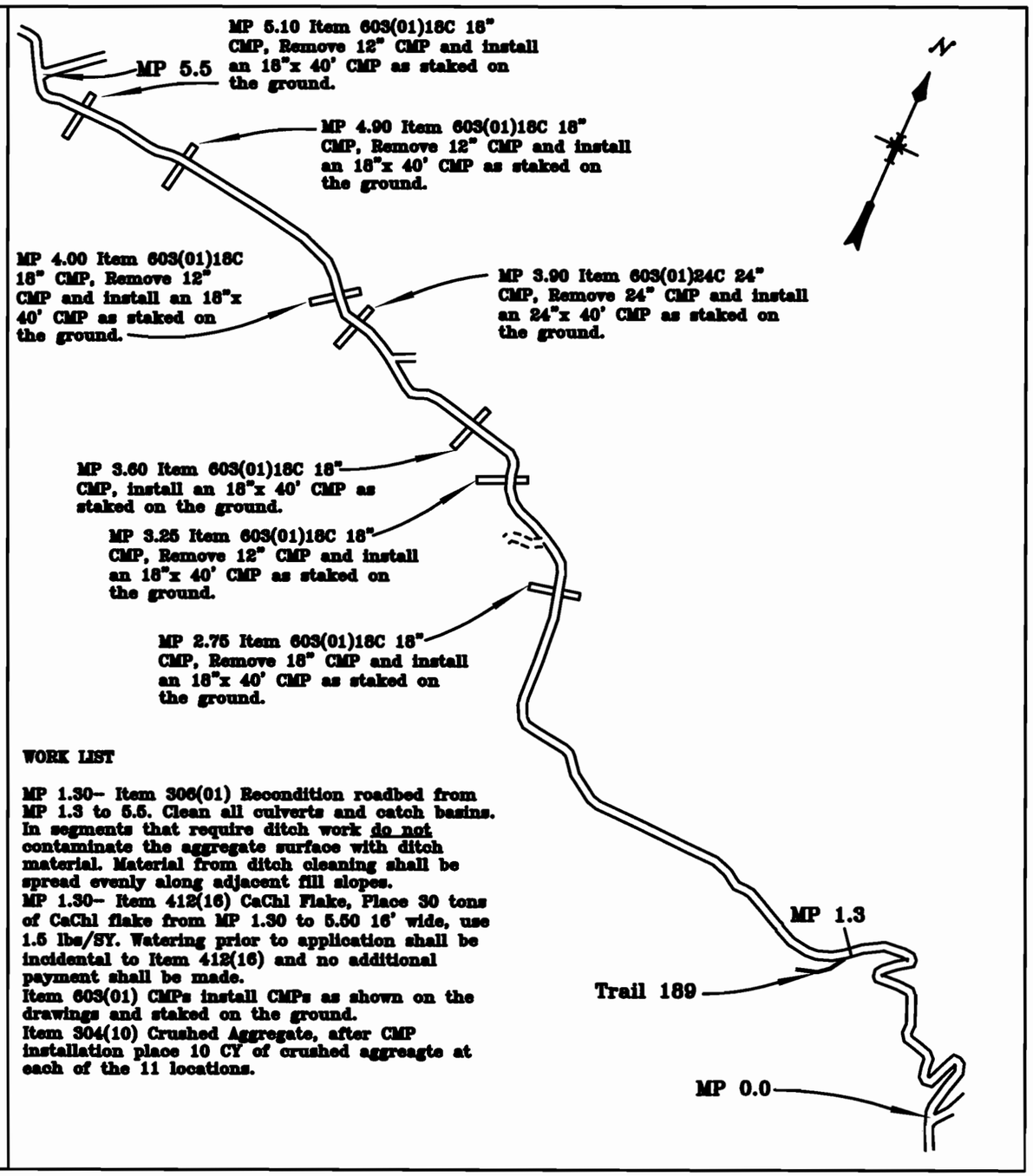
Forest: Idaho Panhandle
Project Name: Snow-Way

Sheet Title: Notes and Typicals
Sheet 3 of 11



Bentonite/Chloride Plan



WORK LIST

MP 1.30– Item 306(01) Recondition roadbed from MP 1.3 to 5.5. Clean all culverts and catch basins. In segments that require ditch work do not contaminate the aggregate surface with ditch material. Material from ditch cleaning shall be spread evenly along adjacent fill slopes.
MP 1.30– Item 412(16) CaChl Flake, Place 30 tons of CaChl flake from MP 1.30 to 5.50 16' wide, use 1.5 lbs/SY. Watering prior to application shall be incidental to Item 412(16) and no additional payment shall be made.
Item 603(01) CMPs install CMPs as shown on the drawings and staked on the ground.
Item 304(10) Crushed Aggregate, after CMP installation place 10 CY of crushed aggreagte at each of the 11 locations.

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Sheet Title: Rd 402
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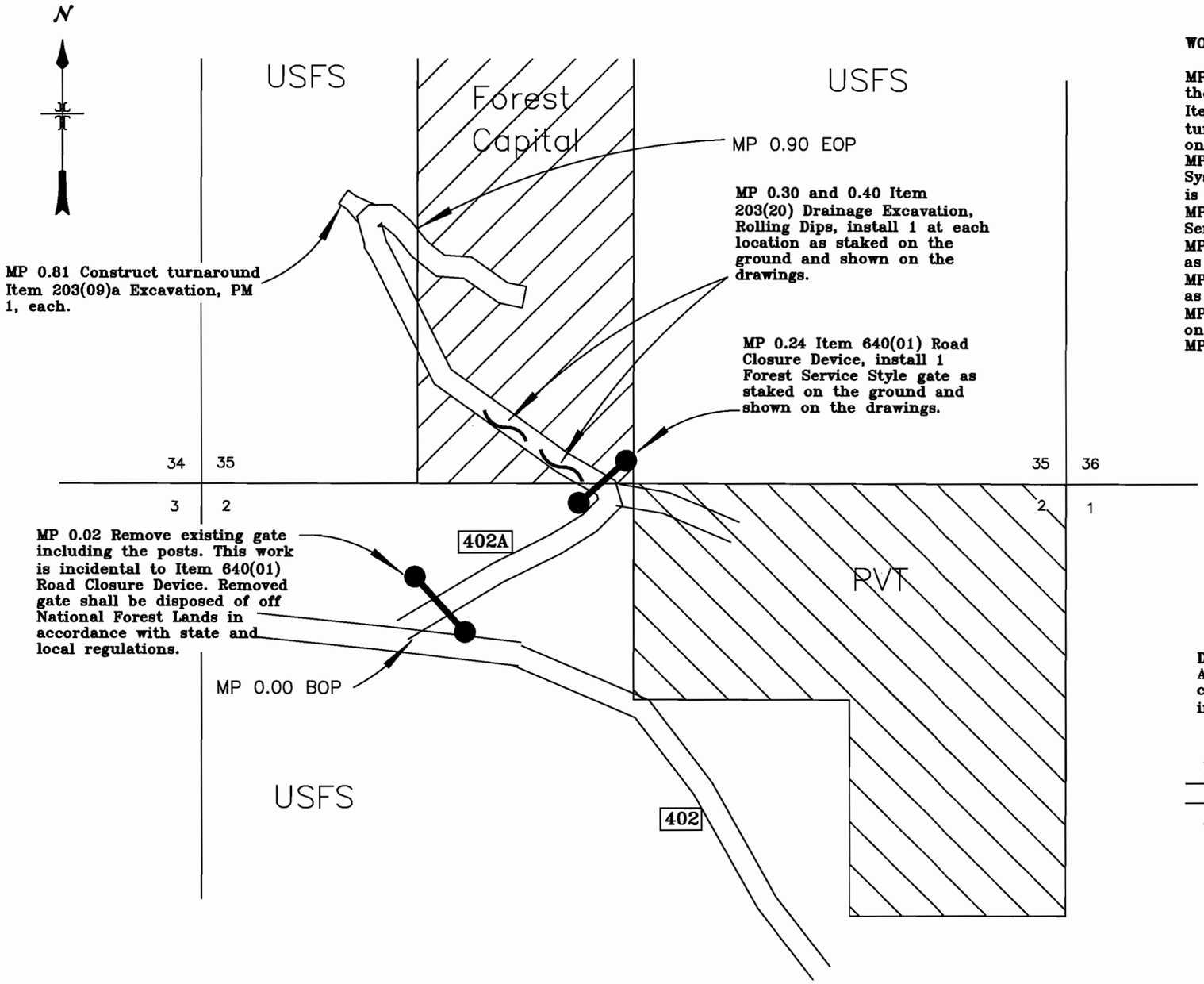
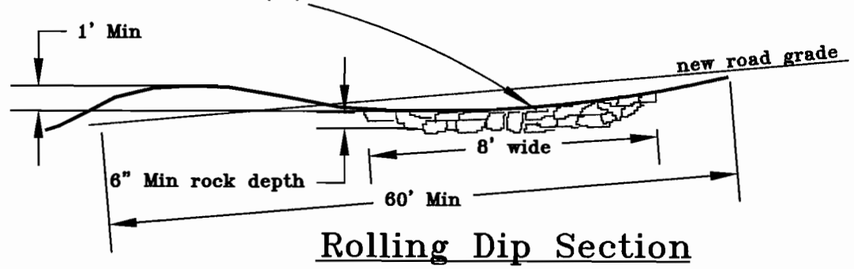


WORK LIST

MP 0.00– Item 201A(01) Roadway brushing, brush roadway as staked on the ground and shown on the drawings from MP 0.00 to 0.90.
Item 306(01) Reconditioning Roadbed, blade surface (full width including turnouts), pull ditches as needed, clean CMPs and catchbasins as staked on the ground and shown on the drawings from MP 0.00 to 0.90.
MP 0.02– Remove existing gate and dispose of off National Forest System Lands in accordance with state and local regulations. This work is incidental to Item 640(01) and no additional payment will be made.
MP 0.24– Item 640(01) Road Closure Device, furnish and install a Forest Service gate as staked on the ground and shown on the drawings.
MP 0.30– Item 203(20) Drainage Excavation, Rolling Dip, Construct 1 Dip as staked on the ground and shown on the drawings.
MP 0.40– Item 203(20) Drainage Excavation, Rolling Dip, Construct 1 Dip as staked on the ground and shown on the drawings.
MP 0.81– Item 203(09)a Excavation, Construct a turn around as staked on the ground and shown on the drawings. See sheet 6 for details.
MP 0.90 End all work items

Dips shall be outsloped 3% to drain. Armor dips with Class 1 riprap from a commercial source. This work is incidental to Item 203(20).



Rolling Dip Section

Item 203(20) Rolling Dip
Road 402A, 2 Dips, MP 0.30 and 0.40
Construct dips as shown on the drawings and staked on the ground.

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Project Name: Snow-Way

Sheet Title: Rd 402A
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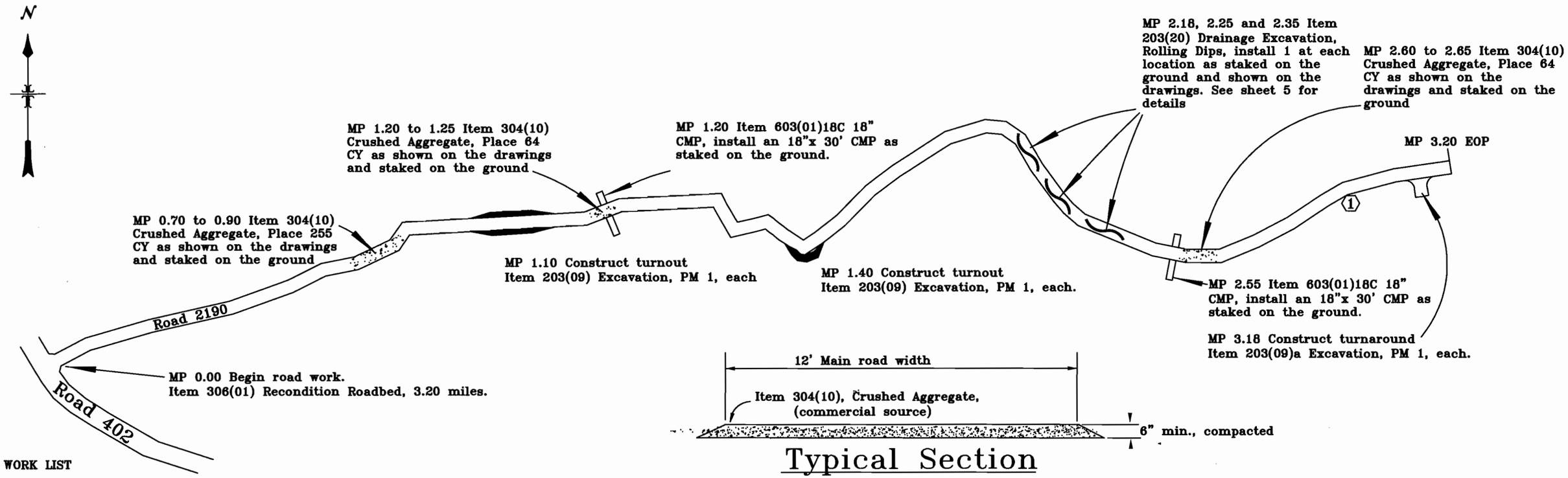
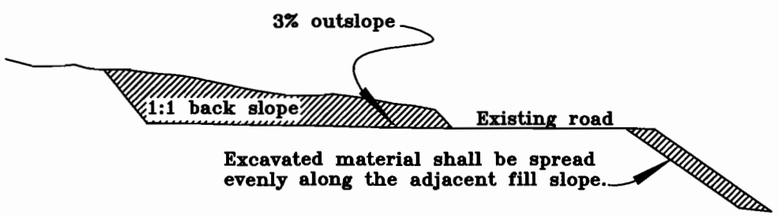


Typical Section

Road 2190 MP 0.70–0.90, 1.20–1.25 and 2.60–2.65
(not to scale)

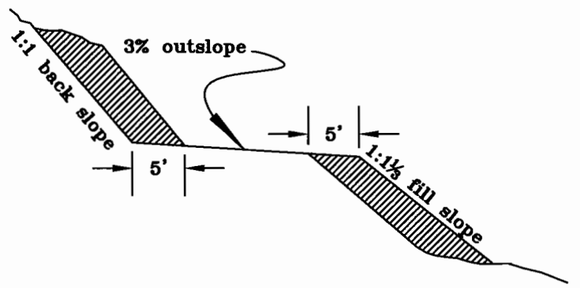
WORK LIST

MP 0.00– Item 201A(01) Roadway brushing, brush roadway as staked on the ground and shown on the drawings from MP 0.00 to 3.20.
Item 306(01) Reconditioning Roadbed, blade surface (full width incliding turnouts), pull ditches as needed, clean CMPs and catchbasins as staked on the ground and shown on the drawings from MP 0.00 to 3.20.
MP 0.70 to 0.90– Item 304(10) Crushed Aggregate, Place 255 CY as shown on the drawings and staked on the ground.
MP 1.10– Item 203(09) Excavation, construct a turnout as shown on the drawings and staked on the ground.
MP 1.20 to 1.25– Item 304(10) Crushed Aggregate, Place 64 CY as shown on the drawings and staked on the ground.
MP 1.20 Item 603(01)18C CMP, Install an 18"x 30 CMP.
MP 1.40– Item 203(09) Excavation, construct a turnout as shown on the drawings and staked on the ground.
MP 2.18– Item 203(20) Drainage Excavation, Rolling Dip, Construct 1 Dip as staked on the ground and shown on the drawings.
MP 2.25– Item 203(20) Drainage Excavation, Rolling Dip, Construct 1 Dip as staked on the ground and shown on the drawings.
MP 2.35– Item 203(20) Drainage Excavation, Rolling Dip, Construct 1 Dip as staked on the ground and shown on the drawings.
MP 2.55 Item 603(01)18C CMP, Install an 18"x 30 CMP.
MP 2.60 to 2.65– Item 304(10) Crushed Aggregate, Place 64 CY as shown on the drawings and staked on the ground.
MP 3.18– Item 203(09)a Excavation, Construct a turn around as staked on the ground and shown on the drawings. See sheet 6 for details.
MP 3.20 End all work items



Turnaround Section

Road 2190 MP 3.18
Item 203(09)a Excavation, PM 1,
Construct 1 turnaround



Turnout Section

Road 2190 MP 1.10 and MP 1.40
Item 203(09) Excavation, PM 1,
Construct 2 turnouts

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Forest: Idaho Panhandle
Project Name: Snow–Way

Sheet Title: Rd 2190
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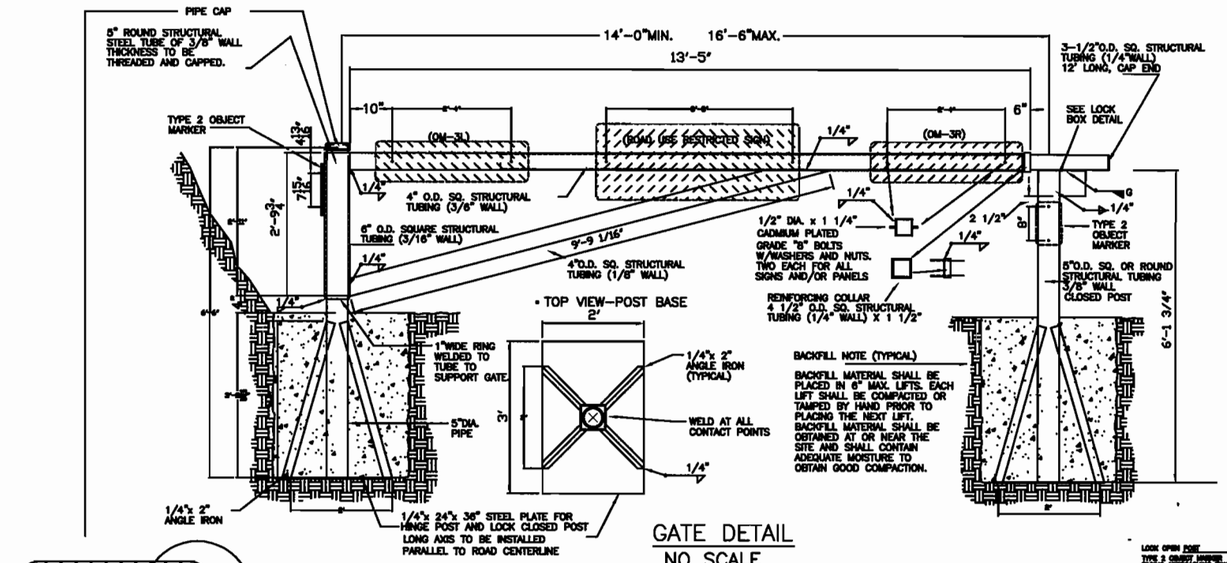
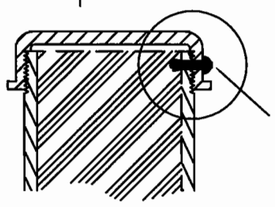
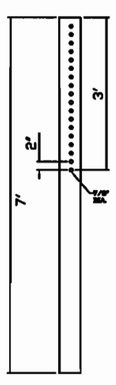


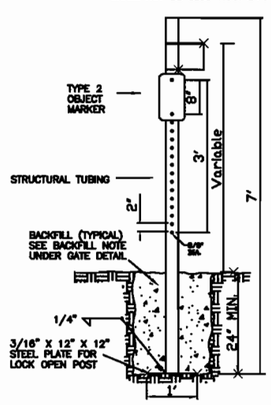
GATE DETAIL
NO SCALE



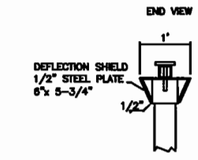


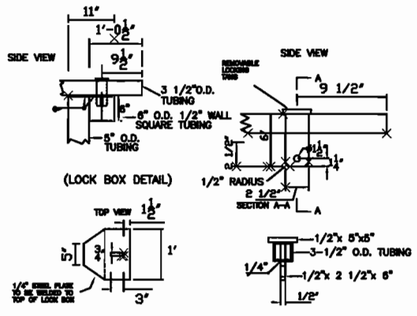
LOCK OPEN POST

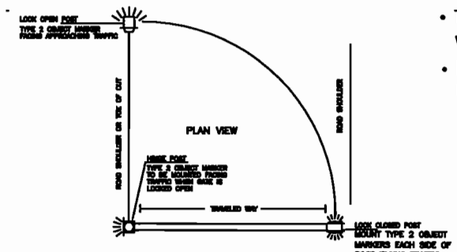
LOCK BOX HEIGHT FOR LOCK OPEN POST CAN VARY TO FIT FIELD CONDITIONS. THAT PORTION OF THE POST TO BE BURIED SHALL NOT BE LESS THAN 24".



LOCK OPEN POST
NO SCALE

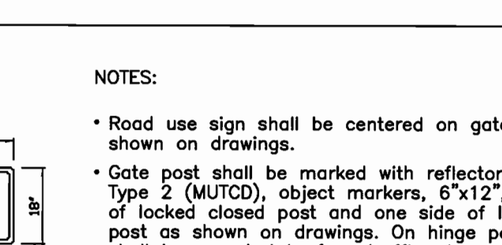






POST LOCATIONS
NO SCALE

(LOCK OPEN BOX)



(LOCK OPEN BOX AND POST DETAIL)

NOTES:

- Road use sign shall be centered on gate as shown on drawings.
- Gate post shall be marked with reflectorized yellow Type 2 (MUTCD), object markers, 6"x12", both sides of locked closed post and one side of locked open post as shown on drawings. On hinge post, marker shall be mounted to face traffic when gate is locked open.
- Road use restricted sign shall be furnished and installed by the contractor.
- Type 3 object markers, 12"x36" panels, white with 3" wide reflective red stripes.
- Type 2 object markers, 6"x12" panels, yellow.
- All object markers, types 2&3, shall be furnished and installed by the contractor or purchaser.
- After fabrication, all gate components must be sanded to remove all rust, scale and oily substances and painted with brown or red primer meeting requirements of 708.03(f)(l).
- Structural tubing shall be ASTM A36 structural steel.
- Tube sizes shown are for structural steel tubing wall thickness as shown.
- Install lock boxes to the elevation necessary to make horizontal gate member level.

ROAD USE RESTRICTED SIGN

1. LETTERS SHALL BE WHITE ON BROWN BACKGROUND
2. SIGN SHALL BE REFLECTORIZED
3. SIGN MATERIALS SHALL MEET THE REQUIREMENTS OF THE CURRENT EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES

Gate Detail

Item 640(01) Road Closure Device
Road 402A (R) MP 0.24

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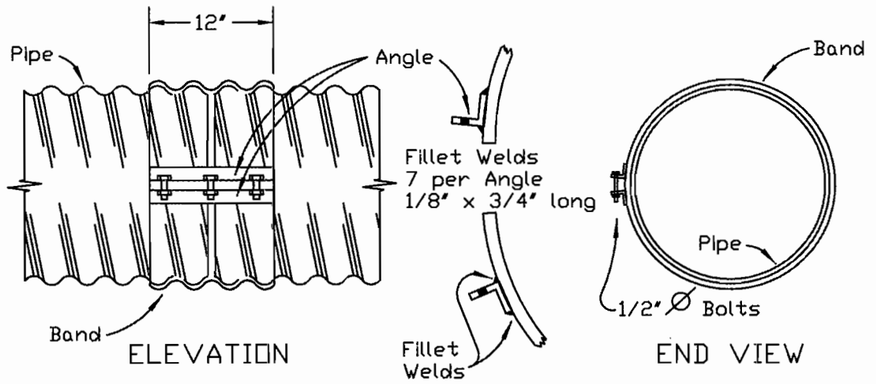
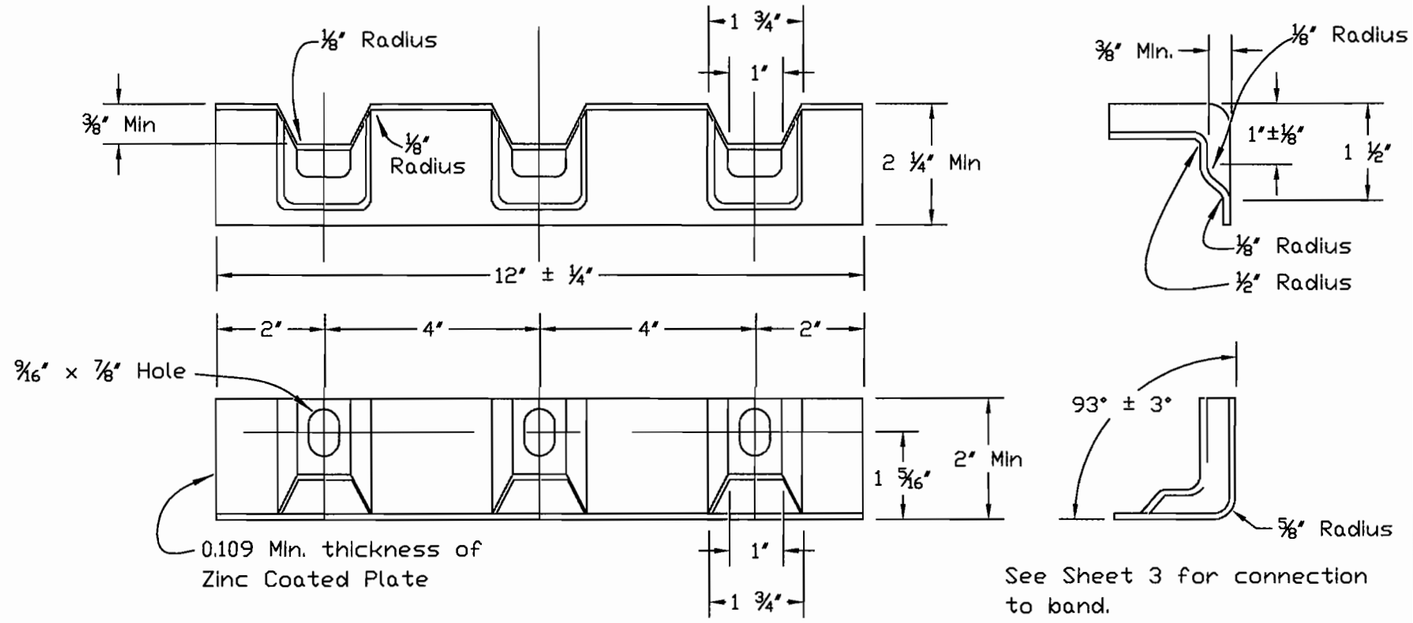
Project Name: Snow-Way

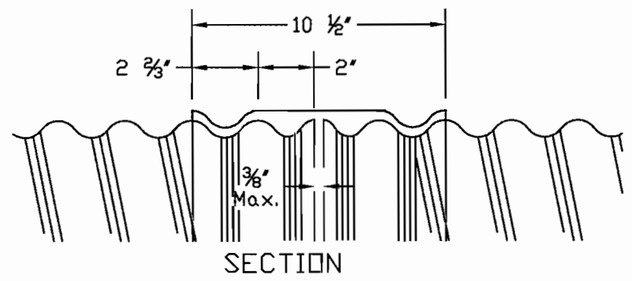
Sheet Title: FS GATE DETAILS
Sheet 7 of 11

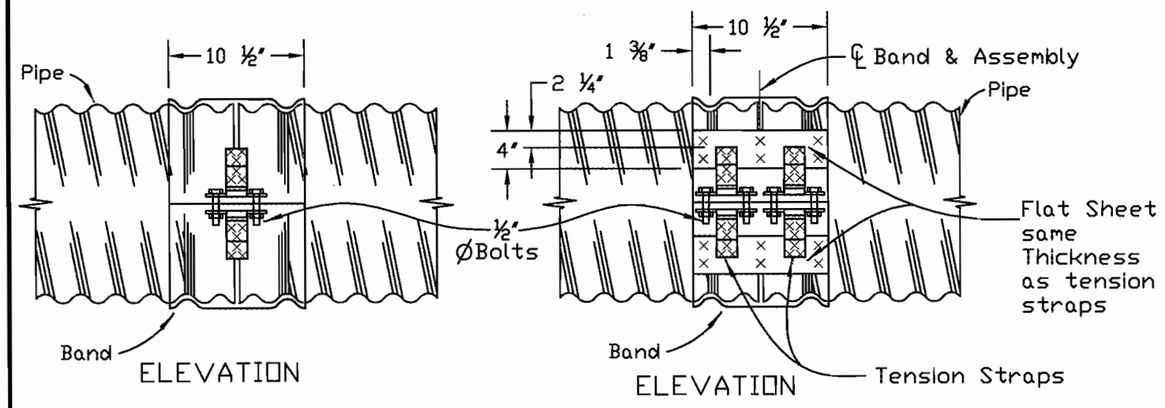


AMERICAN CULVERT BAND
FOR HELICALLY CORRUGATED STEEL PIPE

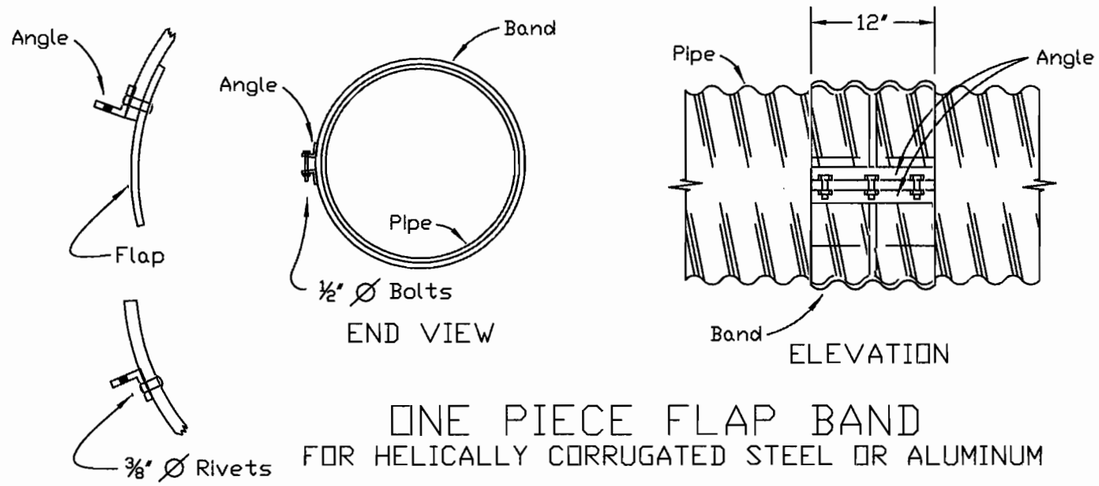


NORTHWEST CULVERT ANGLE ALTERNATIVE
FOR STEEL PIPE



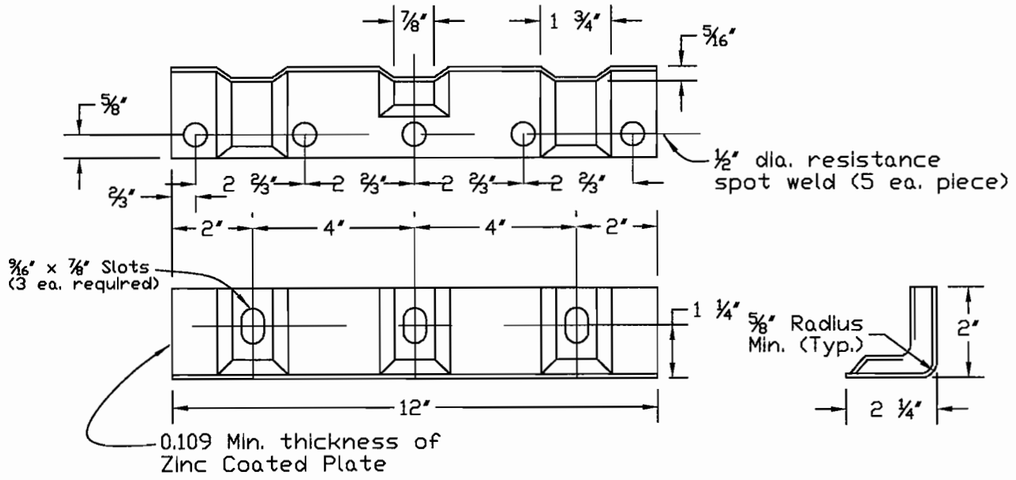


HUGGER COUPLING BAND
FOR REFORMED END HELICALLY CORRUGATED
WELDED SEAM STEEL PIPE

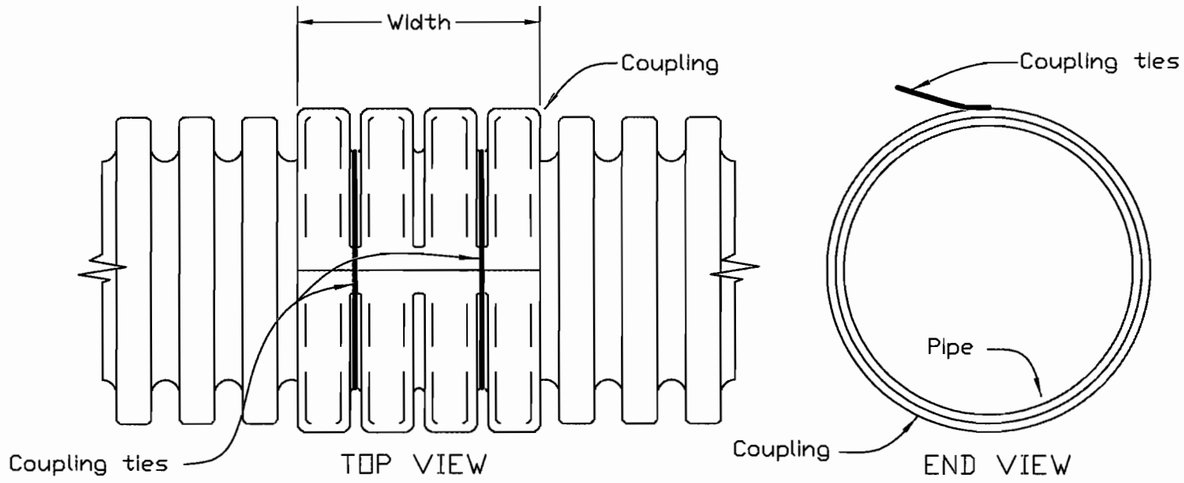


ONE PIECE FLAP BAND
FOR HELICALLY CORRUGATED STEEL OR ALUMINUM

COUPLING BAND DETAILS
FOR
CORRUGATED PIPE AND PIPE ARCH

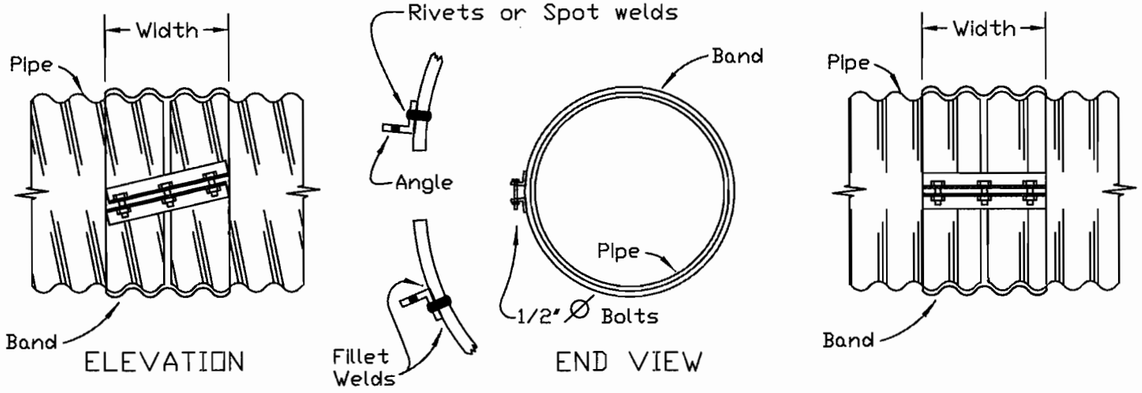


ALTERNATE FOR 2X2X3/16 ANGLE
FOR STEEL PIPE



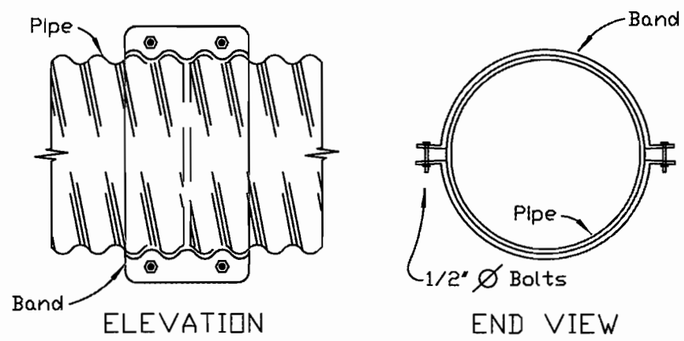
SPLIT COLLAR COUPLING
FOR ANNULAR CORRUGATED POLYETHYLENE PIPE

Notes:
1. Minimum width 4 corrugations, 2 on each culvert segment.
2. The opening of the coupling shall be within 15° of the top of the culvert.



HELICAL COUPLING BAND
FOR HELICALLY CORRUGATED STEEL OR ALUMINUM PIPE

ANNULAR COUPLING BAND
FOR ANNULAR OR REFORMED END HELICALLY CORRUGATED STEEL OR ALUMINUM PIPE



TWO PIECE INTEGRAL FLANGE
FOR HELICALLY CORRUGATED STEEL OR ALUMINUM PIPE

Notes:
1 Use 2x12x0.150 thickness 5052-H141 aluminum plate washer under bolt head & nut on aluminum pipe flange.
2. Use 2x12x0.125 thickness galvanized steel plate washer under bolt head & nut on steel pipe flange.

COUPLING BAND DETAILS FOR CORRUGATED PIPE AND PIPE ARCH

COUPLING TYPE	CORRUGATION Inches	PIPE DIAMETER Inches	WIDTH Inches	SPECIFIED THICKNESS See Note 1-C		ANGLE - See Note 1-H			
				Pipe Wall	Band	DIMENSION	BOLTS NO / DIAMETER	ANGLE TO BAND	
								RIVETS	SPOT WELDS
Metal Pipe Annular and Helical	2-2/3x1/2 (Steel or Aluminum)	Thru 36	12	0.064-0.138	0.064-0.079	2x2x3/16	3-1/2	3-3/8	5-1/2
		42-60	12	0.064-0.079	0.064	2x2x3/16	3-1/2	3-3/8	5-1/2
		42-60	12	0.064-0.168	0.064-0.109	2x2x5/16	3-1/2	5-3/8	
		66-84	24	0.109-0.168	0.064-0.109	2x2x5/16	5-1/2	7-3/8	
	3x1 and 5x1 (Steel Only)	36-60	14	0.064-0.079	0.064	2x2x3/16	3-1/2	3-3/8	5-1/2
		42-60	14	0.109	0.064	2x2x5/16	3-1/2	5-3/8	
		66-120	25	0.064-0.109	0.064	2x2x5/16	5-1/2	9-3/8	
One Piece Flap Band & Two Piece Integral Flange	2-2/3x1/2 (Steel or Aluminum) see Note 1-I	18-24	12	0.064-0.079	0.064		3-1/2	4-3/8*	* Flap Band Only
								WELDS ANGLE TO BAND	
American Culvert Band	2-2/3x1/2 (Steel Only)	Thru 24	12	0.064-0.109	0.064-0.079	2x2x0.183	3-1/2	7-1/8x3/4 Long Fillet	
		30-36	12	0.064-0.109	0.064	2x2x0.183	3-1/2		
		42-48	12	0.064-0.079	0.064	2x2x0.183	3-1/2		
Northwest Culvert Alternative	2-2/3x1/2 (Steel Only)	Thru 84	12	0.064-0.079	0.064-0.109			5-3/16x3/4 Long Fillet	
		Thru 54	12	0.109	0.064-0.109				
		Thru 42	12	0.138	0.064-0.109				
		Thru 84	12	0.064-0.168	0.064-0.109			5-1/2 Spot	

						BAR AND STRAP			
						NUMBER/ THICKNESS	BOLT DIAMETER	BAR DIAMETER	BAR YIELD STRENGTH P.S.I.
Hugger	2-2/3x1/2 (Steel Only)	Thru 48	10-1/2	0.064-0.109	0.064-0.109	One 0.079	1/2	7/8	32,000
		36-48	10-1/2	0.138-0.168	0.079-0.109	One 0.109	1/2	7/8	45,000
		54-60	10-1/2	0.079-0.168	0.064-0.109	Two 0.079	1/2	7/8	32,000
		66-84	10-1/2	0.109-0.168	0.109	Two 0.109	1/2	7/8	45,000
	3x1 (Steel Only)	36-66	10-1/2	0.064-0.109	0.064	Two 0.079	1/2	7/8	32,000
		72-84	10-1/2	0.109	0.079	Two 0.079	1/2	7/8	32,000
		61-120	10-1/2	0.109	0.109	Two 0.109	1/2	7/8	45,000
PE Pipe Split Collar		Thru 24	See Drawing	per AASHTO M-294	per AASHTO M-294				

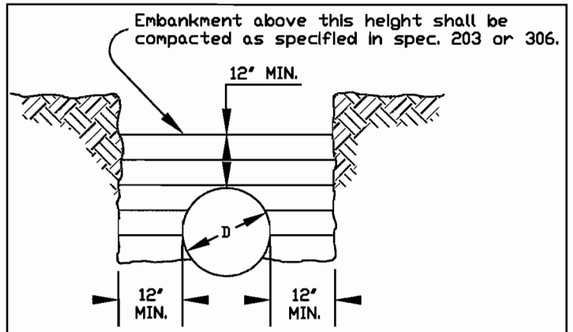
GENERAL NOTES

1. Metal Coupling Bands
   - A. These coupling bands meet the strength requirements for special Joint Types under Non-erodible Soil Conditions, Table 2.23.3 of AASHTO's 'Standard Specifications for Highway Bridges'.
   - B. For pipe walls and bands, the Specified Thickness for steel is given. For aluminum, the Specified Thickness is that for steel less the allowance for the zinc coating which is 0.003 to 0.004 of an inch per AASHTO M-36, M-196 and M-197.
   - C. The minimum specified Thickness for bands is two Specified Thicknesses less than that for the pipe, but in no case thinner than 0.064 inches, (0.060 for aluminum).
   - D. For pipe arches, use the same width band as for round pipe of equal periphery.
   - E. A two-piece band is required for pipe greater than 42 inches in diameter.
   - F. Tension straps may be connected to bands of plates with either spot or fillet welds that develop minimum required strength of strap.
   - G. For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis, provided connecting holes are slotted lengthwise sufficiently to allow adjustment for the helix angle.
   - H. Use 1 1/4 inch center to center gauge line dimension on attached angle leg for rivets and spot welds.
   - I. The Two Piece Integral Flange coupling band shall not be used on pipe arches.
   - J. Culvert bands shall be made of the same metal as the culverts being joined.
2. Polyethylene (PE) Couplings

   Testing standards for Corrugated Polyethylene (PE) Pipe couplings have not been established nor have couplings been tested for shear or bending moment. Therefore, until further information is available, PE couplings shall be used only where bending moment and shear requirements are minimal. Typical situations are:
   - A. Where the slope of the culvert will not be more than 5%.
   - B. Where the fill below the culvert is less than 2 feet.
   - C. In areas of firm soils. This excludes marshes unless the bedding is specially designed and approved by the engineer.
3. Other

   Couplings other than those shown on this drawing may be used upon submission of testing data (see 1-A above) and approval by the Engineer.

COUPLING BAND DETAILS FOR CORRUGATED PIPE AND PIPE ARCH



Maximum 6-inch compacted layers to density called for in the specifications. Bedding shall be suitable material uniformly compacted and shaped to fit the bottom of the pipe.

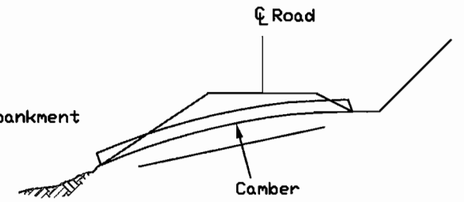
METAL THICKNESS AND GAGE TABLES			
Steel		Aluminum	Approx. Gage
Zinc Coated	Un-Coated		
Metal Thickness in Inches			
0.064	0.0598	0.060	16
0.079	0.0747	0.075	14
0.109	0.1046	0.105	12
0.138	0.1345	0.135	10
0.168	0.1644	0.164	8
0.188	0.1838		7
0.218	0.2145		5
0.249	0.2451		3
0.280	0.2758		1

GENERAL NOTES:

TREATMENT OF DAMAGED SPELTER: The damaged or corroded ends of metal pipe to be extended shall be removed. If the damaged end is flame cut, the burned spelter on the galvanized pipe shall be wire brushed to clean metal and the area shall be painted with two coats of paint, high in zinc content, for repair of the galvanized surfaces.

SETTLEMENT AND CAMBER: Pipes shall be cambered as necessary to compensate for any anticipated settlement in the foundation or bed. Camber shall be on a parabolic curve with no point along the invert being higher than the invert at the inlet.

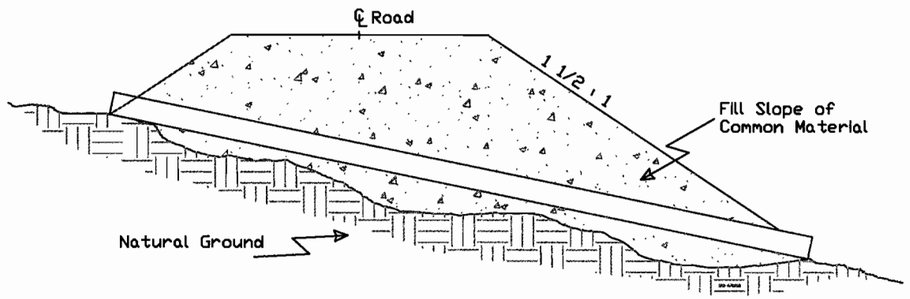
EMBANKMENT AND FOUNDATION SOIL CONDITION
Existing Fills, Regardless of Foundation Soils

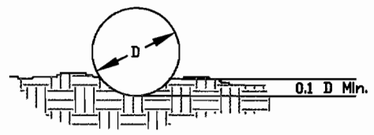


CAMBER
1% of pipe length, not to exceed 3/4 of pipe span.

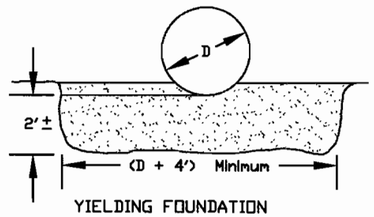
1% of pipe length, not to exceed 3/4 of pipe span or as determined by the engineer.

TYPICAL INSTALLATION IN EMBANKMENT

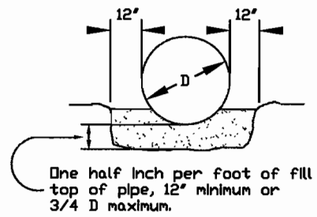




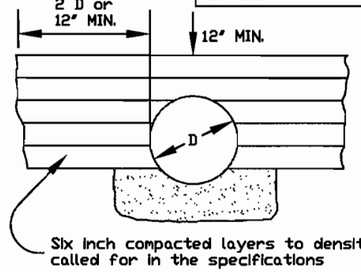
TYPICAL BEDDING MATERIAL



YIELDING FOUNDATION

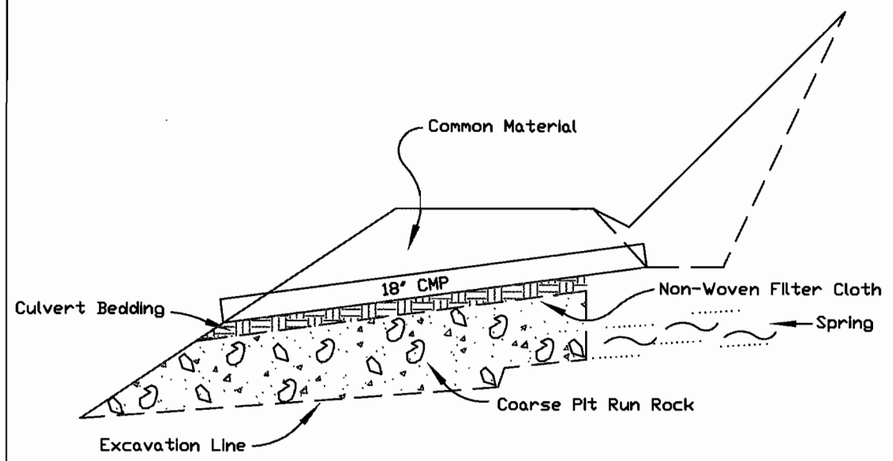


ROCK FOUNDATION

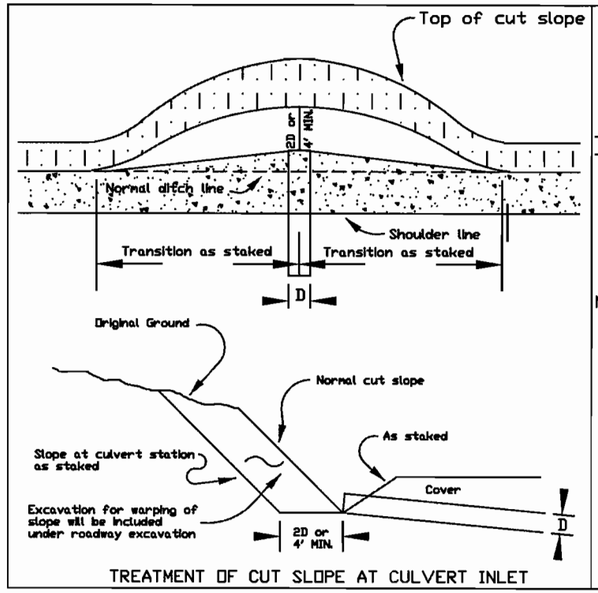


TYPICAL BACKFILL DETAIL

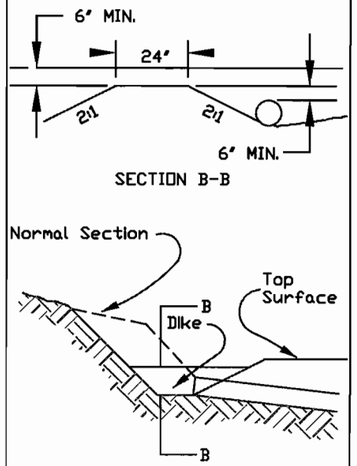
Bedding shall be suitable material uniformly compacted and shaped to fit the bottom of the pipe



UNDERDRAIN TYPICAL SECTION

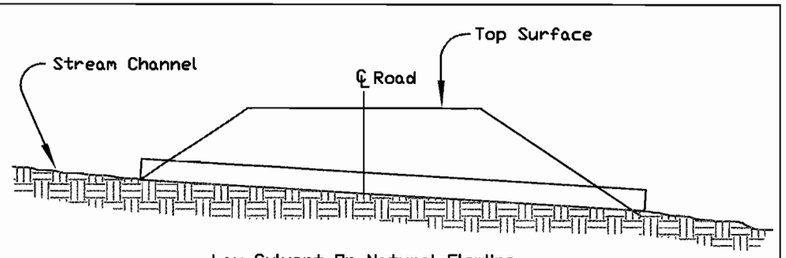


TREATMENT OF CUT SLOPE AT CULVERT INLET



SECTION B-B

DITCH DIKE



Lay Culvert On Natural Flowline

TYPICAL INSTALLATION IN STREAM CHANNEL

NO SCALE

CULVERT DETAILS