

DESIGN DATA	
Traffic	Average Daily
Current 2017	LESS THAN 100 V.P.D.
Forecast 2037	
Clear Zone Distance: NA	
Minimum Sight Dist. for Stopping: 80 FT	Bridges: HS-15
Sight Dist. for No Passing Zone: NA	
Pavement Design Life: NA	
Design Accumulated One-way	ESALs: NA

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	21156	1	1

JOB # 27
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

TEO-0025(012)

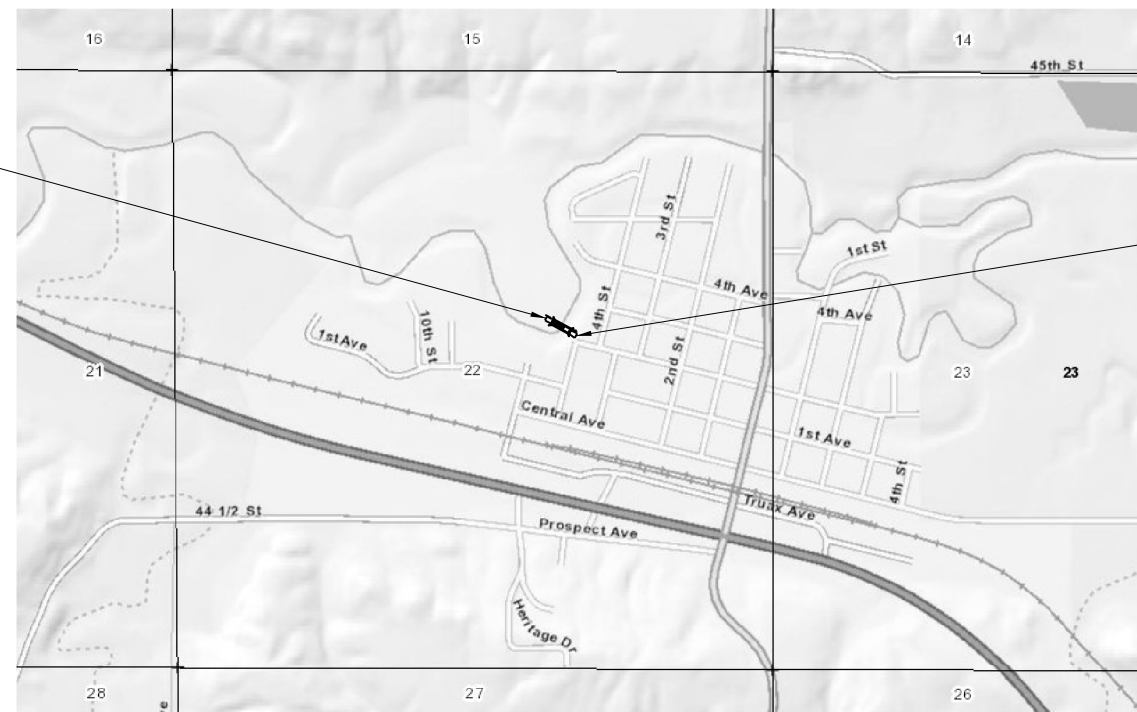
McHenry County
City of Velva
Bridge # 25-106-40.0
Structure Rehabilitation & Incidentals

GOVERNING SPECIFICATIONS:

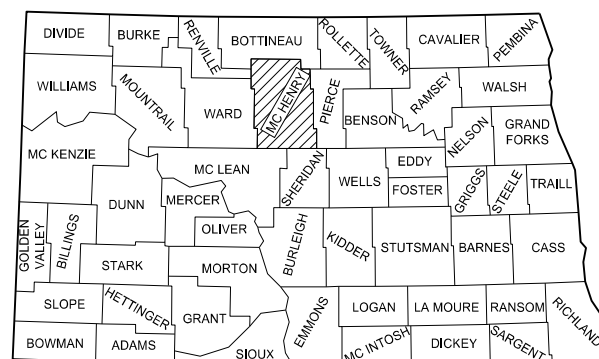
2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
TEO-0025(012)	0.034	0.034

BEGIN PROJECT TEO-0025(012)
2nd Ave Sta 1+60.00
Sec 22 T153N R80W



END PROJECT TEO-0025(012)
2nd Ave Sta 3+40.00
Sec 22 T153N R80W



STATE COUNTY MAP

DESIGNERS
Ryan Rykowsky
Ryan Schuehle

APPROVED DATE 9/1/17

Robert Fode /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 8/31/2017

Ryan A. Rykowsky /s/
SRF CONSULTING GROUP, INC.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	2	1

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SPECIAL PROVISIONS

SP 4(14)	Federal Migratory Bird Treaty Act
SP 524(14)	Painting Over Galvanized Steel
SP 469(14)	Bridge Paint: Lead Paint Removal, Containment, and New Paint
SP 470(14)	Bridge Member Heating and Straightening
SP 517(14)	Glued Laminated Deck Panels
SP 561(14)	Commercial Grade Asphalt
SP 5164(14)	Permits and Environmental Considerations

LIST OF STANDARD DRAWINGS

<u>Standard No.</u>	<u>Description</u>
D-101-01	NDDOT Abbreviations
D-101-02	NDDOT Abbreviations
D-101-03	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20	Line Styles
D-101-21	Line Styles
D-101-30	Symbols
D-101-31	Symbols
D-101-32	Symbols
D-261-01	Erosion Control - Fiber Roll Placement Details
D-622-01	Pile Splice Details
D-704-07	Breakaway Systems for Construction Zone Signs - Perforated Tube
D-704-08	Breakaway Systems for Construction Zone Signs - U-Channel Post
D-704-09	Construction Sign Details - Terminal and Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-13	Barricade and Channelizing Device Details
D-704-14	Construction Sign Punching and Mounting Details
D-724-01	Waterworks
D-750-02	Sidewalk
D-754-82	Object Markers

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NOTES

BASIS OF ESTIMATE

- 100-P01 DIMENSIONS: The dimensions shown for the various fabricated parts are computed from general measurements of the existing structure. The actual dimensions required for a proper fit or alignment may vary from the shown dimensions. Verify all dimensions to assure proper fit and alignment of the various component, both new and existing prior to installation.
- 100-P02 EROSION CONTROL: Bid items "FIBER ROLLS" and "FLOTATION SILT CURTAIN" are included for use in conjunction with the Contractor's SWPPP. These quantities may be reduced depending on the Contractor's operation. An estimated quantity has been set up for each item.
- 100-P03: UTILITIES: Utilities that the Engineer has been made aware of are shown on the plans. Other utilities may exist that are not shown. Underground utility locations are approximate and not all utilities are shown on the plans. The actual locations and elevations are unknown. The Contractor will be liable for any costs resulting from damage to utilities or pipelines.
- 201-P01 CLEARING AND GRUBBING: Remove all trees as necessary to construct the proposed abutments. There are approximately 8 trees to be removed. Some of the trees have multiple trunks that originate from the same root system. Removal of trees in temporary easements will not be allowed unless approved by the Engineer. It is the Contractor's responsibility to assess the work required to for removal. Include all costs for labor, equipment, removal, and disposal of trees in the unit bid price for "CLEARING AND GRUBBING".
- 203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.
- 203-P01 WETLAND TOPSOIL: If delineated wetlands are impacted during construction, wetland topsoil areas will be striped and re-spread in accordance with Section 203 of the Standard Specifications. Include all costs for labor, equipment, and materials in the unit price bid for various pay items.
- 970-P01 TREES: Supply 16 trees that are 1½" diameter above the bole, and a minimum of eight feet in height. Potential species for use on this project are Autumn Blaze Maple, Bur Oak, River Birch, and Quaking Aspen. Coordinate with the Engineer to determine final tree species and locations at the time of planting.

The Contractor is responsible for the watering and maintenance of all new trees for a minimum of four weeks. A warranty period of one year is required for all new trees.

ASPHALT PAVEMENT:

Bituminous Tack Coat, CSS-1h or SS-1h @ 0.10 Gal/SY (to be used between lifts)
(included in the price bid for Commercial Grade Hot Mix Asphalt)

Hot Bituminous Pavement @ 2 Ton/CY

PG 58-28 Asphalt Cement @ 6.0% (included in the price bid for Commercial Grade Hot Mix Asphalt)

SEEDING & HYDRAULIC MULCH:

Entire disturbed area within the right of way and project limits minus impervious surfaces. See Sections 76 and 77.

TOPSOIL:

Spread excess topsoil onsite in locations approved by the engineer.

Topsoil Total = 6" x 5195 SF / 27 CF/CY = 96 CY

WATER:

25 MGal/Mile for Dust Palliative

25 MGal/Mile for Subgrade Prep

20 Gal/Ton for Aggregate

10 Gal/CY for Embankment

COMMON EXCAVATION-TYPE B:

There is approximately 115 CY of common excavation required to flatten the bridge slopes.

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ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL NOTES (EN): The City of Velva, The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EC-1: All impacted riparian trees within the project right of way and easements must be mitigated for as directed by resource agencies. There are riparian trees within the project right-of-way and easements. A minimum of four (4) trees will be impacted during construction. A minimum of four (4) trees will be mitigated at a (2:1) ration in the impacted riparian corridor(s). See plans for tree mitigation.

EC-2: The Contractor shall take steps to prevent construction debris from falling into the waterway.

EN-3 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Jessica Howell by e-mail jmhowell@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter). If an inspection is not required, no follow up documentation is required.

EC-4: Disturbed areas will be reseeded with a native grass mixture and disturbed stream banks shall be returned to pre-project conditions. The Contractor will reseed disturbed areas and contour the banks as shown in these plans.

EC-5: The river channel will not be altered. Berm slopes in front of the abutments shall be transitioned by the contractor to tie into the existing bank contours.

EC-6: The existing structural steel is coated with lead-based paint and may contain materials in concentrations high enough to produce hazardous waste after removal. The existing lead-based paint will be properly removed and contained. The Contractor will comply with the NDDOT special provision "Lead Paint Removal, Containment, and New Paint."

EC-7: Due to the close proximity to residential dwellings, noise mitigation will be required during certain construction operations. The Contractor will limit the hours of pile driving operations to between 7 AM and 9 PM, as provided in these plans.

EC-8: Erosion control devices will be used as needed on banks during construction. Any channel disturbance in the vicinity of the structure will be protected with fiber rolls, loose rock riprap, or vegetative cover. The contractor will install and maintain erosion control devices and place riprap as shown in these plans.

EC-9: The North Dakota Department of Parks and Recreation considers that the continued use of Velva City Park for bridge rehabilitation activities beyond six months will not be considered a temporary use with respect to the Land and Water Conservation Fund Section 6(f) and will result in a conversion of use. Construction shall be limited to six months.

EC-10: Rehabilitation of the bridge truss may occur off of the bridge abutments. Offsite work on the truss may occur within a defined area within Velva City Park in order to avoid impacts to the cut-off channel of the Mouse River. Work performed by the contractor on the truss within Velva City Park shall be limited to a defined area of pavement west of the bridge as provided in the project plans. Orange construction fencing shall be placed at the edge of pavement to ensure that construction activities do not impact areas off of the pavement.

Permits Required:

NDDoH: Construction General Permit
Status: To be obtained by the Contractor

United States Army Corps of Engineers – Section 404 Permit
Status: Obtained

United States Army Corps of Engineers – Section 408 Permit
Status: Obtained

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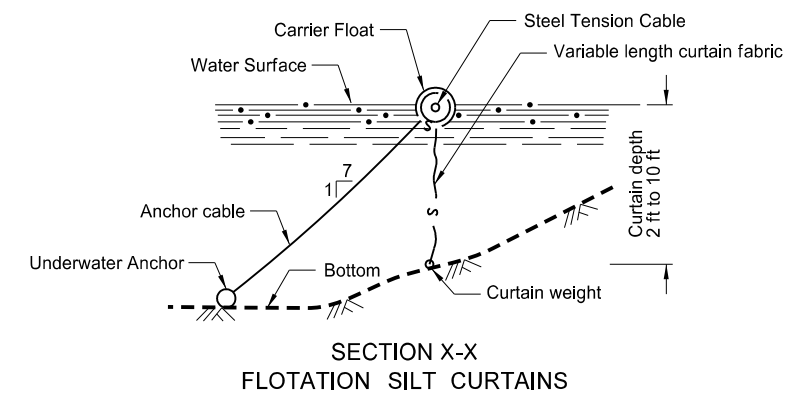
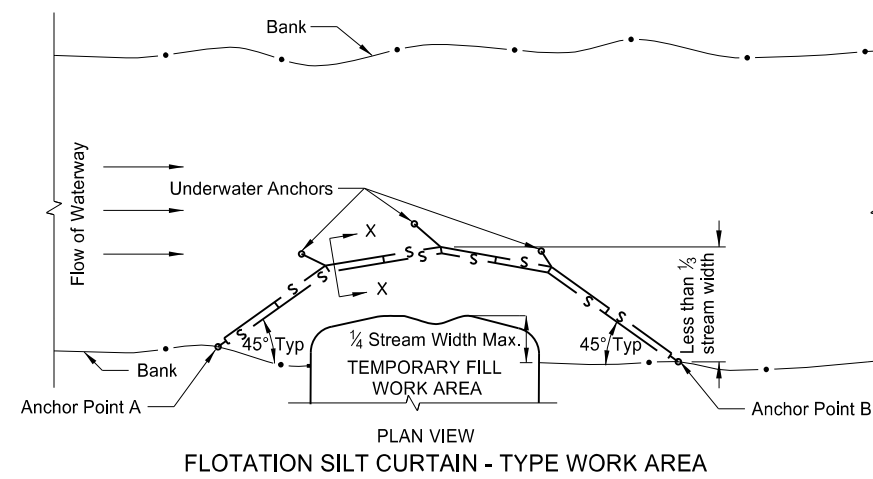
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ESTIMATE OF QUANTITIES

Spec	Code	Item Description	Unit	Participating (NDDOT) Quantity	Non-Participating (City of Velva) Quantity
103	0100	Contract Bond	L SUM	1	
201	0330	Clearing & Grubbing	L SUM	1	
202	0105	Removal of Structure	L SUM	1	
202	0136	Removal of Pavement	TON	113	
202	0174	Removal of Pipe All Types and Sizes	LF	198	
203	0102	Common Excavation-Type B	CY	115	
203	0109	Topsoil	CY	96	
210	0099	Class 1 Excavation	L SUM	1	
210	0201	Foundation Preparation	EA	1	
251	0100	Seeding Class I	ACRE	0.12	
251	2000	Temporary Cover Crop	ACRE	0.12	
253	0201	Hydraulic Mulch	ACRE	0.24	
256	0200	Riprap Grade II	CY	110	
261	0112	Fiber Rolls 12IN	LF	272	
262	0100	Flotation Silt Curtain	LF	166	
302	0120	Aggregate Base Course CI 5	TON		36
430	0500	Commercial Grade Hot Mix Asphalt	TON		72
602	1130	Class AE-3 Concrete	CY	179.2	
612	0115	Reinforcing Steel-Grade 60	LBS	14,713	
616	5890	Structural Steel	L SUM	1	
616	7500	Bearing Modification	EA	4	
618	0120	Treated Timber Structure	L SUM	1	
618	0125	Glulam Deck Panels	SY	290.7	
622	0060	Steel Piling HP 14 X 73	LF	2,640	
624	0123	Pedestrian Railing	LF	102	
630	0100	Sand Blasting & Painting	L SUM	1	
630	9000	Containment System	L SUM	1	
702	0100	Mobilization	L SUM	1	
704	1000	Traffic Control Signs	UNIT	316	
704	1052	Type III Barricade	EA	6	
709	0155	Geosynthetic Material-Type RR	SY	165	
724	0270	Remove Gate Valve & Box	EA	2	
724	0290	Gate Valve & Box 4IN	EA	2	
724	0790	Watermain 4IN PVC	LF	198	
724	0944	Connection to Existing Main	EA	2	
724	0950	Water Service Connection 3/4IN	EA	1	
750	0115	Sidewalk Concrete 4IN	SY		14
752	0922	Fence Remove & Reset	LF	35	
754	0592	Reset Sign Panel	EA	4	
754	0593	Reset Sign Support	EA	4	
930	9537	Abutment Underdrain System	EA	2	
930	9617	Heat Straightening	L SUM	1	
930	9642	Rehabilitate Historic Structure	L SUM	1	
970	1000	Trees	EA	16	

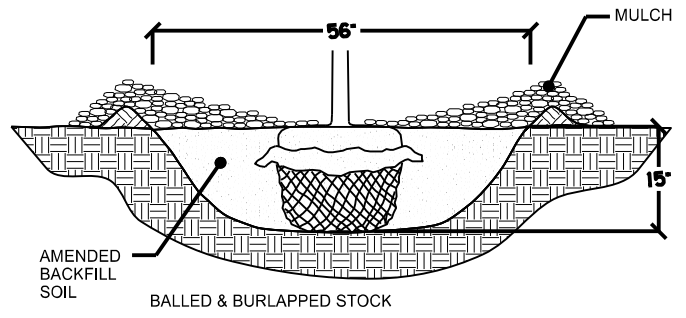
Quantities
Velva Park Bridge

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0025(012)	20	1



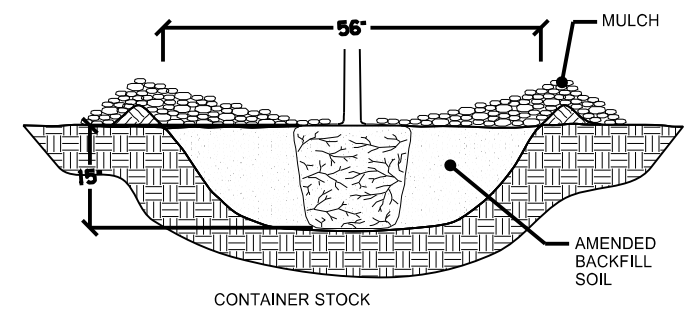
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Flotation Silt Curtain Detail
 Velva Park Bridge

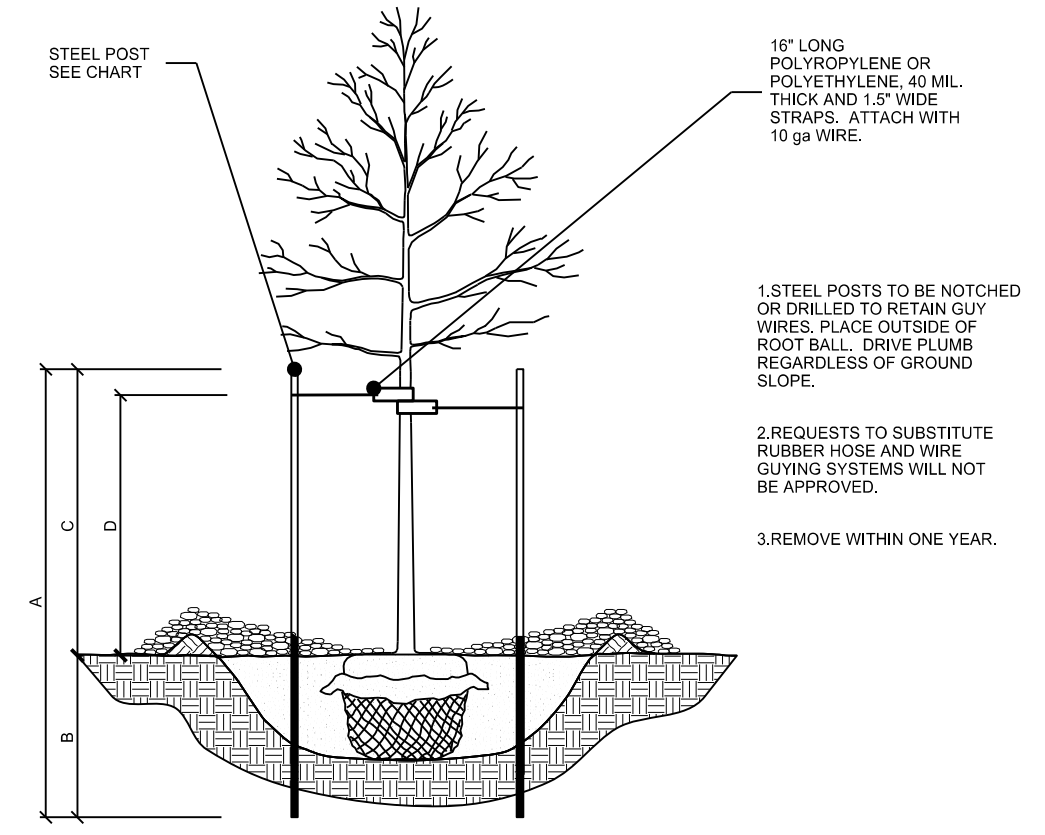


1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING.
3. SET PLANT ON UNDISTURBED NATIVE SOIL OR THOROUGHLY COMPACTED PLANTING SOIL. INSTALL PLANT SO THE ROOT FLARE IS AT OR UP TO 2" ABOVE THE FINISHED GRADE WITH BURLAP AND WIRE BASKET, (IF USED), INTACT.
4. SLIT REMAINING TREATED BURLAP AT 6" INTERVALS.
5. BACKFILL TO WITHIN APPROXIMATELY 12" OF THE TOP OF THE ROOTBALL, THEN WATER PLANT. REMOVE THE TOP 1/3 OF THE BASKET OR THE TOP TWO HORIZONTAL RINGS WHICHEVER IS GREATER. REMOVE ALL BURLAP AND NAILS FROM THE TOP 1/3 OF THE BALL. REMOVE ALL TWINE. REMOVE OR CORRECT STEM GIRDLING ROOTS.
6. PLUMB AND BACKFILL WITH PLANTING SOIL.
7. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
8. BACK FILL VOIDS AND WATER SECOND TIME.
9. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.

INSTALLATION OF PLANTS



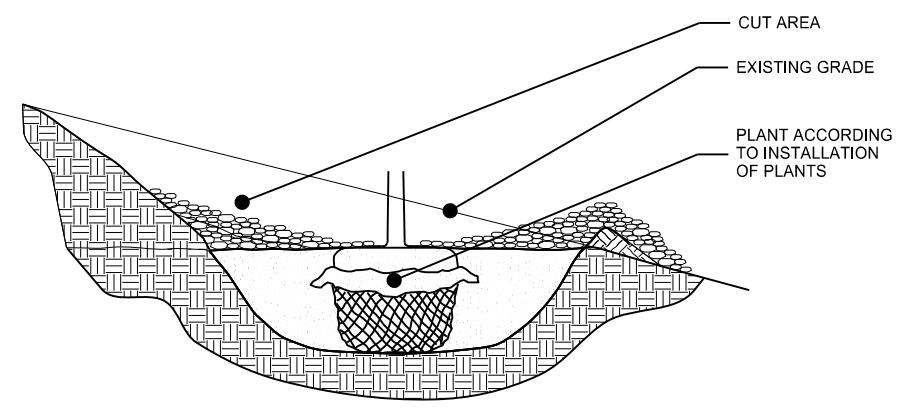
1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING OF TOP AND ROOT.
3. REMOVE CONTAINER AND SCORE OUTSIDE OF SOIL MASS TO REDIRECT AND PREVENT CIRCLING FIBROUS ROOTS. REMOVE OR CORRECT STEM GIRDLING ROOTS.
4. SET PLANT ON UNDISTURBED NATIVE SOIL OR THOROUGHLY COMPACTED PLANTING SOIL. INSTALL PLANT SO THE TOP OF THE ROOT FLARE IS AT OR UP TO 2" ABOVE THE FINISHED GRADE.
5. PLUMB AND BACKFILL WITH PLANTING SOIL.
6. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
7. BACK FILL VOIDS AND WATER SECOND TIME.
8. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.



1. STEEL POSTS TO BE NOTCHED OR DRILLED TO RETAIN GUY WIRES. PLACE OUTSIDE OF ROOT BALL. DRIVE PLUMB REGARDLESS OF GROUND SLOPE.
2. REQUESTS TO SUBSTITUTE RUBBER HOSE AND WIRE GUYING SYSTEMS WILL NOT BE APPROVED.
3. REMOVE WITHIN ONE YEAR.

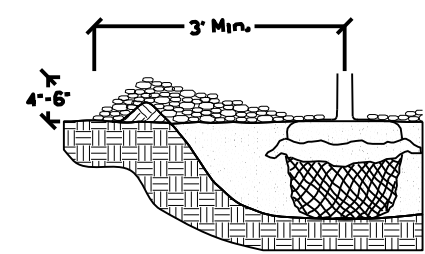
STEEL POST SIZING					
CALIPER	STEEL POST TYPE	A	B	C	D
LESS THEN 4 INCHES	ROLLED STEEL FENCE POST OR APPROVED EQUAL.	7'-0"	3'-0" MIN.	4'-0"	3'-0"
GREATER THEN 4 INCHES	10', 2.2 LB. FLANGED CHANNEL STEEL SIGN POST OR APPROVED EQUAL.	10'-0"	4'-0" MIN.	6'-0"	5'-0"

STAKING AND GUYING



- NOTE:
1. ON 1:2 SLOPES OR GREATER, DO NOT CONSTRUCT THE UPHILL HALF OF THE WATERING BASIN.

PLANTING ON STEEP SLOPES



MULCH PLACEMENT

1. PULL MULCH BACK NO LESS THAN 3" AND NO MORE THAN 6" FROM TREE TRUNKS.
2. SUBSIDING OR DETERIORATING MULCH IS ACCEPTABLE THROUGHOUT THE CONTRACT IF THE MULCH DEPTH IS MAINTAINED AT A MINIMUM 3" DEPTH.
3. IF THE MULCH DEPTH IS LESS THAN 3" ADDITIONAL MULCH IS REQUIRED TO PROVIDE THE MINIMUM DEPTH SPECIFIED IN CHART BELOW.
4. MULCH CONTAMINATED WITH SOIL MUST BE REMOVED AND REPLACED.

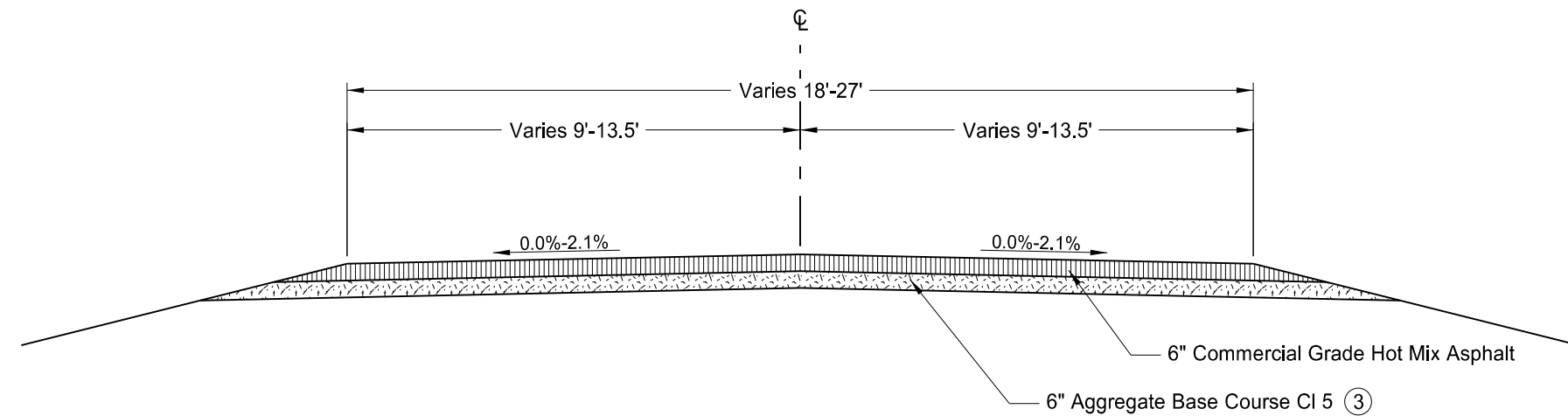
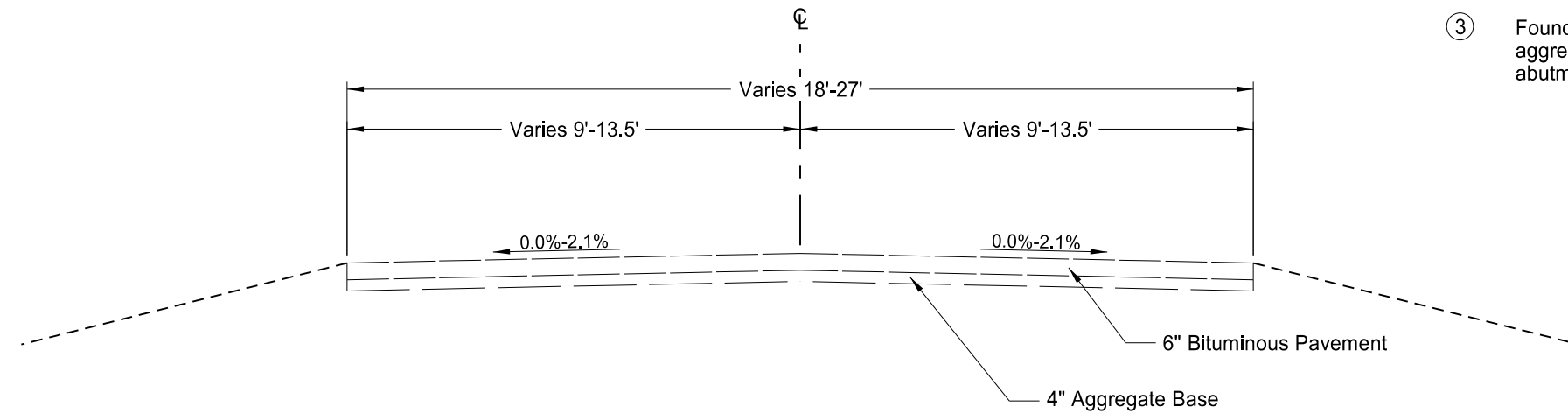
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Planting Details
Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Notes:

1. Existing typical section is assumed. Actual pavement and aggregate thicknesses may vary from plans.
2. Grade inslopes to match existing ground.
- ③ Foundation fill within class 1 excavation area in lieu of aggregate base course class 5. See sheet 170-4 for abutment backfill details.

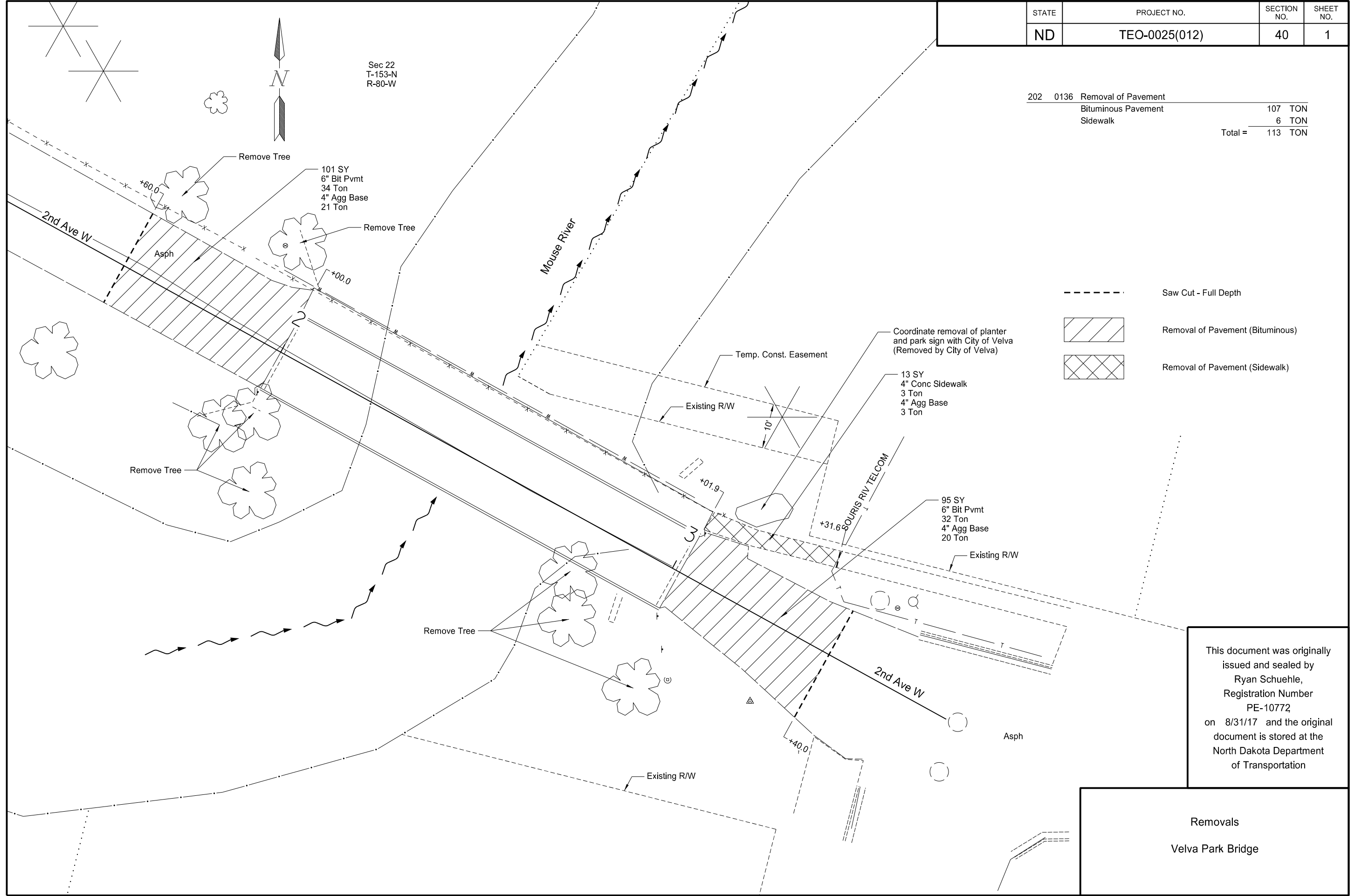


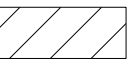
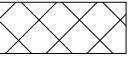
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Typical Sections
 Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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202	0136	Removal of Pavement	
		Bituminous Pavement	107 TON
		Sidewalk	6 TON
Total =			113 TON

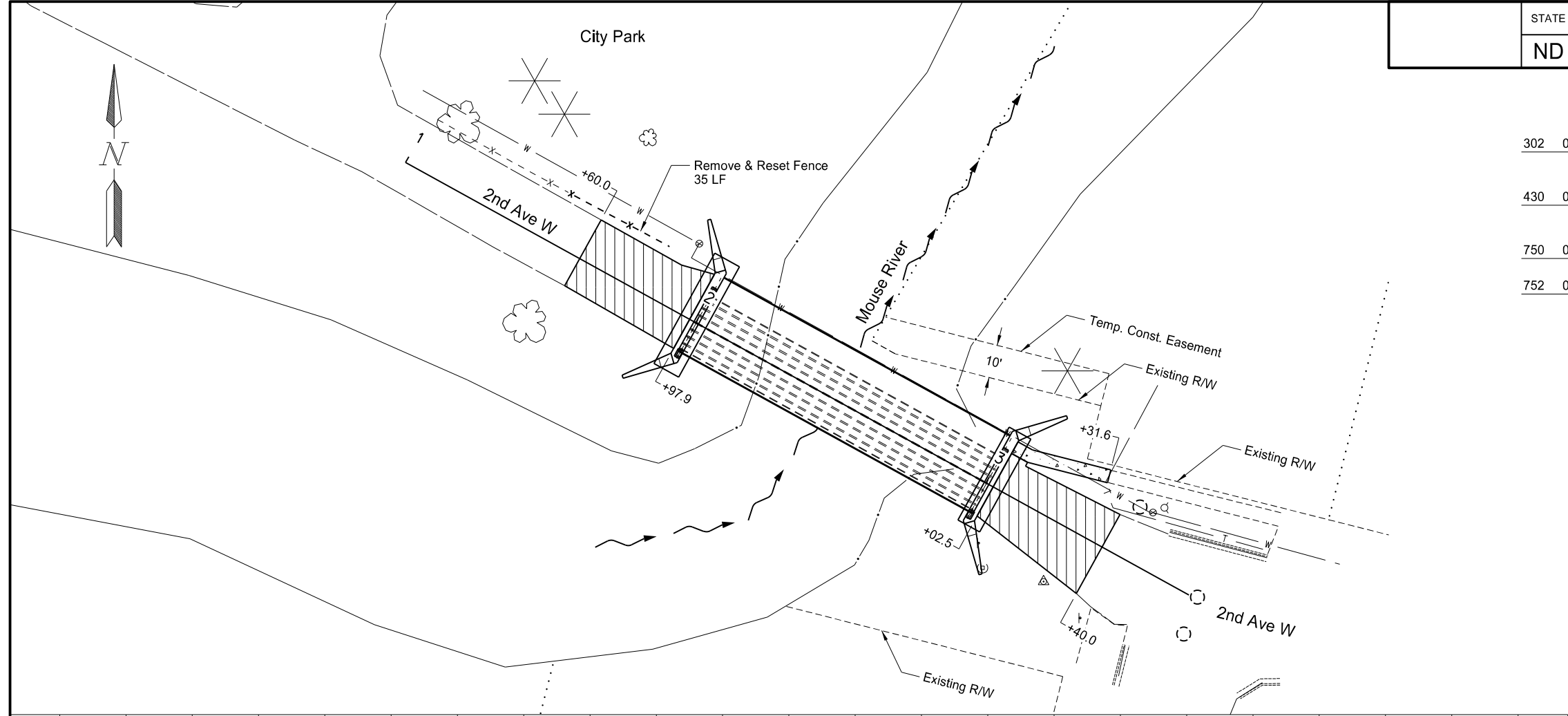


- Saw Cut - Full Depth
-  Removal of Pavement (Bituminous)
-  Removal of Pavement (Sidewalk)

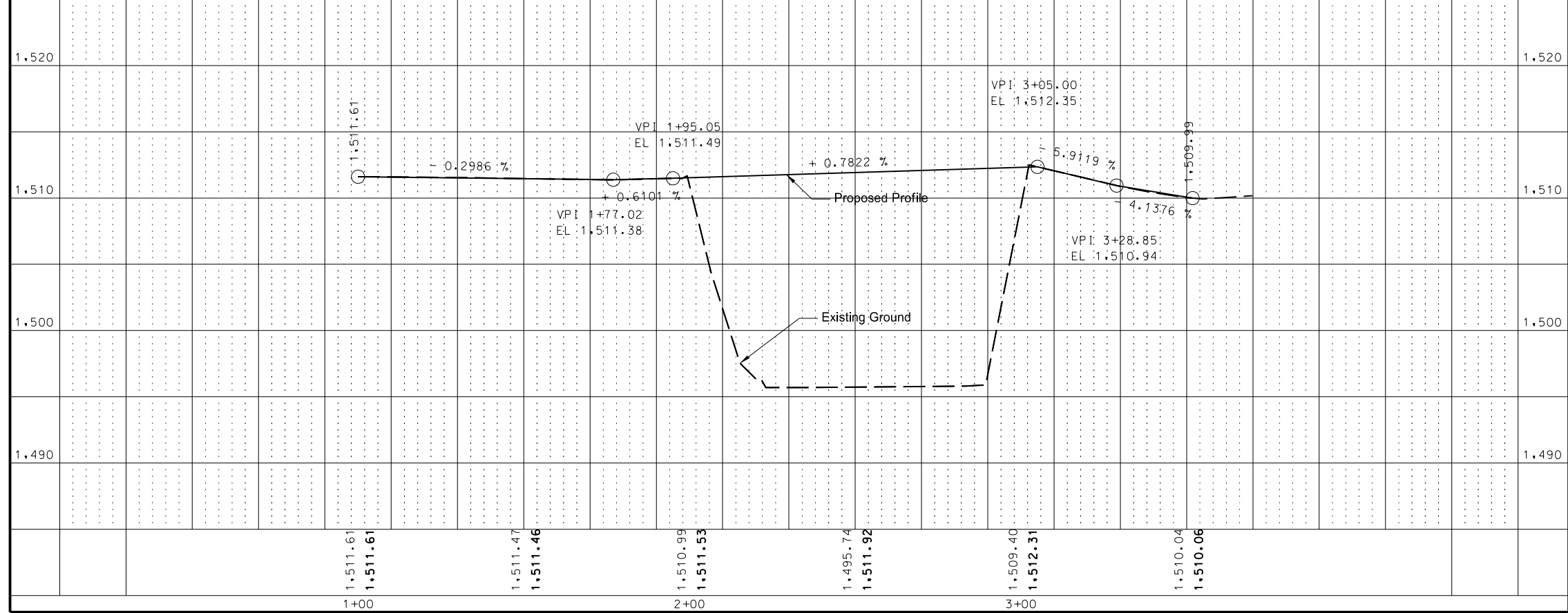
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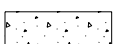
Removals
Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	60	1



302	0120	Aggregate Base Course CL 5	
		Sta 1+60.0 to Sta 1+97.9	16 TON
		Sta 3+02.5 to Sta 3+40.0	20 TON
430	0500	Commercial Grade Hot Mix Asphalt	
		Sta 1+60.0 to Sta 1+97.9	36 TON
		Sta 3+02.5 to Sta 3+40.0	36 TON
750	0115	Sidewalk Concrete 4IN	
		Sta 3+02.5 to Sta 3+40.0	14 SY
752	0922	Fence Remove & Reset	
		Sta 1+47 16' LT to Sta 1+82 16' LT	35 LF

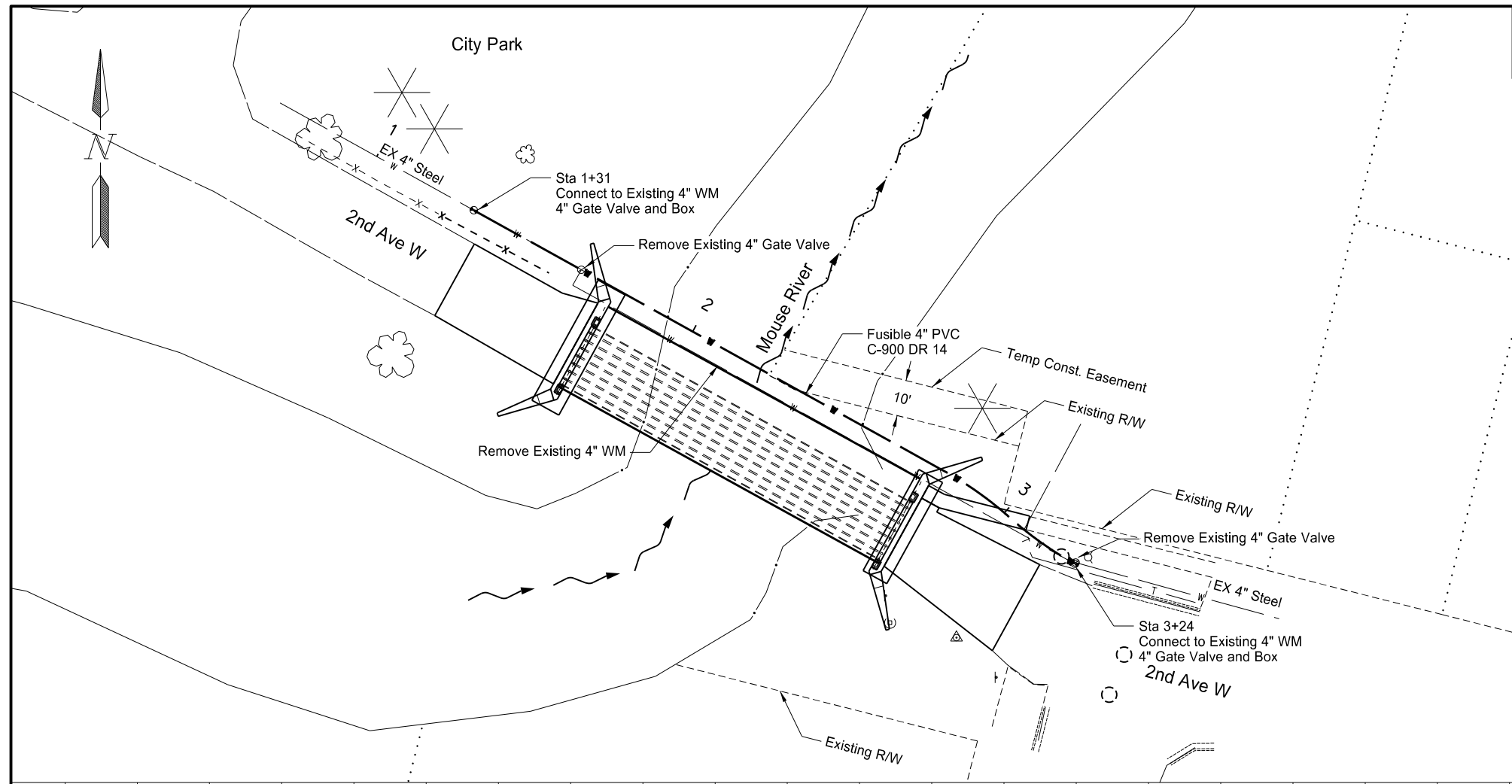


-  Bituminous Pavement
-  Concrete Sidewalk

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Plan and Profile
Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	60	2

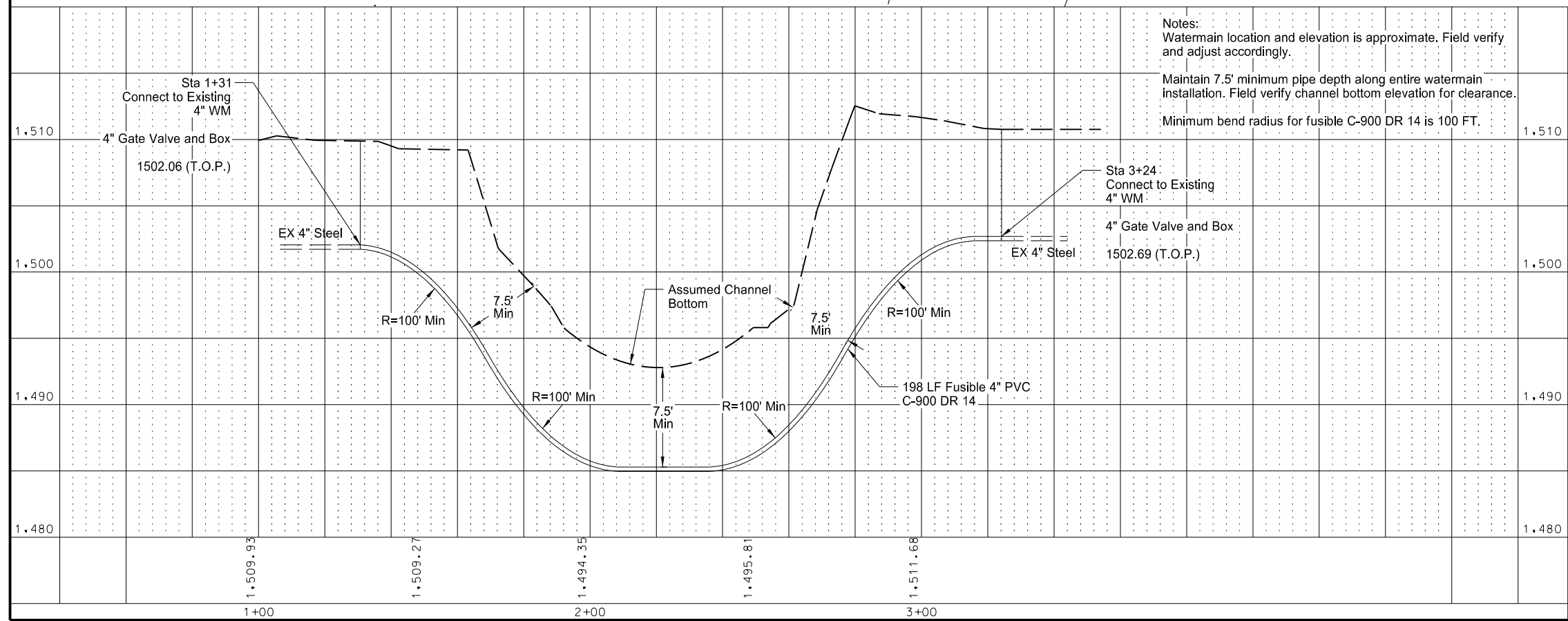


202	0174	Removal of Pipe All Types and Sizes	
		Sta 1+31 to Sta 3+24	198 LF
724	0270	Remove Gate Valve & Box	
		Sta 1+65	1 EA
		Sta 3+24	1 EA
724	0290	Gate Valve & Box 4IN	
		Sta 1+31	1 EA
		Sta 3+24	1 EA
724	0790	Watermain 4IN PVC	
		Sta 1+31 to Sta 3+24	198 LF
724	0944	Connection to Existing Main	
		Sta 1+31	1 EA
		Sta 3+24	1 EA
724	0950	Water Service Connection 3/4IN	
		Pressure Testing	1 EA

- Notes:
- Jack or boring will be the method used to install the 4" watermain indicated in the plans.

This work will consist of providing all labor, materials, and equipment as necessary to bore or jack horizontally and vertically, the watermain pipe at the locations shown on the Plans. Pipe conduit will be Fusible PVC C-900 DR 14. Joining of the pipes and fittings shall be performed in accordance with the procedures recommended by the pipe manufacturer.

Regardless of the method used, all costs associated with labor, materials, and equipment for the jacking or boring of the watermain pipe will be included in the unit price bid for "Watermain 4IN PVC".
 - "Water Service Connection 3/4IN" will be installed and used temporarily to facilitate pressure testing. Contractor will shut valve off at main after successfully pressure testing.



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Plan and Profile
 Watermain Lowering
 Velva Park Bridge

Other Waters Impact Table															
Other Waters							Other Waters Mitigation								
Number	Location	Type	Size		Feature	USACE Jurisdictional ¹	Impacts to Other Waters				Mitigation Required			Mitigation Location; Ratio	Method
			Acre(s)	Linear Feet			Acre(s)		Linear Feet		EO 11990	USACE	USFWS		
			Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.					
OW 1	Sec. 22, T153N, R80W	Perennial Stream	0.14	100	Natural	Yes	0.00	0.00	0.00	0.00	N	N	N	NA	NA
Totals			0.14	100			0.00	0.00	0.00	0.00					

* A wetland Jurisdictional Determination was issued by the USACE on 5/31/2016; NWO-2016-1062-BIS

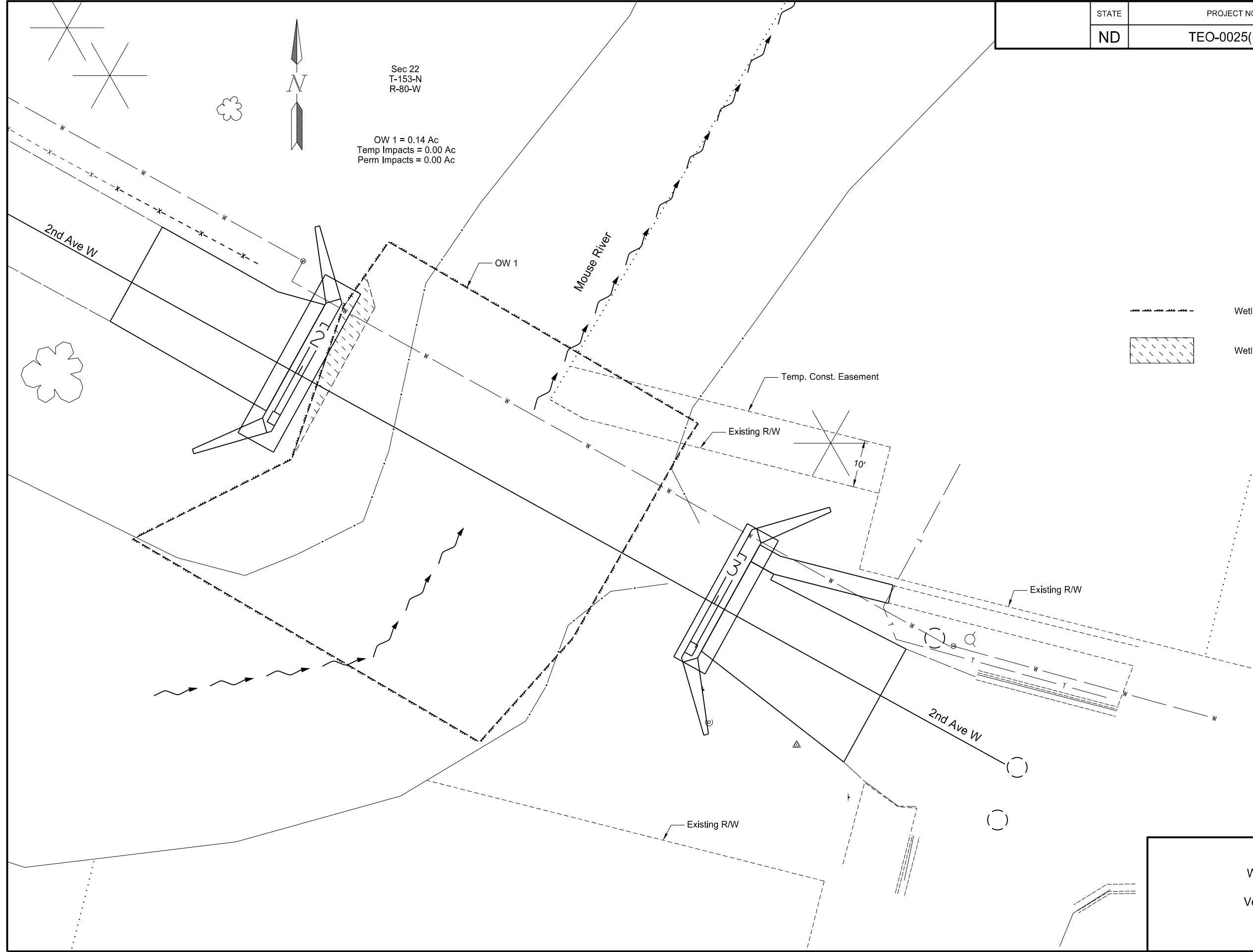
Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and Additional Information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/LF)
Natural/JD	0.00	Temporary JD	0.00
Natural/Non-JD	0.00	Non-JD Temporary	0.00
Artificial/JD	0.00	Permanent JD > 0.10	0.00
Artificial/Non-JD	0.00	Permanent OW	0.00
Total	0.00	Temporary OW	0.00

Mitigation Summary Table		
	Location	Onsite Acre(s)
USACE Only	NA	0.00
EO 11990 Only	NA	0.00
USACE /11990	NA	0.00
USFWS	NA	0.00
	Total	0.00

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Wetlands Mitigation and Environmental
 Velva Park Bridge
 Wetland Impact and Mitigation Table

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	75	2






 Wetland Delineated Existing
 Wetland Impacts Temporary

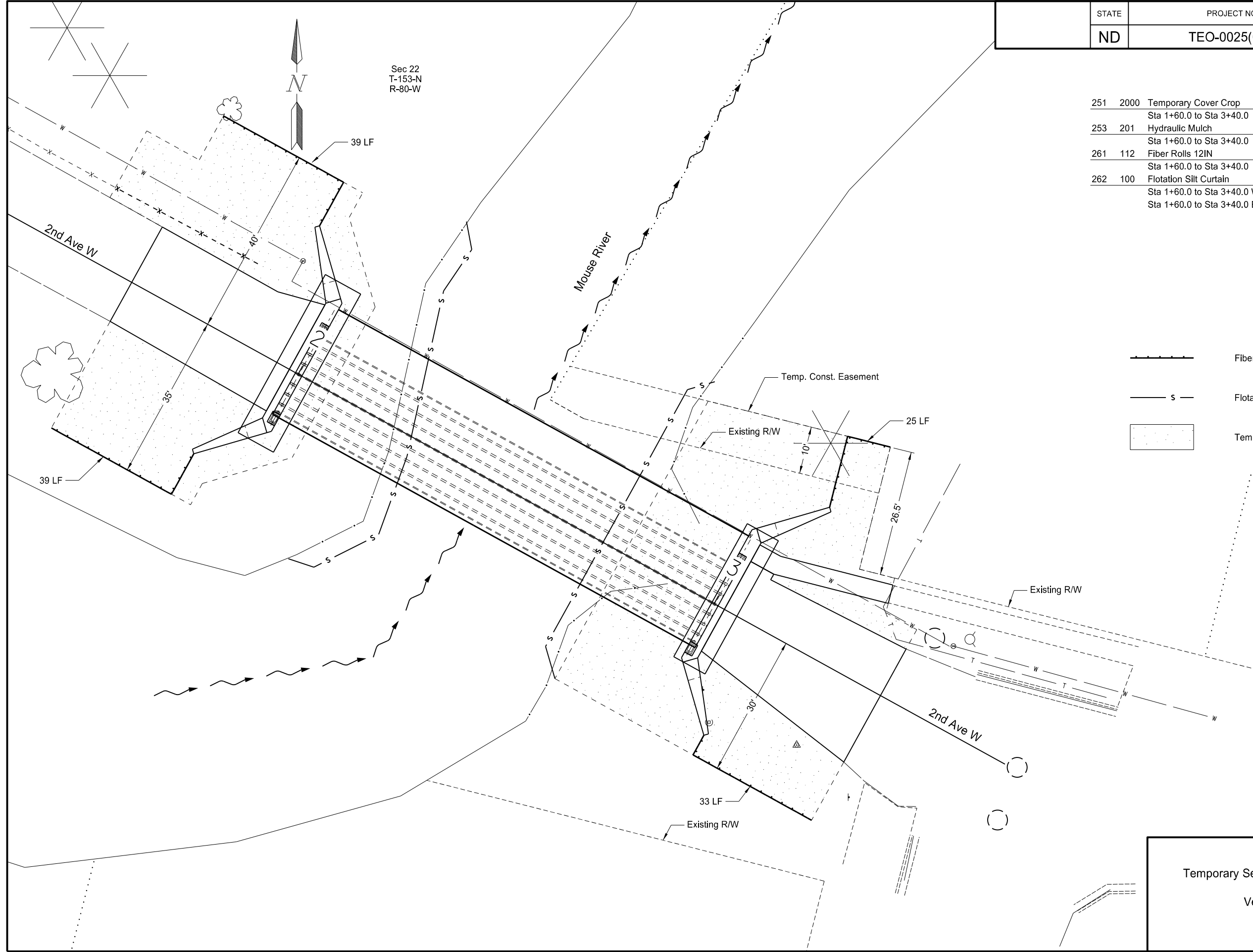
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Wetland Impacts
Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	76	1

251	2000	Temporary Cover Crop		
		Sta 1+60.0 to Sta 3+40.0	0.12	ACRE
253	201	Hydraulic Mulch		
		Sta 1+60.0 to Sta 3+40.0	0.12	ACRE
261	112	Fiber Rolls 12IN		
		Sta 1+60.0 to Sta 3+40.0	136	LF
262	100	Flotation Silt Curtain		
		Sta 1+60.0 to Sta 3+40.0 West Bank	91	LF
		Sta 1+60.0 to Sta 3+40.0 East Bank	75	LF

-  Fiber Rolls 12IN
-  Flotation Silt Curtain
-  Temporary Seeding/Mulching


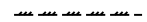



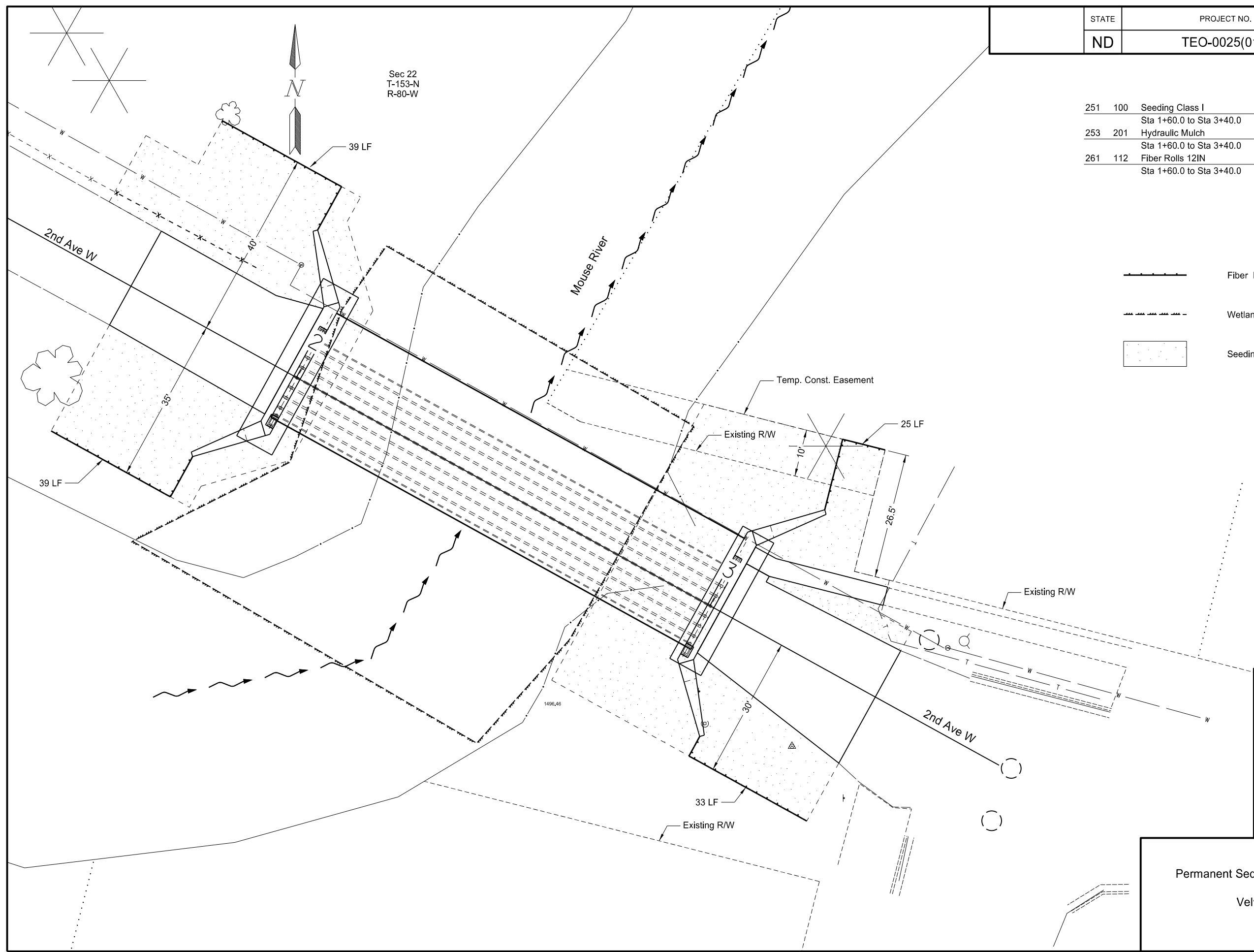
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Temporary Sediment and Erosion Control
Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	77	1

251	100	Seeding Class I		
		Sta 1+60.0 to Sta 3+40.0	0.12	ACRE
253	201	Hydraulic Mulch		
		Sta 1+60.0 to Sta 3+40.0	0.12	ACRE
261	112	Fiber Rolls 12IN		
		Sta 1+60.0 to Sta 3+40.0	136	LF

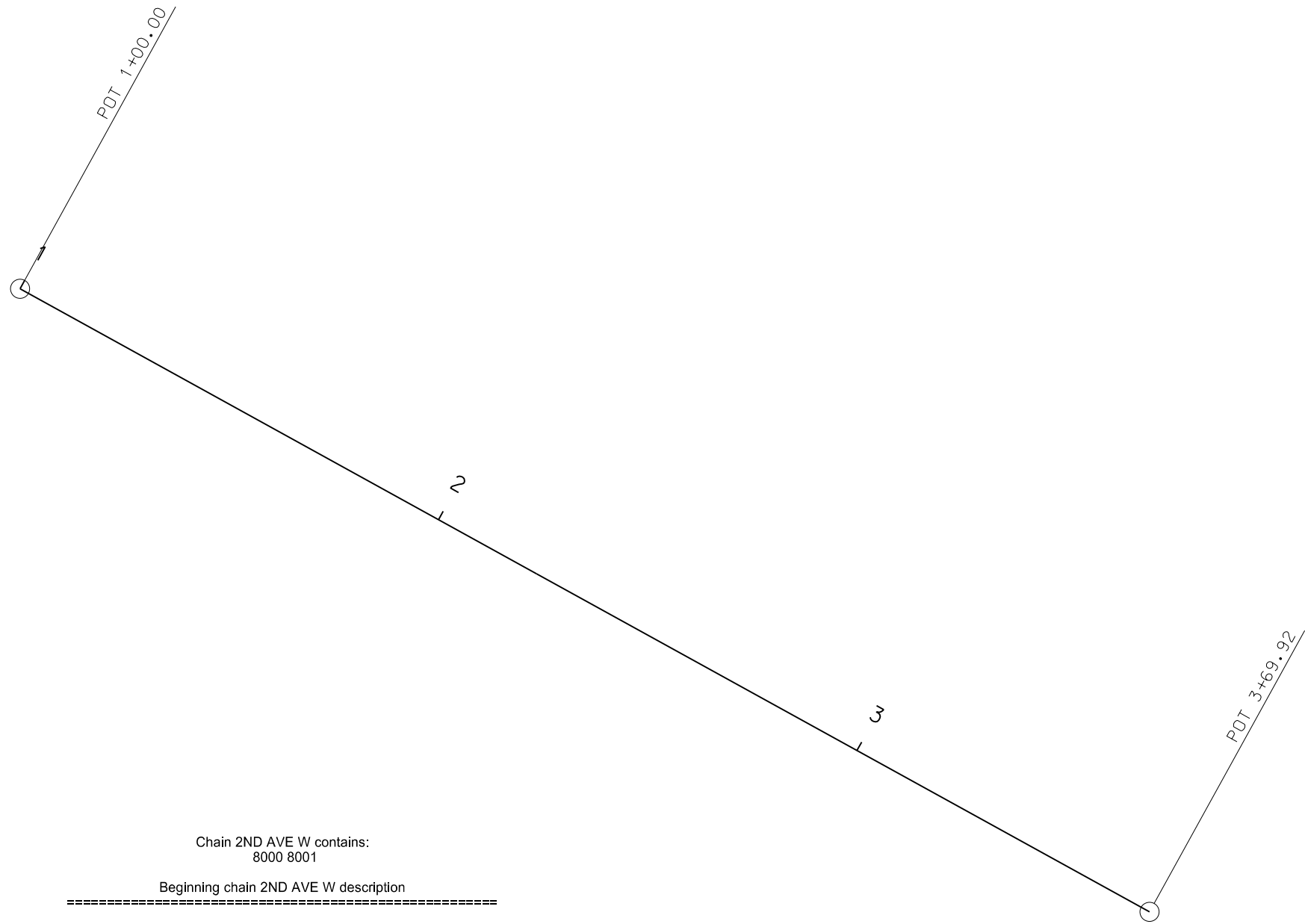
-  Fiber Rolls 12IN
-  Wetland Delineated Existing
-  Seeding/Mulching



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Permanent Sediment and Erosion Control
Velva Park Bridge

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0025(012)	82	1



Chain 2ND AVE W contains:
8000 8001

Beginning chain 2ND AVE W description

=====

Point 8000	N	386,941.50	E	1,861,937.77	Sta	1+00.00
Course from 8000 to 8001 S 61° 06' 47.80" E Dist 269.92						
Point 8001	N	386,811.10	E	1,862,174.11	Sta	3+69.92

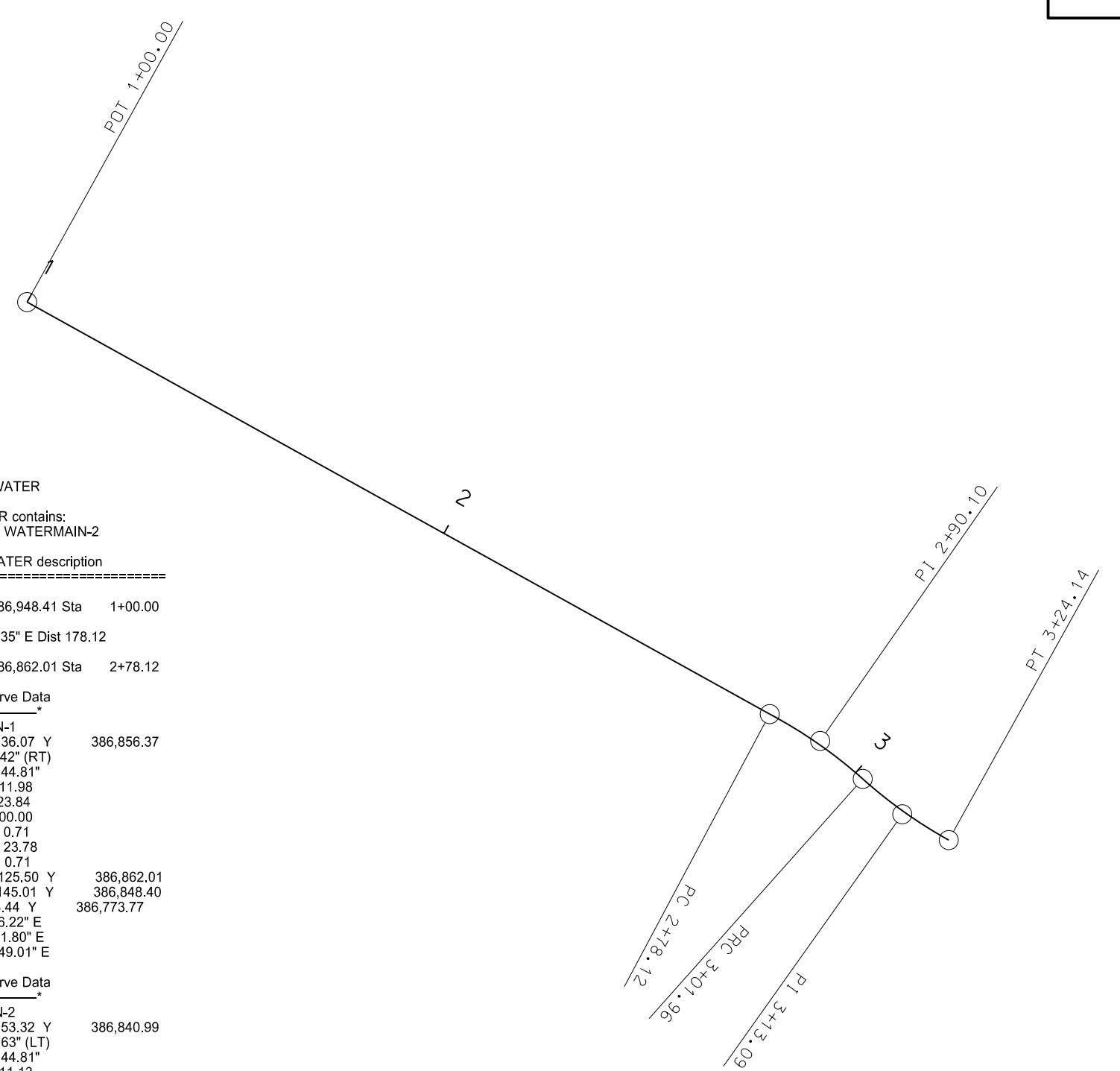
=====

Ending chain 2ND AVE W description

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Survey Data Layout
Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	82	2



CHAIN 2ND_AVE_W_WATER

Chain 2ND_AVE_W_WATER contains:
10 11 CUR WATERMAIN-1 CUR WATERMAIN-2

Beginning chain 2ND_AVE_W_WATER description

Point 10 X 1,861,969.74 Y 386,948.41 Sta 1+00.00

Course from 10 to 11 S 60° 59' 01.35" E Dist 178.12

Point 11 X 1,862,125.50 Y 386,862.01 Sta 2+78.12

Curve Data

P.I. Station Curve WATERMAIN-1
2+90.10 X 1,862,136.07 Y 386,856.37
Delta = 13° 39' 34.42" (RT)
Degree = 57° 17' 44.81"
Tangent = 11.98
Length = 23.84
Radius = 100.00
External = 0.71
Long Chord = 23.78
Mid. Ord. = 0.71

P.C. Station 2+78.12 X 1,862,125.50 Y 386,862.01
P.T. Station 3+01.96 X 1,862,145.01 Y 386,848.40
C.C. X 1,862,078.44 Y 386,773.77

Back = S 61° 55' 36.22" E
Ahead = S 48° 16' 01.80" E
Chord Bear = S 55° 05' 49.01" E

Curve Data

P.I. Station Curve WATERMAIN-2
3+13.09 X 1,862,153.32 Y 386,840.99
Delta = 12° 42' 21.63" (LT)
Degree = 57° 17' 44.81"
Tangent = 11.13
Length = 22.18
Radius = 100.00
External = 0.62
Long Chord = 22.13
Mid. Ord. = 0.61

P.C. Station 3+01.96 X 1,862,145.01 Y 386,848.40
P.T. Station 3+24.14 X 1,862,163.05 Y 386,835.59
C.C. X 1,862,211.57 Y 386,923.02

Back = S 48° 16' 01.80" E
Ahead = S 60° 58' 23.43" E
Chord Bear = S 54° 37' 12.62" E

Ending chain 2ND_AVE_W_WATER description

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Survey Data Layout
Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	60"x24"	ROAD WORK NEXT ___ MILES		34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	48"x24"	END ROAD WORK		19	
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	72"x36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS		37	
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW		30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT	6	15	90
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT (Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back		5	
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT ___		39	
R2-1a-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED	2	28	56
R11-3a-60	60"x30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or ___ FT.		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ___ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	___ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE		35	
W20-2-48	48"x48"	DETOUR AHEAD or ___ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or ___ FT.	1	35	35
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or ___ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.		35	
W20-7a-48	48"x48"	FLAGGING SYMBOL		35	
W20-7k-24	24"x18"	___ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT ___ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or ___ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	48"x48"	SHOULDER WORK			35
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED			35
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ___ FT.			35
W21-6a-48	48"x48"	SURVEY CREW AHEAD			35
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or ___ FT.			35
W21-51-48	48"x48"	MATERIAL ON ROADWAY			35
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK			35
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)			11

SPECIAL SIGNS

CONSIGN	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
Consign 1	72"x18"	VELVA PARK	5	27	135

SPEC & CODE

SPEC & CODE	DESCRIPTION	TOTAL UNITS
704-1000	TRAFFIC CONTROL SIGNS	316

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	6
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

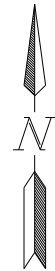
NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
<http://www.dot.nd.gov/>

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Traffic Control Devices List

Velva Park Bridge

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	100	2



Staging Area

Consign 1
Velva Park
M4-9R-30
Post Mounted
DETOUR
→

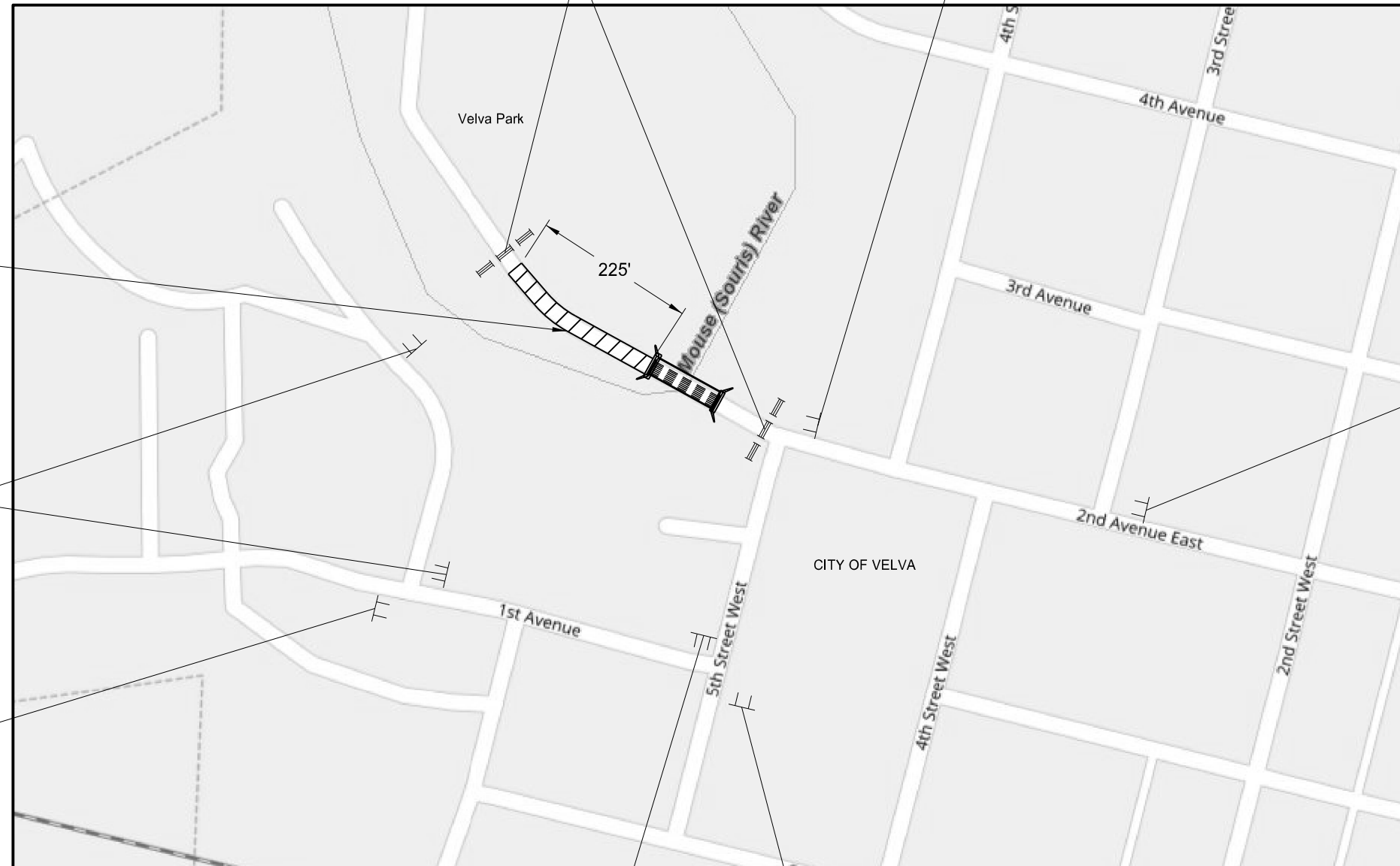
Consign 1
Velva Park
M4-9L-30
Post Mounted
DETOUR
←

R11-2a-48
Barricade Mounted
M4-9R-30
Post Mounted
STREET
CLOSED
DETOUR
→

Velva Park Consign 1
M4-9L-30
Post Mounted
DETOUR
←



W20-3-48
Post Mounted



Consign 1
Velva Park
M4-9R-30
Post Mounted
DETOUR
→

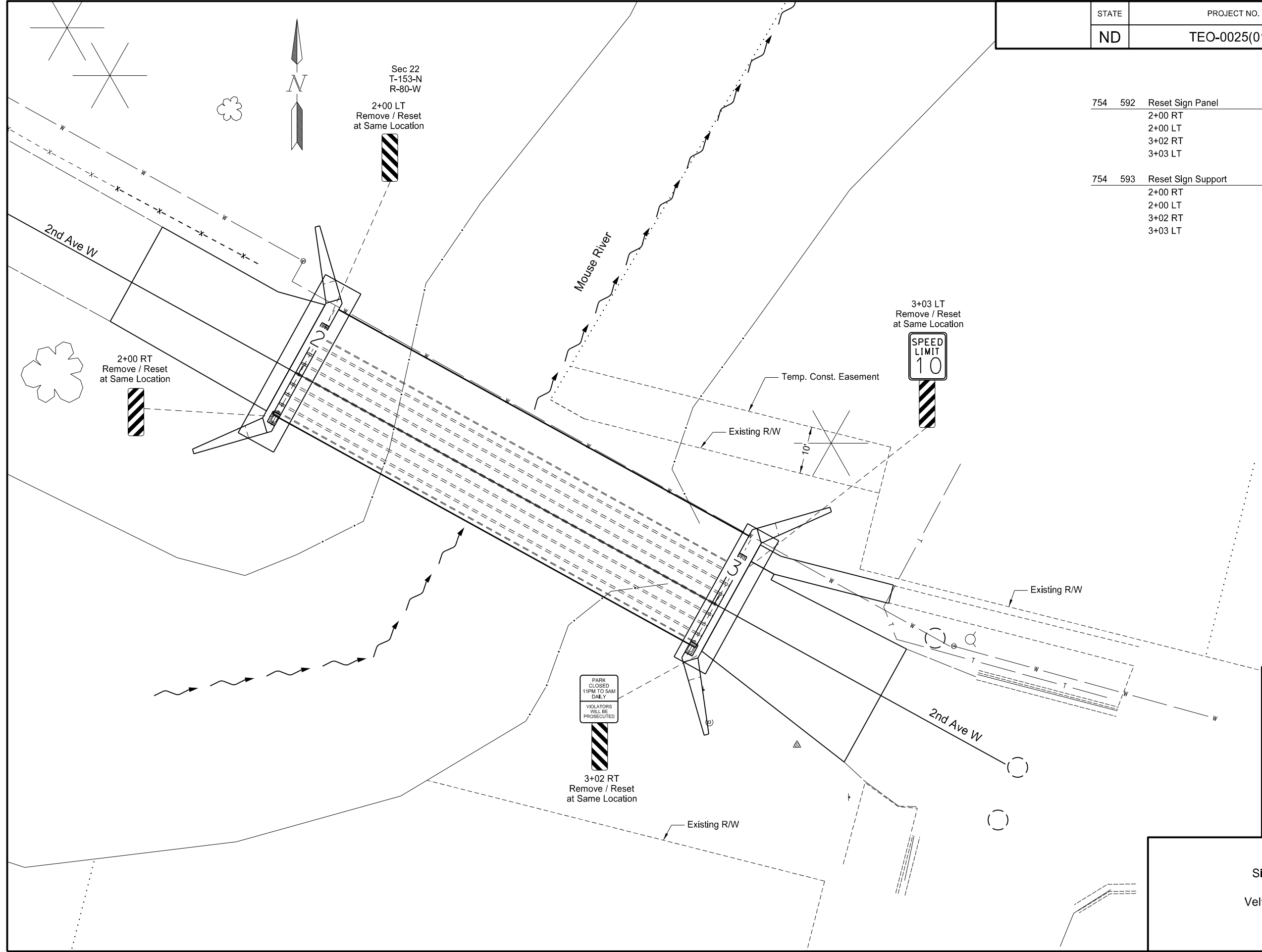
Velva Park Consign 1
M4-9L-30
Post Mounted
DETOUR
←

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Construction Signing Layout
Velva Park Bridge

- Notes:
1. The sign layout is for general informational purposes only. The contractor will be required to conform to MUTCD and the standard drawings when installing the traffic control signs.
 2. Staging area is the roadway surface within the City of Velva Park approximately within 225' of the bridge.

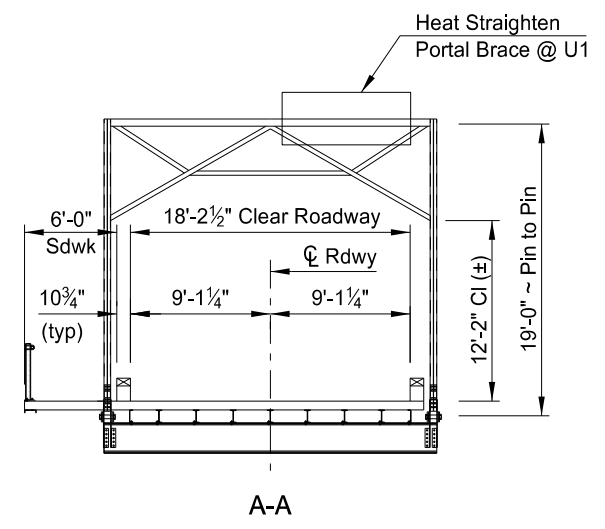
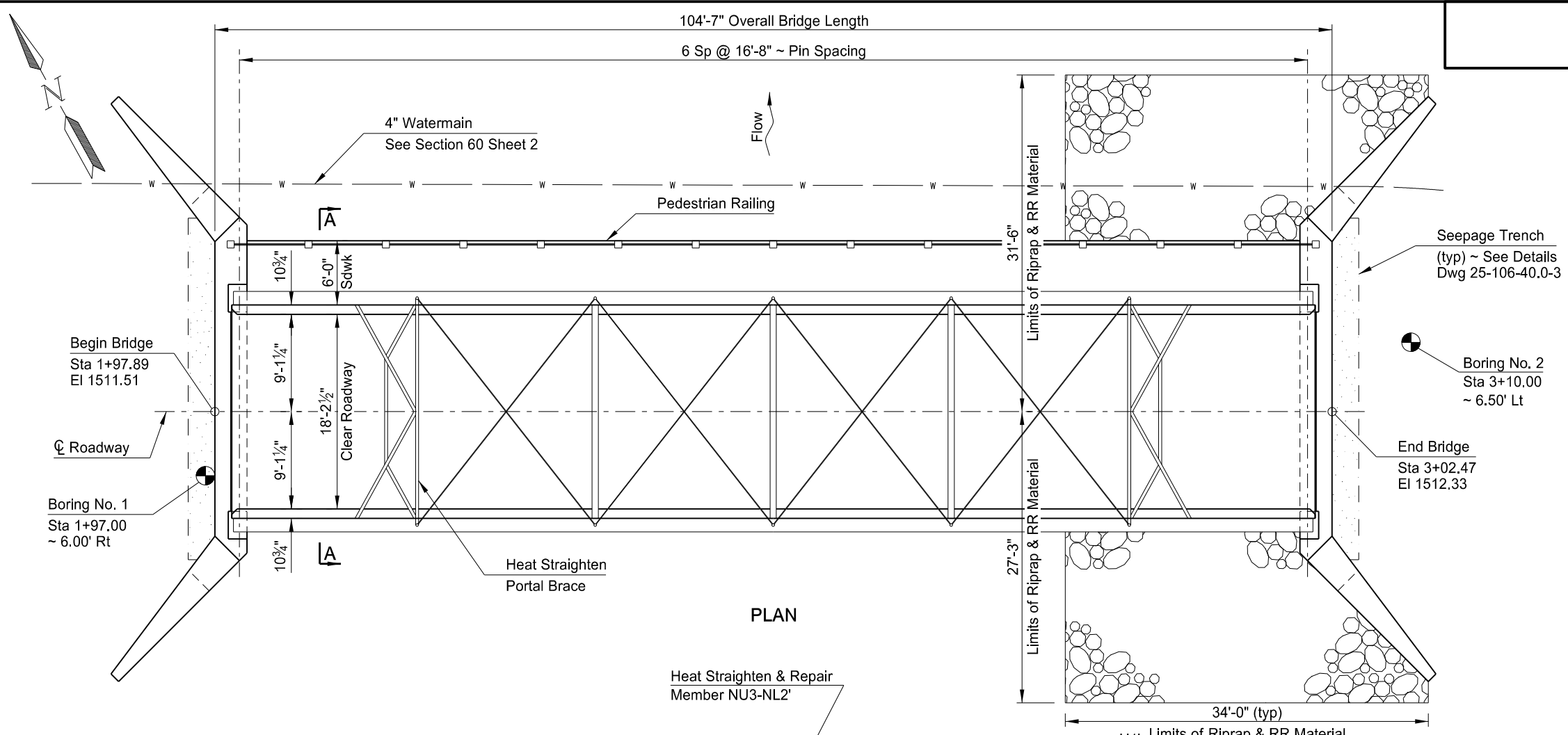
754	592	Reset Sign Panel		
		2+00 RT	1	EA
		2+00 LT	1	EA
		3+02 RT	1	EA
		3+03 LT	1	EA
		Total =	4	EA
754	593	Reset Sign Support		
		2+00 RT	1	EA
		2+00 LT	1	EA
		3+02 RT	1	EA
		3+03 LT	1	EA
		Total =	4	EA



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Signing Layout
Velva Park Bridge

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	1



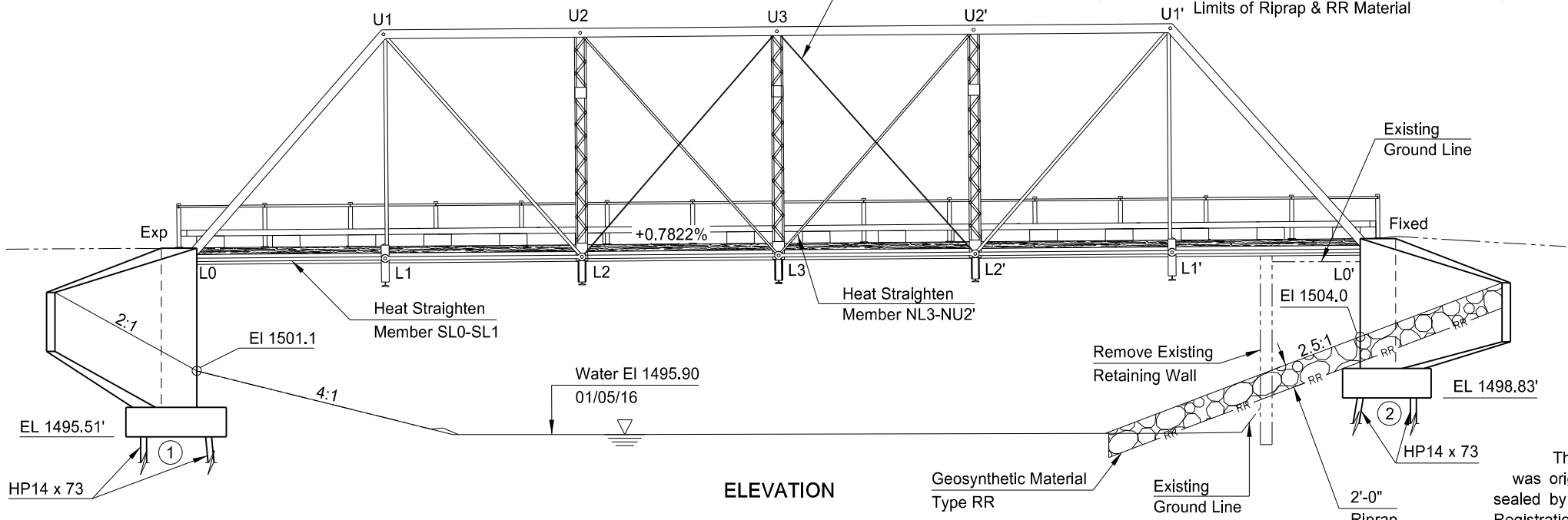
DESIGN STRENGTHS:

f'c = 3,000 psi ~ Class AE-3 Concrete
 fy = 60,000 psi ~ Reinforcing Steel

Load & Resistance Factor Design

SPECIAL PROVISIONS	
SP 4(14)	FEDERAL MIGRATORY BIRD TREATY ACT
SP 524(14)	PAINTING OVER GALVANIZED STEEL
SP 469(14)	BRIDGE PAINT: LEAD PAINT REMOVAL, CONTAINMENT, AND NEW PAINT
SP 470(14)	BRIDGE MEMBER HEATING AND STRAIGHTENING
SP 517(14)	GLUED LAMINATED DECK PANELS

STANDARD DRAWINGS	
D-622-1	



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SURVEY CONTROL POINTS			
POINT	NORTHING	EASTING	ELEVATION
GPS 1	387,027.02	1,861,842.72	1,508.58
GPS 2	386,815.14	1,862,130.26	1,511.15
GPS 3	386,993.72	1,862,075.06	1,508.39

INITIALING BENCH MARK NDGPS STATIONS (OPUS)	
All coordinates on this sheet are McHenry County Ground Coordinates. They are derived from the "North Dakota Coordinate System of 1983", NAD 83 (CORS96). North Zone Combination Factor (cf) = 0.9998830	NAVD-88
	GEOID 12B

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

VELVA PARK BRIDGE

BRIDGE LAYOUT

TEO-0025(012)
STATION: 2+50.18
McHENRY COUNTY

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	2

NOTES

- 100 SCOPE OF WORK: This project consists of rehabilitating a single span, six-panel, pin-connected Pratt thru truss bridge with an overall length of 104'-7" and a clear roadway width of 18'-2½". The overall deck width is 26'-0" which includes a cantilevered sidewalk on the north side. Replace the existing timber deck with glued laminated deck panels. Replace the existing timber abutments with concrete abutments.
- 100 DIMENSIONS: The dimensions shown for the various fabricated parts are computed from general measurements of the existing structure. The actual dimensions required for a proper fit or alignment may vary from the shown dimensions. Verify all dimensions to assure proper fit and alignment of the various components, both new and existing prior to installation.
- 105 WORK DRAWINGS: Submit work drawings for the glued laminated deck panels, bearings, and pedestrian railing to the Engineer for review.
- 202 REMOVAL OF STRUCTURE: Include cost of removing the existing timber abutments, timber deck, angle iron traffic railing, and concrete retaining wall near the east abutment in the price bid for "REMOVAL OF STRUCTURE."
- 210 EXCAVATION: Include the excavation costs at the abutments, as showing in the "Detail at Abutment", in the lump sum bid item, "CLASS 1 EXCAVATION."
- 602 SURFACE FINISH "C": Apply Surface Finish "C" to all exposed substructure surfaces.
- 622 PILING: Drive piling with a diesel hammer with a rated energy and ram weight (minimum of 4,630 pounds) of at least 104,394 foot-pound-tons computed by the formula:
- $W(E-19,404) + 1.076E$
- W = Weight of the ram (tons)
E = Rated hammer energy
- Run the hammer at an energy that produces a penetration at bearing between ½" and 3 inches in the last 10 blows.
- 622 PILE DRIVING: Limit pile driving between the hours of 7:00 a.m. and 9:00 p.m.
- 630 CONTAINMENT SYSTEM: Contain all debris from the paint removal and surface preparation process in accordance with Special Provision 469(14).
- 630 SAND BLASTING AND PAINTING: Sand blast and paint the truss and bearings in accordance with Special Provision 469(14). Use metallic red-brown finish coat, color number 10076 meeting Federal Standard 595B.
- 930 REHABILITATE HISTORIC STRUCTURE: The contractor has the option to complete the sandblasting and painting at the current location, in the designated area in the Velva City Park, or an offsite location.

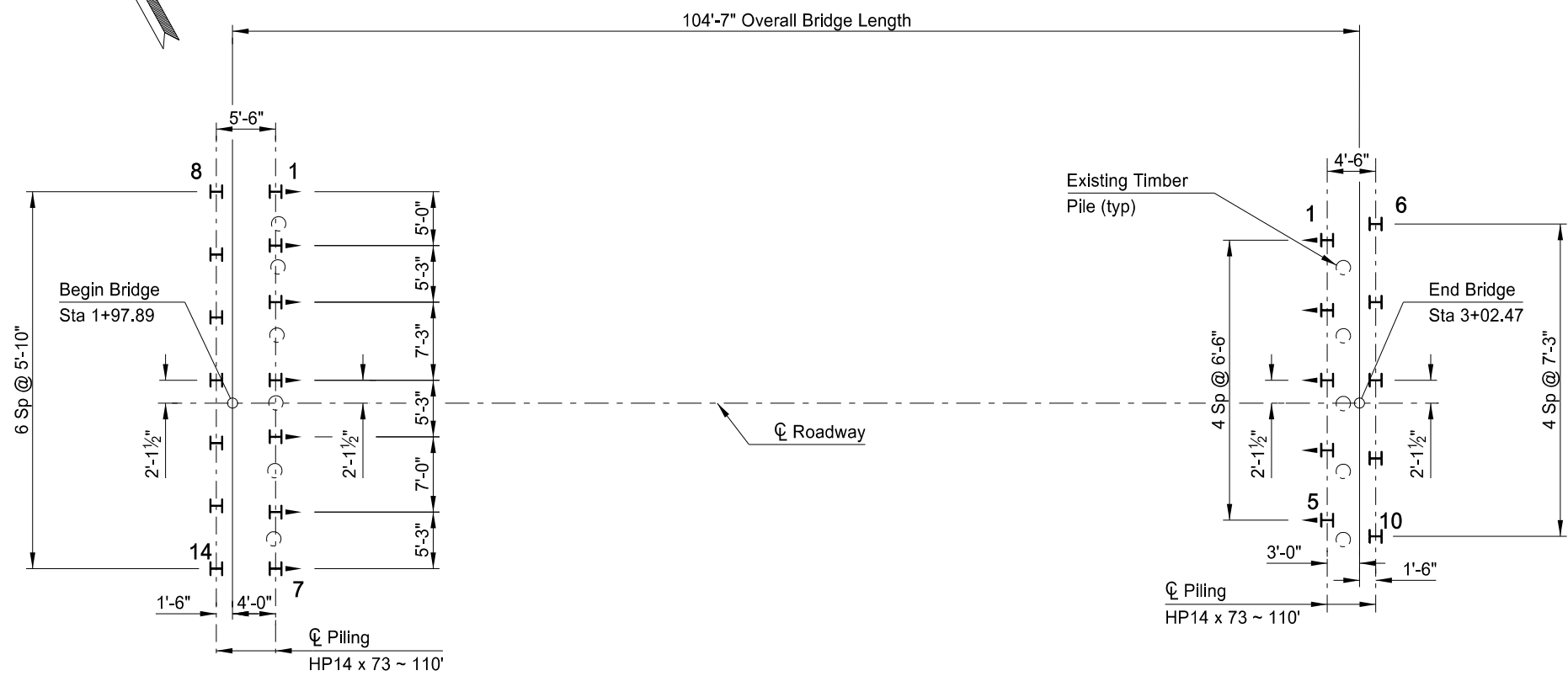
If the bridge is rehabilitated in its current location, temporary support of the truss during abutment removal and construction will be the responsibility of the contractor. Submit plans for the shoring to the Engineer for review before removing the existing abutments. Leave temporary supports in place until the concrete in the abutments have reached 70% of the design strength.

If bridge components are transported to another location, brace and support the truss as necessary to prevent bending or twisting. Disassemble the truss components at bolted connections only. The use of a cutting torch to remove bolts or rivets is prohibited. Submit supplemental support and transport plans certified by a professional engineer to the Engineer for review.

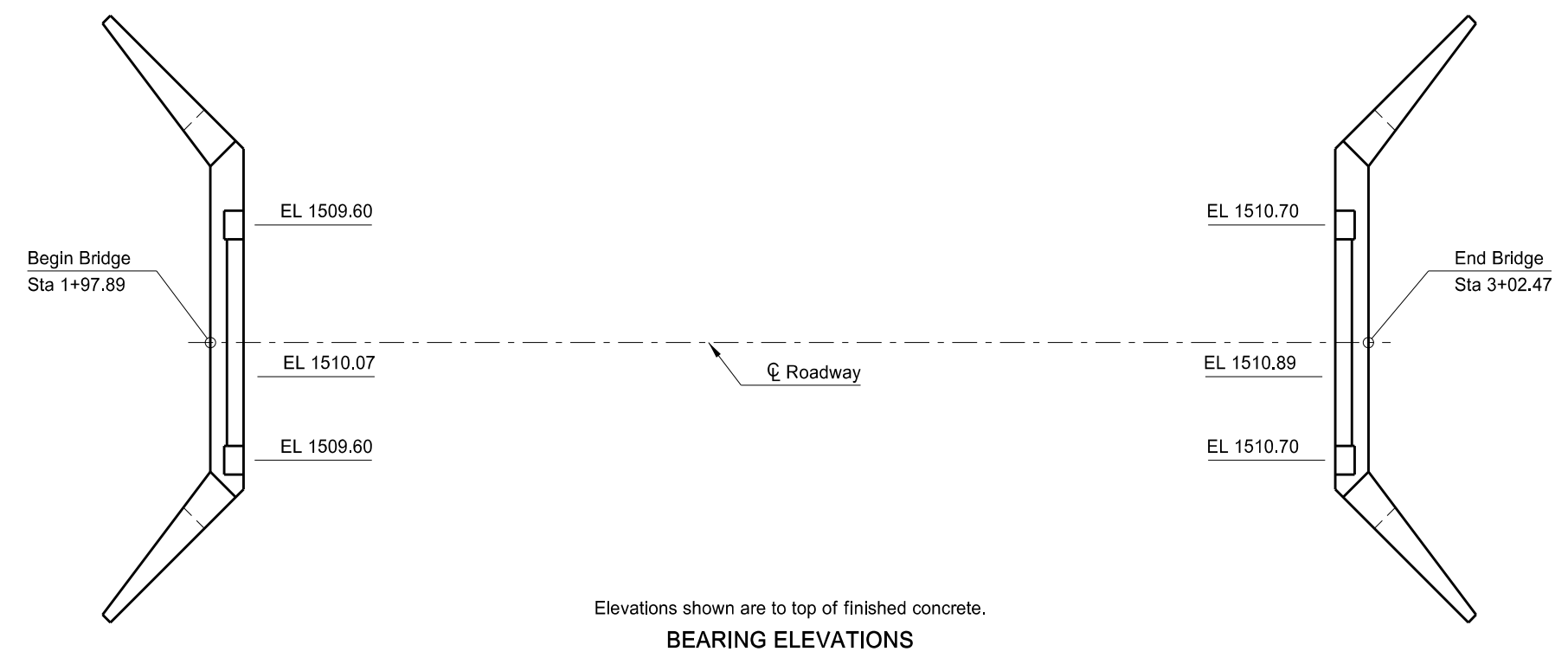
- 930 HEAT STRAIGHTENING: Heat straighten members identified on Dwg 25-106-40.0-1 in accordance with Special Provision 470(14).

Counter diagonal tension member NU3-NL2' has suffered vehicle impact damage and is no longer engaged. Heat straighten the member and retension using the existing turnbuckle such that the sag in the member is less than, or equal to, the corresponding SU3-SL2' diagonal member. Do not over tension the member to a level that induces compression into the NL3-NU2' diagonal. If the required tension cannot be achieved using the existing turnbuckle, fabricate and install a new turnbuckle assembly capable of tensioning the member. Use a new turnbuckle assembly with female threads matching the size and pitch of the existing NU3-NL2' male threads. Meet the material requirements of either ASTM F1145, ASTM A668, or an approved equal. Use a turnbuckle assembly with a safe working load of 17 kips (LRFD). Include all costs associated with the repair in the price bid for "HEAT STRAIGHTENING."

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Drive the HP14 x 73 Pile to 180 tons.
PILING LAYOUT



Elevations shown are to top of finished concrete.
BEARING ELEVATIONS

NOTE:
 Arrows indicate direction of pile batter.
 Pile batter is 1:10 for indicated piling at Abutment 1.
 Pile batter is 1:6 for indicated piling at Abutment 2.

For double acting or single acting diesel hammers, calculate the safe bearing value of piles by the following formula:

$$P = \frac{4.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$

Where:
 P = Safe bearing value, in pounds.
 W = Weight of striking parts (ram), in pounds.
 M = Weight of parts being driven, in pounds. Includes pile weight, anvil (if any), driving cap, etc.
 E = Energy per blow, in foot-pounds.
 S = Average penetration of pile in inches per blow for last ten blows.

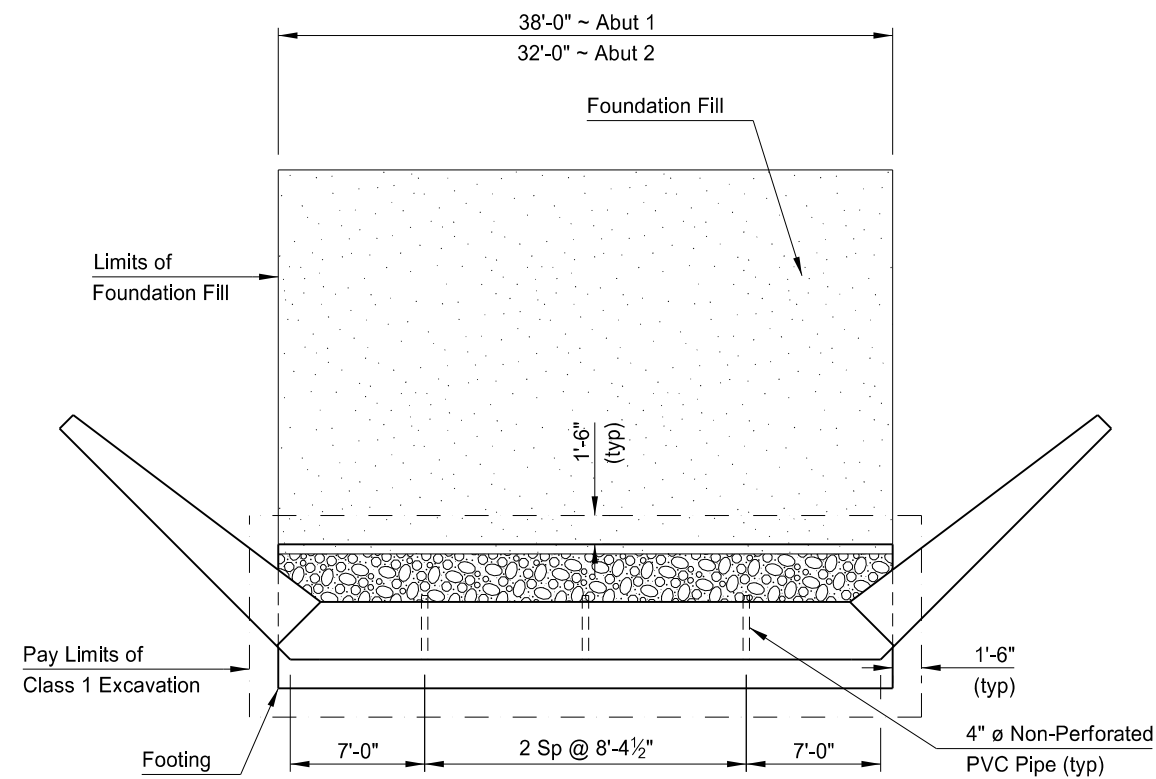
For single acting hammers, calculate E by multiplying observed stroke (ft) and W (lbs).

PILE COORDINATES			
	PILE	NORTHING	EASTING
ABUTMENT 1	1	386,909.46	1,862,036.46
	7	386,878.82	1,862,019.55
	8	386,912.12	1,862,031.64
	14	386,881.47	1,862,014.74
ABUTMENT 2	1	386,858.38	1,862,119.73
	5	386,835.62	1,862,107.17
	6	386,857.52	1,862,124.39
	10	386,832.13	1,862,110.38

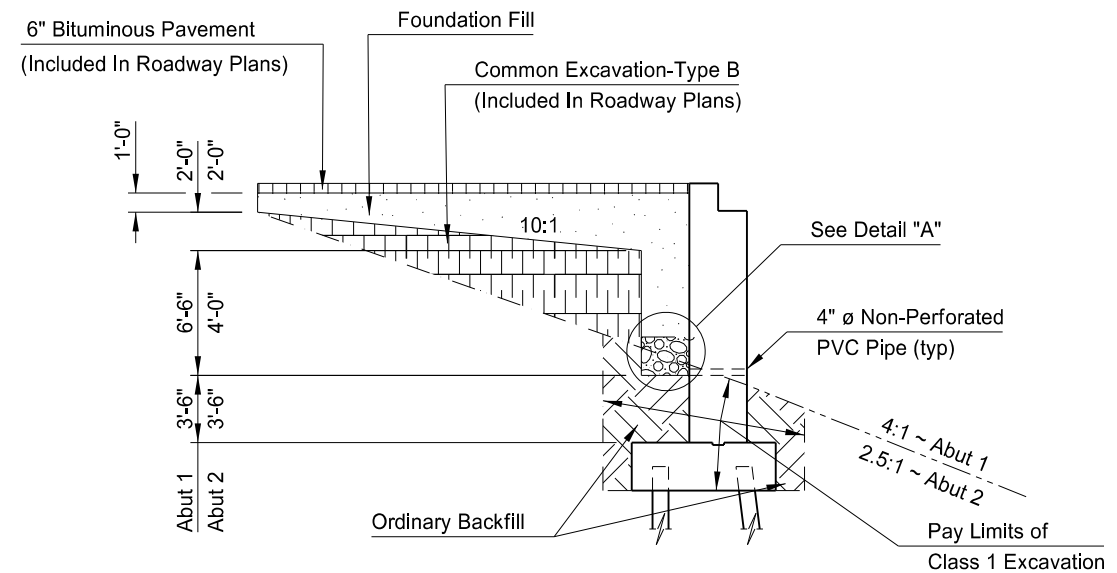
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VELVA PARK BRIDGE

PILING LAYOUT & BEARING ELEVATIONS



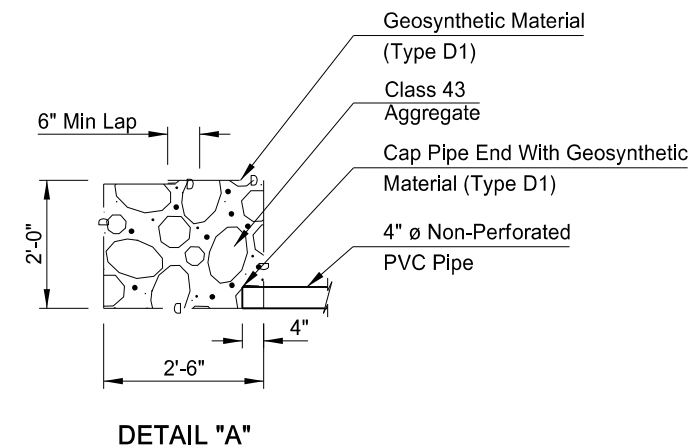
ABUTMENT PLAN



DETAIL AT ABUTMENT

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0105	REMOVAL OF STRUCTURE	L SUM	1
210	0099	CLASS 1 EXCAVATION	L SUM	1
210	0201	FOUNDATION PREPARATION	EA	1
256	0200	RIPRAP GRADE II	CY	110
602	1130	CLASS AE-3 CONCRETE	CY	179.2
612	0115	REINFORCING STEEL-GRADE 60	LBS	14,713
616	5890	STRUCTURAL STEEL	L SUM	1
616	7500	BEARING MODIFICATION	EA	4
618	0120	TREATED TIMBER STRUCTURE	L SUM	1
618	0125	GLULAM DECK PANELS	SY	290.7
622	0060	STEEL PILING HP 14 X 73	LF	2,640
624	0123	PEDESTRIAN RAILING	LF	102
630	0100	SAND BLASTING & PAINTING	L SUM	1
630	9000	CONTAINMENT SYSTEM	L SUM	1
709	0155	GEOSYNTHETIC MATERIAL-TYPE RR	SY	165
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	2
930	9617	HEAT STRAIGHTENING	L SUM	1
930	9642	REHABILITATE HISTORIC STRUCTURE	L SUM	1



DETAIL "A"

NOTE:

Provide PVC that meets the requirements of Section 830.03 A.3. Provide geosynthetic material around drainage aggregate that meets the requirements of Section 858.01. Provide aggregate that meets the requirements of section 816.03, Class 43. Provide foundation fill that meets the requirements of Section 210.

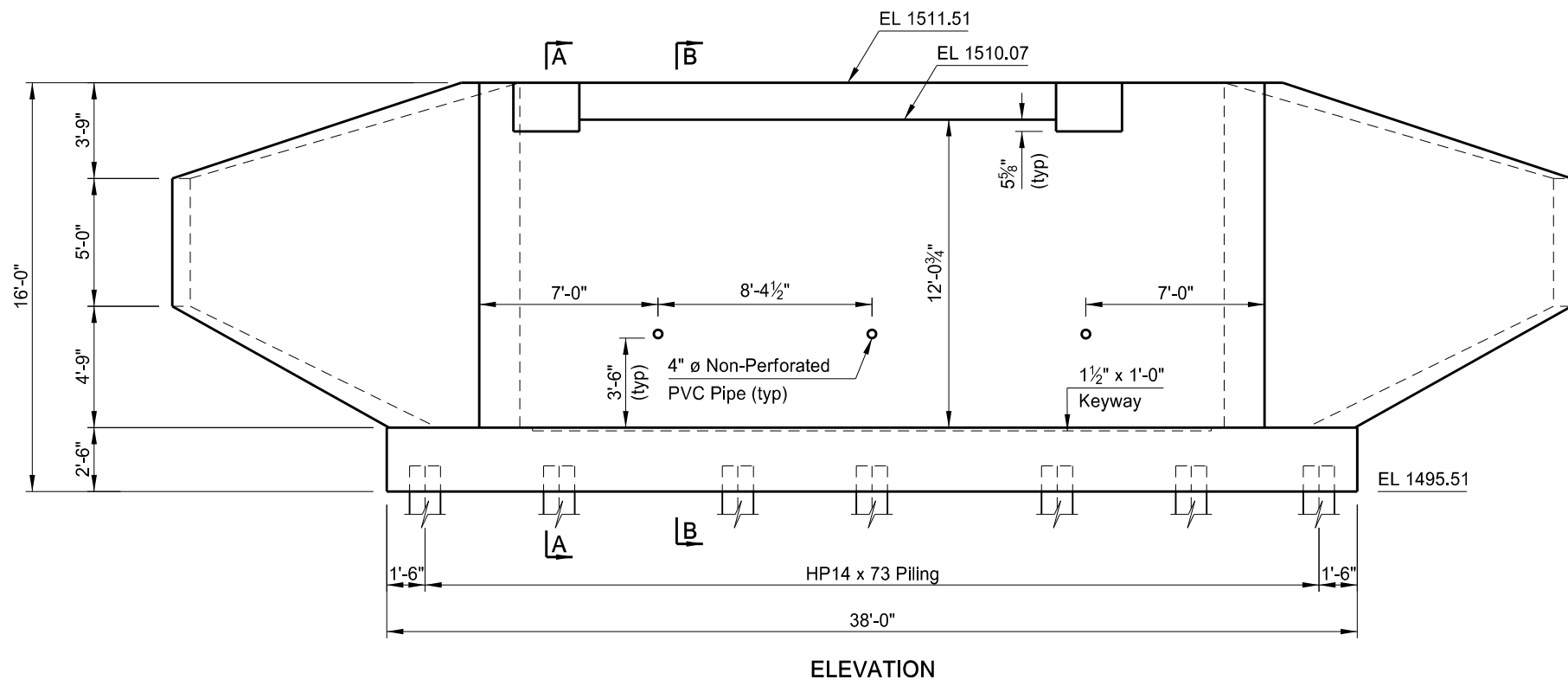
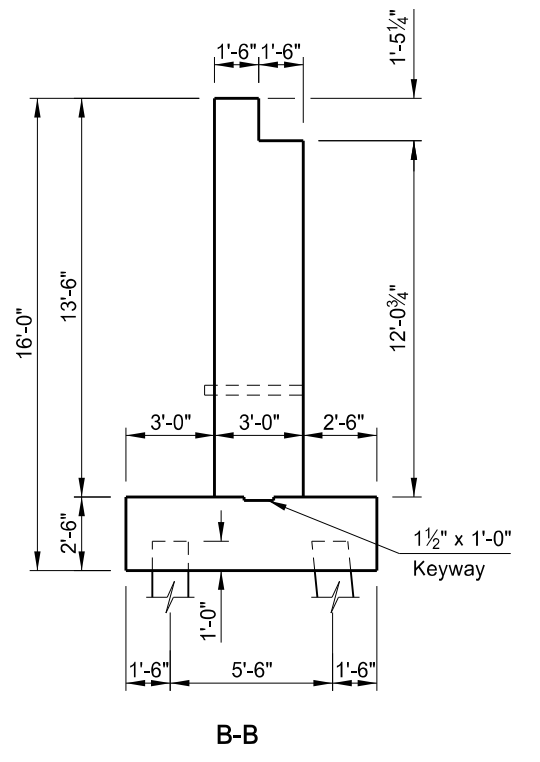
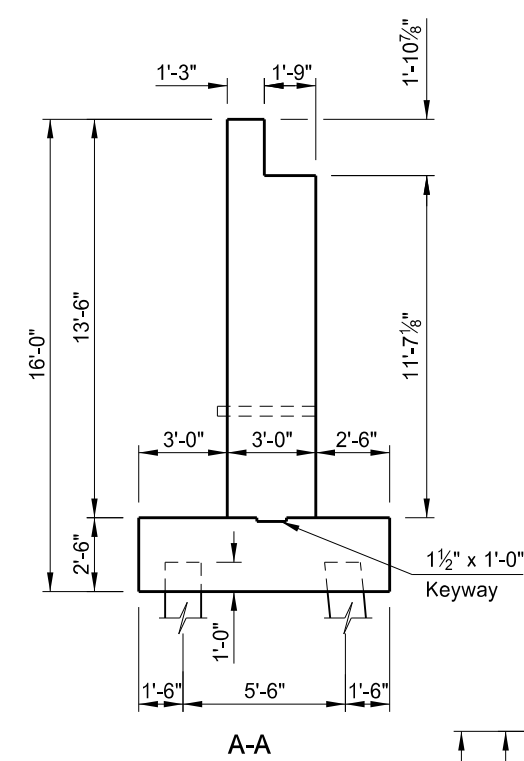
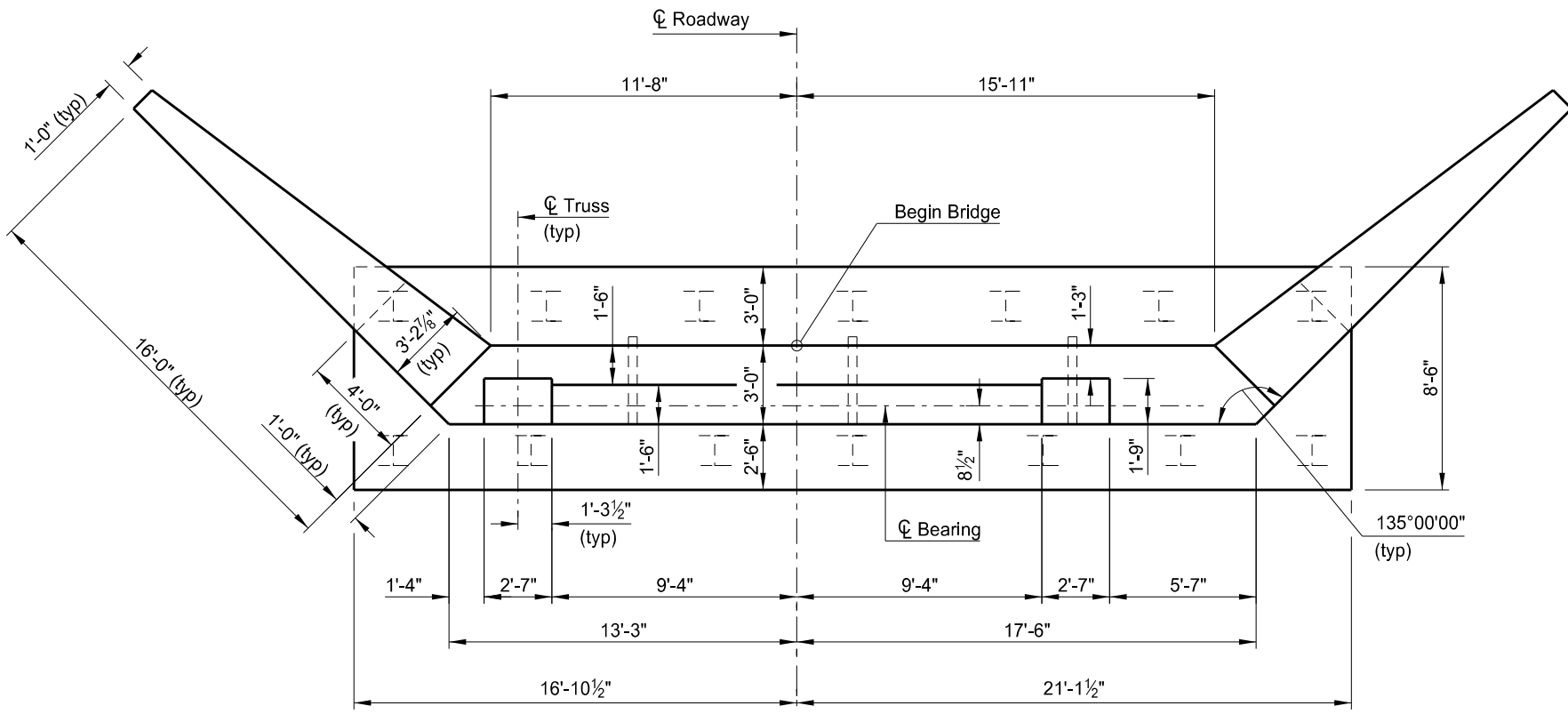
Include the cost to furnish and place the foundation fill, aggregate, PVC and geosynthetic material in the pay item "Abutment Underdrain System."

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VELVA PARK BRIDGE

ABUTMENT UNDERDRAIN, EXCAVATION DETAILS & BID ITEM QUANTITIES

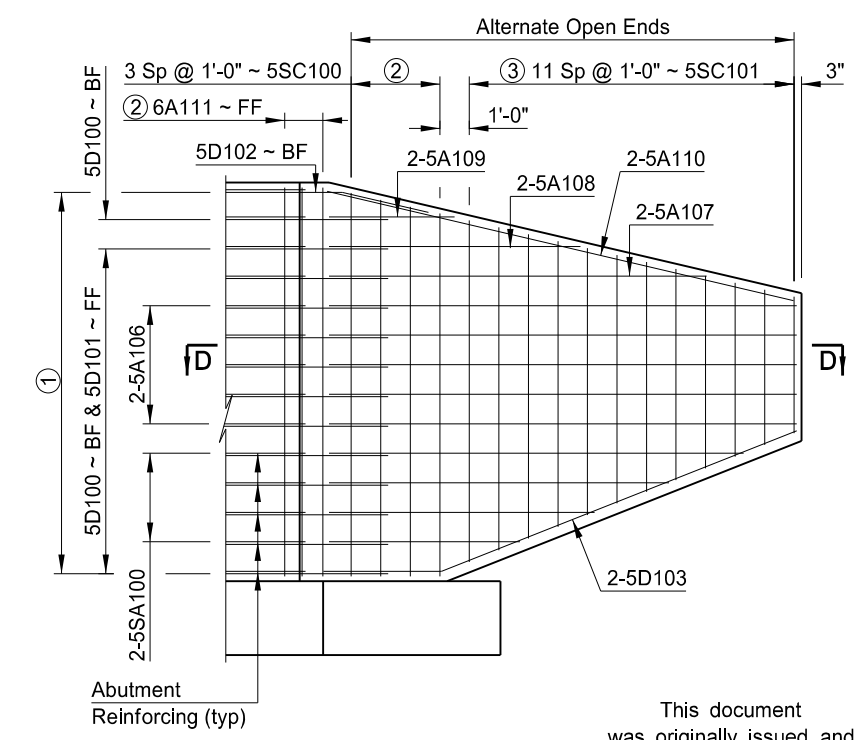
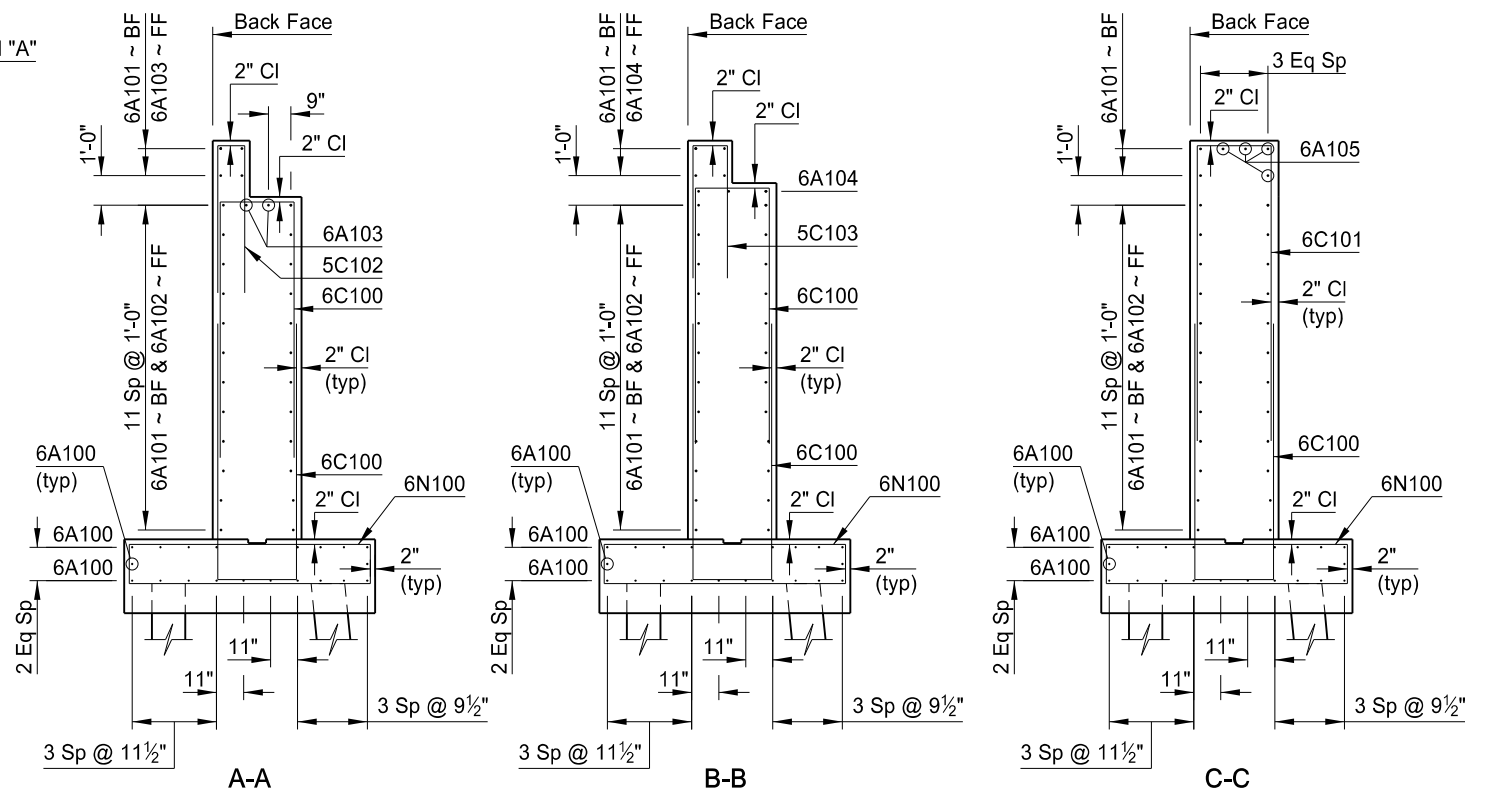
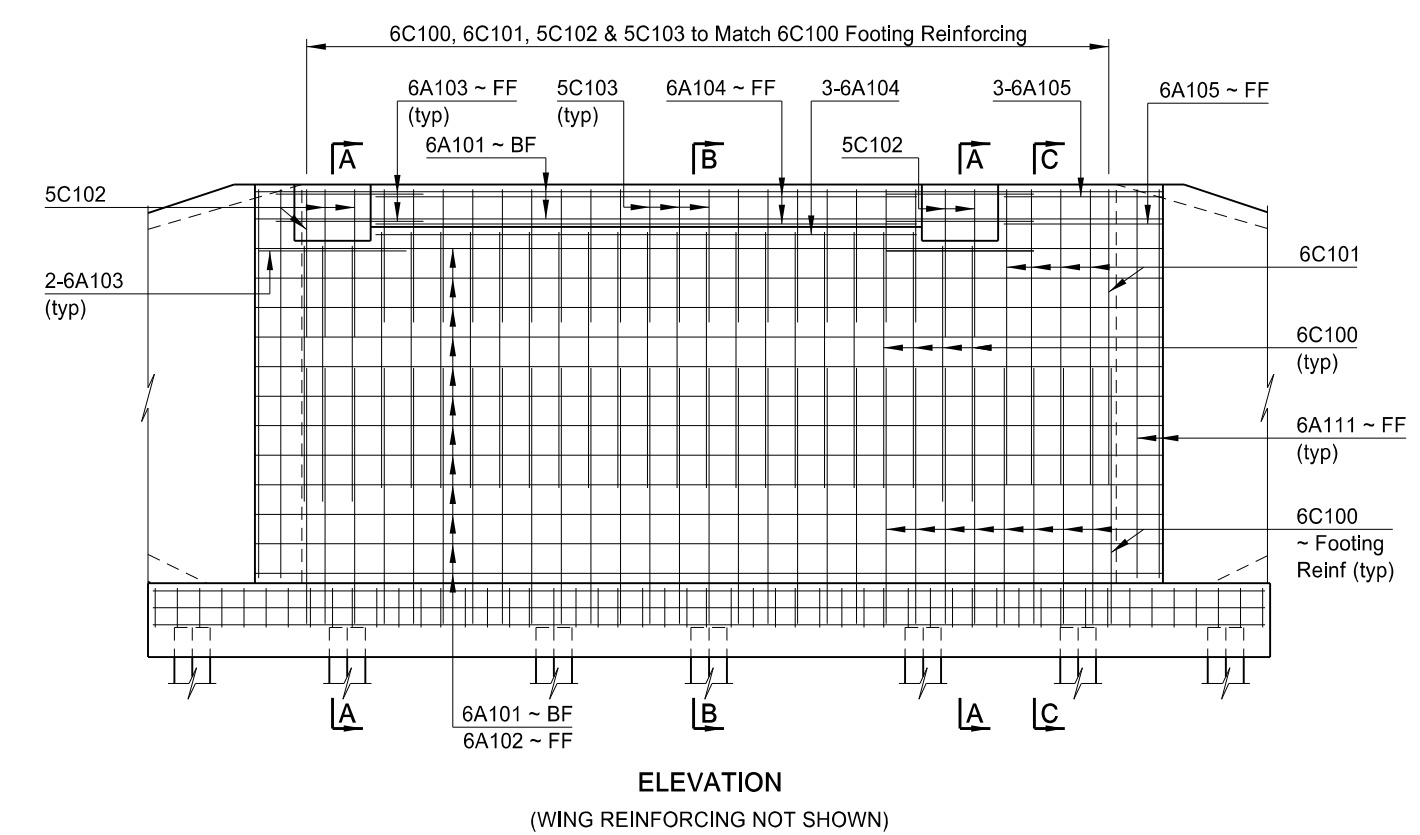
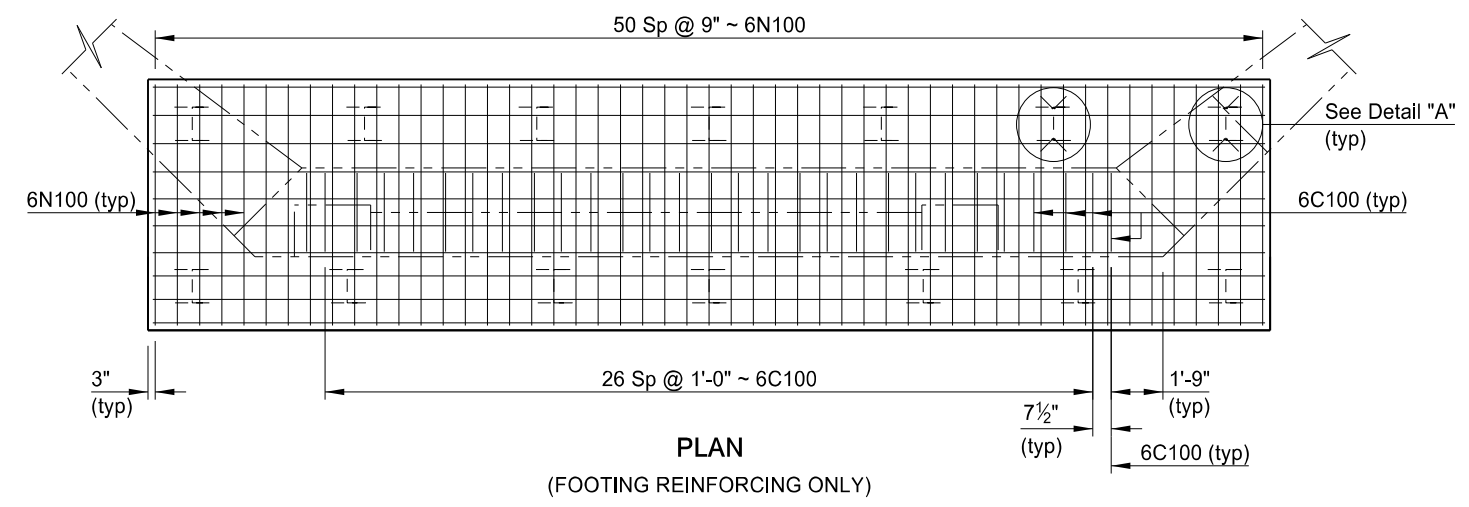
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	5



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QUANTITIES
SEE DWG 25-106-40.0-6
VELVA PARK BRIDGE
(SHOWING DIMENSIONS)
ABUTMENT 1 DETAILS

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	6

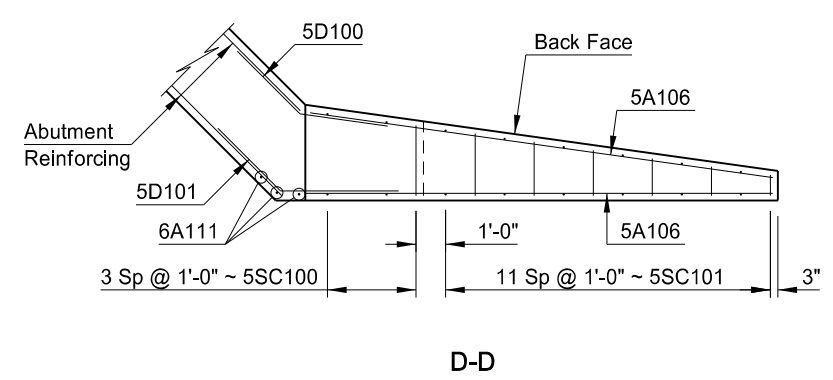
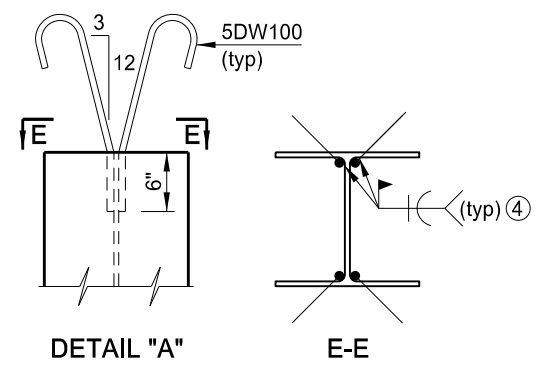


NOMENCLATURE:

BF = Back Face
FF = Front Face

NOTES:

- ① 5D100-5D103, 5SA100 & 5A106-5A110 to Match Abutment Reinforcing
- ② 2" CI ~ Bot
- ③ 4" CI ~ Bot
- ④ Include the cost of welding the 5DW100 bars to the piling in the price bid for Steel Piling HP 14 X 73

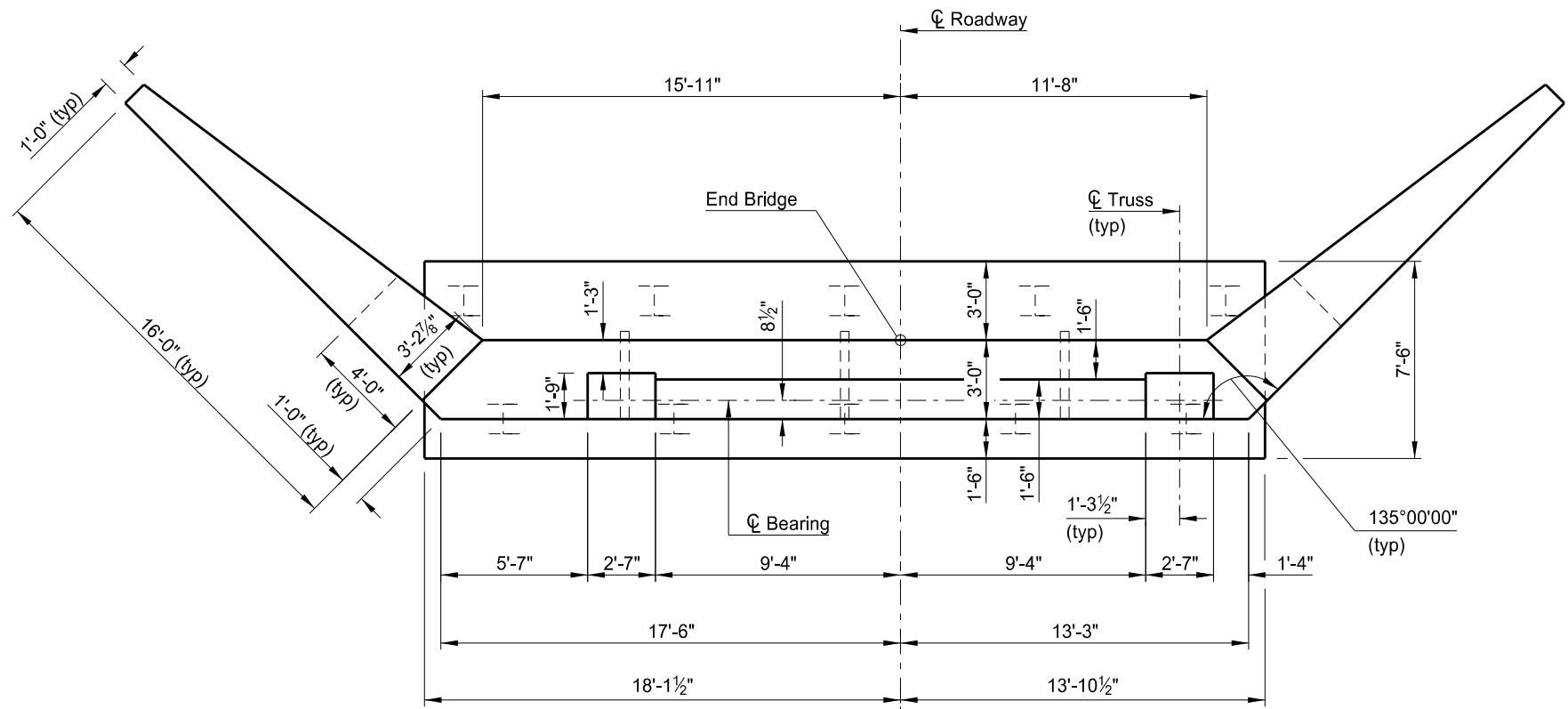


QUANTITIES	
CLASS AE-3 CONCRETE	99.9 CY
REINFORCING STEEL	8032 LBS

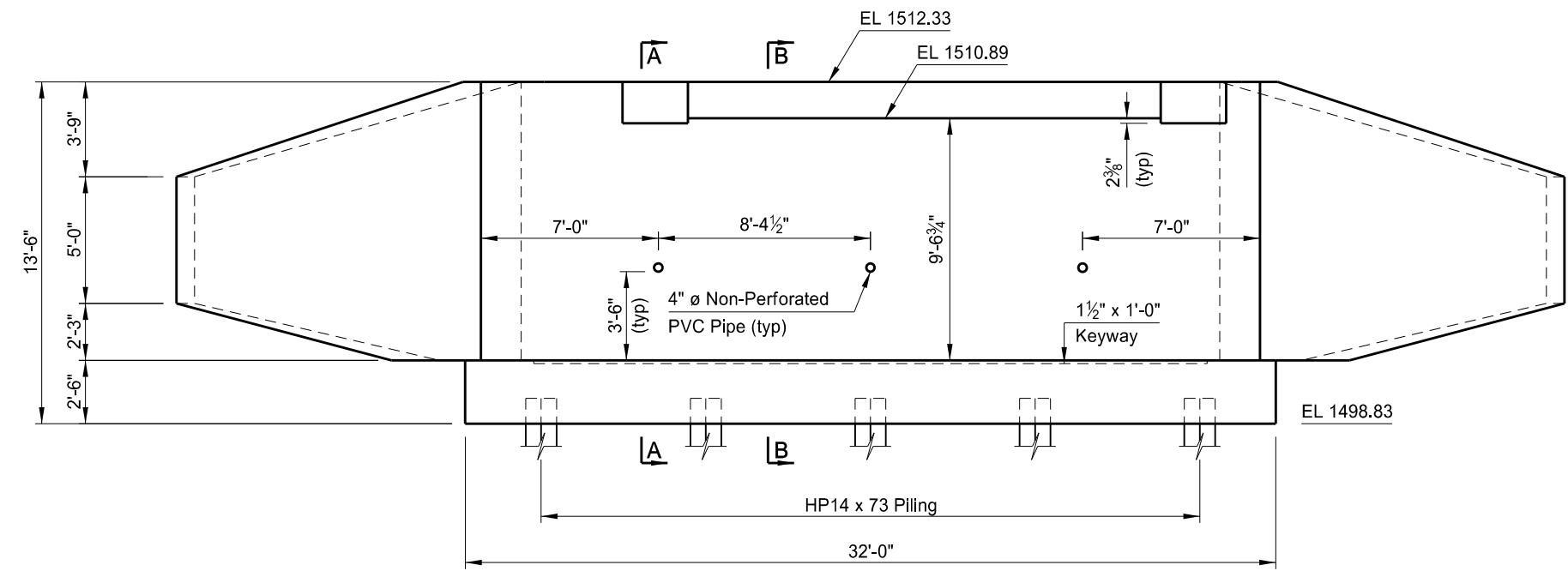
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VELVA PARK BRIDGE
(SHOWING REINFORCING)
ABUTMENT 1 DETAILS

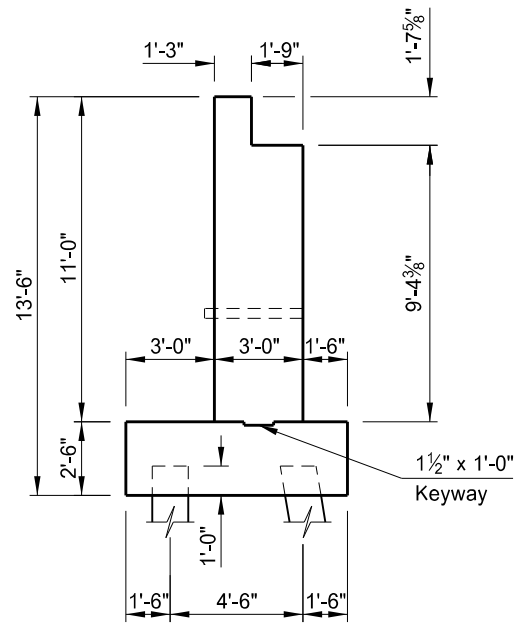
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	7



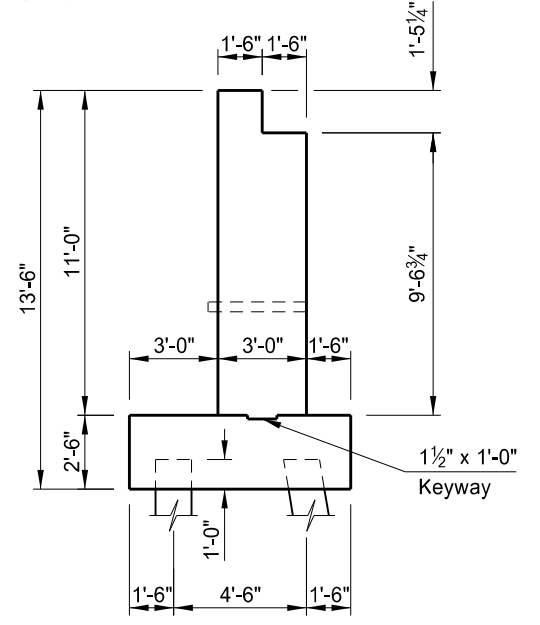
PLAN



ELEVATION



A-A

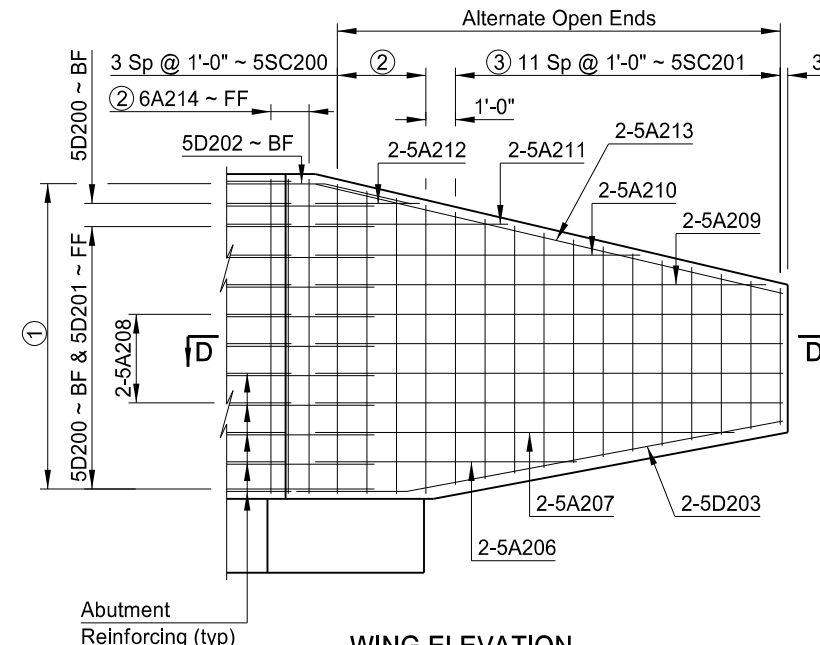
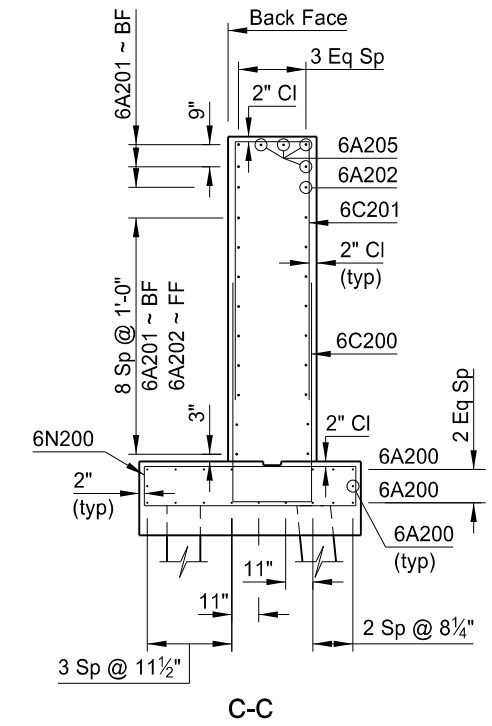
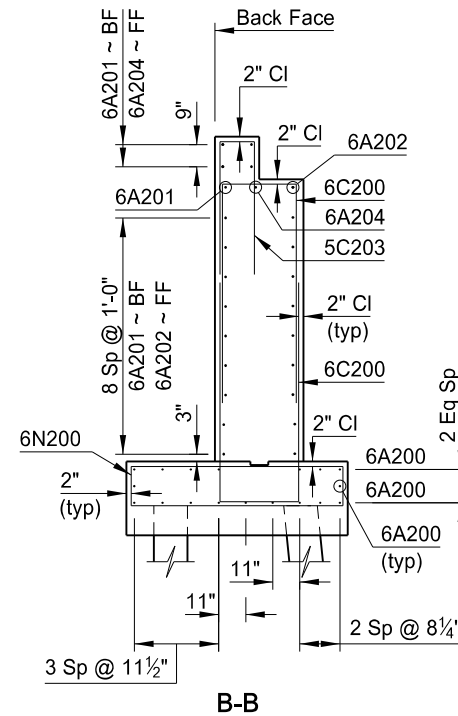
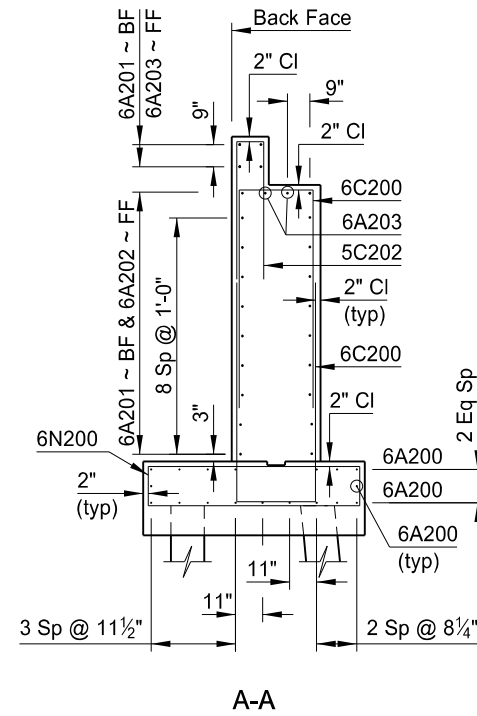
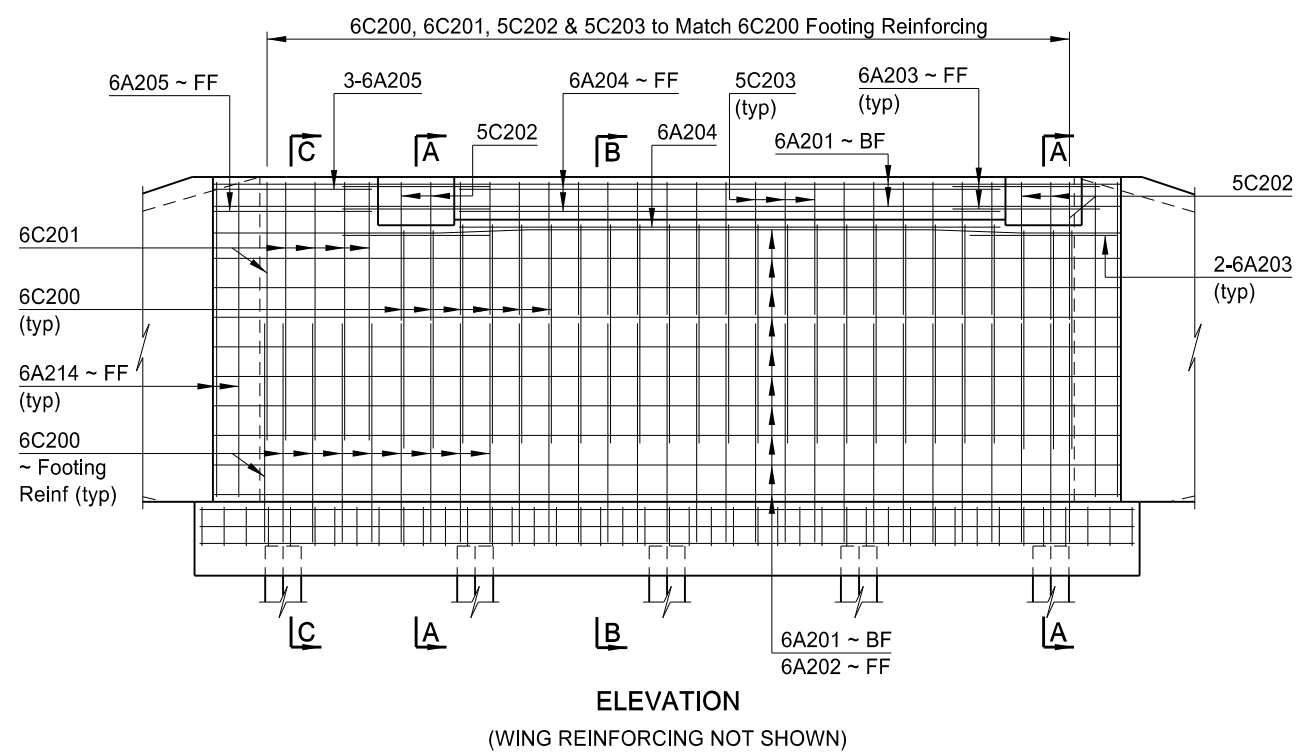
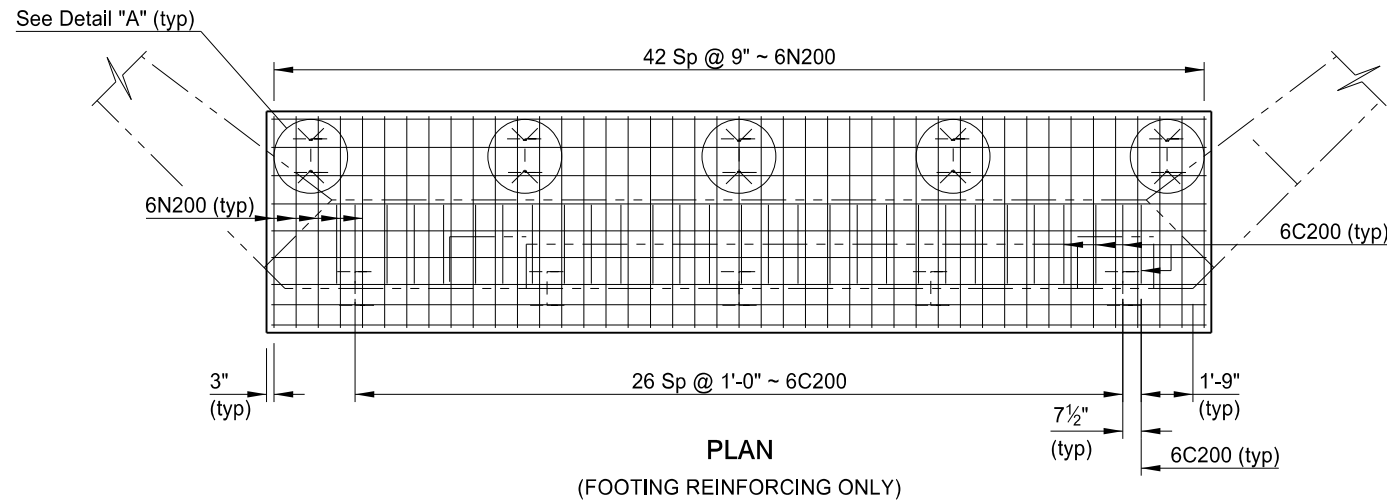


B-B

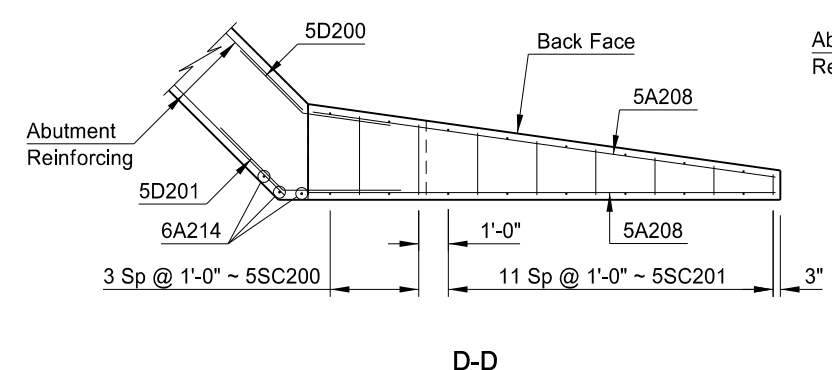
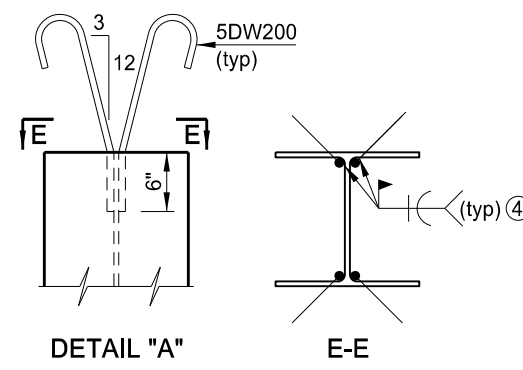
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QUANTITIES
SEE DWG 25-106-40.0-8
VELVA PARK BRIDGE
(SHOWING DIMENSIONS)
ABUTMENT 2 DETAILS

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	8



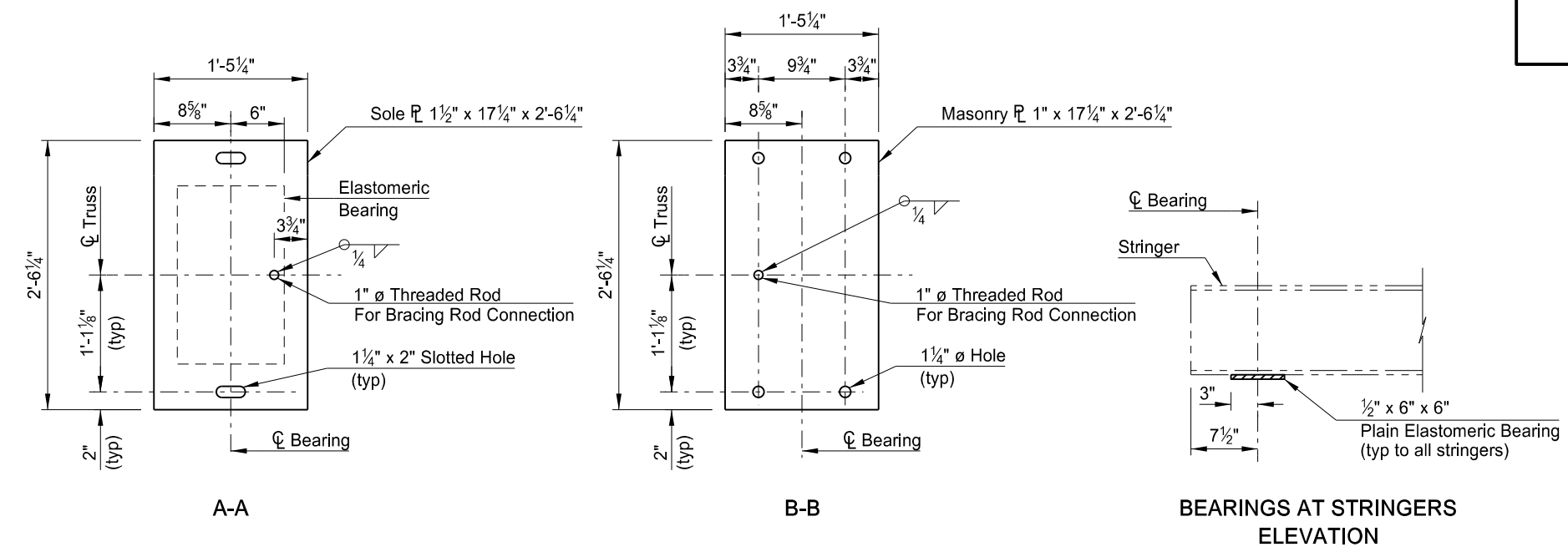
- NOMENCLATURE:**
BF = Back Face
FF = Front Face
- NOTES:**
- 5D200-5D203, 5A206-5A213 to Match Abutment Reinforcing
 - 2" CI ~ Bot
 - 4" CI ~ Bot
 - Include the cost of welding the 5DW200 bars to the piling in the price bid for Steel Piling HP 14 X 73



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QUANTITIES	
CLASS AE-3 CONCRETE	79.3 CY
REINFORCING STEEL	6681 LBS
VELVA PARK BRIDGE	
(SHOWING REINFORCING)	
ABUTMENT 2 DETAILS	

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	10



NOTES:

Bond elastomeric bearings to the bearing seat with an epoxy adhesive as approved by the bearing manufacturer for bonding elastomer to concrete.

Use bearings that meet the requirements of AASHTO LRFD Bridge Construction Specifications, 3rd Edition, with 2010-2016 Interim Revisions.

Use AASHTO M 270 Grade 36 or 50 for the bearing material. The Charpy V-Notch test requirement is waived on the structural steel used for the bearings.

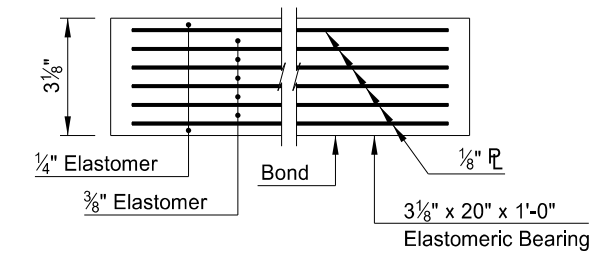
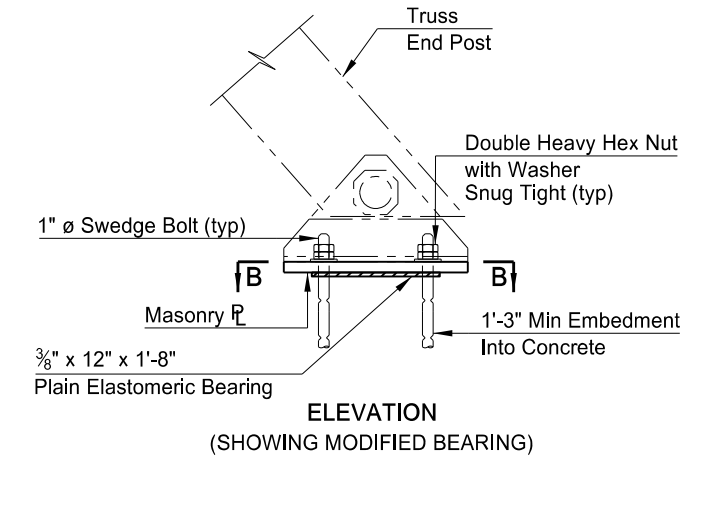
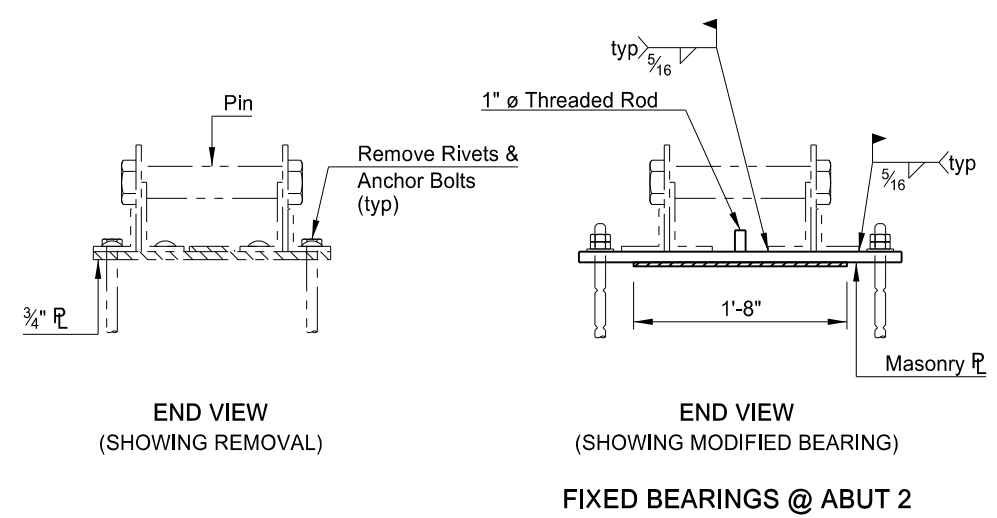
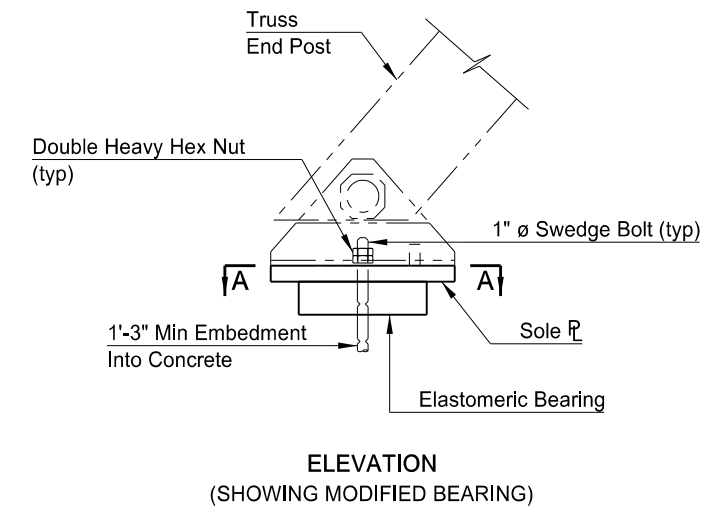
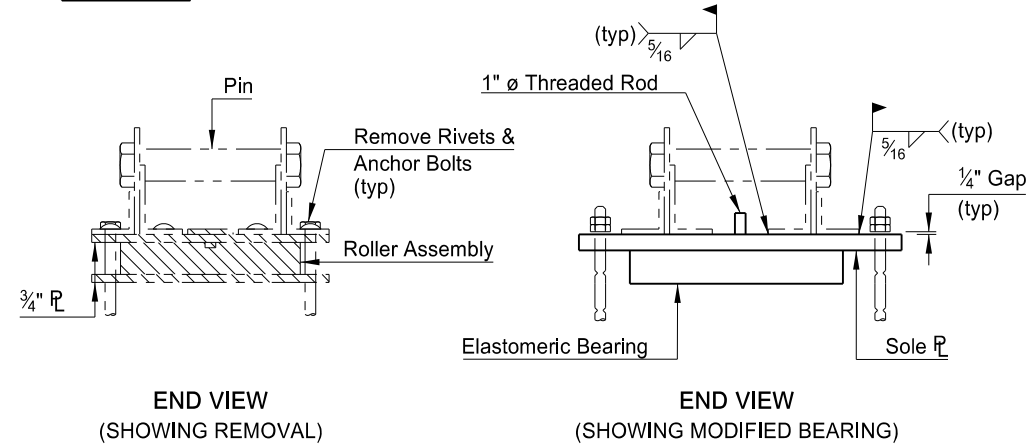
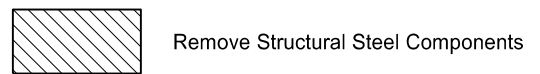
Use ASTM F1554 Grade 55 S1 for the threaded rods welded to the tops of the bearing plates.

Use swedge anchor bolts that meet ASTM A 449. Use an epoxy anchorage system that meets the requirements of Section 806.02. Submit epoxy specifications to the Engineer for approval prior to installation.

Use nuts and washers that meet Section 834.03 D & E.

Galvanize structural steel and hardware according to Section 854.01.

LEGEND:

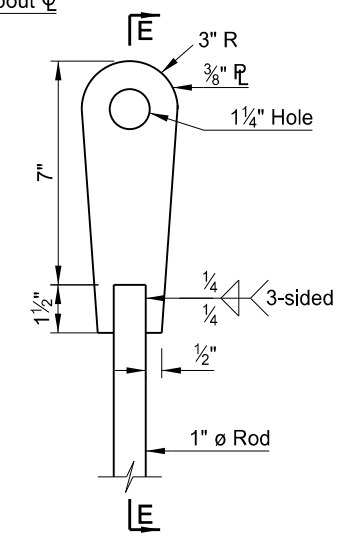
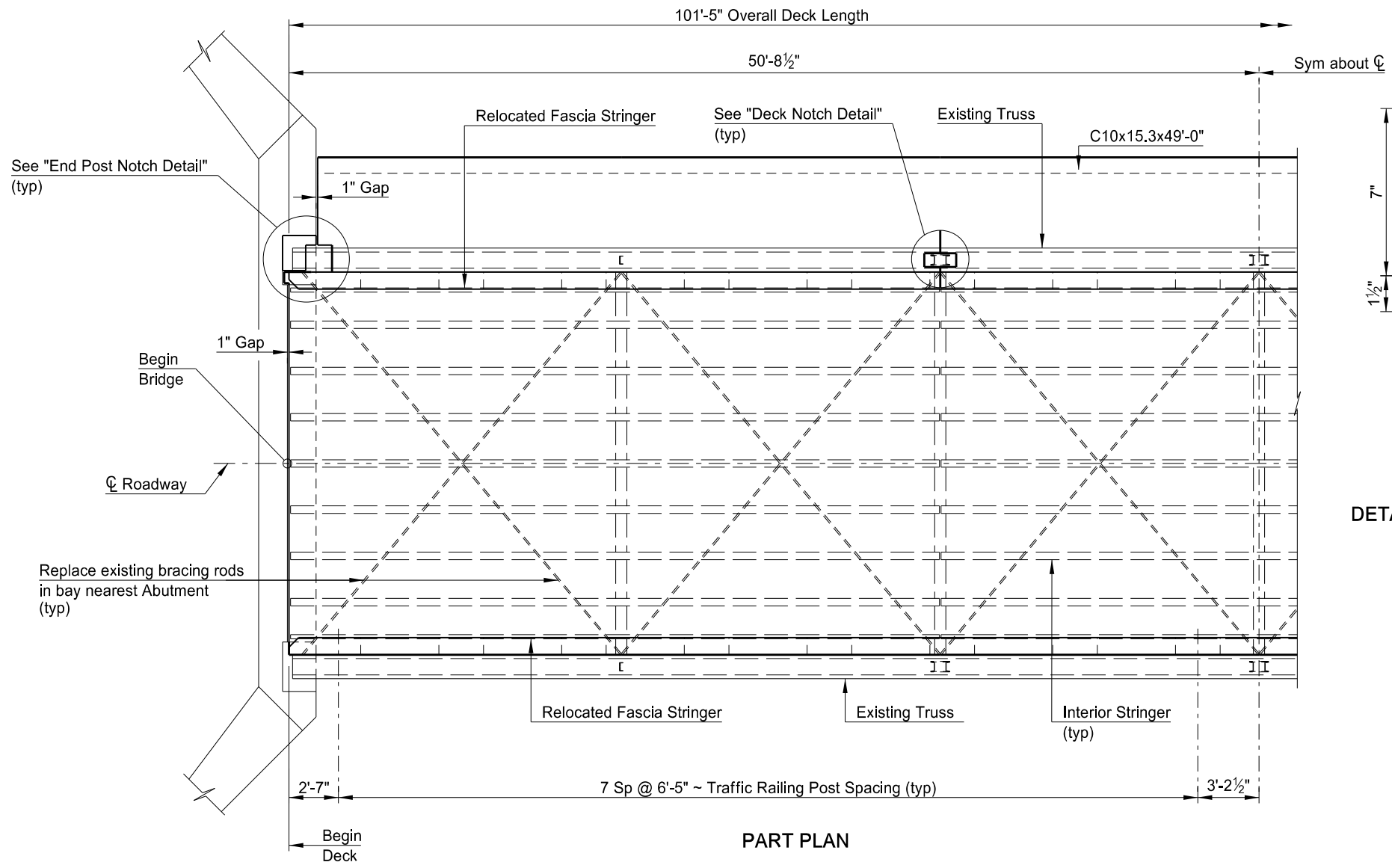


ELASTOMERIC BEARING ELEVATION @ ABUTMENT 1

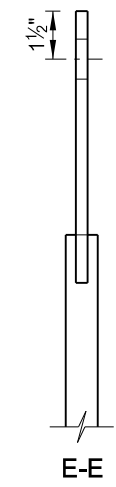
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QUANTITIES	
BEARING MODIFICATION	4 EA
VELVA PARK BRIDGE	
BEARING DETAILS	

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	11



BRACING ROD DETAIL @ ABUTMENTS



NOTES:

616 **STRUCTURAL STEEL:** Use a 3/8" Algrip Slip-Resistant Steel Floor Plate, SlipNOT Steel Floor Plate, or an approved equal. Use floor plate and angle material that meet ASTM A36. Make all concrete connections with 3/4" ø anchor bolts that meet ASTM F1554 Grade 36, washers that meet ASTM F436 and heavy hex nuts that meet ASTM A563 Grade B. Use an epoxy adhesive meeting Section 806.02. Submit epoxy specifications to the Engineer for approval prior to installation. Make all floor plate connections with countersunk flat head bolts according to the manufacturers recommendations for type, size and spacing. Field verify all dimensions prior to fabrication.

Use ASTM A 36 steel for the channel on the underside of the sidewalk cantilever.

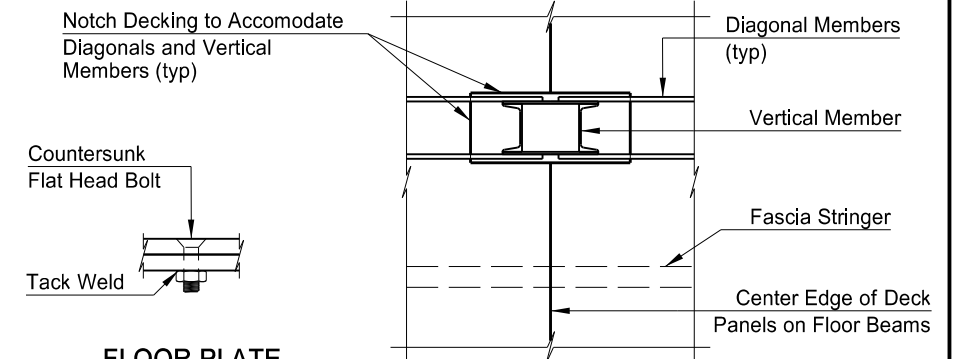
Supply 1" ø bracing rods meeting the material requirements of AASHTO M 270 Grade 36. Fabricate rod so the notched plate at the abutment end lays flat on top of the bearing plate. Thread bracing rod at the far end to match existing floor beam connection.

Galvanize all structural steel according to AASHTO M 111 and hardware according to AASHTO M 232.

Paint all structural steel according to the specifications with a metallic red-brown finish coat, color number 10076 meeting Federal Standard 595B.

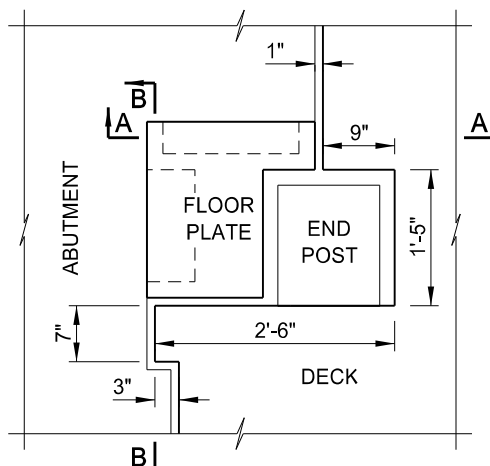
Include all costs associated with the floor plates, channel, bracing rod replacement and fascia beam relocation in the price bid for "Structural Steel".

618 **GLULAM DECK PANELS:** Meet the requirements of Special Provision 517(14) Glued Laminated Deck Panels.

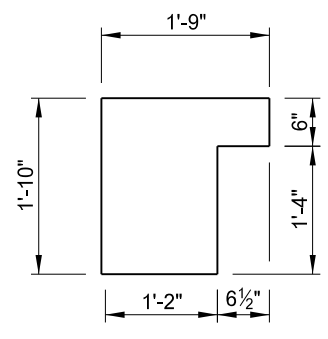


FLOOR PLATE CONNECTION DETAIL

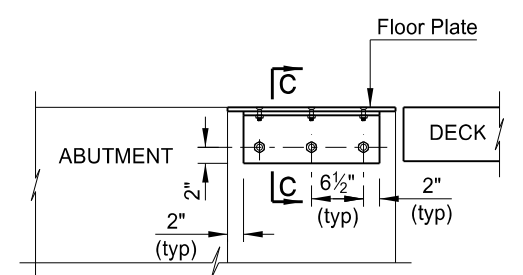
DECK NOTCH DETAIL



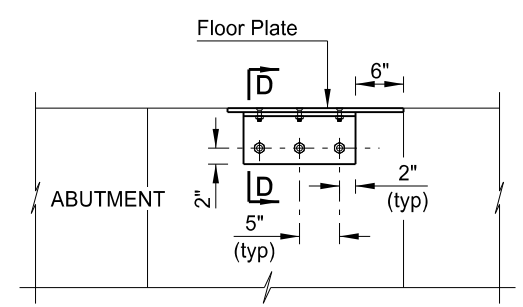
END POST NOTCH DETAIL



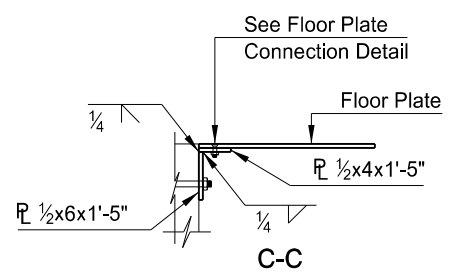
FLOOR PLATE DETAIL



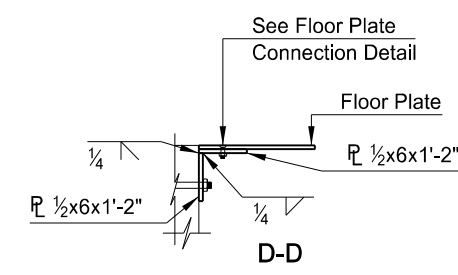
A-A



B-B



C-C



D-D

FLOOR PLATE CONNECTION DETAIL

DECK NOTCH DETAIL

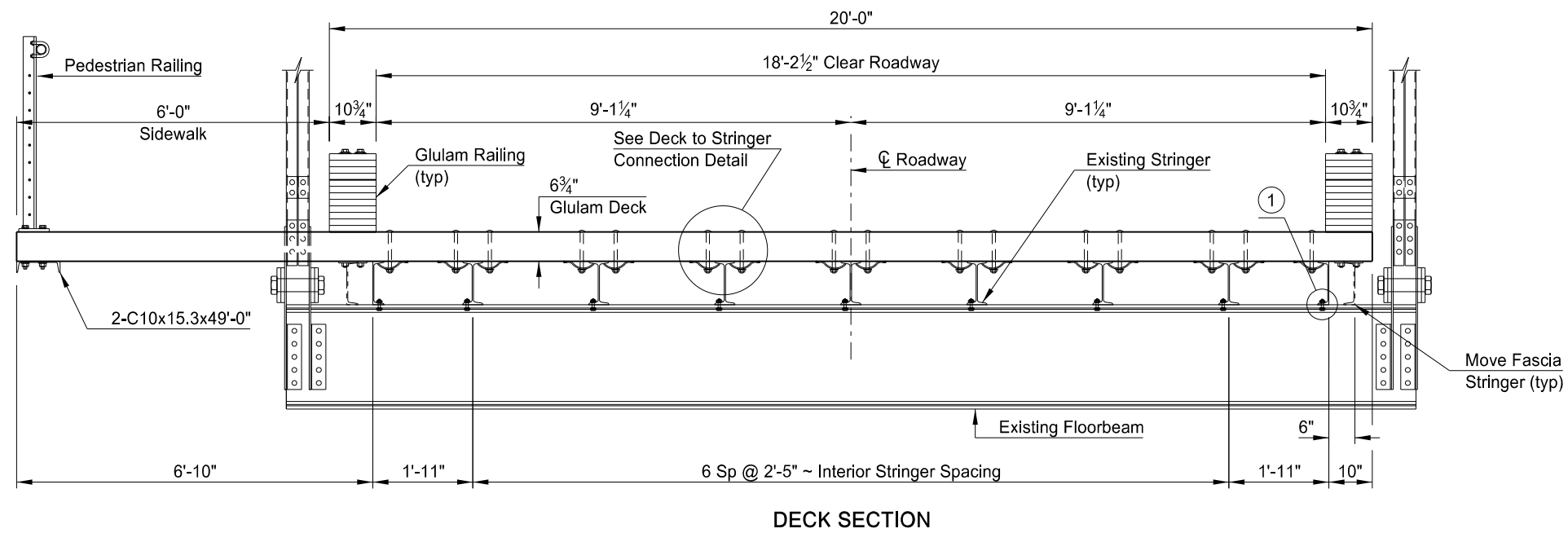
QUANTITIES

SEE DWG 25-106-40.0-12

VELVA PARK BRIDGE

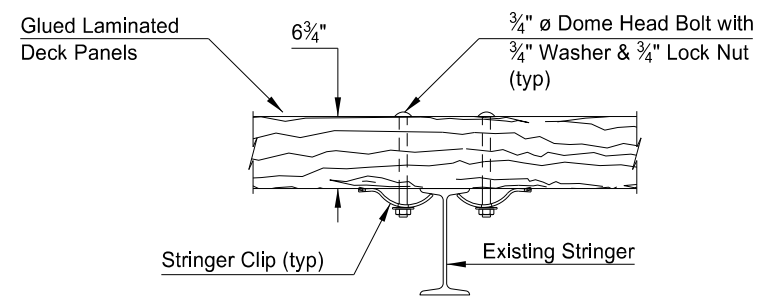
DECK LAYOUT

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	12

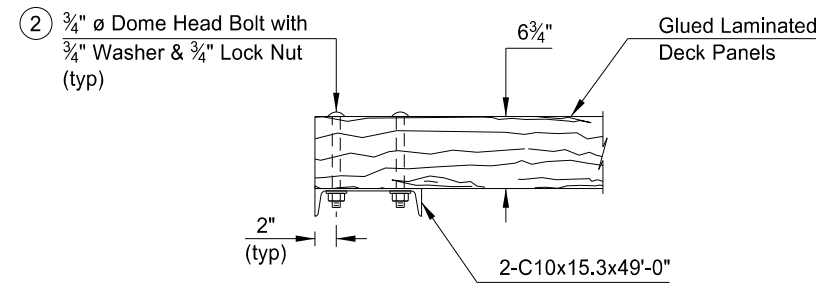


NOTES:

- ① Field drill holes in existing floorbeam for connection of relocated fascia stringers. Use a hole ϕ $\frac{1}{16}$ " greater than the existing bolt diameter.
- ② Fasten deck to channel @ 1'-6" maximum spacing along the longitudinal axis of the bridge. Start bolts within 6" of channel ends.



DECK TO STRINGER CONNECTION DETAIL



DECK TO CHANNEL CONNECTION DETAIL

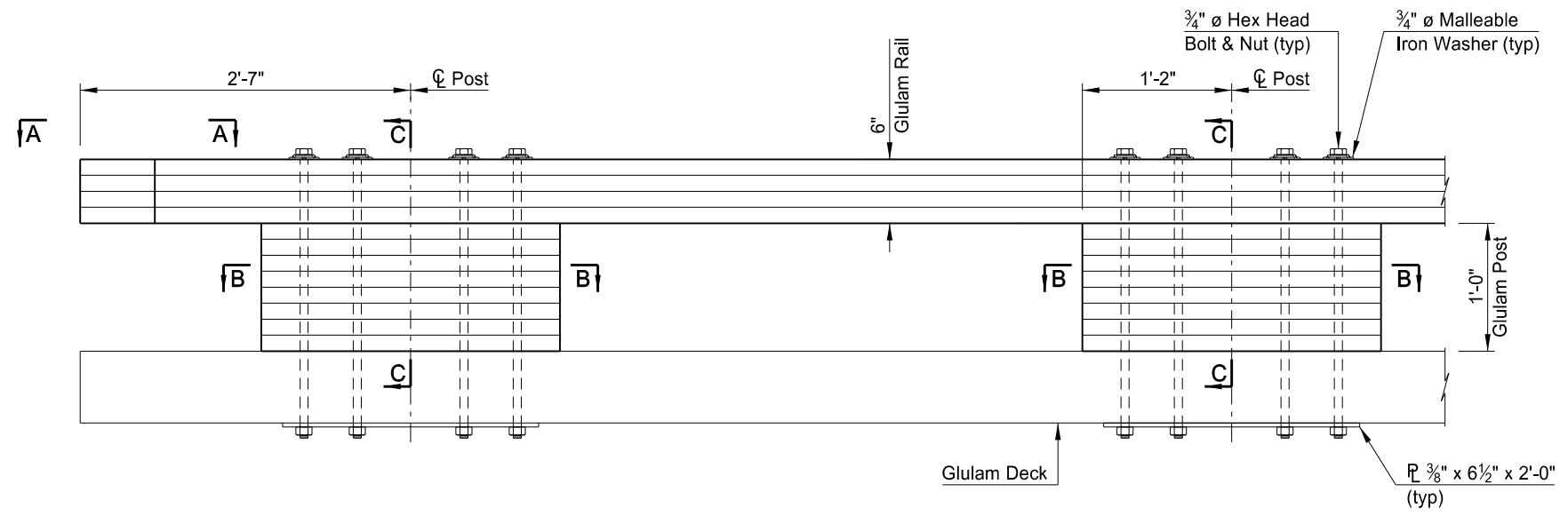
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QUANTITIES	
GLULAM DECK PANELS	290.7 SY
STRUCTURAL STEEL	1 L SUM

VELVA PARK BRIDGE

DECK SECTION

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	13



PART RAILING ELEVATION

NOTES:

See Dwg 25-106-40.0-10 for post spacing.

Contractor to determine number and location of rail splices.

Use timber that meets the requirements of Special Provision 517(14) unless otherwise noted. Use new Douglas Fir Larch No. 1 grade timber.

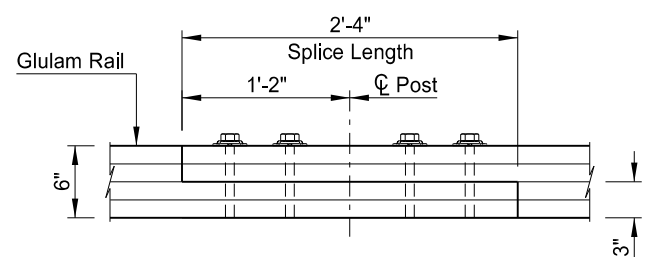
Use the preservative treatment process as specified in Special Provision 517(14).

Use anchor plates that meet ASTM A 36.

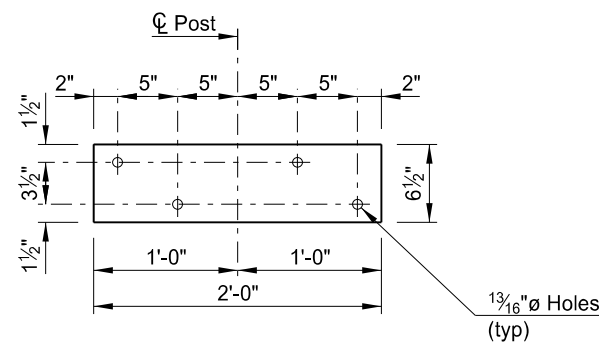
Use bolts that meet ASTM F 3125 Grade A 325 or ASTM A 449. Use malleable iron washers that meet ASTM A 47 and heavy hex nuts that meet ASTM A 563.

Galvanize structural steel and hardware according to Section 854.01.

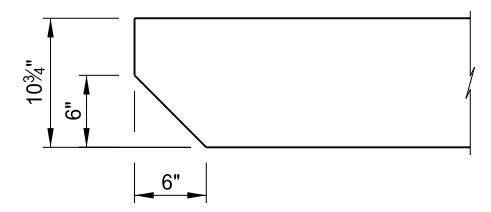
Include all costs associated with the fabrication and installation of the railing in the lump sum bid item "Treated Timber Structure".



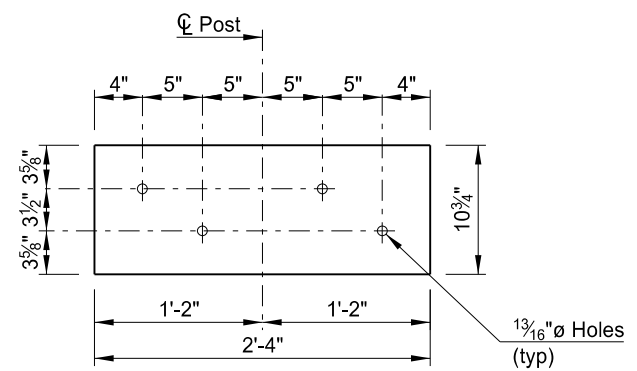
PART RAIL ELEVATION (SHOWING RAIL SPLICE)



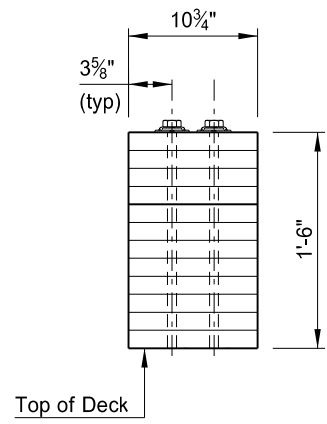
ANCHOR PLATE PLAN



A-A (SHOWING BEVEL AT RAIL ENDS)



B-B

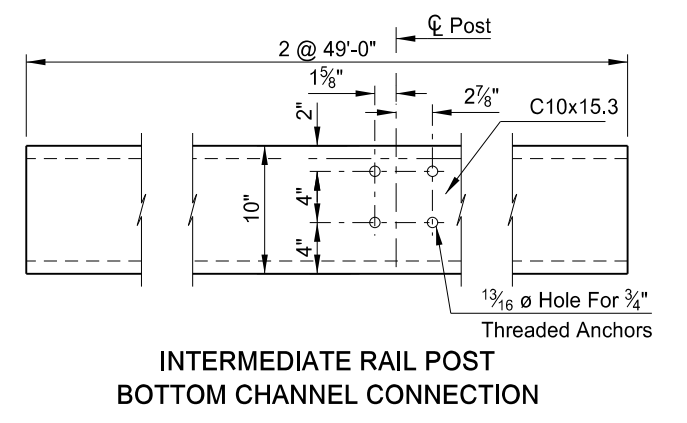
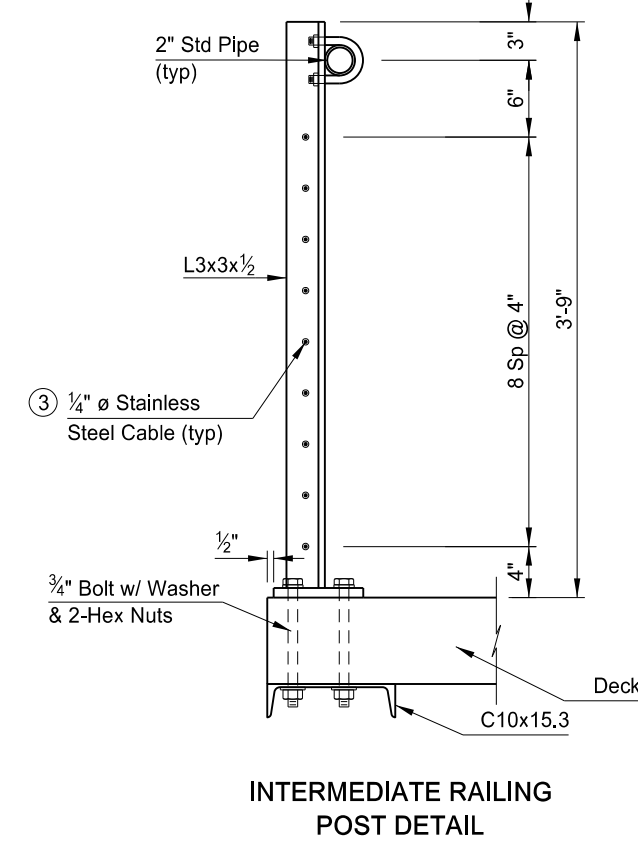
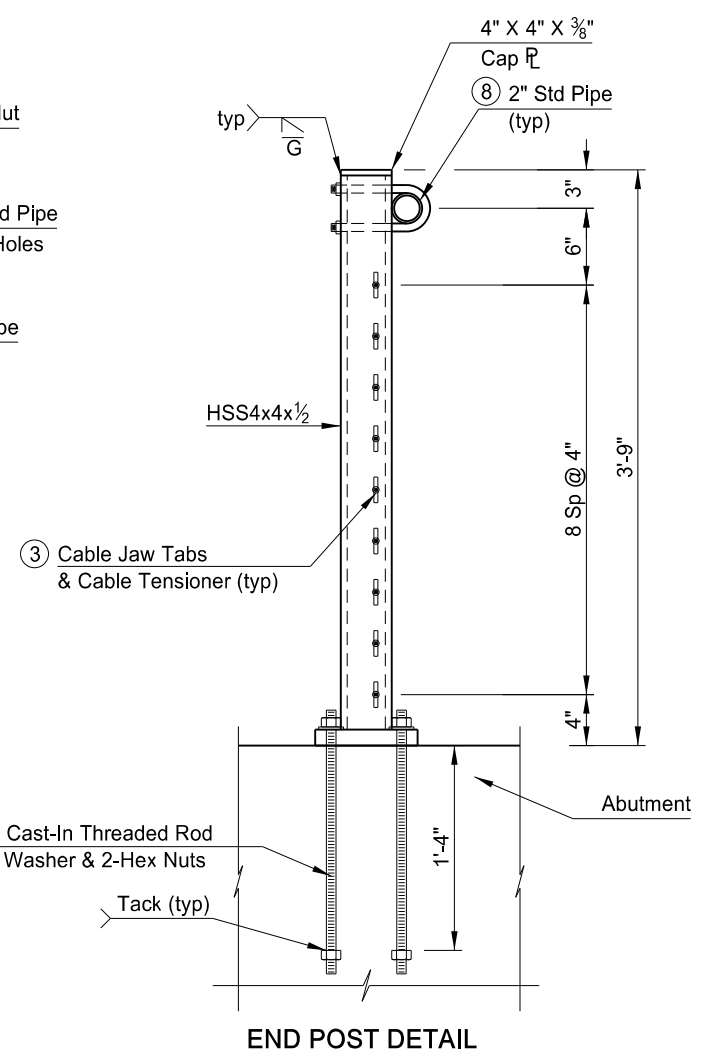
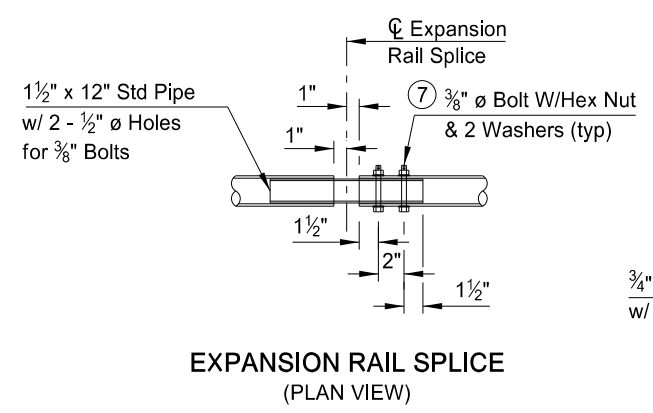
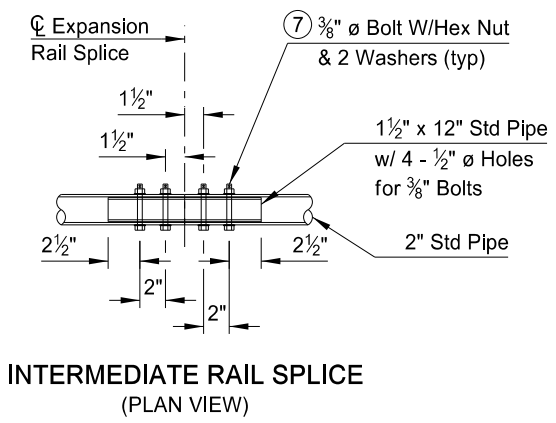
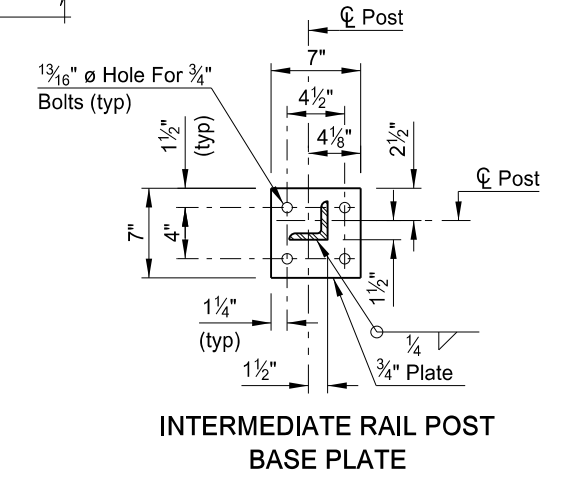
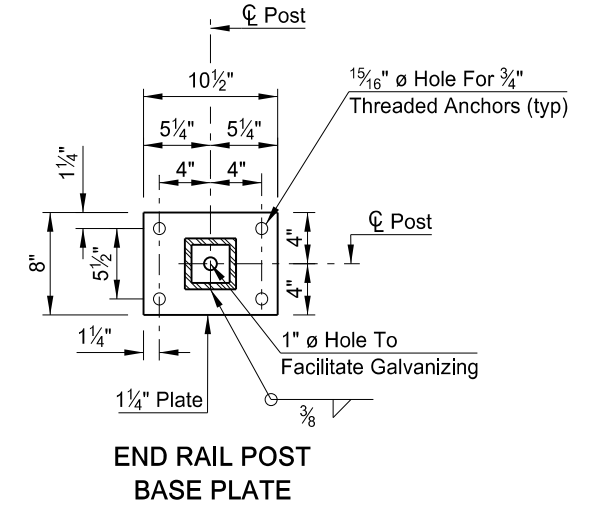
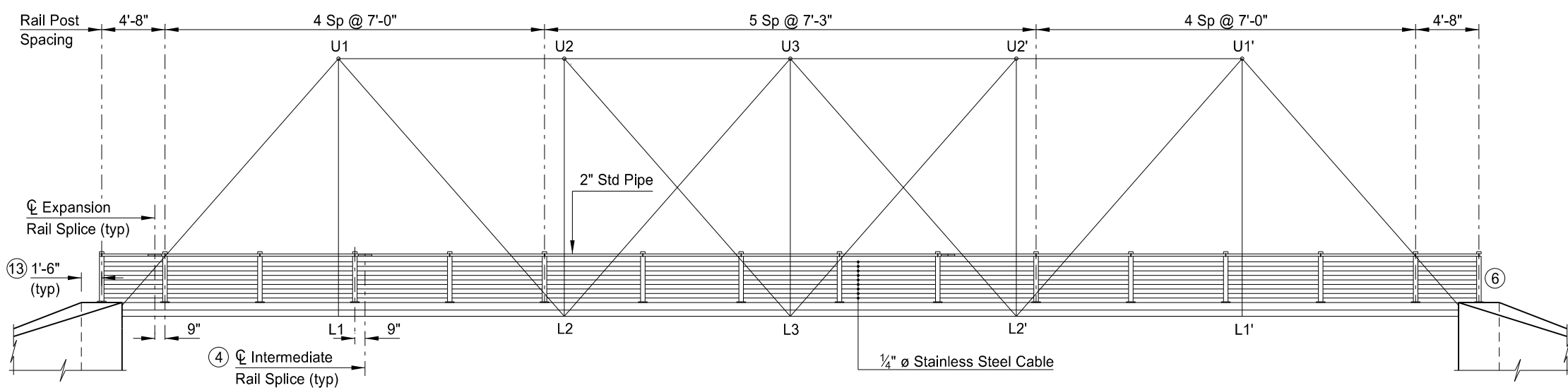


C-C

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QUANTITIES	
TREATED TIMBER STRUCTURE	1 L SUM
VELVA PARK BRIDGE	
RAILING DETAILS	

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0025(012)	170	14



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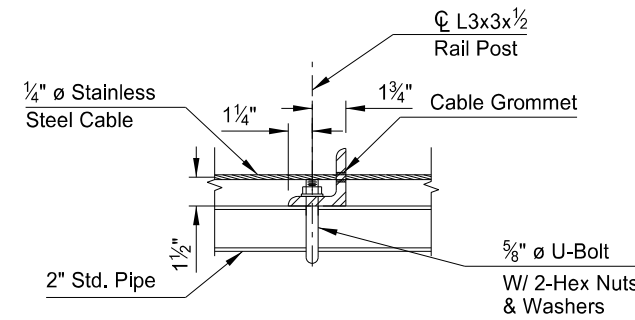
QUANTITIES
SEE DWG 25-106-40.0-15
VELVA PARK BRIDGE
PEDESTRIAN RAILING DETAILS

NOTES

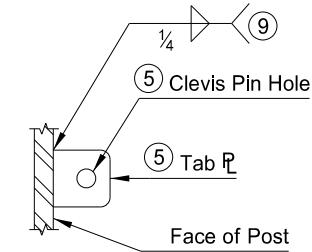
1. Galvanize rail posts and pipe railing after fabrication per NDDOT 854. Galvanize all non-stainless steel hardware per NDDOT 854
2. Rail shall be continuous over a minimum of two posts. Do not shop splice rails
- ③ Provide 1x19 stainless steel wire complying with ASTM A492, Type 316 with mill finish. Fabricate wire rope fittings from stainless steel Type 316 with the capability to sustain, without failure, a load equal to the minimum breaking strength of the wire rope with which they are used. All fittings shall be tamper resistant.

Provide UV-resistant, HDPE, wire rope grommets at all posts in which the cables pass through to prevent abrasion. Double bushings may be substituted in lieu of grommets provided they are bonded to the rail posts with an approved epoxy adhesive.
- Install and tension 1/4" stainless steel cable to the values shown in the table based on ambient temperature at time of installation in accordance with cable fitting manufacturers recommendations. Tension cables from the bottom row up. Do not tension a cable row until the row below has been fully tensioned.
- ④ Number and location of rail splices shall be determined by the contractor. Rail splices may be located on either side of the rail posts. No more than one splice per side of post.
- ⑤ Coordinate size of cable jaw tab plate and clevis pin hole with cable manufacturer. Plate shall have a minimum thickness of 5/16".
- ⑥ One turnbuckle per cable row may be used, at the contractor's option, to aid in cable tensioning.
- ⑦ Locate nut side of bolt toward bridge exterior
- ⑧ Cap open pipe ends with 3/8" x 2 1/8" ø plate welded to the pipe
- ⑨ A CJP groove weld may be substituted for the fillet weld at the contractor's option
10. Anchorage Plates will comply with NDDOT 834.01 "High Strength, Low Alloy Steel". HSS End Rail Post shall comply with ASTM A500 Grade C (50ksi). Pipe Rail shall meet ASTM A53 Grade B. All steel elements shall be galvanized after fabrication according to Section 854 of Standard Specifications. Anchor Bolts shall be galvanized and shall be ASTM F1554, Grade 105.

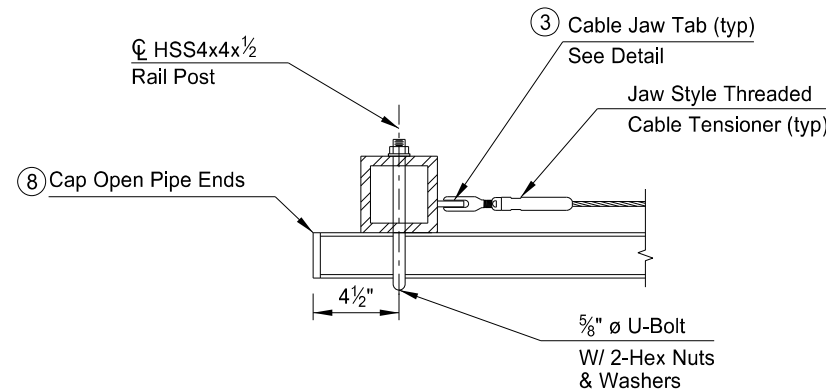
Ensure threaded rods, bolts, U-bolts, nuts, and washers meet NDDOT 834.02. Material references to ASTM A325 should be replaced with ASTM F3125, Grade A325.
11. The length of the "PEDESTRIAN RAILING" for payment shall be measured out to out of the rail anchor posts on the abutment. Include all costs associated with supplying and installing the miscellaneous hardware for the railing in the unit price bid for "PEDESTRIAN RAILING".
12. Paint all structural steel according to SP 524(14). Use metallic red-brown finish coat, color number 10076 meeting Federal Standard 595B.
- ⑬ Install end rail post base plates so that the center-of-post for the end posts are in line with the center-of-post for the intermediate rail post.



INTERMEDIATE POST DETAIL



CABLE JAW TAB DETAIL



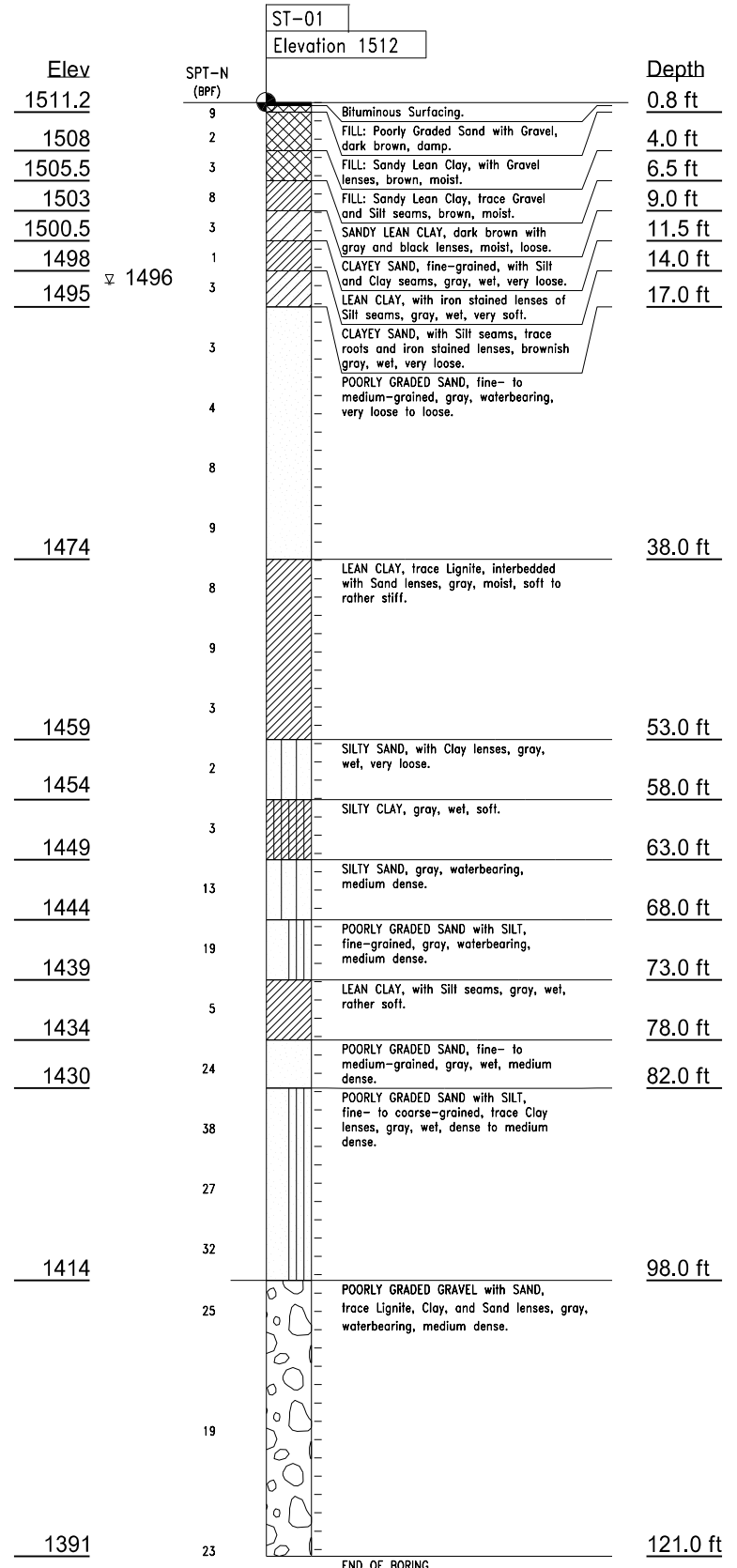
END POST DETAIL

1/4" ø STAINLESS STEEL CABLE TENSION REQUIREMENTS ③	
Ambient Temperature (°F)	Bridge Railing Pre-tension Force (Lbs.)
30	816
45	730
60	644
75	557
90	471

QUANTITIES	
PEDESTRIAN RAILING	102 LF
VELVA PARK BRIDGE	
PEDESTRIAN RAILING DETAILS	

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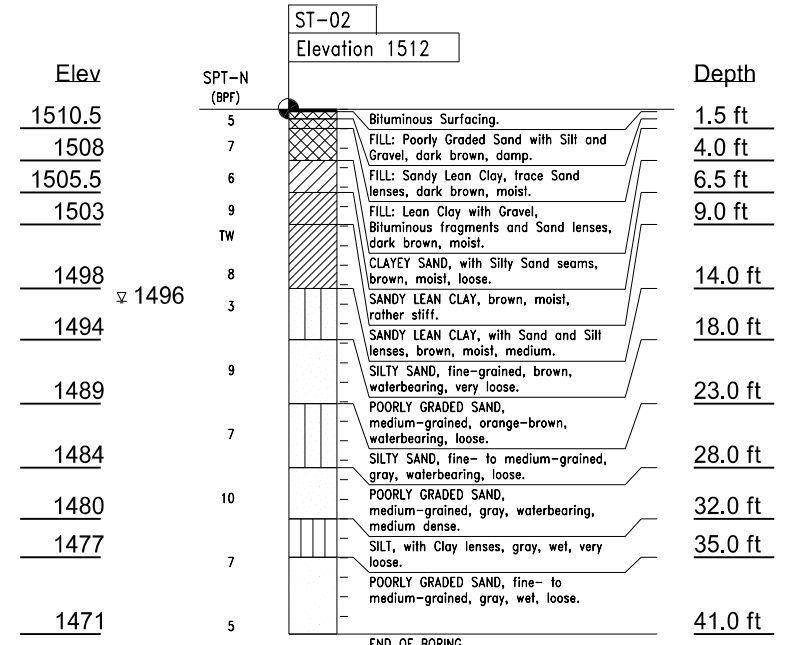
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0025(012)	175	1



Water observed at a depth of 16 feet with 14 1/2 feet of hollow-stem auger in the ground.

Water level not determined at termination due to use of mud rotary drilling fluids.

Boring then backfilled.



END OF BORING.

Water observed at a depth of 16 feet with 14 1/2 feet of hollow-stem auger in the ground.

Water observed at a depth of 20 feet with a cave-in depth of 22 1/2 feet immediately after withdrawal of auger.

Boring then backfilled.

Bottom of Borehole at 41 ft

The boring data shown is for the owner's design and estimating purposes only. The boring logs are only representative of the exact location from which the samples were taken. The owner assumes no responsibility if the soil conditions encountered during construction differ from those shown.

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BORING LOG
Velva Park Bridge

NDDOT ABBREVIATIONS

? This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.

Abn abandoned
 Abut abutment
 Ac acres
 Adj adjusted
 Aggr aggregate
 Ahd ahead
 ARV air release valve
 Align alignment
 Al alley
 Alt alternate
 Alum aluminum
 ADA Americans with Disabilities Act
 A ampere
 & and
 Appr approach
 Approx approximate
 ACP asbestos cement pipe
 Asph asphalt
 AC asphalt cement
 Assmd assumed
 @ at
 Atten attenuation
 ATR automatic traffic recorder
 Ave Avenue
 Avg average
 ADT average daily traffic
 Az azimuth
 Bk back
 BF back face
 Bs backsight
 Balc balcony
 B Wire barbed wire
 Barr barricade
 Btry battery
 Brg bearing
 BI beehive inlet
 Beg begin
 BM bench mark
 Bkwy bikeway
 Bit bituminous
 Blk block
 Bd Ft board feet
 BH bore hole
 BS both sides
 Bot bottom
 Blvd Boulevard
 Bndry boundary
 BC brass cap
 Brkwy breakaway
 Br bridge
 Bldg building

BV butterfly valve
 Byp bypass
 C Gdrl cable guardrail
 Calc calculate
 Cd candela
 CIP cast iron pipe
 CB catch basin
 CRS cationic rapid setting
 C Gd cattle guard
 C To C center to center
 Cl or C centerline
 Cm centimeter
 Ch chain
 Chnlk chain-link
 Ch Blk channel block
 Ch Ch channel change
 Chk check
 Chsld chiseled
 Cir circle
 Cl class
 Cl clay
 Cl F clay fill
 Cl Hvy clay heavy
 Cl Lm clay loam
 Clnt clean-out
 Clr clear
 Cl&gr clearing & grubbing
 Co S coal slack
 Comb. combination
 Coml commercial
 Compr compression
 CADD computer aided drafting & design
 Conc concrete
 Cond conductor
 Const construction
 Cont continuous
 CSB continuous split barrel sample
 Contr contraction
 Contr contractor
 CP control point
 Coord coordinate
 Cor corner
 Corr corrected
 CAES corrugated aluminum end section
 CAP corrugated aluminum pipe
 CMES corrugated metal end section
 CMP corrugated metal pipe
 CPVCP corrugated poly-vinyl chloride pipe
 CSES corrugated steel end section
 CSP corrugated steel pipe
 C coulomb
 Co County
 Crse course
 C Gr course gravel
 CS course sand

Ct Court
 Xarm cross arm
 Xbuck cross buck
 Xsec cross sections
 Xing crossing
 Xrd Crossroad
 Crn crown
 CF cubic feet
 M3 cubic meter
 M3/s cubic meters per second
 CY cubic yard
 Cy/mi cubic yards per mile
 Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 CS curve to spiral
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 Deg or D degree
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia diameter
 Dir direction
 Dist distance
 DM disturbed material
 DB ditch block
 DG ditch grade
 Dbl double
 Dn down
 Dwg drawing
 Dr drive
 Drwy driveway
 DI drop inlet
 D dry density
 Ea each
 Esmt easement
 E East
 EB Eastbound
 Elast elastomeric
 EL electric locker
 E Mtr electric meter
 Elec electric/al
 EDM electronic distance meter
 Elev or El elevation
 Ellipt elliptical
 Emb embankment
 Emuls emulsion/emulsified

ES end section
 Engr engineer
 ESS environmental sensor station
 Eq equal
 Eq equation
 Evgr evergreen
 Exc excavation
 Exst existing
 Exp expansion
 Expy Expressway
 E external of curve
 Extru extruded
 FOS factor of safety
 F Fahrenheit
 FS far side
 F farad
 Fed Federal
 FP feed point
 Ft feet/foot
 Fn fence
 Fn P fence post
 FO fiber optic
 FB field book
 FD field drive
 F fill
 FAA fine aggregate angularity
 FS fine sand
 FH fire hydrant
 Fl flange
 Flrd flared
 FES flared end section
 F Bcn flashing beacon
 FA flight auger sample
 FL flow line
 Ftg footing
 FM force main
 Fs foresight
 Fnd found
 Fdn foundation
 Frac fractional
 Frwy freeway
 Frt front
 FF front face
 F Disp fuel dispenser

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes	IPn	Iron Pin	MC	medium curing	Ped	pedestal
FLS	fuel leak sensor	IP	iron Pipe	M	mega	Ped	pedestrian
Furn	furnish/ed	Jt	joint	Mer	meridian	PPP	pedestrian pushbutton post
Gal	gallon	J	joule	M	meter	Pen.	penetration
Galv	galvanized	Jct	junction	M/s	meters per second	Perf	perforated
Gar	garage	K	kelvin	M	mid ordinate of curve	Per.	perimeter
Gs L	gas line	Kn	kilo newton	Mi	mile	PL	pipeline
G Reg	gas line regulator	Kpa	kilo pascal	MM	mile marker	PI	place
GMV	gas main valve	Kg	kilogram	MP	mile post	P&P	plan & profile
G Mtr	gas meter	Kg/m3	kilogram per cubic meter	MI	milliliter	PL	plastic limit
GSV	gas service valve	Km	kilometer	Mm	millimeter	PI	plate
GVP	gas vent pipe	K	Kip(s)	Mm/hr	millimeters per hour	Pt	point
GV	gate valve	LS	Land Surveyor (licensed)	Min	minimum	PCC	point of compound curve
Ga	gauge	LSIT	Land Surveyor In Training	Misc	miscellaneous	PC	point of curve
Geod	geodetic	Ln	lane	Mon	monument	PI	point of intersection
GIS	Geographical Information System	Lg	large	Mnd	mound	PRC	point of reverse curvature
G	giga	Lat	latitude	Mtbl	mountable	PT	point of tangent
GPS	Global Positioning System	Lt	left	Mtd	mounted	POC	point on curve
Gov	government	L	length of curve	Mtg	mounting	POT	point on tangent
Grd	graded/grade	Lens	lenses	Mk	muck	PE	polyethylene
Gr	gravel	Lvl	level	Mun	municipal	PVC	polyvinyl chloride
Grnd	ground	LB	level book	N	nano	PCC	Portland Cement concrete
GWM	ground water monitor	Lvng	leveling	NGS	National Geodetic Survey	Lb or #	pounds
Gdrl	guardrail	Lht	light	NS	near side	PP	power pole
Gtr	gutter	LP	light pole	Neop	neoprene	Preempt	preemption
H Plg	H piling	Ltg	lighting	Ntwk	network	Prefab	prefabricated
Hdwl	headwall	Lig Co	lignite coal	N	newton	Prfmd	performed
Ha	hectare	Lig Sl	lignite slack	N	North	Prep	preparation
Ht	height	LF	linear foot	NE	North East	Press.	pressure
HI	height of instrument	Liq	liquid	NW	North West	PRV	pressure relief valve
Hel	helical	LL	liquid limit	NB	Northbound	Prestr	prestressed
H	henry	L	litre	No. or #	number	Pvt	private
HZ	hertz	Lm	loam	Obsc	obscure(d)	PD	private drive
HDPE	high density polyethylene	Loc	location	Obsn	observation	Prod.	production/produce
HM	high mast	LC	long chord	Ocpd	occupied	Prog	programmed
HP	high pressure	Long.	longitude	Ocpy	occupy	Prop.	property
HPS	high pressure sodium	Lp	loop	Off Loc	office location	Prop Ln	property line
Hwy	highway	LD	loop detector	O/s	offset	Ppsd	proposed
Hor	horizontal	Lm	lumen	OC	on center	PB	pull box
HBP	hot bituminous pavement	Lum	luminaire	C	one dimensional consolidation		
HMA	hot mix asphalt	L Sum	lump sum	OC	organic content		
Hr	hour(s)	Lx	lux	Orig	original		
Hyd	hydrant	ML	main line	O To O	out to out		
Ph	hydrogen ion content	M Hr	man hour	OD	outside diameter		
Id	identification	MH	manhole	OH	overhead		
In or "	inch	Mkd	marked	PMT	pad mounted transformer		
Incl	inclinometer tube	Mkr	marker	Pg	pages		
IMH	inlet manhole	Mkg	marking	Pntd	painted		
ID	inside diameter	MA	mast arm	Pr	pair		
Inst	instrument	Matl	material	Pnl	panel		
Intchg	interchange	Max	maximum	Pk	park		
Intmdt	intermediate	MC	meander corner	PK	Parker-Kalon nail		
Intscn	intersection	Meas	measure	Pa	pascal		
Inv	invert	Mdn	median	PSD	passing sight distance		
IM	iron monument	MD	median drain	Pvmt	pavement		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions

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NDDOT ABBREVIATIONS

D-101-3

Qty	quantity	SN	sign number	Tan	tangent	Wb	weber
Qtr	quarter	Sig	signal	T	tangent (semi)	WIM	weigh in motion
Rad or R	radius	Si Cl	silt clay	TS	tangent to spiral	W	west
RR	railroad	Si Cl Lm	silty clay loam	Tel	telephone	WB	westbound
Rlwy	railway	Si Lm	silty loam	Tel B	Telephone Booth	Wrng	wiring
Rsd	raised	Sgl	single	Tel P	telephone pole	W/	with
RTP	random traverse point	SC	slow curing	Tv	television	W/o	without
Rge or R	range	SS	slow setting	Temp	temperature	WC	witness corner
RC	rapid curing	Sm	small	Temp	temporary	WGS	world geodetic system
Rec	record	S	South	TBM	temporary bench mark	Z	zenith
Rcy	recycle	SE	South East	T	tesla		
RAP	recycled asphalt pavement	SW	South West	T	thinwall tube sample		
RPCC	recycled portland cement concrete	SB	Southbound	T/mi	tons per mile		
Ref	reference	Sp	spaces	Ts	topsoil		
R Mkr	reference marker	Spcl	special	Twp or T	township		
RM	reference monument	SA	special assembly	Traf	traffic		
Refl	reflectorized	SP	special provisions	TSCB	traffic signal control box		
RCB	reinforced concrete box	G	specific gravity	Tr	trail		
RCES	reinforced concrete end section	Spk	spike	Transf	transformer		
RCP	reinforced concrete pipe	SC	spiral to curve	TB	transit book		
RCPS	reinforced concrete pipe sewer	ST	spiral to tangent	Trans	transition		
Reinf	reinforcement	SB	split barrel sample	TT	transmission tower		
Res	reservation	SH	sprinkler head	Trans	transverse		
Ret	retaining	SV	sprinkler valve	Trav	traverse		
Rev	reverse	Sq	square	TP	traverse point		
Rt	right	SF	square feet	Trtd	treated		
R/W	right of way	Km2	square kilometer	Trmt	treatment		
Riv	river	M2	square meter	Qc	triaxial compression		
Rd	road	SY	square yard	TERO	tribal employment rights ordinance		
Rdbd	road bed	Stk	stake	Tpl	triple		
Rdwy	roadway	Std	standard	TP	turning point		
RWIS	roadway weather information system	N	standard penetration test	Typ	typical		
Rk	rock	Std Specs	standard specifications	Qu	unconfined compressive strength		
Rt	route	Sta	station	Ugrnd	underground		
Salv	salvage(d)	Sta Yd	station yards	USC&G	US Coast & Geodetic Survey		
Sd	sand	Stm L	steam line	USGS	US Geologic Survey		
Sdy Cl	sandy clay	SEC	steel encased concrete	Util	utility		
Sdy Cl Lm	sandy clay loam	SMA	stone matrix asphalt	VG	valley gutter		
Sdy Fl	sandy fill	SSD	stopping sight distance	Vap	vapor		
Sdy Lm	sandy loam	SD	storm drain	Vert	vertical		
San	sanitary sewer line	St	street	VC	vertical curve		
Sc	scoria	SPP	structural plate pipe	VCP	vitrified clay pipe		
Sec	seconds	SPPA	structural plate pipe arch	V	volt		
Sec	section	Str	structure	Vol	volume		
SL	section line	Subd	subdivision	Wkwy	walkway		
Sep	separation	Sub	subgrade	W	water content		
Seq	sequence	Sub Prep	subgrade preperation	WGV	water gate valve		
Serv	service	Ss	subsoil	WL	water line		
Sh	shale	SE	superelevation	WM	water main		
Sht	sheet	SS	supplement specification	WMV	water main valve		
Shtng	sheeting	Supp	supplemental	W Mtr	water meter		
Shldr	shoulder	Surf	surfacing	WSV	water service valve		
Sw	sidewalk	Surv	survey	WW	water well		
S	siemens	Sym	symmetrical	W	watt		
SD	sight distance	SI	systems international	Wrng	wearing		

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM 702 Communications
 ACCENT Accent Communications
 AGASSIZ WU Agassiz Water Users Incorporated
 AGC Associated General Contractors of America
 AII PI Alliance Pipeline
 ALL SEAS WU All Seasons Water Users Association
 AMOCO PI Amoco Pipeline Company
 AMRDA HESS Amerada Hess Corporation
 AT&T AT&T Corporation
 B PAW Bear Paw Energy Incorporated
 BAKER ELEC Baker Electric
 BASIN ELEC Basin Electric Cooperative Incorporated
 BEK TEL Bek Communications Cooperative
 BELLE PL Belle Fourche Pipeline Company
 BLM Bureau of Land Management
 BNSF Burlington Northern Santa Fe Railway
 BOEING Boeing
 BRNS RWD Barnes Rural Water District
 BURK-DIV ELEC Burke-Divide Electric Cooperative
 BURL WU Burleigh Water Users
 Cable One Cable One
 CABLE SERV Cable Services
 CAP ELEC Capital Electric Cooperative Incorporat
 CASS CO ELEC Cass County Electric Cooperative
 CASS RWU Cass Rural Water Users Incorporated
 CAV ELEC Cavalier Rural Electric Cooperative
 CBLCOM Cablecom Of Fargo
 CENEX PL Cenex Pipeline
 CENT PL WATER DIST Central Pipe Line Water District
 CENT PWR ELEC Central Power Electric Cooperative
 COE Corps of Engineers
 CONS TEL Consolidated Telephone
 CONT RES Continental Resource Inc
 CPR Canadian Pacific Railway
 D O E Department Of Energy
 DAK CARR Dakota Carrier Network
 DAK CENT TEL Dakota Central Telephone
 DAK RWD Dakota Rural Water District
 DGC Dakota Gasification Company
 DICKEY R NET Dickey Rural Networks
 DICKEY RWU Dickey Rural Water Users Association
 DICKEY TEL Dickey Telephone
 DNRR Dakota Northern Railroad
 DOME PL Dome Pipeline Company
 DVELEC Dakota Valley Electric Cooperative
 DVMW Dakota, Missouri Valley & Western
 ENBRDG Enbridge Pipelines Incorporated
 ENVENTIS Enventis Telephone
 FALK MNG Falkirk Mining Company
 FHWA Federal Highway Administration
 G FKS-TRL WD Grand Forks-traill Water District
 GETTY TRD & TRAN Getty Trading & Transportation
 GLDN W ELEC Golden West Electric Cooperative
 GRGS CO TEL Griggs County Telephone

GT PLNS NAT GAS Great Plains Natural Gas Company
 HALS TEL Halstad Telephone Company
 IDEA1 Idea1
 INT-COMM TEL Inter-Community Telephone Company
 KANEB PL Kaneb Pipeline Company
 KEM ELEC Kem Electric Cooperative Incorporated
 KOCH GATH SYS Koch Gathering Systems Incorporated
 LKHD PL Lakehead Pipeline Company
 LNGDN RWU Langdon Rural Water Users Incorporated
 LWR YELL R ELEC Lower Yellowstone Rural Electric
 MCKNZ CON McKenzie Consolidated Telcom
 MCKENZIE ELEC McKenzie Electric Cooperative
 MCKNZ WRD McKenzie County Water Resource District
 MCLEOD McLeod USA
 MCLN ELEC McLean Electric Cooperative
 MCLN-SHRDN R WAT McLean-Sheridan Rural Water
 MDU Montana-dakota Utilities
 MID-CONT CABLE Mid-Continent Cable
 MIDSTATE TEL Midstate Telephone Company
 MINOT CABLE Minot Cable Television
 MINOT TEL Minot Telephone Company
 MISS W W S Missouri West Water System
 MNKOTA PWR Minnkota Power
 MOR-GRAN-SOU ELEC Mor-gran-sou Electric Cooperative
 MOUNT-WILLI ELEC Mountrail-williams Electric Cooperative
 MRE LBTY TEL Moore & Liberty Telephone
 MUNICIPAL City Water And Sewer
 MUNICIPAL City Of '.....'
 N CENT ELEC North Central Electric Cooperative
 N VALL W DIST North Valley Water District
 ND PKS & REC North Dakota Parks And Recreation
 ND TEL North Dakota Telephone Company
 NDDOT North Dakota Department of Transportation
 NDSU SOIL SCI DEPT NDSU Soil Science Department
 NEMONT TEL Nemont Telephone
 NODAK R ELEC Nodak Rural Electric Cooperative
 NOON FRMS TEL Noonan Farmers Telephone Company
 NPR Northern Plains Railroad
 NSP Northern States Power
 NTH PRAIR RW Northern Prairie Rural Water Association
 NTHN BRDR PL Northern Border Pipeline
 NTHN PLNS ELEC Northern Plains Electric Cooperative Incorporated
 NTHWSTRN REF Northwestern Refinery Company
 NW COMM Northwest Communication Cooperation
 ONEOK Oneok gas
 OSHA Occupational Safety and Health Administration
 OTTR TL PWR Otter Tail Power Company
 P L E M Prairielands Energy Marketing
 POLAR COM Polar Communications
 PVT ELEC Private Electric
 QWEST Qwest Communications
 R&T W SUPPLY R & T Water Supply Association
 RAMSEY R SEW Ramsey Rural Sewer Association
 RAMSEY RW Ramsey Rural Water Association
 RAMSEY UTIL Ramsey County Rural Utilities

RED RIV TEL Red River Rural Telephone
 RESVTN TEL Reservation Telephone
 ROBRTS TEL Roberts Company Telephone
 R-RIDER ELEC Roughrider Electric Coop
 RRVW Red River Valley & Western Railroad
 RSR ELEC R.S.R. Electric Cooperative
 S E W U South East Water Users Incorporated
 SCOTT CABLE Scott Cable Television Dickinson
 SHERDN ELEC Sheridan Electric Cooperative
 SHEYN VLY ELEC Sheyenne Valley Electric Cooperative
 SKYTECH Skyland Technologies Incorporated
 SLOPE ELEC Slope Electric Cooperative Incorporated
 SOURIS RIV TELCOM Souris River Telecommunications
 ST WAT COMM State Water Commission
 STATE LN WATER State Line Water Cooperative
 STER ENG Sterling Energy
 STUT RWU Stutsman Rural Water Users
 SW PL PRJ Southwest Pipeline Project
 T M C Turtle Mountain Communications
 TCI TCI of North Dakota
 TESORO GHG PLNS PL Tesoro High Plains Pipeline
 TRI-CNTY WU Tri-County Water Users Incorporated
 TRL CO RWU Traill County Rural Water Users
 UNTD TEL United Telephone
 UPPR SOUR WUA Upper Souris Water Users Association
 US SPRINT U.S. Sprint
 USAF MSL CABLE U.S.A.F. Missile Cable
 USFWS US Fish and Wildlife Service
 USW COMM U.S. West Communications
 VRNDRY ELEC Verendrye Electric Cooperative
 W RIV TEL West River Telephone Incorporated
 WEB W. E. B. Water Development Association
 WILLI RWA Williams Rural Water Association
 WILSTN BAS PL Williston Basin Interstate Pipeline Company
 WLSH RWD Walsh Water Rural Water District
 WOLVRTN TEL Wolverton Telephone
 XLENER Xcel Energy
 YSVR Yellowstone Valley Railroad

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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Line Styles

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter

- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break

Proposed Topography

- 3-Cable w Posts
- Flow
- Fence
- Remove Line
- Wall
- Retaining Wall (Plan View)
- W-Beam w Posts

Existing Utilities

- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Existing Culvert
- Existing Telephone Line
- Existing TV Line
- Existing Water or Steam Line
- Existing Under Drain
- Existing Slotted Drain
- Existing Conduit
- Existing Conductor
- Existing Down Guy Wire Down Guy
- Existing Underground Vault or Lift Station

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

Traffic Utilities

- Conductor
- Fiber Optic
- Existing Loop Detector
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Micro Loop Detector
- Micro Loop Detector
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm

Sign Structures

- Existing Overhead Sign Structure
- Existing Overhead Sign Structure Cantilever
- Overhead Sign Structure Cantilever

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups

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Line Styles

Right Of Way

- Easement
- Existing Easement
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Existing Right of Way Not State Owned
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines
- Sight Distance Triangle Line
- Dimension Leader

Boundary Control

- Existing City Corporate Limits or Reservation Boundary
- Existing State or International Line
- Existing Township
- Existing County
- Existing Section Line
- Existing Quarter Section Line
- Existing Sixteenth Section Line
- Existing Centerline
- Tangent Line

Cross Sections and Typical

- Existing Ground
- Existing Topsoil (Cross Section View)
- Existing Ground Void (Not Surveyed)
- Existing Concrete
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar

Geotechnical

- Geotextile Fabric Type D
- Geogrid
- Geotextile Fabric Type R
- Geotextile Fabric Type R1
- Geotextile Fabric Type RR
- Geotextile Fabric Type S

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

- Centerline Pavement Marking
- Barrier with Centerline Pavement Marking
- Barrier Pavement Marking
- Stripe 4 IN Dotted Extension White
- Stripe 8 IN Dotted Extension White
- Stripe 8 IN Lane Drop

Pavement Joints

- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Tie Bar at Random Spacing

Bridge Details

- Hidden Object
- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Centerline Main
- Centerline
- Existing Ground (Details)
- Existing Conditions
- Sheet Piling

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain
- Silt Fence
- Excavation Limits
- Fiber Rolls

Environmental

- Wetland Mitigation
- Existing Wetland Easement USFWS
- Existing Wetland Jurisdictional
- Existing Wetland
- Tree Row

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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09-23-16	Added and Revised Items, Organized by Functional Groups

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Symbols

	North Arrow (Half Scale)		Attenuation Device		Existing Railroad Battery Box		Existing Delineator Type E
	Truck Mounted Attenuator		Diamond Grade Delineator Type A		Existing Bush or Shrub		Existing EFB Misc
	Type I Barricade		Diamond Grade Delineator Type B		Existing Gas Cap or Stub		Existing Flashing Beacon
	Type II Barricade		Diamond Grade Delineator Type C		Existing Sanitary Cap or Stub		Existing Pipe Mounted Flasher
	Type III Barricade		Diamond Grade Delineator Type D		Existing Storm Drain Cap or Stub		Existing Pad Mounted Feed Point
	Catch Basin		Diamond Grade Delineator Type E		Existing Water Cap or Stub		Existing Pipe Mounted Feed Point with Pad
	Cairn or Stone Circle		Flexible Delineator		Existing Sanitary Cleanout		Existing Pole Mounted Feed Point
	Video Detection Camera		Flexible Delineator Type A		Existing Concrete Foundation		Existing Railroad Frog
	Storm Drain Cap or Stub		Flexible Delineator Type B		Existing Traffic Signal Controller		Existing Snow Gate 18
	Corrugated Metal End Section 18 Inch		Flexible Delineator Type C		Existing Pad Mounted Signal Controller		Existing Snow Gate 28
	Corrugated Metal End Section 24 Inch		Flexible Delineator Type D		Existing Sixteenth Section Corner		Existing Snow Gate 40
	Corrugated Metal End Section 30 Inch		Flexible Delineator Type E		Existing Quarter Section Corner		Existing Headwall
	Corrugated Metal End Section 36 Inch		Delineator Type A		Existing Section Corner		Existing Pedestrian Head with Number
	Corrugated Metal End Section 42 Inch		Delineator Type A Reset		Existing Railroad Crossbuck		Existing Signal Head
	Corrugated Metal End Section 48 Inch		Delineator Type B		Existing Satellite Dish		Existing Sprinkler Head
	Concrete Foundation		Delineator Type B Reset		Existing Fuel Dispensers		Existing Fire Hydrant
	Ground Connection Conductor		Delineator Type C		Existing Flexible Delineator Type A		Existing Catch Basin Drop Inlet
	Neutral Connection Conductor		Delineator Type D		Existing Flexible Delineator Type B		Existing Curb Inlet
	Phase 1 Connection Conductor		Delineator Type E		Existing Flexible Delineator Type C		Existing Manhole Inlet
	Phase 2 Connection Conductor		Delineator Drums		Existing Flexible Delineator Type D		Existing Junction Box
	Traffic Cone		Spot Elevation		Existing Flexible Delineator Type E		
	Signal Controller		Existing Access Control Arrow		Existing Delineator Type A		
	Pad Mounted Signal Controller		Existing Artifact		Existing Delineator Type B		
	Alignment Data Point		Existing Flashing Beacon		Existing Delineator Type C		
	Emergency Vehicle Detector		Existing Benchmark		Existing Delineator Type D		

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07-01-14	
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DATE	CHANGE

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Symbols
































































































	Existing Light Standard		Existing Manhole with Valve Water		Existing Telephone Pole		Existing Undefined Manhole
	Existing High Mast Light Standard 10 Luminaire		Existing Water Manhole		Existing Wood Pole		Existing Undefined Pull Box
	Existing High Mast Light Standard 3 Luminaire		Existing Mile Post Type A		Existing Post		Existing Undefined Pedestal
	Existing High Mast Light Standard 4 Luminaire		Existing Mile Post Type B		Existing Pedestrian Push Button Post		Existing Undefined Valve
	Existing High Mast Light Standard 5 Luminaire		Existing Mile Post Type C		Existing Control Point CP		Existing Undefined Pipe Vent
	Existing High Mast Light Standard 6 Luminaire		Existing Reference Marker		Existing Control Point GPS-RTK		Existing Gas Valve
	Existing High Mast Light Standard 7 Luminaire		Existing RW Marker		Existing Control Point TRI		Existing Water Valve
	Existing High Mast Light Standard 8 Luminaire		Existing Utility Marker		Existing Reference Marker Point NGS		Existing Fuel Pipe Vent
	Existing High Mast Light Standard 9 Luminaire		Iron Monument Found		Existing Pull Box		Existing Gas Pipe Vent
	Existing Overhead Sign Structure Load Center		Iron Pin R/W Monument		Existing Intelligent Transportation Pull Box		Existing Sanitary Pipe Vent
	Existing Luminaire		Existing Object Marker Type I		Existing Water Pump		Existing Storm Drain Pipe Vent
	Existing Light Standard Luminaire		Existing Object Marker Type II		Existing Slotted Reinforced Concrete Pipe		Existing Water Pipe Vent
	Existing Federal Mailbox		Existing Object Marker Type III		Existing RR Profile Spot		Existing Weather Station
	Existing Private Mailbox		Existing Electrical Pedestal		Existing Fuel Leak Sensors		Existing Ground Water Well Bore Hole
	Existing Meander Section Corner		Existing Telephone Pedestal		Existing Highway Sign		Existing Windmill or Tower
	Existing Meter		Existing Fiber Optic Telephone Pedestal		Existing Miscellaneous Spot		Existing Witness Corner
	Existing Electrical Manhole		Existing TV Pedestal		Existing Lighting Standard Pole		Flashing Beacon
	Existing Gas Manhole		Existing Fiber Optic TV Pedestal		Existing Traffic Signal Standard		Flagger
	Existing Sanitary Manhole		Existing Fuel Filler Pipes		Existing Transformer		Pipe Mounted Flasher
	Existing Sanitary Force Main Manhole		Existing Traverse PI Aerial Panel		Existing Large Evergreen Tree		Sanitary Force Main with Valve
	Existing Sanitary Manhole with Valve		Existing Pole		Existing Small Evergreen Tree		
	Existing Storm Drain Manhole		Existing Power Pole		Existing Large Tree		
	Existing Force Main Storm Drain Manhole		Existing Power Pole with Transformer		Existing Small Tree		
	Existing Force Main Storm Drain Manhole with Valve				Existing Tree Trunk		
	Existing Telephone Manhole				Existing Pad Mounted Traffic Signal Control Box		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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Symbols

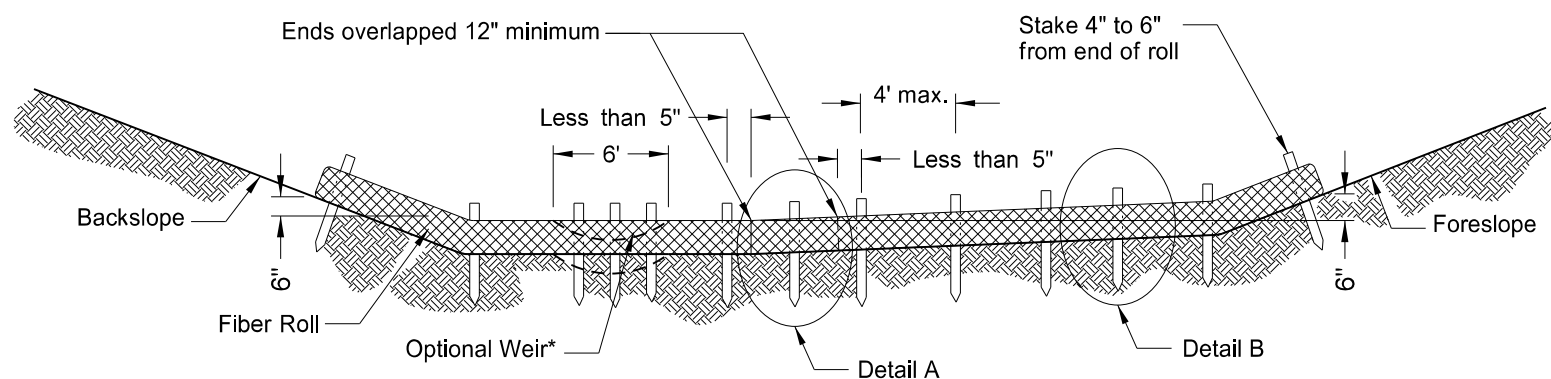
D-101-32

 Pad Mounted Feed Point  Pipe Mounted Feed Point with Pad  Pole Mounted Feed Point  Headwall  Double Headwall with Vegetation Barrier  Single Headwall with Vegetation Barrier  Pole Mounted Head  Sprinkler Head  Fire Hydrant  Inlet Type 1  Inlet Type 2  Double Inlet Type 2  Inlet Gate Type 2  Junction Box  High Mast Light Standard 10 Luminaire  High Mast Light Standard 3 Luminaire  High Mast Light Standard 4 Luminaire  High Mast Light Standard 5 Luminaire  High Mast Light Standard 6 Luminaire  High Mast Light Standard 7 Luminaire  High Mast Light Standard 8 Luminaire  High Mast Light Standard 9 Luminaire  Relocate Light Standard  Overhead Sign Structure Load Center  Light Standard 100 Watt High Pressure Sodium Vapor Luminaire	 Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire  Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  Light Standard 175 Watt High Pressure Sodium Vapor Luminaire  Light Standard 200 Watt High Pressure Sodium Vapor Luminaire  Light Standard 250 Watt High Pressure Sodium Vapor Luminaire  Light Standard 310 Watt High Pressure Sodium Vapor Luminaire  Light Standard 35 Watt High Pressure Sodium Vapor Luminaire  Light Standard 400 Watt High Pressure Sodium Vapor Luminaire  Light Standard 50 Watt High Pressure Sodium Vapor Luminaire  Light Standard 70 Watt High Pressure Sodium Vapor Luminaire  Light Standard 700 Watt High Pressure Sodium Vapor Luminaire  Manhole  Manhole 48 Inch  Sanitary Force Main Manhole  Sanitary Sewer Manhole  Storm Drain Manhole  Storm Drain Manhole with Inlet  Reset Mile Post  Mile Post Type A  Mile Post Type B  Mile Post Type C  Right of Way Marker  Tubular Marker  Alignment Monument  Iron Pin Reference Monument	 Object Marker Type I  Object Marker Type II  Object Marker Type III  Caution Mode Arrow Panel  Back to Back Vertical Panel Sign  Double Direction Arrow Panel  Left Directional Arrow Panel  Right Directional Arrow Panel  Sequencing Arrow Panel  Truck Mounted Arrow Panel  Power Pole  Wood Pole  Pedestrian Push Button Post  Property Corner  Pull Box  Intelligent Transportation Pull Box  Sanitary Pump  Storm Drain Pump  Reinforced Pavement  Reinforced Concrete End Section 15 Inch  Reinforced Concrete End Section 18 Inch  Reinforced Concrete End Section 24 Inch  Reinforced Concrete End Section 30 Inch  Reinforced Concrete End Section 36 Inch  Reinforced Concrete End Section 42 Inch	 Reinforced Concrete End Section 48 Inch  Reinforced Concrete End Section 54 Inch  Reset Right of Way Marker  Reset USGS Marker  Right of Way Markers  Riser 30 Inch  Continuous Split Barrel Sample  Flight Auger Sample  Split Barrel Sample  Thinwall Tube Sample  Highway Sign  SNOW GATE 18 FT  SNOW GATE 28 FT  SNOW GATE 40 FT  Standard Penetration Test  Transformer  Inclinometer Tube  Underdrain Cleanout  Excavation Unit  Water Valve
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

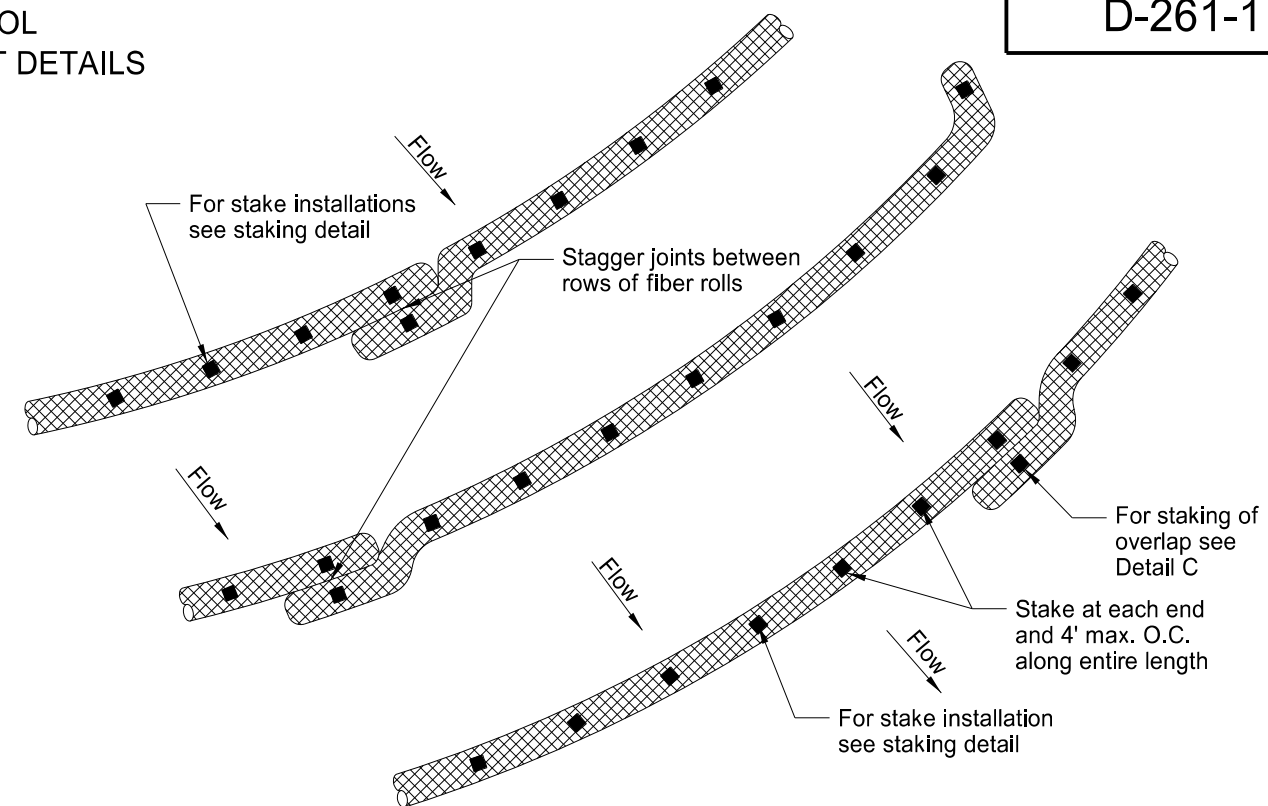
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EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

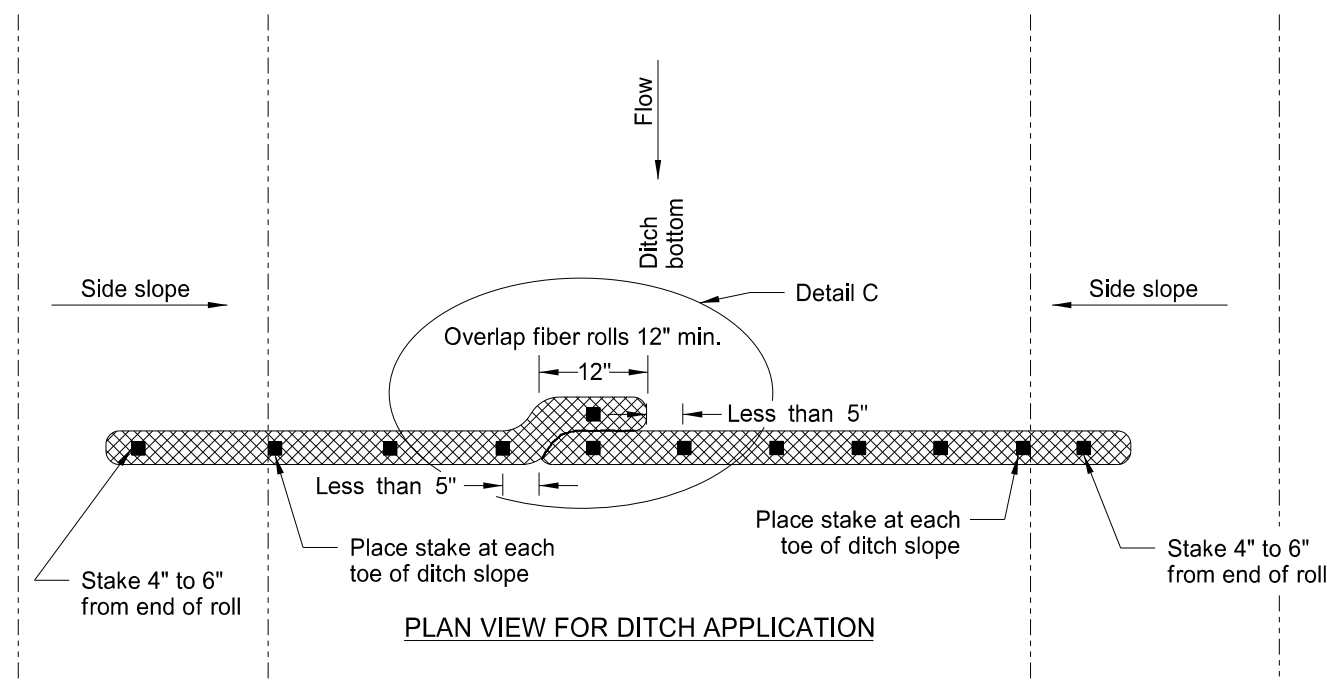


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

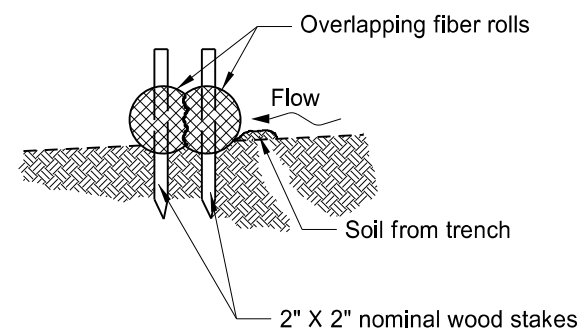
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



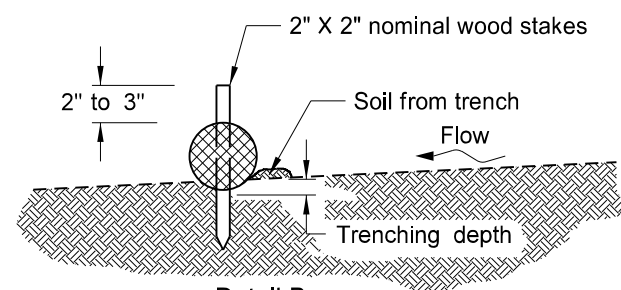
PLAN VIEW FOR SLOPE APPLICATION



PLAN VIEW FOR DITCH APPLICATION



Detail A
Fiber Roll Overlapping Staking Detail



Detail B
Fiber Roll Staking Detail

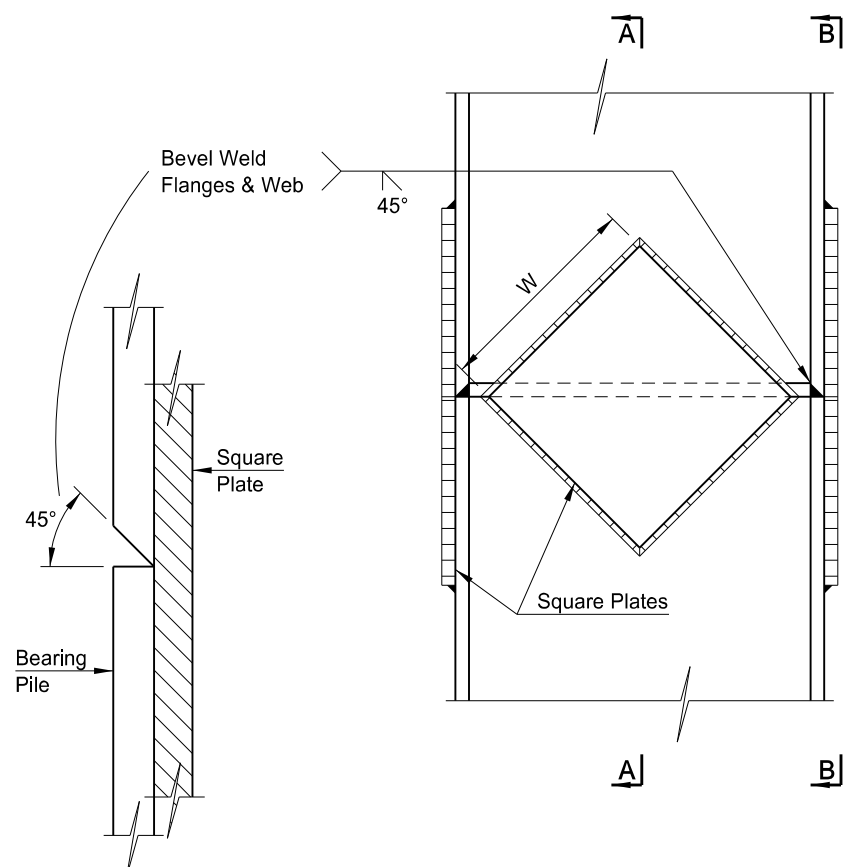
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

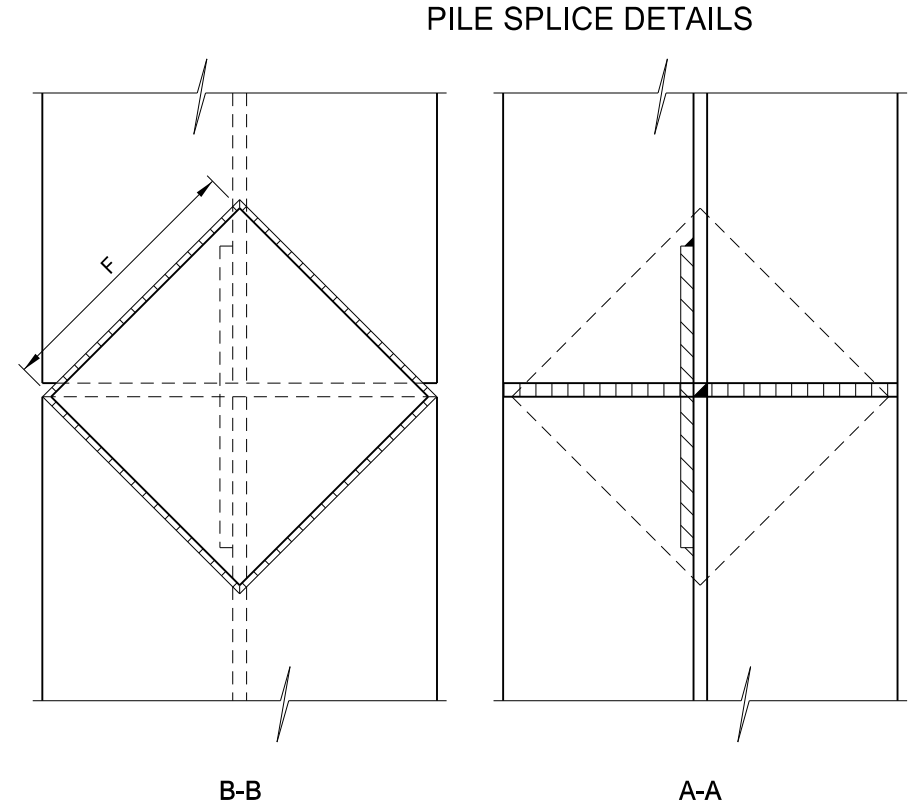
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application, Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1

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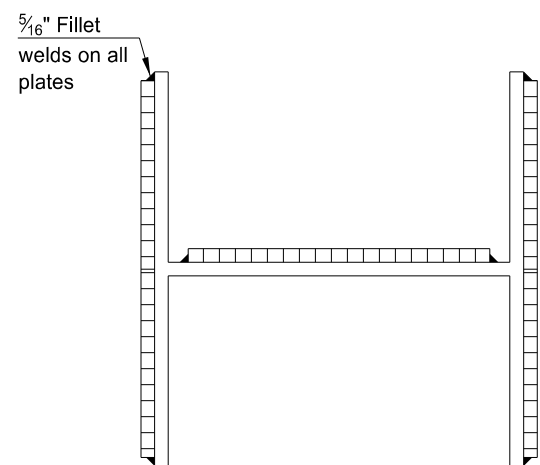
PILE SPLICE DETAILS



ENLARGED VIEW

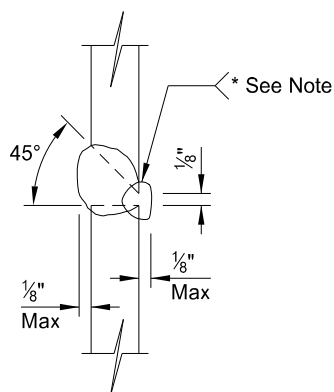


Flame scarf inside of both flanges and one side of web of upper section.



PILE	8"	10"	12"	14"
"F" FLANGE	5"	6 1/2"	8"	10"
"W" WEB	4"	5 1/2"	6 1/2"	8"

H-PILE SPLICE DETAIL



ALTERNATE H-PILE SPLICE DETAIL

NOTES:

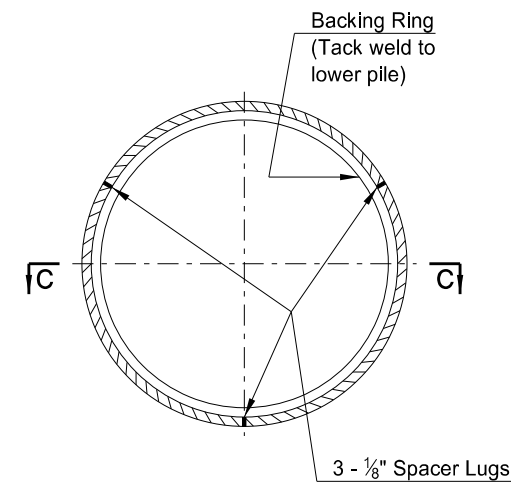
Steel H-Pile may be spliced with complete penetration groove welds in both flanges and web in lieu of using the reinforcing plates.

AWS classification E70XX Low Hydrogen Electrodes shall be used.

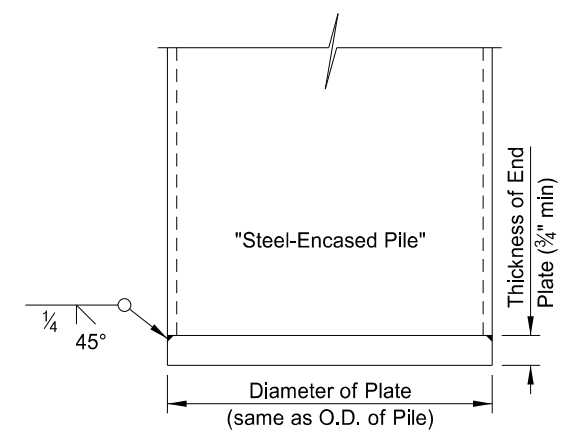
* Welds made without the use of backing material shall have the root gouged to sound metal and welded from the second side.

All welding shall conform to the current AASHTO/AWS D1.5 Bridge Welding Code.

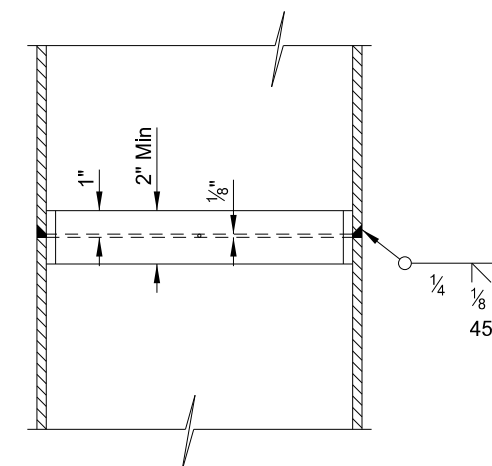
The thickness of the steel square plates shall at a minimum be as thick as the flanges and web of the pile being spliced.



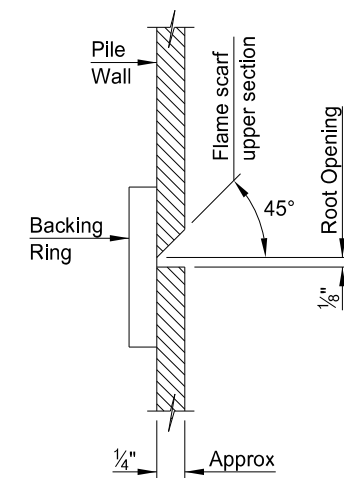
Backing Ring may be made from pile cut-offs or other material of a like quality.



END PLATE DETAIL



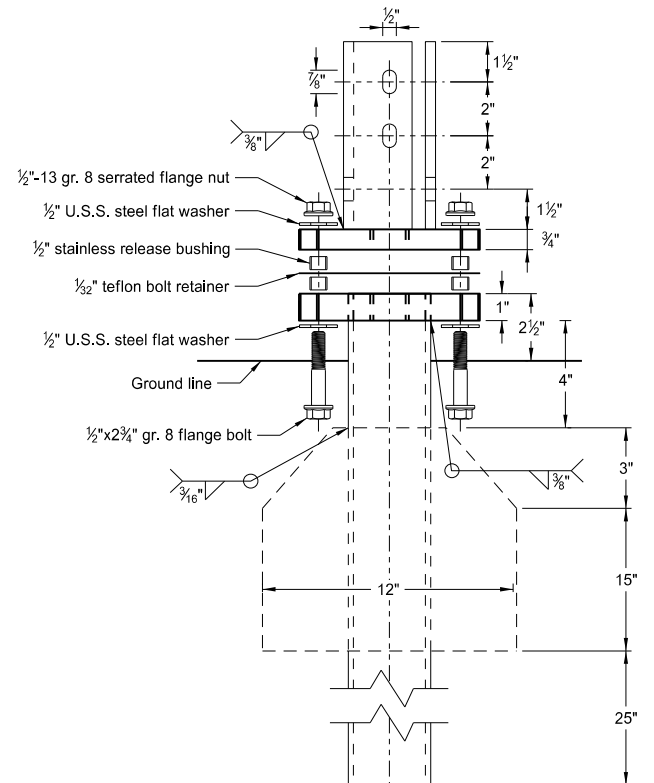
STEEL-ENCASED CONCRETE PILE SPLICE DETAIL



ENLARGED VIEW

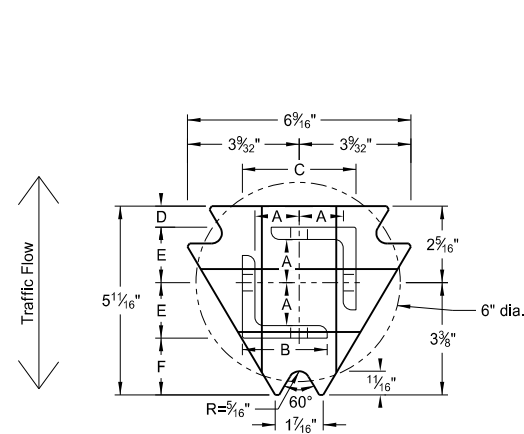
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09/14/11	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Terrence R. Udland, Registration Number PE-2674, on 09/14/11 and the original document is stored at the North Dakota Department of Transportation

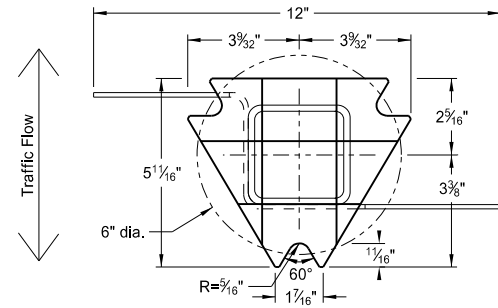


Multi-Directional Slip Base Assembly

Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2 1/2"x2 1/2"x3/8" ASTM A36 structural angle



Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

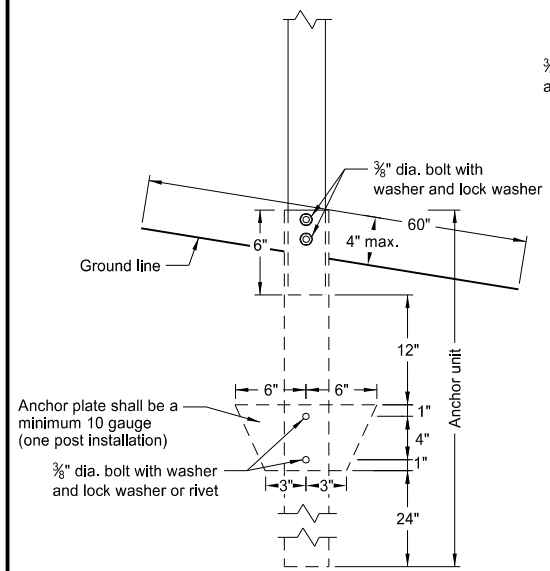
Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

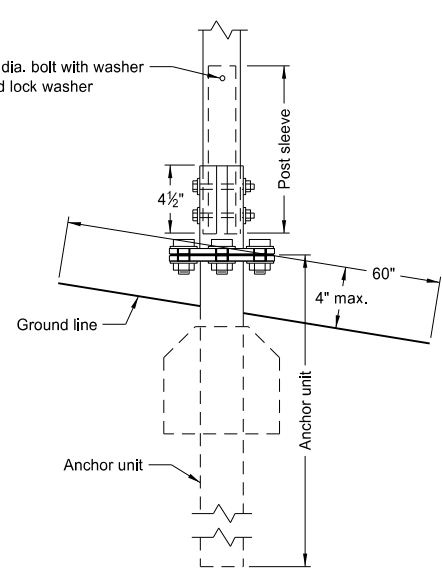
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	12			Yes	
2	2 1/4	10	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

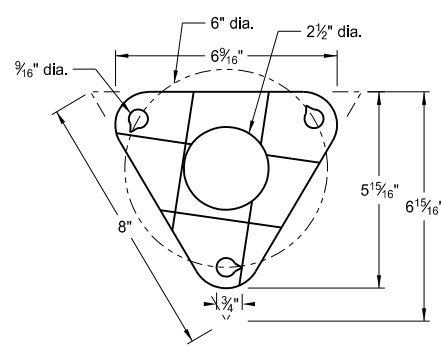
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 1/8"
2 1/2"x10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"



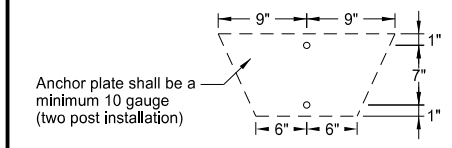
Anchor Unit and Post Assembly



Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



Bolt Retainer for Base Connection
Bolt Retainer - 1/32" Reprocessed Teflon

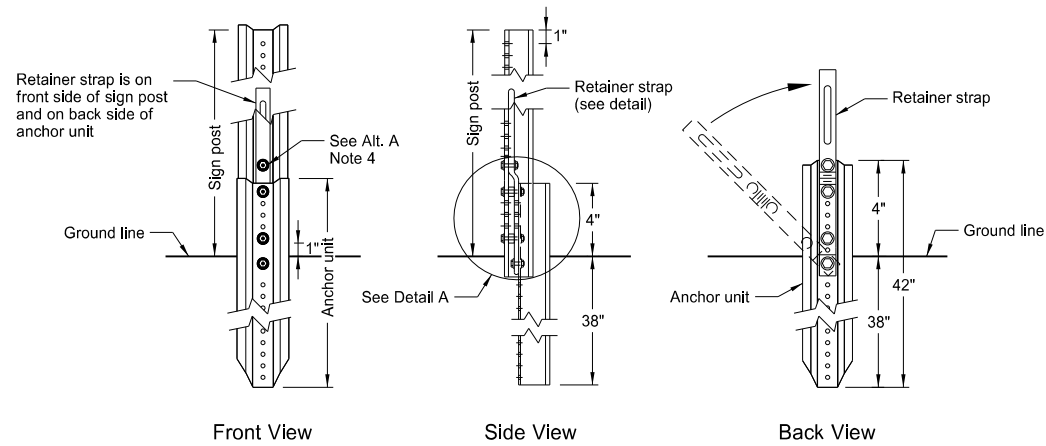
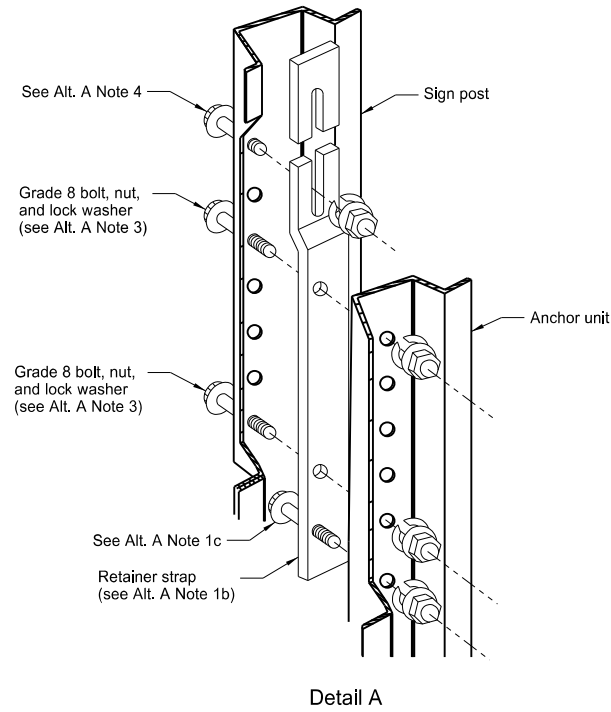


Anchor plate shall be a minimum 10 gauge (two post installation)

- (A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.
 (B) The 2 3/16"x10 ga. may be inserted into 2 1/2"x10 ga. for additional wind load.

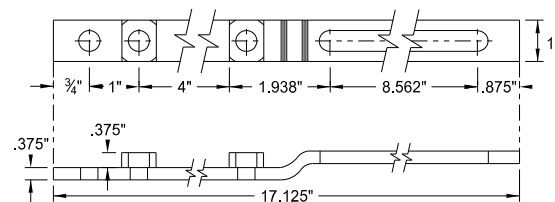
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 2/28/14 and the original document is stored at the North Dakota Department of Transportation
2-28-14		
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U-Channel Post

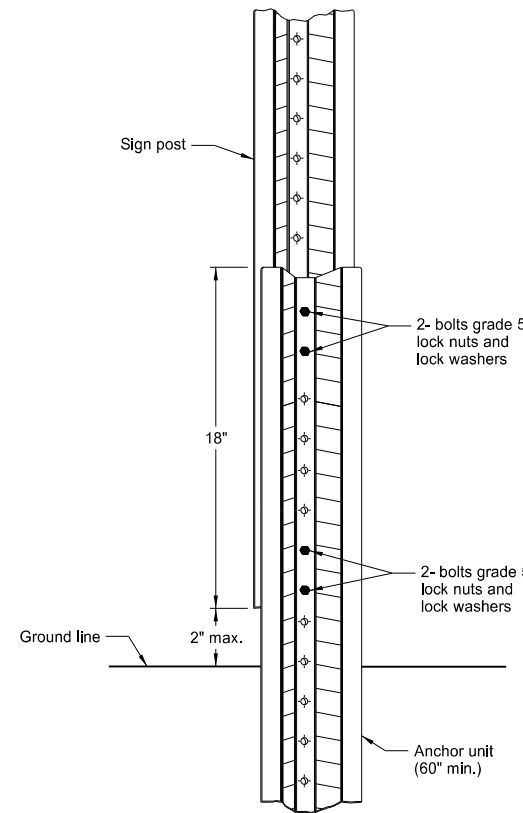


Breakaway U-Channel Detail Alternate A

A maximum of 2 posts shall be installed within 7'.

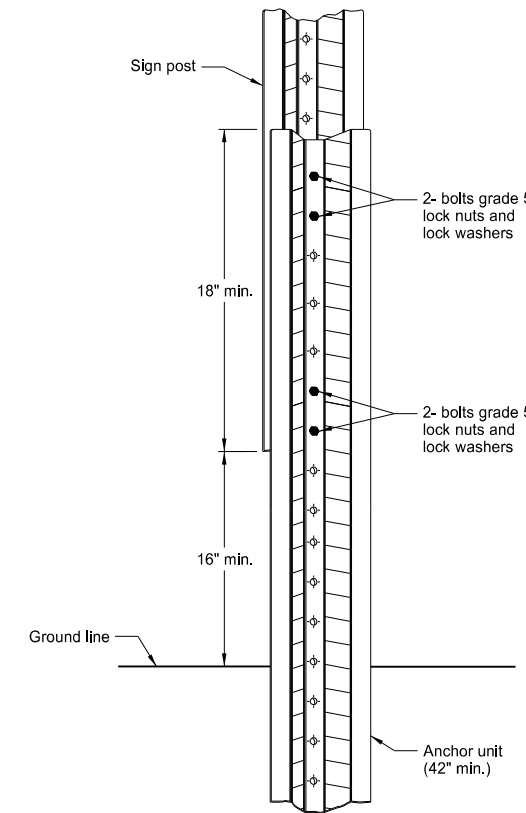


Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B (2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.



Breakaway U-Channel Splice Detail Alternate C (2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

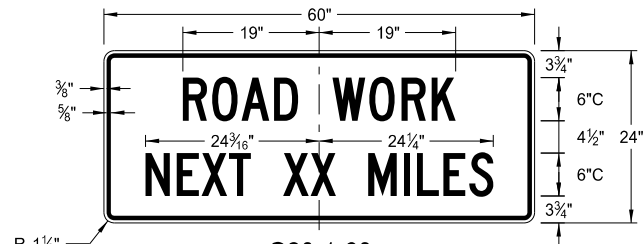
1. a) Drive anchor unit to within 12" of ground level.
b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. The base post, strap and sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

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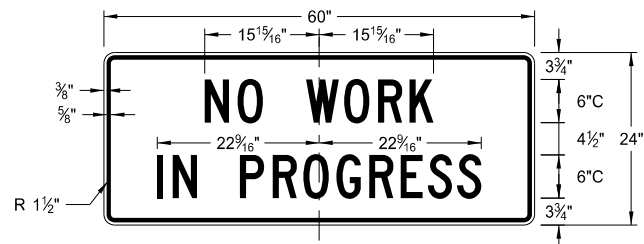
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

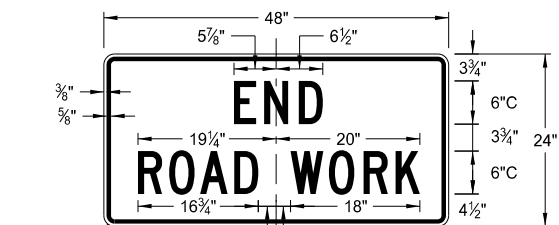
D-704-9



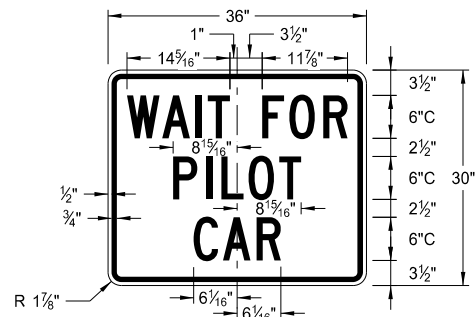
G20-1-60
Legend: black (non-refl)
Background: orange



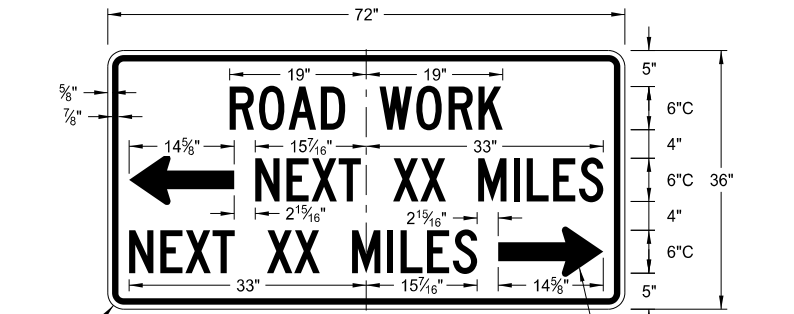
G20-1b-60
Legend: black (non-refl)
Background: orange



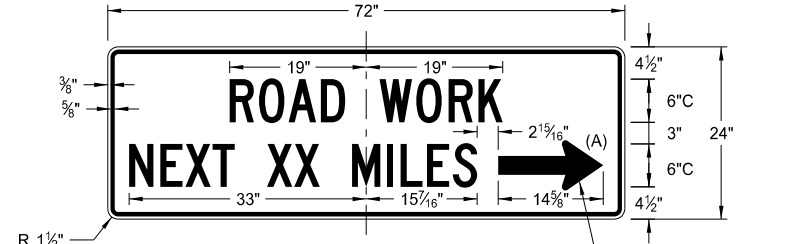
G20-2-48
Legend: black (non-refl)
Background: orange



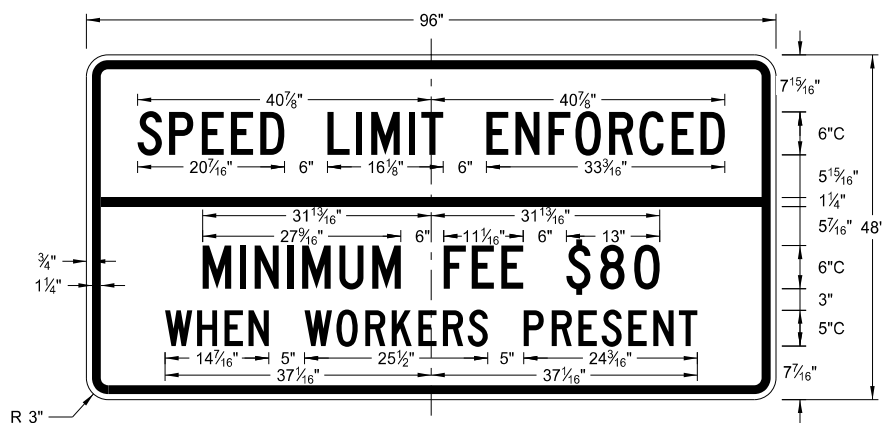
G20-4b-36
Legend: black (non-refl)
Background: orange



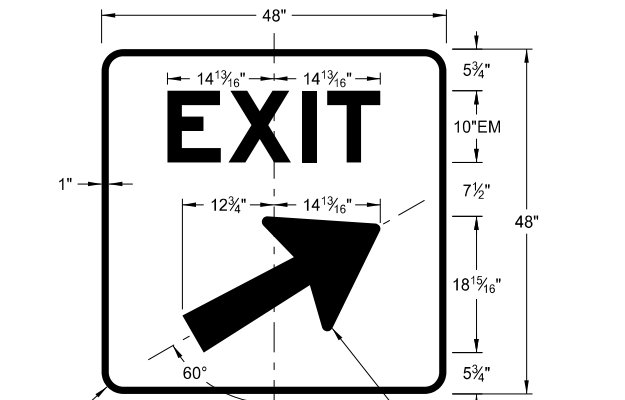
G20-50a-72
Legend: black (non-refl)
Background: orange



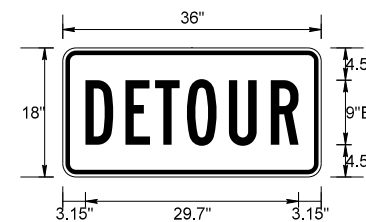
G20-52a-72
Legend: black (non-refl)
Background: orange



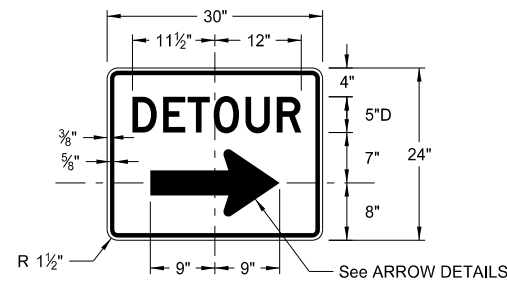
G20-55-96
Legend: black (non-refl)
Background: orange



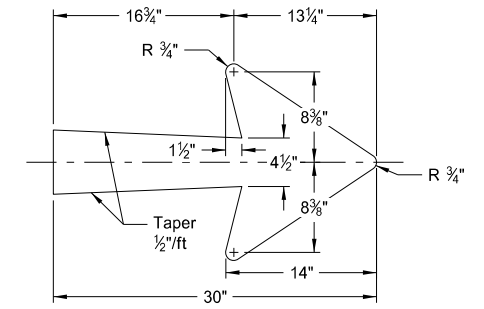
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



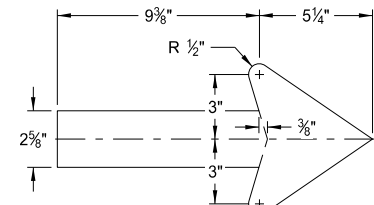
M4-8-36
Legend: black (non-refl)
Background: orange



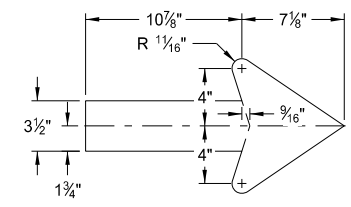
M4-9(L or R)-30 & M4-9-30
Legend: black (non-refl)
Background: orange



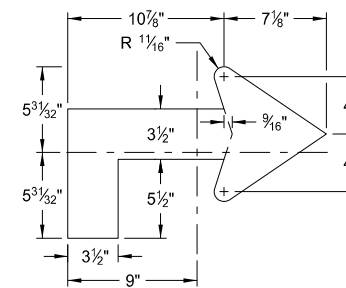
E5-1-48



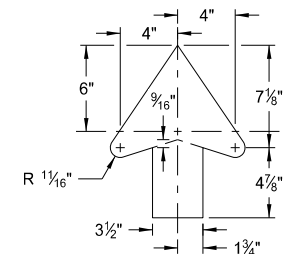
G20-50a-72
G20-52a-72



M4-9(L or R)-30
Right or Left



M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS

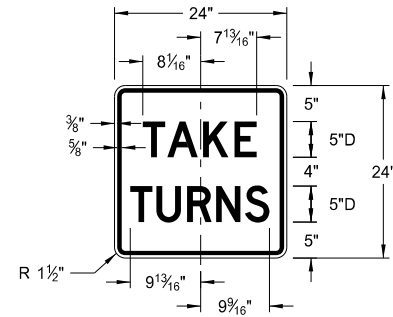
NOTES:

(A) Arrow may be right or left of the legend to indicate construction to the right or left.

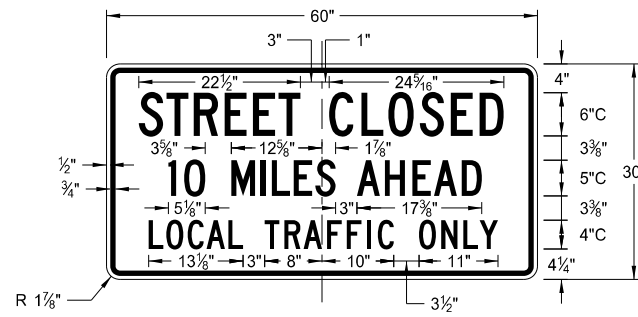
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color

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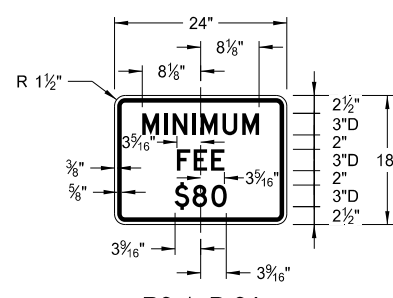
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



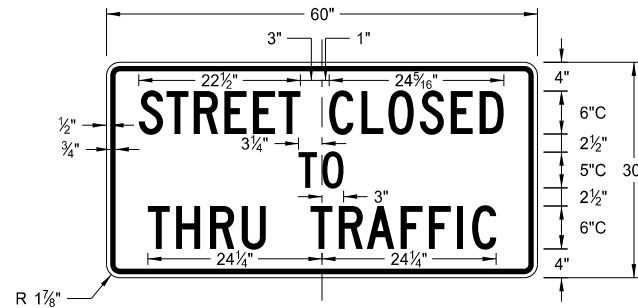
R1-50P-24
Legend: black (non-refl)
Background: white



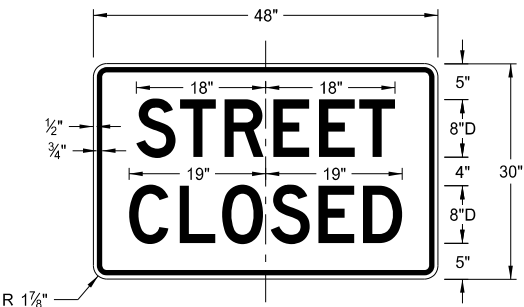
R11-3c-60
Legend: black (non-refl)
Background: white



R2-1aP-24
Legend: black (non-refl)
Background: white



R11-4a-60
Legend: black (non-refl)
Background: white

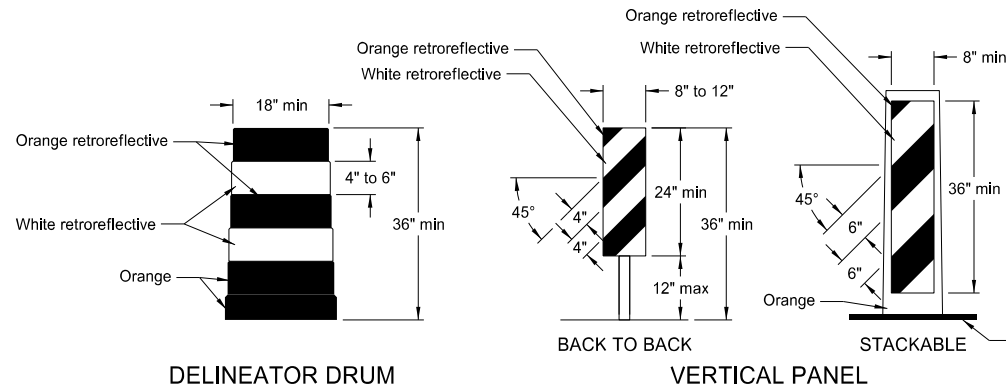


R11-2a-48
Legend: black (non-refl)
Background: white

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number

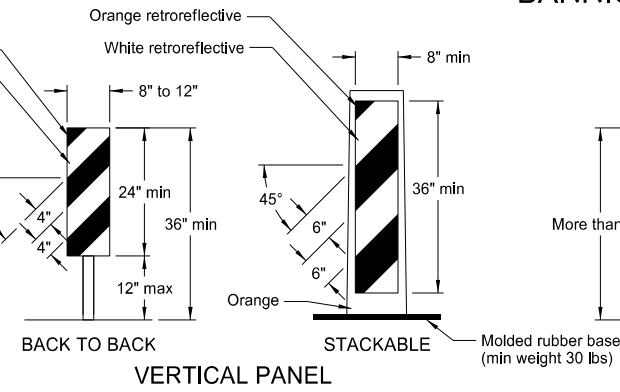
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BARRICADE AND CHANNELIZING DEVICE DETAILS



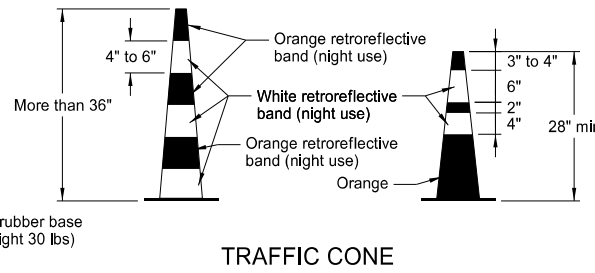
DELINEATOR DRUM

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.



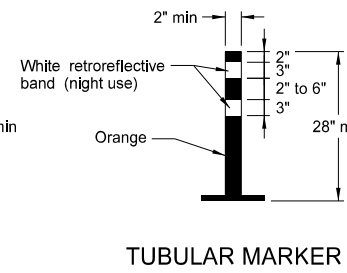
VERTICAL PANEL

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.



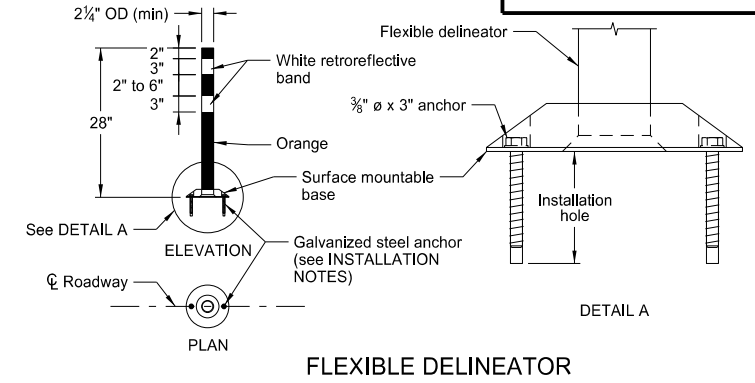
TRAFFIC CONE

RetroreflectORIZATION of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED space between the orange and white stripes shall not exceed 3" wide.



TUBULAR MARKER

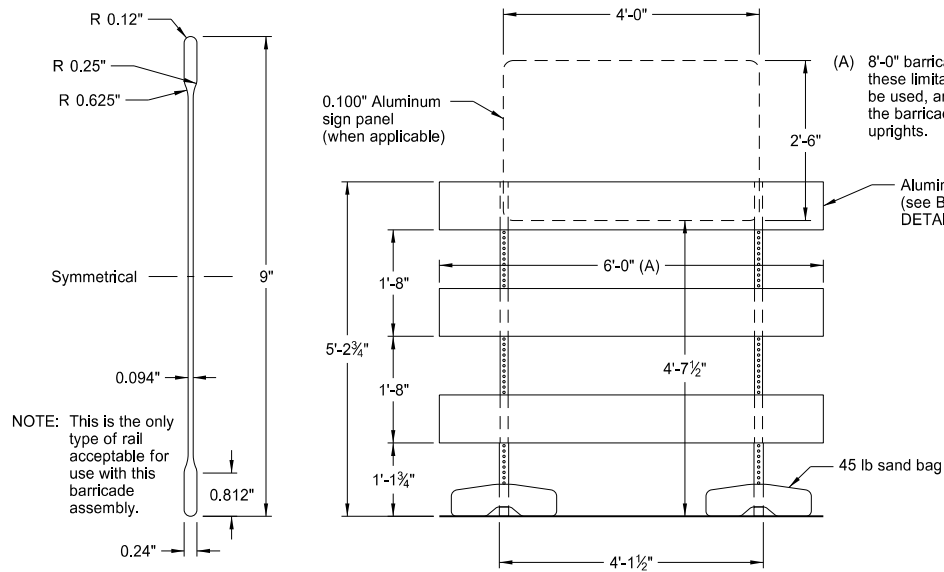
RetroreflectORIZATION of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

INSTALLATION NOTES:

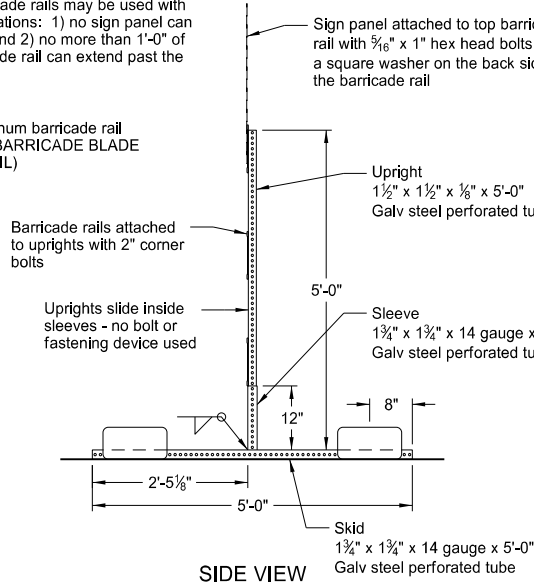
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.



BARRICADE BLADE DETAIL

ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

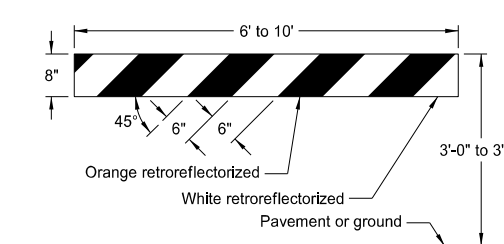


ELEVATION VIEW

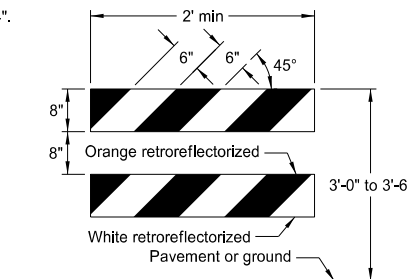
BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

SIDE VIEW

NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".

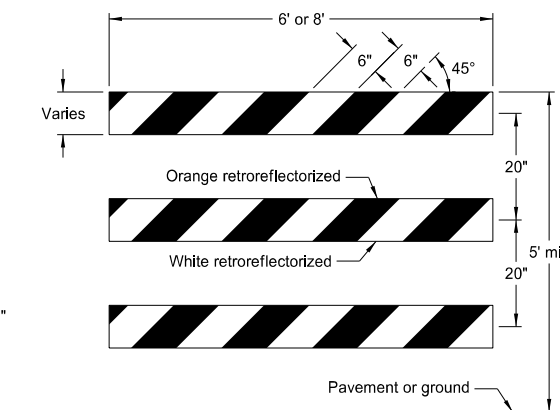


TYPE I BARRICADE

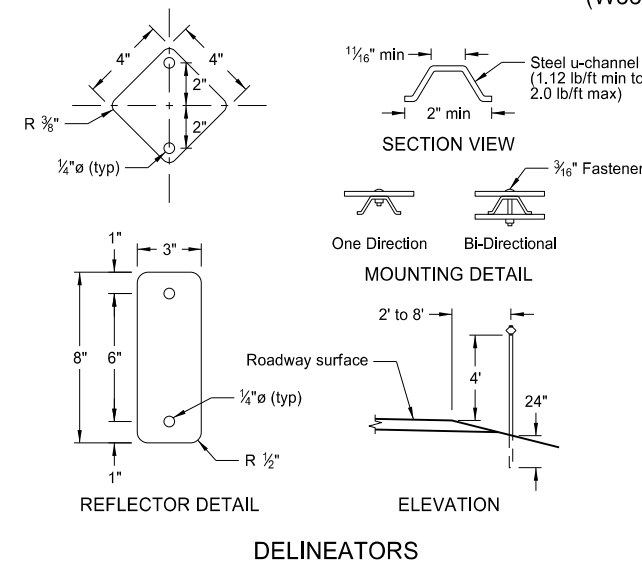


TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



REFLECTOR DETAIL

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

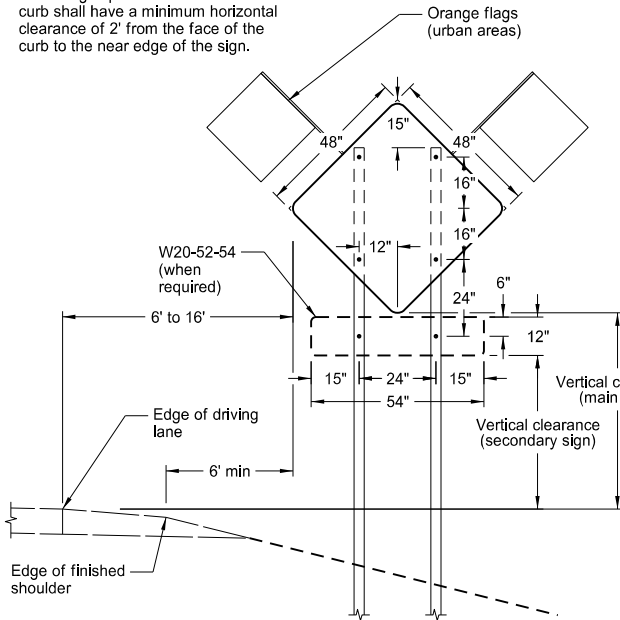
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

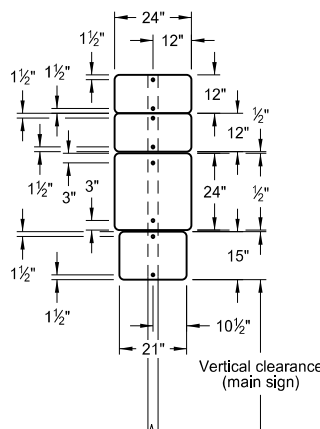
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

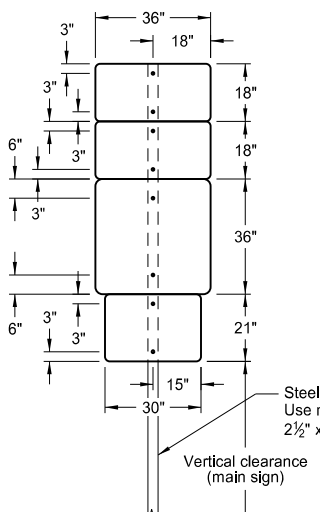
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



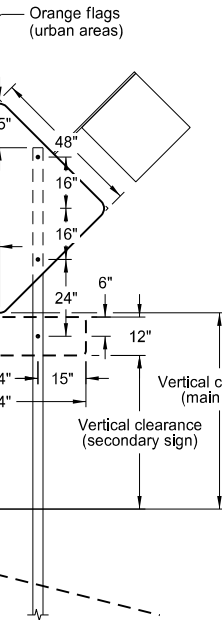
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



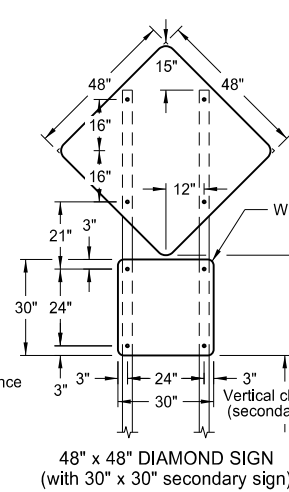
24" x 24" ROUTE MARKER ASSEMBLY



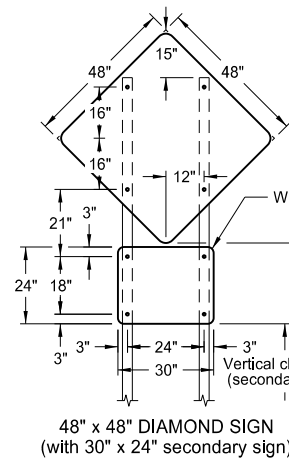
36" x 36" ROUTE MARKER ASSEMBLY



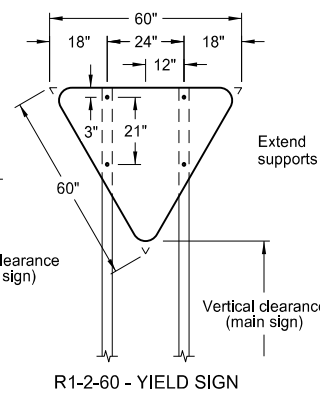
18" x 18" DIAMOND SIGN



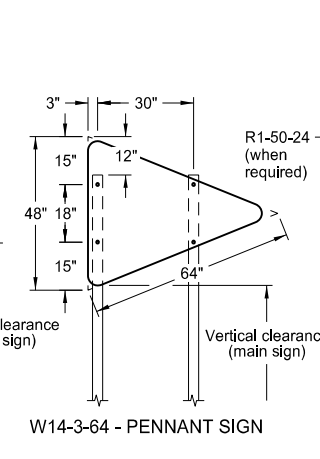
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



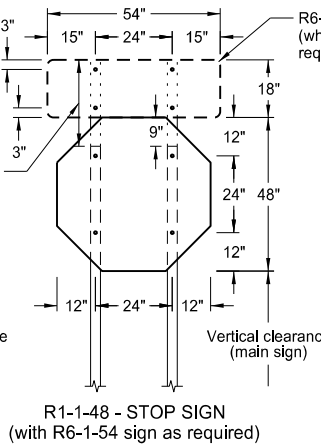
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



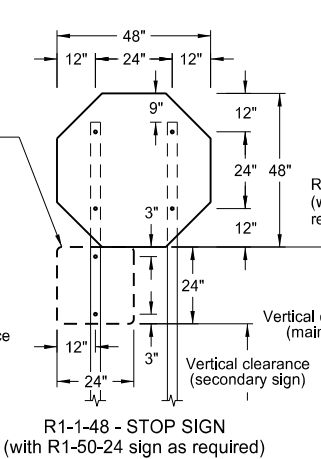
R1-2-60 - YIELD SIGN



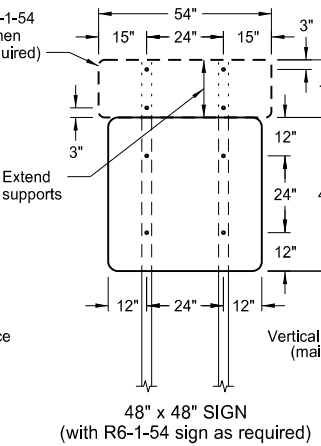
W14-3-64 - PENNANT SIGN



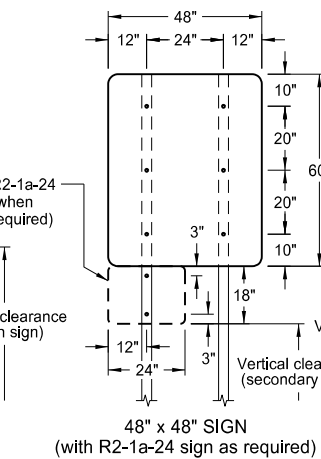
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



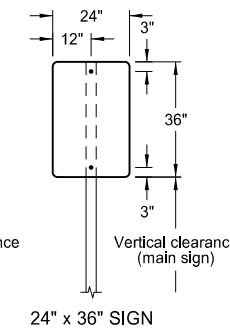
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



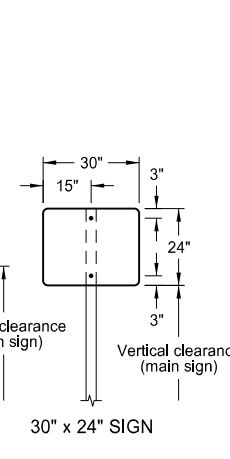
48" x 48" SIGN
(with R6-1-54 sign as required)



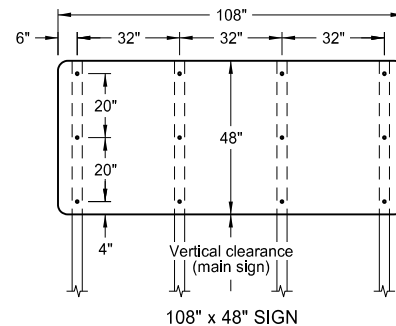
48" x 48" SIGN
(with R2-1a-24 sign as required)



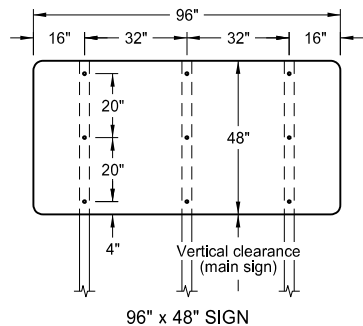
24" x 36" SIGN



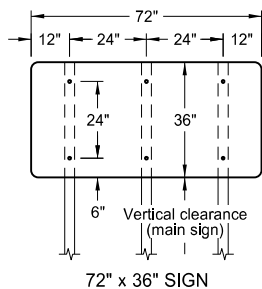
30" x 24" SIGN



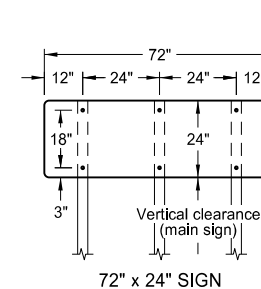
108" x 48" SIGN



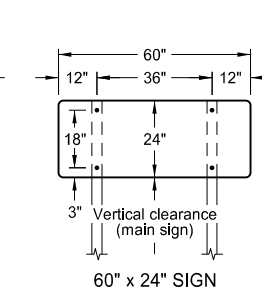
96" x 48" SIGN



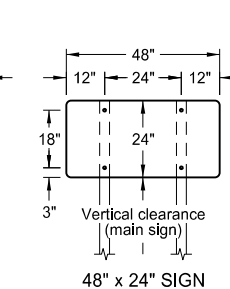
72" x 36" SIGN



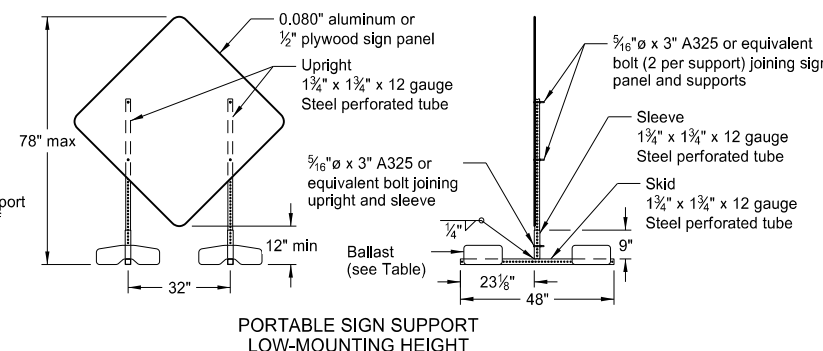
72" x 24" SIGN



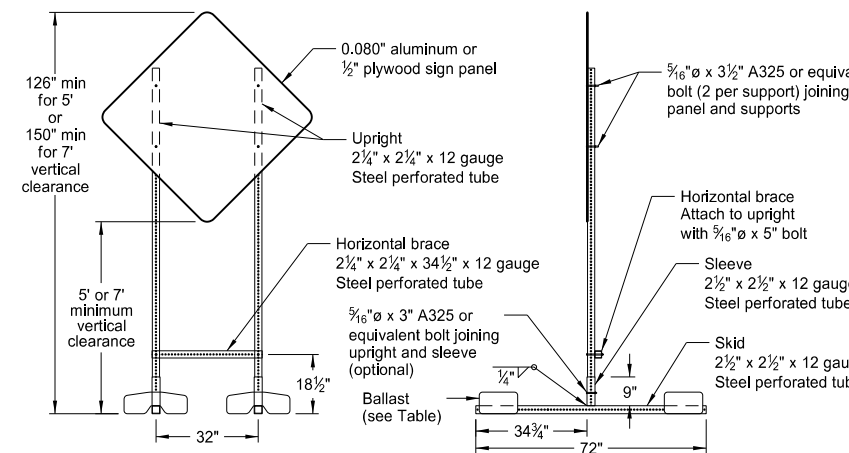
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

- Sign Supports:** Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.
- Sign Panels:** Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.
- Alternate Messages:** The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)
- Route Marker Auxiliary Signs:** Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background
- Vertical Clearance:** Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.
- Portable Signs:** Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-5 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

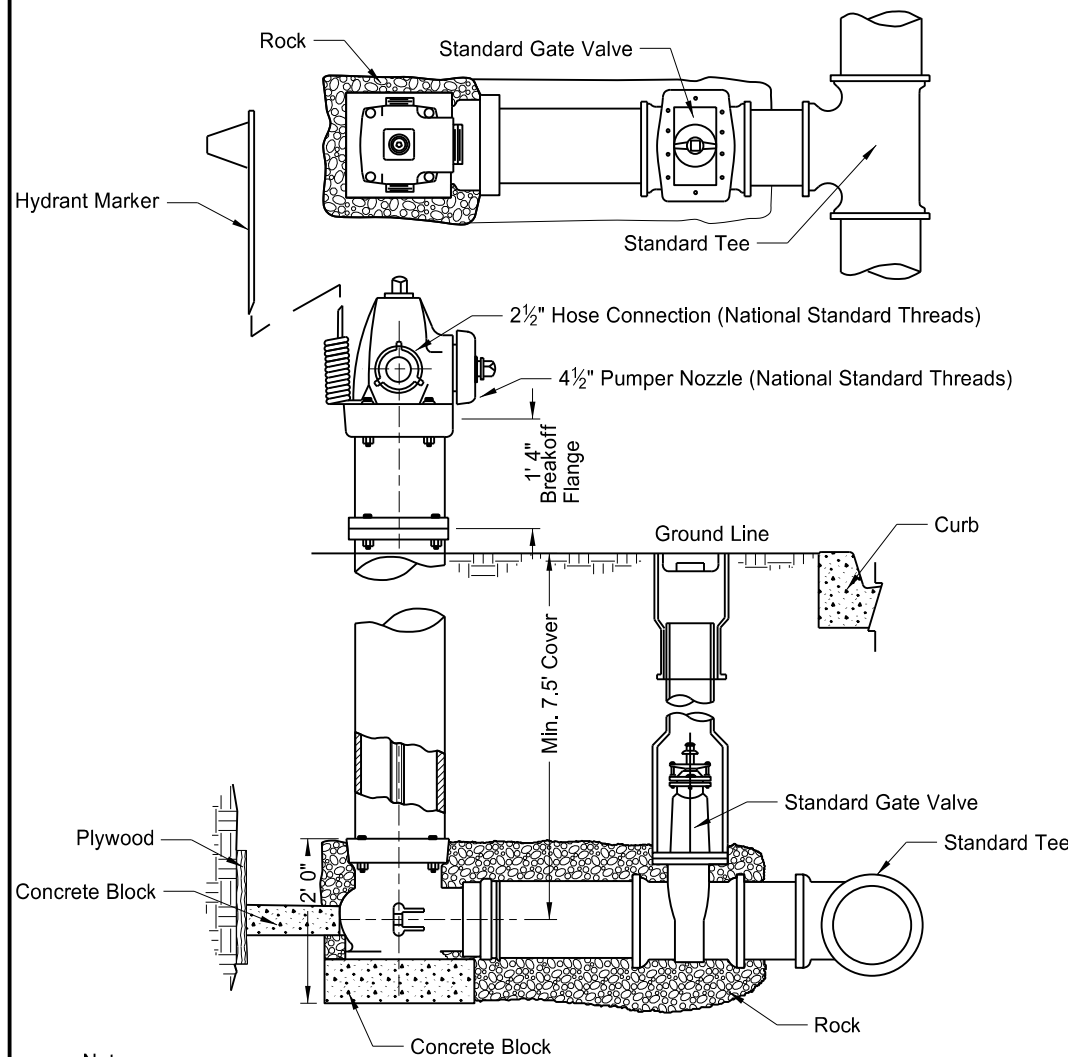
Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
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DATE	CHANGE
11-14-13	Revised Note 6.

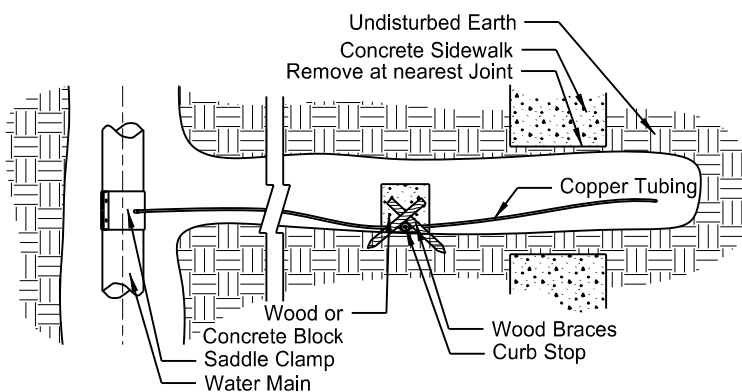
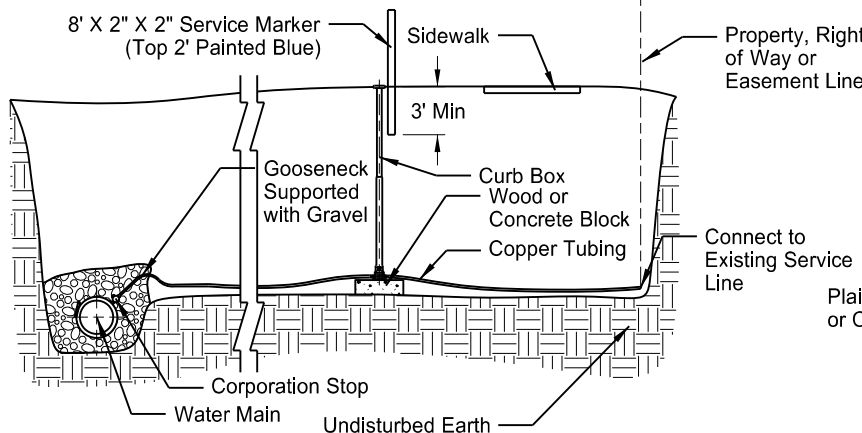
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WATERWORKS



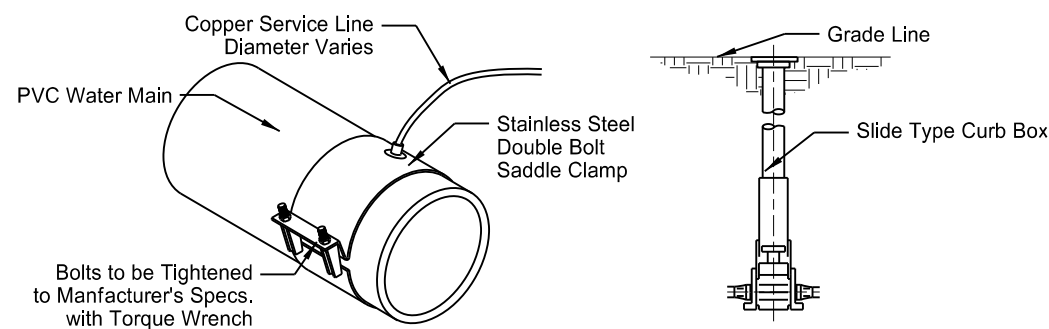
- Notes:
1. Operating & Cap Nuts: City Standards
 2. Supply and furnish and install hydrant marker. Cost will be included with the unit bid price for the hydrant. The hydrant marker shall be current with city standards or as approved by the engineer in the field.

STANDARD FIRE HYDRANT & CONNECTION

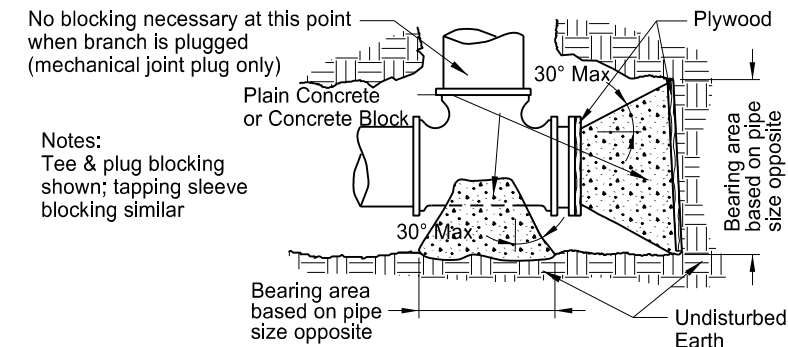


- Notes:
1. Service clamp are not required where small size service lines are connected to large cast iron or ductile iron pipe and three threads of the corporation stop make contact with the wall.
 2. Trench shall be gravel backfill from water main to back of curb line and under sidewalk areas or standard compaction of earth backfill where specified.

WATER CURB CONNECTION



TYPICAL CORPORATION STOP AND CURB STOP

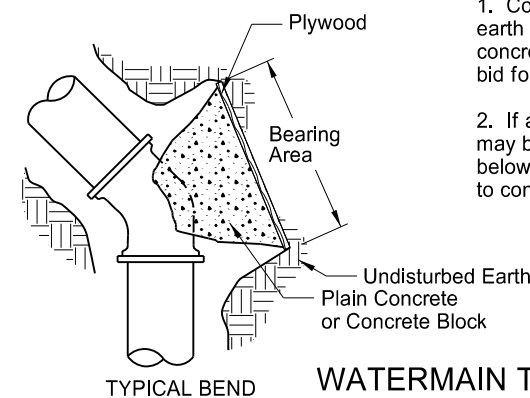


- Notes:
- Tee & plug blocking shown; tapping sleeve blocking similar

Table of Required Bearing Areas					
Size of Pipe	90° Bend	45° Bend	22.5° Bend	11.25° Bend	Tees, Plugs & Tapping Sleeves
4"	2' Sq	2' Sq	2' Sq	2' Sq	2' Sq
6"	3' Sq	2' Sq	2' Sq	2' Sq	3' Sq
8"	5' Sq	3' Sq	2' Sq	2' Sq	4' Sq
10"	8' Sq	4' Sq	3' Sq	2' Sq	6' Sq
12"	11' Sq	6' Sq	3' Sq	2' Sq	8' Sq
16"	20' Sq	11' Sq	6' Sq	4' Sq	15' Sq
18"	25' Sq	14' Sq	7' Sq	4' Sq	18' Sq

- Notes:
1. Concrete blocking to be poured against undisturbed earth and plywood. Keep bells and bolts free of concrete. Concrete in place to be included in price bid for water main.
 2. If approved by the engineer, solid concrete blocks may be used for blocking on 8" Dia. pipe and below. 10" Dia. pipe and above will conform to concrete poured in place areas as shown above.

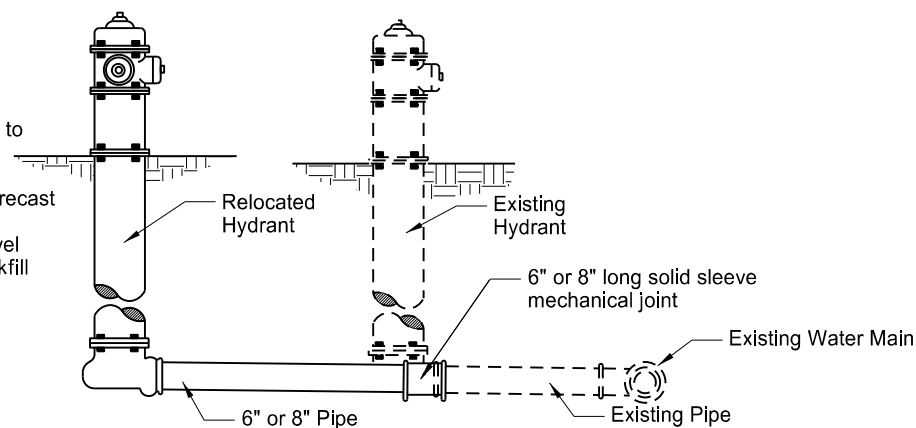
TYPICAL SECTION



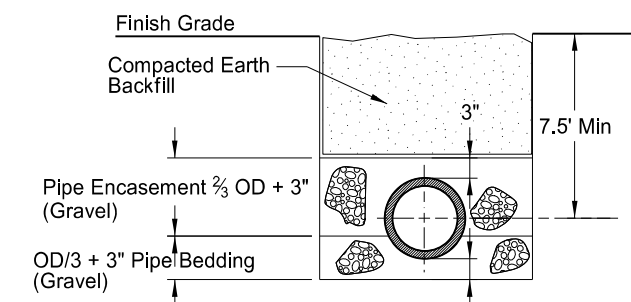
TYPICAL BEND

WATERMAIN THRUST BLOCK DETAILS

- Notes:
1. Concrete thrust blocking to be placed as directed.
 2. Hydrant to be set on a precast concrete pad. The hydrant shall be surrounded by gravel according to the trench backfill detail.



LAYOUT FOR RELOCATION OF HYDRANTS



TRENCH BACKFILL

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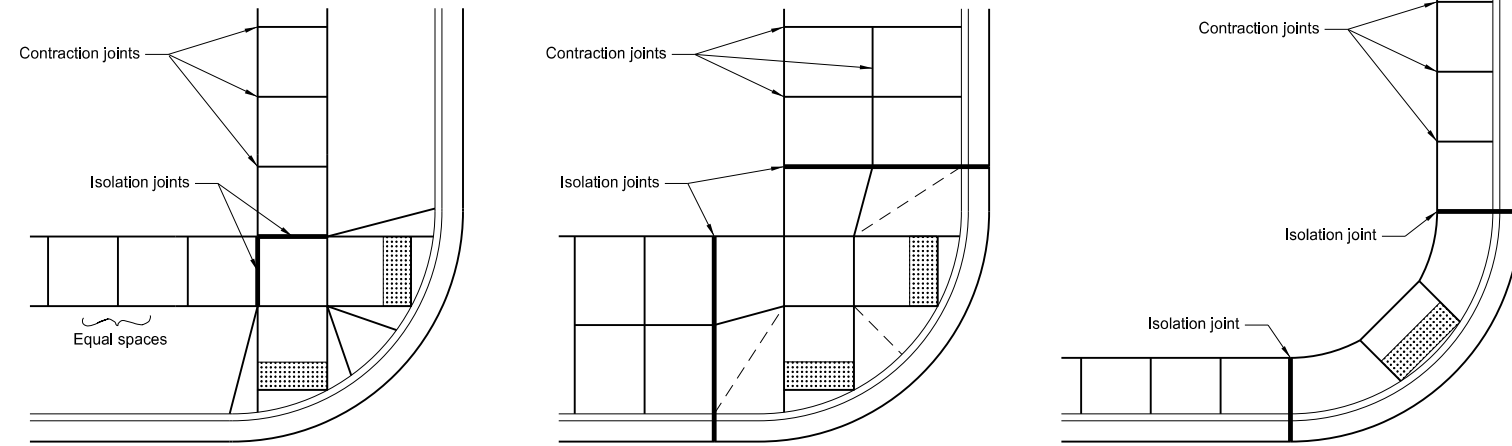
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SIDEWALK

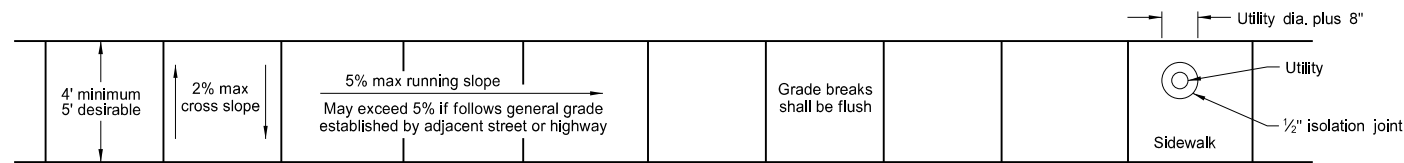
D-750-2

NOTES:

1. Curb ramp and detectable warning panel layouts are for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Transverse contraction joint spacing shall vary from 4' to 6' to create approximate square panels. Longitudinal contraction joints shall be used where the sidewalk width is 8' or greater, and shall be spaced at half the sidewalk width. The contraction joints may be sawed or a grooved joint, and shall be a minimum of 1/3 the depth of the concrete. When the sidewalk is adjacent to the curb & gutter, the sidewalk joint spacing shall be varied to match up with the curb & gutter joints. Isolation joints should also be used between separately poured concretes, or between old and new concrete. The cost for all labor, equipment, and material necessary to construct contraction and isolation joints shall be included in the price bid for sidewalk concrete.
3. 4" sidewalk concrete thickness to be used unless otherwise specified in the plans.
4. 4" base material thickness to be used unless otherwise specified in the plans. All labor and materials necessary to place the base material shall be included in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."
5. Landscaping is preferred to modify existing ground slope changes as needed. If not possible, such as adjacent buildings, a vertical curb may be used as shown in the detail below. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.

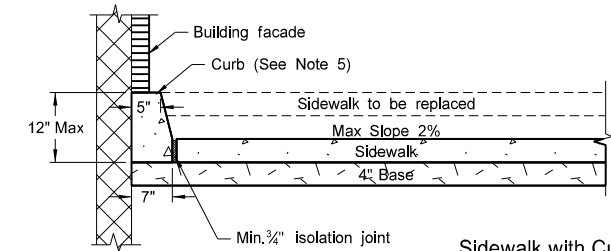


Typical Joint Layouts

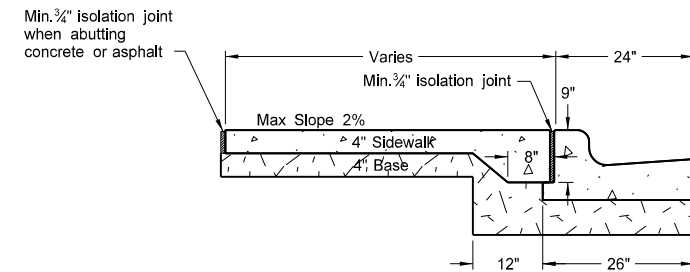


Sidewalk Width and Grade

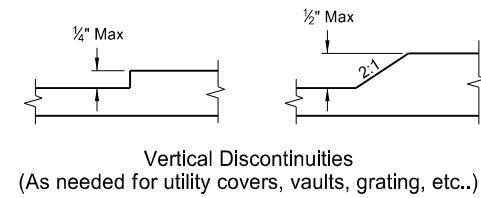
Utility Blockout



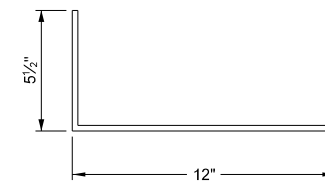
Sidewalk with Curb Detail (Building face application)



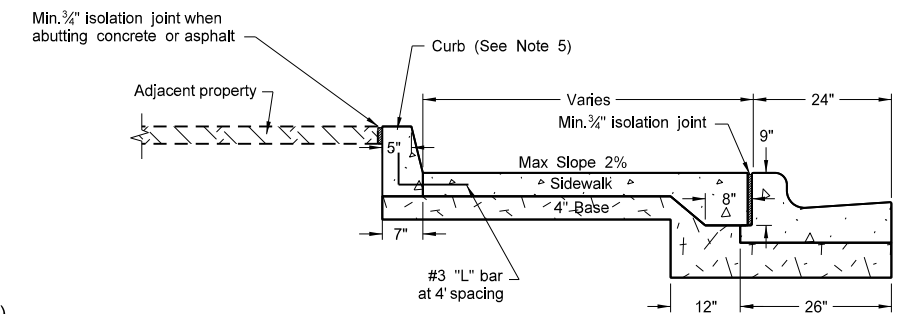
Sidewalk Detail (Installed adjacent to curb and gutter)



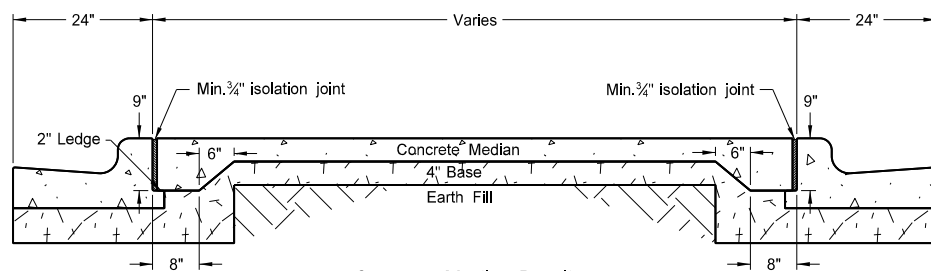
Vertical Discontinuities (As needed for utility covers, vaults, grating, etc..)



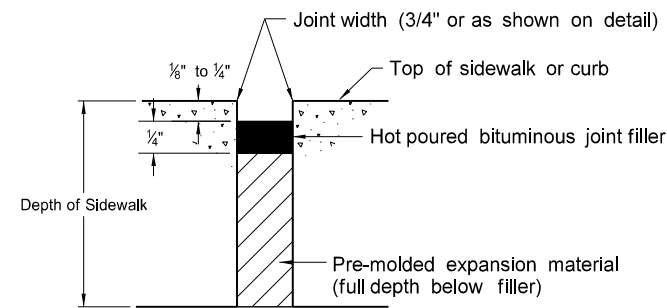
"L" Bar Detail #3 Bar



Sidewalk with Curb Detail (Adjacent property application)



Concrete Median Detail



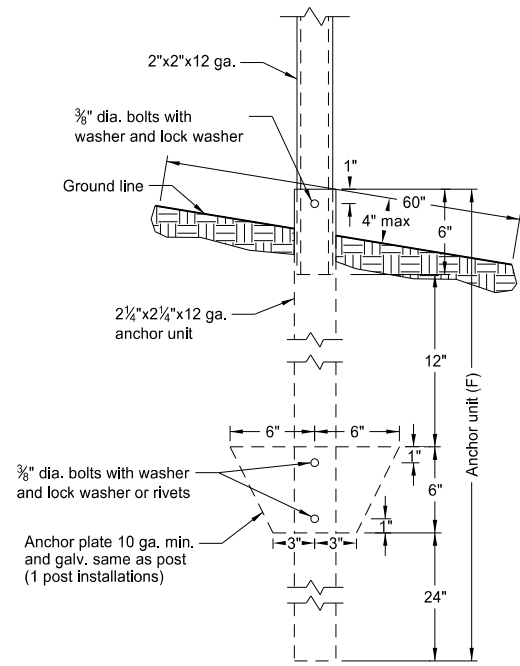
Typical Isolation Joint Seal (longitudinal and transverse)

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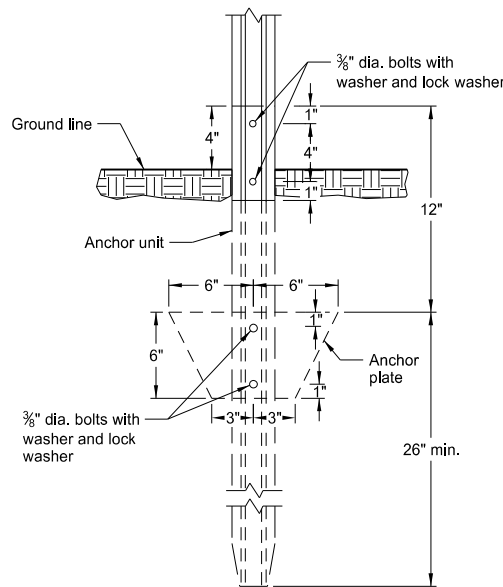
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OBJECT MARKERS

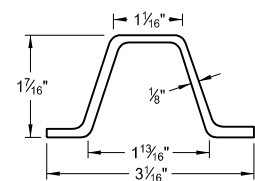
D-754-82



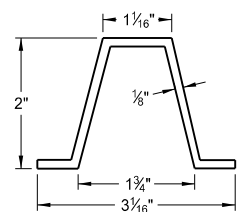
Perforated Tube Anchor Unit Assembly



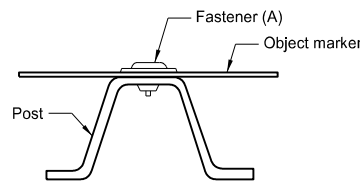
U-Channel Anchor Unit Assembly



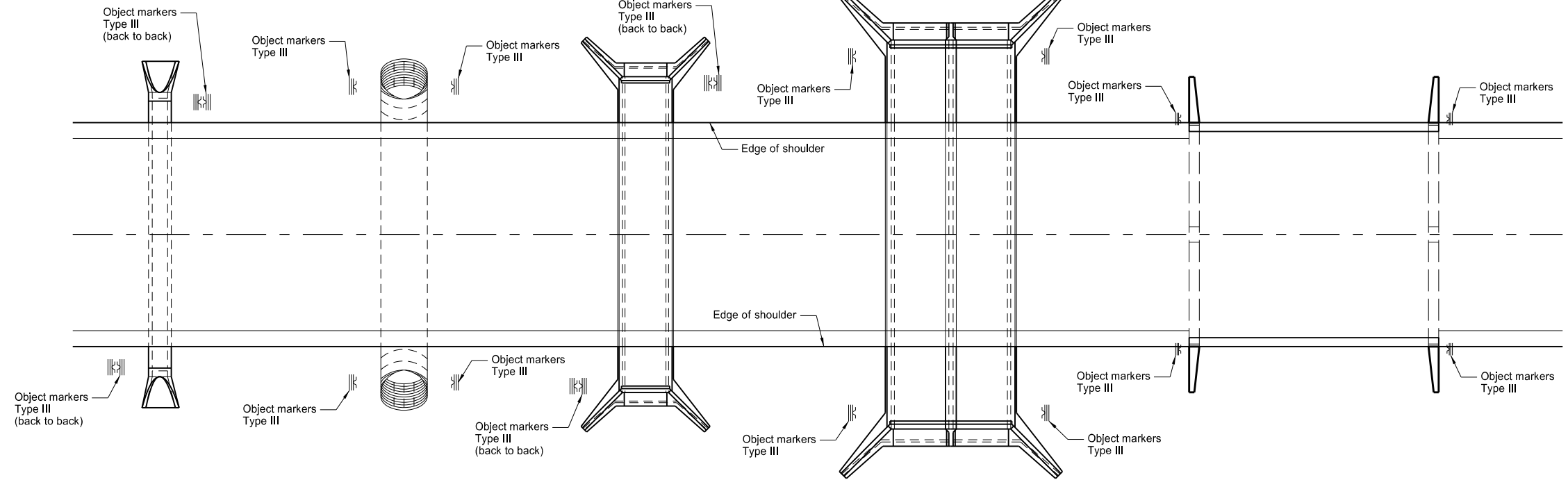
Steel Post Detail (E)
 Approx. 2 lb/ft



Aluminum Post Detail (E)
 Approx. 0.88 lb/ft



Fastener Detail



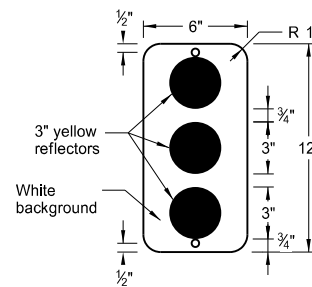
Pipe Culverts
 10' max

Pipe Culverts
 greater than 10'

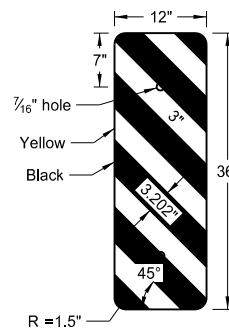
Box Culverts
 10' max

Box Culverts
 greater than 10'

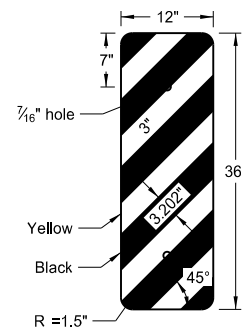
Bridges (B)



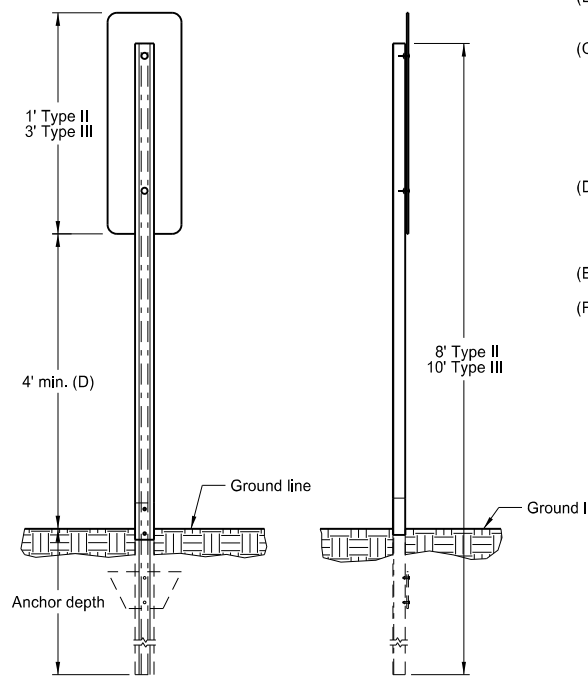
Object Marker
 OM2-1V (C)
 Type II



Object Marker Left
 OM-3L (C)
 Type III



Object Marker Right
 OM-3R (C)
 Type III



Object Marker
 Installation Detail

Notes:

- (A) The fastener shall be 3/8" dia. with flat washer having a min. outside dia. of 1 1/16". Fasteners shall be tension pin type or other non-rust vandal resistant fastener.
- (B) Object markers are not required if approach guardrail is installed with reflectors and end terminal with impact head object markers.
- (C) Back to back mountings require two object markers. The 3" yellow reflector shall conform to the requirements of Section 894.06 B.2 of the Standard Specifications. Object markers to be mounted vertically on steel posts in front of the bridge railing on each side of highway to mark the horizontal clearance on all bridges where the distance between wheel guards is less than approach width. All sign backing material shall be .100" sheet aluminum. Type III object markers shall be ASTM Type XI sheeting. Type II object markers shall be ASTM Type IV background sheeting with ASTM Type XI reflectors.
- (D) When an object marker is located 8' or less from shoulder or curb, vertical clearance shall be a minimum of 4' from the near edge of the traveled way to the bottom of the sign. If located more than 8' from the shoulder or curb the vertical clearance shall be a minimum of 4' from the ground to the bottom of the sign.
- (E) Posts shall conform to Section 894.03 B of the Standard Specifications.
- (F) 4" vertical clearance of anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and back and ahead of post.

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7-18-14	Revised Note C

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