

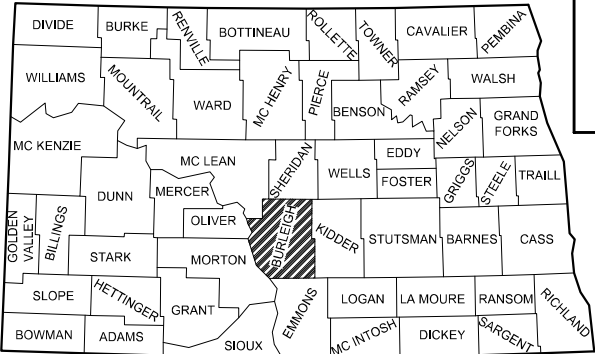
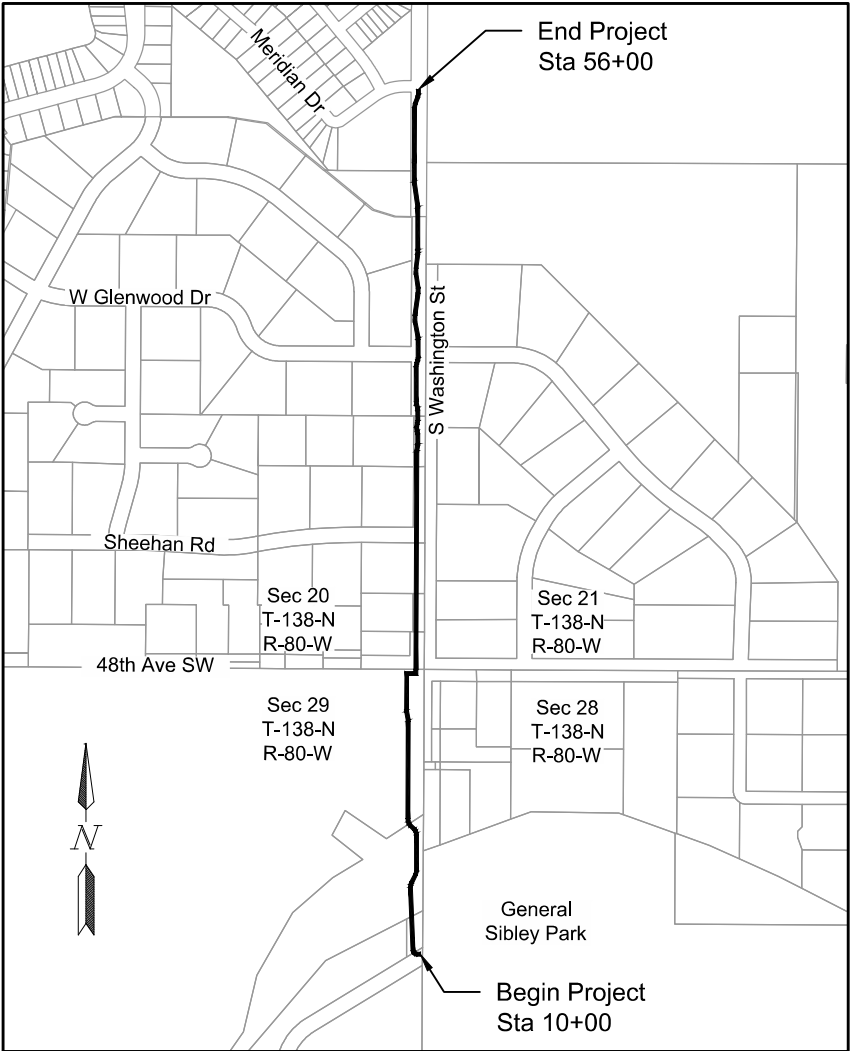
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|--|-------|----------------|-------|-------------|-----------|
|  | STATE | PROJECT NO.    | PCN   | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 23910 | 1           | 1         |

NORTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
TAC-1-981(138)

Bismarck Parks and Recreation District  
Burleigh County  
South Washington Street from Meridian Drive to General Sibley Park  
Grading, Culverts, Shared Use Path, Signing, & Pavement Marking

|                             |                                                                                   |
|-----------------------------|-----------------------------------------------------------------------------------|
| GOVERNING SPECIFICATIONS    | Date Published and Adopted<br>by the North Dakota<br>Department of Transportation |
| Standard Specifications     | 7/1/2024                                                                          |
| Supplemental Specifications | NONE                                                                              |

| PROJECT NUMBER \ DESCRIPTION  | NET MILES | GROSS MILES |
|-------------------------------|-----------|-------------|
| TAC-1-981(138)                |           |             |
| South Washington Street Trail | 0.871     | 0.871       |



STATE COUNTY MAP

|                                     |
|-------------------------------------|
| DESIGNER<br>Thomas Demke, PE        |
| DESIGNER<br>Amanda Vetter, PE, PTOE |
| DESIGNER<br>Derek Anderson, PE      |
| DESIGNER<br>Bryce Mathison          |
| DESIGNER<br>Ethan Haley             |

APEX ENGINEERING GROUP

REGISTERED PROFESSIONAL ENGINEER

THOMAS J. DEMKE

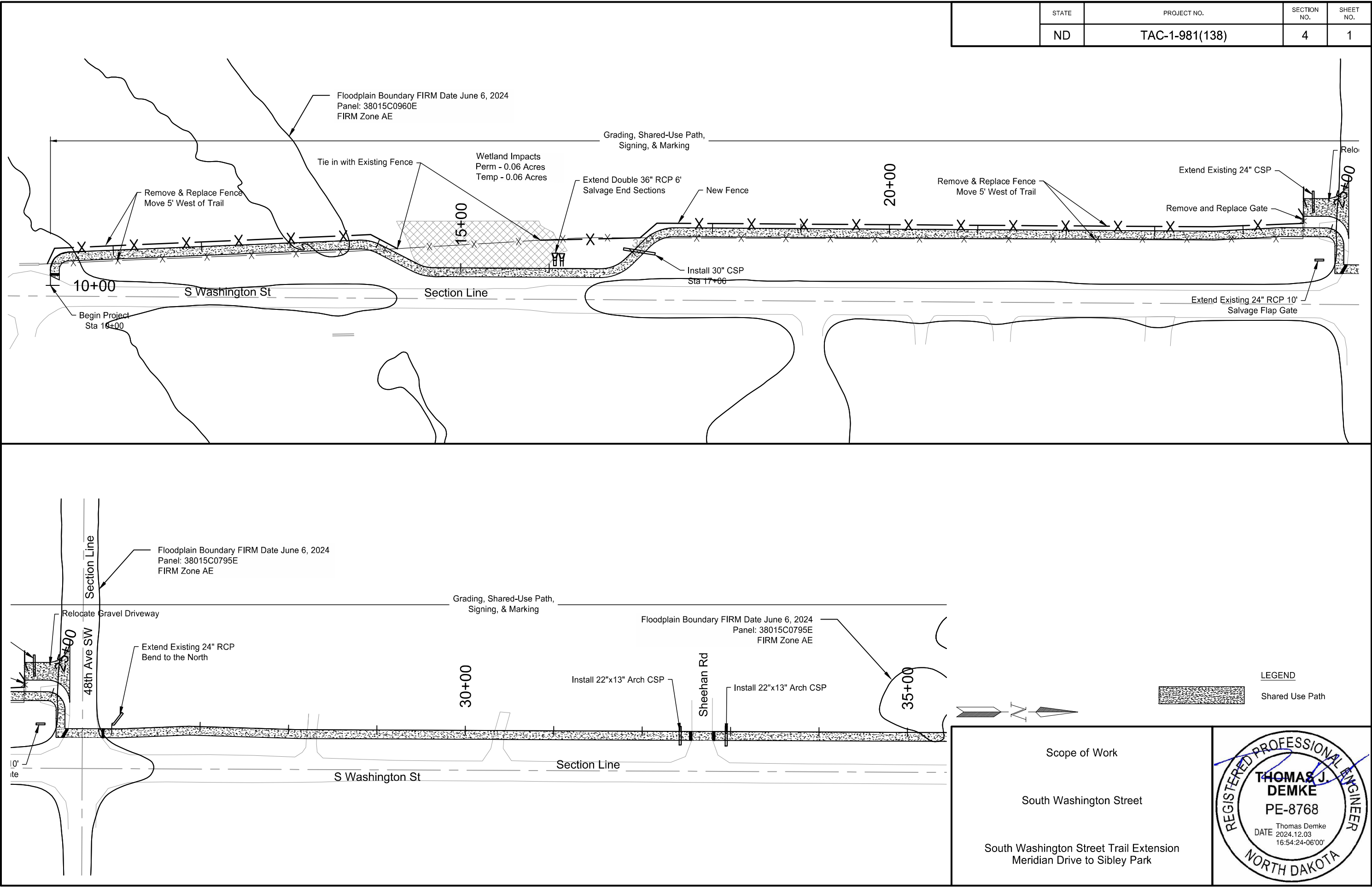
PE-8768

Thomas Demke  
DATE 2024.12.03  
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NORTH DAKOTA

|                                                                                                                                                                                                      |                                                          |                                  |                           |                                                                                                    |       |  |  |  |                |  |             |  |           |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------|---------------------------|----------------------------------------------------------------------------------------------------|-------|--|--|--|----------------|--|-------------|--|-----------|--|
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|                                                                                                                                                                                                      |                                                          |                                  |                           |                                                                                                    | ND    |  |  |  | TAC-1-981(138) |  | 2           |  | 1         |  |
| PLAN SECTIONS                                                                                                                                                                                        |                                                          |                                  | LIST OF STANDARD DRAWINGS |                                                                                                    |       |  |  |  |                |  |             |  |           |  |
| Section                                                                                                                                                                                              | Page(s)                                                  | Description                      | Number                    | Description                                                                                        |       |  |  |  |                |  |             |  |           |  |
| 1                                                                                                                                                                                                    | 1                                                        | Title Sheet                      | D-101-1, 2,3,4            | NDDOT Abbreviations                                                                                |       |  |  |  |                |  |             |  |           |  |
| 2                                                                                                                                                                                                    | 1                                                        | Table of Contents                | D-101-10                  | NDDOT Utility Company and Organization Abbreviations                                               |       |  |  |  |                |  |             |  |           |  |
| 4                                                                                                                                                                                                    | 1 - 2                                                    | Scope of Work                    | D-101-20, 21              | Line Styles                                                                                        |       |  |  |  |                |  |             |  |           |  |
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| 30                                                                                                                                                                                                   | 1                                                        | Typical Sections                 | D-704-8                   | Breakaway Systems For Construction Zone Signs - U-Channel Post                                     |       |  |  |  |                |  |             |  |           |  |
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|                                                                                                                                                                                                      |                                                          |                                  | D-714-4                   | Round Corrugated Steel Pipe Culverts And End Sections                                              |       |  |  |  |                |  |             |  |           |  |
|                                                                                                                                                                                                      |                                                          |                                  | D-714-5                   | Corrugated Steel Pipe Arch Culverts And End Sections                                               |       |  |  |  |                |  |             |  |           |  |
|                                                                                                                                                                                                      |                                                          |                                  | D-714-22                  | Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties                                   |       |  |  |  |                |  |             |  |           |  |
|                                                                                                                                                                                                      |                                                          |                                  | D-714-27                  | Pipe Installation Detail for Longitudinal Mainline Pipe or Pipe Not Under the Roadway              |       |  |  |  |                |  |             |  |           |  |
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|                                                                                                                                                                                                      |                                                          |                                  | D-750-3                   | Curb Ramp Retrofit Details                                                                         |       |  |  |  |                |  |             |  |           |  |
|                                                                                                                                                                                                      |                                                          |                                  | D-750-4                   | Curb Ramp Retrofit Transitional Area Details                                                       |       |  |  |  |                |  |             |  |           |  |
|                                                                                                                                                                                                      |                                                          |                                  | D-752-1                   | Standard Barbed Wire Fence                                                                         |       |  |  |  |                |  |             |  |           |  |
|                                                                                                                                                                                                      |                                                          |                                  | D-754-23                  | Perforated Tube Assembly Details                                                                   |       |  |  |  |                |  |             |  |           |  |
|                                                                                                                                                                                                      |                                                          |                                  | D-754-24, 25              | Mounting Details Perforated Tube                                                                   |       |  |  |  |                |  |             |  |           |  |
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|                                                                                                                                                                                                      |                                                          |                                  | D-762-1                   | Pavement Marking Message Details                                                                   |       |  |  |  |                |  |             |  |           |  |
| SPECIAL PROVISIONS                                                                                                                                                                                   |                                                          |                                  |                           |                                                                                                    |       |  |  |  |                |  |             |  |           |  |
| Number                                                                                                                                                                                               | Description                                              |                                  |                           |                                                                                                    |       |  |  |  |                |  |             |  |           |  |
| SSP 1                                                                                                                                                                                                | Temporary Erosion and Sediment Best Management Practices |                                  |                           |                                                                                                    |       |  |  |  |                |  |             |  |           |  |
| SP 237(24)                                                                                                                                                                                           | Commercial Grade Asphalt                                 |                                  |                           |                                                                                                    |       |  |  |  |                |  |             |  |           |  |
| PSP 30(24)                                                                                                                                                                                           | Permits and Environmental Considerations                 |                                  |                           |                                                                                                    |       |  |  |  |                |  |             |  |           |  |
| <div><div>REGISTERED PROFESSIONAL ENGINEER</div><div>THOMAS J. DEMKE</div><div>PE-8768</div><div>Thomas Demke</div><div>DATE 2024.12.03</div><div>16:54:09-06'00'</div><div>NORTH DAKOTA</div></div> |                                                          |                                  |                           |                                                                                                    |       |  |  |  |                |  |             |  |           |  |







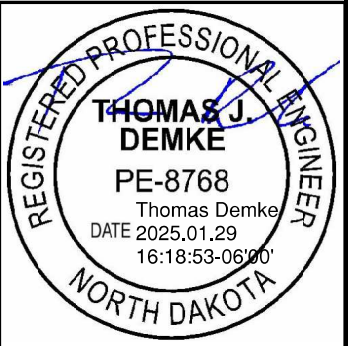
| STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|-------|----------------|-------------|-----------|
| ND    | TAC-1-981(138) | 6           | 1         |

NOTES

GENERAL NOTES

- 100-P01 UTILITIES: All utility companies were notified to mark their services. All underground utilities shown were either marked by their owners in the field or taken from maps supplied to Apex Engineering Group Inc. by the utility owner at the time of the survey. Apex Engineering Group Inc. does not certify to the completeness and/or accuracy of these locations. Persons using this survey should contact each utility company to verify that all utilities.
- Take measures to protect all existing utilities. Repair any damage caused by work at contractor's expense.
- 107-500 PAVEMENT SWEEPING: Sweep the roadways adjacent to work area at the end of each day. Use a vacuum or pickup type sweeper.
- 107-P01 HAUL ROAD RESTRICTIONS: Follow all and any local road authority haul road restrictions.
- 107-P02 SITE ACCESS: Access construction zone from public road or right of way. Avoid using private driveways as access, any damage to roadway or private driveways shall be repaired at the contractor's expense. Maintain access to homes and businesses for duration of construction.
- 201-P01 CLEARING AND GRUBBING: Tree and Woody Vegetation Removal: Remove trees and woody vegetation as shown on plans. Required tree removal limits are at minimum 14 feet, 2 feet outside of each edge of path or Grade Tie limits shown in the plans, whichever is greater. Remove branches vertical of the trail to ensure construction operations can proceed. Any tree of 3" DBH or larger are to be removed during inactive season of the Northern Long-Eared Bat from November 1 to April 14<sup>th</sup>. This includes the removal of felled trees that can be considered habitat. Removal of all trees, woody vegetation and stumps and all other items associated with this shall be included in the bid price for "Clearing and Grubbing".
- 201-P02 Protect trees and roots of trees that are not removed.
- 202-P02 REMOVAL OF BITUMINOUS SURFFACING: Include the cost to sawcut asphalt in the unit price bid for "Removal of Bituminous Surfacing".
- 203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.
- 203-P01 REMOVE AND SALVAGE TOPSOIL: There will be excess topsoil on the project. The salvaged topsoil will become the property of the Contractor and will be removed from the site. All costs associated with the excess topsoil will be included in the price bid for "Topsoil". The estimated excess topsoil is 256 CY.
- 203-P02 COMPACTION AND DENSITY CONTROL: Compact material as specified in Section 203.04 G.3, Compaction Control, Type B.

- 203-P03 MAINTAIN DRAINAGE: Maintain drainage throughout construction of project. Maintain drainage in a manner that does not inundate roadways, driveways, or adjacent properties.
- 251-P01 SEEDING CLASS III: Seed disturbed ground immediately after topsoil placement to promote early seed growing conditions. Use a seed mixture as follows:
- |                    |                   |
|--------------------|-------------------|
| Seed               | Percent by Weight |
| Fairway Crested    | 30%               |
| Sheep Fescue       | 30%               |
| Perennial Ryegrass | 40%               |
- Apply the above mix at 90 lbs./acre. Include all cost for labor, equipment, and materials necessary to complete the work in the price bid for "Seeding Class III."
- 430-P01 COMMERCIAL GRADE HOT MIX ASPHALT: Submit a mix design that meets FAA 43 for approval. The Hot Mix Asphalt used will be accepted by one random aggregate and mix sample representing the plan quantity for the project.
- 430-P02 ORDINARY COMPACTION OF HOT MIX ASPHALT: Compact asphalt in accordance with Section 430.04 I.3 of the Standard Specifications, modified as follows; Use one self-propelled roller such as a single drum or double drum steel roller of adequate size to obtain compaction without damage to the trail surface or subgrade.
- 714-P01 PIPE CONDUIT: All new Pipe Conduit installed are intended to be Corrugated Steel Pipe. Match existing Pipe Conduit material for Pipe Conduit Extensions.
- 714-P02 FLAP GATE: Include all costs associated with Remove and Relay Flapgate in the bid price for "Flap Gate – Relay All Sizes".
- 750-P01 SIDEWALK CONCRETE 6IN: Include the cost to sawcut and remove asphalt to provide a clean tie in edge for Concrete Sidewalk. Include the sawcut and removal in the unit price "Sidewalk Concrete 6IN".
- 750-P02 DETECTABLE WARNING PANELS: Provide cast iron, stainless steel, or galvanized steel detectable warning panels. Color to be Safety Yellow U.S. ANSI Z535.1-1991, 6.3.
- 752-P01 VEHICLE GATE: Salvage all mounting hardware and gates. Reset gate in location specified in the plan sheets. Include all costs associated with removing, salvaging, resetting, and all other items associated with resetting/installing the gate in the bid price for "Reset Vehicle Gate". See Section 20 for gate detail.
- 752-P02 FENCE: Resetting of fence will require additional corner posts. Include cost of corner posts and all costs associated with installing additional corner posts in the bid price for "Fence Remove and Reset".



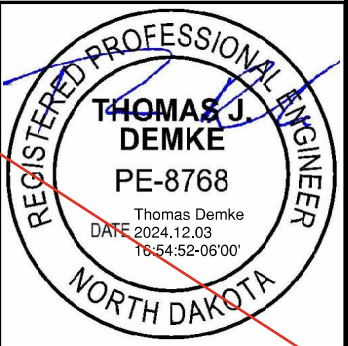


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ENVIRONMENTAL NOTES

ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EN-1 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, Ben Holen by e-mail - bholen@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).

EN-2 THREATENED AND ENDANGERED SPECIES: The project is located near/within suitable habitat for the species listed in the following

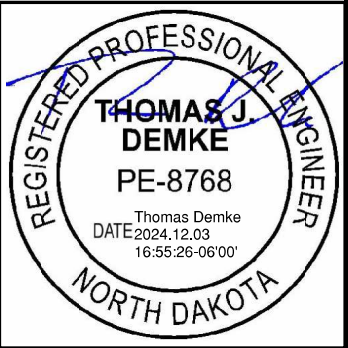
| SPECIES                 | HABITAT                                                | PRESENCE                                                                    |
|-------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------|
| Northern Long-Eared Bat | Forested/Wooded Areas/Bridges/Box Culverts/Caves/Mines | Active Season: April 15 - October 31*<br>Inactive Season: Nov 1 – April 14* |

\*Time frames can differ slightly, depending on the year

If any of the above threatened and endangered species are identified within 1 mile of the project, the Contractor will notify the Engineer immediately and cease construction activities in the vicinity until an avoidance area is established. The Engineer will establish an avoidance area that is at least a 0.5 mile and immediately coordinate with the USFWS (701-355-8513), FHWA (701-221-9464), and NDDOT Environmental and Transportation Services (701-328-2592). The Contractor will not resume work within the avoidance area until the Engineer has confirmed with the agencies that work may proceed (either the species have left the area, or approved avoidance/minimization measures have been implemented).

- Marck tree removal limits according to plans prior to removal of trees. Stay within clearing limits.
- Do not remove documented Norther Long-Eared Bat roosts that are still suitable for roosting, or trees within 0.25 miles of roosts, or documented foraging habitat any time of year.

EN-3 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.





|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 8           | 1         |

| ESTIMATE OF QUANTITIES |      |                                               |       |       |
|------------------------|------|-----------------------------------------------|-------|-------|
| SPEC                   | CODE | ITEM DESCRIPTION                              | UNIT  | TOTAL |
| 103                    | 0100 | CONTRACT BOND                                 | L SUM | 1     |
| 201                    | 0330 | CLEARING & GRUBBING                           | L SUM | 1     |
| 202                    | 0132 | REMOVAL OF BITUMINOUS SURFACING               | SY    | 72    |
| 202                    | 0169 | REMOVAL OF END SECTION-ALL TYPES & SIZES      | EA    | 1     |
| 203                    | 0101 | COMMON EXCAVATION-TYPE A                      | CY    | 835   |
| 203                    | 0109 | TOPSOIL                                       | CY    | 1,153 |
| 203                    | 0140 | BORROW-EXCAVATION                             | CY    | 528   |
| 216                    | 0100 | WATER                                         | M GAL | 1     |
| 251                    | 0300 | SEEDING CLASS III                             | ACRE  | 4     |
| 253                    | 0201 | HYDRAULIC MULCH                               | ACRE  | 4     |
| 255                    | 0103 | ECB TYPE 3                                    | SY    | 294   |
| 260                    | 0100 | SILT FENCE UNSUPPORTED                        | LF    | 233   |
| 260                    | 0101 | REMOVE SILT FENCE UNSUPPORTED                 | LF    | 233   |
| 261                    | 0112 | FIBER ROLLS 12IN                              | LF    | 1,315 |
| 261                    | 0113 | REMOVE FIBER ROLLS 12IN                       | LF    | 1,315 |
| 302                    | 0120 | AGGREGATE BASE COURSE CL 5                    | TON   | 1,162 |
| 430                    | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT              | TON   | 1,080 |
| 702                    | 0100 | MOBILIZATION                                  | L SUM | 1     |
| 704                    | 0100 | FLAGGING                                      | MHR   | 200   |
| 704                    | 1000 | TRAFFIC CONTROL SIGNS                         | UNIT  | 652   |
| 704                    | 1054 | SIDEWALK BARRICADE                            | EA    | 2     |
| 704                    | 1060 | DELINEATOR DRUMS                              | EA    | 24    |
| 704                    | 1067 | TUBULAR MARKERS                               | EA    | 20    |
| 714                    | 0615 | PIPE CONC REINF 24IN CL III                   | LF    | 28    |
| 714                    | 0905 | PIPE CONC REINF 36IN CL III                   | LF    | 12    |
| 714                    | 4110 | PIPE CONDUIT 30IN                             | LF    | 36    |
| 714                    | 4216 | PIPE CONDUIT ARCH 22IN X 13IN                 | LF    | 95    |
| 714                    | 5035 | PIPE CORR STEEL .064IN 24IN                   | LF    | 24    |
| 714                    | 5820 | END SECT CORR STEEL .064IN 24IN               | EA    | 1     |
| 714                    | 9660 | REMOVE & RELAY END SECTION-ALL TYPE & SIZES   | EA    | 3     |
| 714                    | 9925 | FLAP GATE-RELAY ALL SIZES                     | EA    | 1     |
| 750                    | 0115 | SIDEWALK CONCRETE 4IN                         | SY    | 96    |
| 750                    | 0140 | SIDEWALK CONCRETE 6IN                         | SY    | 50    |
| 750                    | 2115 | DETECTABLE WARNING PANELS                     | SF    | 160   |
| 752                    | 0922 | FENCE REMOVE & RESET                          | LF    | 1,290 |
| 752                    | 2110 | RESET VEHICLE GATE                            | EA    | 1     |
| 752                    | 2120 | REMOVE VEHICLE GATE                           | EA    | 1     |
| 754                    | 0110 | FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING    | SF    | 32    |
| 754                    | 0112 | FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING    | SF    | 24    |
| 754                    | 0206 | STEEL GALV POSTS-TELESCOPING PERFORATED TUBE  | LF    | 174   |
| 754                    | 0592 | RESET SIGN PANEL                              | EA    | 4     |
| 754                    | 0593 | RESET SIGN SUPPORT                            | EA    | 1     |
| 762                    | 1307 | PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED  | LF    | 149   |
| 762                    | 1325 | PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED | LF    | 33    |

Estimated Quantities

South Washington Street

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

REGISTERED PROFESSIONAL ENGINEER  
THOMAS J. DEMKE  
PE-8768  
Thomas Demke  
DATE 2024.12.03 16:55:48-06'00'  
NORTH DAKOTA

|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 10          | 1         |

|                                           |
|-------------------------------------------|
| Basis of Estimate                         |
| Aggregate Base Course CL 5 @ 1.875 Ton/CY |
| Commercial Hot Mix Asphalt @2.0 Ton/CY    |
| Included: PG 58S-28 Asphalt Cement @ 6%   |
| Tack Coat @ 0.05 Gal/SY                   |
| PG 58S-28 ASPHALT CEMENT @ 4.7%           |

**Common Excavation**

Any existing aggregate base is included in the Common Excavation quantity.  
Payment shall be plan quantity.  
25% additional volume is included for shrinkage in earth embankment.

**Borrow Excavation**

25% additional quantity included in the bid item "Borrow Excavation" to Account for Shrinkage.

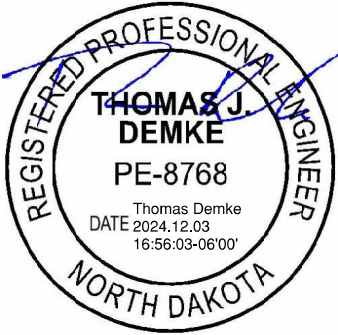
**Water**

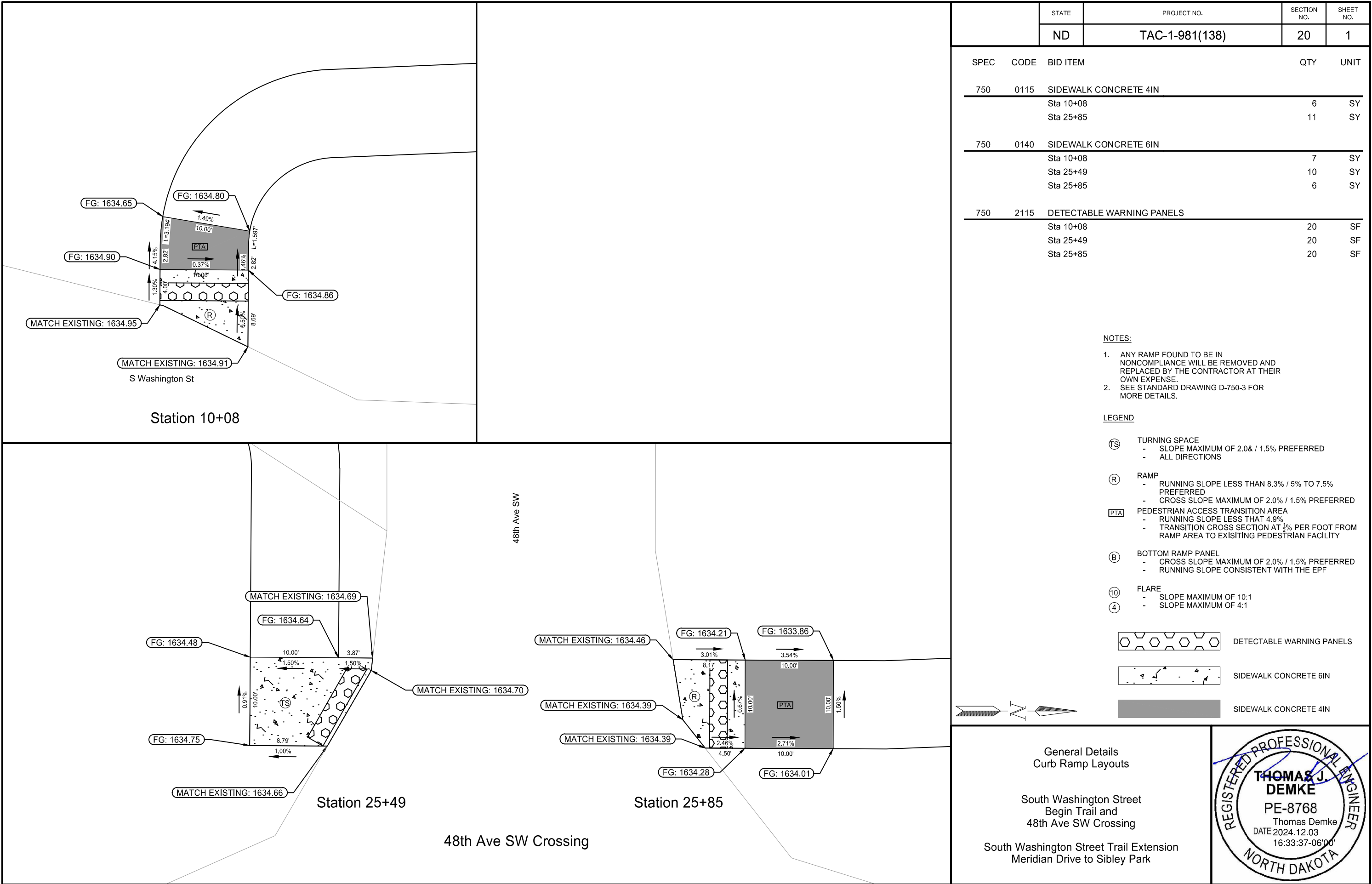
It is assumed 10 gal/CY of water for Embankment, 20 gal/CY for aggregate, and water for dust control. Bid quantity is assumed to be 1 Mgal.

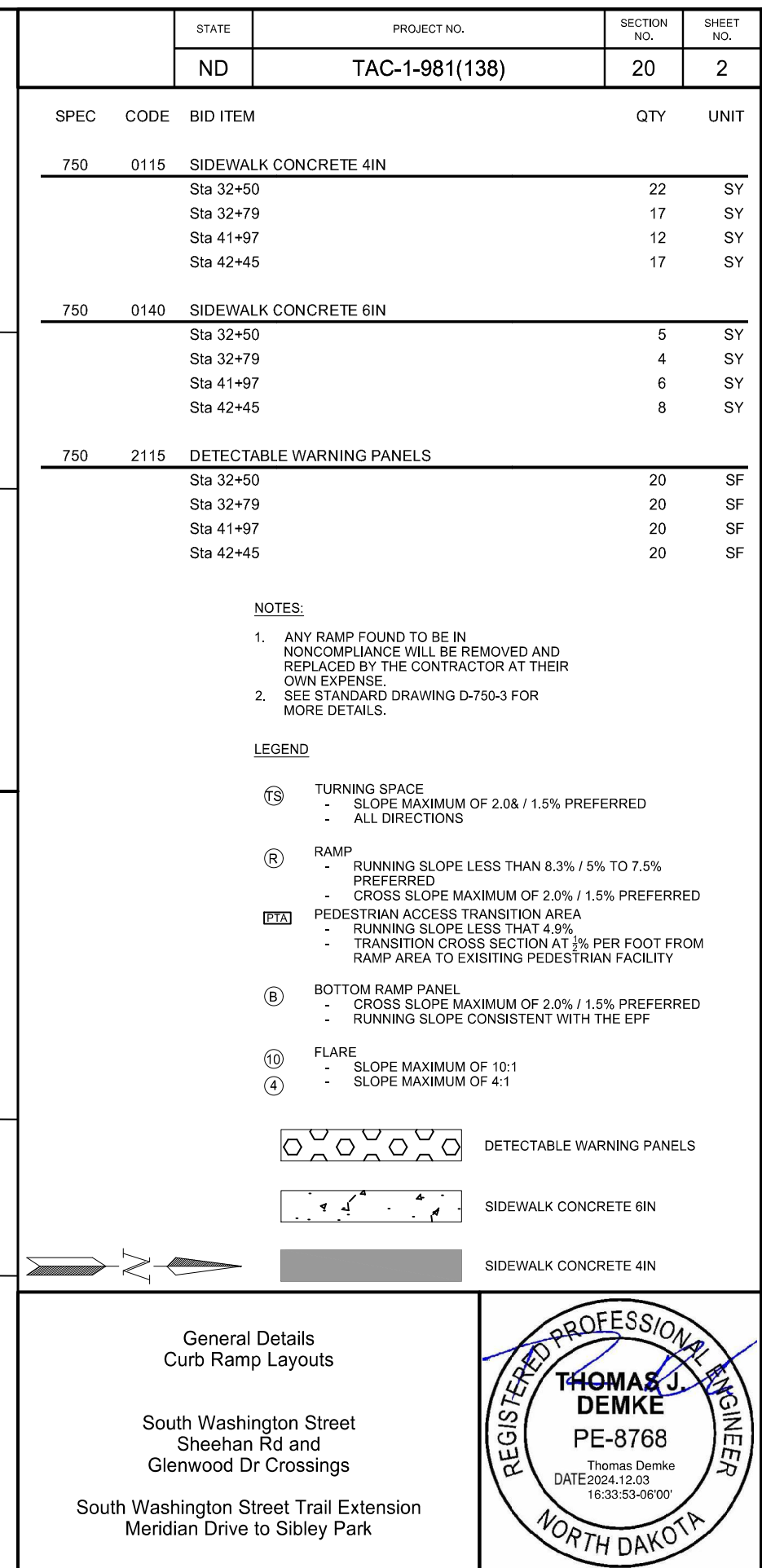
Basis of Estimate

South Washington Street

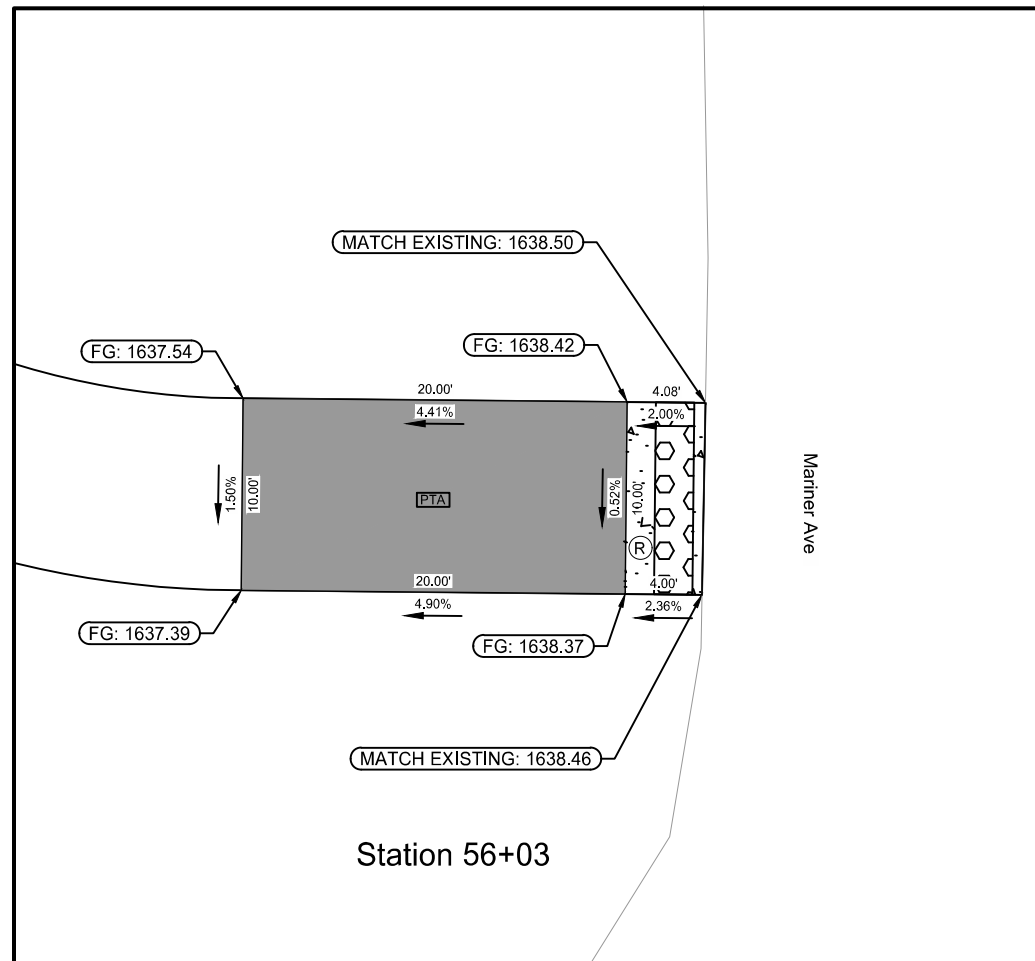
South Washington Street Trail Extension  
Meridian Drive to Sibley Park



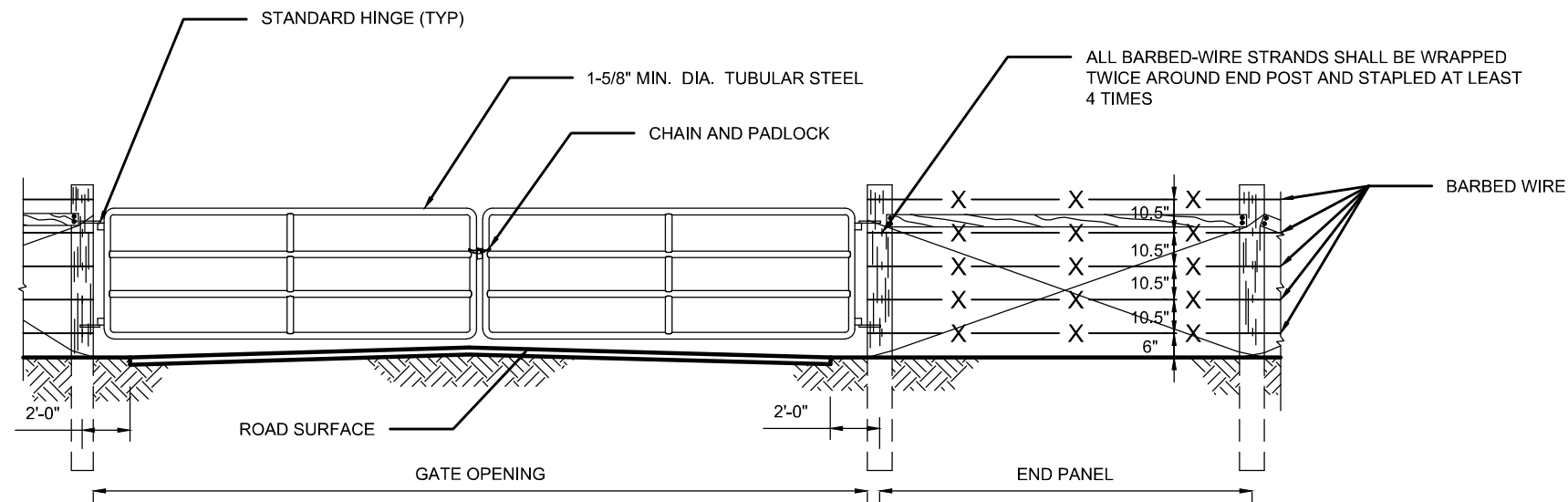








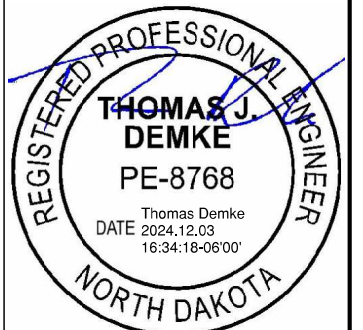
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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 20          | 4         |



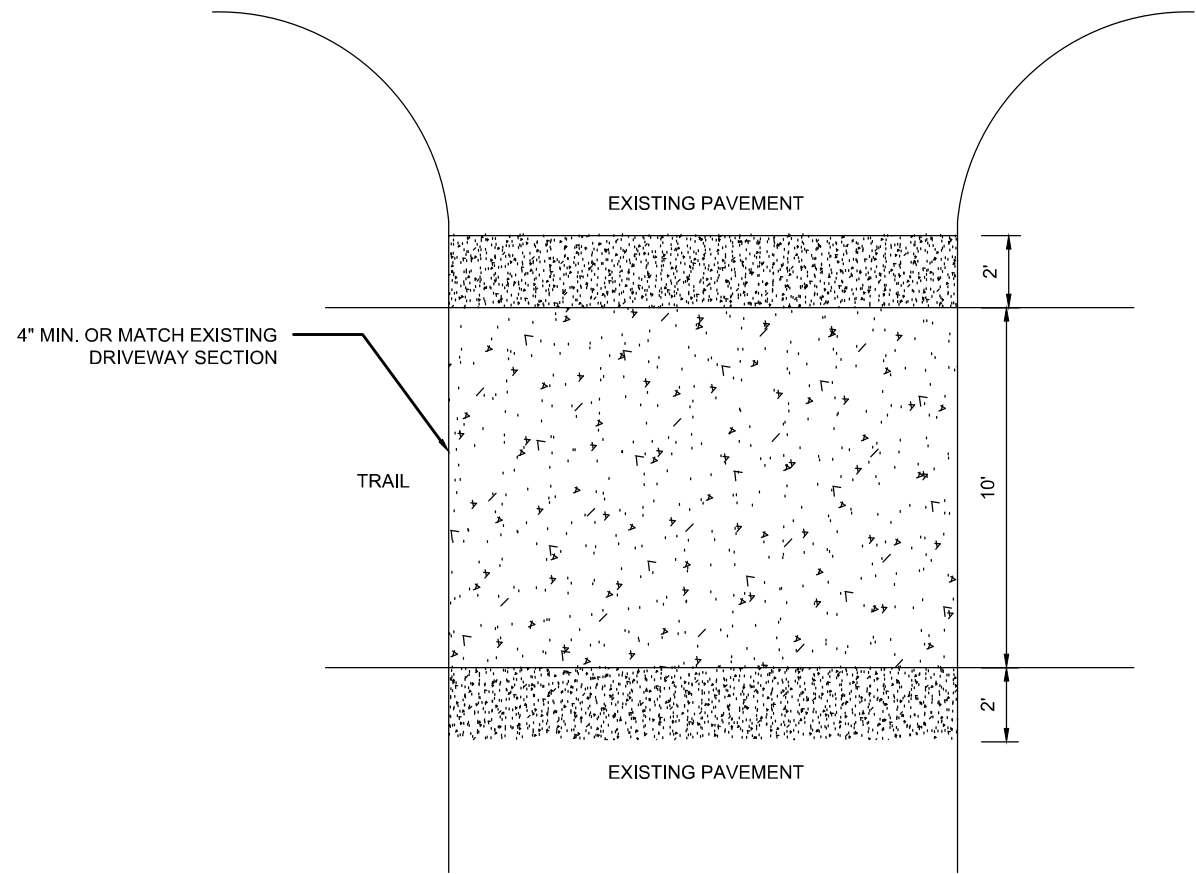
General Details  
Typical Cattle-Panel Gate

South Washington Street

South Washington Street Trail Extension  
Meridian Drive to Sibley Park



|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 20          | 5         |

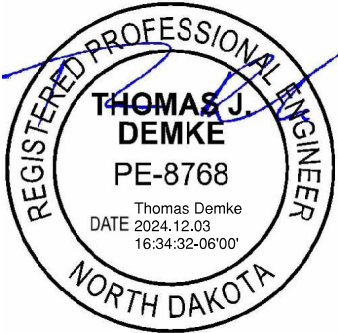


- NOTE:
1. REMOVE EXISTING PAVEMENT AT INTERSECTIONS 2 FEET OUTSIDE EDGE OF PATH.
  2. SLOPE TO MATCH PATH AND EXISTING DRIVEWAYS.

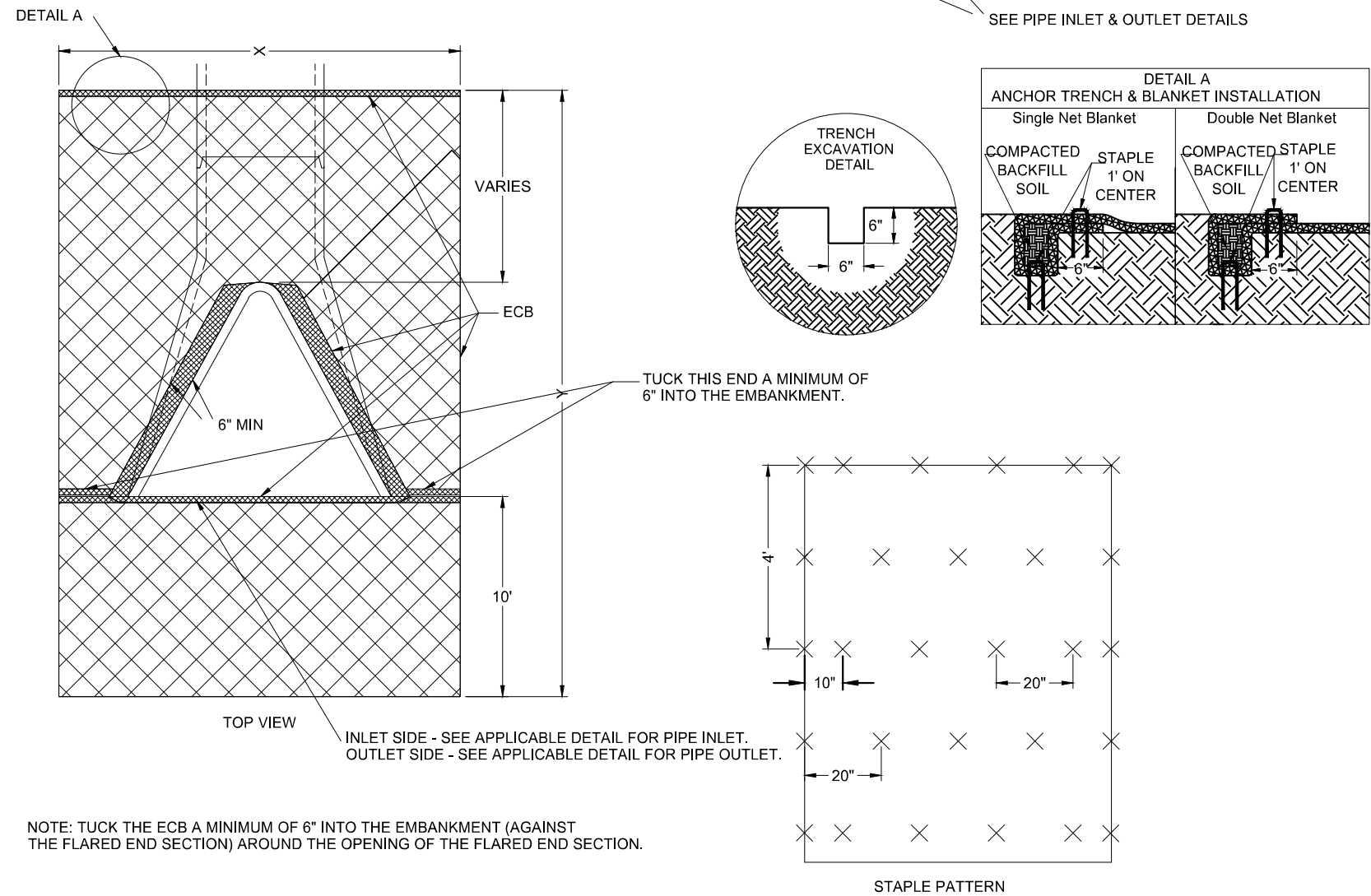
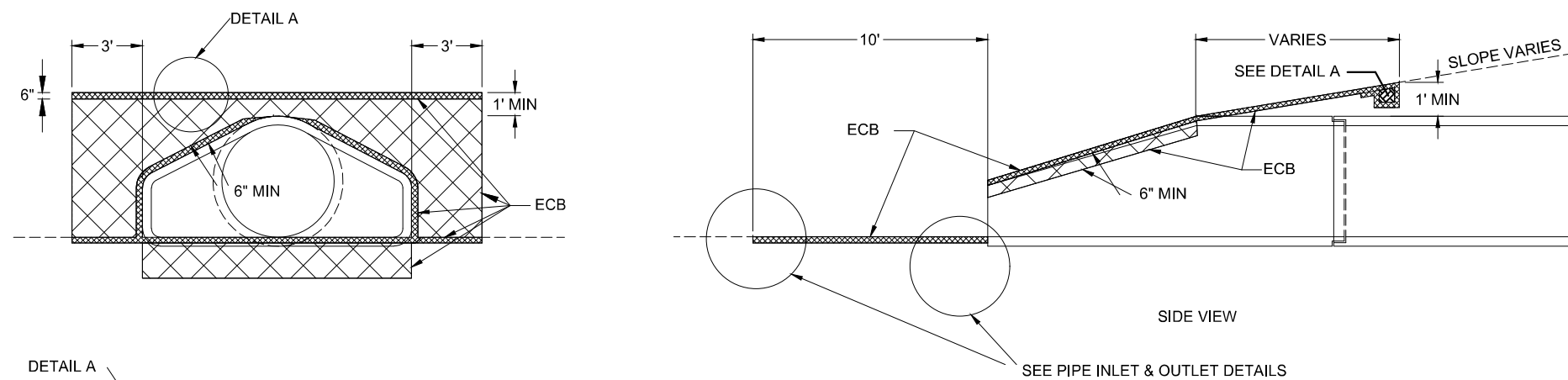
General Details  
Typical Section at Driveway Crossings

South Washington Street

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

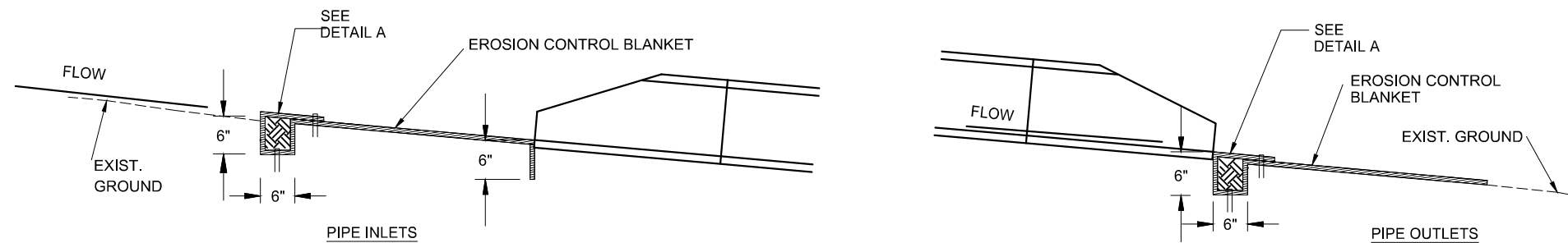


|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 20          | 6         |



NOTE: TUCK THE ECB A MINIMUM OF 6" INTO THE EMBANKMENT (AGAINST THE FLARED END SECTION) AROUND THE OPENING OF THE FLARED END SECTION.

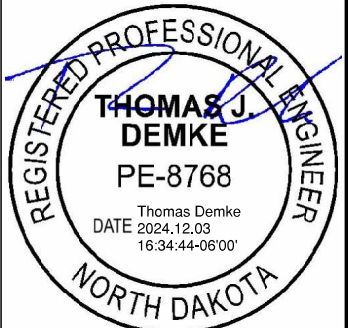
| 255 0103 ECB TYPE 3<br>CULVERTS |         |               |     |      |      |               |                |
|---------------------------------|---------|---------------|-----|------|------|---------------|----------------|
|                                 |         | Pipe Diameter | No. | X    | Y    | Unit Quantity | Total Quantity |
| Station                         | Offset  | (IN)          |     | (FT) | (FT) | (SY)          | (SY)           |
| 16+10                           | Rt      | 36            | 2   | 12.7 | 19.2 | 24            | 48             |
| 17+06                           | Lt & Rt | 30            | 2   | 11.6 | 18.5 | 22            | 44             |
| 25+57                           | Lt      | 24            | 1   | 10.5 | 17.6 | 20            | 20             |
| 25+57                           | Rt      | 24            | 1   | 10.5 | 17.6 | 20            | 20             |
| 26+15                           | Lt      | 24            | 1   | 10.5 | 17.6 | 20            | 20             |
| 32+43                           | Lt & Rt | 22x13         | 2   | 10.0 | 16.0 | 18            | 36             |
| 32+95                           | Lt & Rt | 22x13         | 2   | 10.0 | 16.0 | 18            | 36             |
| 41+84                           | Lt & Rt | 22x13         | 2   | 10.0 | 16.0 | 18            | 36             |
| 42+45                           | Lt & Rt | 22x13         | 2   | 10.0 | 16.0 | 18            | 36             |
|                                 |         |               |     |      |      |               | 294            |



General Details  
Culvert End Protection

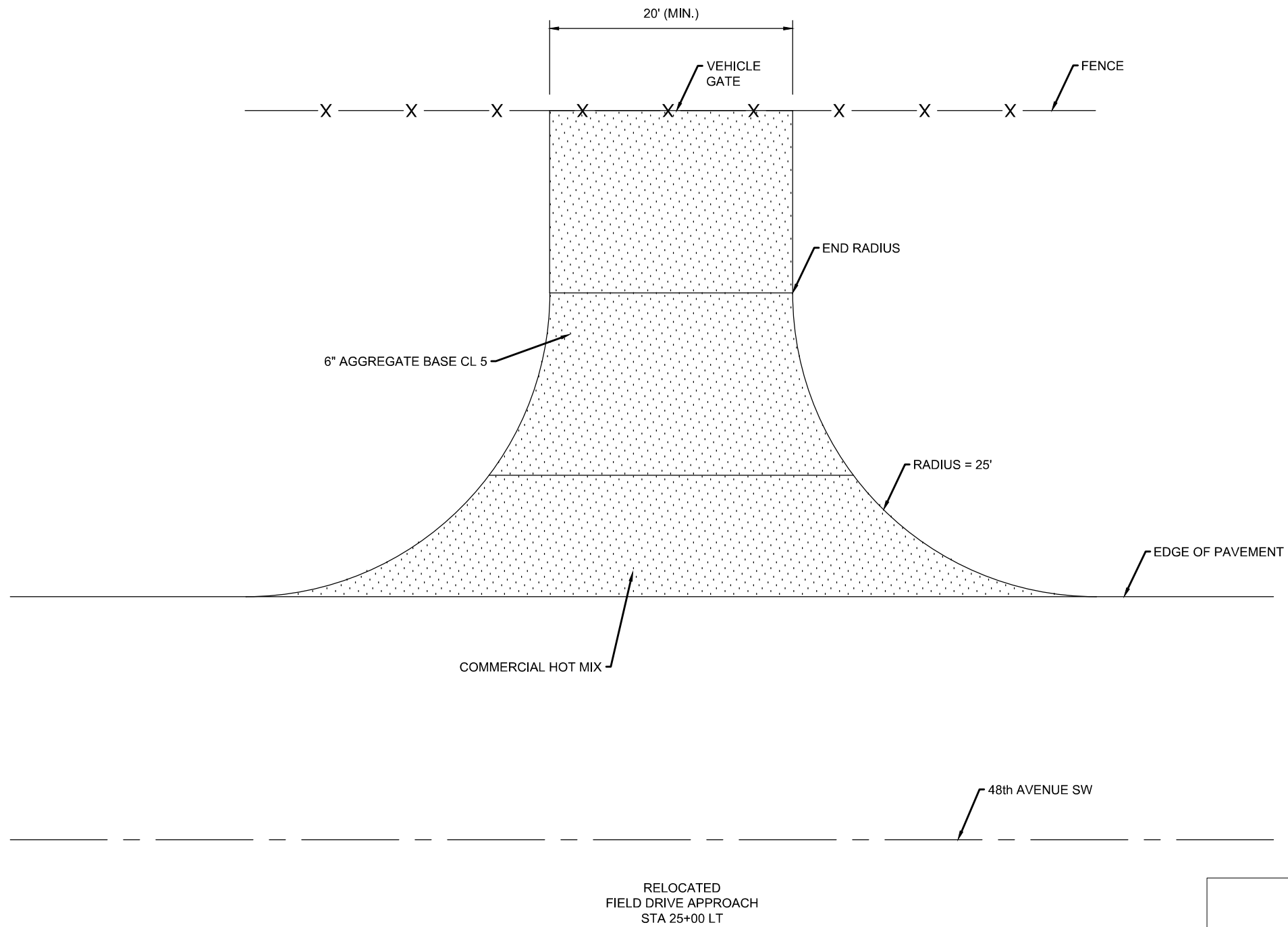
South Washington Street

South Washington Street Trail Extension  
Meridian Drive to Sibley Park





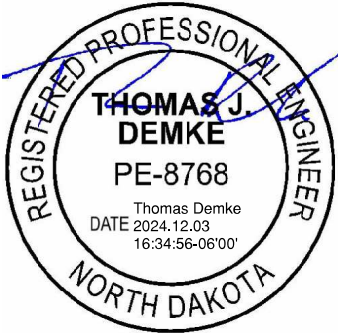
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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 20          | 7         |



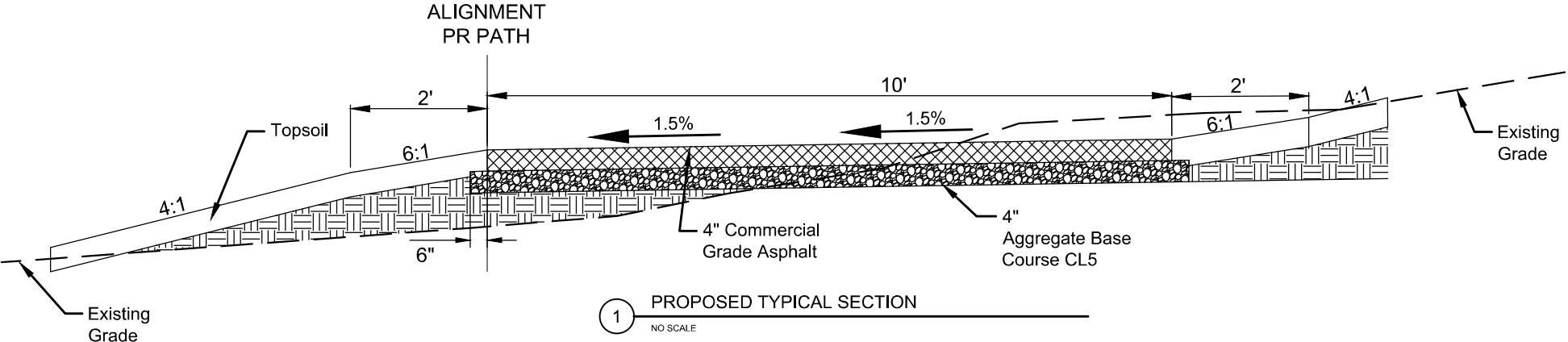
General Details  
Field Drive Approach

South Washington Street

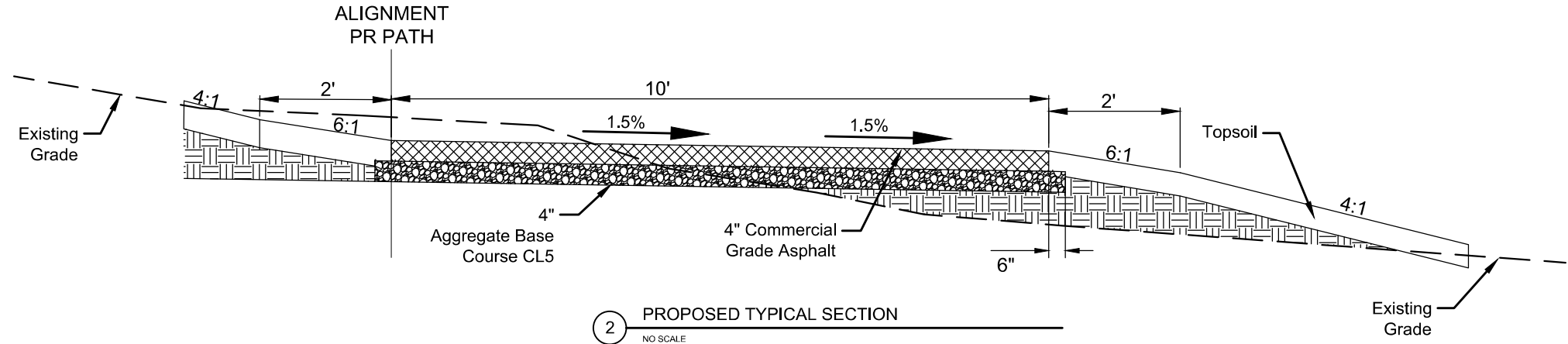
South Washington Street Trail Extension  
Meridian Drive to Sibley Park



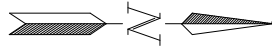
|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 30          | 1         |



1 PROPOSED TYPICAL SECTION  
NO SCALE



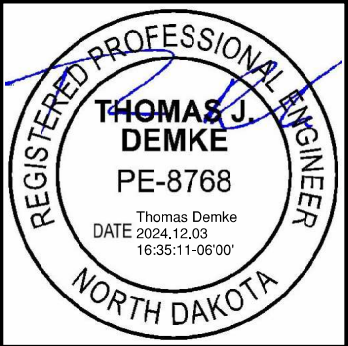
2 PROPOSED TYPICAL SECTION  
NO SCALE

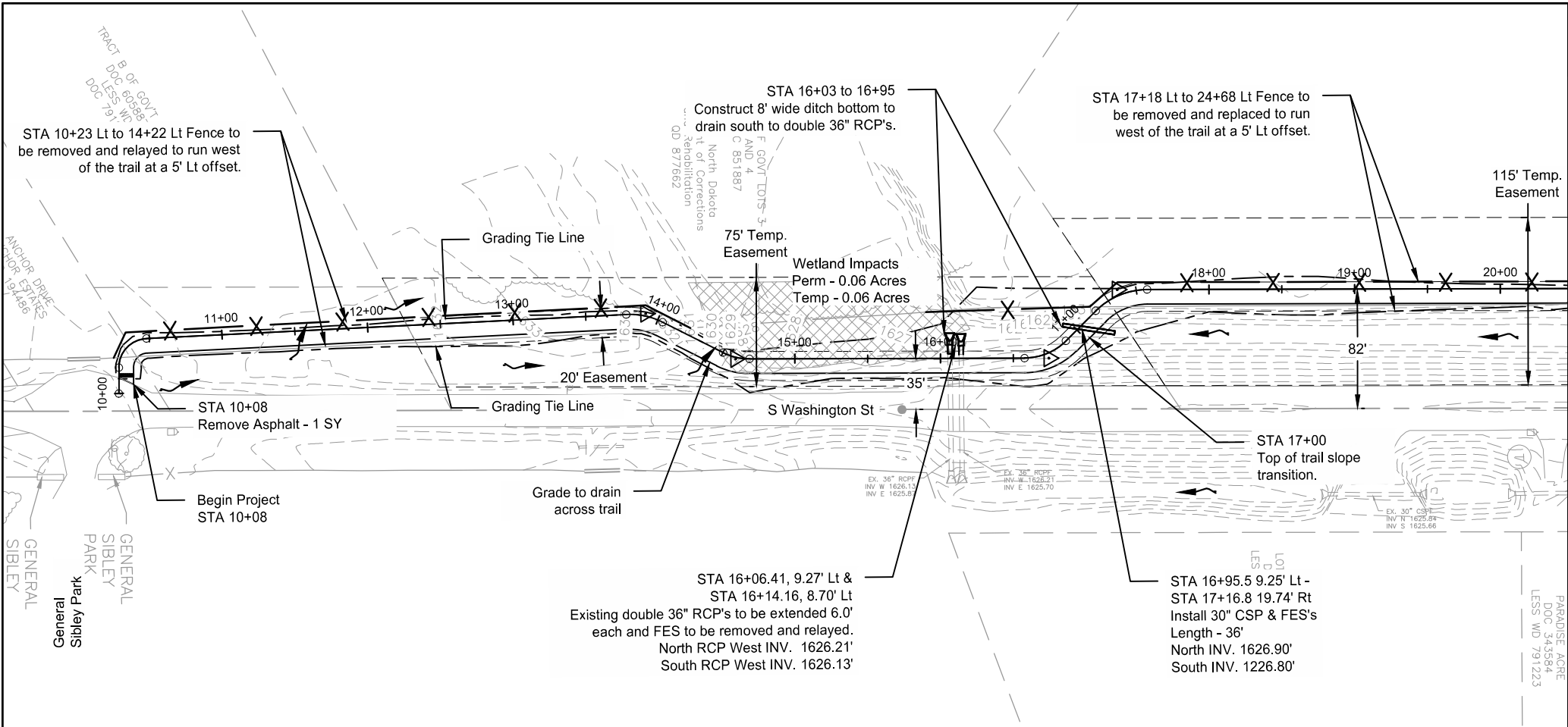


Typical Sections

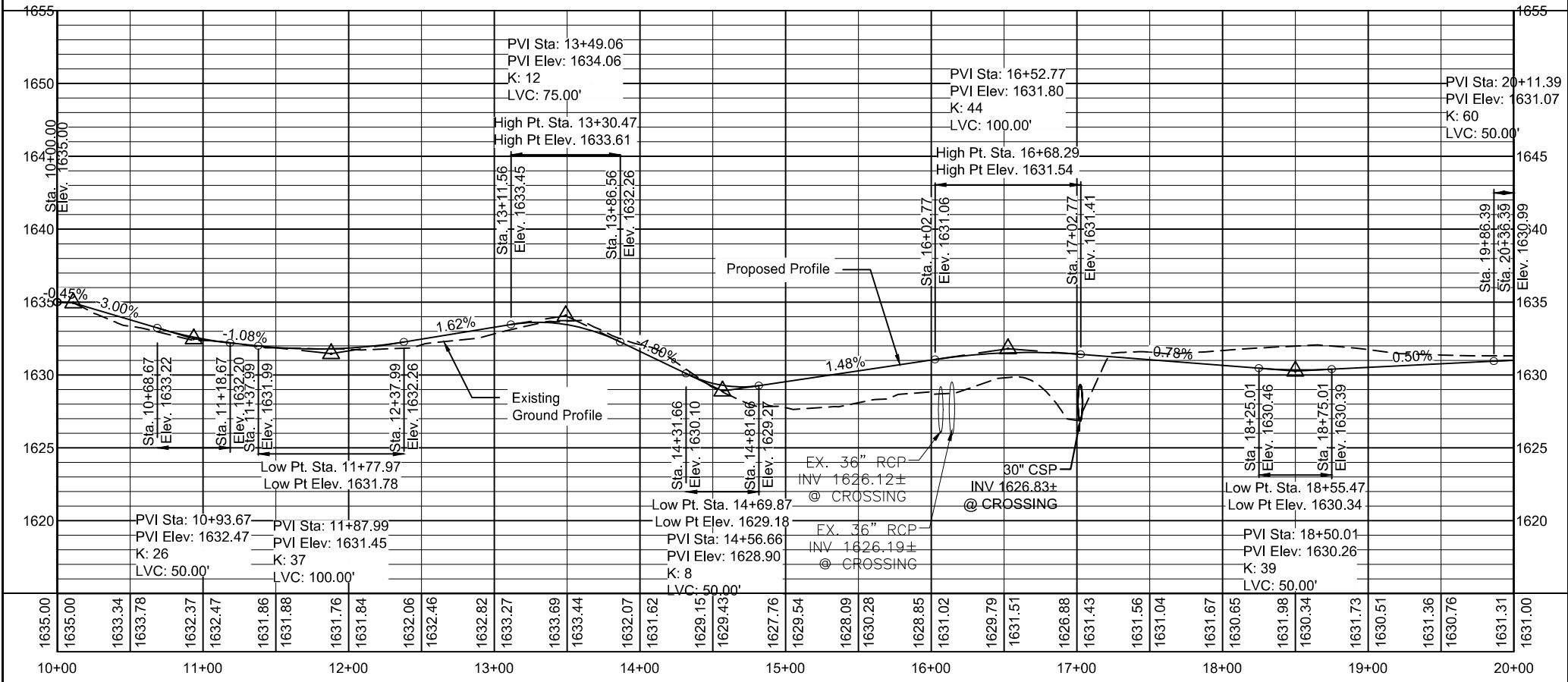
South Washington Street

South Washington Street Trail Extension  
Meridian Drive to Sibley Park





|      | STATE | PROJECT NO.                                      | SECTION NO. | SHEET NO. |
|------|-------|--------------------------------------------------|-------------|-----------|
|      |       |                                                  |             |           |
|      | ND    | TAC-1-981(138)                                   | 60          | 1         |
| SPEC | CODE  | BID ITEM                                         | QTY         | UNIT      |
| 202  | 0132  | REMOVAL OF BITUMINOUS SURFACING                  |             |           |
|      |       | Sta 10+08                                        | 1           | SY        |
| 302  | 0120  | AGGREGATE BASE COURSE CL 5                       |             |           |
|      |       | Sta 10+21 to 20+00                               | 250         | TON       |
| 430  | 0500  | COMMERCIAL GRADE HOT MIX ASPHALT                 |             |           |
|      |       | Sta 10+21 to 20+00                               | 242         | TON       |
| 714  | 0905  | PIPE CONC REINF 36IN CL III                      |             |           |
|      |       | Sta 16+06.51, 3.27' Lt to Sta 16+06.41, 9.27' Lt | 6           | LF        |
|      |       | Sta 16+14.17, 2.70' Lt to Sta 16+14.16, 8.70' Lt | 6           | LF        |
| 714  | 4110  | PIPE CONDUIT 30IN                                |             |           |
|      |       | Sta 16+95.5 9.25' Lt to 17+16.8 19.74' Rt        | 36          | LF        |
| 714  | 9660  | REMOVE & RELAY END SECTION-ALL TYPE & SIZES      |             |           |
|      |       | Sta 16+06.41, 9.27' Lt                           | 1           | EA        |
|      |       | Sta 16+14.16, 8.70' Lt                           | 1           | EA        |
| 752  | 0922  | FENCE REMOVE & RESET                             |             |           |
|      |       | Sta 10+23 to 14+22 Lt                            | 410         | LF        |
|      |       | Sta 15+90 to 20+00 Lt                            | 400         | LF        |



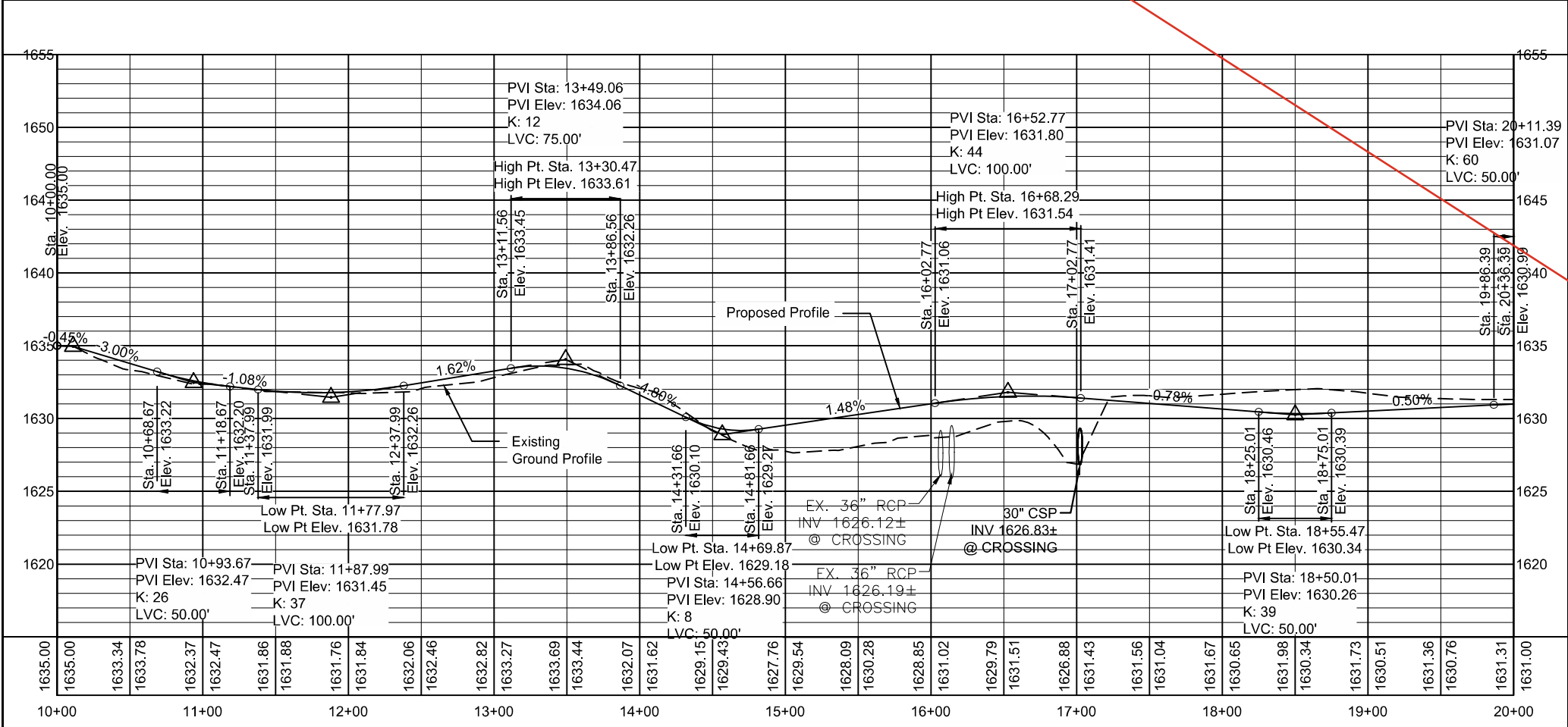
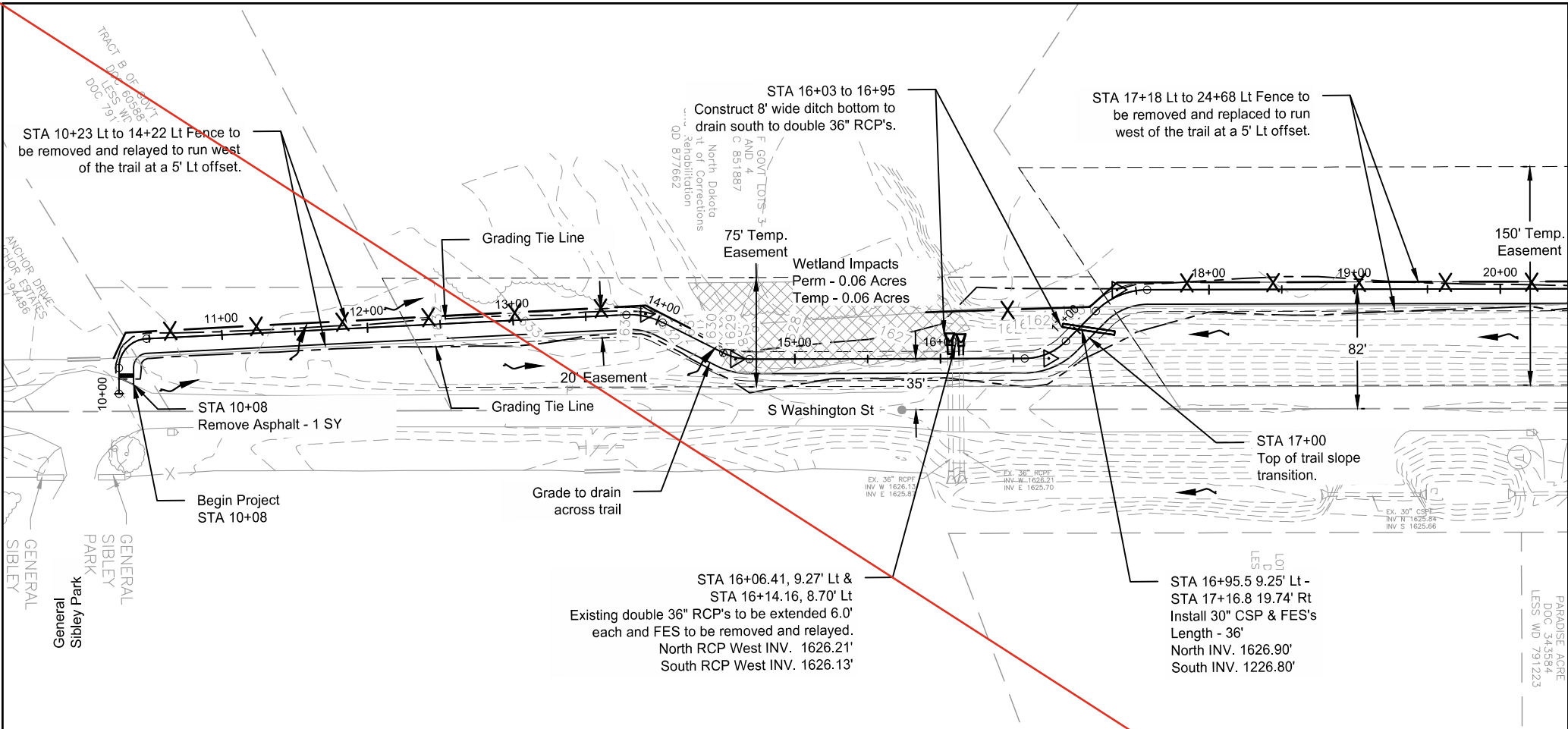
SCALE: 1 INCH = 100 FEET

Plan & Profile

Sta 10+00 to Sta 20+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

REGISTERED PROFESSIONAL ENGINEER  
**THOMAS J. DEMKE**  
PE-8768  
Thomas Demke  
DATE 2025.01.29  
16:28:07-06'00"  
NORTH DAKOTA



|      |      | STATE                                            | PROJECT NO.    | SECTION NO. | SHEET NO. |
|------|------|--------------------------------------------------|----------------|-------------|-----------|
|      |      | ND                                               | TAC-1-981(138) | 60          | 1         |
| SPEC | CODE | BID ITEM                                         | QTY            | UNIT        |           |
| 202  | 0132 | REMOVAL OF BITUMINOUS SURFACING                  |                |             |           |
|      |      | Sta 10+08                                        | 1              | SY          |           |
| 302  | 0120 | AGGREGATE BASE COURSE CL 5                       |                |             |           |
|      |      | Sta 10+21 to 20+00                               | 250            | TON         |           |
| 430  | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT                 |                |             |           |
|      |      | Sta 10+21 to 20+00                               | 242            | TON         |           |
| 714  | 0905 | PIPE CONC REINF 36IN CL III                      |                |             |           |
|      |      | Sta 16+06.51, 3.27' Lt to Sta 16+06.41, 9.27' Lt | 6              | LF          |           |
|      |      | Sta 16+14.17, 2.70' Lt to Sta 16+14.16, 8.70' Lt | 6              | LF          |           |
| 714  | 4110 | PIPE CONDUIT 30IN                                |                |             |           |
|      |      | Sta 16+95.5 9.25' Lt to 17+16.8 19.74' Rt        | 36             | LF          |           |
| 714  | 9660 | REMOVE & RELAY END SECTION-ALL TYPE & SIZES      |                |             |           |
|      |      | Sta 16+06.41, 9.27' Lt                           | 1              | EA          |           |
|      |      | Sta 16+14.16, 8.70' Lt                           | 1              | EA          |           |
| 752  | 0922 | FENCE REMOVE & RESET                             |                |             |           |
|      |      | Sta 10+23 to 14+22 Lt                            | 410            | LF          |           |
|      |      | Sta 15+90 to 20+00 Lt                            | 400            | LF          |           |

Plan & Profile

Sta 10+00 to Sta 20+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

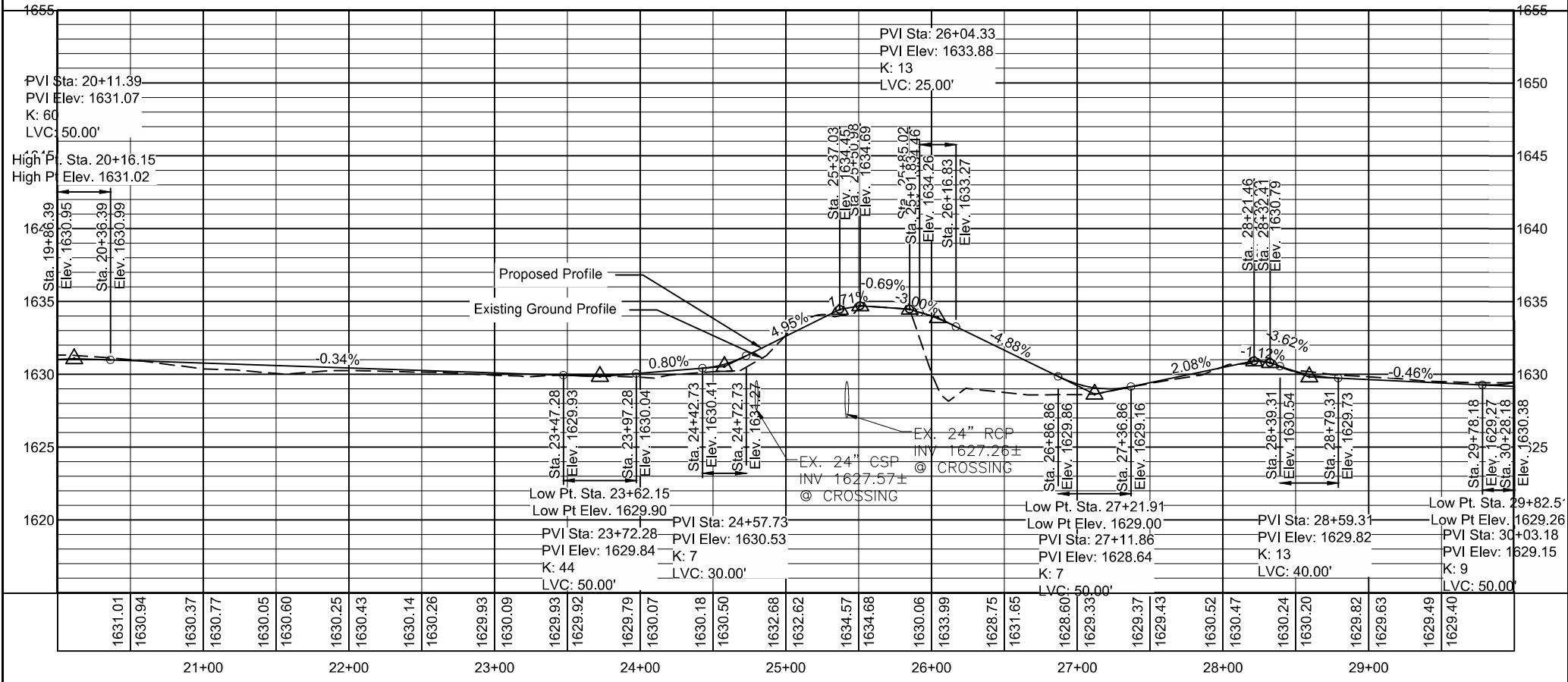
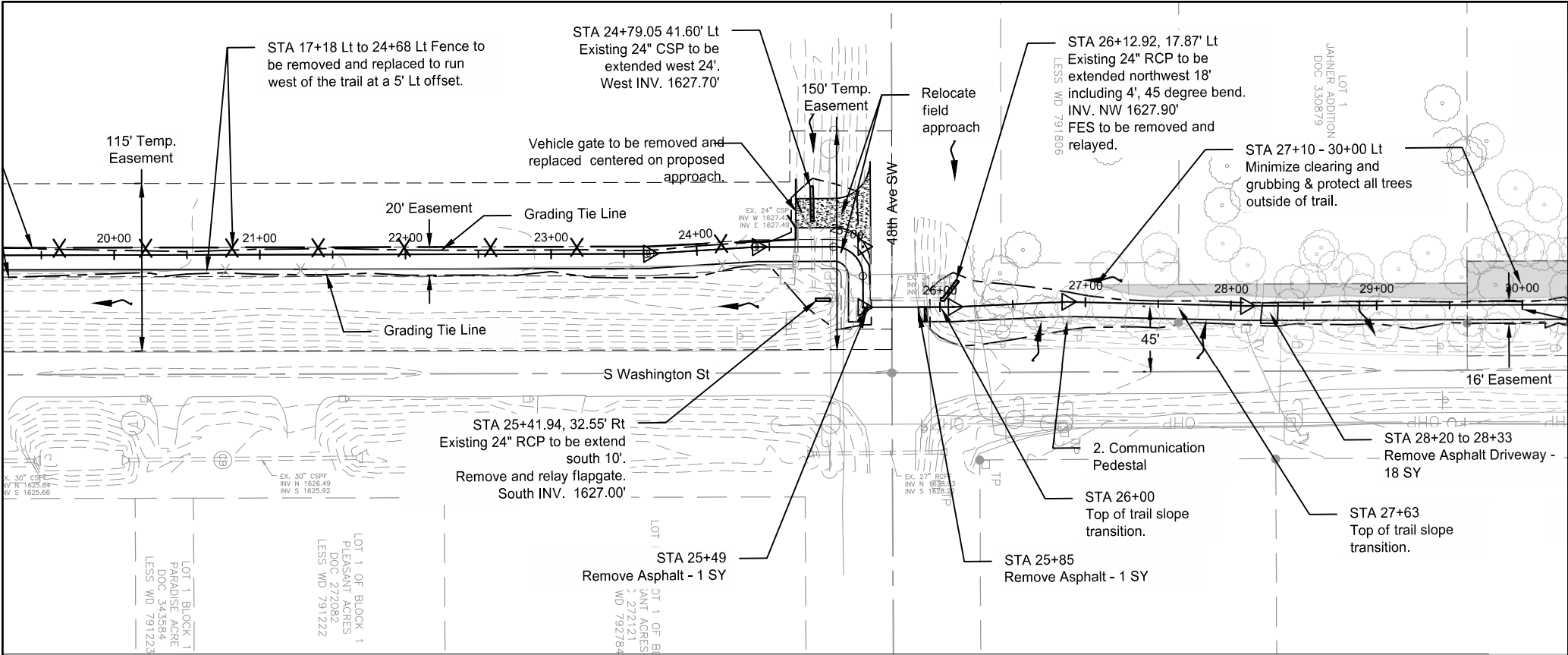
0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

REGISTERED PROFESSIONAL ENGINEER  
THOMAS J. DEMKE  
PE-8768  
DATE 2024.12.03  
16:36:01 -06'00'

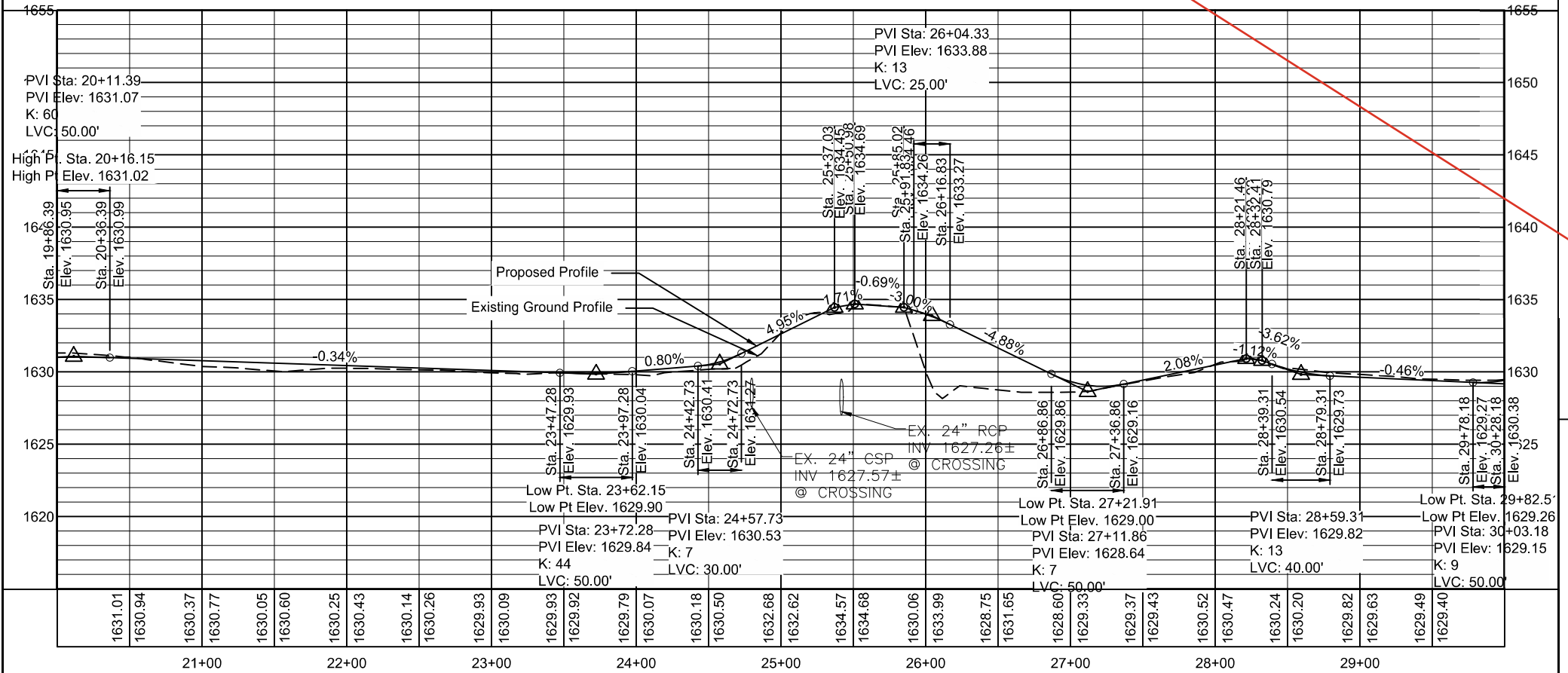
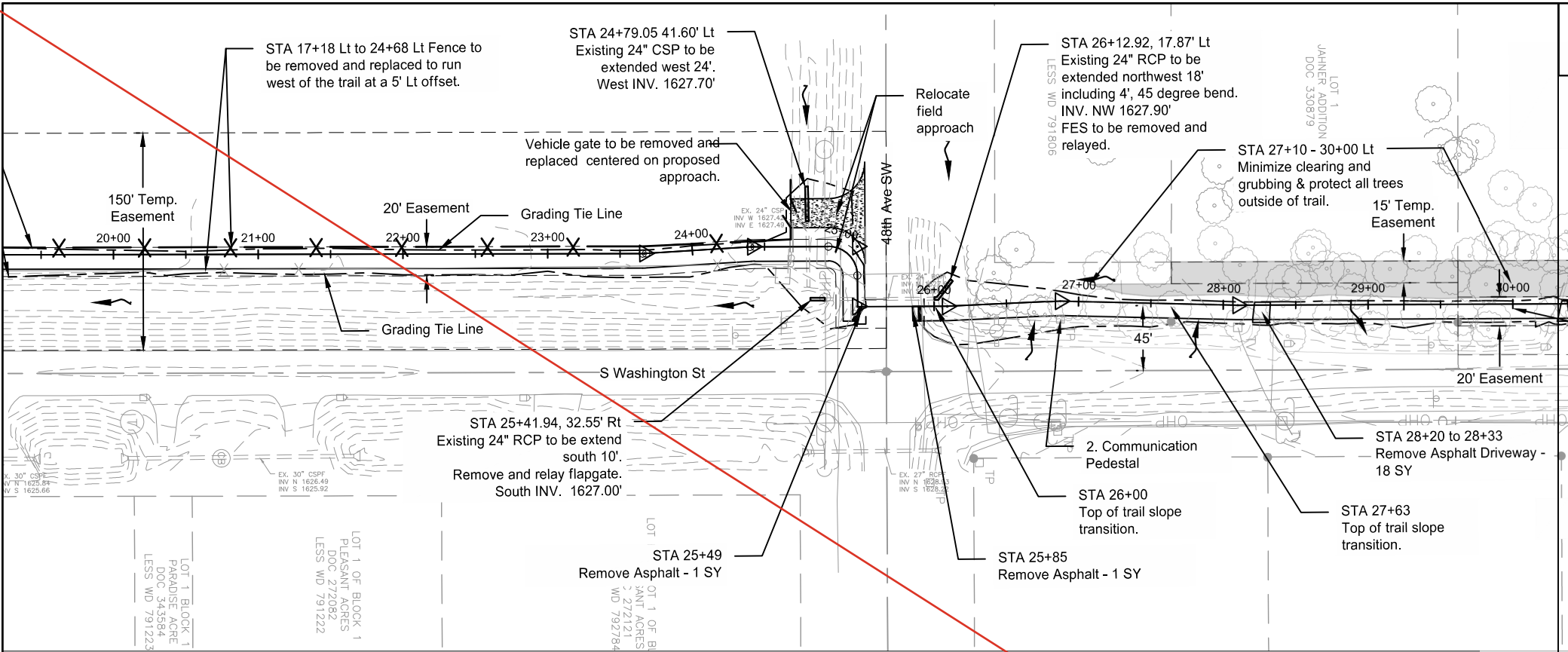
NORTH DAKOTA



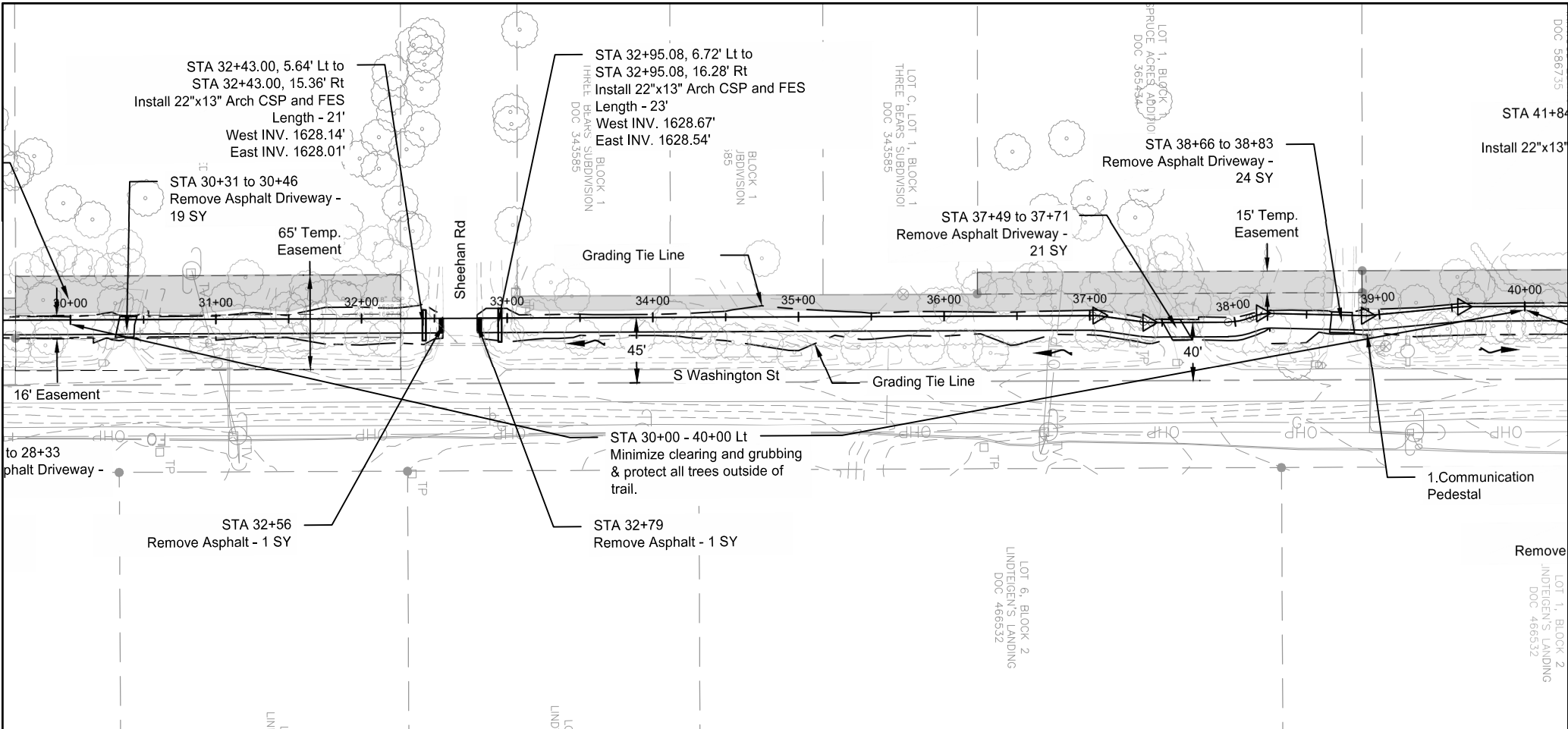


|                                                                                                                                                                                                      |      | STATE                                                                                                                          | PROJECT NO.    | SECTION NO. | SHEET NO. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|-----------|
|                                                                                                                                                                                                      |      | ND                                                                                                                             | TAC-1-981(138) | 60          | 2         |
| SPEC                                                                                                                                                                                                 | CODE | BID ITEM                                                                                                                       |                | QTY         | UNIT      |
| 202                                                                                                                                                                                                  | 0132 | REMOVAL OF BITUMINOUS SURFACING                                                                                                |                |             |           |
|                                                                                                                                                                                                      |      | Sta 25+49                                                                                                                      |                | 1           | SY        |
|                                                                                                                                                                                                      |      | Sta 25+85                                                                                                                      |                | 1           | SY        |
| 202                                                                                                                                                                                                  | 0169 | REMOVAL OF END SECTION-ALL TYPES & SIZES                                                                                       |                |             |           |
|                                                                                                                                                                                                      |      | Sta 24+79.05, 17.50' Lt - 24" CSP                                                                                              |                | 1           | EA        |
| 302                                                                                                                                                                                                  | 0120 | AGGREGATE BASE COURSE CL 5                                                                                                     |                |             |           |
|                                                                                                                                                                                                      |      | Sta 20+00 to 30+00 including approach                                                                                          |                | 287         | TON       |
| 430                                                                                                                                                                                                  | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT                                                                                               |                |             |           |
|                                                                                                                                                                                                      |      | Sta 20+00 to 30+00                                                                                                             |                | 233         | TON       |
| 714                                                                                                                                                                                                  | 0615 | PIPE CONC REINF 24IN CL III                                                                                                    |                |             |           |
|                                                                                                                                                                                                      |      | Sta 25+41.91, 22.55' Lt - Sta 25+41.94, 32.55' Rt                                                                              |                | 10          | LF        |
|                                                                                                                                                                                                      |      | Sta 26+00.39,5.34' Lt - 26+12.92, 17.87' Lt w/ 45 degree be                                                                    |                | 18          | LF        |
| 714                                                                                                                                                                                                  | 5035 | PIPE CORR STEEL .064IN 24IN                                                                                                    |                |             |           |
|                                                                                                                                                                                                      |      | Sta 24+79.49, 17.60' Lt - Sta 24+79.05, 41.60' Lt                                                                              |                | 24          | LF        |
| 714                                                                                                                                                                                                  | 5820 | END SECT CORR STEEL .064IN 24IN                                                                                                |                |             |           |
|                                                                                                                                                                                                      |      | Sta 24+79.05, 41.60' Lt - 24" CSP                                                                                              |                | 1           | EA        |
| 714                                                                                                                                                                                                  | 9660 | REMOVE & RELAY END SECTION-ALL TYPE & SIZES                                                                                    |                |             |           |
|                                                                                                                                                                                                      |      | Sta 26+12.92, 17.87' Lt - 24" RCP                                                                                              |                | 1           | EA        |
| 714                                                                                                                                                                                                  | 9925 | FLAP GATE-RELAY ALL SIZES                                                                                                      |                |             |           |
|                                                                                                                                                                                                      |      | Sta 25+41.94, 32.55' Rt                                                                                                        |                | 1           | EA        |
| 752                                                                                                                                                                                                  | 0922 | FENCE REMOVE & RESET                                                                                                           |                |             |           |
|                                                                                                                                                                                                      |      | Sta 20+00 to 24+68 Lt                                                                                                          |                | 480         | LF        |
| 752                                                                                                                                                                                                  | 2110 | RESET VEHICLE GATE                                                                                                             |                |             |           |
|                                                                                                                                                                                                      |      | Sta 24+68 13.0'-33.0' Lt                                                                                                       |                | 1           | EA        |
| 752                                                                                                                                                                                                  | 2120 | REMOVE VEHICLE GATE                                                                                                            |                |             |           |
|                                                                                                                                                                                                      |      | Sta 24+68                                                                                                                      |                | 1           | EA        |
| NOTES:                                                                                                                                                                                               |      |                                                                                                                                |                |             |           |
| 1. SEE SECTION 2 FOR CURB RAMP LAYOUTS.                                                                                                                                                              |      |                                                                                                                                |                |             |           |
| 2. ADJUST PATH LOCATION, IF NECESSARY TO PROVIDE 2' MINIMUM DISTANCE BETWEEN COMMUNICATION PEDESTAL AND EDGE OF SHARED USE TRAIL.                                                                    |      |                                                                                                                                |                |             |           |
|                                                                                                                                                                                                      |      | <div>050'100'200'</div> <div><div></div><div></div><div></div><div></div><div></div></div> <div>SCALE: 1 INCH = 100 FEET</div> |                |             |           |
| <div>Plan &amp; Profile</div> <div>Sta 20+00 to Sta 30+00</div> <div>South Washington Street Trail Extension<br/>Meridian Drive to Sibley Park</div>                                                 |      |                                                                                                                                |                |             |           |
| <div><div>REGISTERED PROFESSIONAL ENGINEER</div><div>THOMAS J. DEMKE</div><div>PE-8768</div><div>Thomas Demke</div><div>DATE 2025.01.29</div><div>16:28:20-06'00"</div><div>NORTH DAKOTA</div></div> |      |                                                                                                                                |                |             |           |





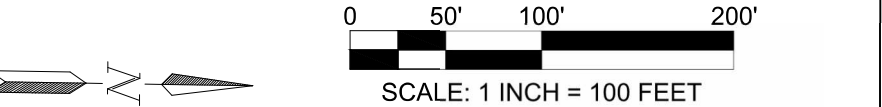
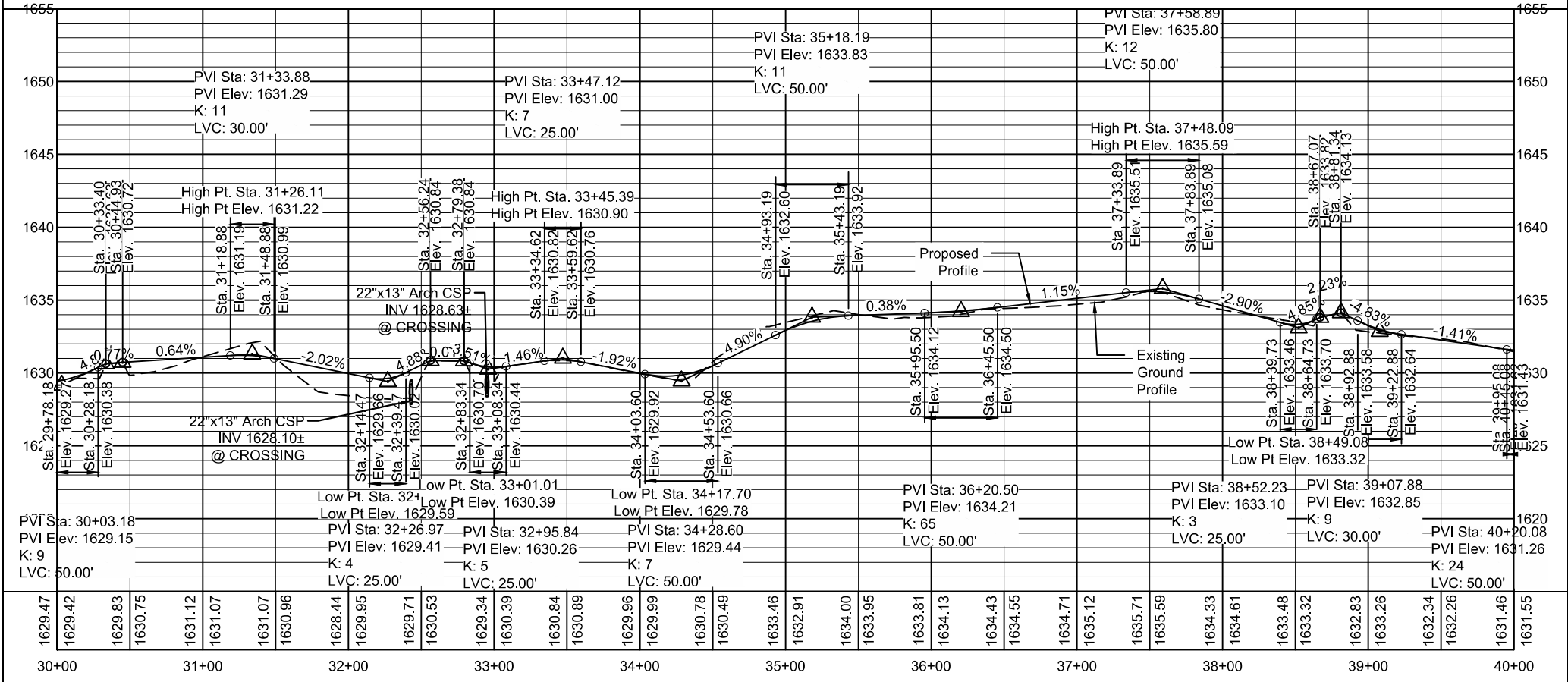
|                                                                                                                                   |      | STATE                                                        | PROJECT NO.                                                                                                          | SECTION NO. | SHEET NO. |
|-----------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------|-----------|
|                                                                                                                                   |      | ND                                                           | TAC-1-981(138)                                                                                                       | 60          | 2         |
| SPEC                                                                                                                              | CODE | BID ITEM                                                     | QTY                                                                                                                  | UNIT        |           |
| 202                                                                                                                               | 0132 | REMOVAL OF BITUMINOUS SURFACING                              |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 25+49                                                    | 1                                                                                                                    | SY          |           |
|                                                                                                                                   |      | Sta 25+85                                                    | 1                                                                                                                    | SY          |           |
| 202                                                                                                                               | 0169 | REMOVAL OF END SECTION-ALL TYPES & SIZES                     |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 24+79.05, 17.50' Lt - 24" CSP                            | 1                                                                                                                    | EA          |           |
| 302                                                                                                                               | 0120 | AGGREGATE BASE COURSE CL 5                                   |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 20+00 to 30+00 including approach                        | 287                                                                                                                  | TON         |           |
| 430                                                                                                                               | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT                             |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 20+00 to 30+00                                           | 233                                                                                                                  | TON         |           |
| 714                                                                                                                               | 0615 | PIPE CONC REINF 24IN CL III                                  |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 25+41.91, 22.55' Lt - Sta 25+41.94, 32.55' Rt            | 10                                                                                                                   | LF          |           |
|                                                                                                                                   |      | Sta 26+00.39, 5.34' Lt - 26+12.92, 17.87' Lt w/ 45 degree be | 18                                                                                                                   | LF          |           |
| 714                                                                                                                               | 5035 | PIPE CORR STEEL .064IN 24IN                                  |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 24+79.49, 17.60' Lt - Sta 24+79.05, 41.60' Lt            | 24                                                                                                                   | LF          |           |
| 714                                                                                                                               | 5820 | END SECT CORR STEEL .064IN 24IN                              |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 24+79.05, 41.60' Lt - 24" CSP                            | 1                                                                                                                    | EA          |           |
| 714                                                                                                                               | 9660 | REMOVE & RELAY END SECTION-ALL TYPE & SIZES                  |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 26+12.92, 17.87' Lt - 24" RCP                            | 1                                                                                                                    | EA          |           |
| 714                                                                                                                               | 9925 | FLAP GATE-RELAY ALL SIZES                                    |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 25+41.94, 32.55' Rt                                      | 1                                                                                                                    | EA          |           |
| 752                                                                                                                               | 0922 | FENCE REMOVE & RESET                                         |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 20+00 to 24+68 Lt                                        | 480                                                                                                                  | LF          |           |
| 752                                                                                                                               | 2110 | RESET VEHICLE GATE                                           |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 24+68 13.0'-33.0' Lt                                     | 1                                                                                                                    | EA          |           |
| 752                                                                                                                               | 2120 | REMOVE VEHICLE GATE                                          |                                                                                                                      |             |           |
|                                                                                                                                   |      | Sta 24+68                                                    | 1                                                                                                                    | EA          |           |
| NOTES:                                                                                                                            |      |                                                              |                                                                                                                      |             |           |
| 1. SEE SECTION 2 FOR CURB RAMP LAYOUTS.                                                                                           |      |                                                              |                                                                                                                      |             |           |
| 2. ADJUST PATH LOCATION, IF NECESSARY TO PROVIDE 2' MINIMUM DISTANCE BETWEEN COMMUNICATION PEDestal AND EDGE OF SHARED USE TRAIL. |      |                                                              |                                                                                                                      |             |           |
|                                                                                                                                   |      |                                                              | 0 50' 100' 200'                                                                                                      |             |           |
|                                                                                                                                   |      |                                                              | SCALE: 1 INCH = 100 FEET                                                                                             |             |           |
| Plan & Profile                                                                                                                    |      |                                                              |                                                                                                                      |             |           |
| Sta 20+00 to Sta 30+00                                                                                                            |      |                                                              |                                                                                                                      |             |           |
| South Washington Street Trail Extension<br>Meridian Drive to Sibley Park                                                          |      |                                                              |                                                                                                                      |             |           |
|                                                                                                                                   |      |                                                              | REGISTERED PROFESSIONAL ENGINEER<br>THOMAS J. DEMKE<br>PE-8768<br>DATE 2024.12.03<br>16:36:18-06:00'<br>NORTH DAKOTA |             |           |



| SPEC | CODE | BID ITEM                                         | QTY | UNIT |
|------|------|--------------------------------------------------|-----|------|
|      |      |                                                  |     |      |
| 202  | 0132 | REMOVAL OF BITUMINOUS SURFACING                  |     |      |
|      |      | Sta 30+31 to 30+46                               | 19  | SY   |
|      |      | Sta 32+56                                        | 1   | SY   |
|      |      | Sta 32+79                                        | 1   | SY   |
|      |      | Sta 37+49 to 37+71                               | 21  | SY   |
|      |      | Sta 38+66 to 38+83                               | 24  | SY   |
| 302  | 0120 | AGGREGATE BASE COURSE CL 5                       |     |      |
|      |      | Sta 30+00 to 40+00                               | 239 | TON  |
| 430  | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT                 |     |      |
|      |      | Sta 30+00 to 40+00                               | 231 | TON  |
| 714  | 4216 | PIPE CONDUIT ARCH 22IN X 13IN                    |     |      |
|      |      | Sta 32+43.00, 5.64' Lt - Sta 32+43.00, 15.36' Rt | 21  | LF   |
|      |      | Sta 32+95.08, 6.72' Lt - Sta 32+95.08, 16.28' Rt | 23  | LF   |

NOTES:

- ADJUST PATH LOCATION, IF NECESSARY TO PROVIDE 2' MINIMUM DISTANCE BETWEEN COMMUNICATION PEDESTAL AND EDGE OF SHARED USE TRAIL.

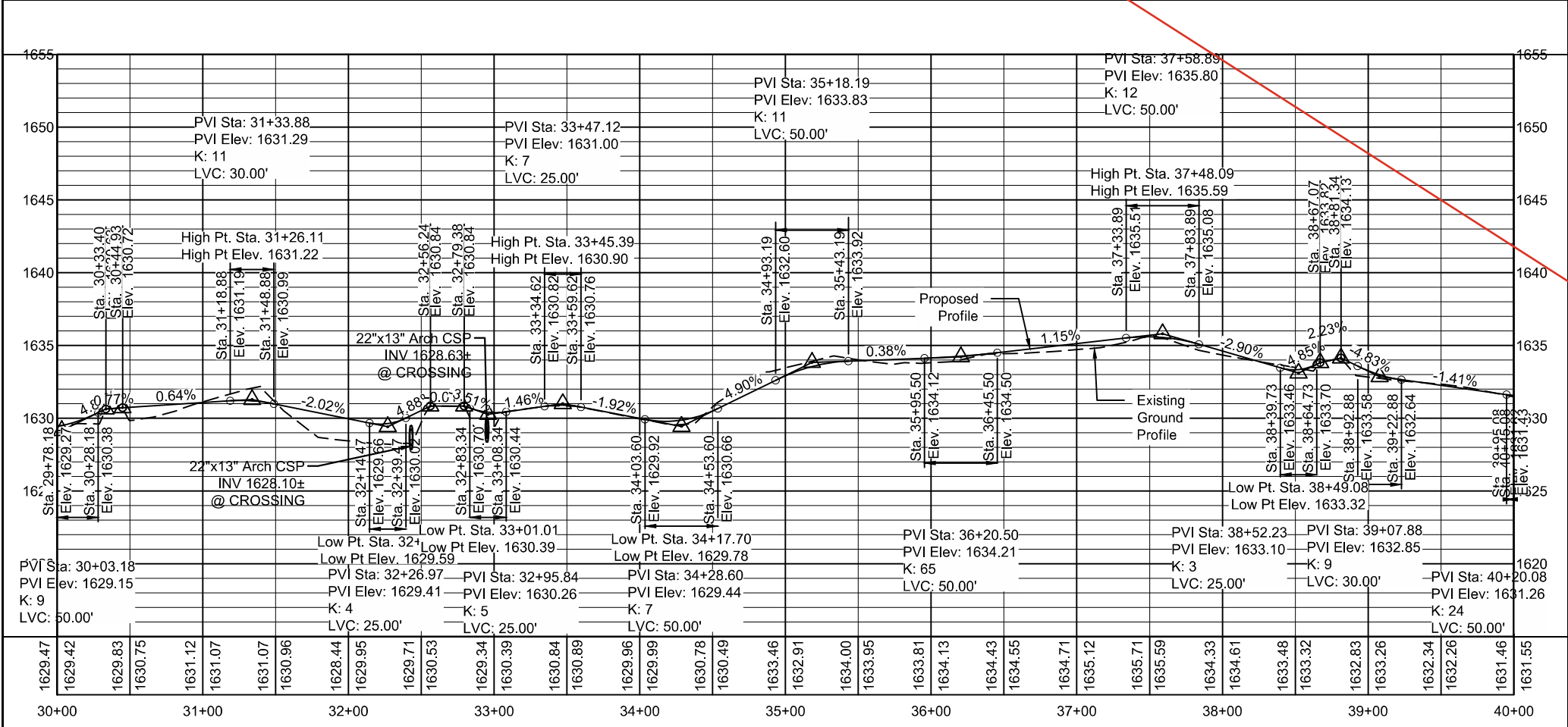
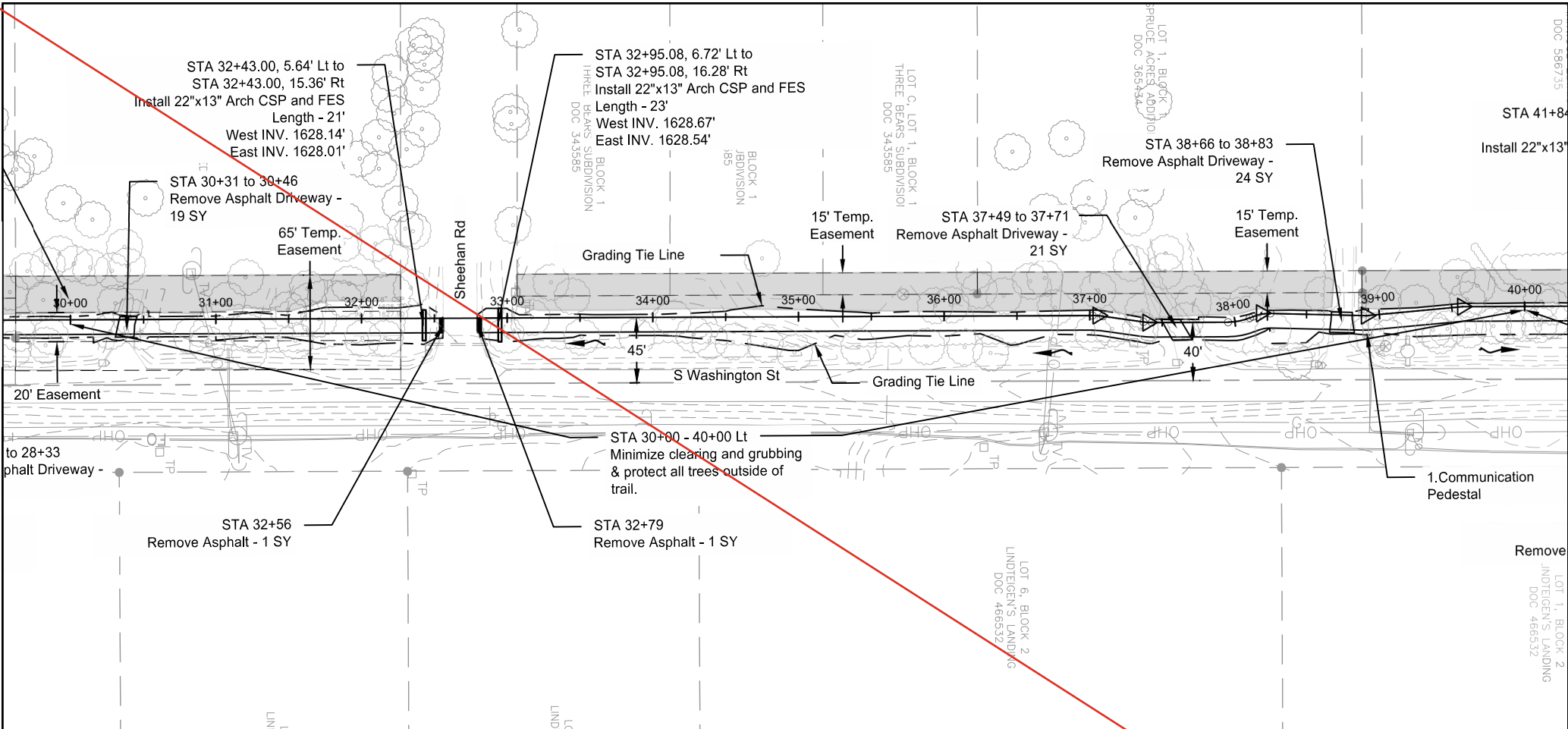


Plan & Profile

Sta 30+00 to Sta 40+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park





| STATE |  | PROJECT NO.    | SECTION NO. | SHEET NO. |
|-------|--|----------------|-------------|-----------|
| ND    |  | TAC-1-981(138) | 60          | 3         |

| SPEC | CODE | BID ITEM                                         | QTY | UNIT |
|------|------|--------------------------------------------------|-----|------|
| 202  | 0132 | REMOVAL OF BITUMINOUS SURFACING                  |     |      |
|      |      | Sta 30+31 to 30+46                               | 19  | SY   |
|      |      | Sta 32+56                                        | 1   | SY   |
|      |      | Sta 32+79                                        | 1   | SY   |
|      |      | Sta 37+49 to 37+71                               | 21  | SY   |
|      |      | Sta 38+66 to 38+83                               | 24  | SY   |
| 302  | 0120 | AGGREGATE BASE COURSE CL 5                       |     |      |
|      |      | Sta 30+00 to 40+00                               | 239 | TON  |
| 430  | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT                 |     |      |
|      |      | Sta 30+00 to 40+00                               | 231 | TON  |
| 714  | 4216 | PIPE CONDUIT ARCH 22IN X 13IN                    |     |      |
|      |      | Sta 32+43.00, 5.64' Lt - Sta 32+43.00, 15.36' Rt | 21  | LF   |
|      |      | Sta 32+95.08, 6.72' Lt - Sta 32+95.08, 16.28' Rt | 23  | LF   |

NOTES:

- ADJUST PATH LOCATION, IF NECESSARY TO PROVIDE 2' MINIMUM DISTANCE BETWEEN COMMUNICATION PEDESTAL AND EDGE OF SHARED USE TRAIL.

Plan & Profile

Sta 30+00 to Sta 40+00

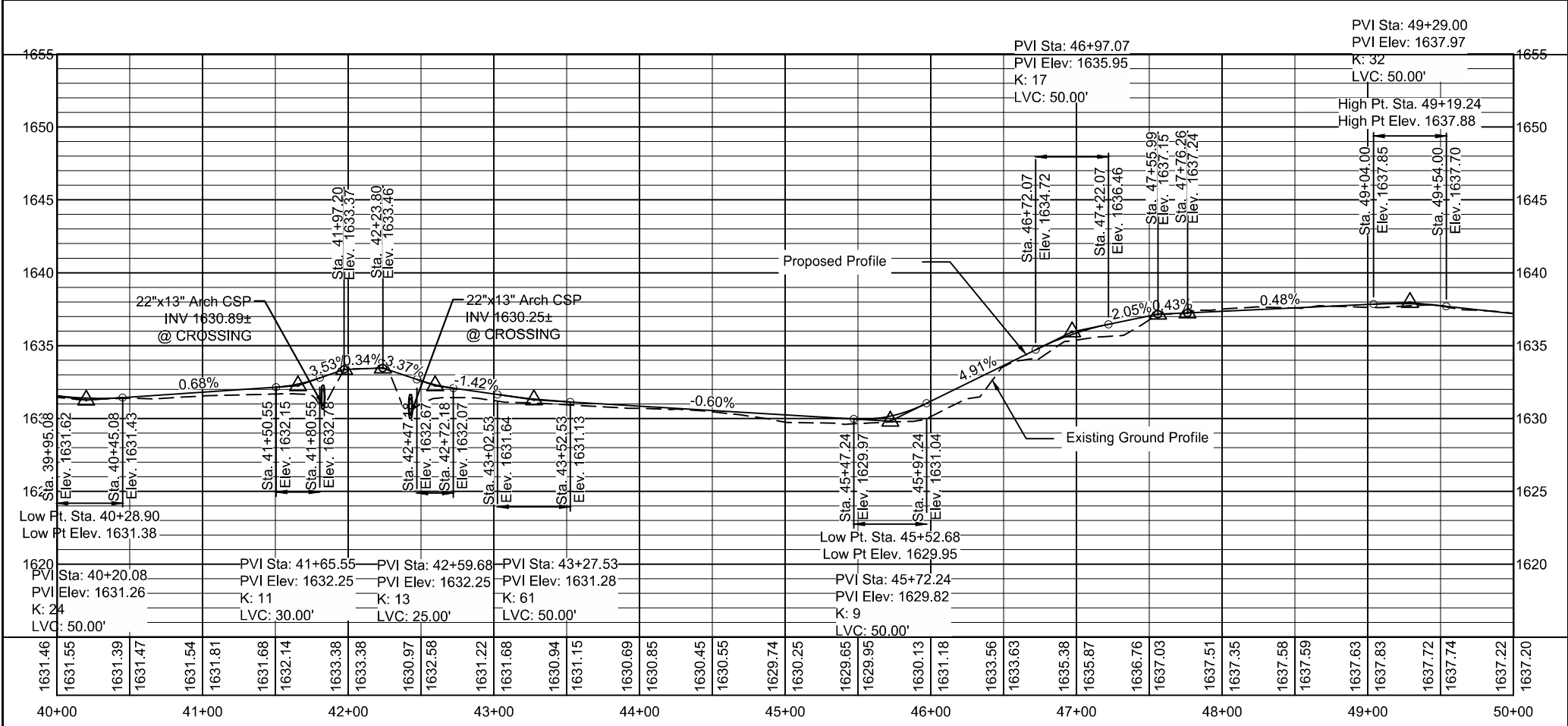
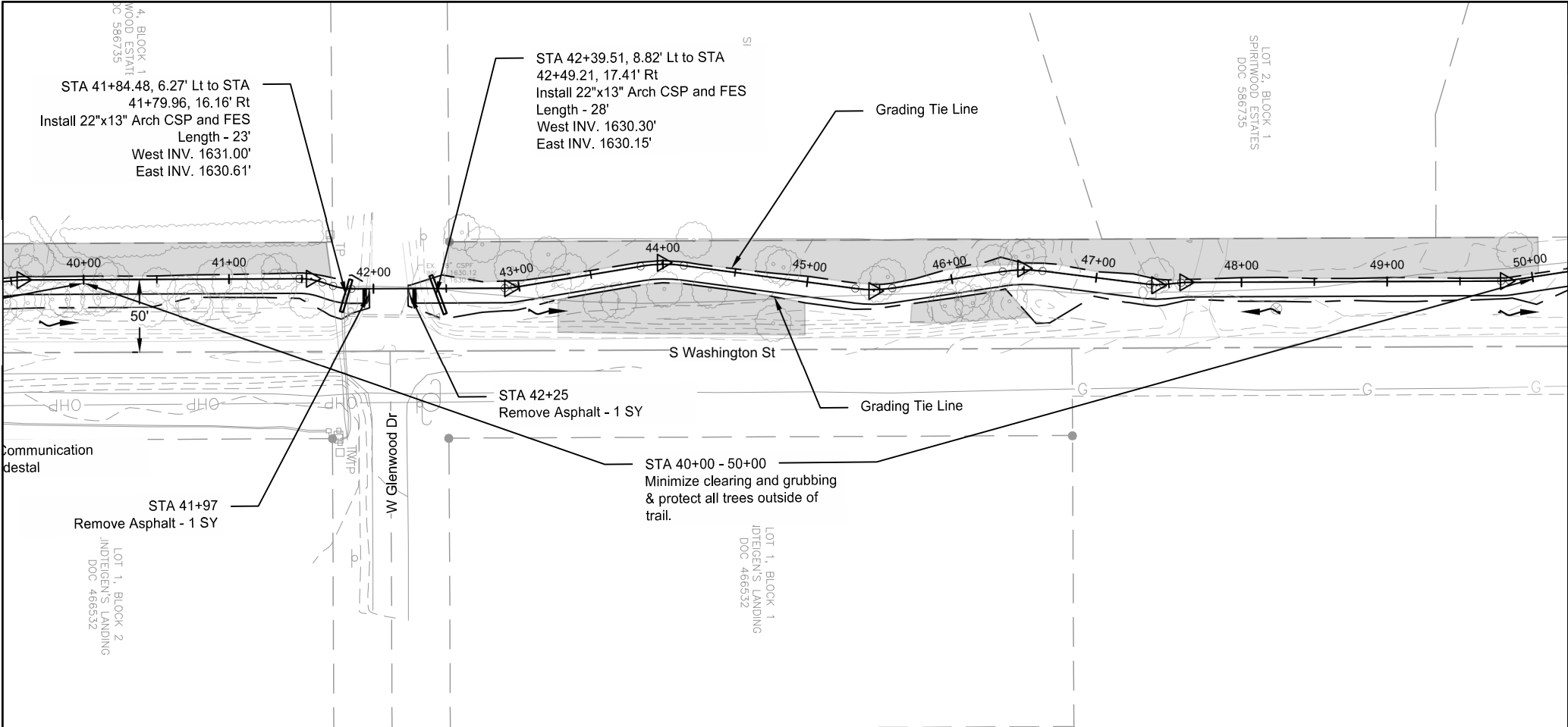
South Washington Street Trail Extension  
Meridian Drive to Sibley Park

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

REGISTERED PROFESSIONAL ENGINEER  
**THOMAS J. DEMKE**  
PE-8768  
DATE 2024.12.03  
16:36:33-06'00'

NORTH DAKOTA



|      |      | STATE                                            | PROJECT NO.    | SECTION NO. | SHEET NO. |
|------|------|--------------------------------------------------|----------------|-------------|-----------|
|      |      | ND                                               | TAC-1-981(138) | 60          | 4         |
| SPEC | CODE | BID ITEM                                         |                | QTY         | UNIT      |
| 202  | 0132 | REMOVAL OF BITUMINOUS SURFACING                  |                |             |           |
|      |      | Sta 41+97                                        |                | 1           | SY        |
|      |      | Sta 42+95                                        |                | 1           | SY        |
| 302  | 0120 | AGGREGATE BASE COURSE CL 5                       |                |             |           |
|      |      | Sta 40+00 to 50+00                               |                | 239         | TON       |
| 430  | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT                 |                |             |           |
|      |      | Sta 40+00 to 50+00                               |                | 231         | TON       |
| 714  | 4216 | PIPE CONDUIT ARCH 22IN X 13IN                    |                |             |           |
|      |      | Sta 41+84.48, 6.27' Lt - Sta 41+79.96, 16.16' Rt |                | 23          | LF        |
|      |      | Sta 42+39.51, 8.82' Lt - Sta 42+49.21, 17.41' Rt |                | 28          | LF        |

Plan & Profile

Sta 40+00 to Sta 50+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

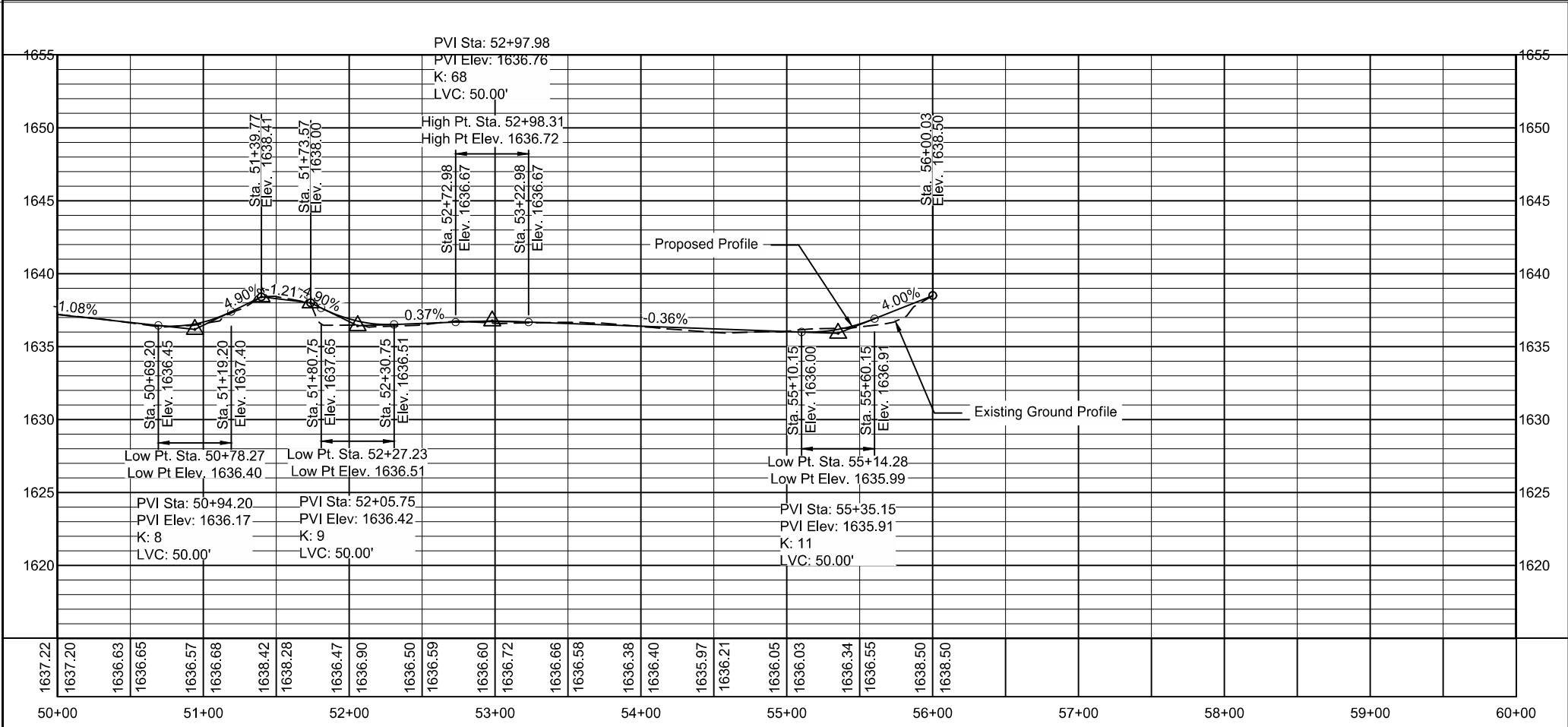
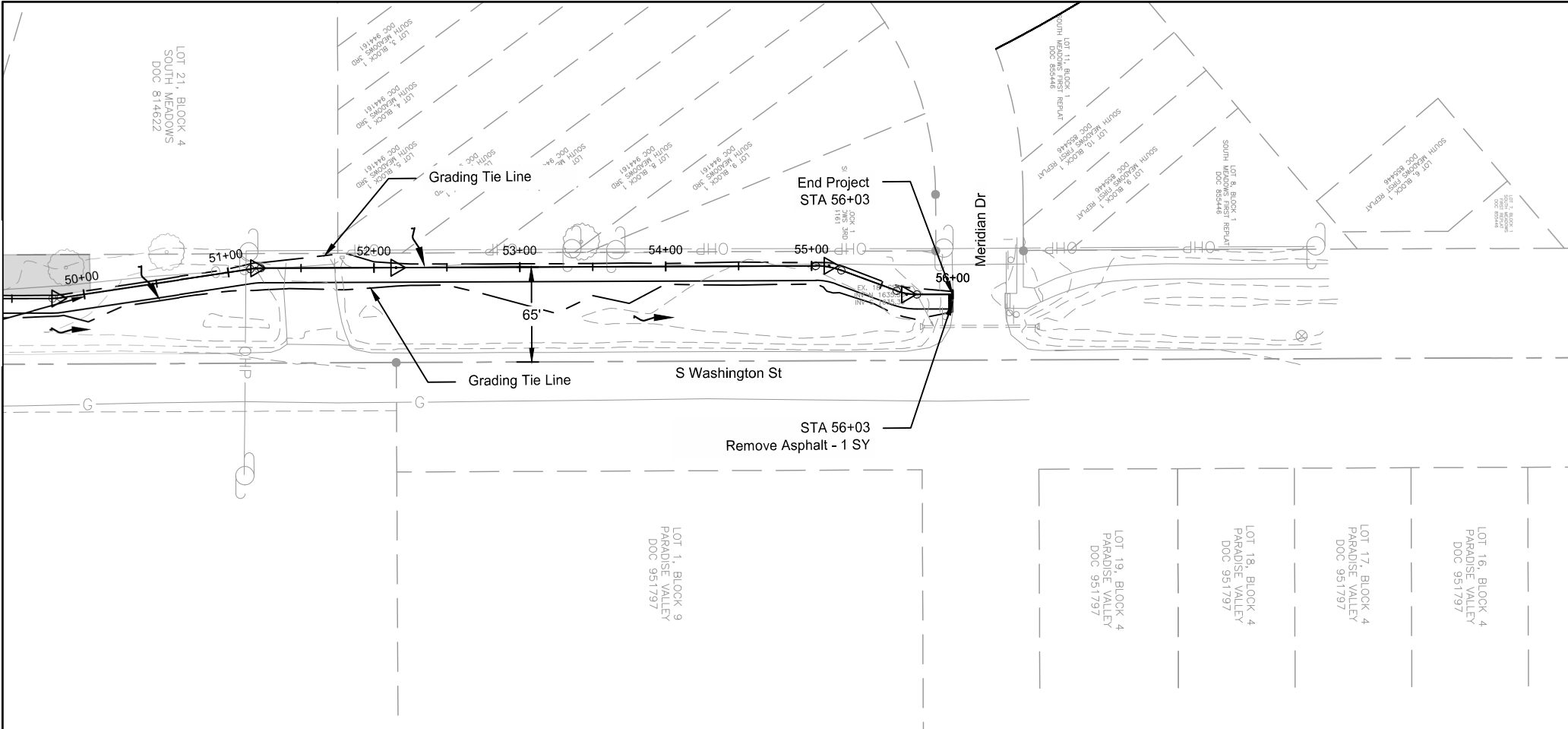
0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

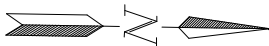
REGISTERED PROFESSIONAL ENGINEER  
**THOMAS J. DEMKE**  
PE-8768  
Thomas Demke  
DATE 2024.12.03  
16:36:46-06'00'

NORTH DAKOTA





|                    |      |                                  |                |  |             |           |
|--------------------|------|----------------------------------|----------------|--|-------------|-----------|
|                    |      | STATE                            | PROJECT NO.    |  | SECTION NO. | SHEET NO. |
|                    |      | ND                               | TAC-1-981(138) |  | 60          | 5         |
| SPEC               | CODE | BID ITEM                         |                |  | QTY         | UNIT      |
| 202                | 0132 | REMOVAL OF BITUMINOUS SURFACING  |                |  |             |           |
| Sta 56+03          |      |                                  |                |  | 1           | SY        |
| 302                | 0120 | AGGREGATE BASE COURSE CL 5       |                |  |             |           |
| Sta 50+00 to 56+03 |      |                                  |                |  | 147         | TON       |
| 430                | 0500 | COMMERCIAL GRADE HOT MIX ASPHALT |                |  |             |           |
| Sta 50+00 to 56+03 |      |                                  |                |  | 143         | TON       |



050'100'200'

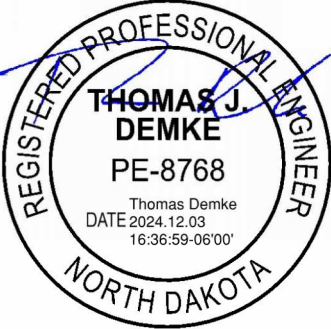


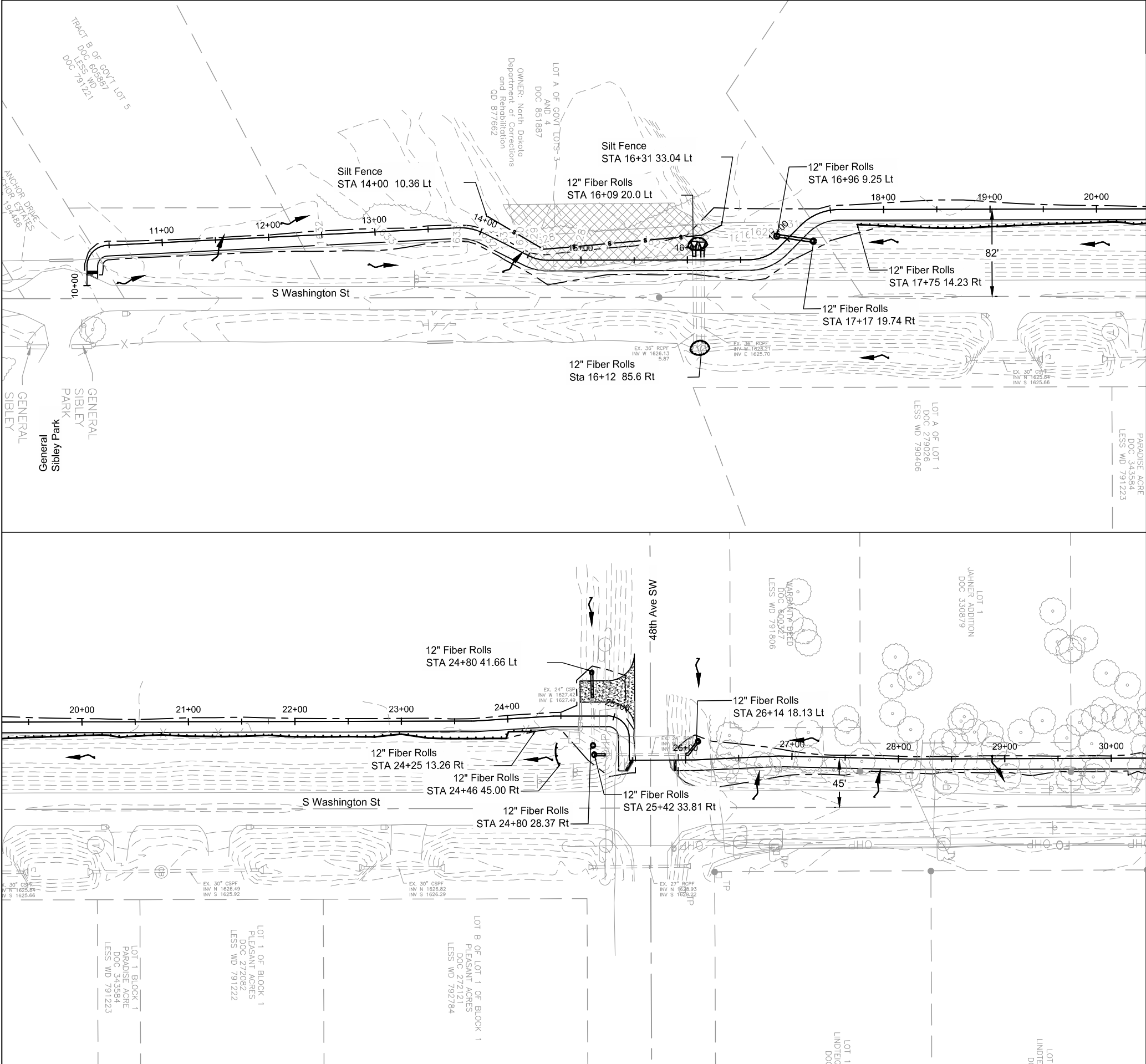
SCALE: 1 INCH = 100 FEET

Plan & Profile

Sta 50+00 to Sta 56+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park





|      | STATE | PROJECT NO.                   | SECTION NO. | SHEET NO. |
|------|-------|-------------------------------|-------------|-----------|
|      |       |                               |             |           |
|      | ND    | TAC-1-981(138)                | 76          | 1         |
| SPEC | CODE  | BID ITEM                      | QTY         | UNIT      |
| 260  | 0100  | SILT FENCE UNSUPPORTED        |             |           |
|      |       | Sta 14+00 to 16+31 Lt         | 233         | LF        |
| 261  | 0101  | REMOVE SILT FENCE UNSUPPORTED |             |           |
|      |       | Sta 14+00 to 16+31 Lt         | 233         | LF        |
| 261  | 0112  | FIBER ROLLS 12IN              |             |           |
|      |       | Sta 16+09 Lt                  | 50          | LF        |
|      |       | Sta 16+12 Rt                  | 50          | LF        |
|      |       | Sta 16+96 Lt                  | 20          | LF        |
|      |       | Sta 17+17 Rt                  | 20          | LF        |
|      |       | Sta 17+75 to 24+25 Rt         | 655         | LF        |
|      |       | Sta 24+46 Rt                  | 25          | LF        |
|      |       | Sta 24+80 Lt                  | 15          | LF        |
|      |       | Sta 24+80 Rt                  | 15          | LF        |
|      |       | Sta 25+42 Rt                  | 15          | LF        |
|      |       | Sta 26+14 Lt                  | 15          | LF        |
| 261  | 0113  | REMOVE FIBER ROLLS 12IN       |             |           |
|      |       | Sta 16+09 Lt                  | 50          | LF        |
|      |       | Sta 16+12 Rt                  | 50          | LF        |
|      |       | Sta 16+96 Lt                  | 20          | LF        |
|      |       | Sta 17+17 Rt                  | 20          | LF        |
|      |       | Sta 17+75 to 24+25 Rt         | 655         | LF        |
|      |       | Sta 24+46 Rt                  | 25          | LF        |
|      |       | Sta 24+80 Lt                  | 15          | LF        |
|      |       | Sta 24+80 Rt                  | 15          | LF        |
|      |       | Sta 25+42 Rt                  | 15          | LF        |
|      |       | Sta 26+14 Lt                  | 15          | LF        |

LEGEND

- Silt Fence
- Grading Tie Line
- 12IN Fiber Roll
- Flow

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

Temporary Erosion Control

Sta 10+00 to Sta 30+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

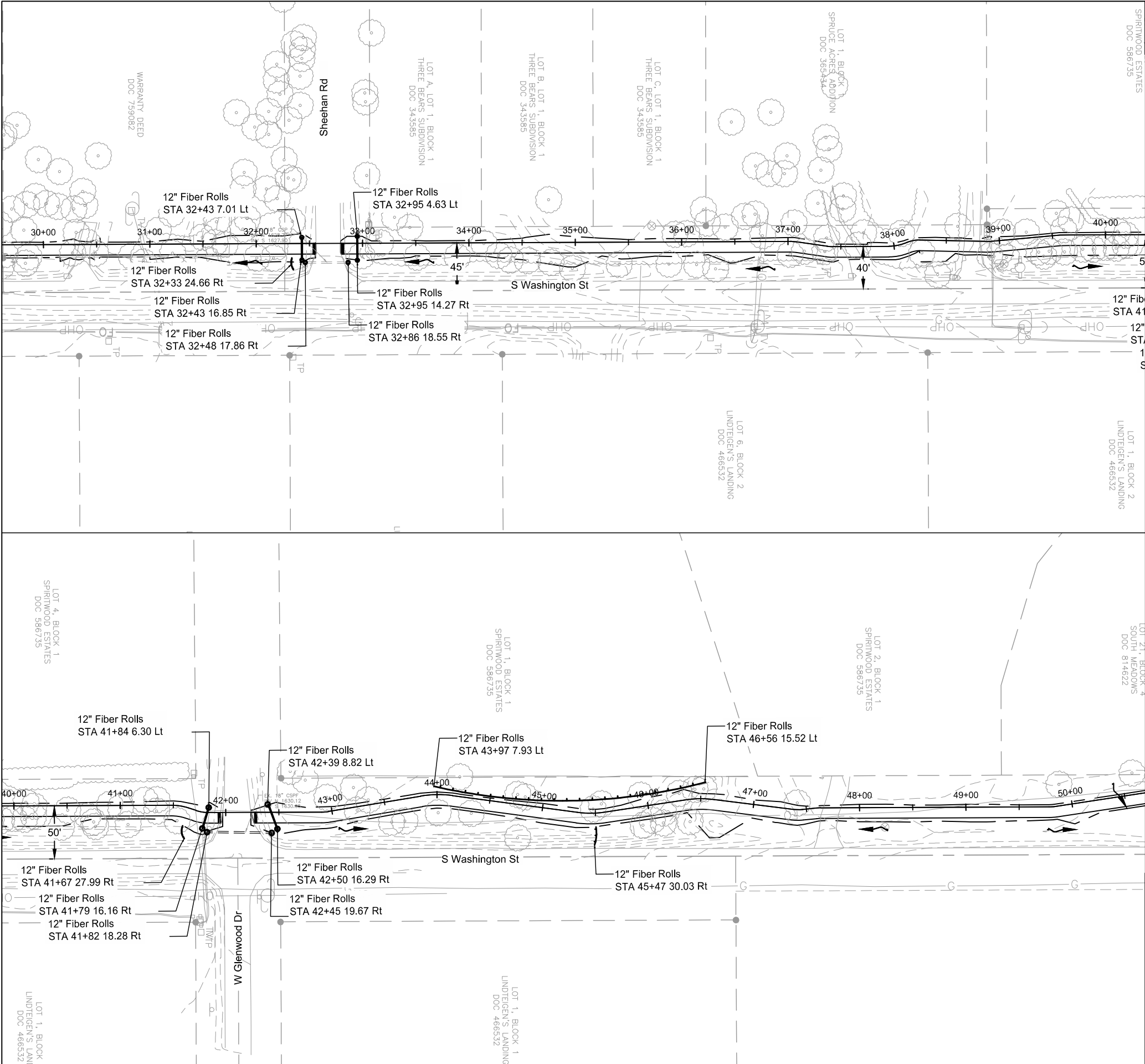
REGISTERED PROFESSIONAL ENGINEER

THOMAS J. DEMKE

PE-8768

Thomas Demke  
DATE 2024.12.03  
16:37:37-06'00"

NORTH DAKOTA



|      |      | STATE                        | PROJECT NO.    | SECTION NO. | SHEET NO. |
|------|------|------------------------------|----------------|-------------|-----------|
|      |      | ND                           | TAC-1-981(138) | 76          | 2         |
| SPEC | CODE | BID ITEM                     |                | QTY         | UNIT      |
| 714  | 4405 | FIBER ROLLS 12IN             |                |             |           |
|      |      | Sta 32+33 Rt                 |                | 15          | LF        |
|      |      | Sta 32+43 Lt                 |                | 10          | LF        |
|      |      | Sta 32+43 Rt                 |                | 10          | LF        |
|      |      | Sta 32+48 Rt                 |                | 10          | LF        |
|      |      | Sta 32+86 Rt                 |                | 10          | LF        |
|      |      | Sta 32+95 Lt                 |                | 10          | LF        |
|      |      | Sta 32+95 Rt                 |                | 10          | LF        |
|      |      | Sta 41+67 Rt                 |                | 15          | LF        |
|      |      | Sta 41+80 Rt                 |                | 10          | LF        |
|      |      | Sta 41+82 Rt                 |                | 10          | LF        |
|      |      | Sta 41+86 Lt                 |                | 10          | LF        |
|      |      | Sta 42+37 Lt                 |                | 10          | LF        |
|      |      | Sta 42+45 Rt                 |                | 10          | LF        |
|      |      | Sta 42+50 Rt                 |                | 10          | LF        |
|      |      | Sta 43+97 Lt to Sta 46+56 Lt |                | 255         | LF        |
|      |      | Sta 45+47 Rt                 |                | 15          | LF        |
| 261  | 0113 | REMOVE FIBER ROLLS 12IN      |                |             |           |
|      |      | Sta 32+33 Rt                 |                | 15          | LF        |
|      |      | Sta 32+43 Lt                 |                | 10          | LF        |
|      |      | Sta 32+43 Rt                 |                | 10          | LF        |
|      |      | Sta 32+48 Rt                 |                | 10          | LF        |
|      |      | Sta 32+86 Rt                 |                | 10          | LF        |
|      |      | Sta 32+95 Lt                 |                | 10          | LF        |
|      |      | Sta 32+95 Rt                 |                | 10          | LF        |
|      |      | Sta 41+67 Rt                 |                | 15          | LF        |
|      |      | Sta 41+80 Rt                 |                | 10          | LF        |
|      |      | Sta 41+82 Rt                 |                | 10          | LF        |
|      |      | Sta 41+86 Lt                 |                | 10          | LF        |
|      |      | Sta 42+37 Lt                 |                | 10          | LF        |
|      |      | Sta 42+45 Rt                 |                | 10          | LF        |
|      |      | Sta 42+50 Rt                 |                | 10          | LF        |
|      |      | Sta 43+97 Lt to Sta 46+56 Lt |                | 255         | LF        |
|      |      | Sta 45+47 Rt                 |                | 15          | LF        |

LEGEND

— s — s — s Silt Fence

- - - - - Grading Tie Line

————— 12IN Fiber Roll

→ → → Flow

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

Temporary Erosion Control

Sta 30+00 to Sta 50+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

REGISTERED PROFESSIONAL ENGINEER

THOMAS J. DEMKE

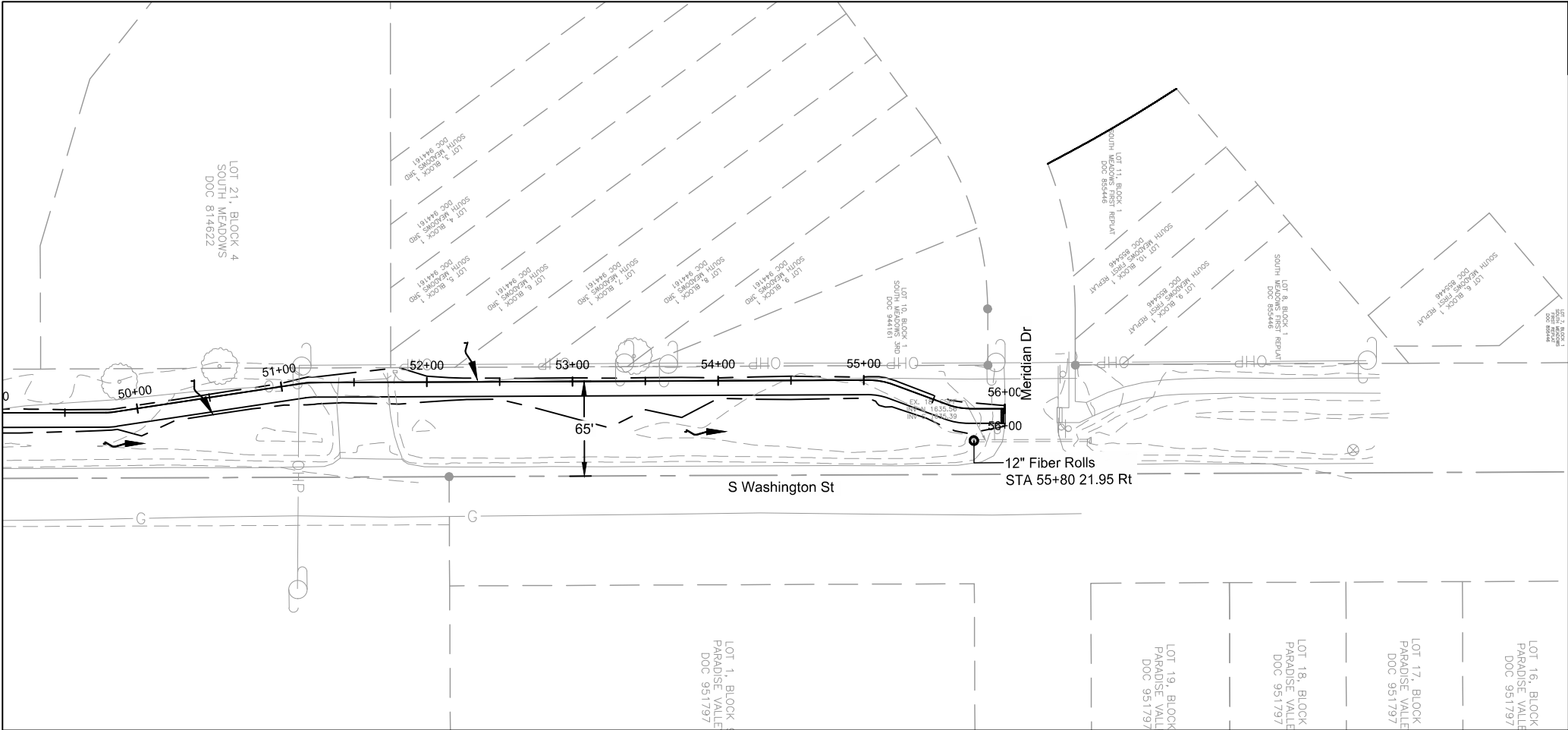
PE-8768

Thomas Demke

DATE 2024.12.03

16:37:56-06'00"

NORTH DAKOTA



|  |  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|--|--|-------|----------------|-------------|-----------|
|  |  | ND    | TAC-1-981(138) | 76          | 3         |

| SPEC | CODE | BID ITEM                | QTY | UNIT |
|------|------|-------------------------|-----|------|
| 261  | 0112 | FIBER ROLLS 12IN        |     |      |
|      |      | Sta 55+80 Rt            | 15  | LF   |
| 261  | 0113 | REMOVE FIBER ROLLS 12IN |     |      |
|      |      | Sta 55+ 80 Rt           | 15  | LF   |

LEGEND

— s — s — s — Silt Fence

- - - - - Grading Tie Line

— + + + + + 12IN Fiber Roll

→ → Flow

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

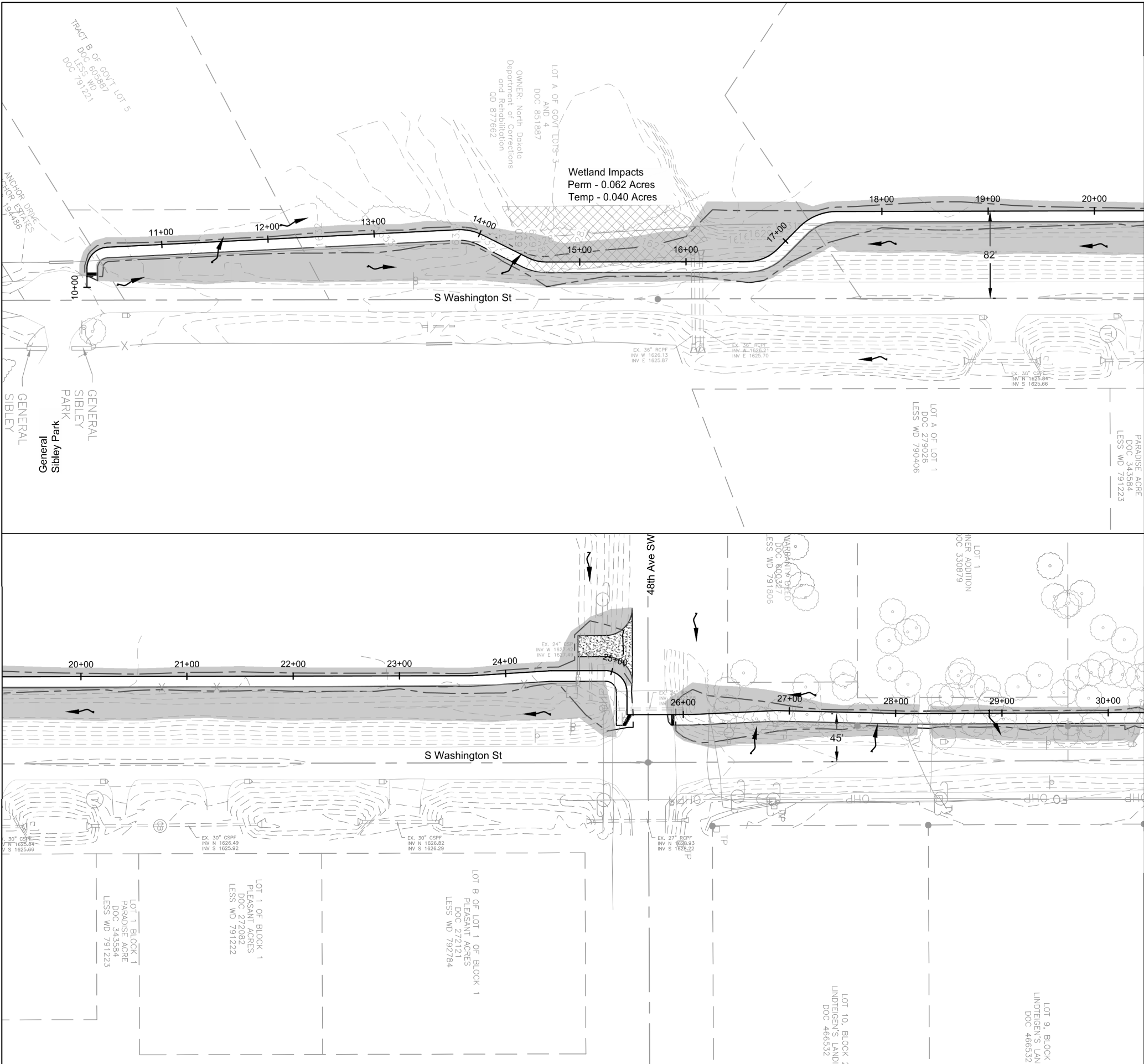
  

Temporary Erosion Control

Sta 50+00 to Sta 56+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park





|  |  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|--|--|-------|----------------|-------------|-----------|
|  |  | ND    | TAC-1-981(138) | 77          | 1         |

| SPEC | CODE | BID ITEM                  | QTY  | UNIT |
|------|------|---------------------------|------|------|
| 251  | 0300 | SEEDING CLASS III         |      |      |
|      |      | Sta 10+00 to Sta 30+00 Lt | 0.80 | ACRE |
|      |      | Sta 10+00 to Sta 30+00 Rt | 1.04 | ACRE |
| 253  | 0201 | HYDRAULIC MULCH           |      |      |
|      |      | Sta 10+00 to Sta 30+00 Lt | 0.80 | ACRE |
|      |      | Sta 10+00 to Sta 30+00 Rt | 1.04 | ACRE |

**LEGEND**

----- Grading Tie Line

→ Flow

Seeding Class III & Hydraulic Mulch

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

Permanent Erosion Control

Sta 10+00 to Sta 30+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

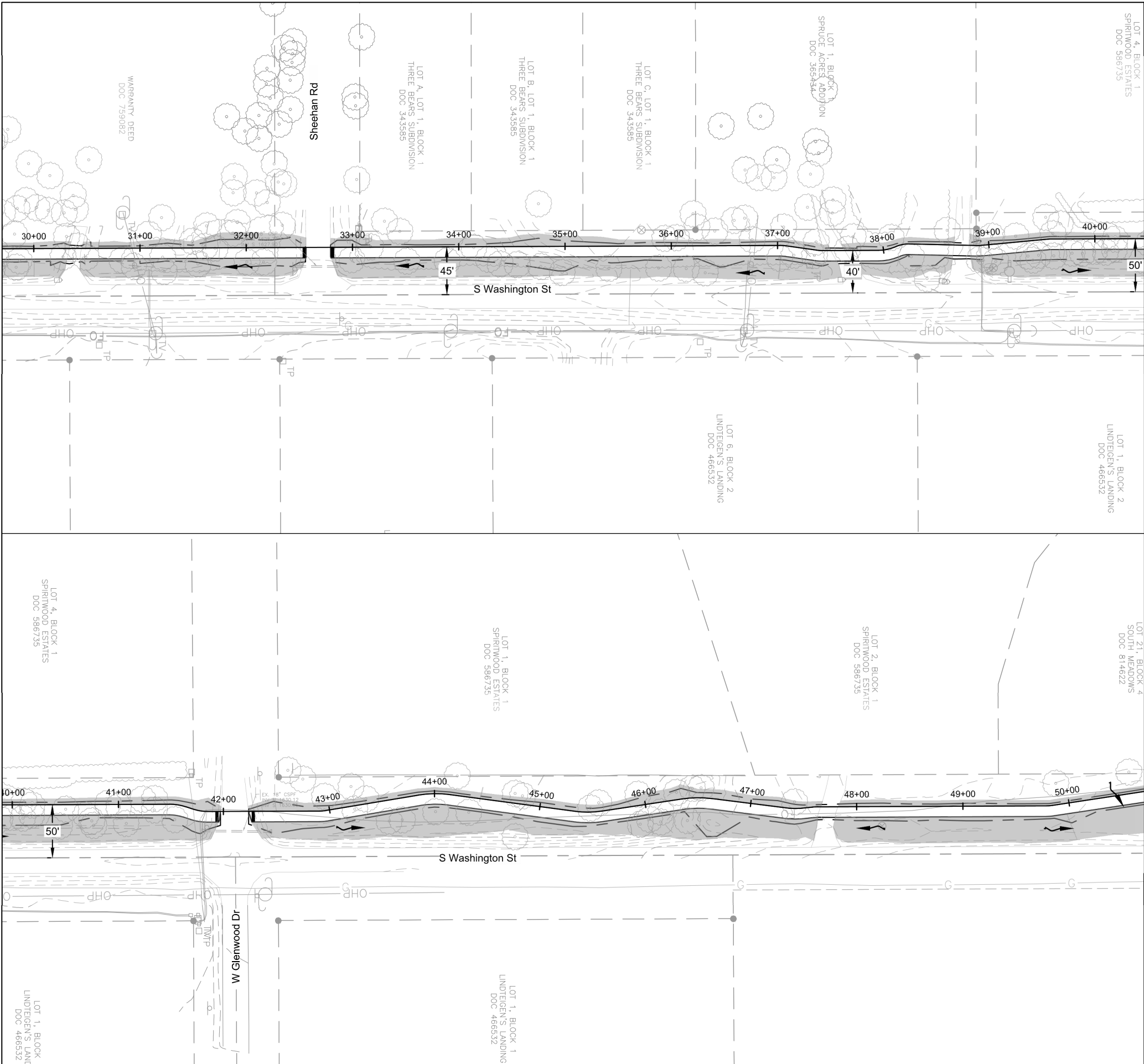
**REGISTERED PROFESSIONAL ENGINEER**

**THOMAS J. DEMKE**

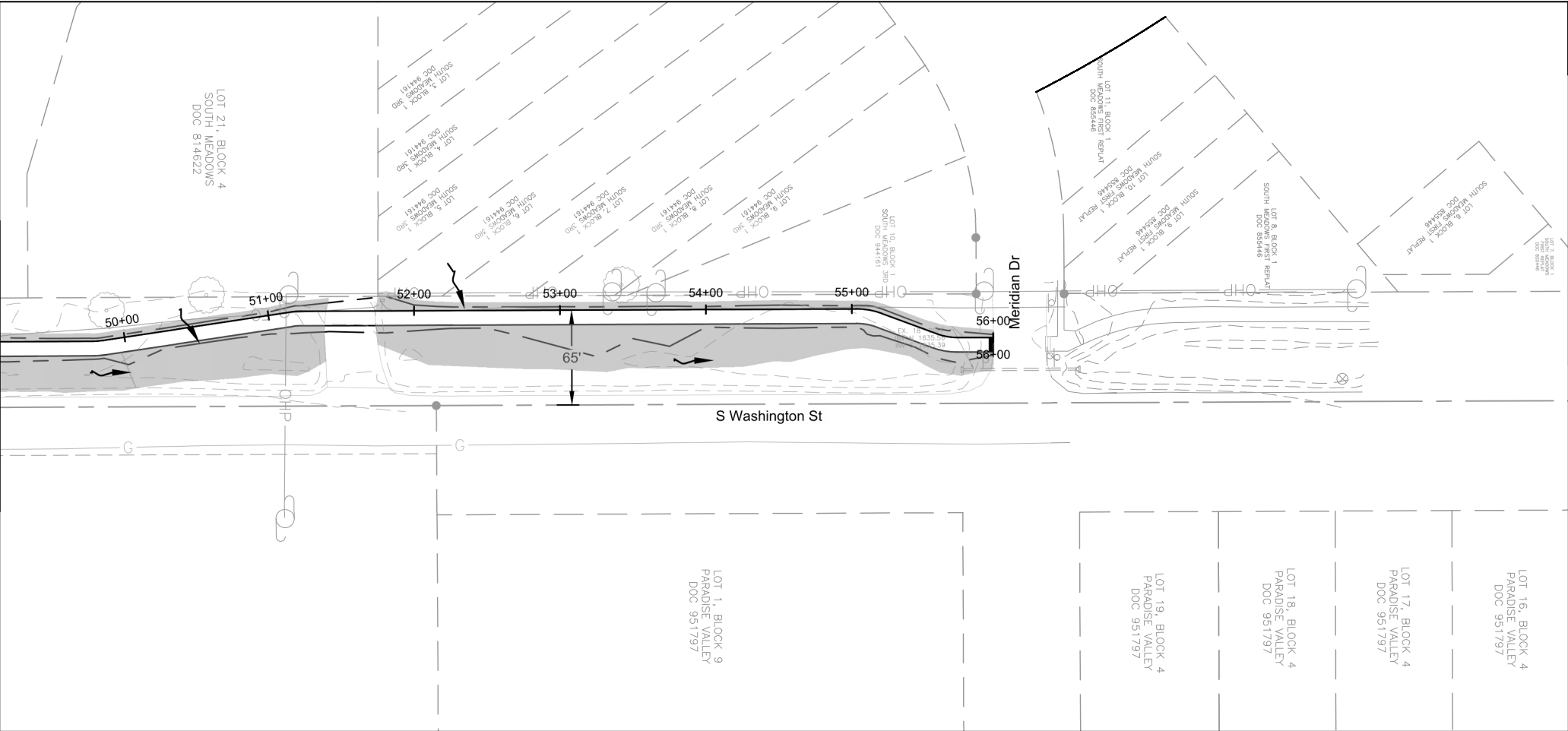
PE-8768

Thomas Demke  
DATE 2024.12.03  
16:38:27-06'00'

**NORTH DAKOTA**



|      |      |                           |                |  |             |           |
|------|------|---------------------------|----------------|--|-------------|-----------|
|      |      | STATE                     | PROJECT NO.    |  | SECTION NO. | SHEET NO. |
|      |      | ND                        | TAC-1-981(138) |  | 77          | 2         |
| SPEC | CODE | BID ITEM                  |                |  | QTY         | UNIT      |
| 251  | 0300 | SEEDING CLASS III         |                |  |             |           |
|      |      | Sta 30+00 to Sta 50+00 Lt |                |  | 0.33        | ACRE      |
|      |      | Sta 30+00 to Sta 50+00 Rt |                |  | 0.88        | ACRE      |
| 253  | 0201 | HYDRAULIC MULCH           |                |  |             |           |
|      |      | Sta 30+00 to Sta 50+00 Lt |                |  | 0.33        | ACRE      |
|      |      | Sta 30+00 to Sta 50+00 Rt |                |  | 0.88        | ACRE      |
|      |      |                           |                |  |             |           |
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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
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|  | ND    | TAC-1-981(138) | 77          | 3         |

| SPEC | CODE | BID ITEM                  | QTY  | UNIT |
|------|------|---------------------------|------|------|
| 251  | 0300 | SEEDING CLASS III         |      |      |
|      |      | Sta 50+00 to Sta 56+18 Lt | 0.07 | ACRE |
|      |      | Sta 53+45 to Sta 56+18 Rt | 0.32 | ACRE |
| 253  | 0201 | HYDRAULIC MULCH           |      |      |
|      |      | Sta 50+00 to Sta 56+18 Lt | 0.07 | ACRE |
|      |      | Sta 50+00 to Sta 56+18 Rt | 0.32 | ACRE |

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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 81          | 1         |

| Section Corners |            |                           |             |
|-----------------|------------|---------------------------|-------------|
| Northing        | Easting    | Description               | Sec - T - R |
| 398361.23       | 1894885.93 | EQCOR #5 REBAR            | 20-138-80   |
| 401001.47       | 1894897.83 | NESEC #5 REBAR            | 20-138-80   |
| 395720.95       | 1894873.97 | SWSEC DEFACED AC          | 21-138-80   |
| 393077.26       | 1894856.71 | WQCOR LS-27331 1IN PIPE   | 28-138-80   |
| 395739.29       | 1892231.30 | NQCOR DEFACED 2IN AC      | 29-138-80   |
| 395758.32       | 1889596.78 | NWSEC DEFACED 2IN AC      | 29-138-80   |
| 395709.96       | 1897495.72 | SQCOR IRON PIPE WITH NAIL | 21-138-80   |
| 395699.13       | 1900116.80 | SESEC 2IN AC              | 21-138-80   |

Coordinate System

Coordinate System  
Name:North Dakota Ground  
Zone: North Dakota South  
Datum: NAD 1983 (Conus)  
Global reference datum: NAD83(2011)  
Global reference epoch: 2010  
Geoid:GEOID18 (Conus)  
Vertical datum: NAVD 88  
UNITS: INTERNATIONAL FEET

Calibrated site: Burleigh  
Additional Coordinate System Details

Local Site Settings  
Project latitude: N45°24'10.14699" Ground scale factor: 1.0001485221  
Project longitude: W108°10'26.06000"False northing offset: 0.000 ft  
Project height: 0.000 ft False easting offset: 0.000 ft

Survey Coordinate and Curve Data

South Washington Street

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

REGISTERED PROFESSIONAL SURVEYOR  
BRETT ZELTINGER  
LS-27331  
DATE 11/22/2024  
NORTH DAKOTA



|           |                       |             |           |
|-----------|-----------------------|-------------|-----------|
| STATE     | PROJECT NO.           | SECTION NO. | SHEET NO. |
| <b>ND</b> | <b>TAC-1-981(138)</b> | <b>100</b>  | <b>1</b>  |

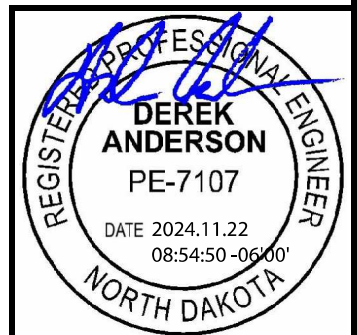
| SIGN<br>NUMBER | SIGN<br>SIZE | DESCRIPTION                                                         | AMOUNT<br>REQUIRED | UNITS<br>PER<br>AMOUNT | UNITS<br>SUB<br>TOTAL |
|----------------|--------------|---------------------------------------------------------------------|--------------------|------------------------|-----------------------|
| E5-1-48        | 48"x48"      | EXIT GORE                                                           |                    | 35                     |                       |
| G20-1-60       | 60"x24"      | ROAD WORK NEXT ___ MILES                                            | 2                  | 28                     | 56                    |
| G20-1b-60      | 60"x24"      | NO WORK IN PROGRESS (Sign and installation only)                    |                    | 18                     |                       |
| G20-2-48       | 48"x24"      | END ROAD WORK                                                       | 2                  | 26                     | 52                    |
| G20-4-36       | 36"x18"      | PILOT CAR FOLLOW ME (Mounted to back of pilot car)                  |                    | 18                     |                       |
| G20-4b-36      | 36"x30"      | WAIT FOR PILOT CAR                                                  |                    | 18                     |                       |
| G20-50a-72     | 72"x36"      | ROAD WORK NEXT ___ MILES RT & LT ARROWS                             | 2                  | 43                     | 86                    |
| G20-52a-72     | 72"x24"      | ROAD WORK NEXT ___ MILES RT or LT ARROW                             |                    | 36                     |                       |
| 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)                |                    | 11                     |                       |
| 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                         |                    | 15                     |                       |
| M4-10-48       | 48"x18"      | DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)          |                    | 7                      |                       |
| M5-1-21        | 21"x15"      | ADVANCE TURN ARROW RT or LT(Mounted on route marker post)           |                    | 7                      |                       |
| M5-1-30        | 30"x21"      | ADVANCE TURN ARROW RT or LT(Mounted on route marker post)           |                    | 9                      |                       |
| M6-1-21        | 21"x15"      | DIRECTIONAL ARROW RT or LT (Mounted on route marker post)           |                    | 7                      |                       |
| M6-1-30        | 30"x21"      | DIRECTIONAL ARROW RT or LT (Mounted on route marker post)           |                    | 9                      |                       |
| M6-3-21        | 21"x15"      | DIRECTIONAL ARROW UP (Mounted on route marker post)                 |                    | 7                      |                       |
| R1-1-48        | 48"x48"      | STOP                                                                |                    | 32                     |                       |
| R1-2-60        | 60"x60"      | YIELD                                                               |                    | 29                     |                       |
| R2-1-36        | 36"x48"      | SPEED LIMIT ___ (Portable only)                                     | 2                  | 30                     | 60                    |
| R2-1-48        | 48"x60"      | SPEED LIMIT ___                                                     | 3                  | 39                     | 117                   |
| R2-1aP-24      | 24"x18"      | MINIMUM FEE \$80 (Mounted on Speed Limit post)                      | 2                  | 10                     | 20                    |
| R3-2-48        | 48"x48"      | NO LEFT TURN                                                        |                    | 35                     |                       |
| R4-1-48        | 48"x60"      | DO NOT PASS                                                         |                    | 39                     |                       |
| R4-7-48        | 48"x60"      | KEEP RIGHT                                                          |                    | 39                     |                       |
| R5-1-48        | 48"x48"      | DO NOT ENTER                                                        |                    | 35                     |                       |
| R6-1-54        | 54"x18"      | ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)        |                    | 14                     |                       |
| R7-1-12        | 12"x18"      | NO PARKING ANY TIME                                                 |                    | 11                     |                       |
| R9-9-24        | 24"x12"      | SIDEWALK CLOSED (Mounted on Barricade)                              | 2                  | 3                      | 6                     |
| R10-6-24       | 24"x36"      | STOP HERE ON RED                                                    |                    | 16                     |                       |
| R11-2-48       | 48"x30"      | ROAD CLOSED (Mounted on barricade)                                  |                    | 12                     |                       |
| R11-2a-48      | 48"x30"      | STREET CLOSED (Mounted on barricade)                                |                    | 12                     |                       |
| R11-3a-60      | 60"x30"      | ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)   |                    | 15                     |                       |
| R11-3c-60      | 60"x30"      | STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade) |                    | 15                     |                       |
| R11-4a-60      | 60"x30"      | STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)                |                    | 15                     |                       |
| W1-3-48        | 48"x48"      | REVERSE TURN RIGHT or LEFT                                          |                    | 35                     |                       |
| W1-4-48        | 48"x48"      | REVERSE CURVE RIGHT or LEFT                                         |                    | 35                     |                       |
| W1-4b-48       | 48"x48"      | TWO LANE REVERSE CURVE RIGHT or LEFT                                |                    | 35                     |                       |
| W1-6-48        | 48"x24"      | ONE DIRECTION LARGE ARROW                                           |                    | 26                     |                       |
| W3-1-48        | 48"x48"      | STOP AHEAD                                                          |                    | 35                     |                       |
| W3-3-48        | 48"x48"      | SIGNAL AHEAD                                                        |                    | 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"      | LANE ENDS RIGHT or LEFT                                             |                    | 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                                                     |                    | 35                     |                       |
| W8-1-48        | 48"x48"      | BUMP                                                                |                    | 35                     |                       |
| W8-3-48        | 48"x48"      | PAVEMENT ENDS                                                       |                    | 35                     |                       |
| W8-7-48        | 48"x48"      | LOOSE GRAVEL                                                        |                    | 35                     |                       |
| W8-11-48       | 48"x48"      | UNEVEN LANES                                                        |                    | 35                     |                       |
| W8-12-48       | 48"x48"      | NO CENTER LINE                                                      |                    | 35                     |                       |
| W8-17-48       | 48"x48"      | SHOULDER DROP-OFF SYMBOL                                            |                    | 35                     |                       |
| W8-53-48       | 48"x48"      | TRUCKS ENTERING HIGHWAY                                             |                    | 35                     |                       |
| W8-54-48       | 48"x48"      | TRUCKS ENTERING AHEAD or ___ FT or ___ MILE                         |                    | 35                     |                       |
| W8-55-48       | 48"x48"      | TRUCKS CROSSING AHEAD or ___ FT or ___ MILE                         |                    | 35                     |                       |
| W8-56-48       | 48"x48"      | TRUCKS EXITING HIGHWAY                                              |                    | 35                     |                       |
| W9-3a-48       | 48"x48"      | CENTER LANE CLOSED SYMBOL                                           |                    | 35                     |                       |
| W13-1P-30      | 30"x30"      | ___ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)        |                    | 14                     |                       |
| W14-3-64       | 64"x48"      | NO PASSING ZONE                                                     |                    | 28                     |                       |
| W16-2P-30      | 30"x24"      | ___ FEET PLAQUE (Mounted on warning sign post)                      |                    | 10                     |                       |
| W20-1-48       | 48"x48"      | ROAD WORK AHEAD or ___ FT or ___ MILE                               | 4                  | 35                     | 140                   |
| W20-2-48       | 48"x48"      | DETOUR AHEAD or ___ FT or ___ MILE                                  |                    | 35                     |                       |
| W20-3-48       | 48"x48"      | ROAD or STREET CLOSED AHEAD or ___ FT or ___ MILE                   |                    | 35                     |                       |
| W20-4-48       | 48"x48"      | ONE LANE ROAD AHEAD or ___ FT or ___ MILE                           |                    | 35                     |                       |
| W20-5-48       | 48"x48"      | RIGHT or CENTER or LEFT LANE CLOSED AHEAD or ___ FT or ___ MILE     |                    | 35                     |                       |
| W20-7-48       | 48"x48"      | FLAGGER                                                             | 2                  | 35                     | 70                    |
| W20-8-18       | 18"x18"      | STOP - SLOW PADDLE Back to Back                                     | 2                  | 5                      | 10                    |
| W20-52P-54     | 54"x12"      | NEXT ___ MILES (Mounted on warning sign post)                       |                    | 12                     |                       |
| W21-1-48       | 48"x48"      | WORKERS                                                             |                    | 35                     |                       |
| W21-2-48       | 48"x48"      | FRESH OIL                                                           |                    | 35                     |                       |
| W21-3-48       | 48"x48"      | ROAD MACHINERY AHEAD or ___ FT or ___ MILE                          |                    | 35                     |                       |
| W21-5-48       | 48"x48"      | SHOULDER WORK                                                       | 1                  | 35                     | 35                    |
| W21-5a-48      | 48"x48"      | RIGHT or LEFT SHOULDER CLOSED                                       |                    | 35                     |                       |

[illegible][illegible]

| SPEC & CODE |                       |             |     |
|-------------|-----------------------|-------------|-----|
| 704-1000    | TRAFFIC CONTROL SIGNS | TOTAL UNITS | 652 |

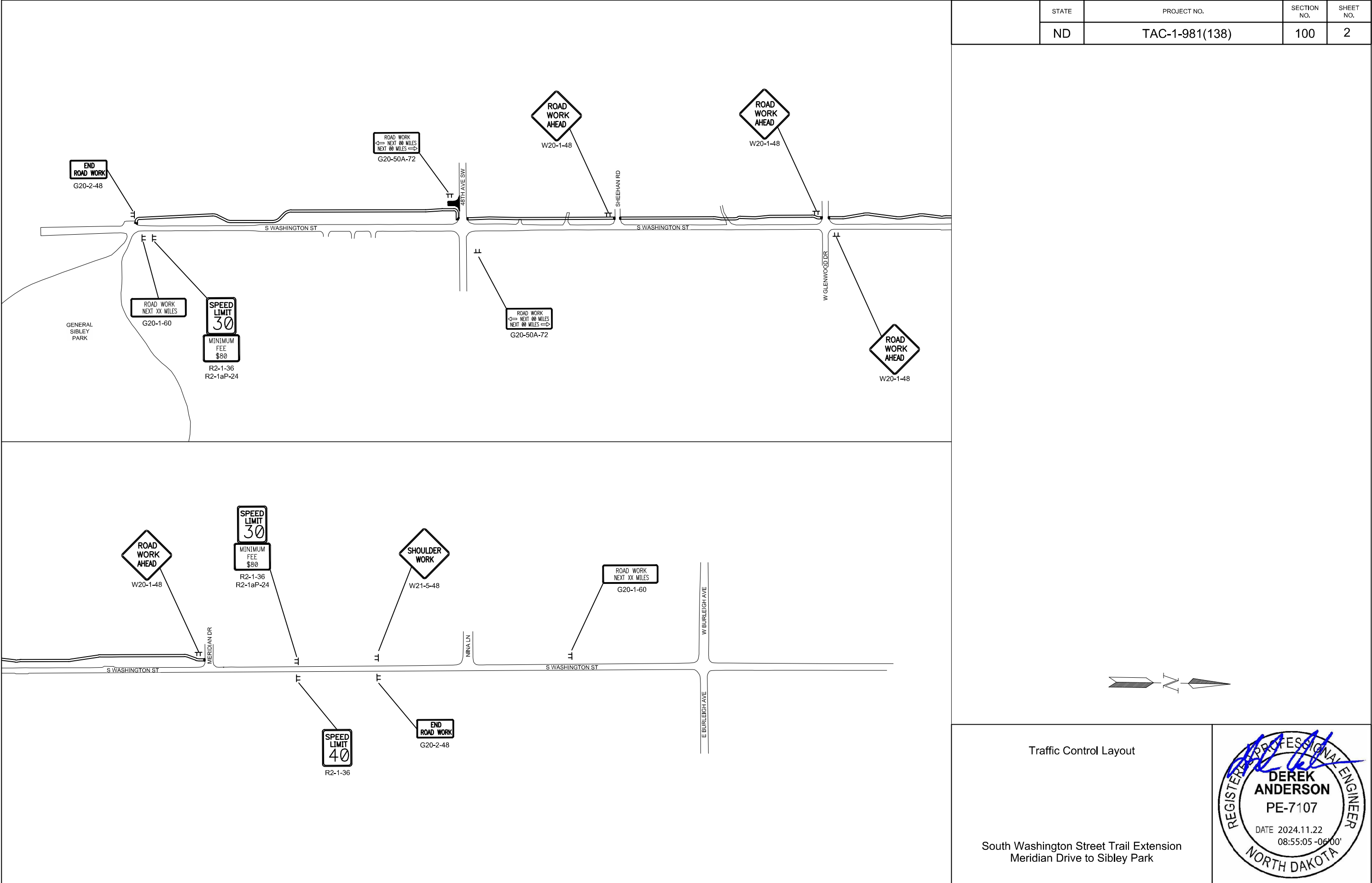
[illegible]

**NOTE:**  
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.  
<http://www.dot.nd.gov/>

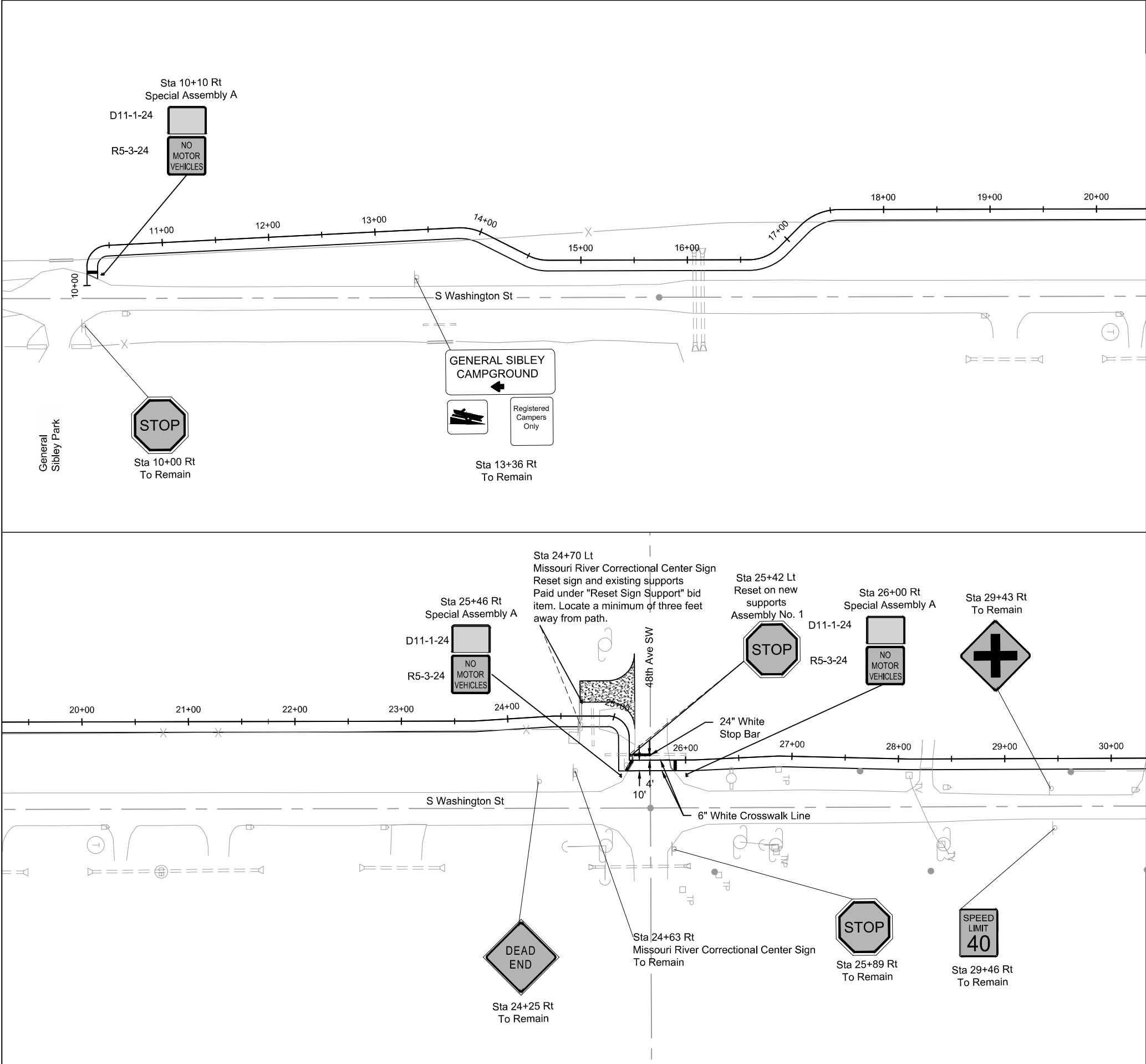


### Traffic Control Devices List

## SouthWashington Street Trail Extension Meridain Drive to Sibley Park







| STATE |  | PROJECT NO.    | SECTION NO. | SHEET NO. |
|-------|--|----------------|-------------|-----------|
| ND    |  | TAC-1-981(138) | 110         | 2         |

| SPEC | CODE | BID ITEM                                      | QTY | UNIT |
|------|------|-----------------------------------------------|-----|------|
| 754  | 0593 | RESET SIGN SUPPORT                            |     |      |
|      |      | Sta 24+70 Lt                                  | 1   | EA   |
| 762  | 1307 | PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED  |     |      |
|      |      | 48th Ave SW                                   | 77  | LF   |
| 762  | 1325 | PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED |     |      |
|      |      | 48th Ave SW                                   | 15  | LF   |

Permanent Signing and Pavement Marking

Sta 10+00 to Sta 30+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

REGISTERED PROFESSIONAL ENGINEER

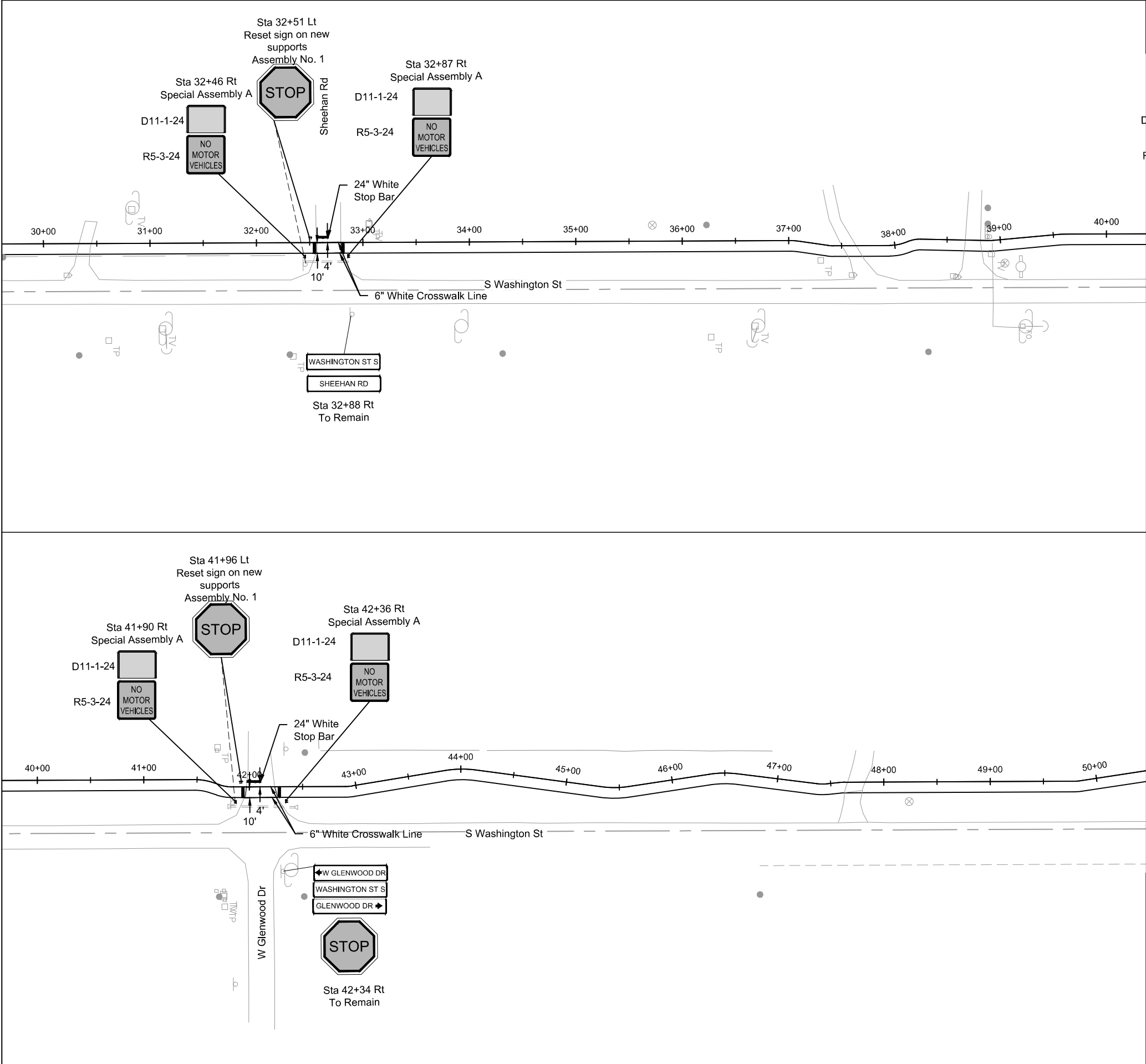
**DEREK ANDERSON**

PE-7107

DATE 2024.11.22 08:56:30 -06'00'

NORTH DAKOTA





|  |  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|--|--|-------|----------------|-------------|-----------|
|  |  | ND    | TAC-1-981(138) | 110         | 3         |

| SPEC | CODE | BID ITEM                                      | QTY | UNIT |
|------|------|-----------------------------------------------|-----|------|
| 762  | 1307 | PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED  |     |      |
|      |      | Sheehan Rd                                    | 47  | LF   |
|      |      | Glenwood Dr                                   | 58  | LF   |
| 762  | 1325 | PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED |     |      |
|      |      | Sheehan Rd                                    | 12  | LF   |
|      |      | Glenwood Dr                                   | 13  | LF   |

SCALE: 1 INCH = 100 FEET

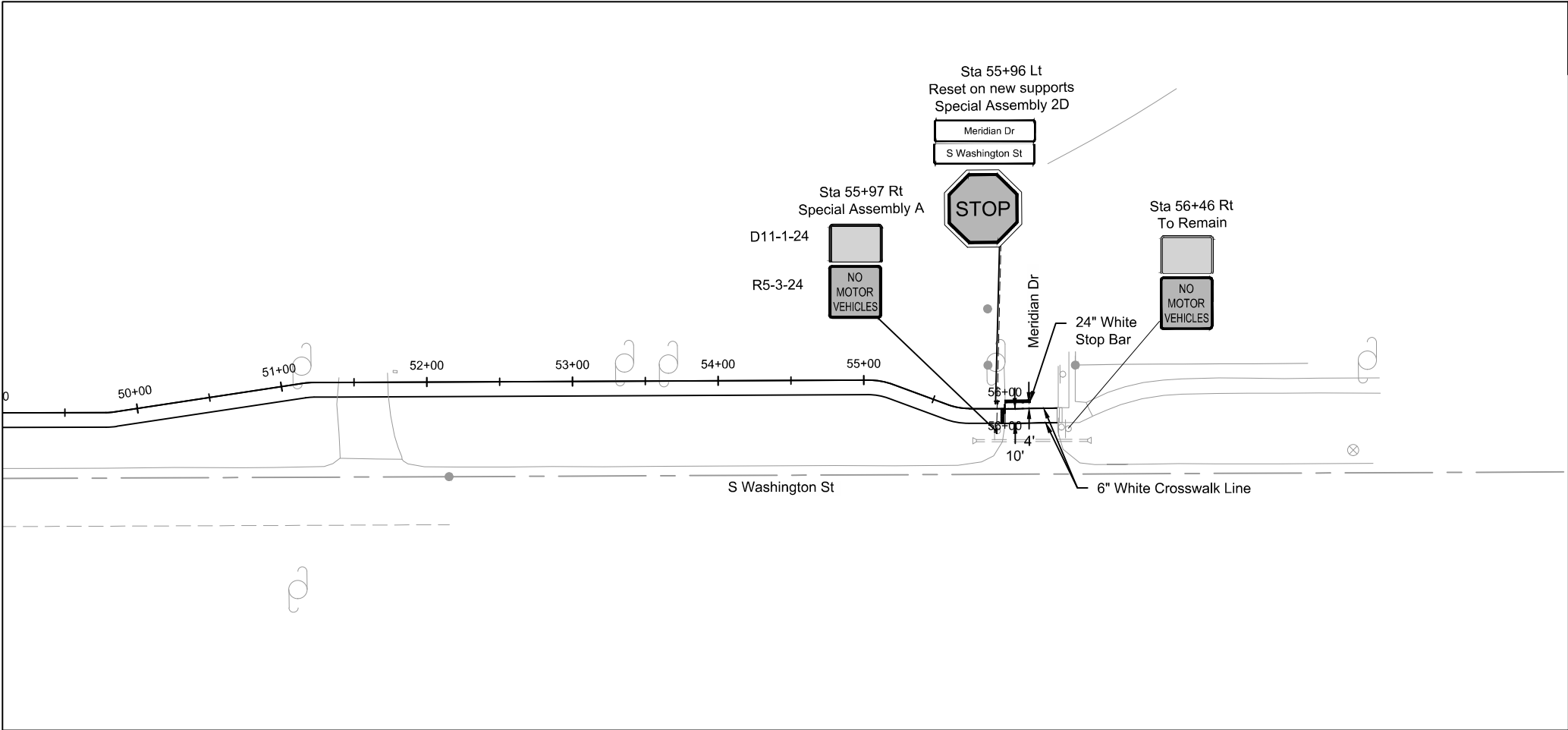
  

Permanent Signing and Pavement Marking

Sta 30+00 to Sta 50+00

South Washington Street Trail Extension  
Meridian Drive to Sibley Park

REGISTERED PROFESSIONAL ENGINEER  
**DEREK ANDERSON**  
PE-7107  
DATE 2024.11.22  
08:56:41 -06'00'  
NORTH DAKOTA



| STATE |  | PROJECT NO.    | SECTION NO. | SHEET NO. |
|-------|--|----------------|-------------|-----------|
| ND    |  | TAC-1-981(138) | 110         | 4         |

| SPEC        | CODE | BID ITEM                                      | QTY | UNIT |
|-------------|------|-----------------------------------------------|-----|------|
| 762         | 1307 | PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED  |     |      |
| Meridian Dr |      |                                               | 72  | LF   |
| 762         | 1325 | PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED |     |      |
| Meridian Dr |      |                                               | 18  | LF   |

**Special Assembly A**  
Area = 7.0 SF  
(Perforated Square Tube)

Sta 10+10 Rt  
Sta 25+46 Rt  
Sta 26+00 Rt  
Sta 32+46 Rt  
Sta 32+87 Rt  
Sta 41+90 Rt  
Sta 42+36 Rt  
Sta 55+97 Rt

SCALE: 1 INCH = 100 FEET

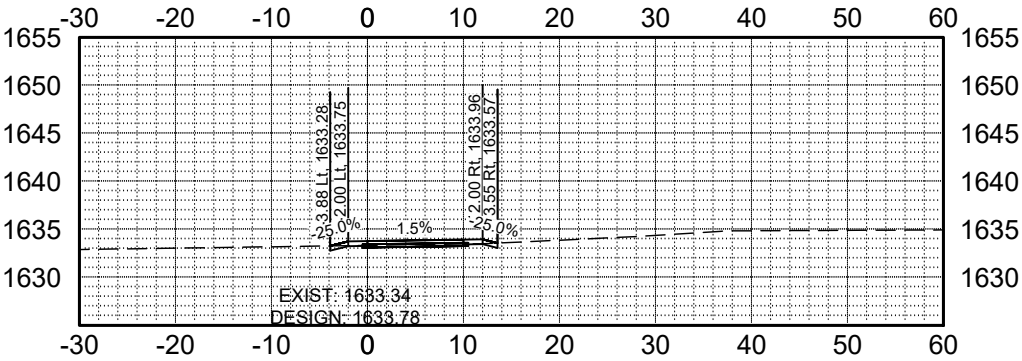
Permanent Signing and Pavement Marking

Sta 50+00 to Sta 56+18

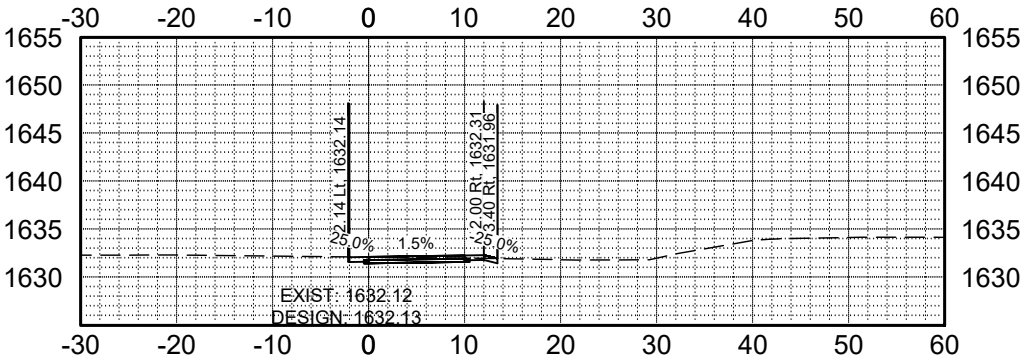
South Washington Street Trail Extension  
Meridian Drive to Sibley Park

|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 1         |

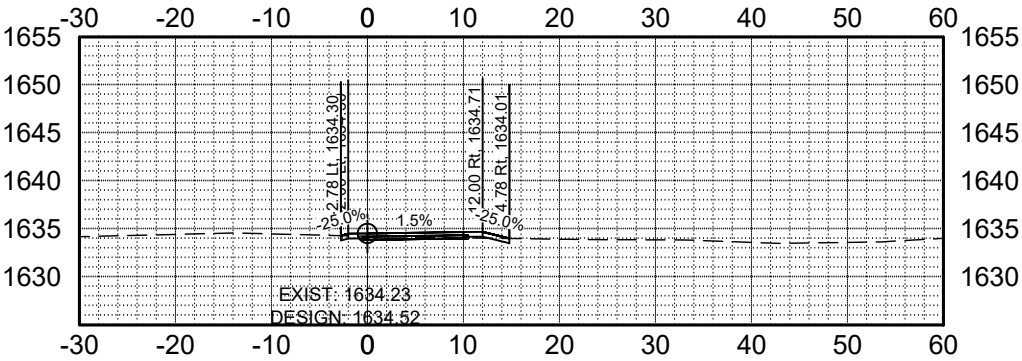
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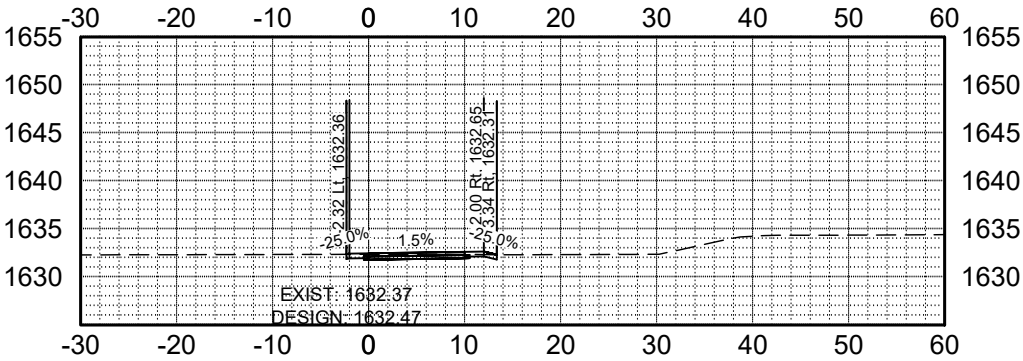
PR\_Path STA 11+25.00



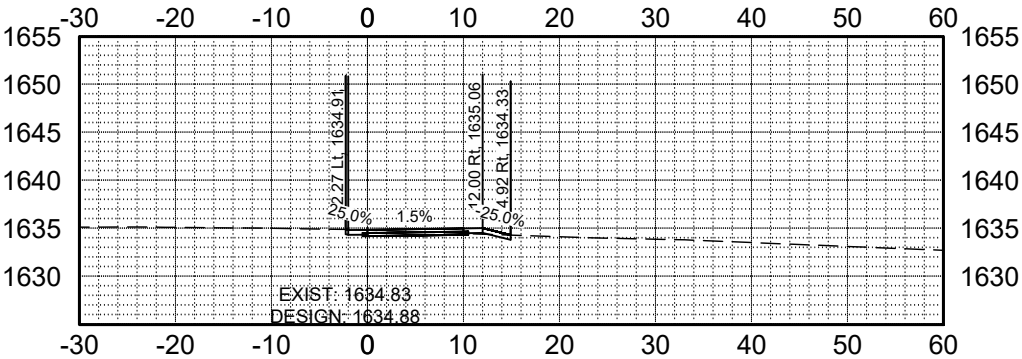
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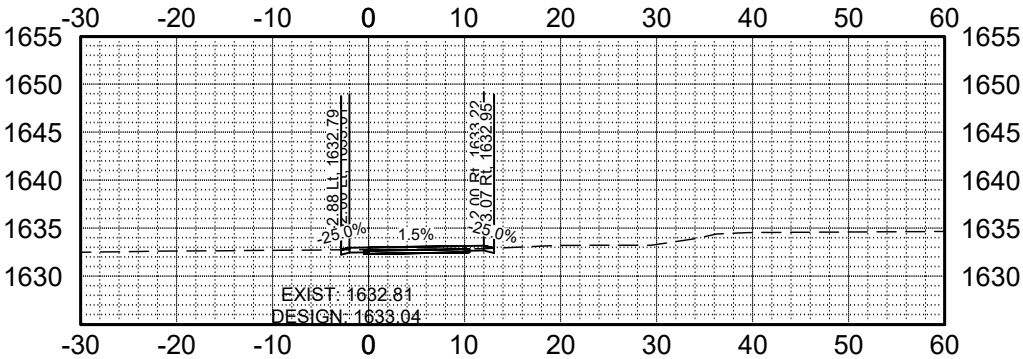
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PR\_Path STA 10+13.41

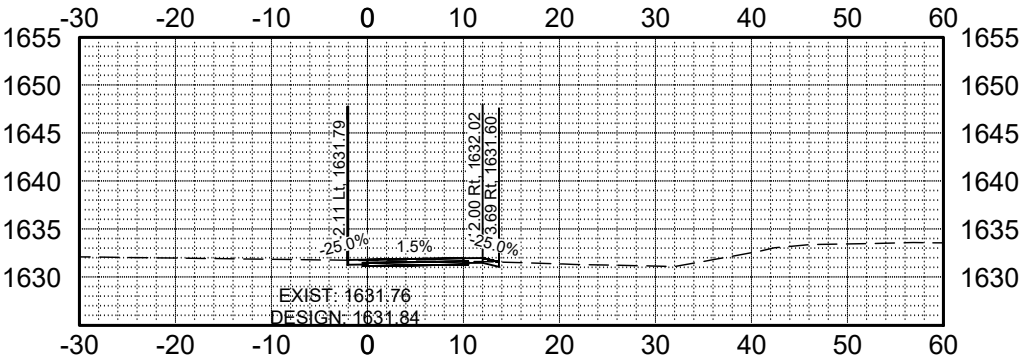


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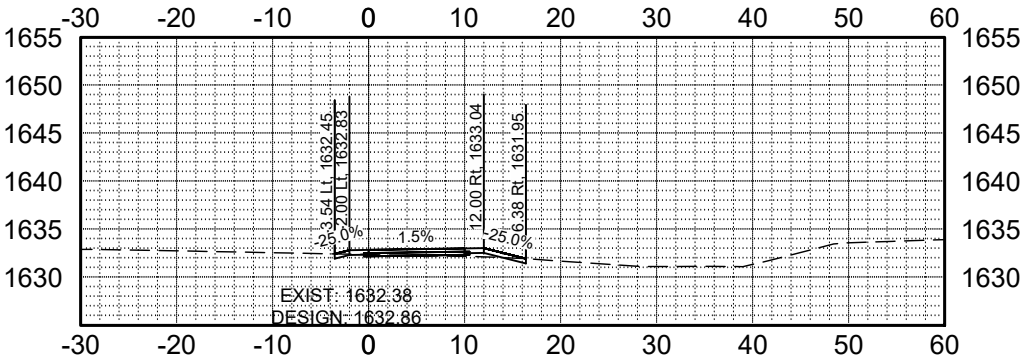


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 2         |

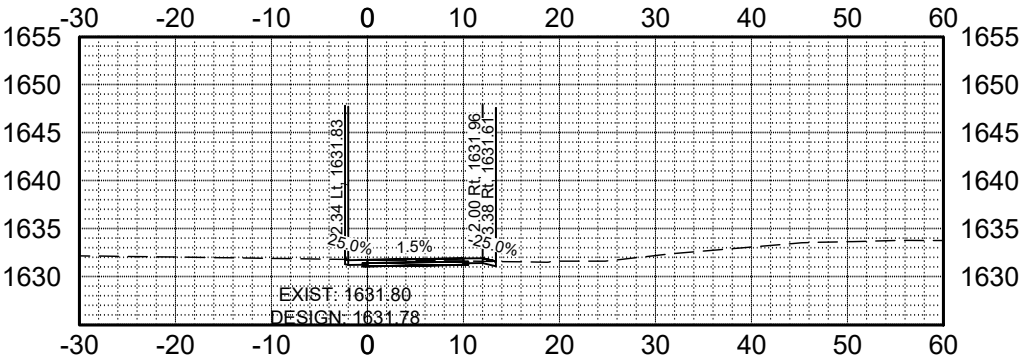
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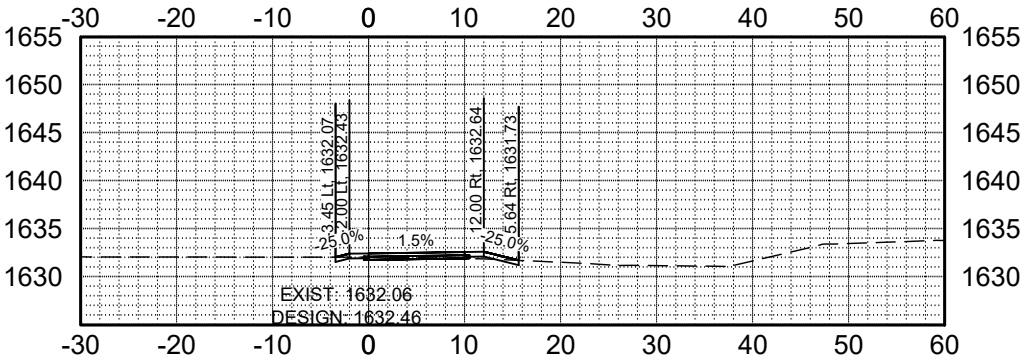
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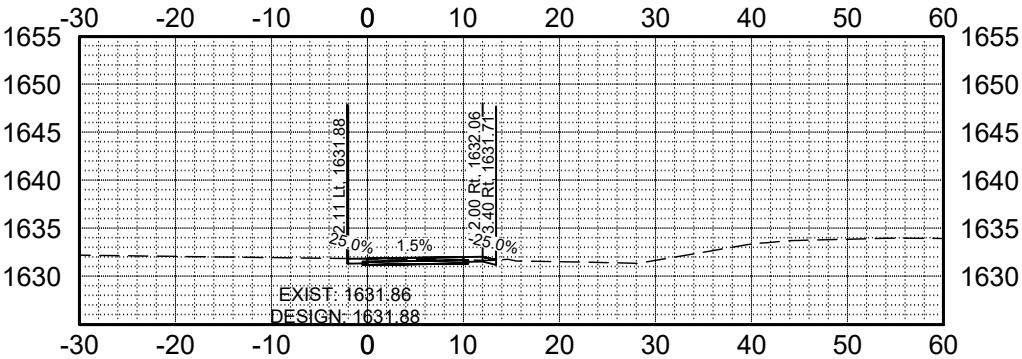
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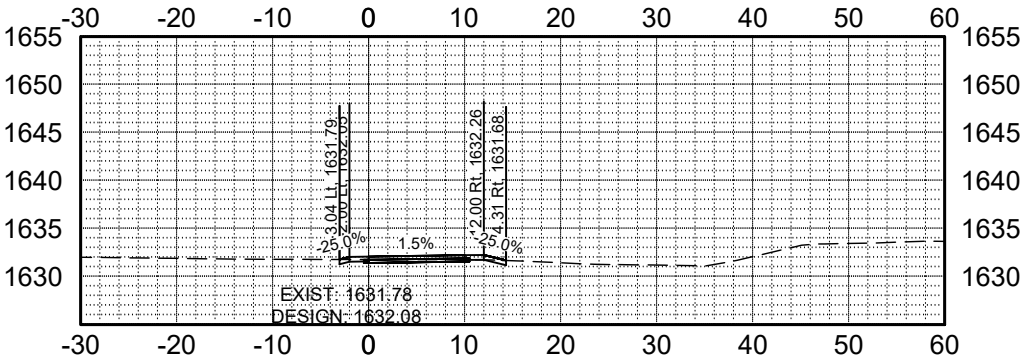
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PR\_Path STA 11+50.00



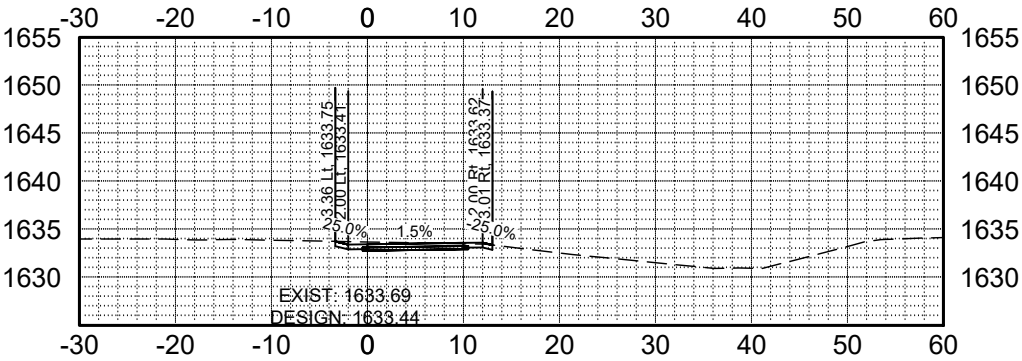
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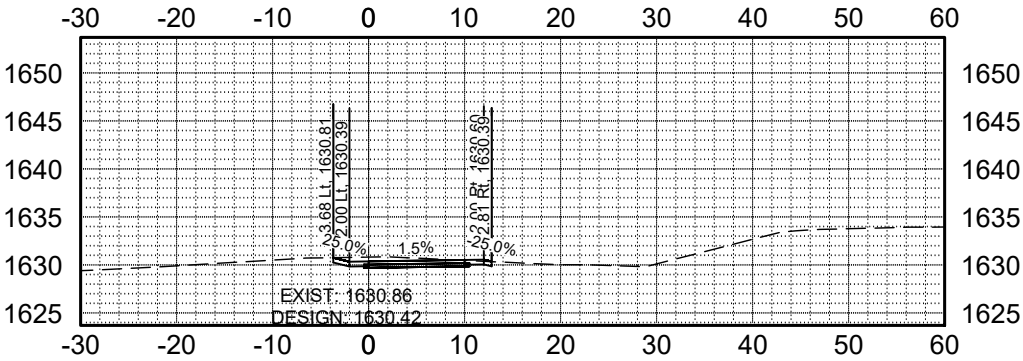


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 3         |

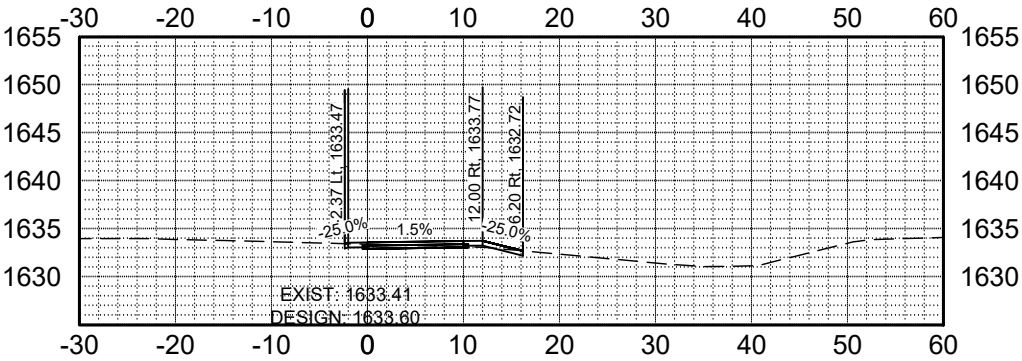
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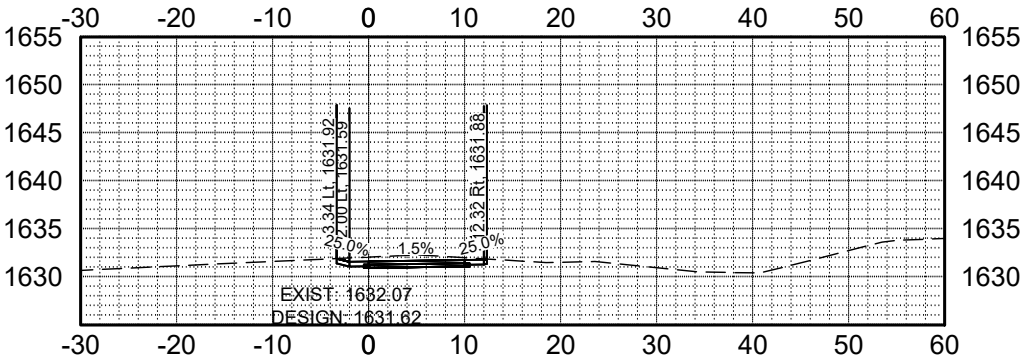
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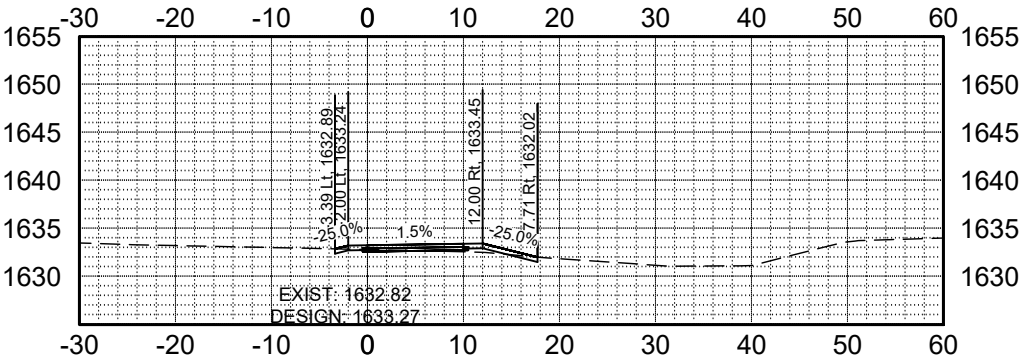
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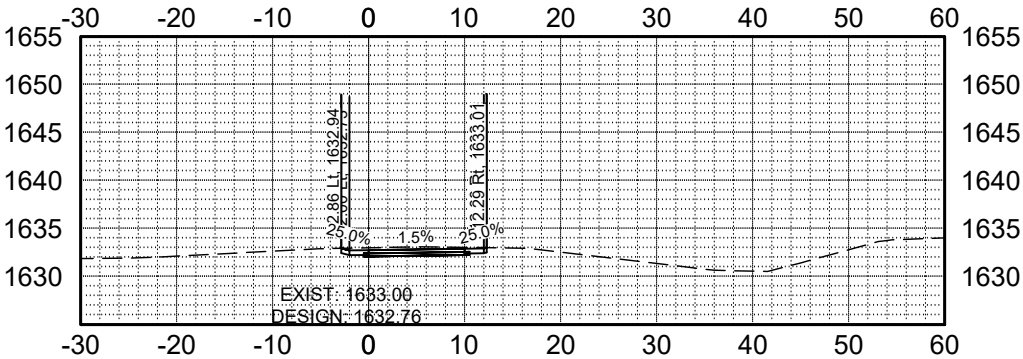
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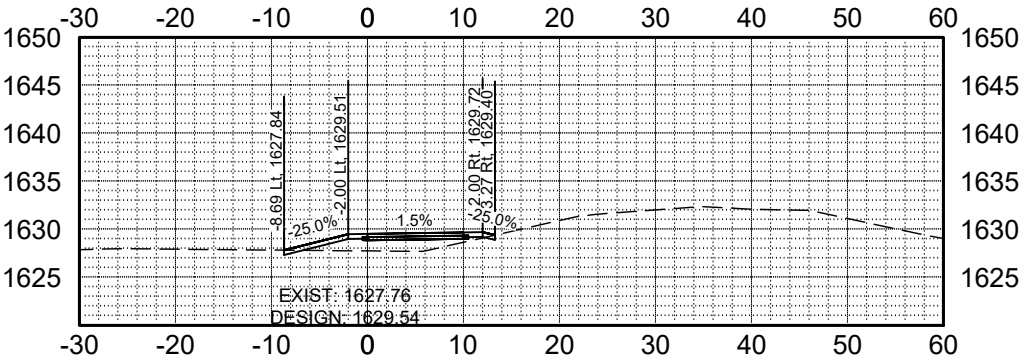


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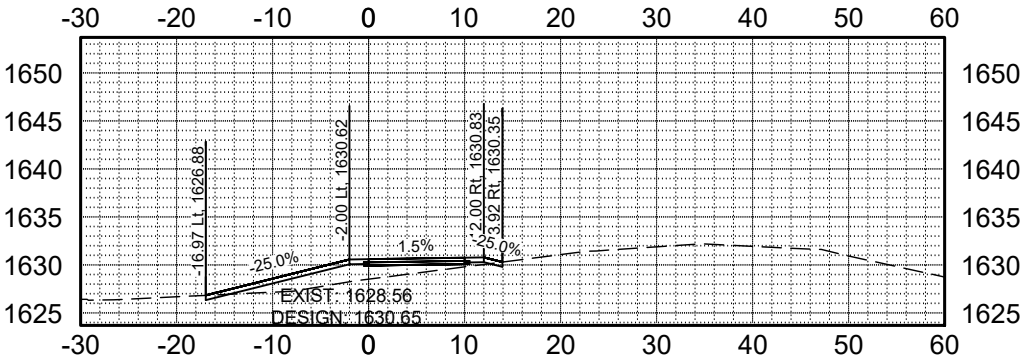


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 4         |

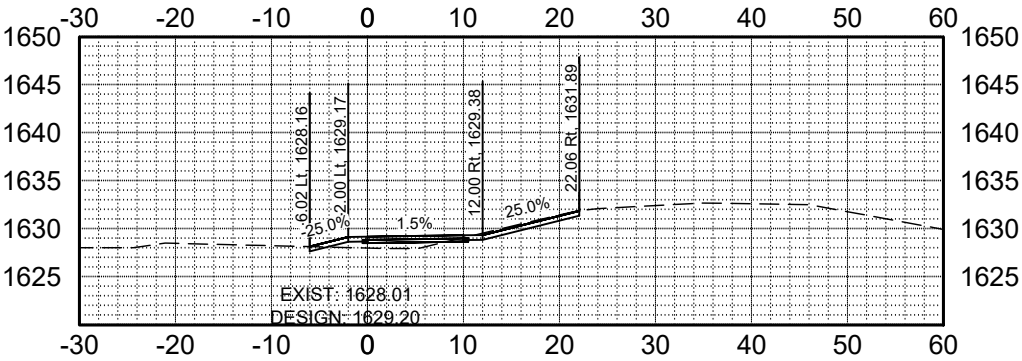
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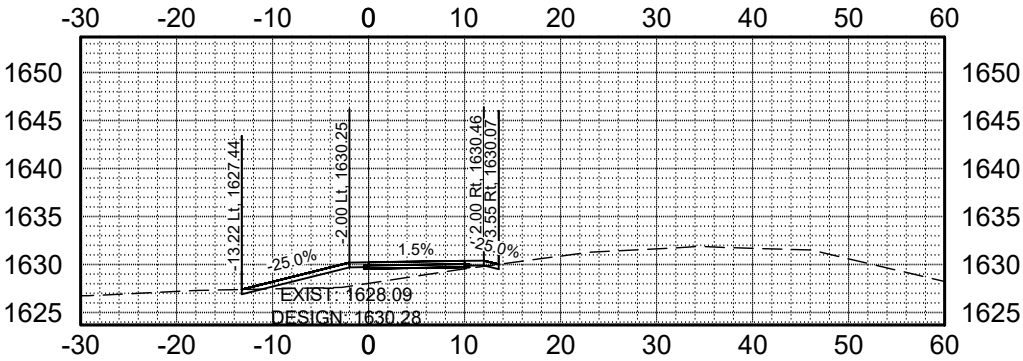
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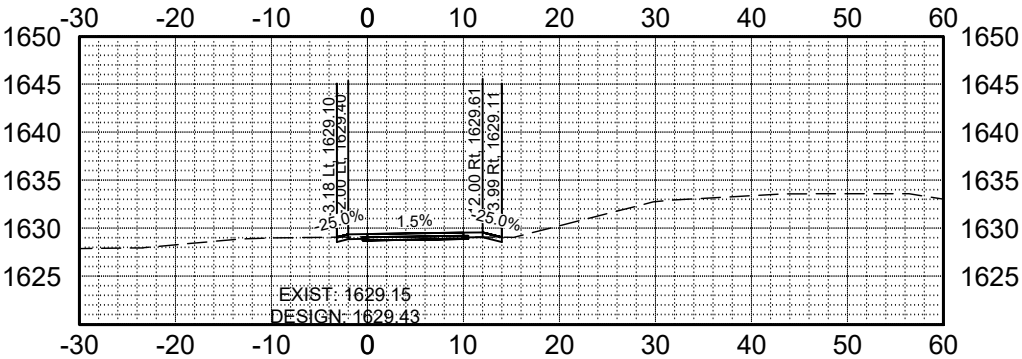
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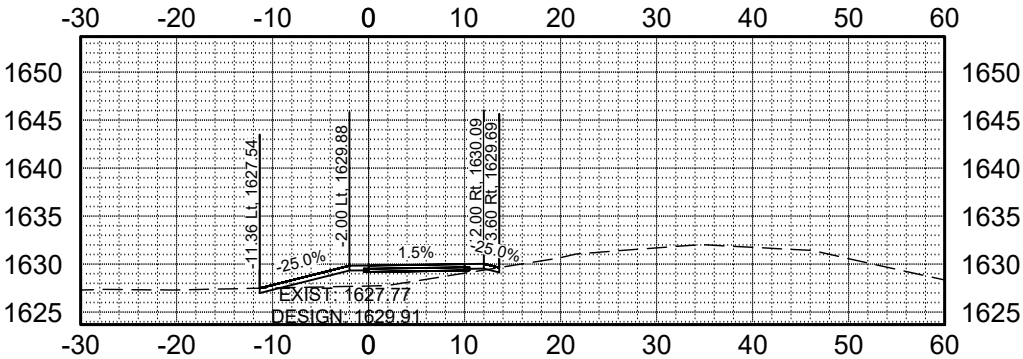
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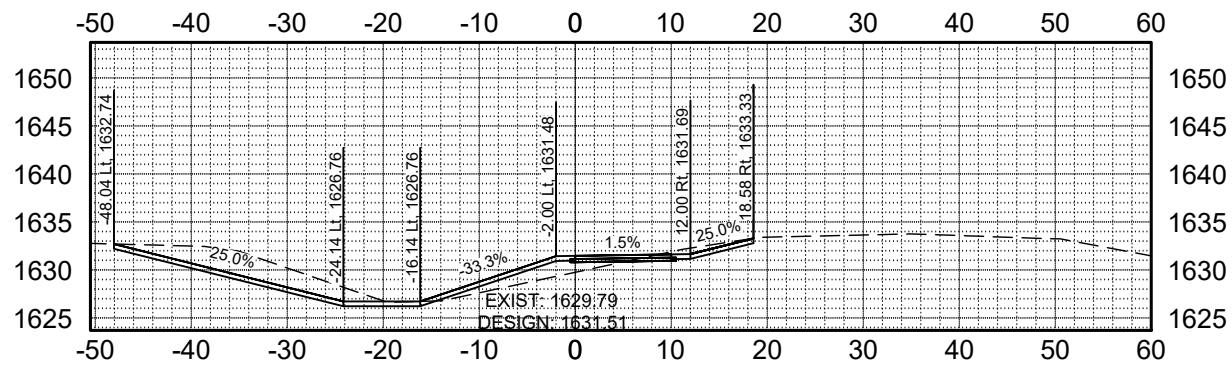


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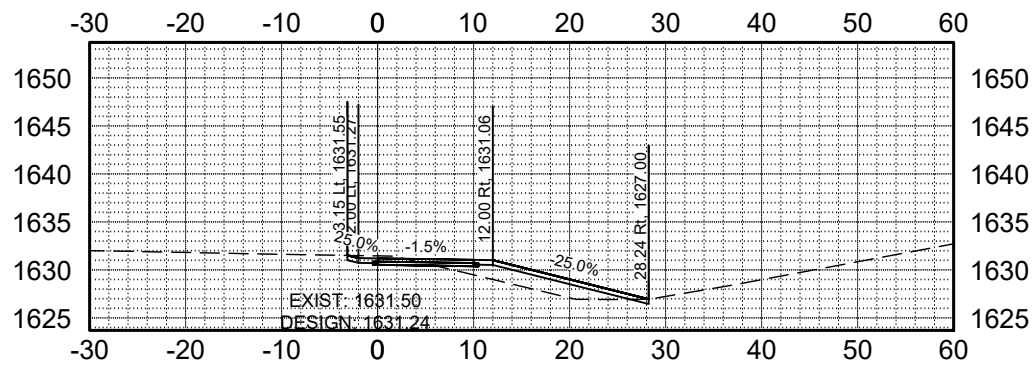


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 5         |

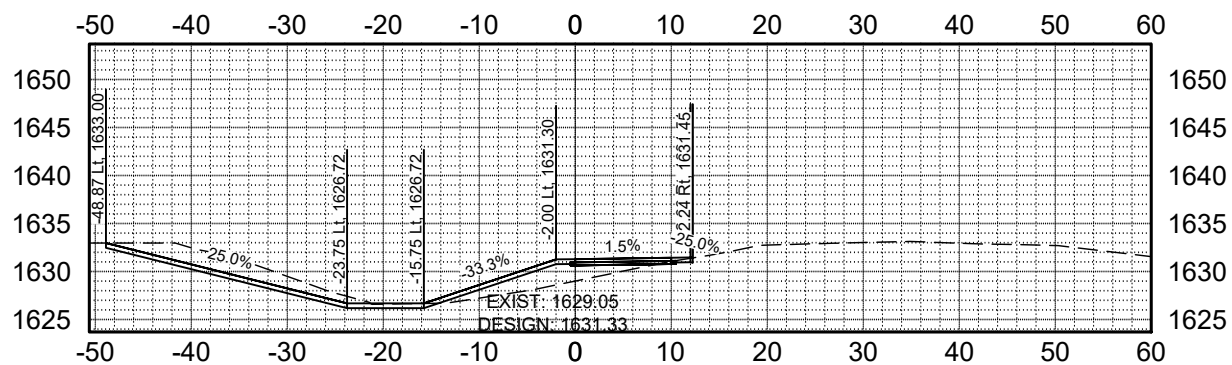
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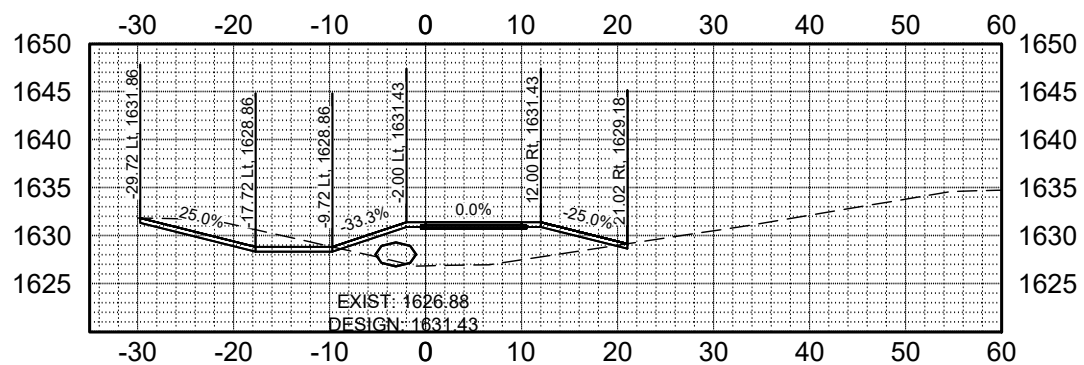
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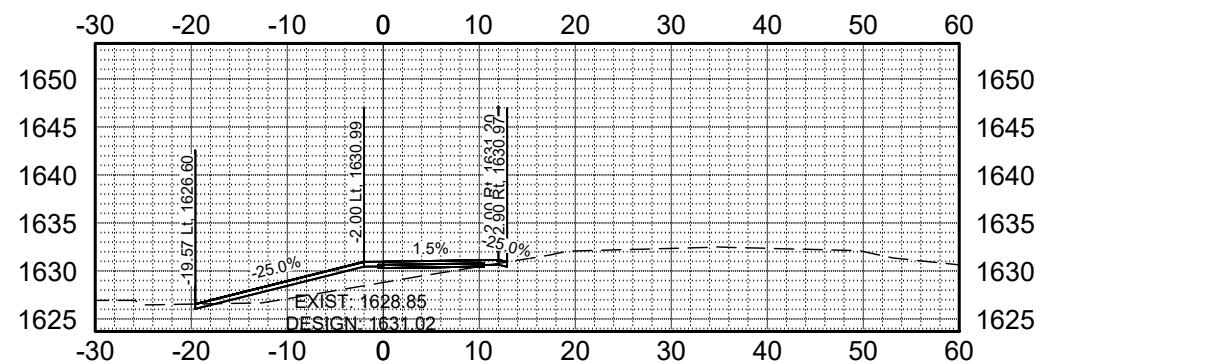
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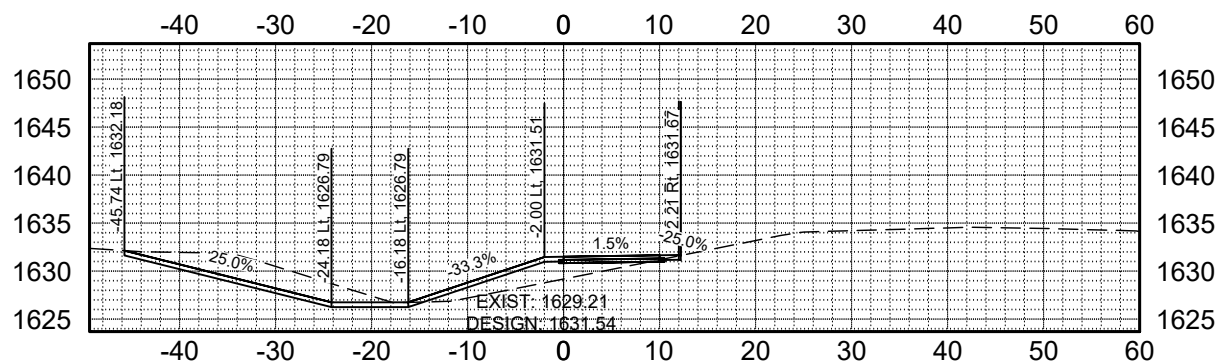
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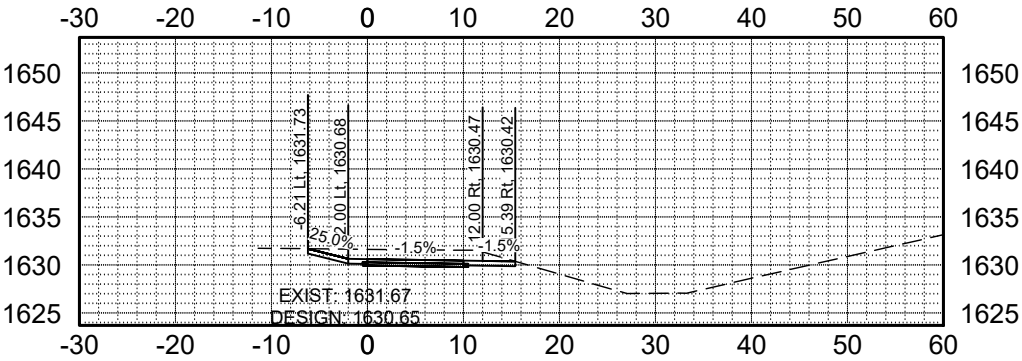


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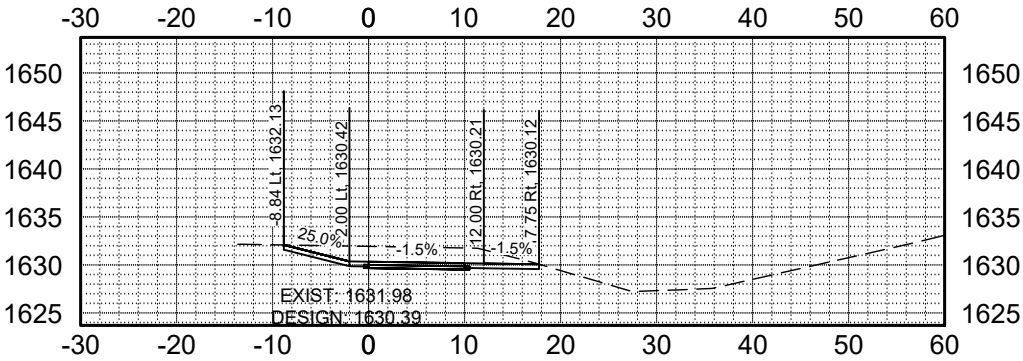


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 6         |

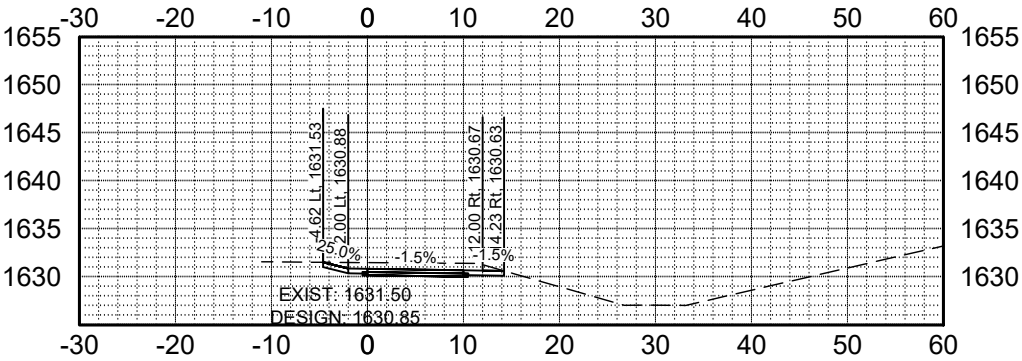
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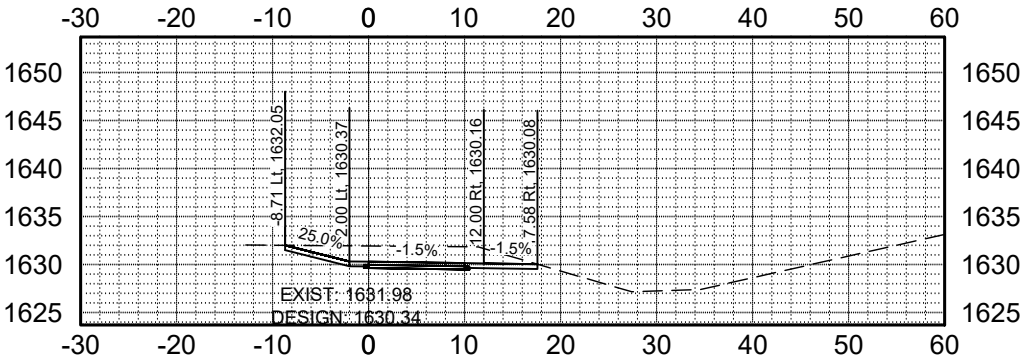
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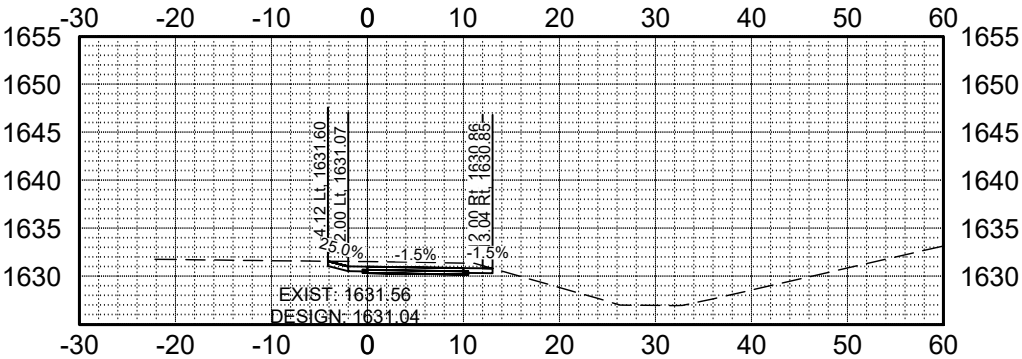
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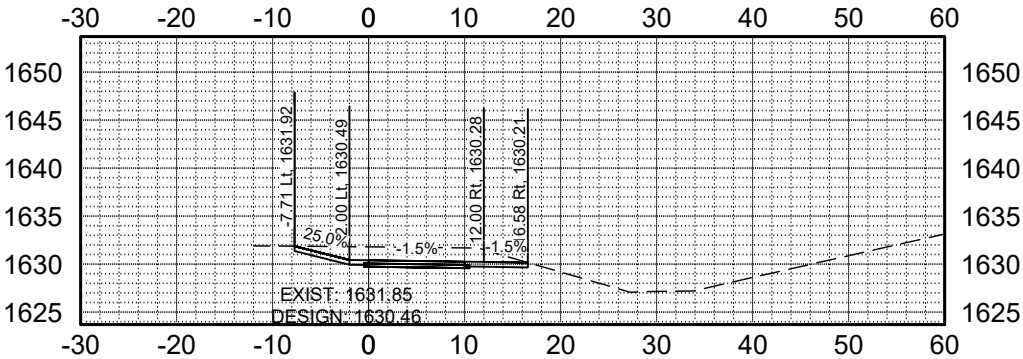
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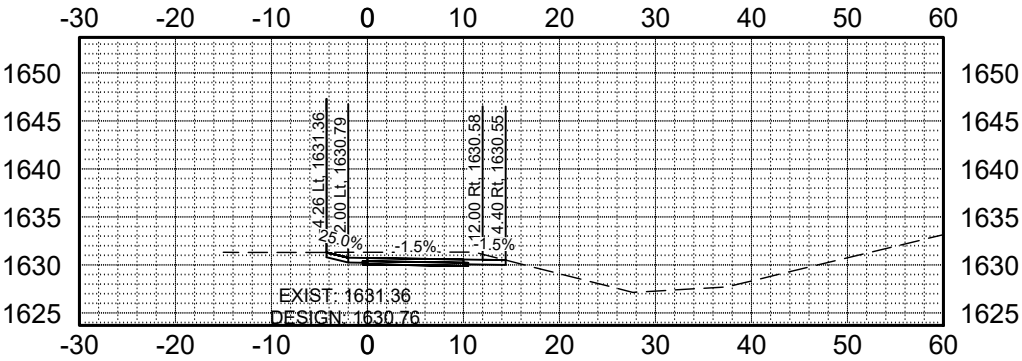
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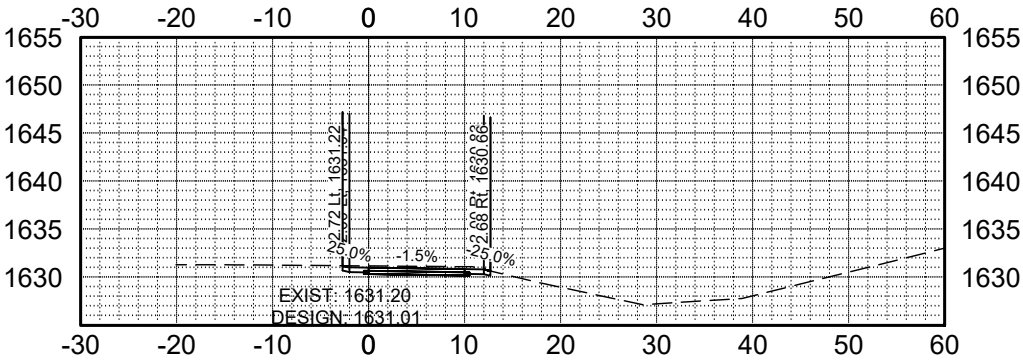


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 7         |

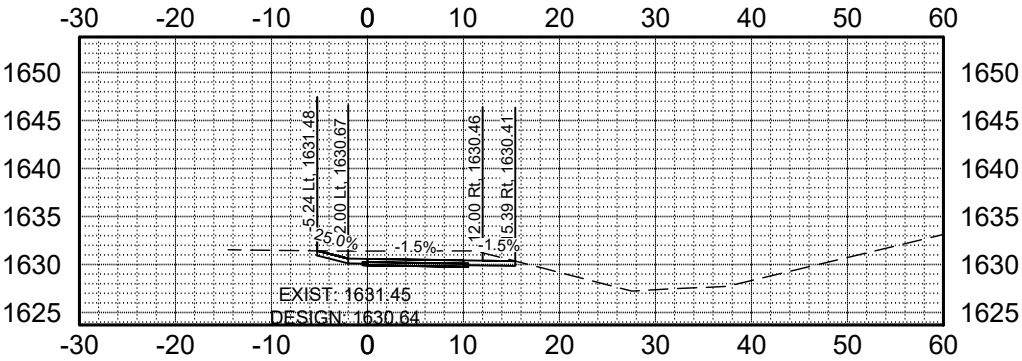
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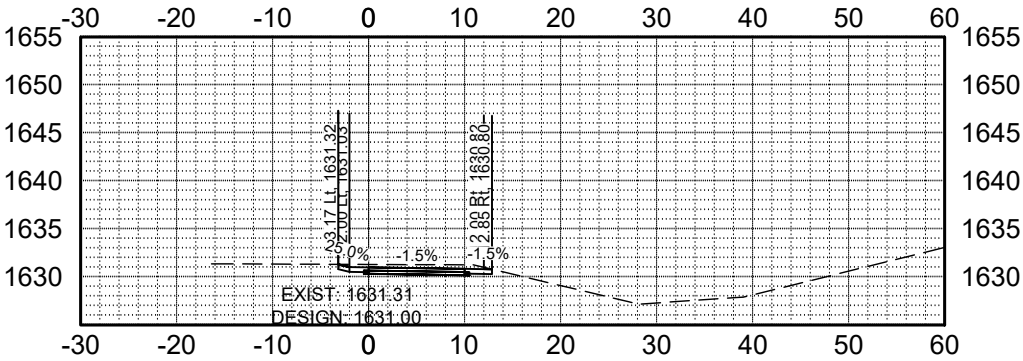
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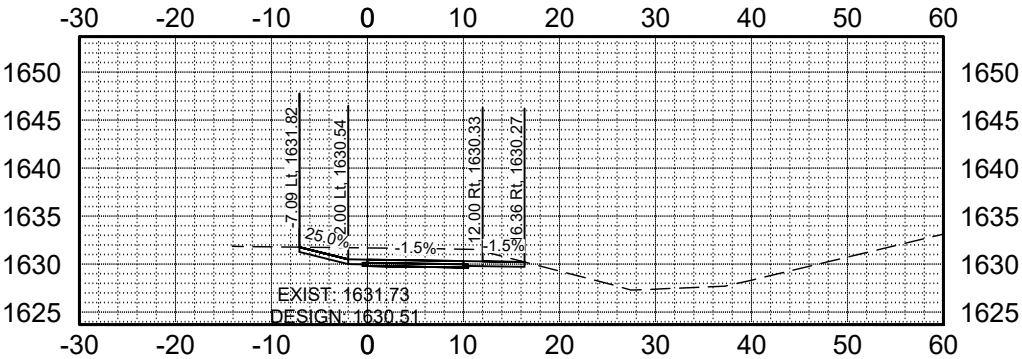
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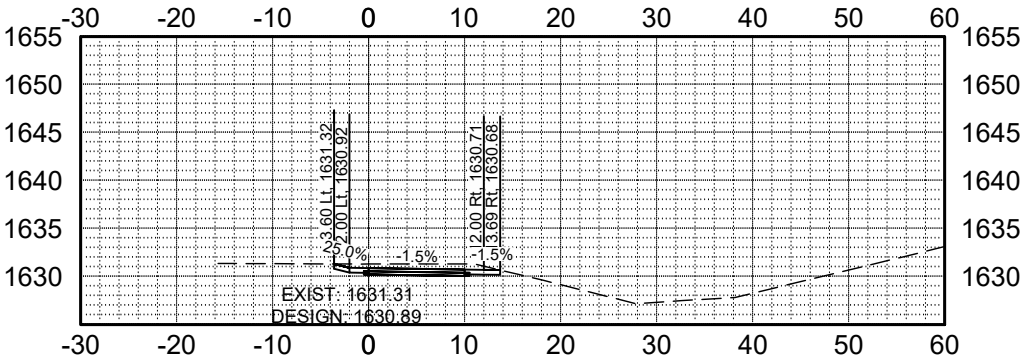
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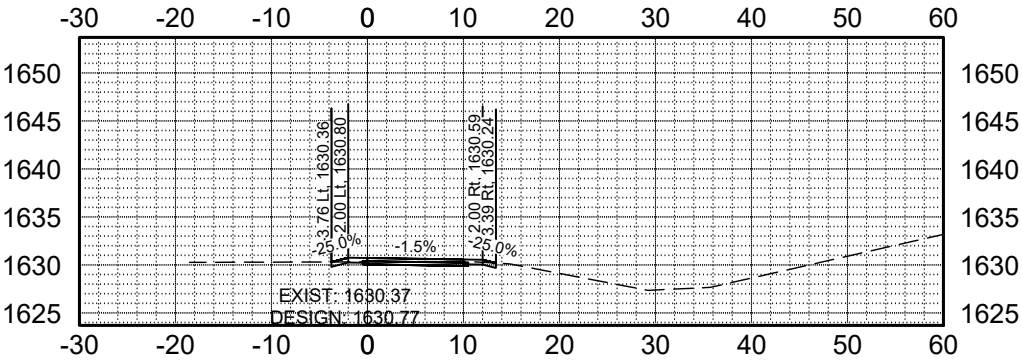


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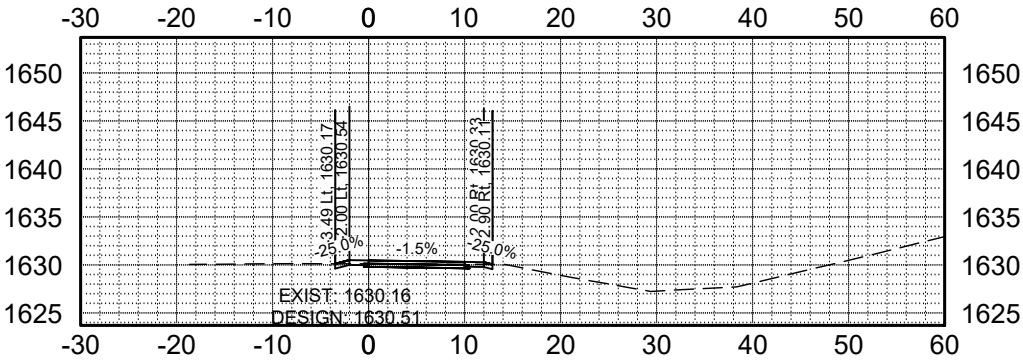


|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 8         |

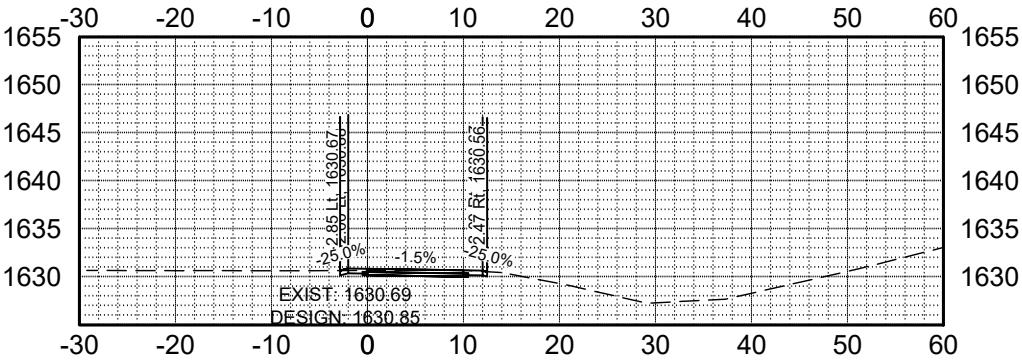
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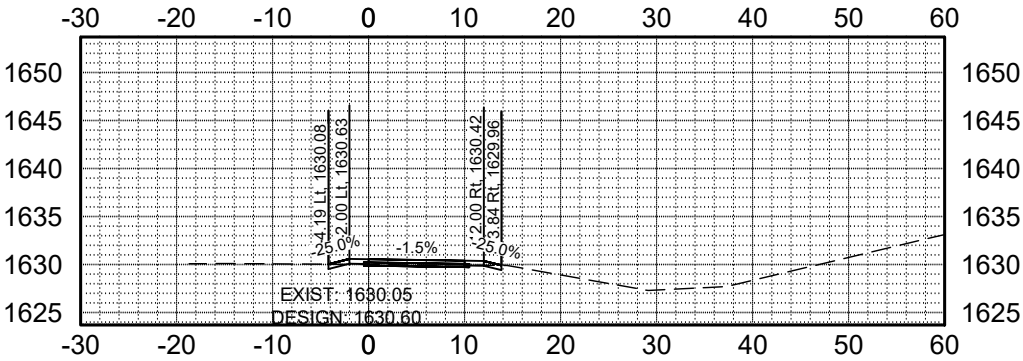
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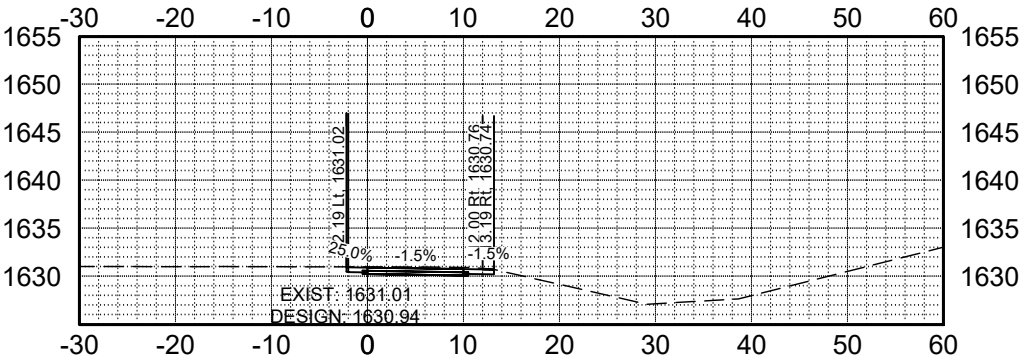
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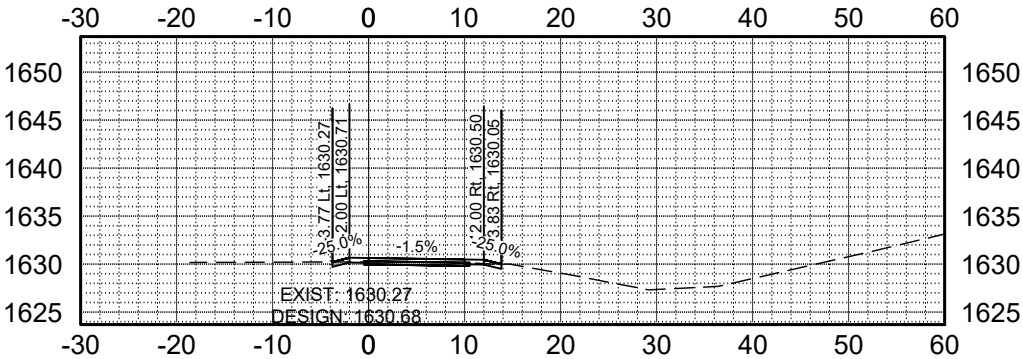
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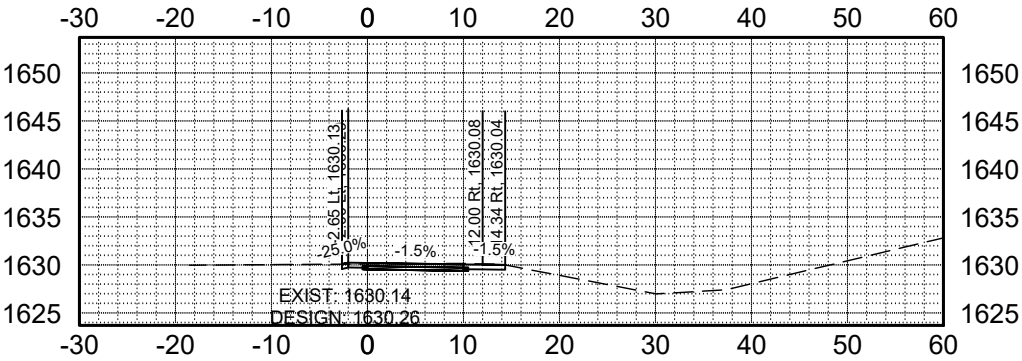


PR\_Path STA 21+25.00

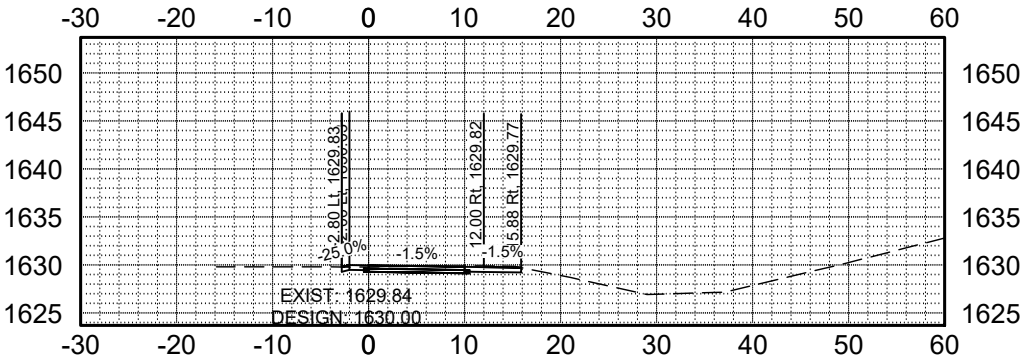


|  |       |                |             |           |
|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 9         |

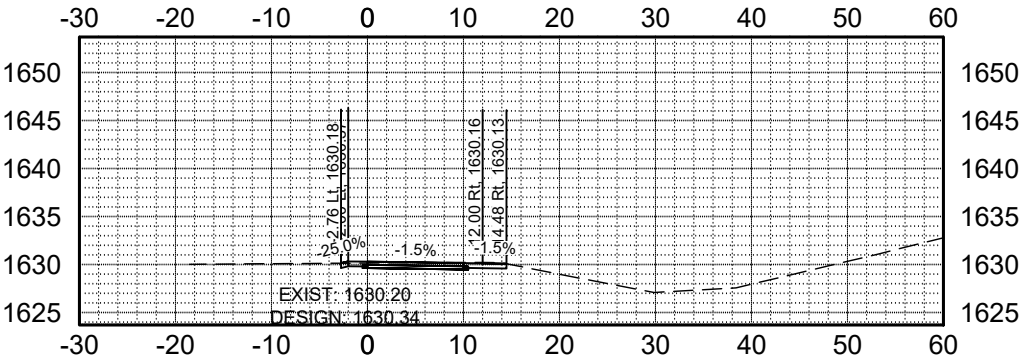
PR\_Path STA 22+50.00



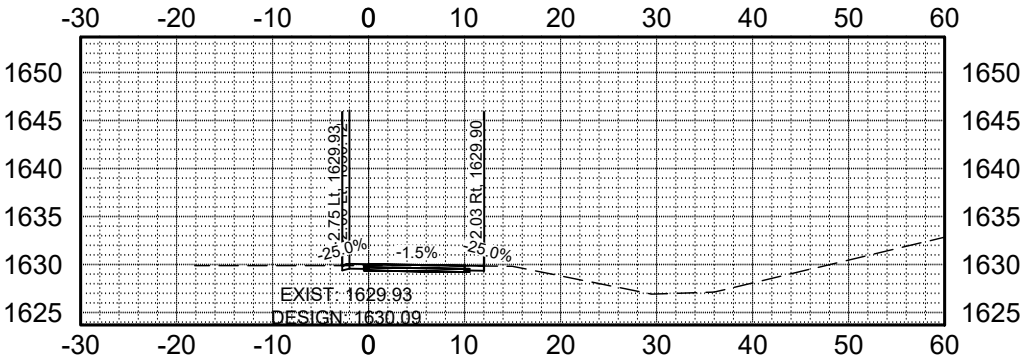
PR\_Path STA 23+25.00



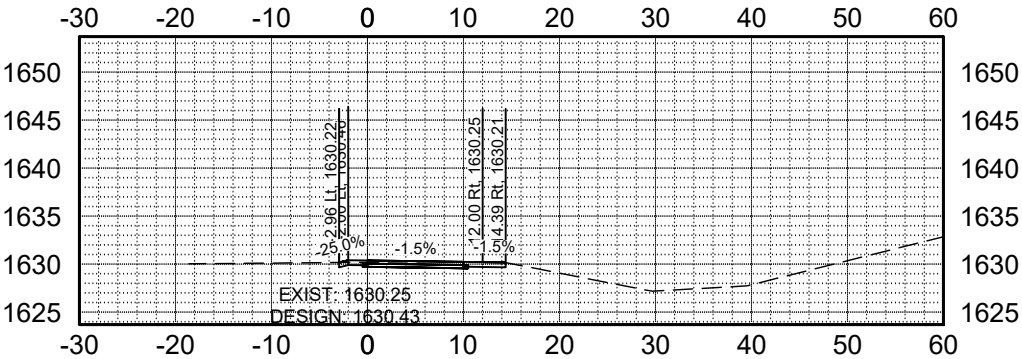
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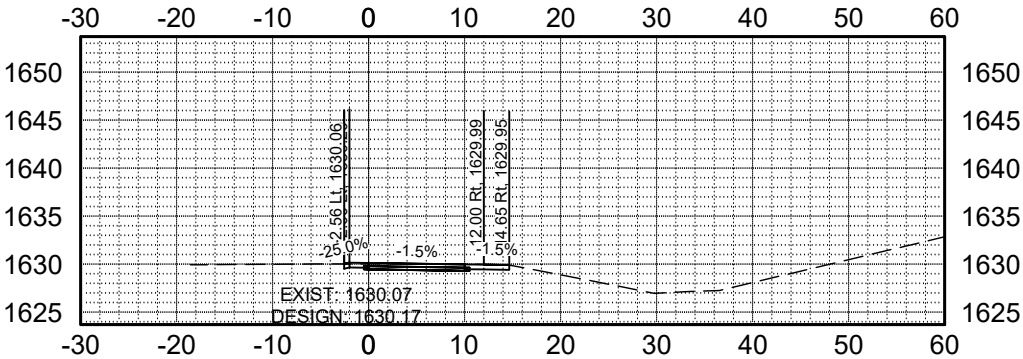
PR\_Path STA 23+00.00



PR\_Path STA 22+00.00

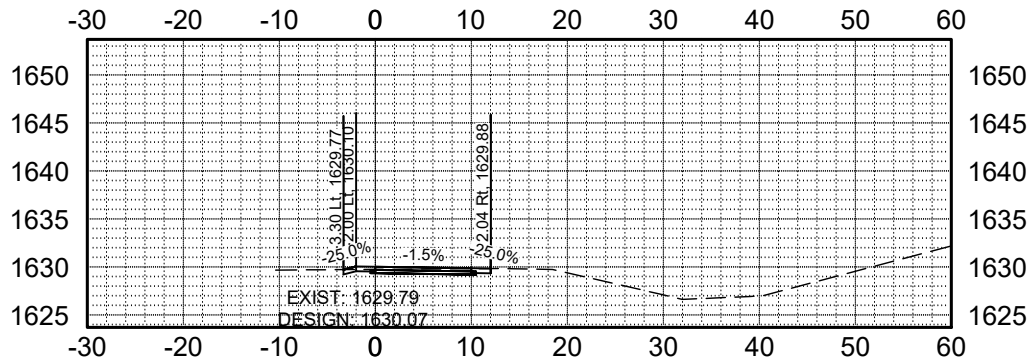


PR\_Path STA 22+75.00

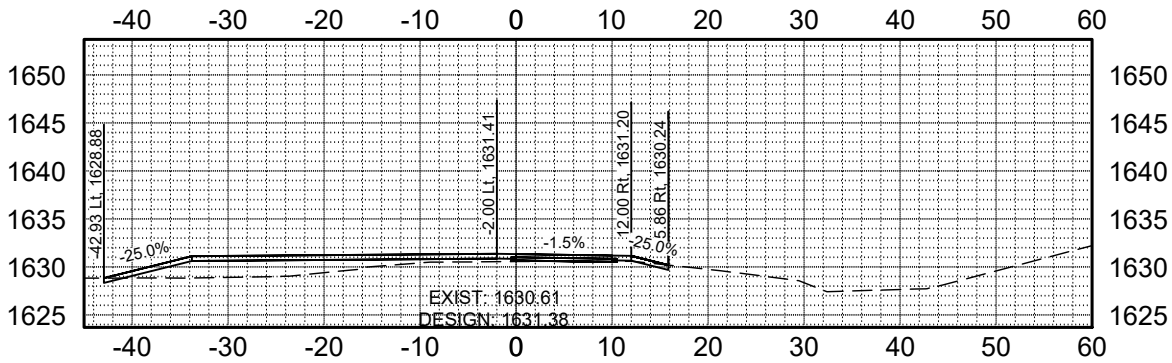


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 10        |

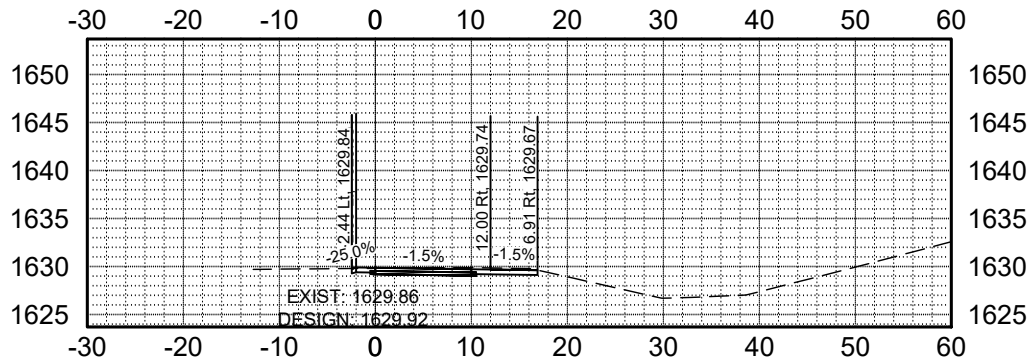
PR\_Path STA 24+00.00



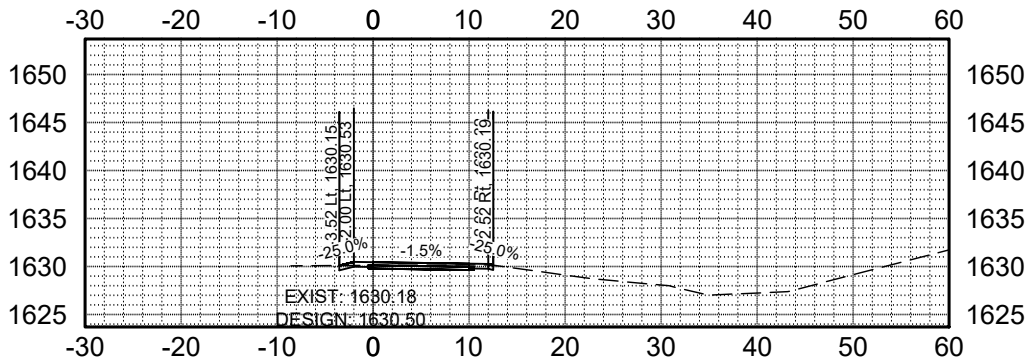
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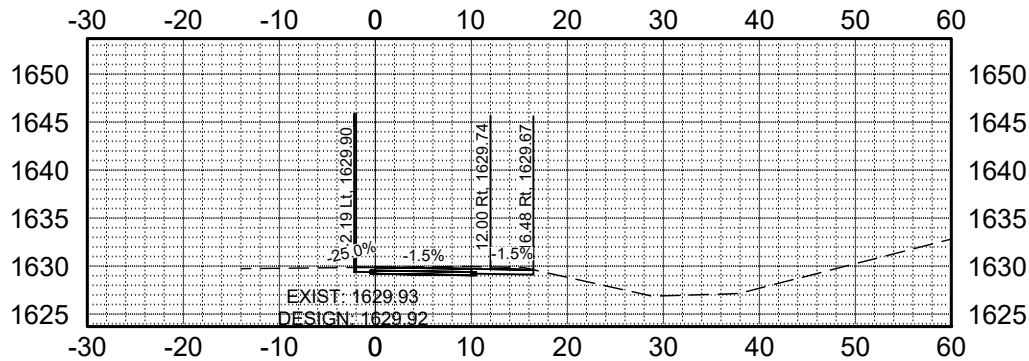
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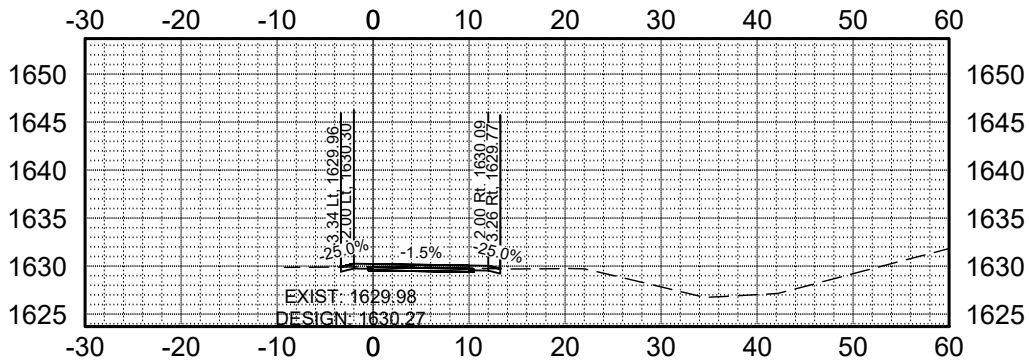
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PR\_Path STA 23+50.00

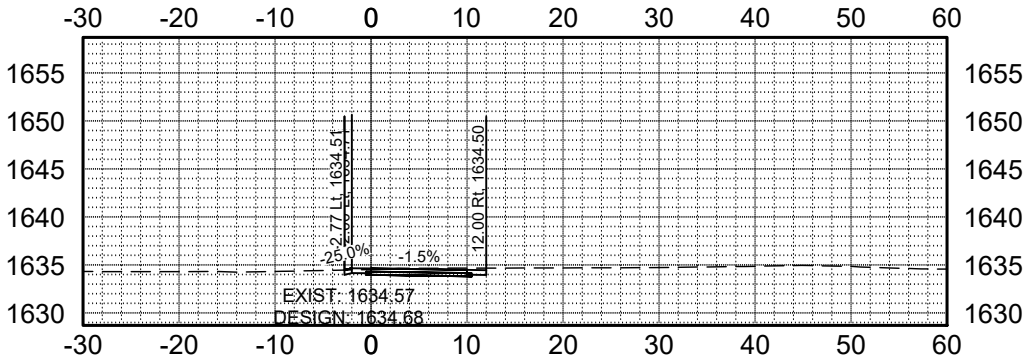


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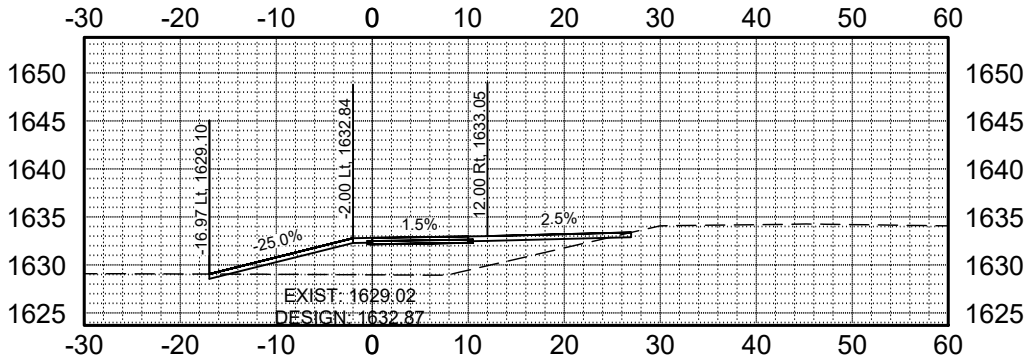


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 11        |

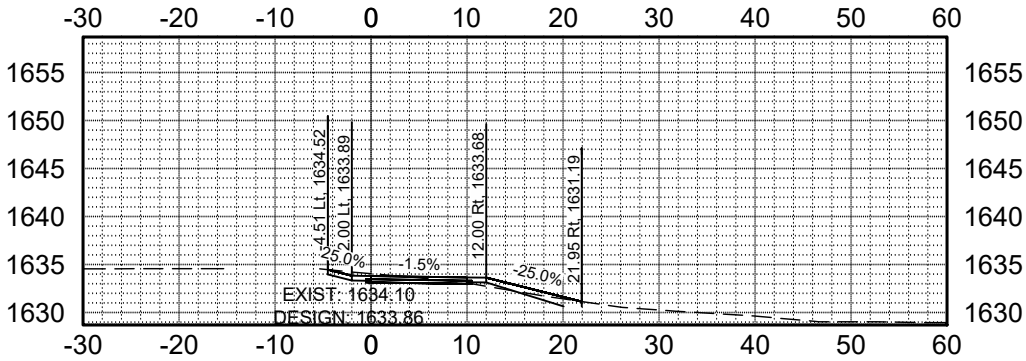
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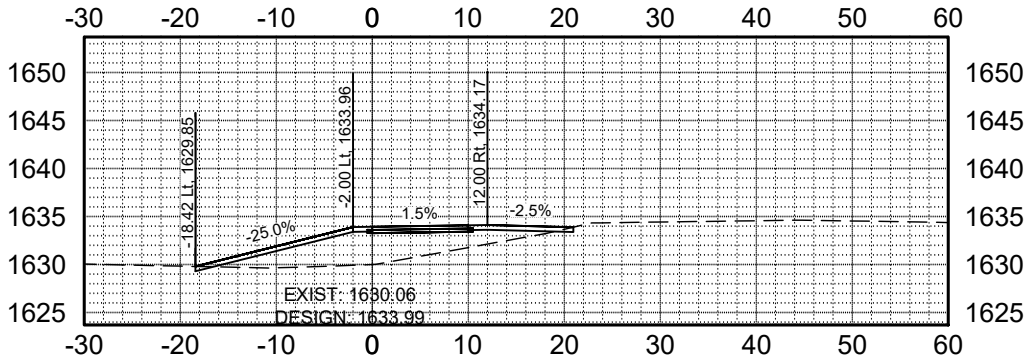
PR\_Path STA 26+25.00



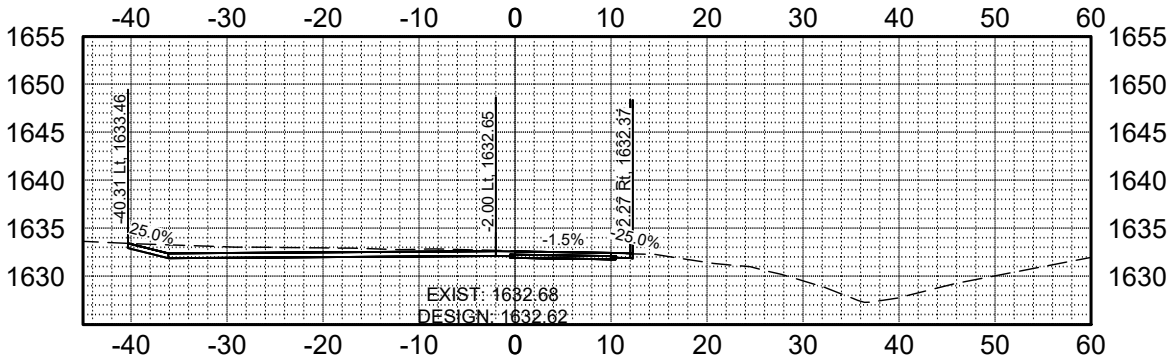
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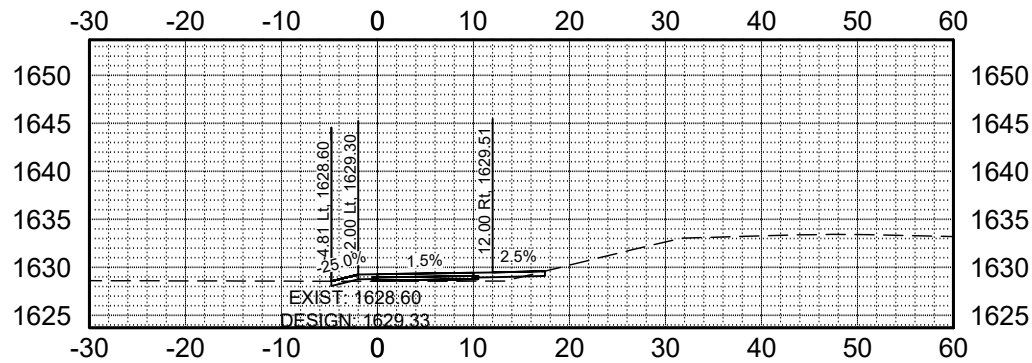
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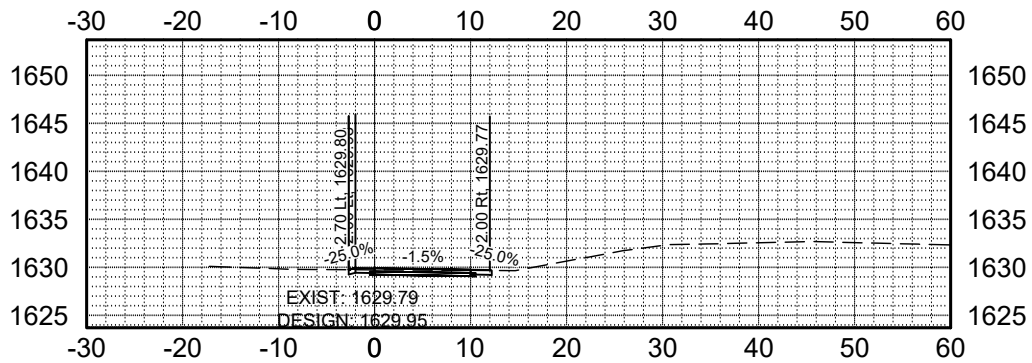


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 12        |

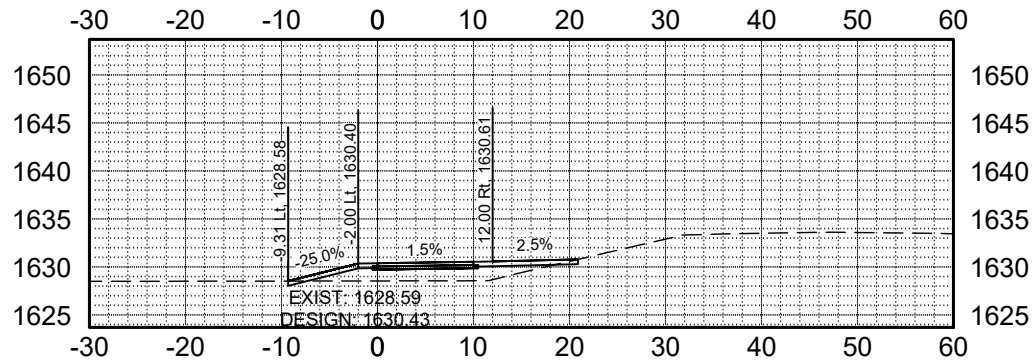
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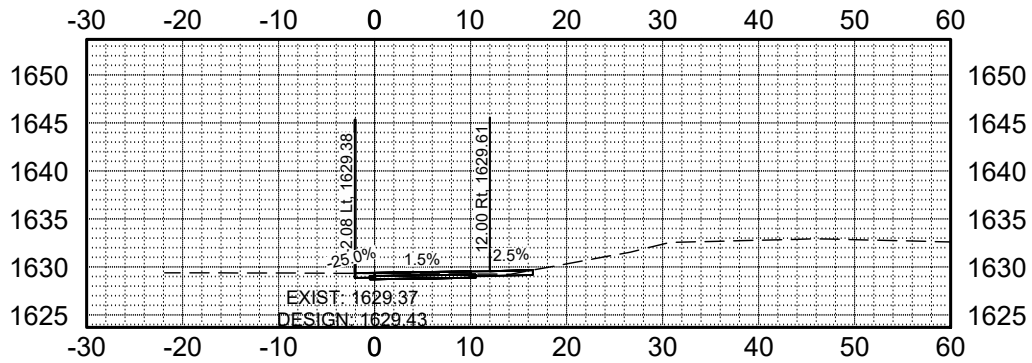
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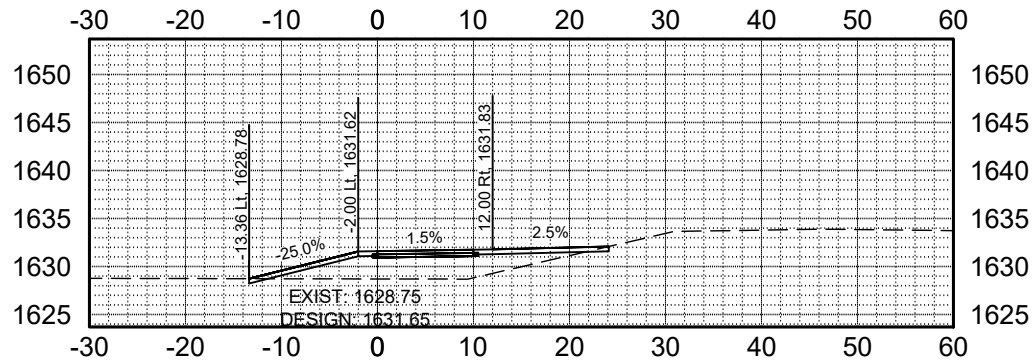
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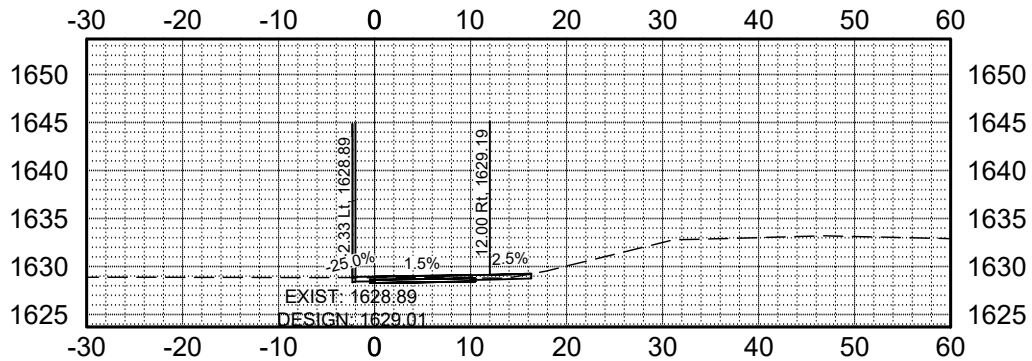
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PR\_Path STA 26+50.00

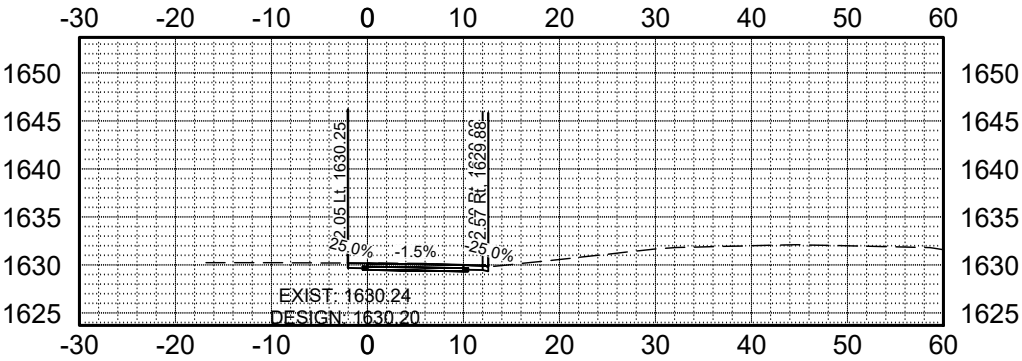


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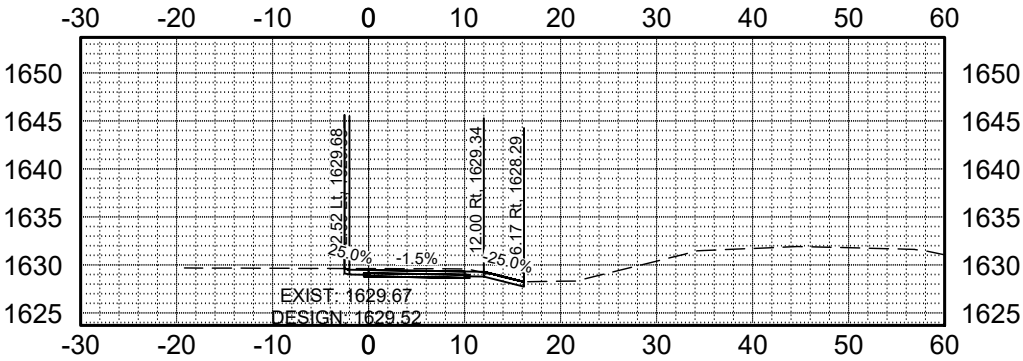


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 13        |

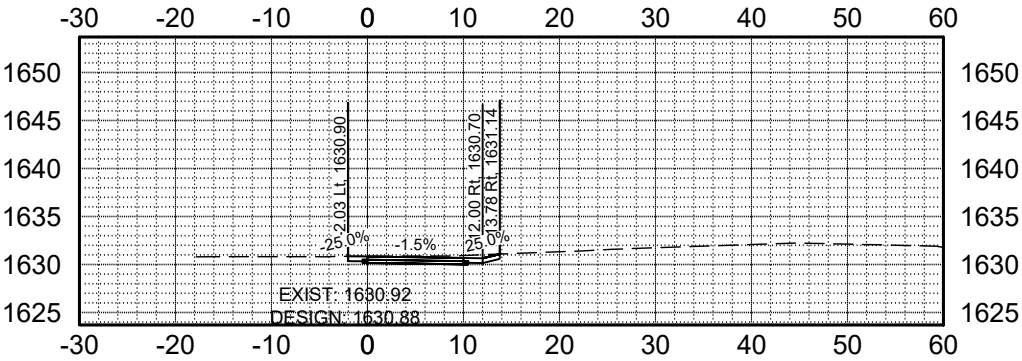
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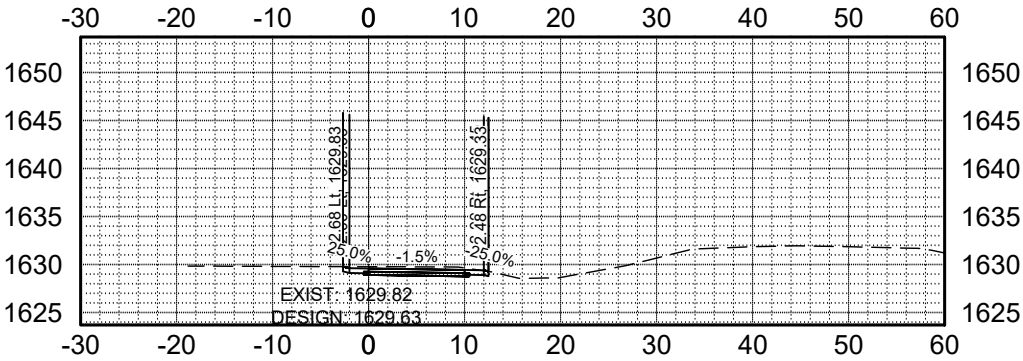
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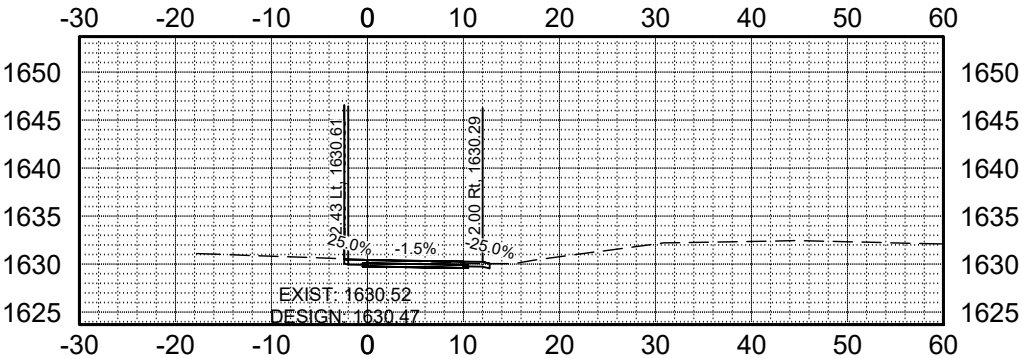
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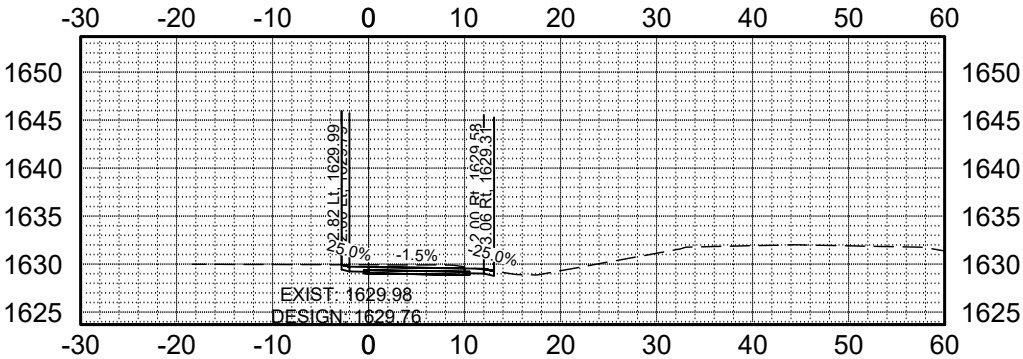
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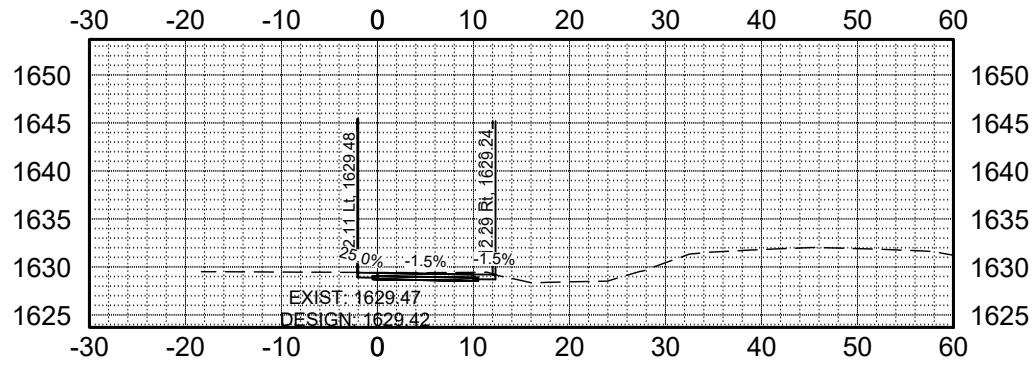


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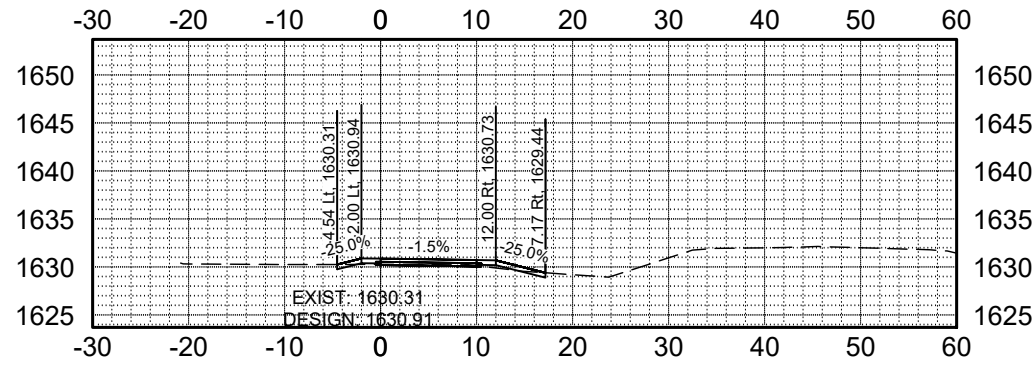


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 14        |

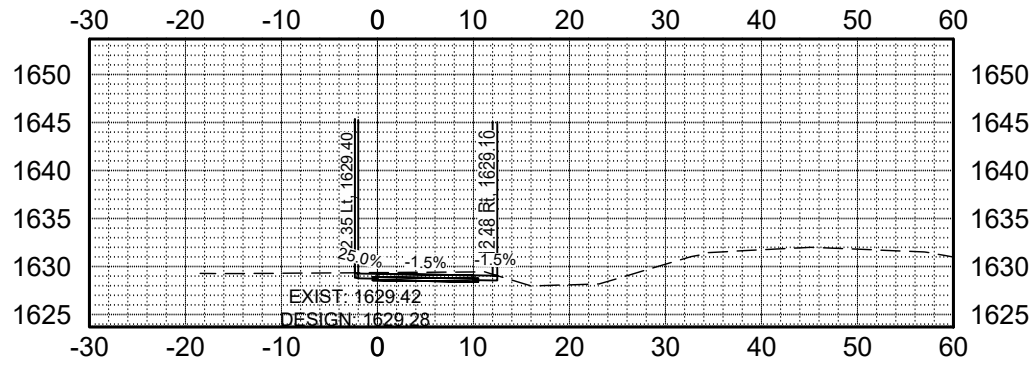
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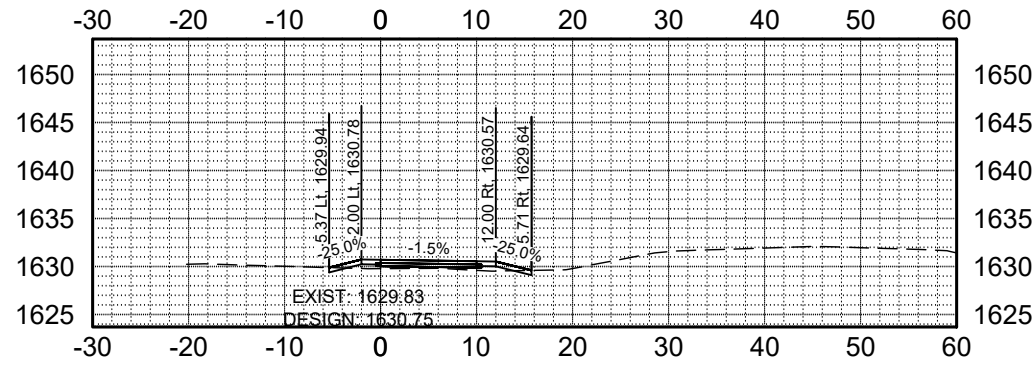
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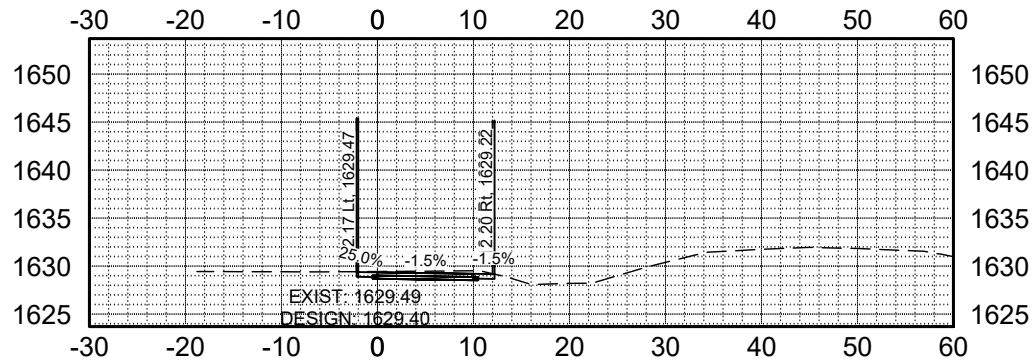
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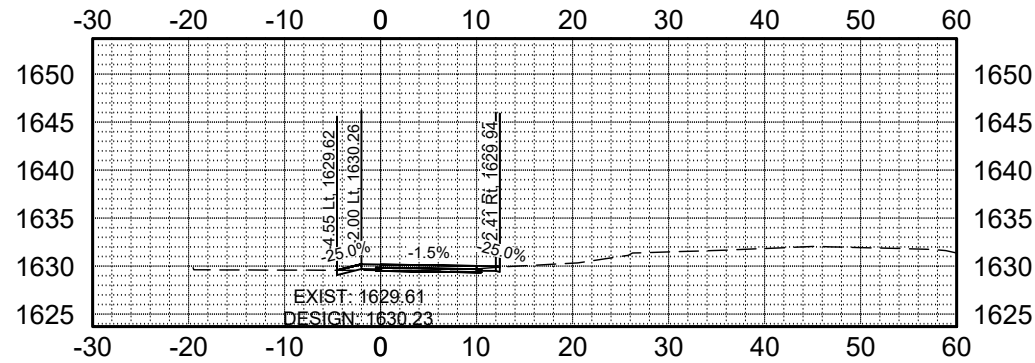
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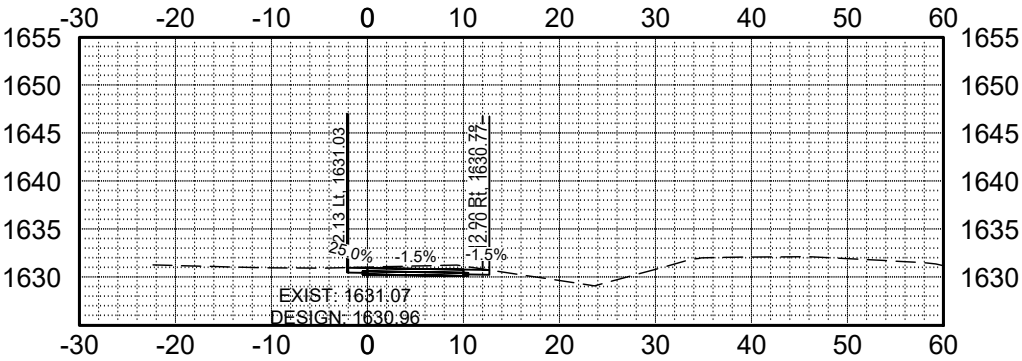


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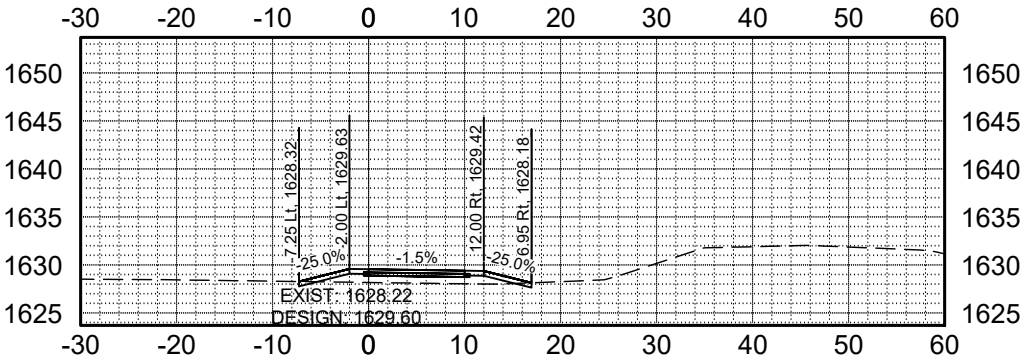


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 15        |

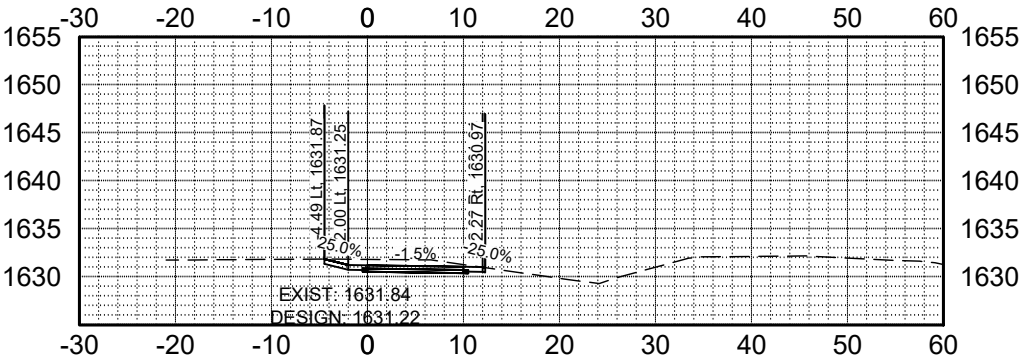
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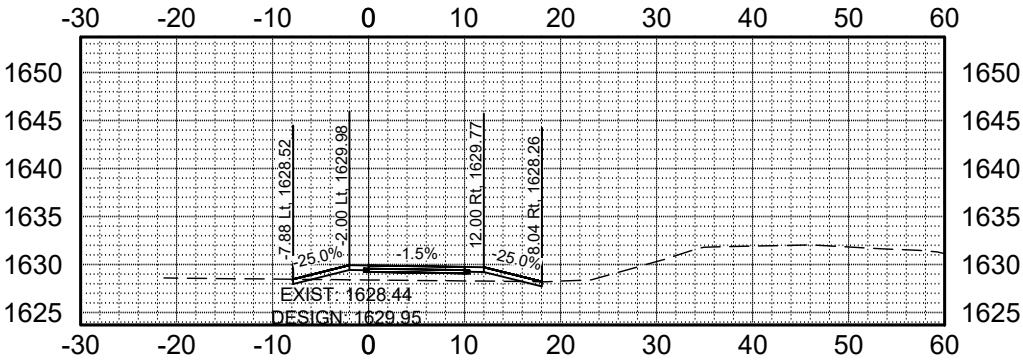
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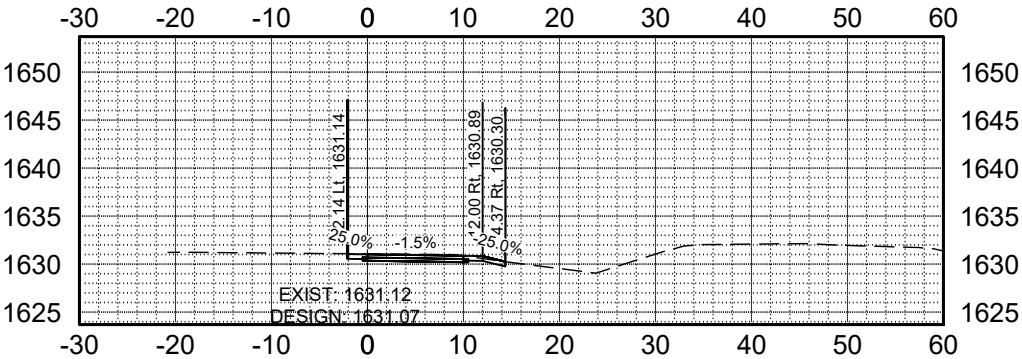
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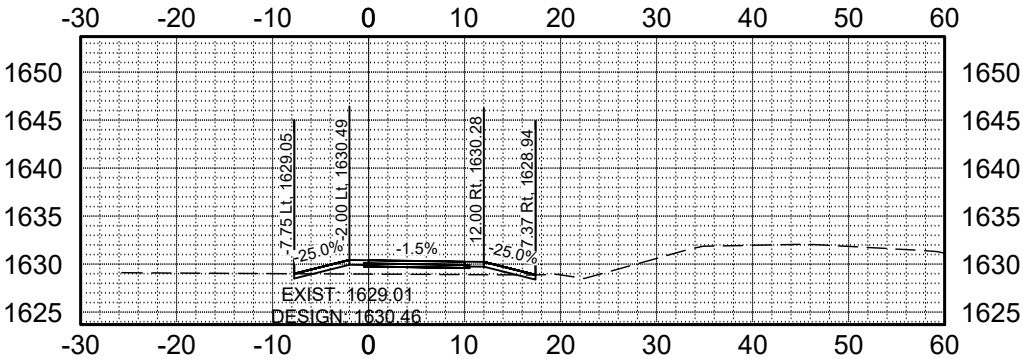
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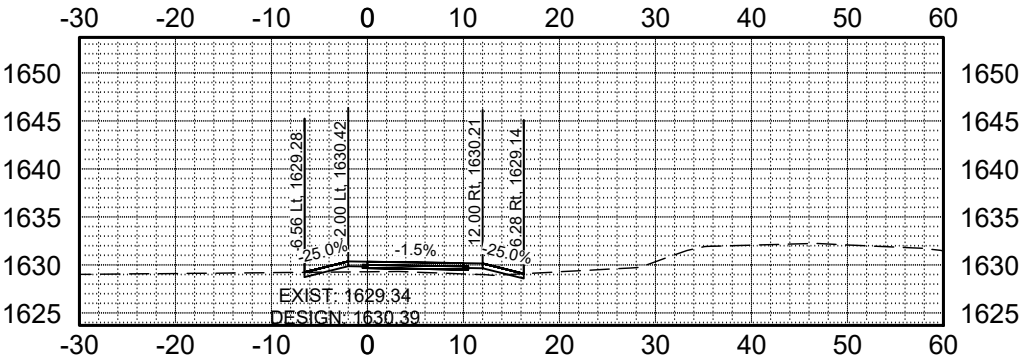


PR\_Path STA 31+75.00

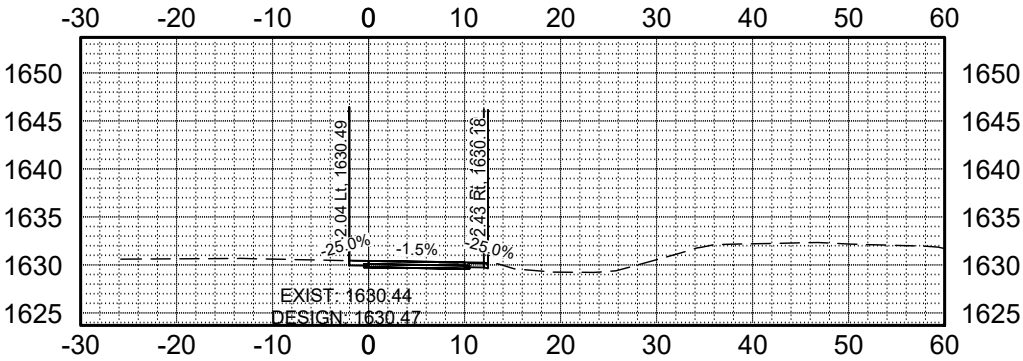


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 16        |

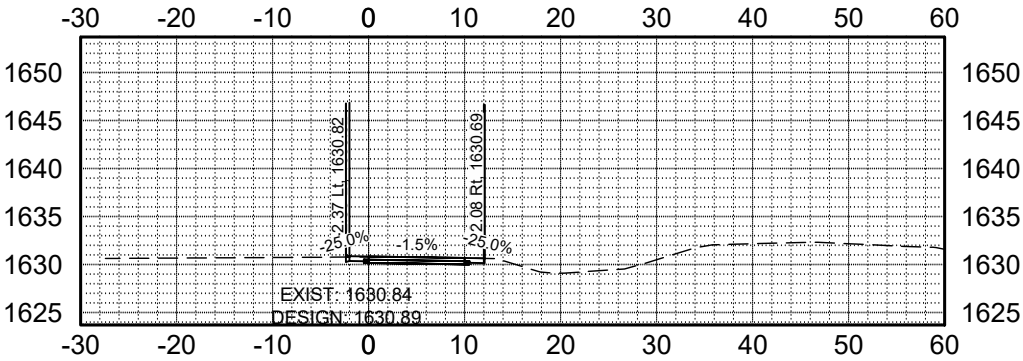
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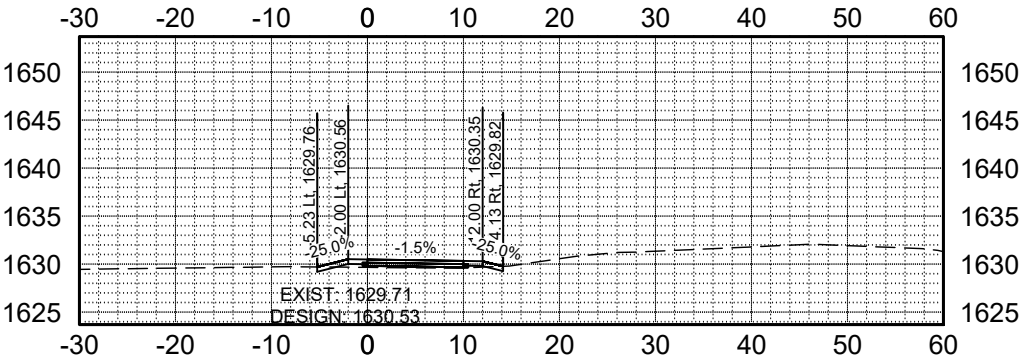
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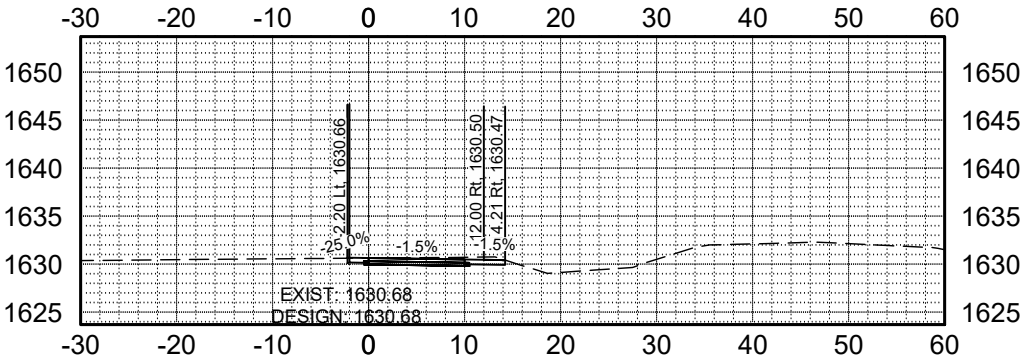
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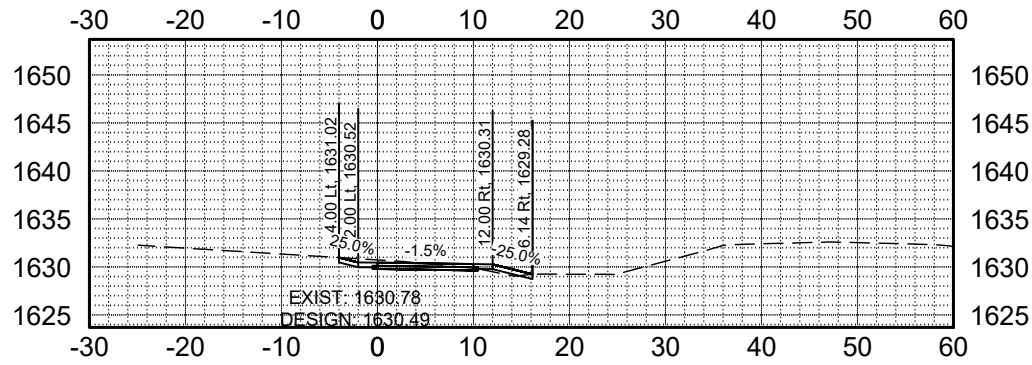
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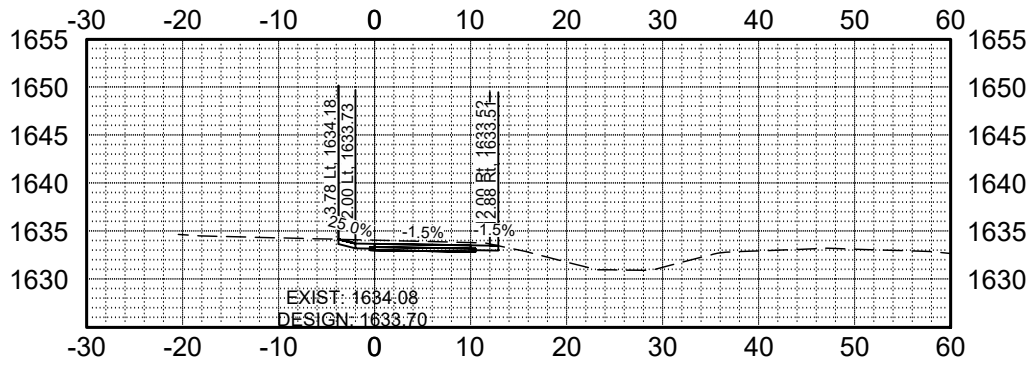


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 17        |

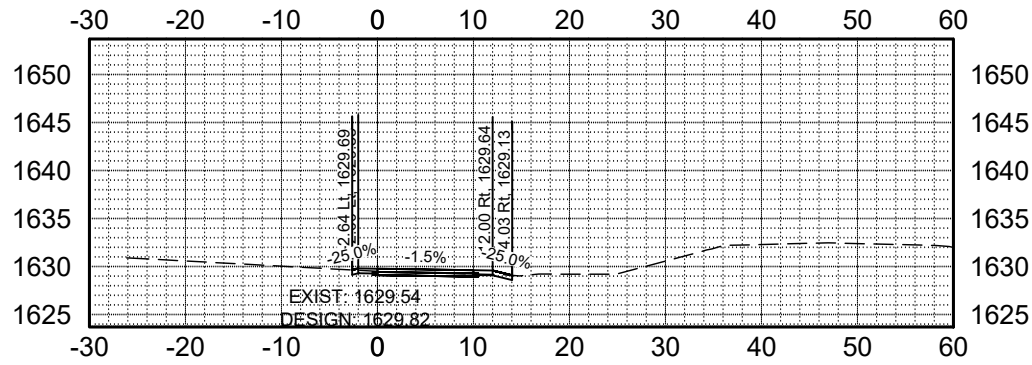
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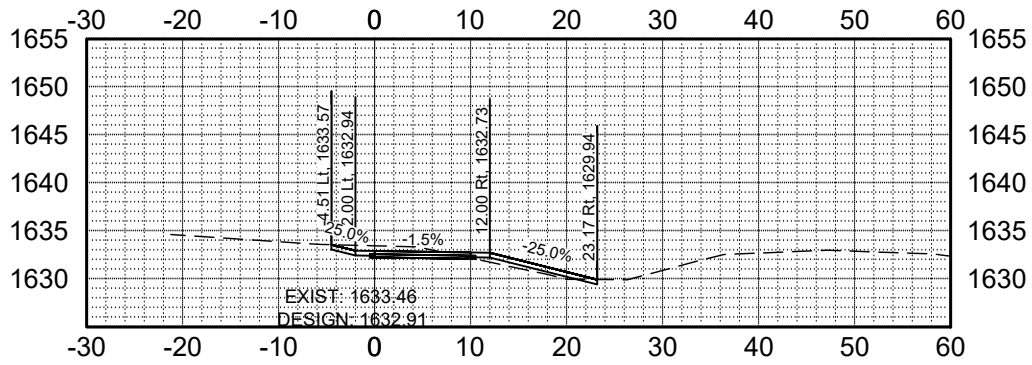
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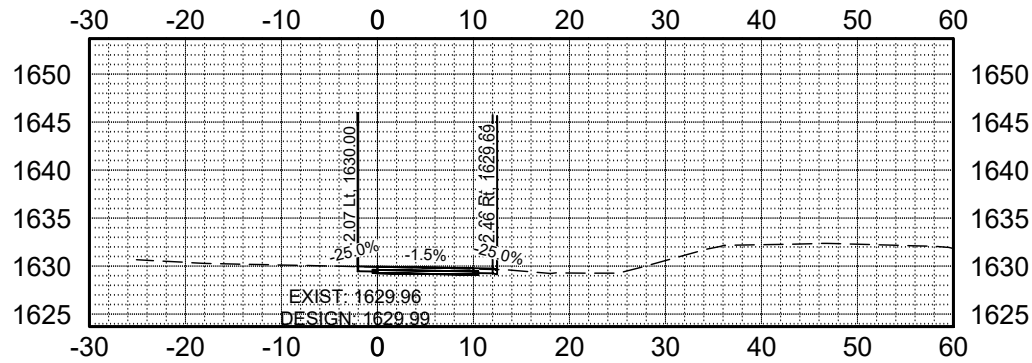
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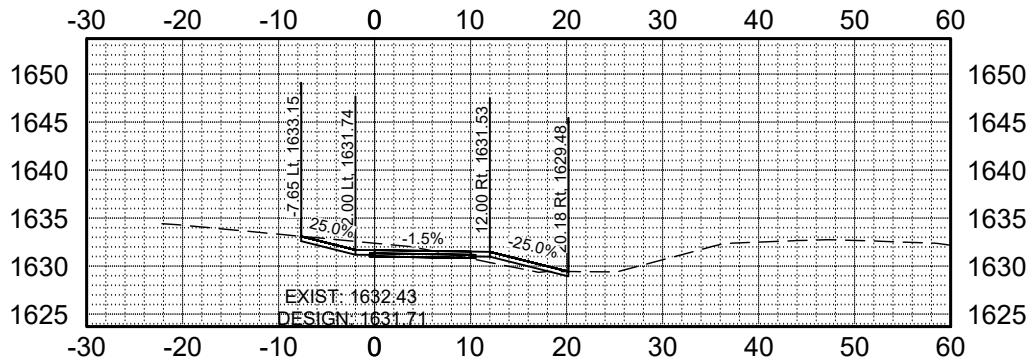
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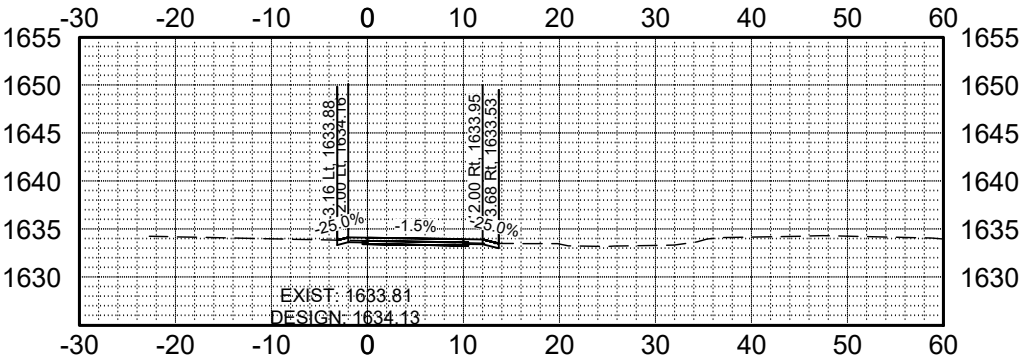


PR\_Path STA 34+75.00

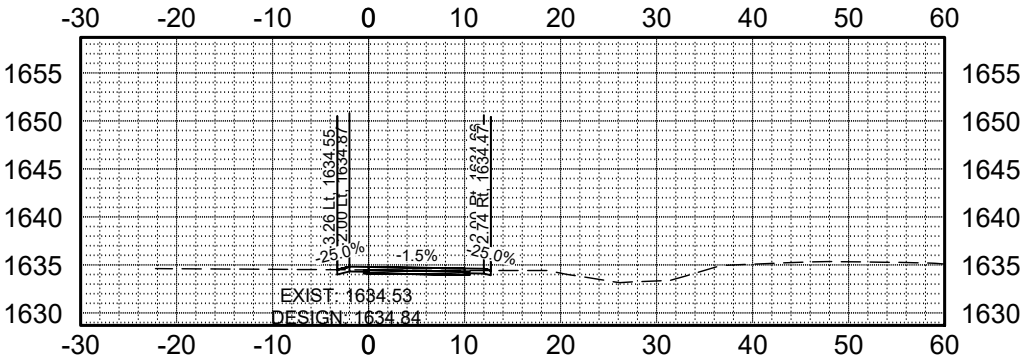


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 18        |

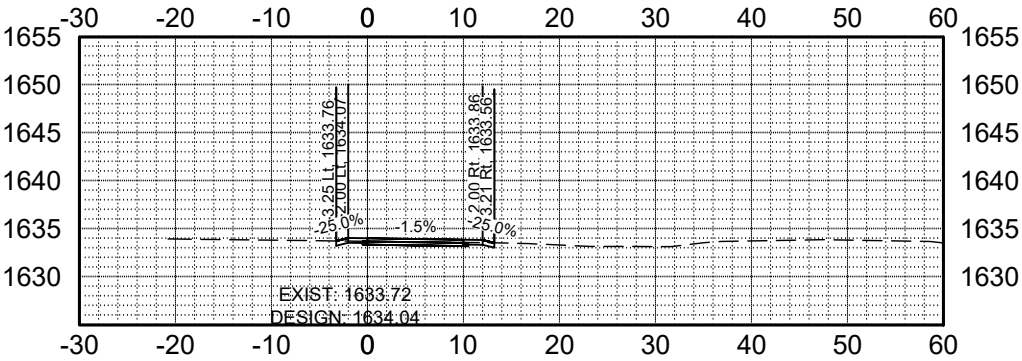
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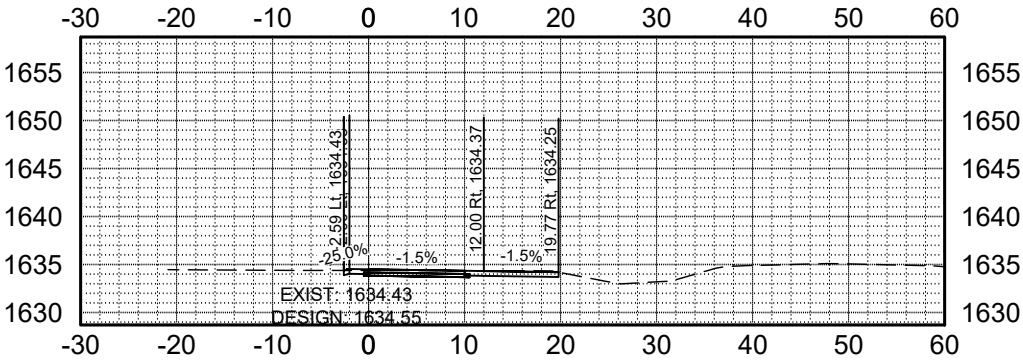
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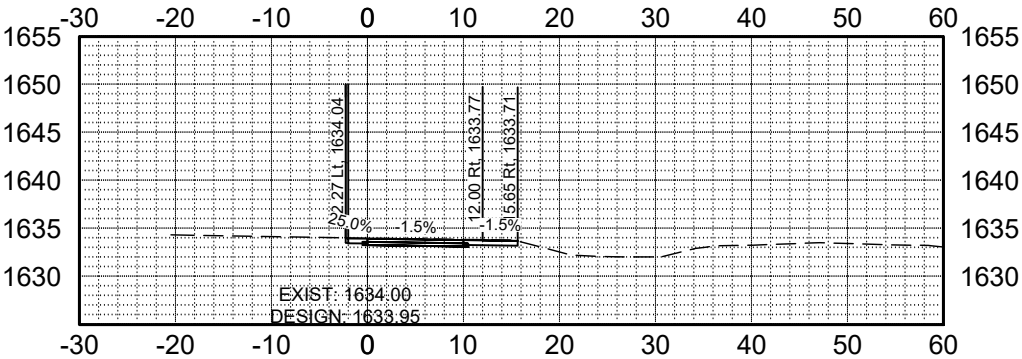
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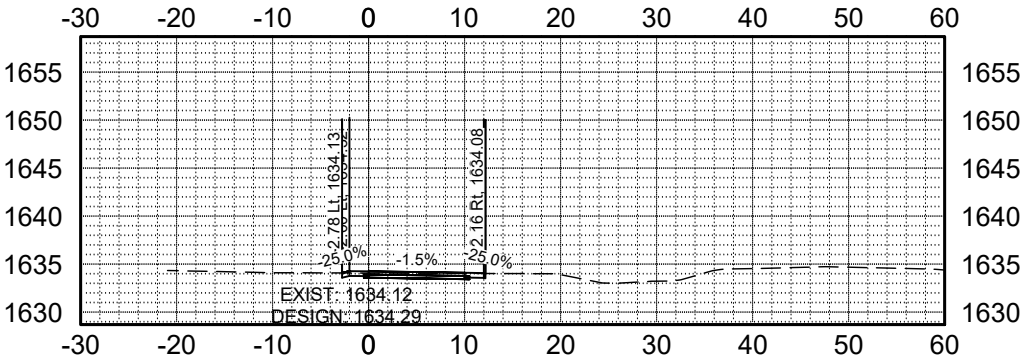
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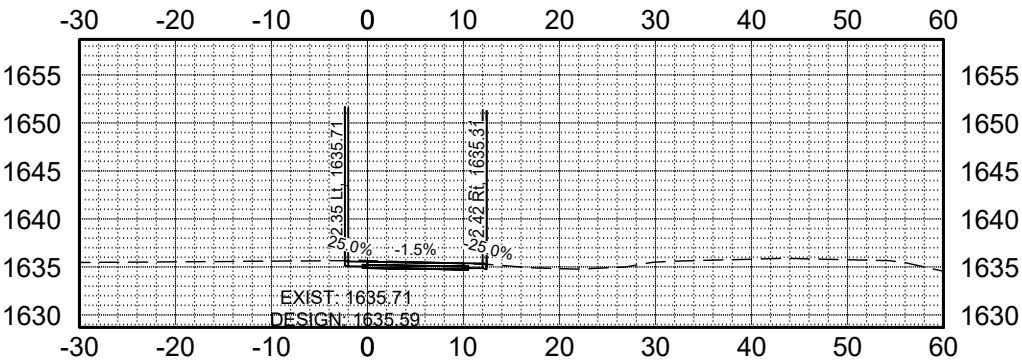


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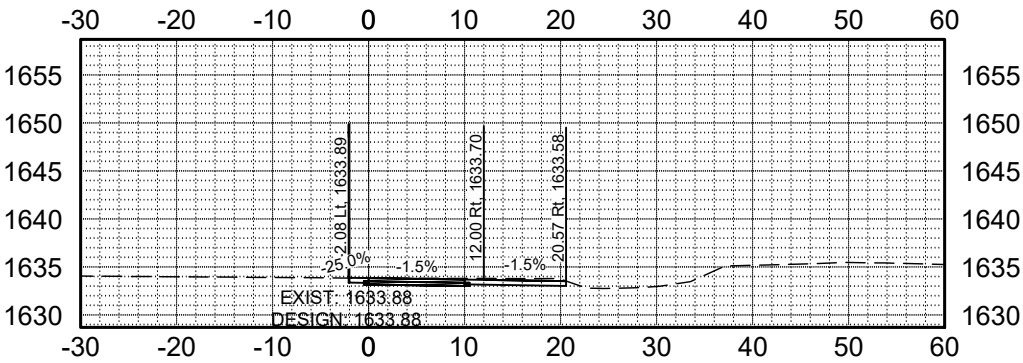


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 19        |

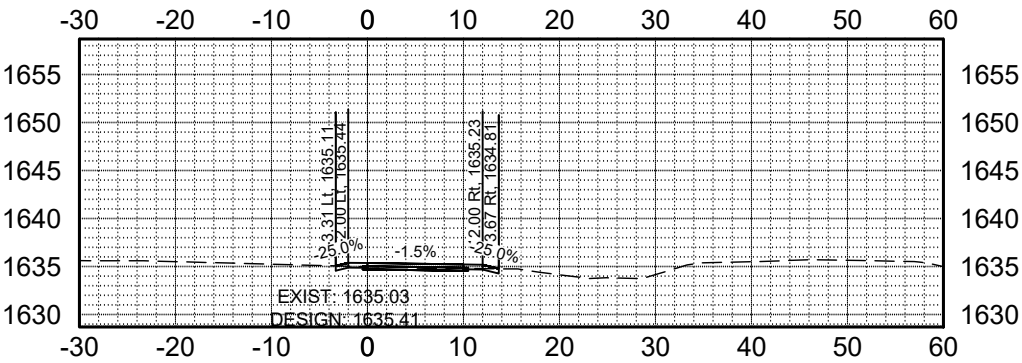
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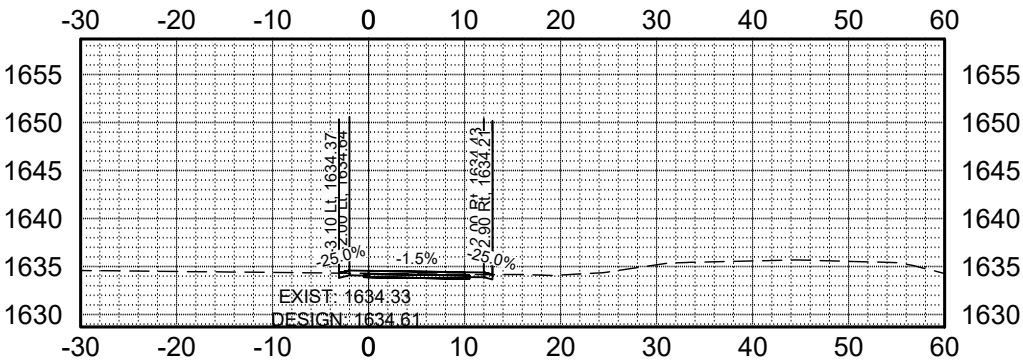
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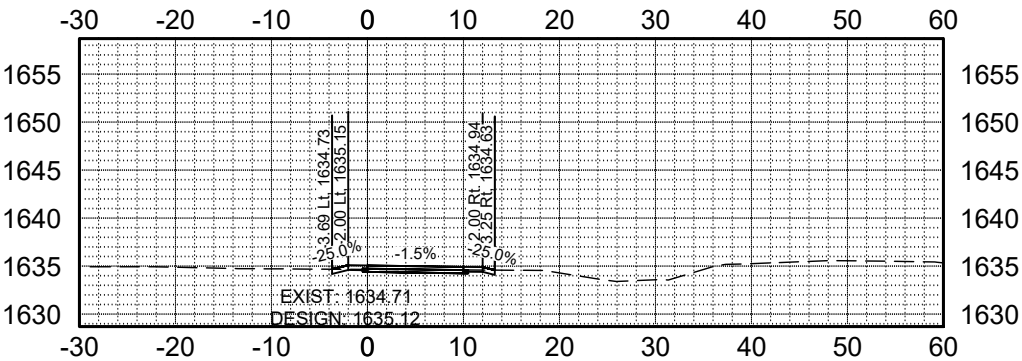
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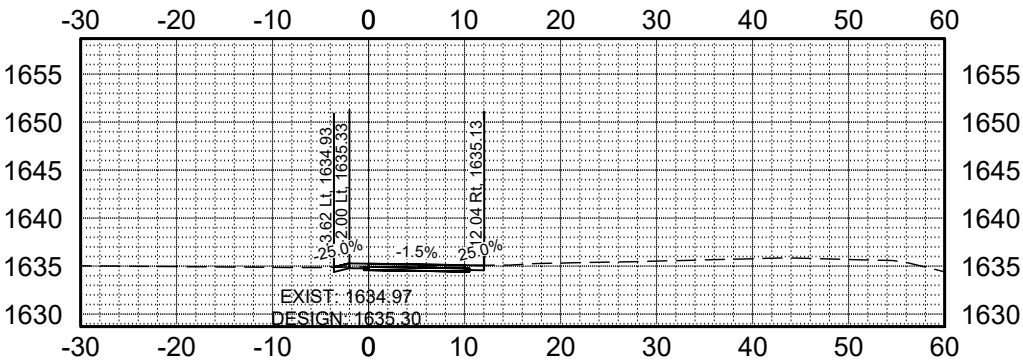
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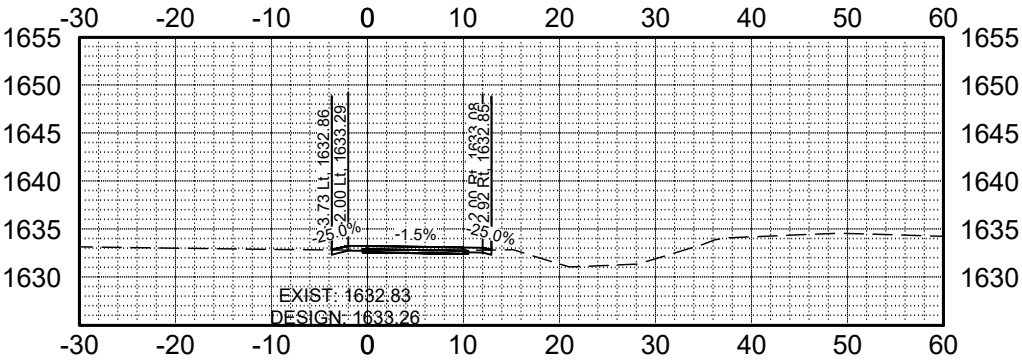


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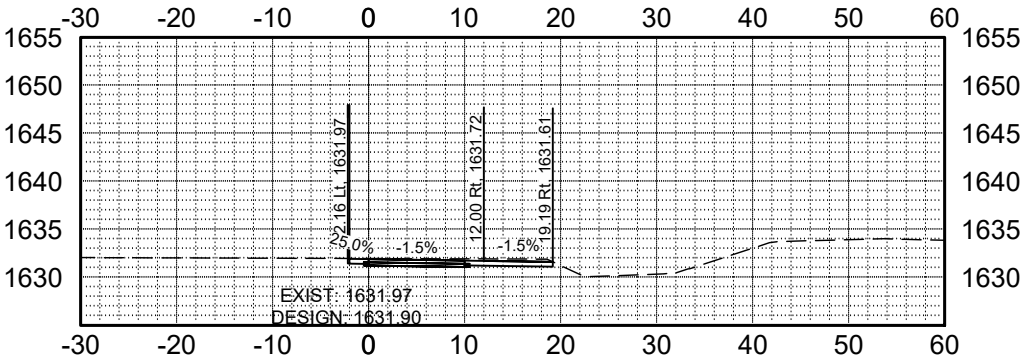


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|--|-------|----------------|-------------|-----------|
|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 20        |

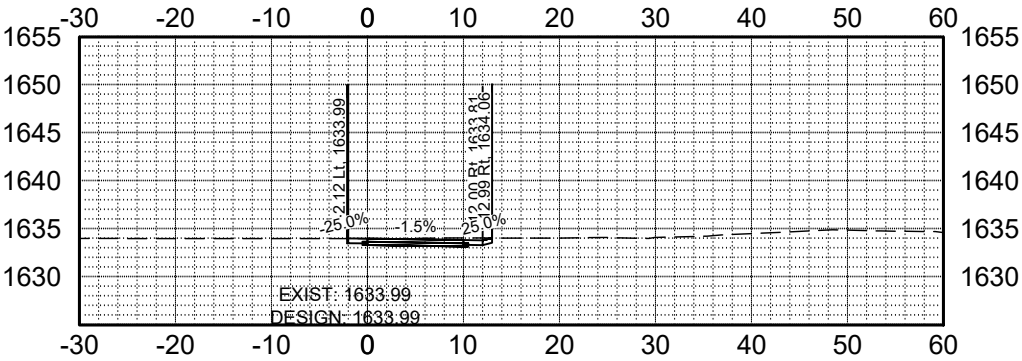
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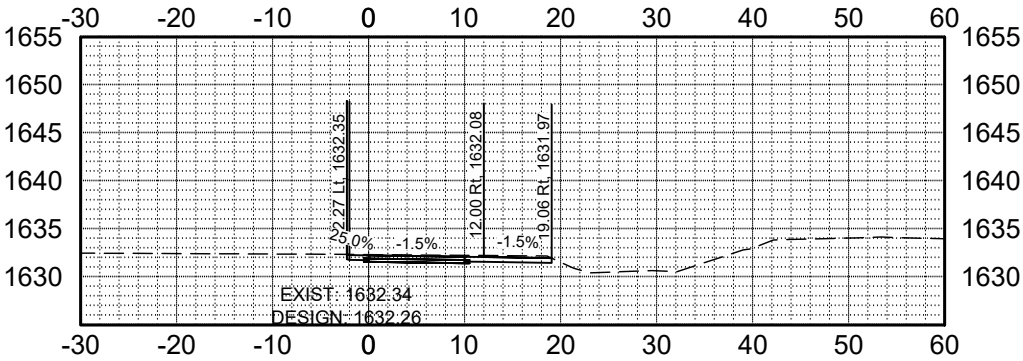
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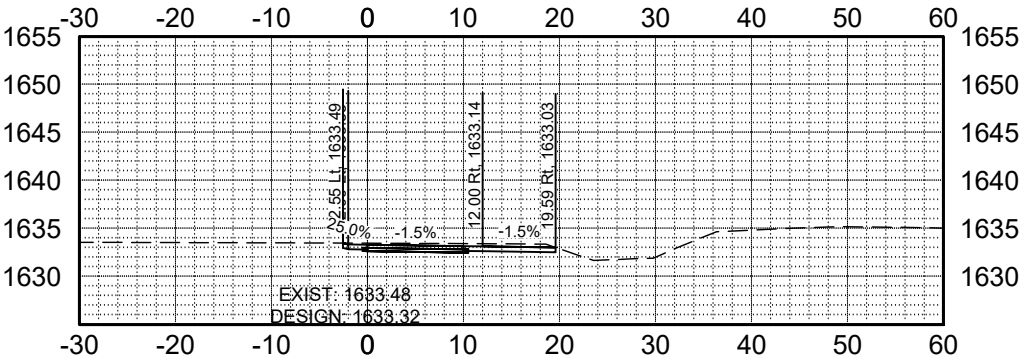
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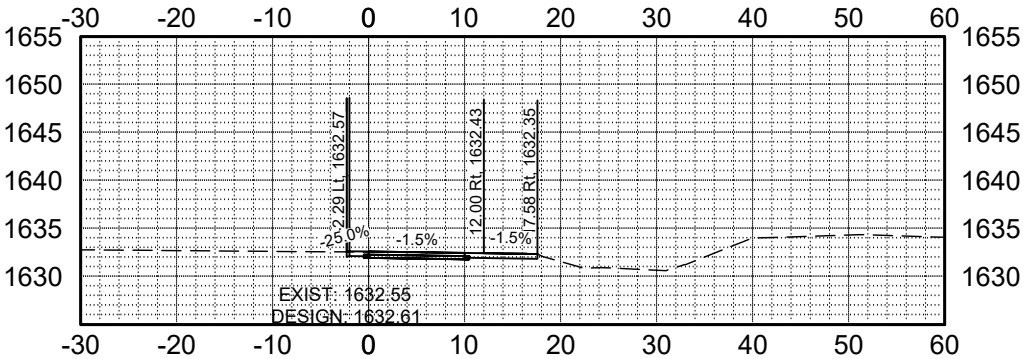
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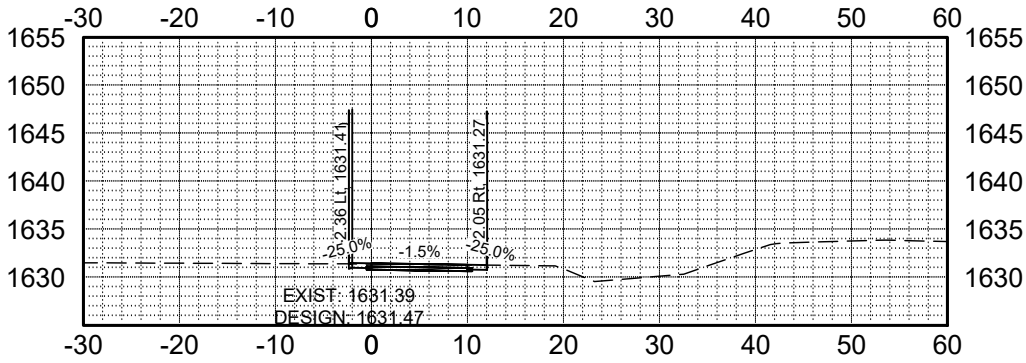


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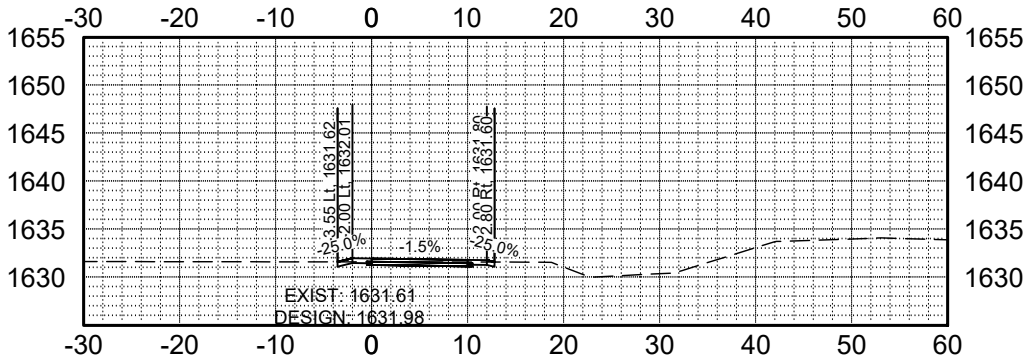


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 21        |

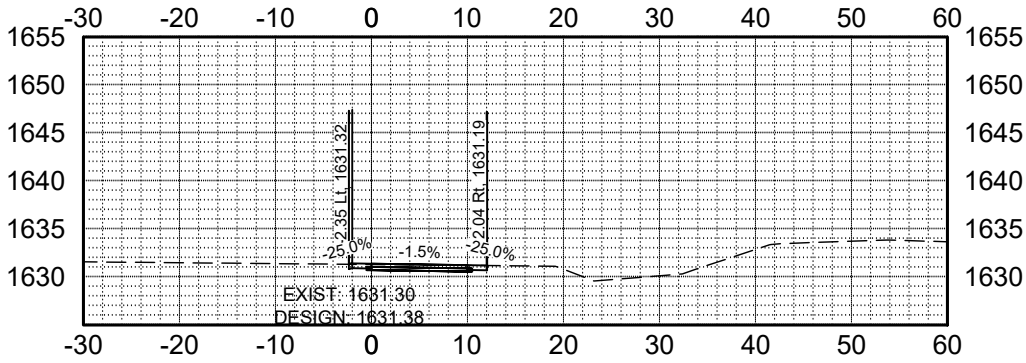
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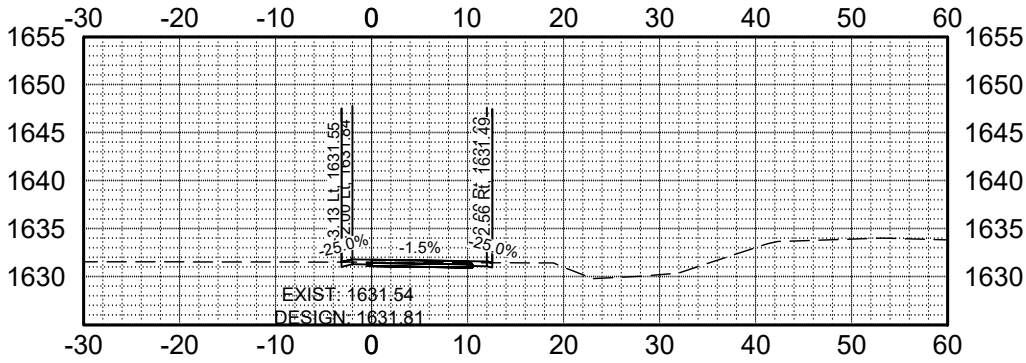
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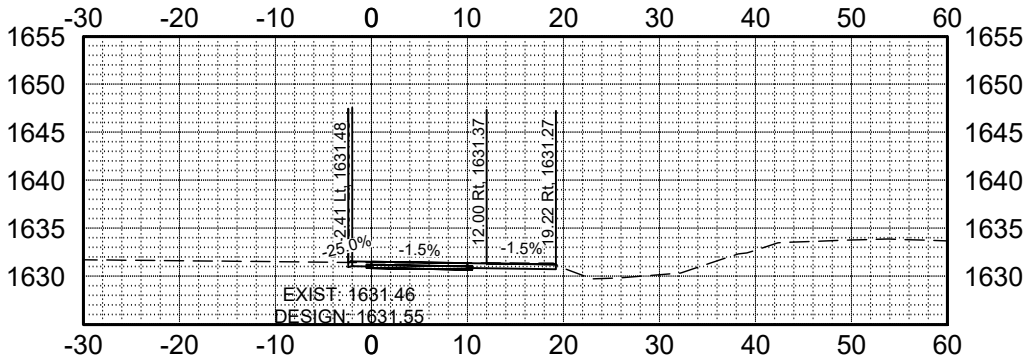
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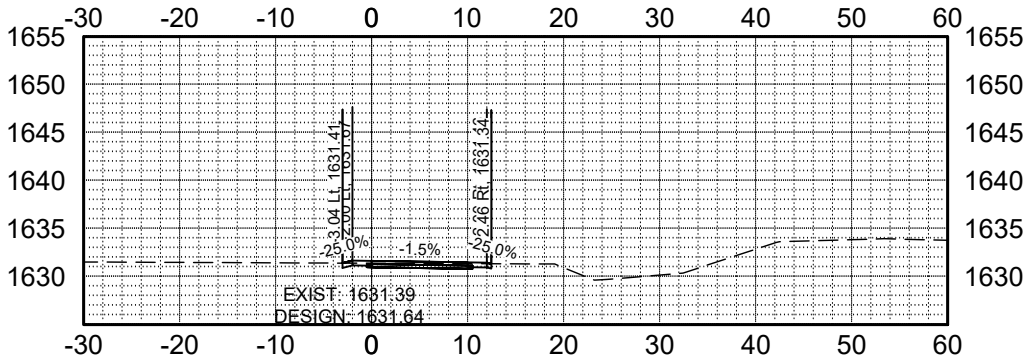
PR\_Path STA 41+00.00



PR\_Path STA 40+00.00

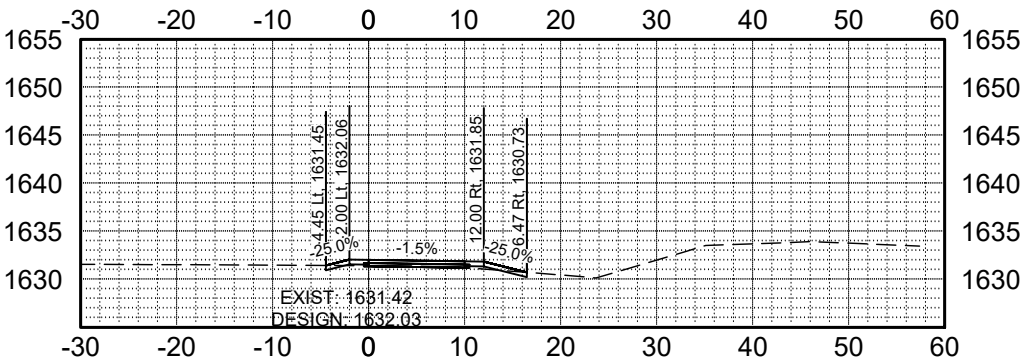


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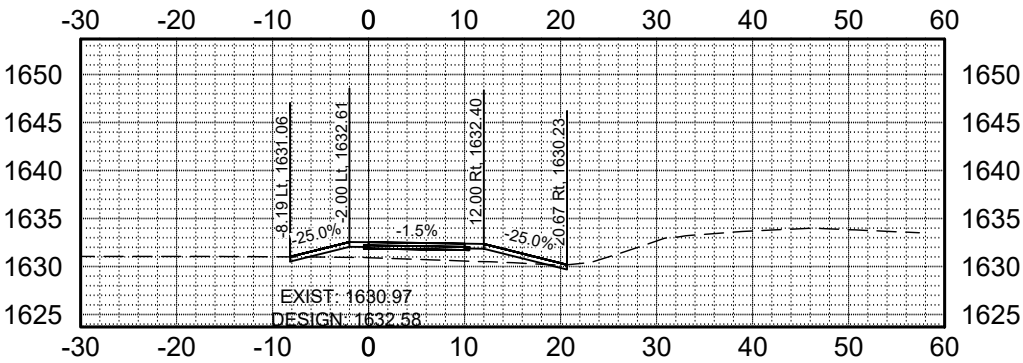


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 22        |

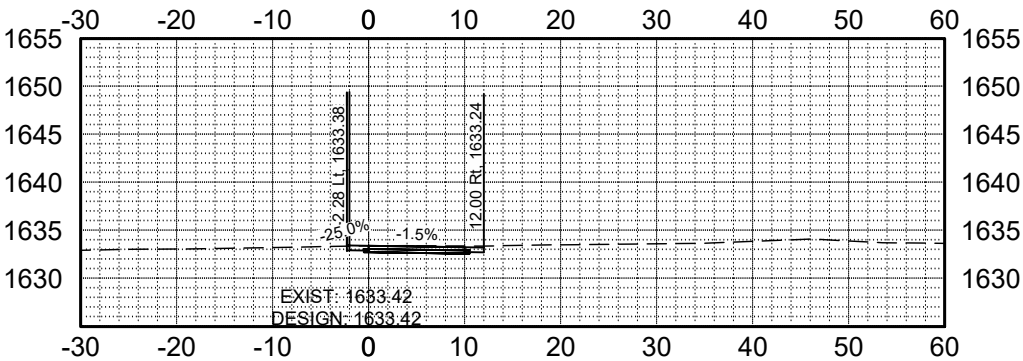
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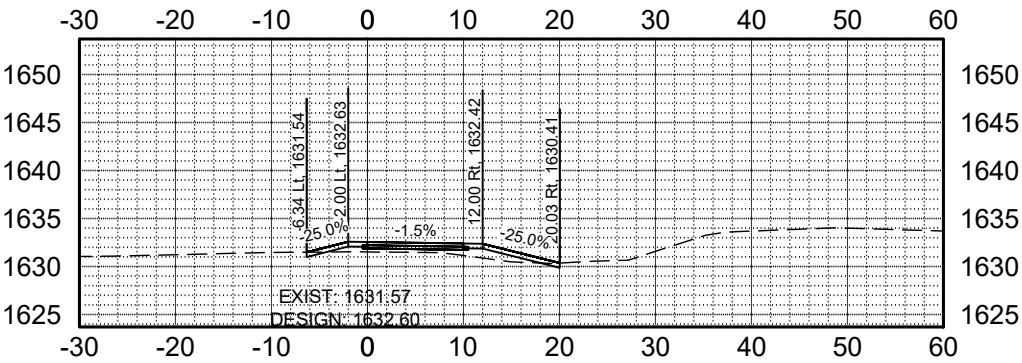
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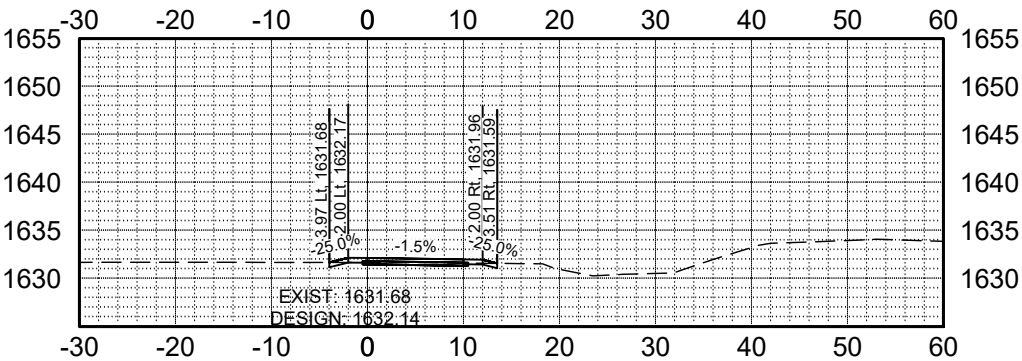
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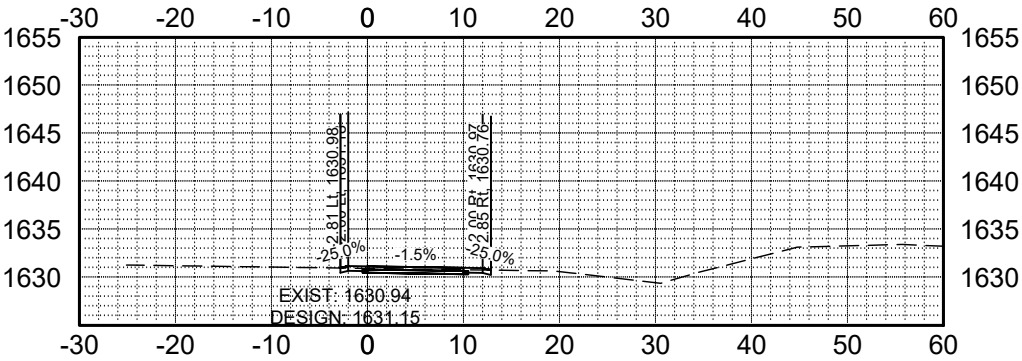
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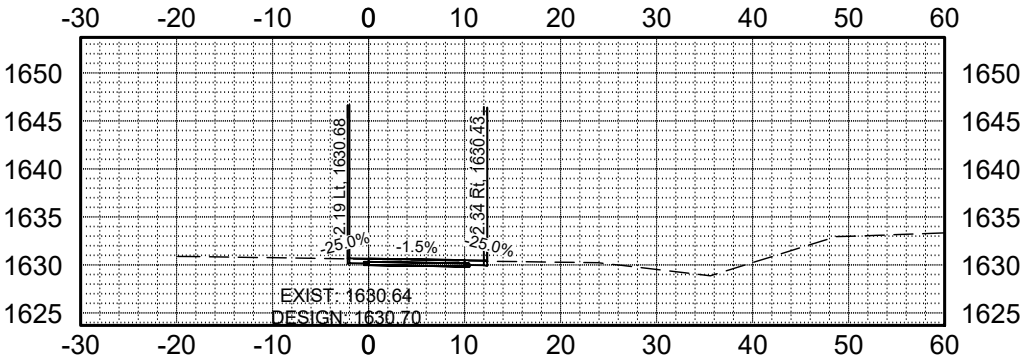


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
|  | ND    | TAC-1-981(138) | 200         | 23        |

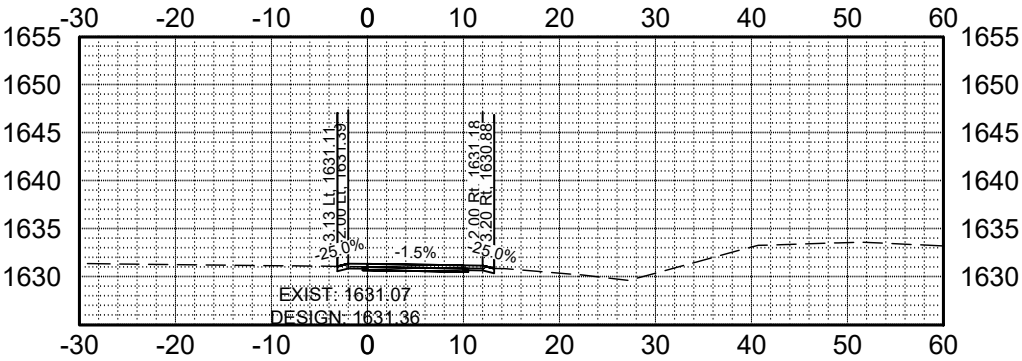
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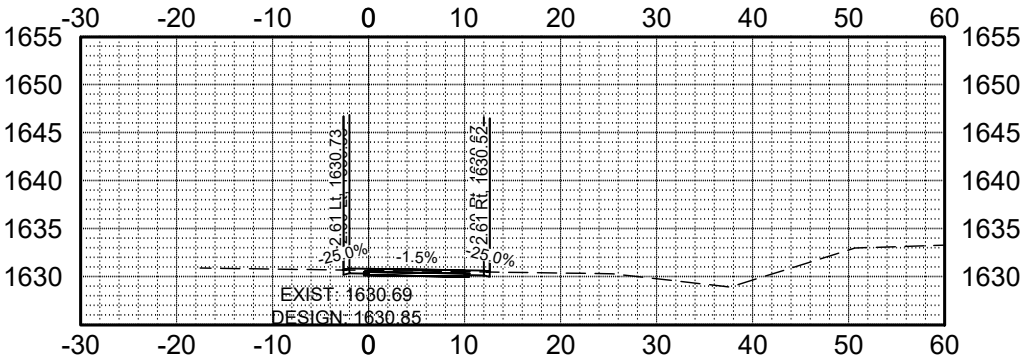
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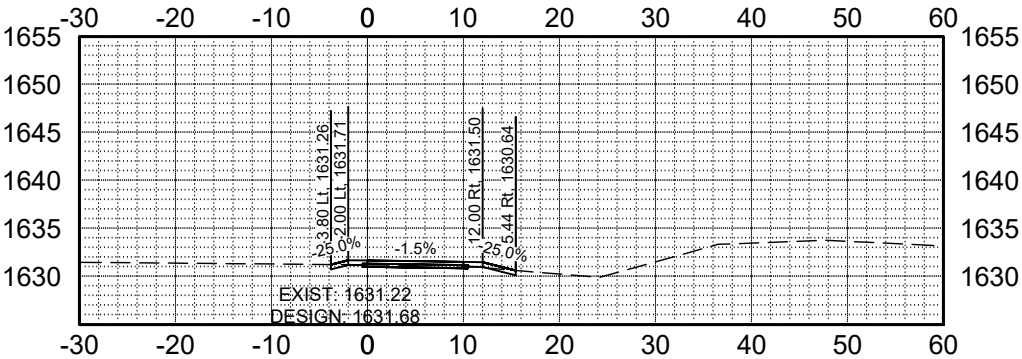
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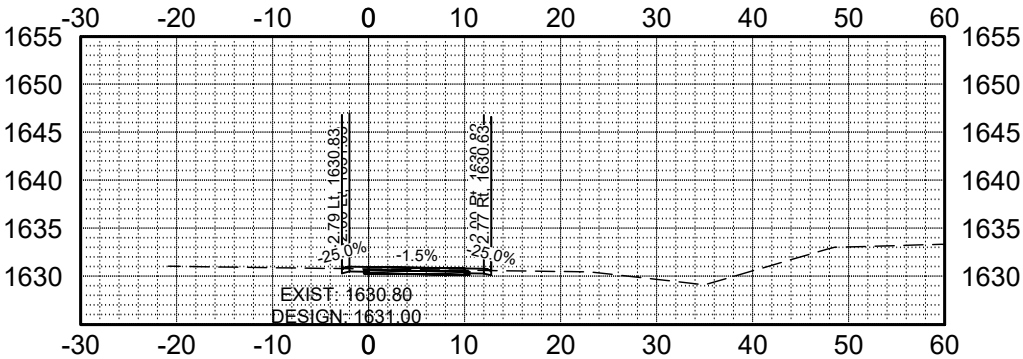
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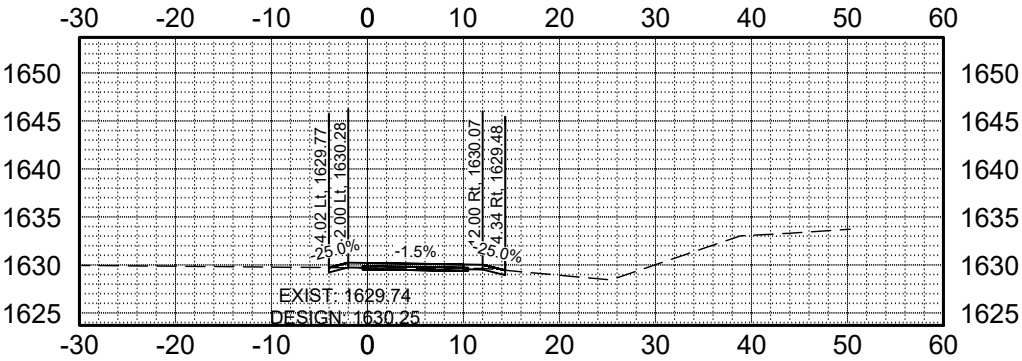


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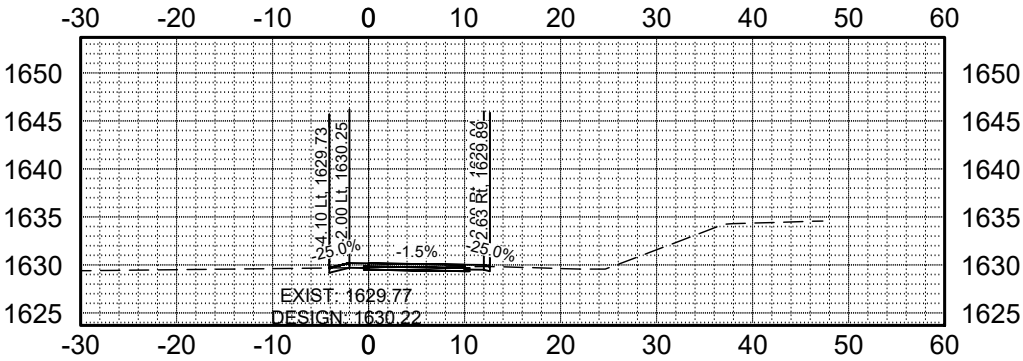


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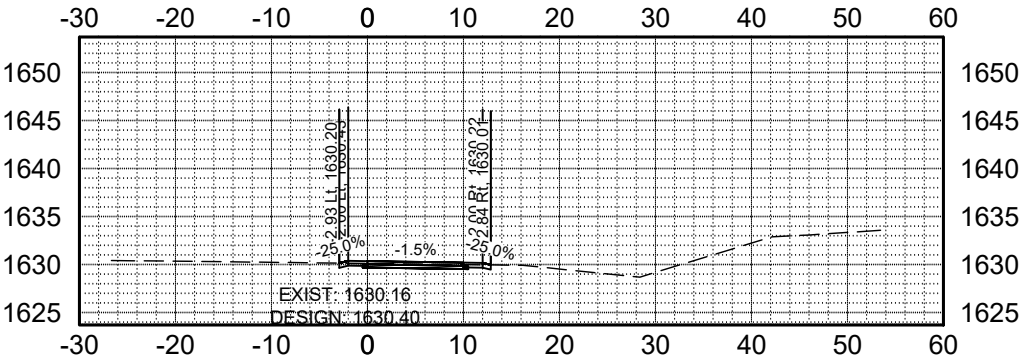
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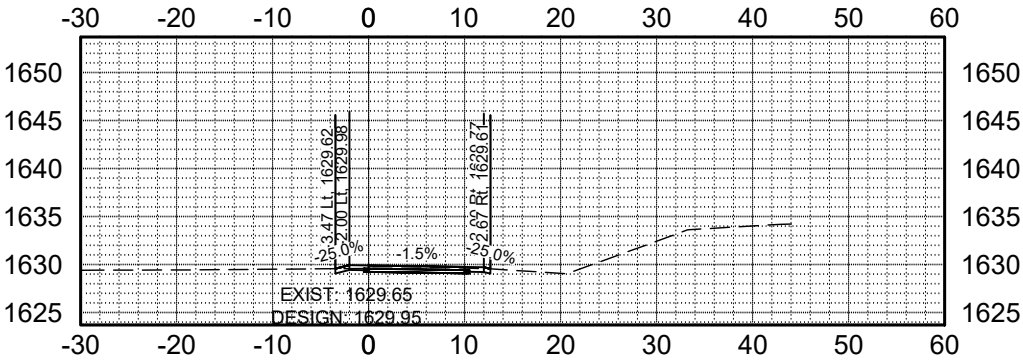
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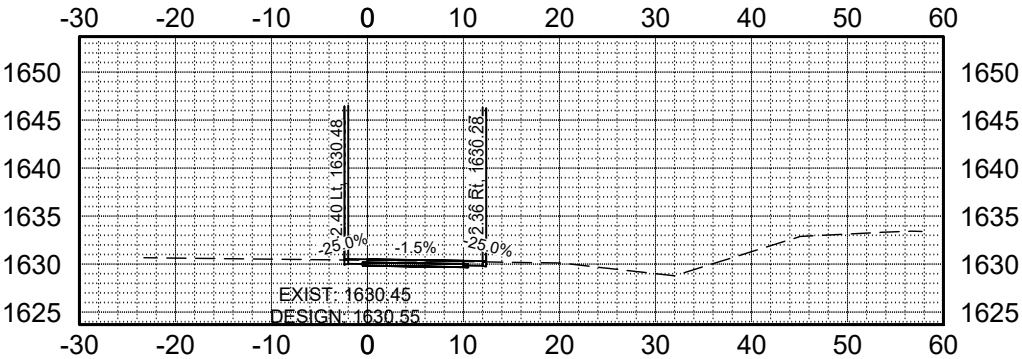
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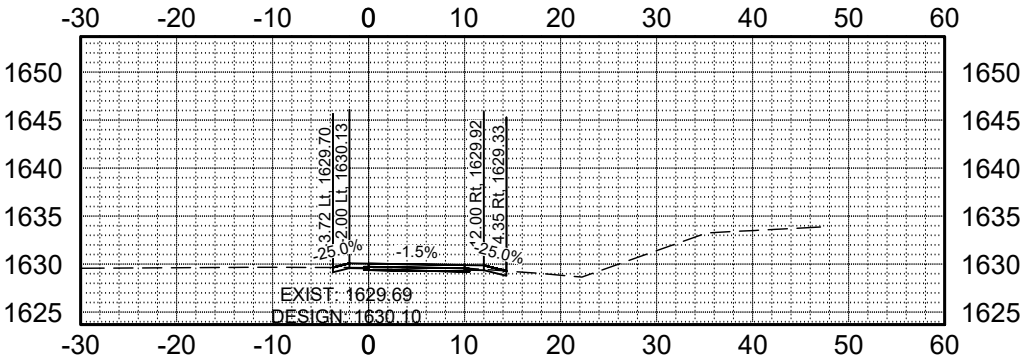
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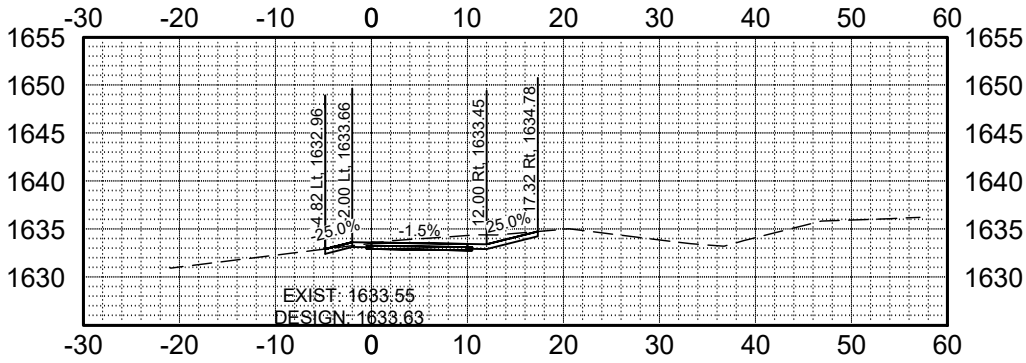


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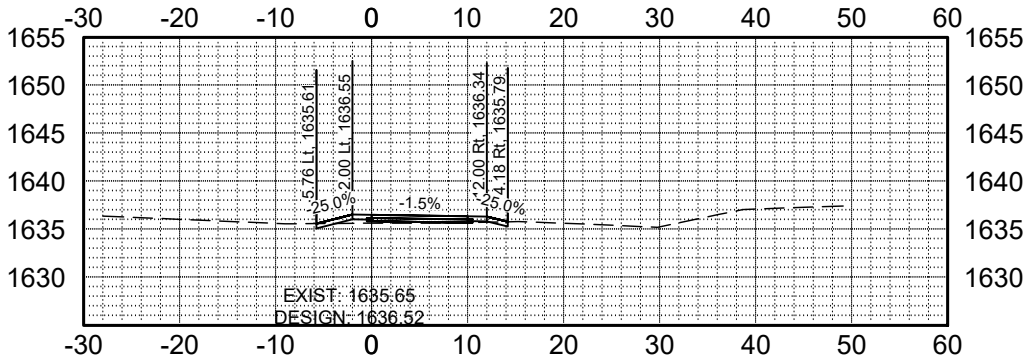


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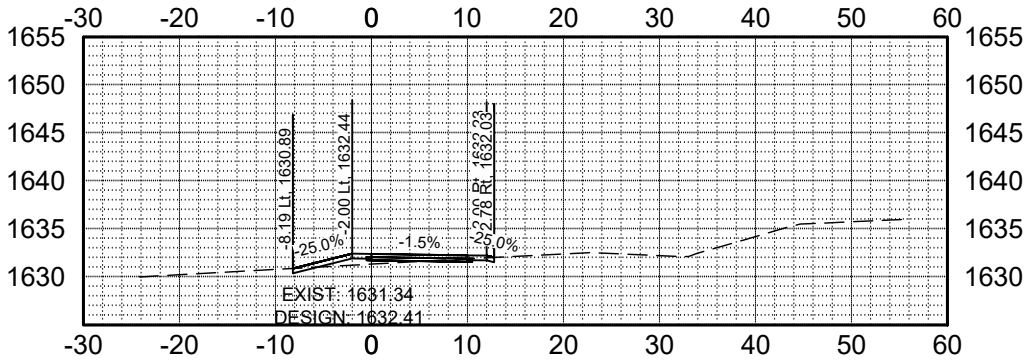
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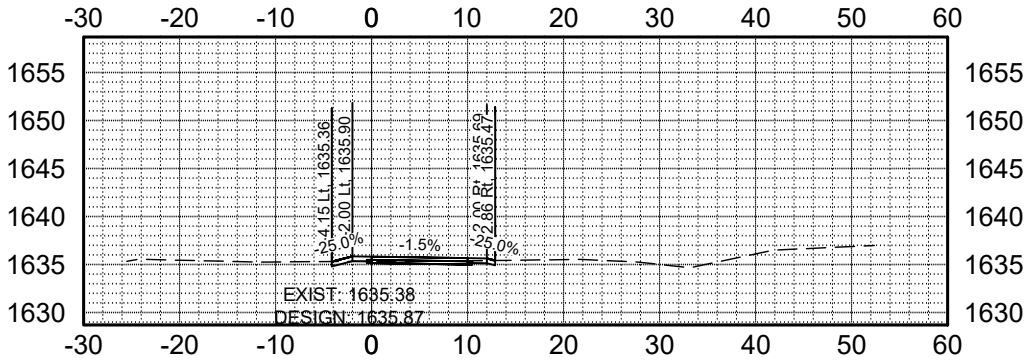
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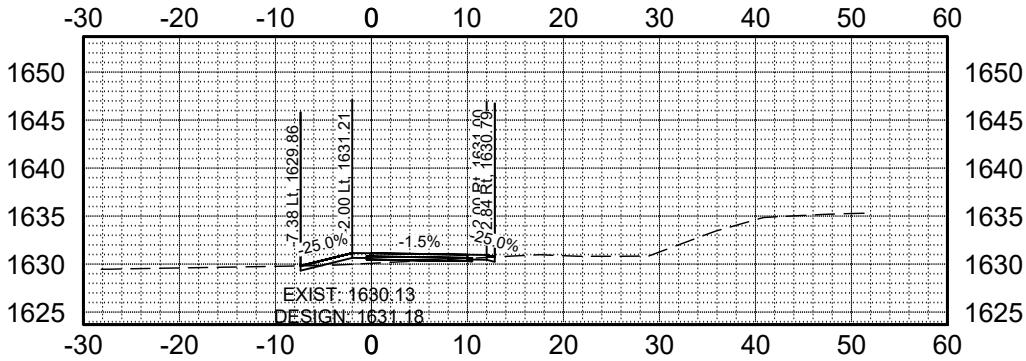
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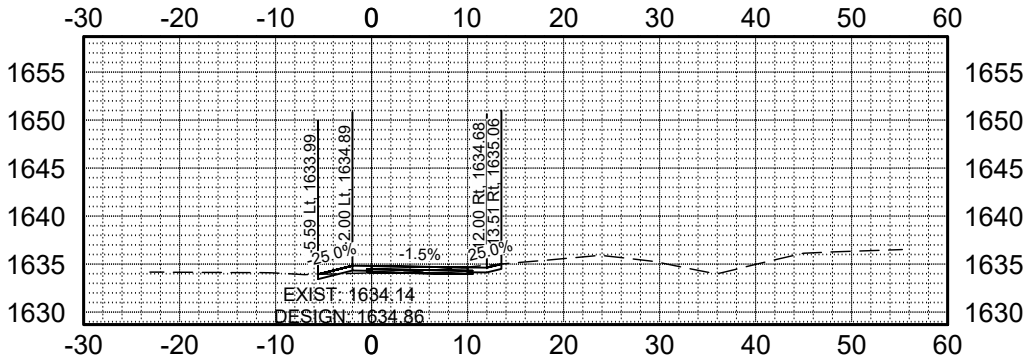
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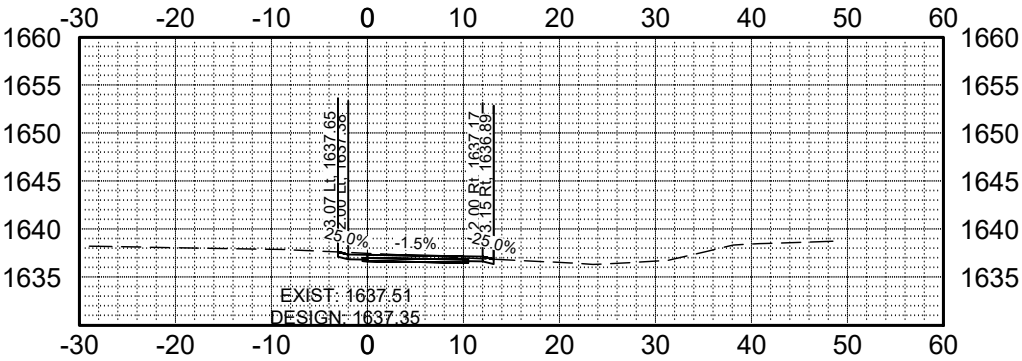


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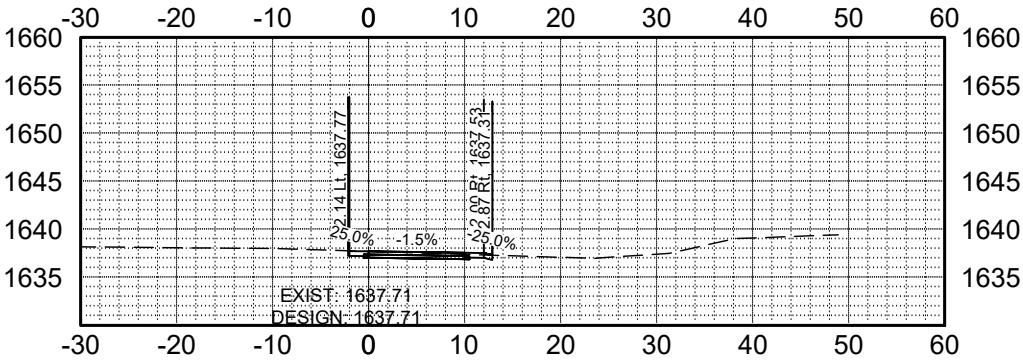


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|  | STATE | PROJECT NO.    | SECTION NO. | SHEET NO. |
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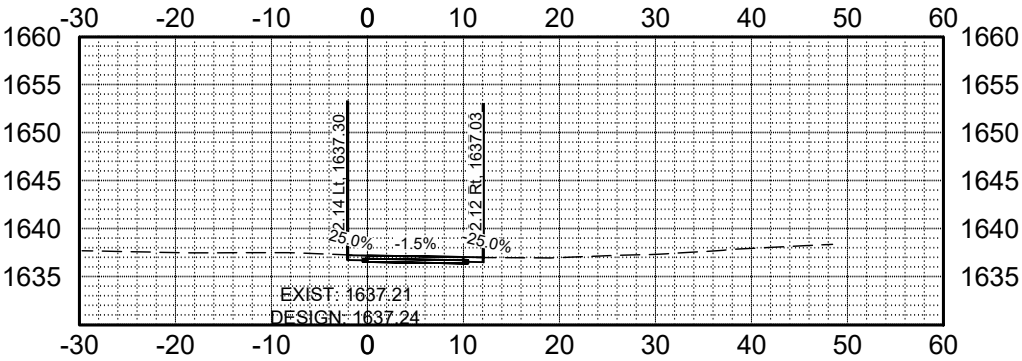
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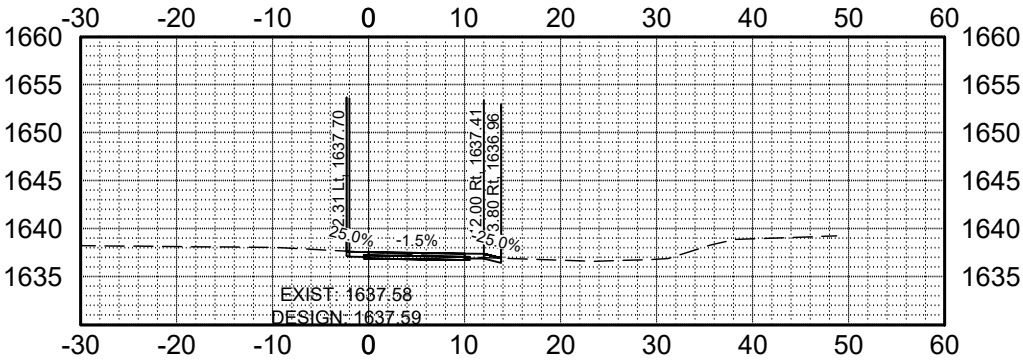
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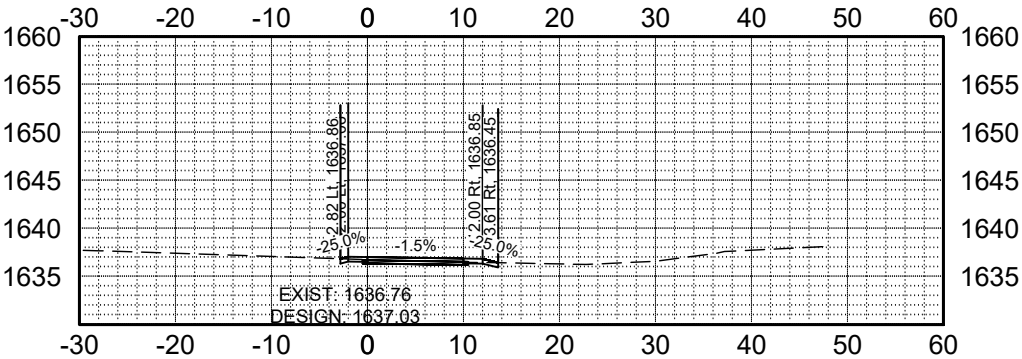
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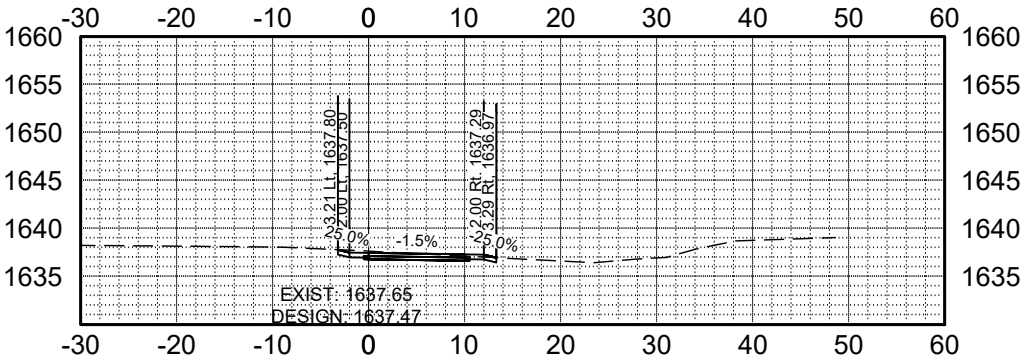
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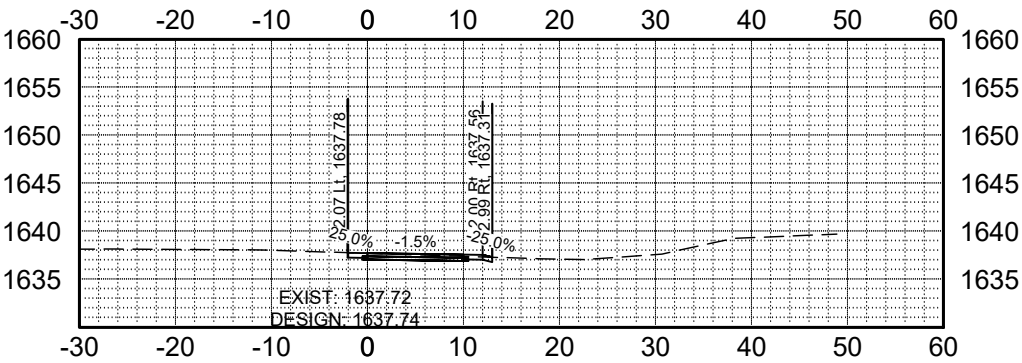


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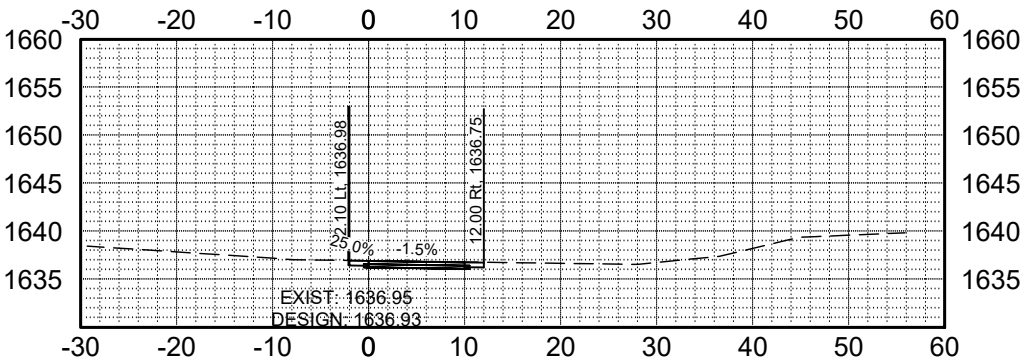


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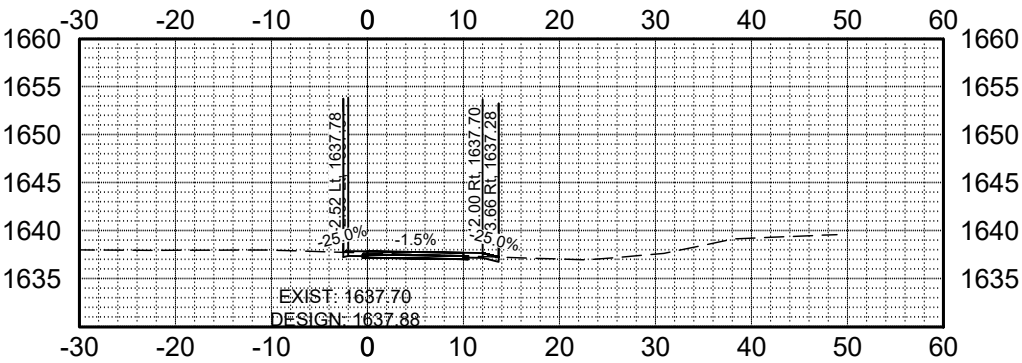
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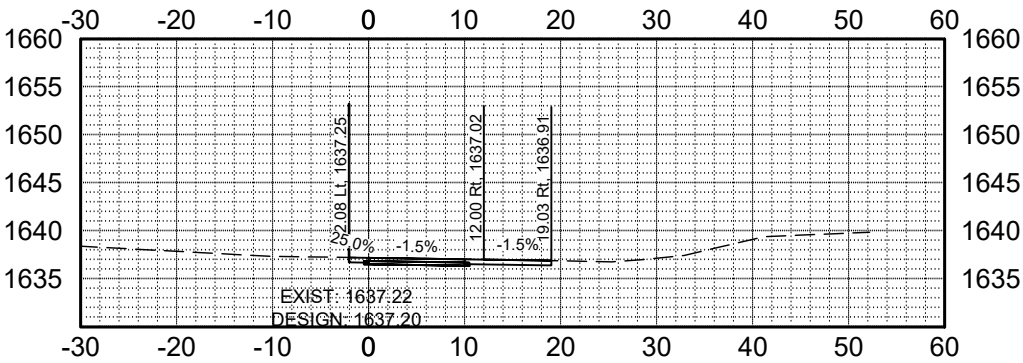
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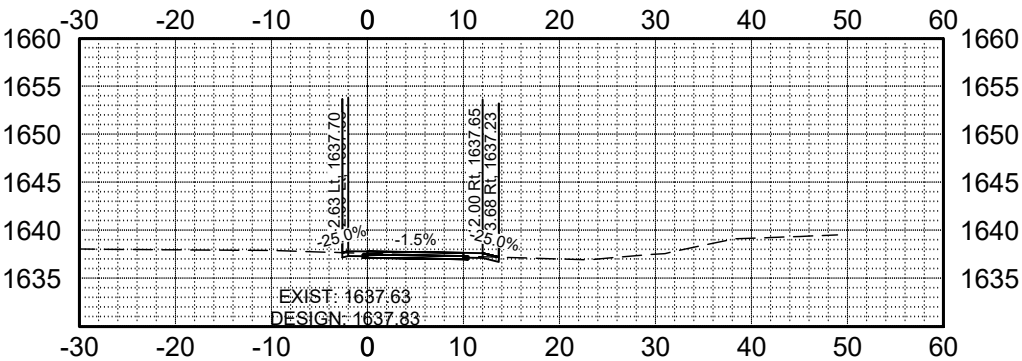
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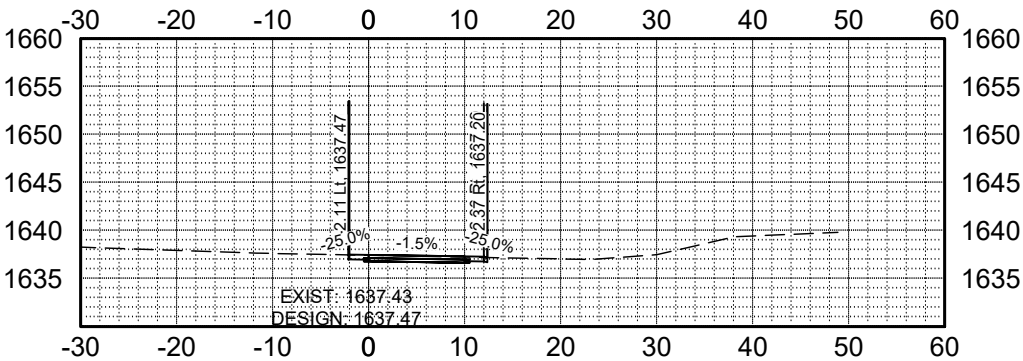
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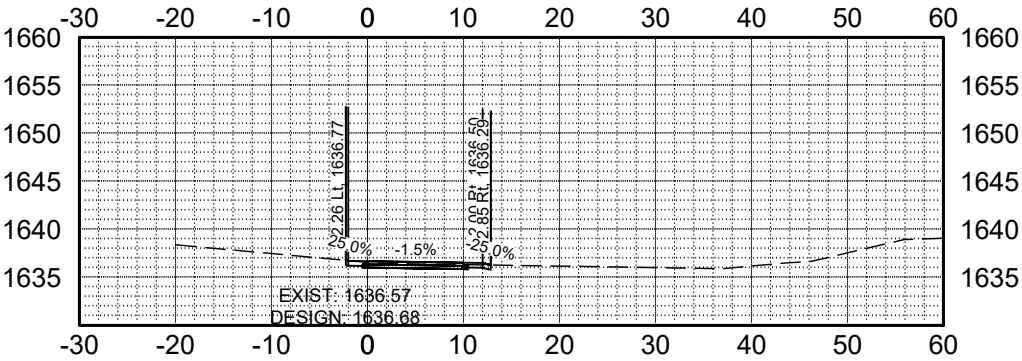


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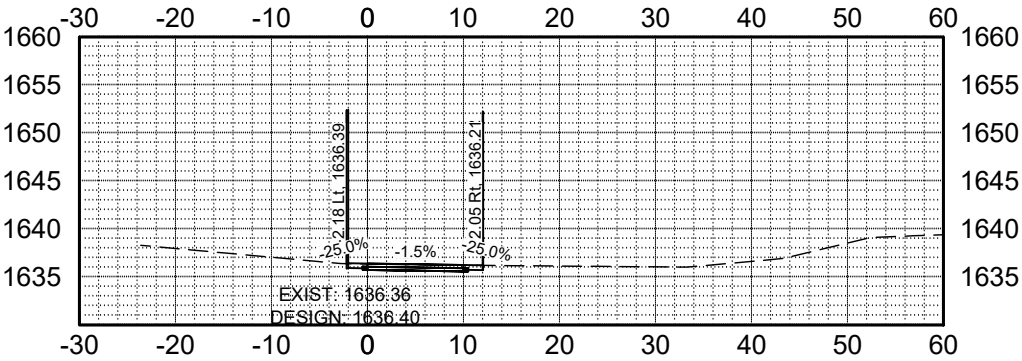


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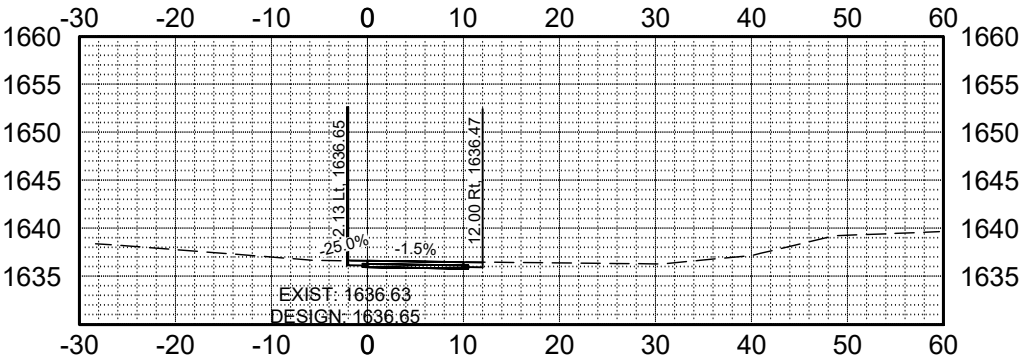
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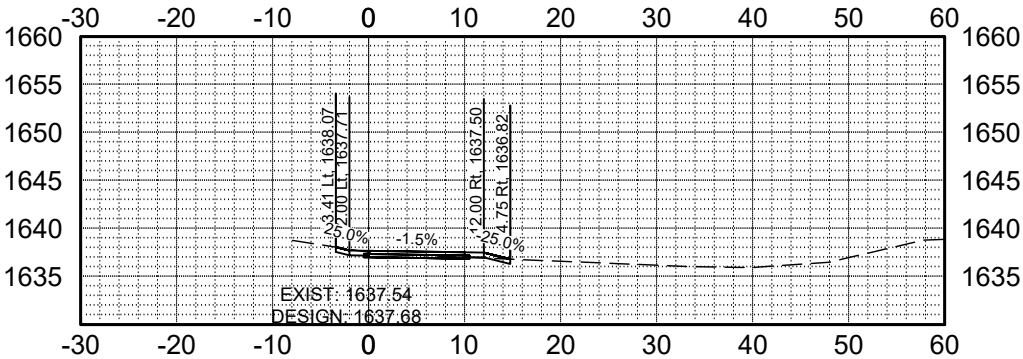
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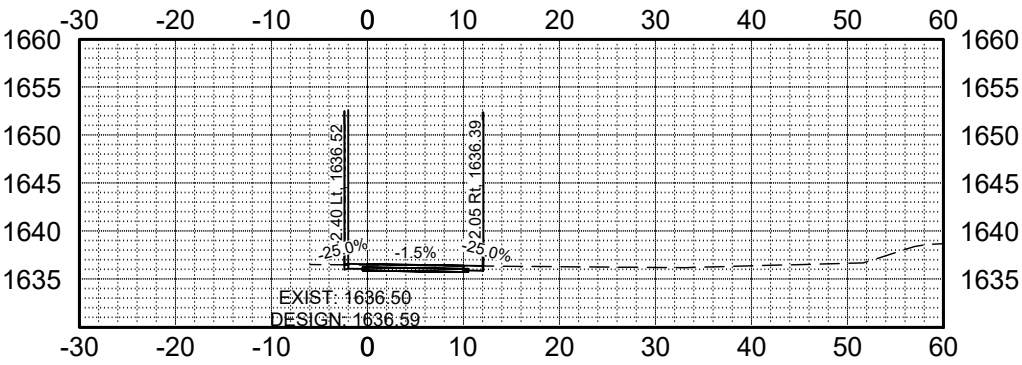
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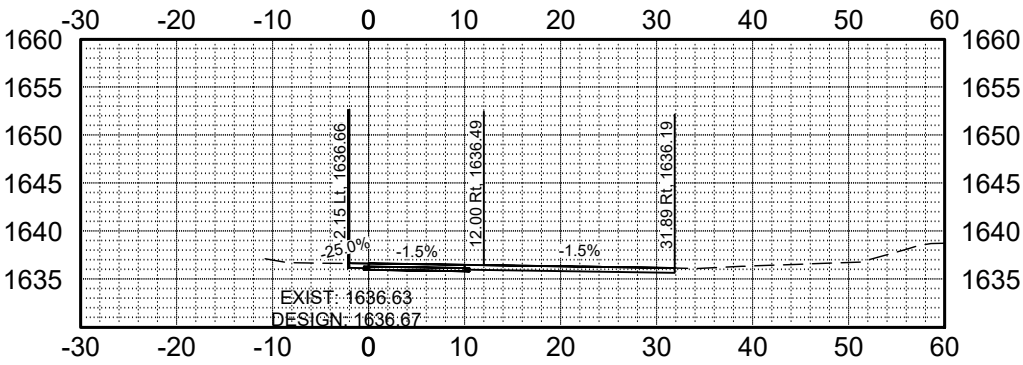


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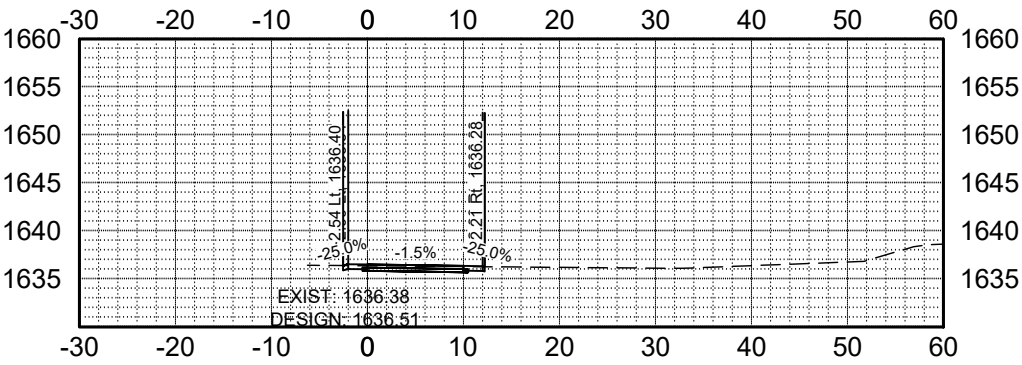
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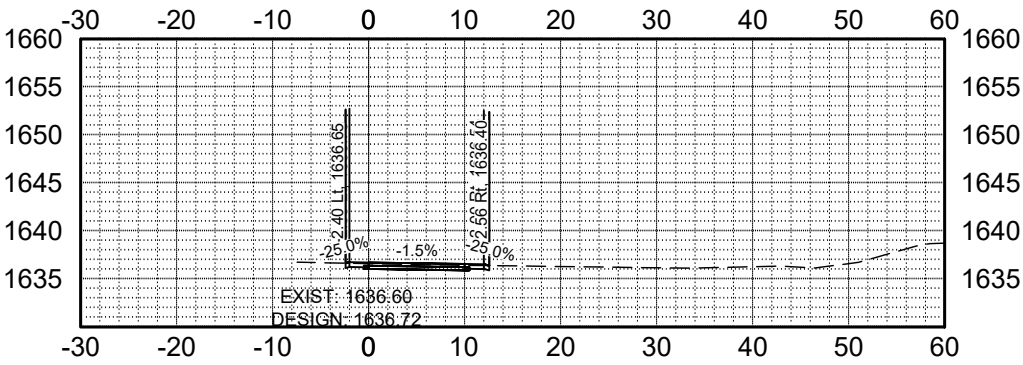
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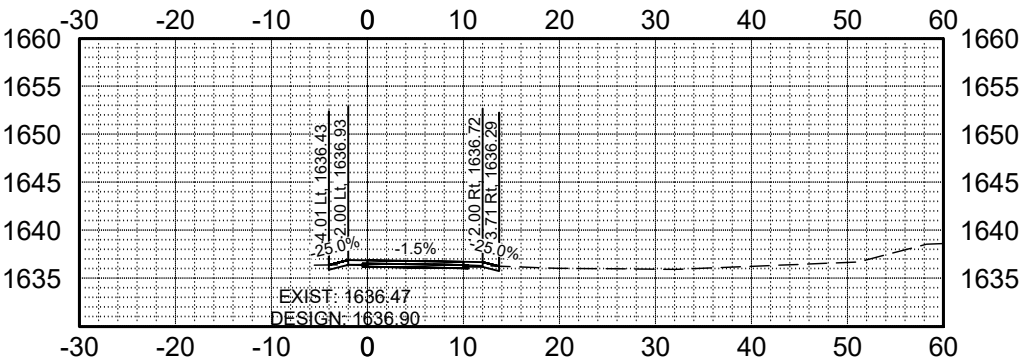
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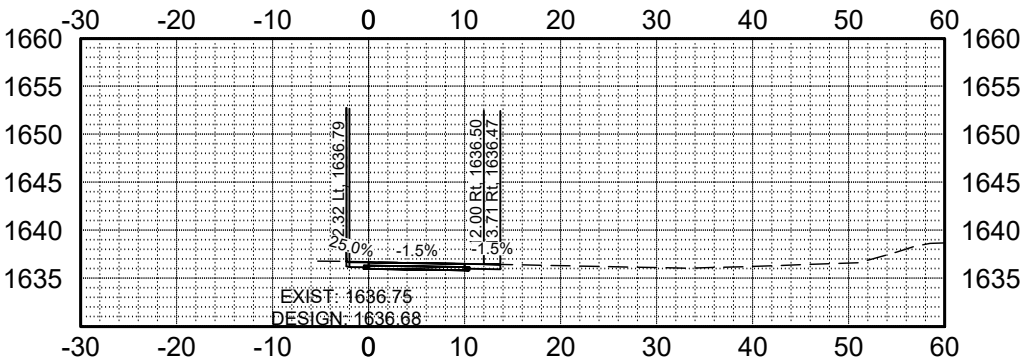
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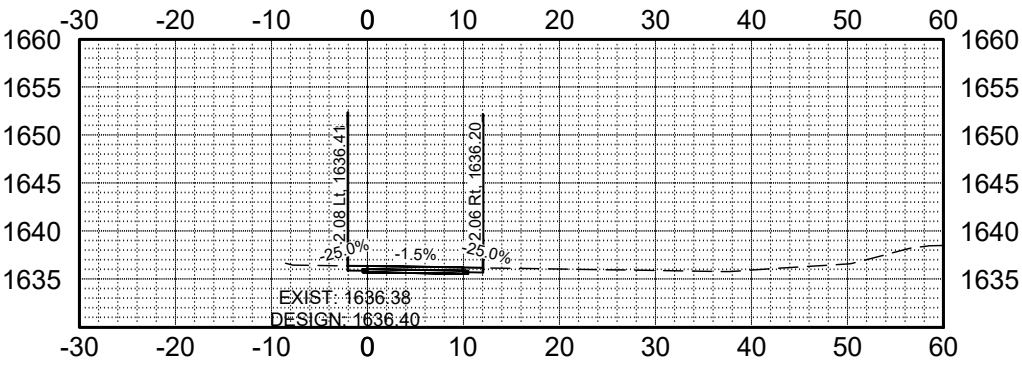


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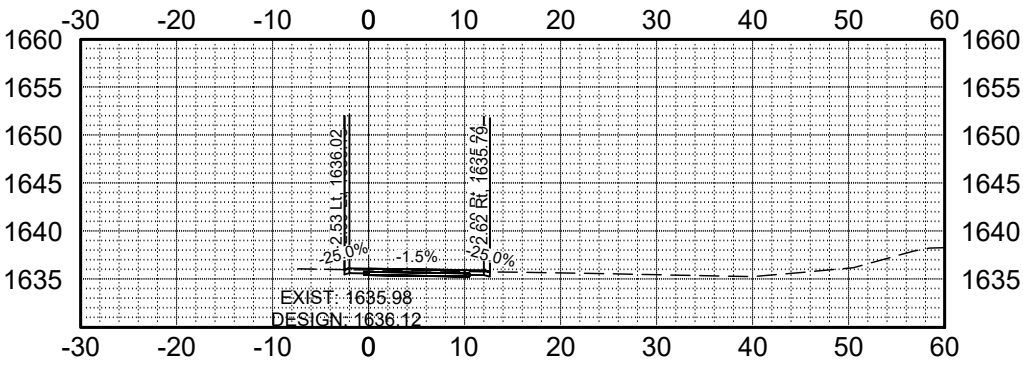


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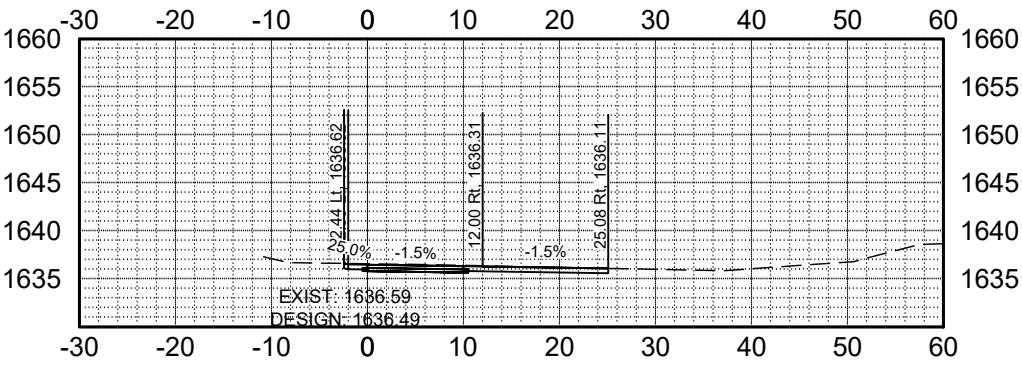
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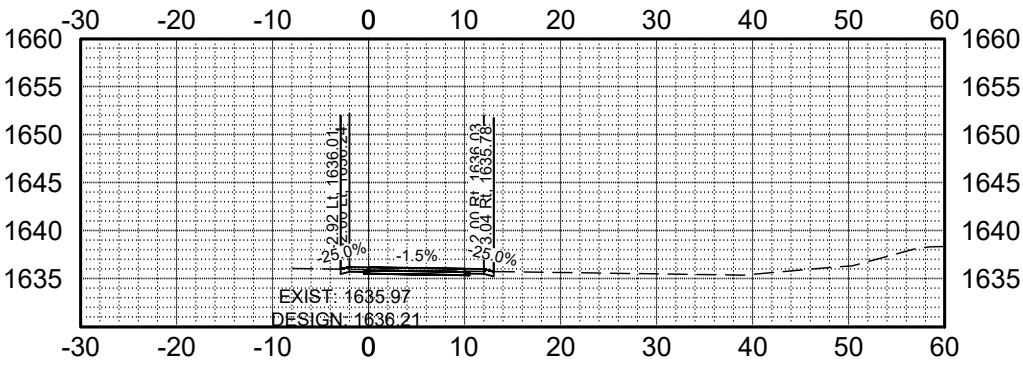
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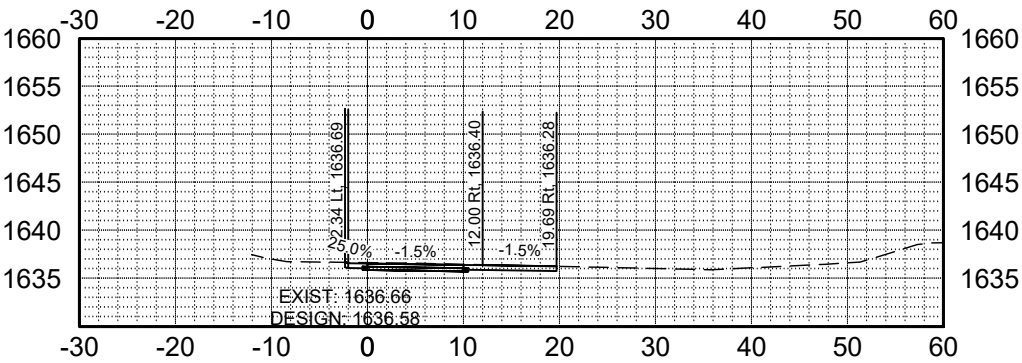
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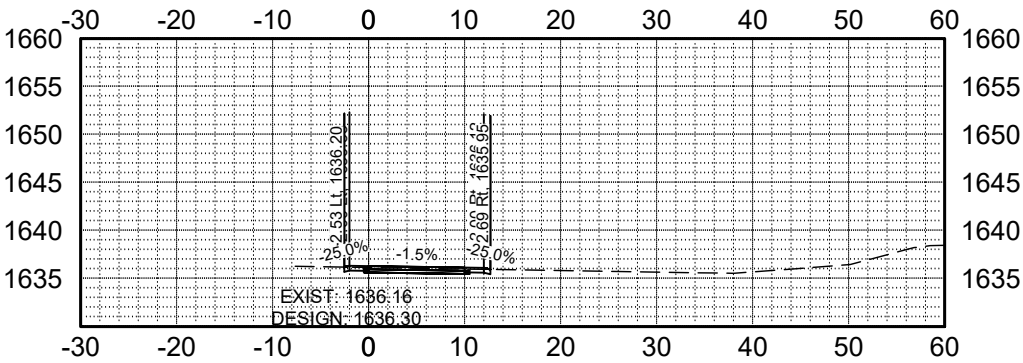
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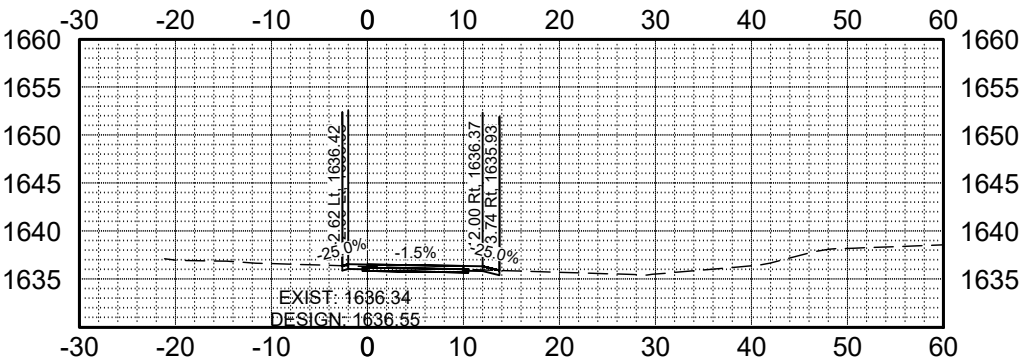


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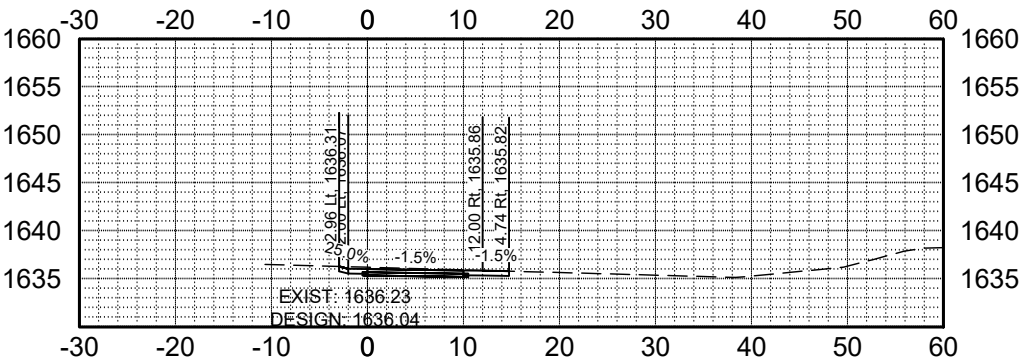


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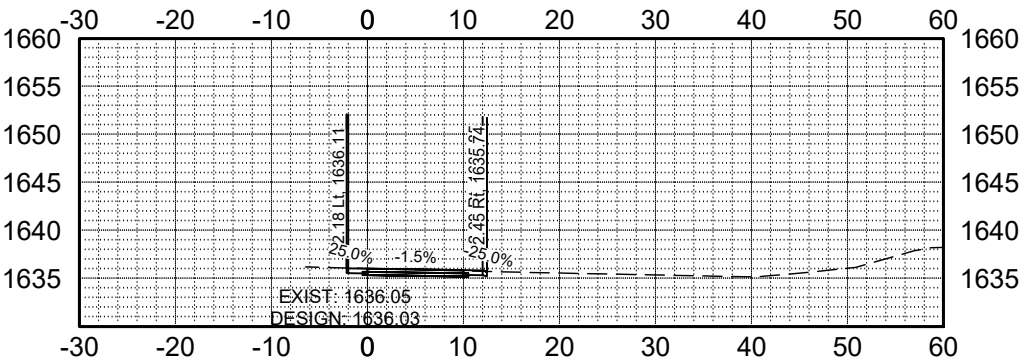
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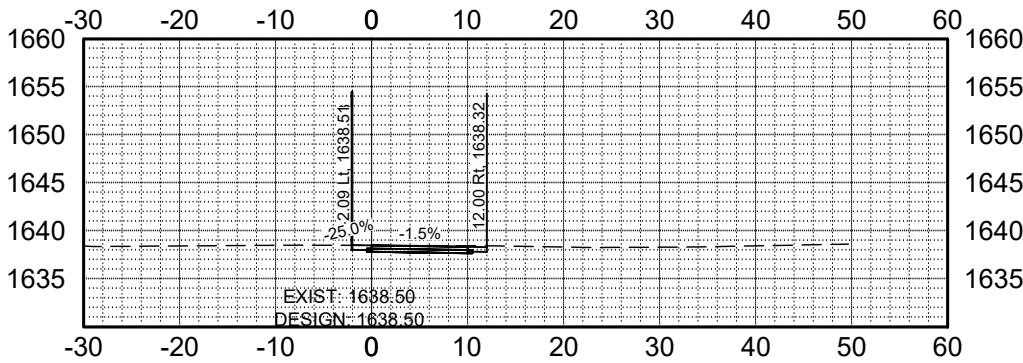
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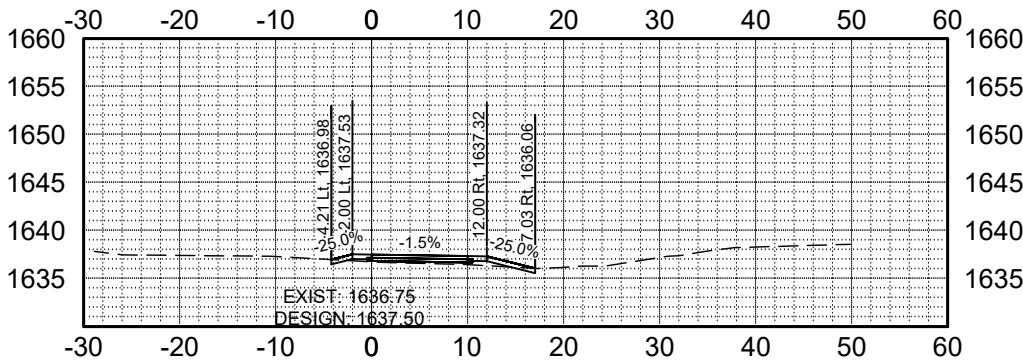
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PR\_Path STA 56+00.00



PR\_Path STA 55+75.00



NDDOT ABBREVIATIONS

D-101-1

|        |                                                                                                                                                                                                                 |                     |                                          |                      |                              |        |                           |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------|----------------------|------------------------------|--------|---------------------------|
| ?      | 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. | C Gdrl              | cable guardrail                          | Culv                 | culvert                      | FOS    | factor of safety          |
| Abn    | abandoned                                                                                                                                                                                                       | Calc                | calculate                                | C&G                  | curb & gutter                | Fed    | Federal                   |
| Abut   | abutment                                                                                                                                                                                                        | CIP                 | cast iron pipe                           | CI                   | curb inlet                   | FP     | feed point                |
| Adj    | adjusted                                                                                                                                                                                                        | CB                  | catch basin                              | CR                   | curb ramp                    | Fn     | fence                     |
| Aggr   | aggregate                                                                                                                                                                                                       | CRS                 | cationic rapid setting                   | C                    | cut                          | Fn P   | fence post                |
| Ahd    | ahead                                                                                                                                                                                                           | C Gd                | cattle guard                             | Dd Ld                | dead load                    | FO     | fiber optic               |
| ARV    | air release valve                                                                                                                                                                                               | C To C              | center to center                         | Defl                 | deflection                   | FD     | field drive               |
| Align  | alignment                                                                                                                                                                                                       | CL or $\varnothing$ | centerline                               | Defm                 | deformed                     | F      | fill                      |
| Al     | alley                                                                                                                                                                                                           | Ch                  | chain                                    | DInt                 | delineate                    | FAA    | fine aggregate angularity |
| Alt    | alternate                                                                                                                                                                                                       | Chnlk               | chain-link                               | DIntr                | delineator                   | FH     | fire hydrant              |
| Alum   | aluminum                                                                                                                                                                                                        | Ch Blk              | channel block                            | Depr                 | depression                   | FI     | flange                    |
| ADA    | Americans with Disabilities Act                                                                                                                                                                                 | Ch Ch               | channel change                           | Desc                 | description                  | FIRD   | flared                    |
| &      | and                                                                                                                                                                                                             | Chk                 | check                                    | Det                  | detail                       | FES    | flared end section        |
| Appr   | approach                                                                                                                                                                                                        | Chsld               | chiseled                                 | DWP                  | detectable warning panel     | F Bcn  | flashing beacon           |
| Approx | approximate                                                                                                                                                                                                     | Cir                 | circle                                   | Dtr                  | detour                       | FA     | flight auger sample       |
| ACP    | asbestos cement pipe                                                                                                                                                                                            | Cl                  | class                                    | Dia or $\varnothing$ | diameter                     | FL     | flow line                 |
| Asph   | asphalt                                                                                                                                                                                                         | Clnt                | clean-out                                | Dir                  | direction                    | Ftg    | footing                   |
| AC     | asphalt cement                                                                                                                                                                                                  | Clr                 | clear                                    | Dist                 | distance                     | FM     | force main                |
| Assmd  | assumed                                                                                                                                                                                                         | Cl&gr               | clearing & grubbing                      | DM                   | disturbed material           | Fnd    | found                     |
| @      | at                                                                                                                                                                                                              | Comb.               | combination                              | DB                   | ditch block                  | Fdn    | foundation                |
| Atten  | attenuation                                                                                                                                                                                                     | Coml                | commercial                               | DG                   | ditch grade                  | Frac   | fractional                |
| ATR    | automatic traffic recorder                                                                                                                                                                                      | Compr               | compression                              | Dbl                  | double                       | Frwy   | freeway                   |
| Ave    | Avenue                                                                                                                                                                                                          | CADD                | computer aided drafting & design         | Dn                   | down                         | Frt    | front                     |
| Avg    | average                                                                                                                                                                                                         | Conc                | concrete                                 | Dwg                  | drawing                      | FF     | front face                |
| ADT    | average daily traffic                                                                                                                                                                                           | CECB                | concrete erosion control blanket         | Dr                   | drive                        | F Disp | fuel dispenser            |
|        |                                                                                                                                                                                                                 | Cond                | conductor                                | Drw                  | driveway                     | FFP    | fuel filler pipes         |
|        |                                                                                                                                                                                                                 | Const               | construction                             | DI                   | drop inlet                   | FLS    | fuel leak sensor          |
|        |                                                                                                                                                                                                                 | Cont                | continuous                               | D                    | dry density                  | Furn   | furnish/ed                |
|        |                                                                                                                                                                                                                 | CSB                 | continuous split barrel sample           |                      |                              |        |                           |
|        |                                                                                                                                                                                                                 | Contr               | contraction                              |                      |                              |        |                           |
|        |                                                                                                                                                                                                                 | Contr               | contractor                               |                      |                              |        |                           |
| Bk     | back                                                                                                                                                                                                            | CP                  | control point                            |                      |                              |        |                           |
| BF     | back face                                                                                                                                                                                                       | Coord               | coordinate                               | Ea                   | each                         |        |                           |
| Balc   | balcony                                                                                                                                                                                                         | Cor                 | corner                                   | Esmt                 | easement                     |        |                           |
| B Wire | barbed wire                                                                                                                                                                                                     | Corr                | corrected                                | E                    | East                         |        |                           |
| Barr   | barricade                                                                                                                                                                                                       | CAES                | corrugated aluminum end section          | EB                   | Eastbound                    |        |                           |
| Btry   | battery                                                                                                                                                                                                         | CAP                 | corrugated aluminum pipe                 | Elast                | elastomeric                  |        |                           |
| BI     | beehive inlet                                                                                                                                                                                                   | CMES                | corrugated metal end section             | EL                   | electric locker              |        |                           |
| Beg    | begin                                                                                                                                                                                                           | CMP                 | corrugated metal pipe                    | E Mtr                | electric meter               |        |                           |
| BG     | below grade                                                                                                                                                                                                     | CPVCP               | corrugated poly-vinyl chloride pipe      | Elec                 | electric/al                  |        |                           |
| BM     | bench mark                                                                                                                                                                                                      | CSES                | corrugated steel end section             | EDM                  | electronic distance meter    |        |                           |
| Bkwy   | bikeway                                                                                                                                                                                                         | CSFES               | corrugated steel flared end section      | Elev or El           | elevation                    |        |                           |
| Bit    | bituminous                                                                                                                                                                                                      | CSP                 | corrugated steel pipe                    | Ellipt               | elliptical                   |        |                           |
| Blk    | block                                                                                                                                                                                                           | CSTES               | corrugated steel traversable end section | Emb                  | embankment                   |        |                           |
| BH     | bore hole                                                                                                                                                                                                       | Co                  | County                                   | Emuls                | emulsion/emulsified          |        |                           |
| Bot    | bottom                                                                                                                                                                                                          | Crse                | course                                   | ES                   | end section                  |        |                           |
| Blvd   | Boulevard                                                                                                                                                                                                       | Ct                  | Court                                    | Engr                 | engineer                     |        |                           |
| Bndry  | boundary                                                                                                                                                                                                        | Xarm                | cross arm                                | ESS                  | environmental sensor station |        |                           |
| Brkwy  | breakaway                                                                                                                                                                                                       | Xbuck               | cross buck                               | Eq                   | equal                        |        |                           |
| Br     | bridge                                                                                                                                                                                                          | Xsec                | cross sections                           | Evgr                 | evergreen                    |        |                           |
| Bldg   | building                                                                                                                                                                                                        | Xing                | crossing                                 | Exc                  | excavation                   |        |                           |
| Bus.   | business                                                                                                                                                                                                        | Xrd                 | crossroad                                | Exst                 | existing                     |        |                           |
| BV     | butterfly valve                                                                                                                                                                                                 | Crn                 | crown                                    | Exp                  | expansion                    |        |                           |
| Byp    | bypass                                                                                                                                                                                                          |                     |                                          | Expy                 | Expressway                   |        |                           |
|        |                                                                                                                                                                                                                 |                     |                                          | E                    | external of curve            |        |                           |
|        |                                                                                                                                                                                                                 |                     |                                          | Extru                | extruded                     |        |                           |

|                                              |                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                                  |
| 07-01-14                                     |                                                                                  |
| REVISIONS                                    |                                                                                  |
| DATE                                         | CHANGE                                                                           |
| 04-23-18<br>09-20-18<br>12-10-20<br>08-16-22 | General Revisions<br>General Revisions<br>General Revisions<br>General Revisions |

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NDDOT ABBREVIATIONS

D-101-2

|        |                              |          |                          |                      |                               |          |                                             |
|--------|------------------------------|----------|--------------------------|----------------------|-------------------------------|----------|---------------------------------------------|
| Galv   | galvanized                   | Ln       | lane                     | Obsc                 | obscure(d)                    | Qty      | quantity                                    |
| Gar    | garage                       | Lg       | large                    | Ocpd                 | occupied                      | Qtr      | quarter                                     |
| Gs L   | gas line                     | Lat      | latitude                 | Ocpy                 | occupy                        |          |                                             |
| G Reg  | gas line regulator           | Lt       | left                     | O/s                  | offset                        |          |                                             |
| GMV    | gas main valve               | Lens     | lenses                   | OC                   | on center                     | Rad or R | radius                                      |
| G Mtr  | gas meter                    | Lvl      | level                    | C                    | one dimensional consolidation | RR       | railroad                                    |
| GSV    | gas service valve            | Lvng     | leveling                 | OC                   | organic content               | Rlwy     | railway                                     |
| GVP    | gas vent pipe                | Lht      | light                    | Orig                 | original                      | Rsd      | raised                                      |
| GV     | gate valve                   | LP       | light pole               | O To O               | out to out                    | RC       | rapid curing                                |
| Ga     | gauge                        | Ltg      | lighting                 | OD                   | outside diameter              | Rec      | record                                      |
| Gov    | government                   | Liq      | liquid                   | OH                   | overhead                      | Rcy      | recycle                                     |
| Grd    | graded/grade                 | LL       | liquid limit             |                      |                               | RAP      | recycled asphalt pavement                   |
| Grnd   | ground                       | Loc      | location                 |                      |                               | RPCC     | recycled portland cement concrete           |
| GWM    | ground water monitor         | Long.    | longitude                | PMT                  | pad mounted transformer       | Ref      | reference                                   |
| Gdrl   | guardrail                    | Lp       | loop                     | Pg                   | pages                         | R Mkr    | reference marker                            |
| Gtr    | gutter                       | LD       | loop detector            | Pntd                 | painted                       | RM       | reference monument                          |
|        |                              | Lum      | luminaire                | Pr                   | pair                          | RP       | reference point                             |
|        |                              |          |                          | Pnl                  | panel                         | Refl     | reflectorized                               |
| H Plg  | H piling                     |          |                          | Pk                   | park                          | RCB      | reinforced concrete box                     |
| Hdwl   | headwall                     | Mb       | mailbox                  | PSD                  | passing sight distance        | RCES     | reinforced concrete end section             |
| Ht     | height                       | ML       | main line                | Pvmt                 | pavement                      | RCFES    | reinforced concrete flared end section      |
| Hel    | helical                      | MH       | manhole                  | Ped                  | pedestal                      | RCP      | reinforced concrete pipe                    |
| HDPE   | high density polyethylene    | Mkd      | marked                   | Ped                  | pedestrian                    | RCPS     | reinforced concrete pipe sewer              |
| HM     | high mast                    | Mkr      | marker                   | PPP                  | pedestrian pushbutton post    | RCTES    | reinforced concrete traversable end section |
| HP     | high pressure                | Mkg      | marking                  | Pen.                 | penetration                   | Reinf    | reinforcement                               |
| HPS    | high pressure sodium         | MA       | mast arm                 | Perf                 | perforated                    | Res      | reservation                                 |
| HTCG   | high tension cable guardrail | Matl     | material                 | Per.                 | perimeter                     | Res      | residence                                   |
| Hwy    | highway                      | Max      | maximum                  | Perm                 | permanent                     | Ret      | retaining                                   |
| Hor    | horizontal                   | MC       | meander corner           | PL                   | pipeline                      | Rev      | reverse                                     |
| HBP    | hot bituminous pavement      | Meas     | measure                  | Pl                   | place                         | Rt       | right                                       |
| HMA    | hot mix asphalt              | Mdn      | median                   | P&P                  | plan & profile                | R/W      | right of way                                |
| Hyd    | hydrant                      | MD       | median drain             | PL                   | plastic limit                 | Riv      | river                                       |
| Ph     | hydrogen ion content         | MC       | medium curing            | Pl or P <sub>L</sub> | plate                         | Rd       | road                                        |
|        |                              | MGS      | Midwest Guardrail System | Pt                   | point                         | Rdbd     | road bed                                    |
|        |                              | MM       | mile marker              | PE                   | polyethylene                  | Rdwy     | roadway                                     |
| Id     | identification               | MP       | mile post                | PVC                  | polyvinyl chloride            | RWIS     | roadway weather information system          |
| Incl   | inclinometer tube            | Min      | minimum                  | PCC                  | Portland Cement concrete      | Rk       | rock                                        |
| IMH    | inlet manhole                | Misc     | miscellaneous            | PP                   | power pole                    | Rt       | route                                       |
| ID     | inside diameter              | Mon      | monument                 | Preempt              | preemption                    |          |                                             |
| Inst   | instrument                   | Mnd      | mound                    | Prefab               | prefabricated                 |          |                                             |
| Intchg | interchange                  | Mtbl     | mountable                | Prfmd or Pref        | preformed                     |          |                                             |
| Intmdt | intermediate                 | Mtd      | mounted                  | Prep                 | preperation                   |          |                                             |
| Intscn | intersection                 | Mtg      | mounting                 | Press.               | pressure                      |          |                                             |
| Inv    | invert                       | Mk       | muck                     | PRV                  | pressure relief valve         |          |                                             |
| IP     | iron pipe                    |          |                          | Prestr               | prestressed                   |          |                                             |
|        |                              |          |                          | Pvt                  | private                       |          |                                             |
|        |                              |          |                          | PD                   | private drive                 |          |                                             |
| Jt     | joint                        | Neop     | neoprene                 | Prod.                | production/produce            |          |                                             |
| Jct    | junction                     | Ntwk     | network                  | Prog                 | programmed                    |          |                                             |
|        |                              | N        | North                    | Prop.                | property                      |          |                                             |
|        |                              | NE       | North East               | Prop Ln              | property line                 |          |                                             |
|        |                              | NW       | North West               | Ppsd                 | proposed                      |          |                                             |
|        |                              | NB       | Northbound               | PB                   | pull box                      |          |                                             |
|        |                              | No. or # | number                   |                      |                               |          |                                             |

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|            |                                  |        |                                    |
|------------|----------------------------------|--------|------------------------------------|
| Salv       | salvage(d)                       | Tel    | telephone                          |
| San        | sanitary sewer line              | Tel B  | Telephone Booth                    |
| Sec        | section                          | Tel P  | telephone pole                     |
| SL         | section line                     | Tv     | television                         |
| Sep        | separation                       | Temp   | temperature                        |
| Seq        | sequence                         | Temp   | temporary                          |
| Serv       | service                          | TBM    | temporary bench mark               |
| Sht        | sheet                            | T      | thinwall tube sample               |
| Shtng      | sheeting                         | Ts     | topsoil                            |
| Shldr      | shoulder                         | Traf   | traffic                            |
| Sw or Sdwk | sidewalk                         | TSCB   | traffic signal control box         |
| SD         | sight distance                   | Tr     | trail                              |
| SN         | sign number                      | Transf | transformer                        |
| Sig        | signal                           | Trans  | transition                         |
| Sgl        | single                           | TT     | transmission tower                 |
| SRCP       | slotted reinforced concrete pipe | TES    | traversable end section            |
| SC         | slow curing                      | Trans  | transverse                         |
| SS         | slow setting                     | Trtd   | treated                            |
| Sm         | small                            | Trmt   | treatment                          |
| S          | South                            | Qc     | triaxial compression               |
| SE         | South East                       | TERO   | tribal employment rights ordinance |
| SW         | South West                       | Tpl    | triple                             |
| SB         | Southbound                       | Typ    | typical                            |
| Sp         | spaces                           |        |                                    |
| Spcl       | special                          | Qu     | unconfined compressive strength    |
| SA         | special assembly                 | Ugrnd  | underground                        |
| SP         | special provisions               | Util   | utility                            |
| G          | specific gravity                 |        |                                    |
| Spk        | spike                            |        |                                    |
| SB         | split barrel sample              | VG     | valley gutter                      |
| SH         | sprinkler head                   | Vap    | vapor                              |
| SV         | sprinkler valve                  | Vert   | vertical                           |
| Sq         | square                           | VCP    | vitrified clay pipe                |
| Stk        | stake                            | Vol    | volume                             |
| Std        | standard                         | VSFS   | vehicle speed feedback sign        |
| N          | standard penetration test        |        |                                    |
| Std Specs  | standard specifications          | Wkwy   | walkway                            |
| Stm L      | steam line                       | W      | water content                      |
| SEC        | steel encased concrete           | WGV    | water gate valve                   |
| SMA        | stone matrix asphalt             | WL     | water line                         |
| SSD        | stopping sight distance          | WM     | water main                         |
| SD         | storm drain                      | WMV    | water main valve                   |
| St         | street                           | W Mtr  | water meter                        |
| SPP        | structural plate pipe            | WSV    | water service valve                |
| SPPA       | structural plate pipe arch       | WW     | water well                         |
| Str        | structure                        | Wrng   | wearing                            |
| Subd       | subdivision                      | WIM    | weigh in motion                    |
| Sub        | subgrade                         | W      | west                               |
| Sub Prep   | subgrade preparation             | WB     | westbound                          |
| Ss         | subsoil                          | Wrng   | wiring                             |
| SS         | supplement specification         | W/     | with                               |
| Supp       | supplemental                     | W/o    | without                            |
| Surf       | surfacing                        | WC     | witness corner                     |
| Surv       | survey                           |        |                                    |
| Sym        | symmetrical                      |        |                                    |

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MEASUREMENTS

|          |                          |
|----------|--------------------------|
| ac       | acres                    |
| A        | ampere                   |
| Bd Ft    | board feet               |
| Cd       | candela                  |
| cm       | centimeter               |
| C        | coulomb                  |
| CF       | cubic feet               |
| m3       | cubic meter              |
| m3/s     | cubic meters per second  |
| CY       | cubic yard               |
| CY/mi    | cubic yards per mile     |
| D or Deg | degree                   |
| F        | Fahrenheit               |
| F        | farad                    |
| ft       | feet/foot                |
| Gal      | gallon                   |
| G        | giga                     |
| Ha       | hectare                  |
| H        | henry                    |
| Hz       | hertz                    |
| hr       | hour(s)                  |
| in       | inch                     |
| J        | joule                    |
| K        | kelvin                   |
| kN       | kilo newton              |
| kPa      | kilo pascal              |
| kg       | kilogram                 |
| kg/m3    | kilogram per cubic meter |
| km       | kilometer                |
| K        | Kip(s)                   |
| LF       | linear foot              |
| L        | litre                    |
| Lm       | lumen                    |
| L sum    | lump sum                 |
| Lx       | lux                      |
| M Hr     | man hour                 |
| M        | mega                     |
| m        | meter                    |
| m/s      | meters per second        |
| mi       | mile                     |
| mL       | milliliter               |
| mm       | millimeter               |
| mm/hr    | millimeters per hour     |
| n        | nano                     |
| N        | newton                   |
| Pa       | pascal                   |
| lb       | pounds                   |
| sec      | seconds                  |
| S        | siemens                  |
| SF       | square feet              |
| km2      | square kilometer         |
| m2       | square meter             |
| SY       | square yard              |
| Sta Yd   | station yards            |
| SI       | Systems International    |

|      |               |
|------|---------------|
| T    | tesla         |
| T/mi | tons per mile |
| V    | volt          |
| W    | watt          |
| Wb   | weber         |

SURVEY DESCRIPTIONS

|         |                                 |
|---------|---------------------------------|
| Az      | azimuth                         |
| Bs      | backsight                       |
| Brg     | bearing                         |
| BP Cap  | blue plastic cap                |
| BS      | both sides                      |
| BC      | brass cap                       |
| CS      | curve to spiral                 |
| Eq      | equation                        |
| E       | external of curve               |
| FS      | far side                        |
| FB      | field book                      |
| Fs      | foresight                       |
| Geod    | geodetic                        |
| GIS     | Geographical Information System |
| GPS     | Global Positioning System       |
| HI      | height of instrument            |
| IM      | iron monument                   |
| I Pn    | iron pin                        |
| LS      | Land Surveyor (licensed)        |
| LSIT    | Land Surveyor In Training       |
| L       | length of curve                 |
| LC      | long chord                      |
| LB      | level book                      |
| Mer     | meridian                        |
| M       | mid ordinate of curve           |
| NGS     | National Geodetic Survey        |
| NS      | near side                       |
| Obsn    | observation                     |
| Off Loc | office location                 |
| OP Cap  | orange plastic cap              |
| PK      | Parker-Kalon nail               |
| P Cap   | plastic cap                     |
| PP Cap  | pink plastic cap                |
| PCC     | point of compound curve         |
| PC      | point of curve                  |
| PI      | point of intersection           |
| PRC     | point of reverse curvature      |
| PT      | point of tangent                |
| POC     | point on curve                  |
| POT     | point on tangent                |
| RTP     | random traverse point           |
| Rge     | range                           |
| RP Cap  | red plastic cap                 |
| SC      | spiral to curve                 |
| ST      | spiral to tangent               |
| Sta     | station                         |
| SE      | superelevation                  |
| Tan     | tangent                         |
| T       | tangent (semi)                  |
| TS      | tangent to spiral               |
| Twp     | township                        |
| TB      | transit book                    |
| TP      | traverse point                  |
| TP      | turning point                   |
| USC&G   | US Coast & Geodetic Survey      |
| USGS    | US Geologic Survey              |
| VC      | vertical curve                  |
| WGS     | World Geodetic System           |
| YP Cap  | yellow plastic cap              |
| Z       | zenith                          |

SOIL TYPES

|           |                 |
|-----------|-----------------|
| Cl        | clay            |
| Cl F      | clay fill       |
| Cl Hvy    | clay heavy      |
| Cl Lm     | clay loam       |
| Co S      | coal slack      |
| C Gr      | coarse gravel   |
| CS        | coarse sand     |
| FS        | fine sand       |
| Gr        | gravel          |
| Lig Co    | lignite coal    |
| Lig Sl    | lignite slack   |
| Lm        | loam            |
| Rk        | rock            |
| Sd        | sand            |
| Sdy Cl    | sandy clay      |
| Sdy Cl Lm | sandy clay loam |
| Sdy Fl    | sandy fill      |
| Sdy Lm    | sandy loam      |
| Sc        | scoria          |
| Sh        | shale           |
| Si Cl     | silt clay       |
| Si Cl Lm  | silty clay loam |
| Si Lm     | silty loam      |

|                                              |                                         |
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| 12-18-20                                     | Sheet Added<br>- Continued from D-101-3 |

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

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 |
| ALL PL             | 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        |
| CENTURYLINK        | CenturyLink                               |
| 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                        |
| EQUINOR            | Equinor Pipeline                          |
| 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                   |
| GTR RAMSEY WD      | Greater Ramsey Water District             |

|                    |                                                   |
|--------------------|---------------------------------------------------|
| 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                      |
| MCKNZ 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                          |
| MIDCO              | MidContinent Communications                       |
| MIDSTATE TEL       | Midstate Telephone Company                        |
| MINOT CABLE        | Minot Cable Television                            |
| MINOT TEL          | Minot Telephone Company                           |
| MISS VALL COMM     | Missouri Valley Communications                    |
| 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               |
| NWRWD              | Northwest Rural Water District                    |
| ONEOK              | Oneok gas                                         |
| OSHA               | Occupational Safety and Health Administration     |
| OTTR TL PWR        | Otter Tail Power Company                          |
| PAAP               | Plains All American Pipeline                      |
| 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                    |

|                    |                                             |
|--------------------|---------------------------------------------|
| RED RIV COMM       | Red River Rural Communications              |
| RESVTN TEL         | Reservation Telephone                       |
| ROBRTS TEL         | Roberts Company Telephone                   |
| R-RIDER ELEC       | Roughrider Electric Cooperative             |
| RRVW               | Red River Valley & Western Railroad         |
| S CENT REG WD      | South Central Regional Water District       |
| 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           |
| WAPA               | Western Area Power Administration           |
| WAWSA              | Western Area Water Supply Authority         |
| 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                 |

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| 09-20-18                                     | General Revisions |
| 12-10-20                                     | General Revisions |
| 08-16-22                                     | General Revisions |

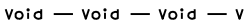
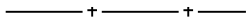
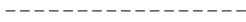
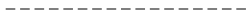
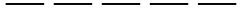


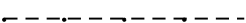
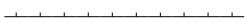
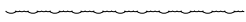
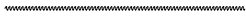
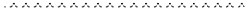
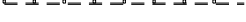
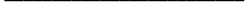
08/16/22

LINE STYLES

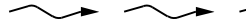
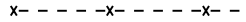
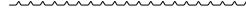
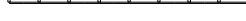
D-101-20

Existing Topography

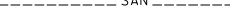
|                                                                                     |                                    |
|-------------------------------------------------------------------------------------|------------------------------------|
|    | Existing Ground Void               |
|    | Existing Cemetery 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               |
|  | Existing High Tension Cable Guardrail            |
|  | Existing High Tension Cable Guardrail with Posts |

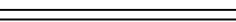
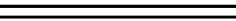
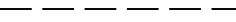
Proposed Topography

|                                                                                      |                                         |
|--------------------------------------------------------------------------------------|-----------------------------------------|
|  | 3-Cable w Posts                         |
|  | Flow                                    |
|  | Fence                                   |
|  | Remove Line                             |
|  | Wall                                    |
|  | Retaining Wall (Plan View)              |
|  | W-Beam w Posts                          |
|  | High Tension Cable Guardrail with Posts |

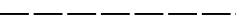
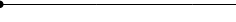
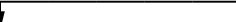
Existing Utilities

|                                                                                       |                                            |
|---------------------------------------------------------------------------------------|--------------------------------------------|
|    | 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

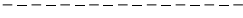
|                                                                                       |                                             |
|---------------------------------------------------------------------------------------|---------------------------------------------|
|  | Existing Overhead Sign Structure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

|                                              |                                                                                 |                                                                                       |
|----------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                                 |  |
| 07-01-14<br>REVISIONS                        |                                                                                 |                                                                                       |
| DATE                                         | CHANGE                                                                          |                                                                                       |
| 09-23-16<br>12-18-20                         | Added and Revised Items,<br>Organized by Functional Groups<br>General Revisions |                                                                                       |
|                                              |                                                                                 | 12 18 2020                                                                            |

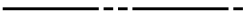
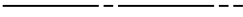
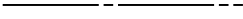
LINE STYLES

D-101-21

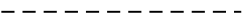
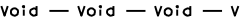
Right Of Way

|                                                                                     |                                       |
|-------------------------------------------------------------------------------------|---------------------------------------|
|    | 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 Typicals

|                                                                                    |                                               |
|------------------------------------------------------------------------------------|-----------------------------------------------|
|  | 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  |

|                                                                                      |                        |
|--------------------------------------------------------------------------------------|------------------------|
|  | Subgrade Reinforcement |
|  | Failure Line           |

Countours

|                                                                                      |                      |
|--------------------------------------------------------------------------------------|----------------------|
|  | Depression Contours  |
|  | Supplemental Contour |

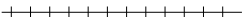
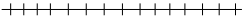
Profile

|                                                                                      |                                 |
|--------------------------------------------------------------------------------------|---------------------------------|
|  | 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               |

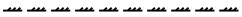
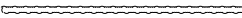
Bridge Details

|                                                                                       |                            |
|---------------------------------------------------------------------------------------|----------------------------|
|  | Small Hidden Object        |
|  | Large Hidden Object        |
|  | Phantom Object             |
|  | Existing Conditions Object |
|  | Centerline Main            |
|  | Centerline Secondary       |
|  | Excavation Limits          |
|  | Proposed Ground            |
|  | 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

REVISIONS

| DATE     | CHANGE                                                                          |
|----------|---------------------------------------------------------------------------------|
| 09-23-16 | Added and Revised Items,<br>Organized by Functional Groups<br>General Revisions |
| 12-18-20 |                                                                                 |

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30



North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

Existing Section Corner (Full, Quarter, Sixteenth, Meander)

Existing Witness Corner

Existing Control Point (CP, GPS-RTK, TRI)

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

Continuous Split Barrel Sample

Flight Auger Sample

Split Barrel Sample

Thinwall Tube Sample

Standard Penetration Test

Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

|                                              |                   |
|----------------------------------------------|-------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                   |
| 07-01-14                                     |                   |
| REVISIONS                                    |                   |
| DATE                                         | CHANGE            |
| 12-18-20                                     | General Revisions |

KIRK J. HOFF

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12 18 2020



SYMBOLS

D-101-31

|                                                                                     |                                                                                                              |                                                                                       |                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------|
|    | Flexible Delineator                                                                                          |    | Highway Sign (Exst, Ppsd)            |
|    | Flexible Delineator Type A (Exst, Ppsd)                                                                      |    | Mile Post Type A (Exst-Ppsd-Reset)   |
|    | Flexible Delineator Type B (Exst, Ppsd)                                                                      |    | Mile Post Type B (Exst, Ppsd)        |
|    | Flexible Delineator Type C (Exst, Ppsd)                                                                      |    | Mile Post Type C (Exst, Ppsd)        |
|    | Flexible Delineator Type D (Exst, Ppsd)                                                                      |    | Object Marker Type I (Exst, Ppsd)    |
|    | Flexible Delineator Type E (Exst, Ppsd)                                                                      |    | Object Marker Type II (Exst, Ppsd)   |
|    | Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)                                                          |    | Object Marker Type III (Exst, Ppsd)  |
|    | Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)                                                          |    | Existing Reference Marker            |
|    | Delineator Type C (Exst, Ppsd, Diamond Grade)                                                                |    | Road Closure Gate 18 Ft (Exst, Ppsd) |
|    | Delineator Type D (Exst, Ppsd, Diamond Grade)                                                                |    | Road Closure Gate 28 Ft (Exst, Ppsd) |
|    | Delineator Type E (Exst, Ppsd, Diamond Grade)                                                                |    | Road Closure Gate 40 Ft (Exst, Ppsd) |
|   | Barricade (Type I, Type II, Type III)                                                                        |  | Existing Railroad Battery Box        |
|  | Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted) |  | Existing RR Profile Spot             |
|  | Attenuation Device                                                                                           |  | Existing Railroad Crossbuck          |
|  | Truck Mounted Attenuator                                                                                     |  | Existing Railroad Frog               |
|  | Delineator Drums                                                                                             |  | Existing Mailbox (Private, Federal)  |
|  | Flagger                                                                                                      |                                                                                       |                                      |
|  | Tubular Marker                                                                                               |                                                                                       |                                      |
|  | Traffic Cone                                                                                                 |                                                                                       |                                      |
|  | Back to Back Vertical Panel Sign                                                                             |                                                                                       |                                      |

|                                              |                   |
|----------------------------------------------|-------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                   |
| 07-01-14                                     |                   |
| REVISIONS                                    |                   |
| DATE                                         | CHANGE            |
| 12-18-20                                     | General Revisions |



12 18 2020



SYMBOLS

D-101-32

|                                                                                     |                                                               |                                                                                       |                                                                                       |                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------|
|    | Existing Luminaire                                            |    |    | High Mast Light Standard 3 Luminaire (Exst, Ppsd)  |  | Existing Traffic Signal Standard                                                    |                                                                                     |                                                                                     |                                                          |
|    | Luminaire LED                                                 |    |    | High Mast Light Standard 4 Luminaire (Exst, Ppsd)  |  |  |  | Pull Box (Exst-Ppsd-Undefined)                                                      |                                                          |
|    | Existing Light Standard Luminaire                             |    |    | High Mast Light Standard 5 Luminaire (Exst, Ppsd)  |  |  |                                                                                     | Intelligent Transportation Pull Box (Exst, Ppsd)                                    |                                                          |
|    | Relocate Light Standard                                       |    |    | High Mast Light Standard 6 Luminaire (Exst, Ppsd)  |                                                                                     |  |  | Transformer (Exst, Ppsd)                                                            |                                                          |
|    | Light Standard Light LED Luminaire                            |    |    | High Mast Light Standard 7 Luminaire (Exst, Ppsd)  |  |  |  | Power Pole (Exst-Ppsd-with Transformer)                                             |                                                          |
|    | Light Standard 35 Watt High Pressure Sodium Vapor Luminaire   |    |    | High Mast Light Standard 8 Luminaire (Exst, Ppsd)  |                                                                                     |  |  | Wood Pole (Exst, Ppsd)                                                              |                                                          |
|    | Light Standard 50 Watt High Pressure Sodium Vapor Luminaire   |    |    | High Mast Light Standard 9 Luminaire (Exst, Ppsd)  |                                                                                     |  |  | Pedestrian Push Button Post (Exst, Ppsd)                                            |                                                          |
|    | Light Standard 70 Watt High Pressure Sodium Vapor Luminaire   |    |    | High Mast Light Standard 10 Luminaire (Exst, Ppsd) |                                                                                     |                                                                                     |  | Existing Pole                                                                       |                                                          |
|    | Light Standard 100 Watt High Pressure Sodium Vapor Luminaire  |    |    | Overhead Sign Structure Load Center (Exst, Ppsd)   |                                                                                     |                                                                                     |  | Existing Telephone Pole                                                             |                                                          |
|    | Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  |    |    | Traffic Signal Controller (Exst, Ppsd)             |                                                                                     |                                                                                     |  | Existing Post                                                                       |                                                          |
|    | Light Standard 200 Watt High Pressure Sodium Vapor Luminaire  |    |    | Pad Mounted Traffic Signal Controller (Exst, Ppsd) |  |  |  |  | Connection Conductor (Ground, Neutral, Phase 1, Phase 2) |
|   | Light Standard 250 Watt High Pressure Sodium Vapor Luminaire  |  |  | Flashing Beacon (Exst, Ppsd)                       |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|  | Light Standard 310 Watt High Pressure Sodium Vapor Luminaire  |  |  | Concrete Foundation (Exst, Ppsd)                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|  | Light Standard 400 Watt High Pressure Sodium Vapor Luminaire  |  |  | Pipe Mounted Flasher (Exst, Ppsd)                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|  | Light Standard 700 Watt High Pressure Sodium Vapor Luminaire  |  |  | Pad Mounted Feed Point (Exst, Ppsd)                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|  | Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire |  |  | Pipe Mounted Feed Point with Pad (Exst, Ppsd)      |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|  | Emergency Vehicle Detector                                    |  |  | Pole Mounted Feed Point (Exst, Ppsd)               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|  | Video Detection Camera                                        |  |  | Junction Box (Exst, Ppsd)                          |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|                                                                                     |                                                               |  |                                                                                       | Existing Pedestrian Head with Number               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|                                                                                     |                                                               |  |                                                                                       | Existing Signal Head                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|                                                                                     |                                                               |                                                                                       |  | Pole Mounted Head                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |
|                                                                                     |                                                               |  |                                                                                       | Existing Lighting Standard Pole                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                          |

|                                              |                   |
|----------------------------------------------|-------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                   |
| 07-01-14                                     |                   |
| REVISIONS                                    |                   |
| DATE                                         | CHANGE            |
| 12-18-20                                     | General Revisions |

KIRK J. HOFFMAN

REGISTERED PROFESSIONAL

Kirk J. Hoffman

|                                              |                   |
|----------------------------------------------|-------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                   |
| 07-01-14                                     |                   |
| REVISIONS                                    |                   |
| DATE                                         | CHANGE            |
| 12-18-20                                     | General Revisions |



12 18 2020

SYMBOLS

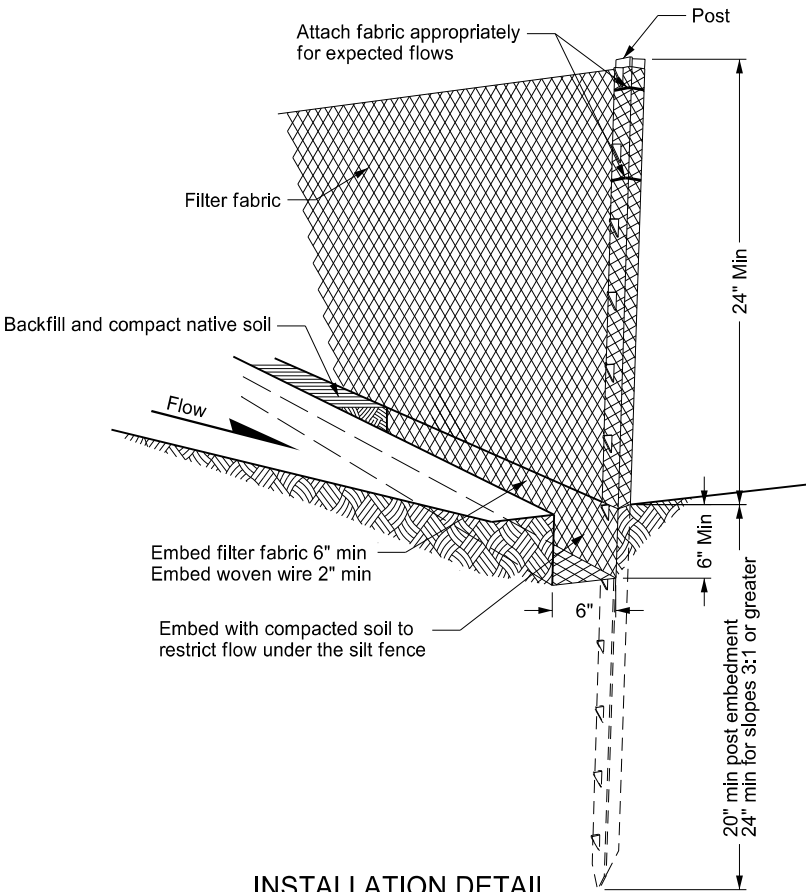
D-101-33

|  |  |  |                                                                                                    |  |                                                                                                  |
|--|--|--|----------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------|
|  |  |  | Existing Manhole (Electrical, Gas, Telephone)                                                      |  | Cap or Stub<br>Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water           |
|  |  |  | Water Manhole (Exst, Exst with Valve)                                                              |  | Existing Pedestal<br>Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined |
|  |  |  | Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)                                               |  | Existing Pipe Vent<br>Gas, Fuel, Sanitary, Storm Drain, Water, Undefined                         |
|  |  |  | Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)                                          |  | Valve<br>Exst Gas, Exst Water, Ppsd Water, Exst Undefined                                        |
|  |  |  | Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)                                 |  | Pump<br>Sanitary, Storm Drain, Exst Water                                                        |
|  |  |  | Force Main Storm Drain Manhole (Exst, Exst with Valve)                                             |  | Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)                               |
|  |  |  | Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)                                                       |  | Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)                            |
|  |  |  | Existing Water Appurtenance                                                                        |  | Existing Utility Marker                                                                          |
|  |  |  | Sprinkler Head (Exst, Ppsd)                                                                        |  | Existing Meter                                                                                   |
|  |  |  | Fire Hydrant (Exst, Ppsd)                                                                          |  | Existing Fuel Dispensers                                                                         |
|  |  |  | Cleanout (Exst Sanitary, Underdrain)                                                               |  | Existing Fuel Filler Pipes                                                                       |
|  |  |  | Existing Catch Basin Inlet (Round, Square)                                                         |  | Existing Fuel Leak Sensors                                                                       |
|  |  |  | Existing Curb Inlet (Round, Square)                                                                |  |                                                                                                  |
|  |  |  | Existing Slotted Reinforced Concrete Pipe                                                          |  |                                                                                                  |
|  |  |  | Catch Basin (Riser 30 Inch, Beehive, Type A)                                                       |  |                                                                                                  |
|  |  |  | Inlet Mountable Curb (Type A, Type B)                                                              |  |                                                                                                  |
|  |  |  | Inlet Saddle Base (Type 1, Type 2)                                                                 |  |                                                                                                  |
|  |  |  | Inlet Special (Catch Basin, Type 1, Type A)                                                        |  |                                                                                                  |
|  |  |  | Inlet (Tee, Type 1, Type 2, Type 2 Double)                                                         |  |                                                                                                  |
|  |  |  | Median Drain                                                                                       |  |                                                                                                  |
|  |  |  | Headwall (Exst, Ppsd, Ppsd Single with Vegetation Barrier,<br>Ppsd Double with Vegetation Barrier) |  |                                                                                                  |

|                                              |                                                               |
|----------------------------------------------|---------------------------------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                               |
| 07-01-14                                     |                                                               |
| REVISIONS                                    |                                                               |
| DATE                                         | CHANGE                                                        |
| 12-18-20                                     | General Revisions<br>Sheet added<br>- Continued from D-101-32 |

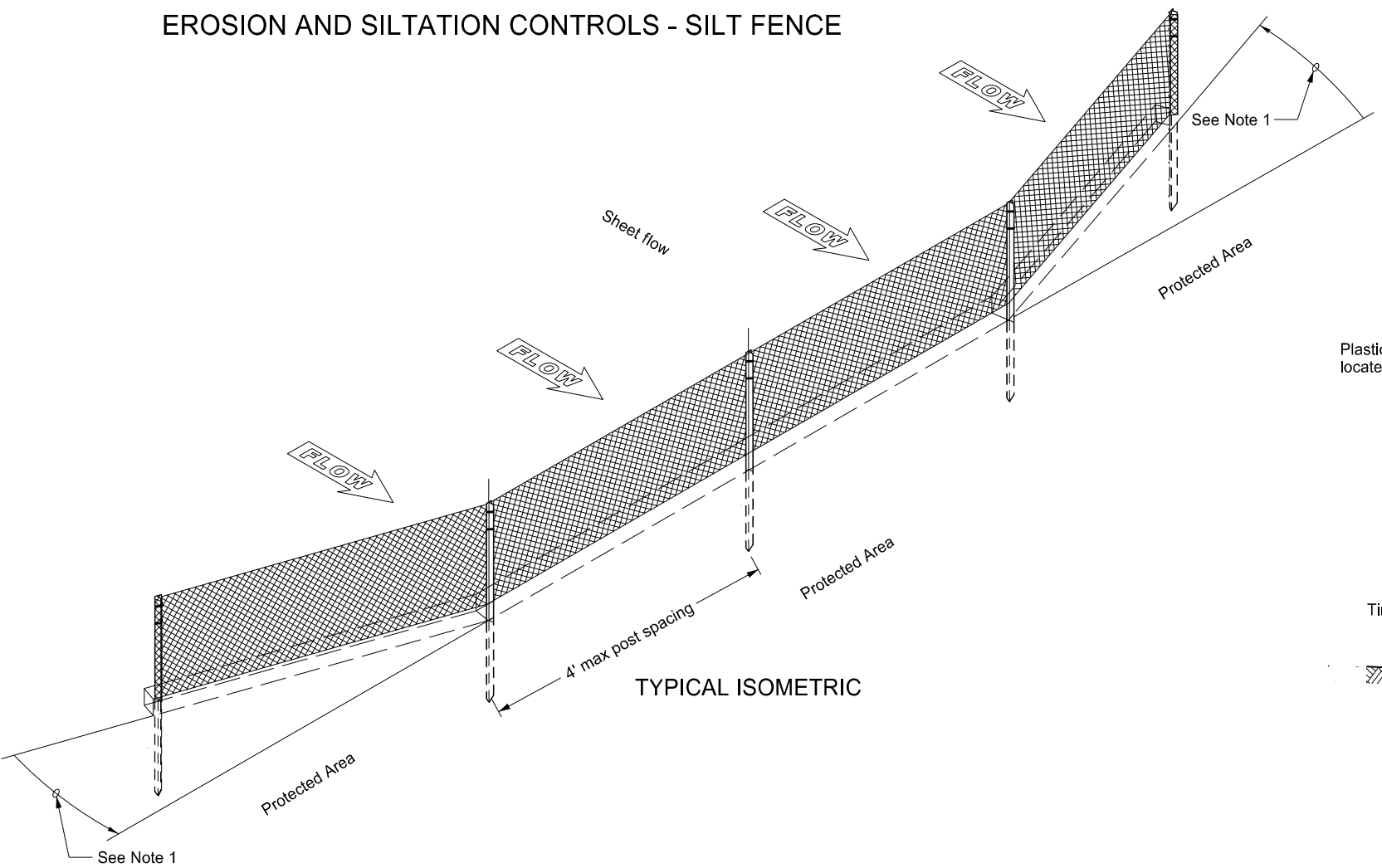
KIRK J. HOFF  
REGISTERED  
PROFESSIONAL  
PE-4683  
ENGINEER  
NORTH DAKOTA  
12 18 2020

EROSION AND SILTATION CONTROLS - SILT FENCE

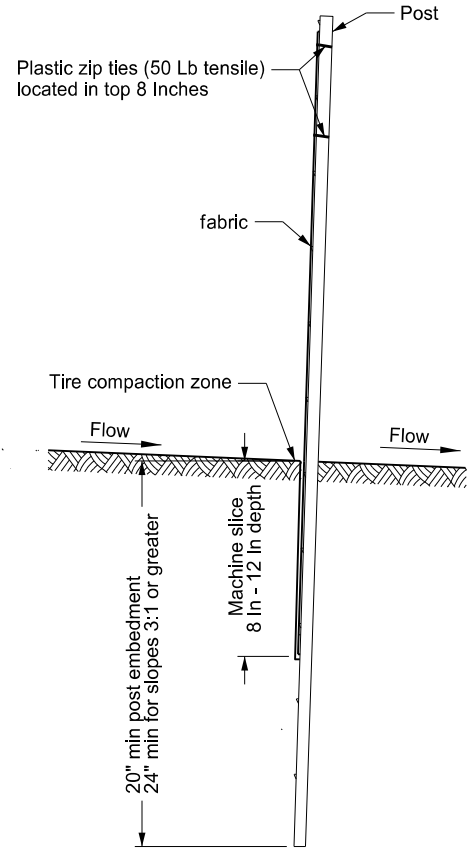


INSTALLATION DETAIL

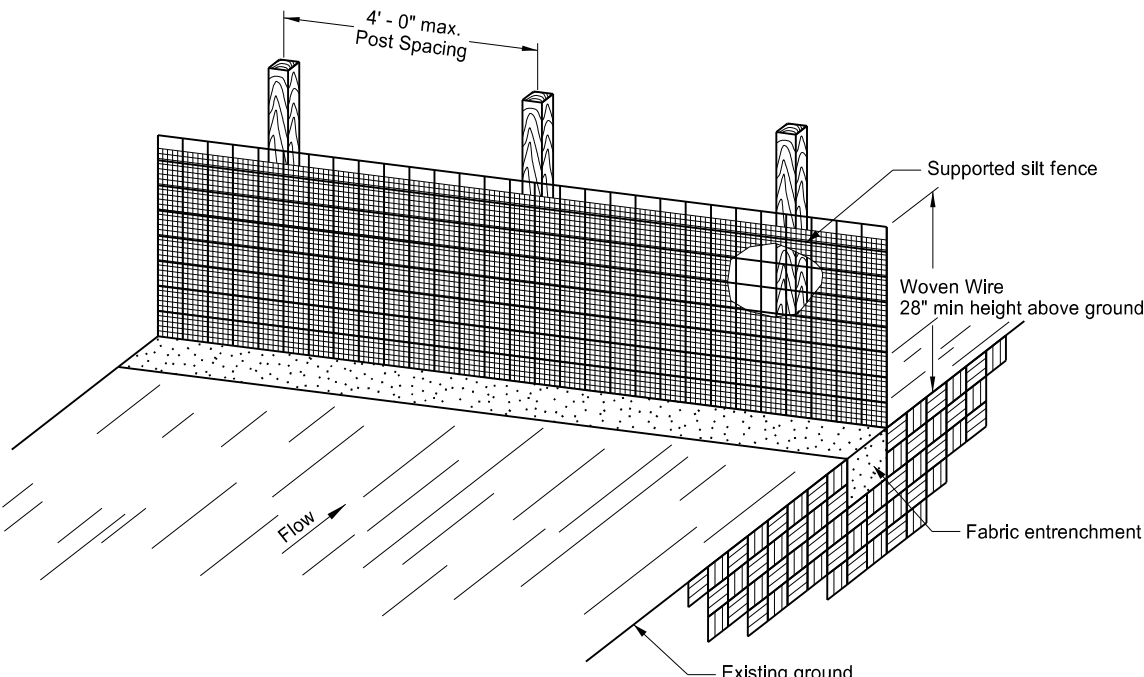
Minimize disturbance of ground around trench and smooth surface after excavation to avoid concentrating flows. Compact to prevent undercutting flows.



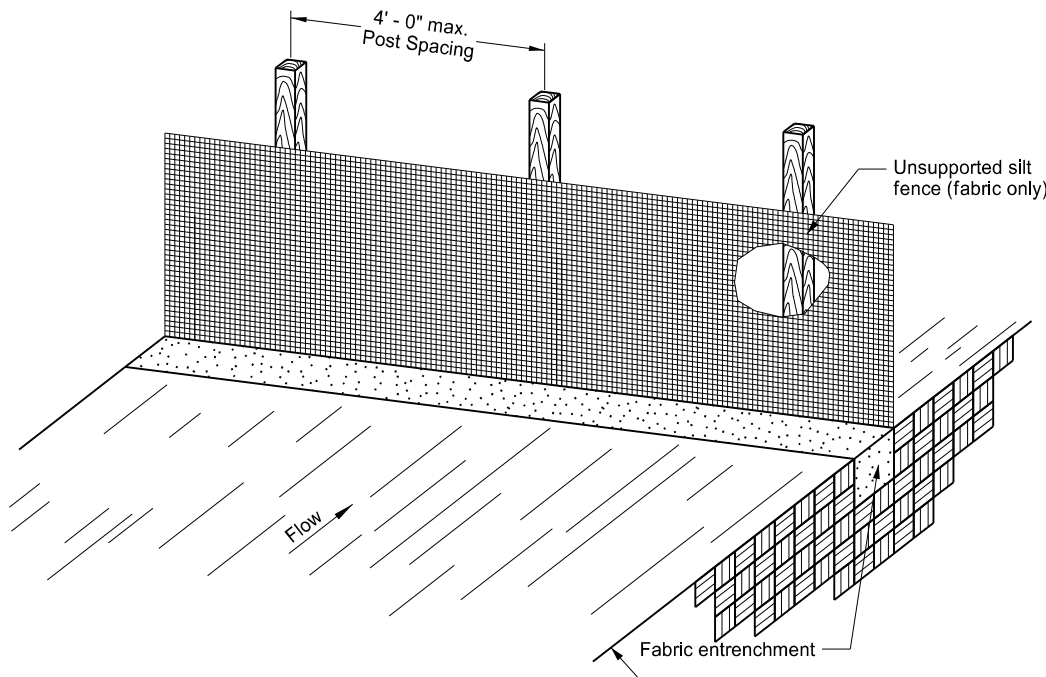
TYPICAL ISOMETRIC



MACHINE SLICED SILT FENCE



SILT FENCE SUPPORTED



SILT FENCE UNSUPPORTED

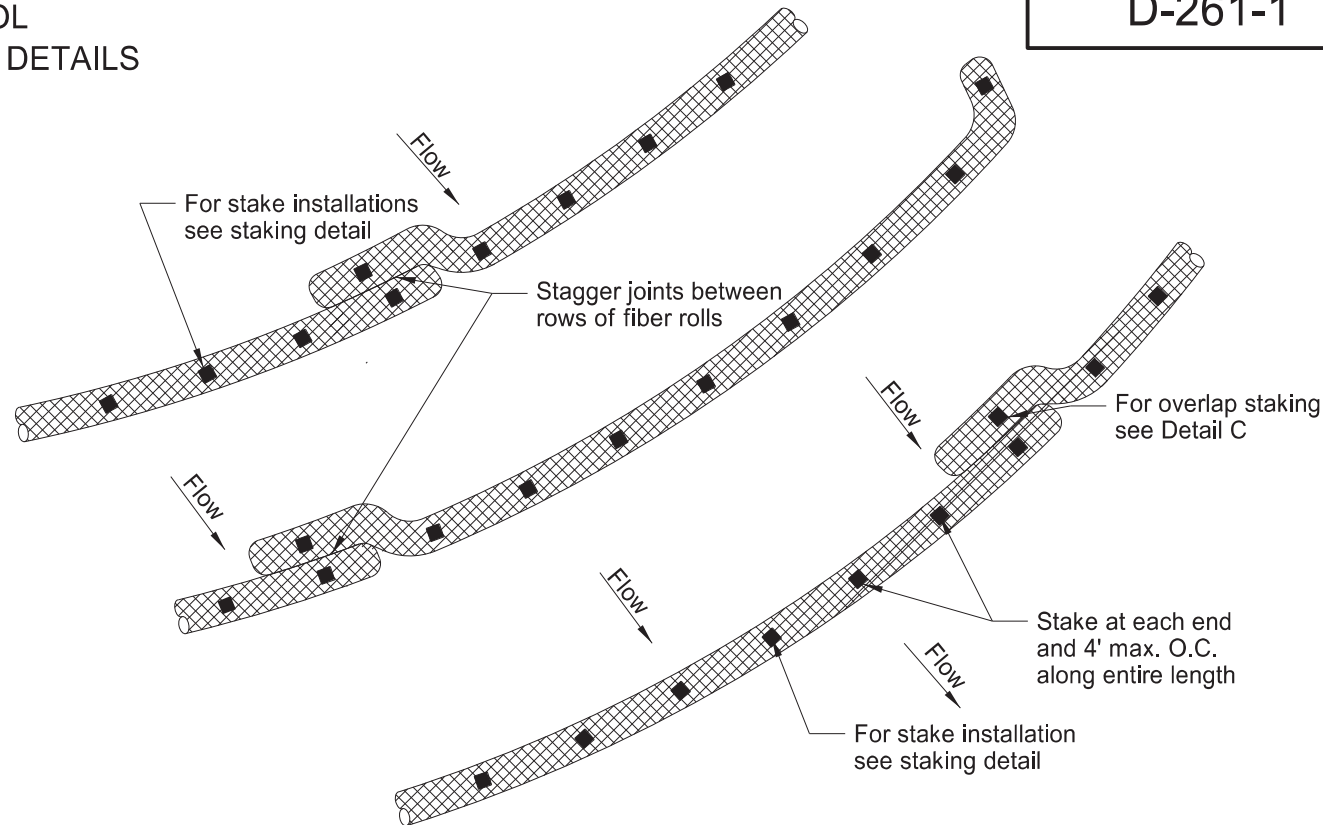
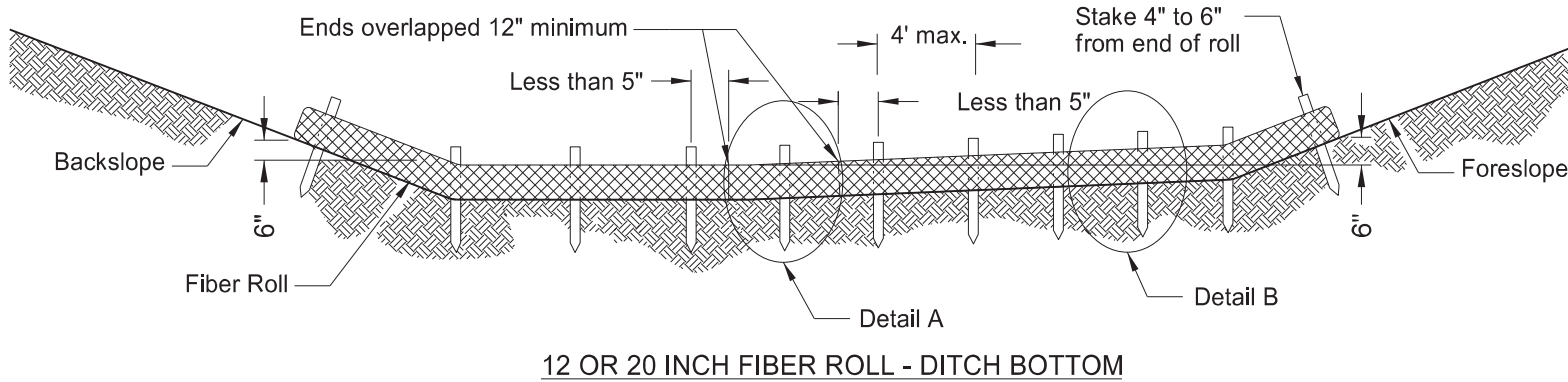
- NOTES:
- 1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
  - 2. Place splices outside low spots.
  - 3. Install silt fencing parallel to contour lines.
  - 4. Do not embed silt fence when placed in standing water.
  - 5. Silt fence material does not need to reach the top of woven wire support.

|                                              |                                                                    |
|----------------------------------------------|--------------------------------------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                    |
| 10-03-13                                     |                                                                    |
| REVISIONS                                    |                                                                    |
| DATE                                         | CHANGE                                                             |
| 06-26-14                                     | Standard drawing resulted from splitting standard D-708-2.         |
| 06-27-16<br>08-27-19                         | Revised details & added new ones.<br>New Design Engineer PE Stamp. |

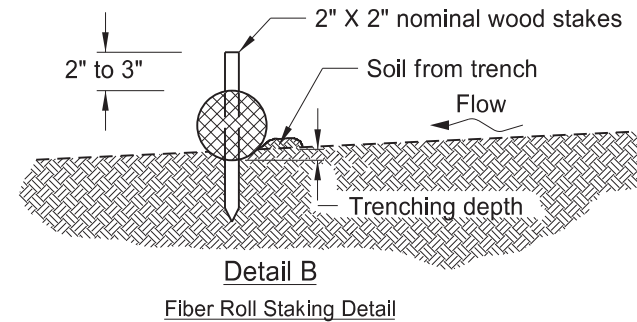
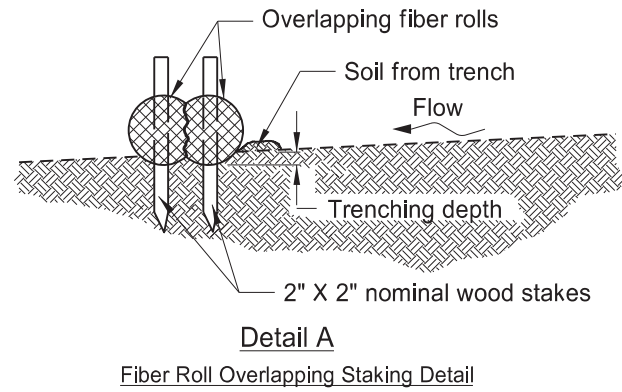
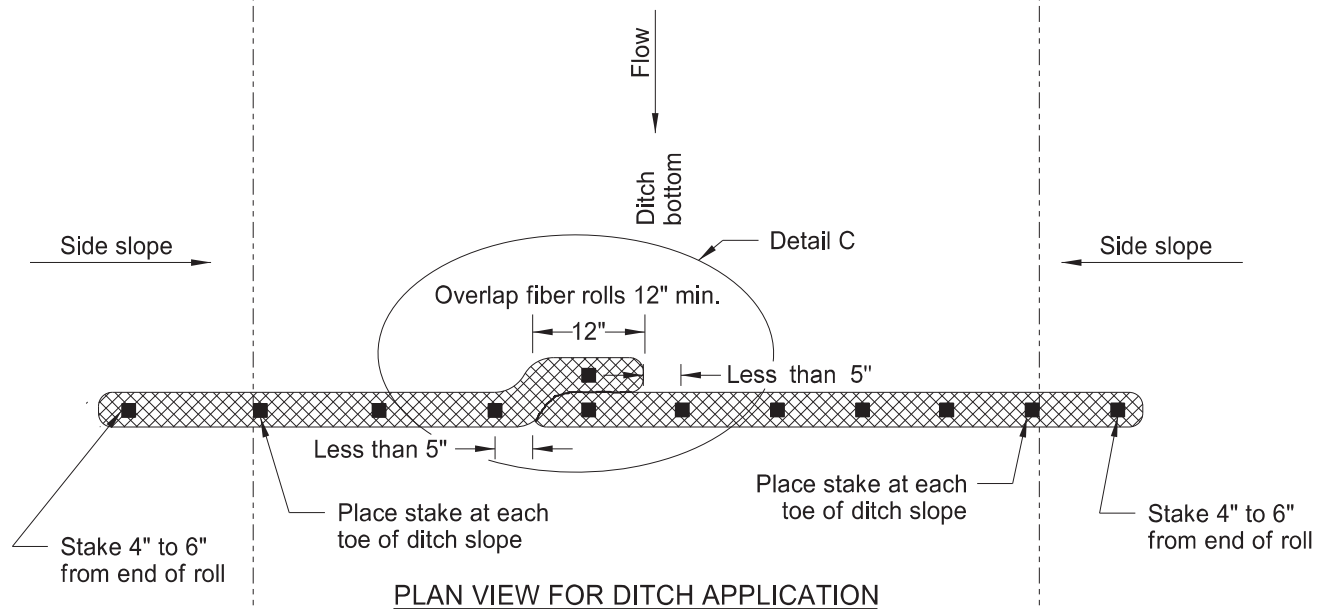
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EROSION CONTROL  
FIBER ROLL PLACEMENT DETAILS

D-261-1



PLAN VIEW FOR SLOPE APPLICATION  
Ensure fiber rolls are placed along the contours of the slope.



| 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.

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|----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 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.                                                  |
| 08-27-19                                     | New Design Engineer PE Stamp                                                                              |
| 04-22-24                                     | Slope Plan View-Overlap Change.                                                                           |

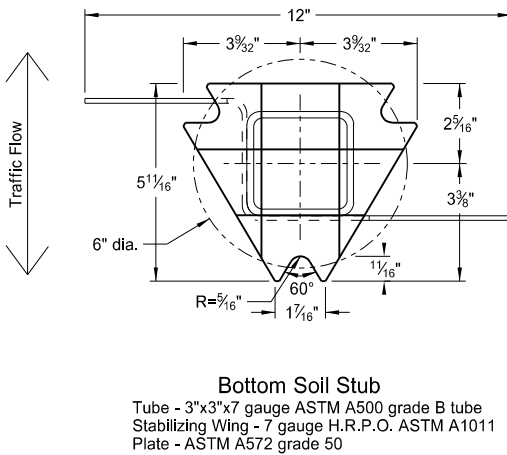
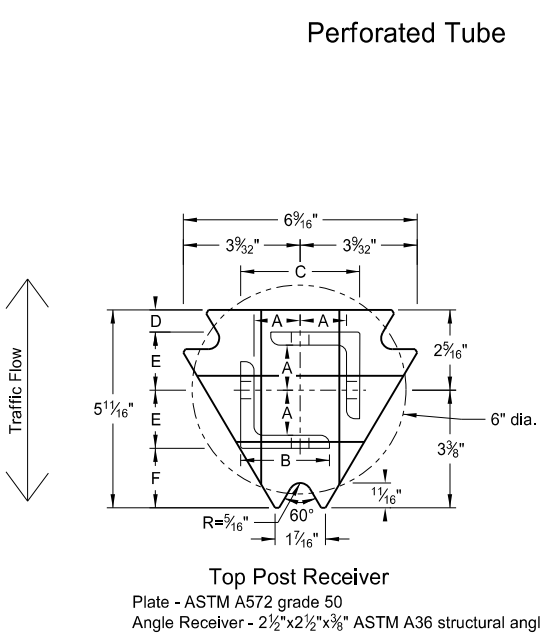
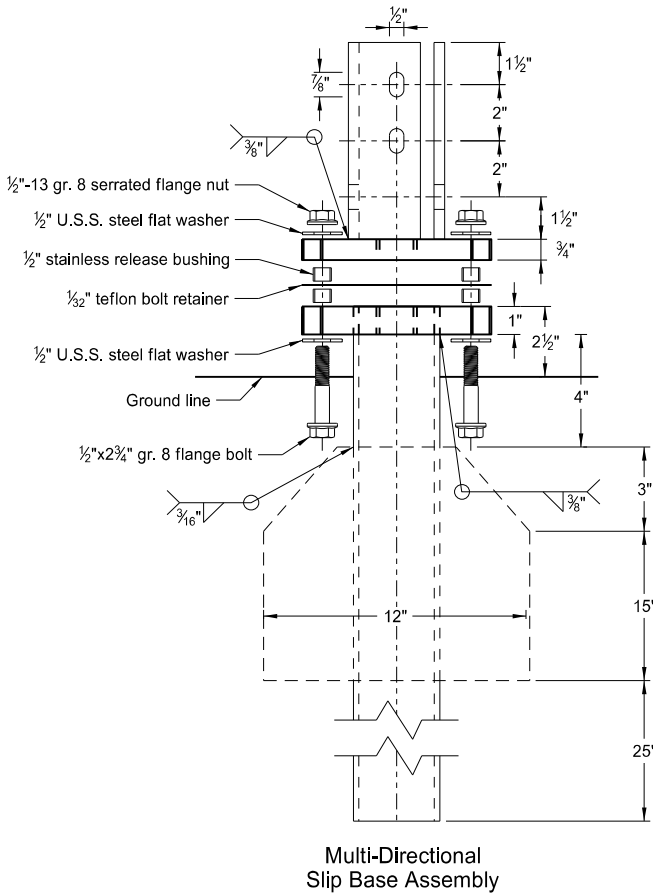


04/22/24

Perforated Tube

Notes:

1. Torque slip base bolts as specified by manufacturer.
2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
4. In concrete sidewalk, use same anchor without wings.
5. Provide more than 7' between the first and fourth posts of a four post sign.

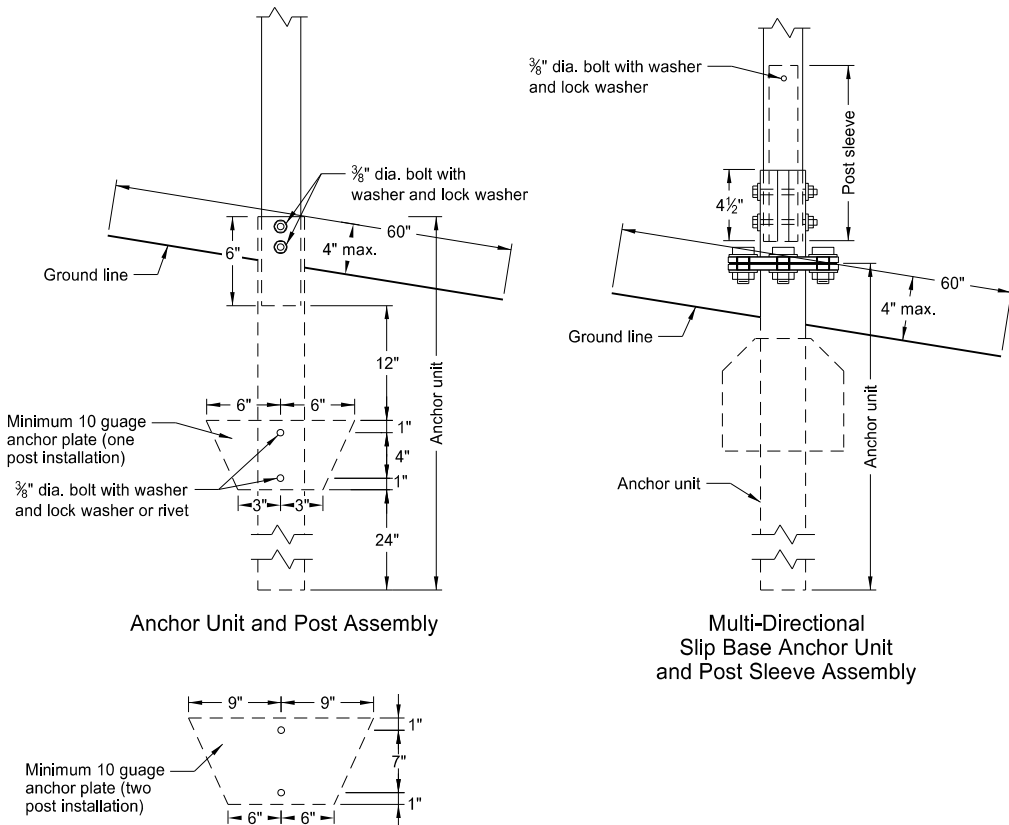


| Telescoping Perforated Tube |               |                       |                 |                       |           |                                   |
|-----------------------------|---------------|-----------------------|-----------------|-----------------------|-----------|-----------------------------------|
| Number of Posts             | Post Size in. | Wall Thick-ness Gauge | Sleeve Size in. | Wall Thick-ness 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. <sup>4</sup> | Cross Sec. Area in. <sup>2</sup> | Section Modulus in. <sup>3</sup> |
| 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 3/8 x 2 3/8                             | 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 5/16" | 2 1/2" | 3 1/2"  | 2 5/32" | 1 33/64" | 1 7/8" |
| 2 1/2"x10 ga.                | 1 5/32" | 2 1/2" | 3 5/16" | 5/8"    | 1 21/32" | 1 3/4" |

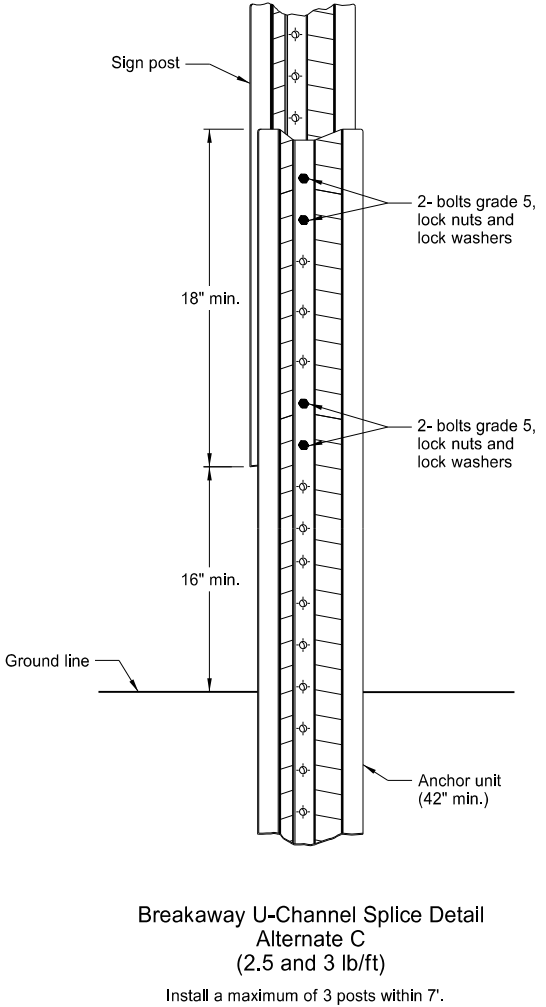
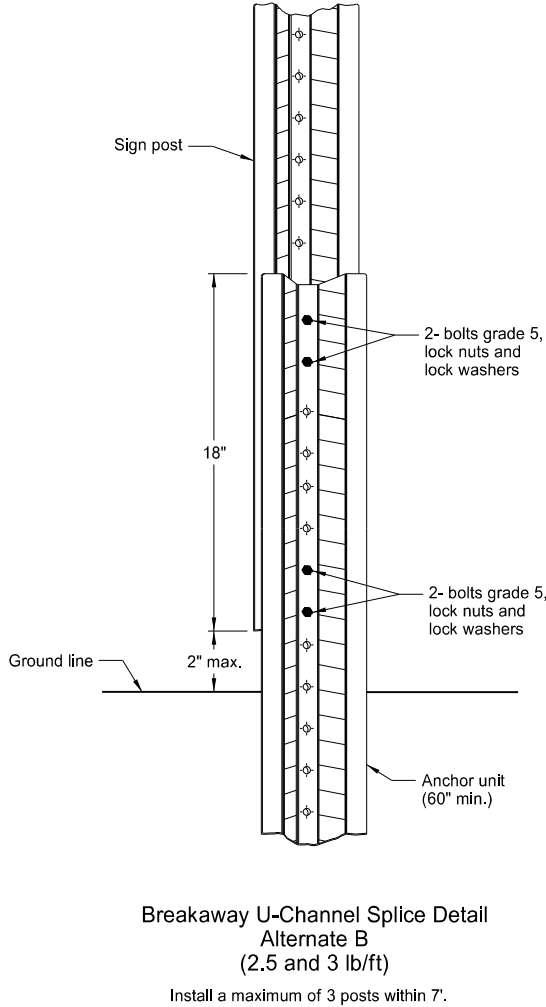
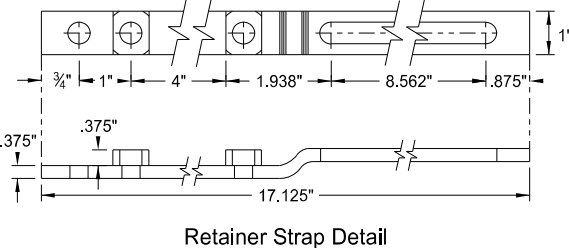
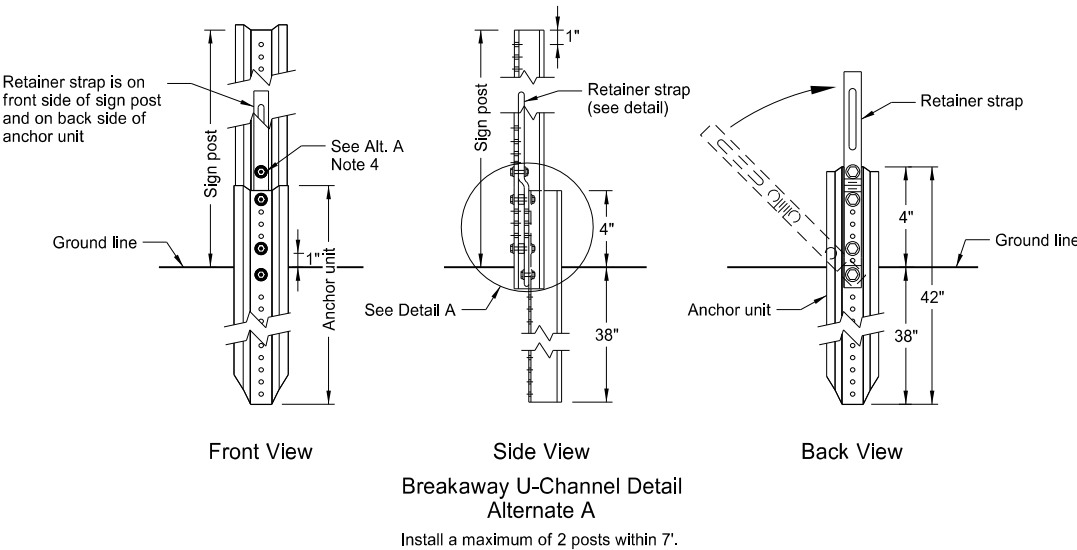
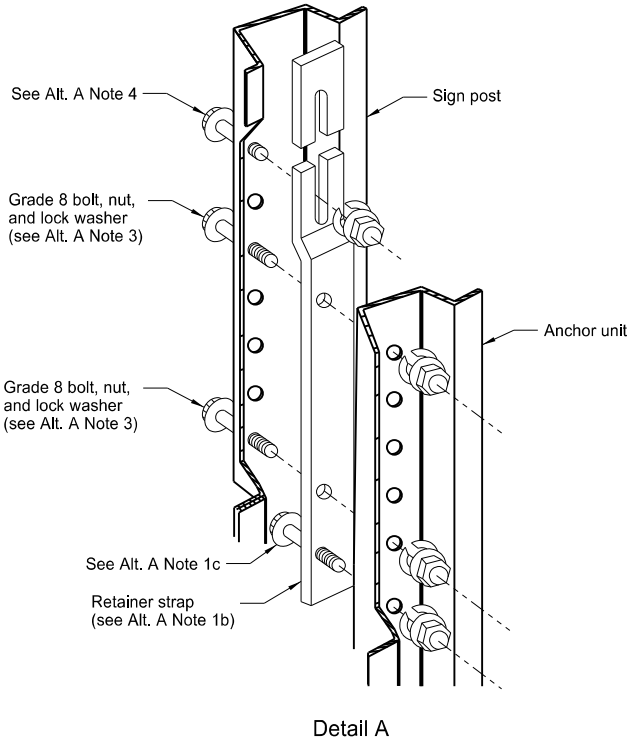
- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/8"x10 ga. into 2 1/2"x10 ga.



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| 2-28-14                                      |                                                     |
| REVISIONS                                    |                                                     |
| DATE                                         | CHANGE                                              |
| 9-27-17<br>10-03-19                          | Updated to active voice<br>New Design Engr PE Stamp |

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U-Channel Post



Alternate A Steps of Installation:

- a) Drive anchor unit to within 12" of ground level.  
b) Establish proper assembly by lining up bottom hole of retainer strap with 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.
- a) Drive anchor unit to 4" above ground.  
b) Rotate strap to vertical position.
- 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.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- Properly nest base post, strap, and sign post. 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.

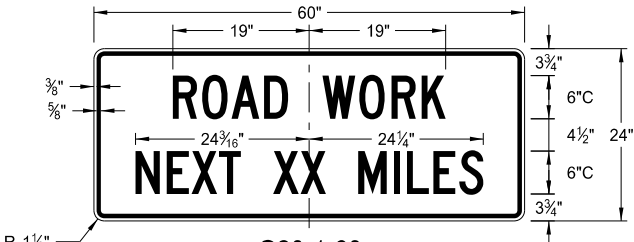
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|----------------------------------------------|-----------------------------------------------------|
| 2-28-14                                      |                                                     |
| REVISIONS                                    |                                                     |
| DATE                                         | CHANGE                                              |
| 9-27-17<br>10-03-19                          | Updated to active voice<br>New Design Engr PE Stamp |

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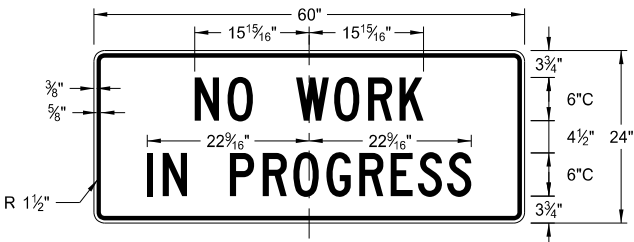


CONSTRUCTION SIGN DETAILS  
TERMINAL AND GUIDE SIGNS

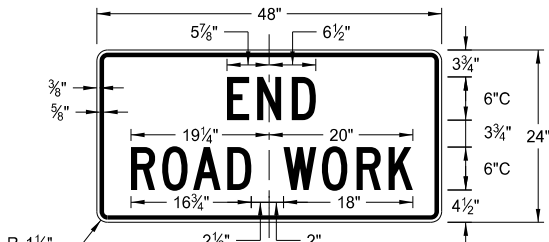
D-704-9



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



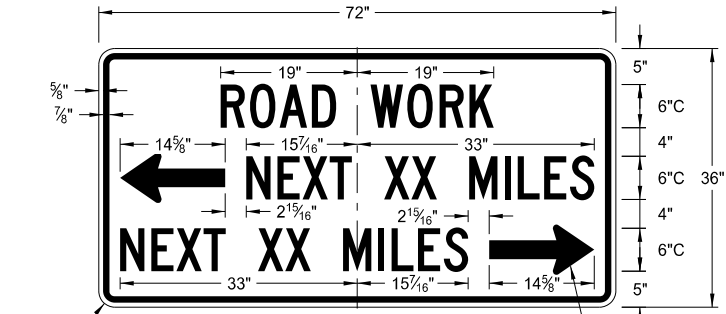
G20-1b-60  
Legend: black (non-refl)  
Background: orange



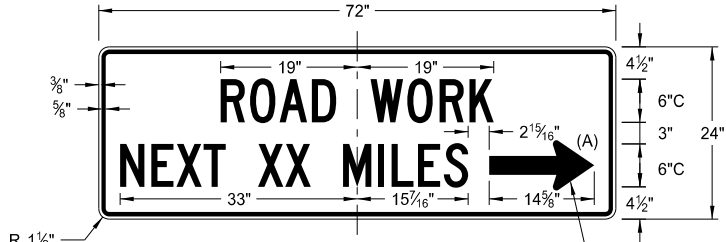
G20-2-48  
Legend: black (non-refl)  
Background: orange



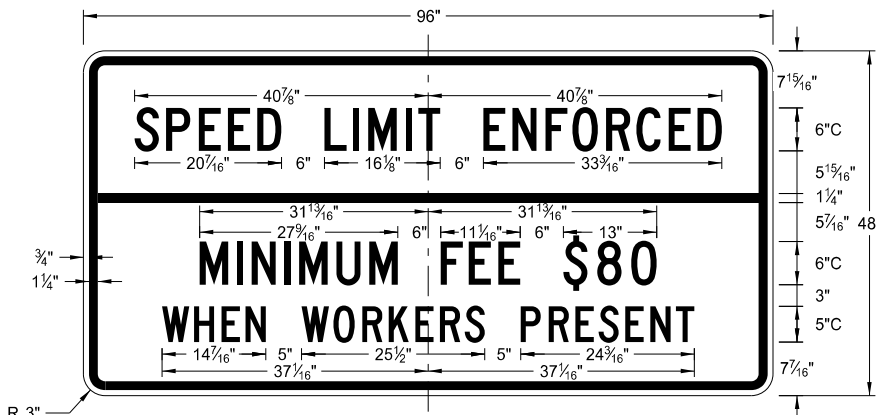
G20-4b-36  
Legend: black (non-refl)  
Background: orange



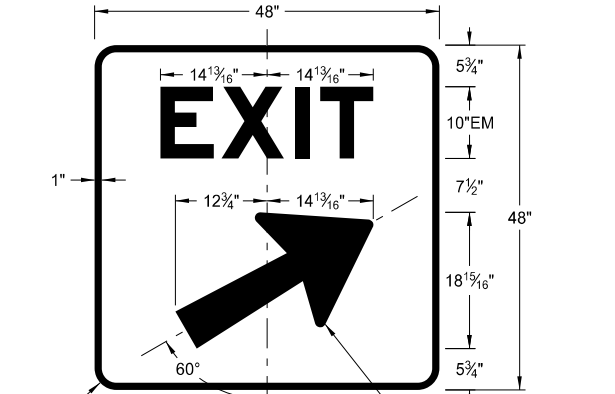
G20-50a-72  
Legend: black (non-refl)  
Background: orange



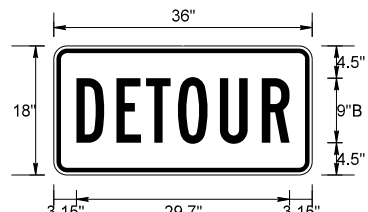
G20-52a-72  
Legend: black (non-refl)  
Background: orange



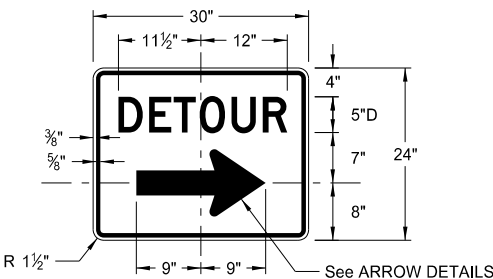
G20-55-96  
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Background: orange



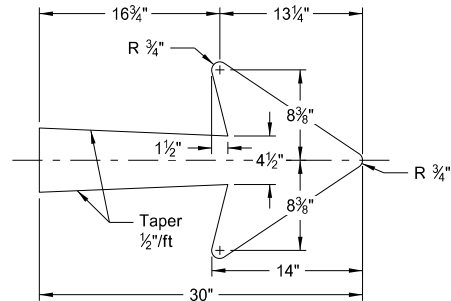
E5-1(L or R)-48  
Legend: white  
Background: green (orange optional)



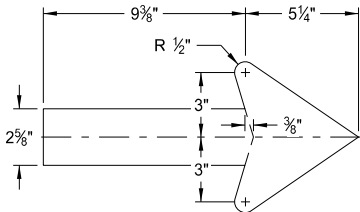
M4-8-36  
Legend: black (non-refl)  
Background: orange



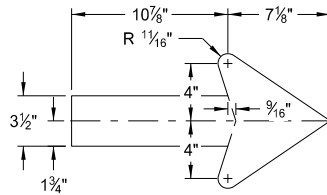
M4-9(L or R)-30 & M4-9-30  
Legend: black (non-refl)  
Background: orange



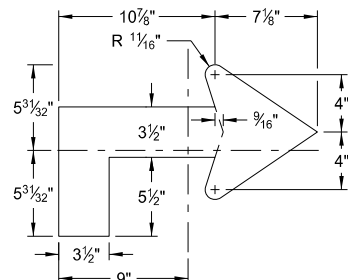
E5-1-48



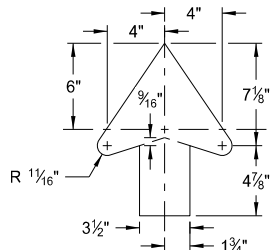
G20-50a-72  
G20-52a-72



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



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



M4-9-30  
Straight

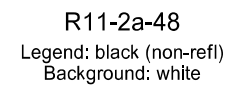
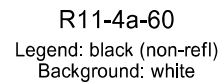
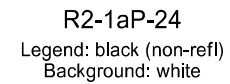
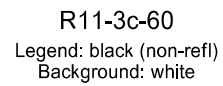
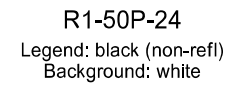
ARROW DETAILS

NOTES:

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

|                                              |                                                               |
|----------------------------------------------|---------------------------------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                               |
| 8-13-13                                      |                                                               |
| REVISIONS                                    |                                                               |
| DATE                                         | CHANGE                                                        |
| 8-17-17<br>10-03-19                          | Added sign & background color<br>New Design Engineer PE Stamp |

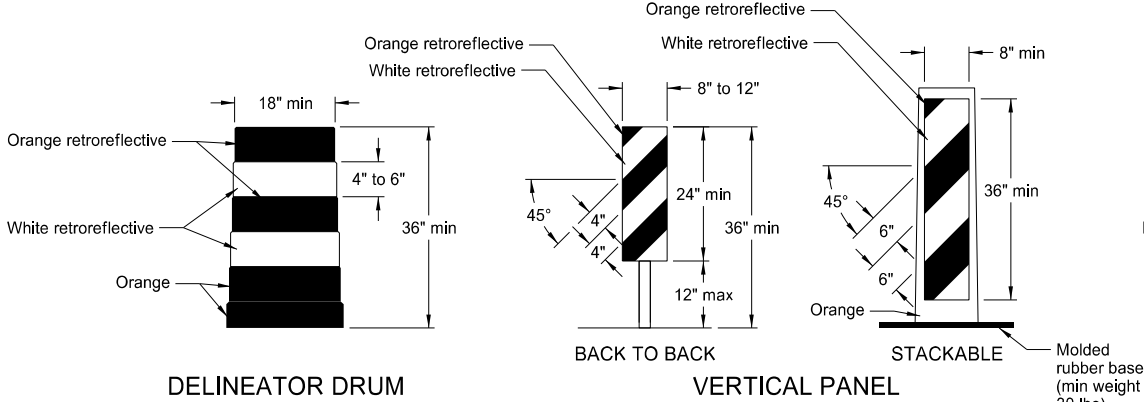
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| 8-13-13                                      |                                                     |
| REVISIONS                                    |                                                     |
| DATE                                         | CHANGE                                              |
| 8-17-17<br>10-03-19                          | Revised sign number<br>New Design Engineer PE Stamp |

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 Registration Number  
**PE- 4683 ,**  
 on 10/03/19 and the original document is stored at the  
 North Dakota Department  
 of Transportation

BARRICADE AND CHANNELIZING DEVICE DETAILS



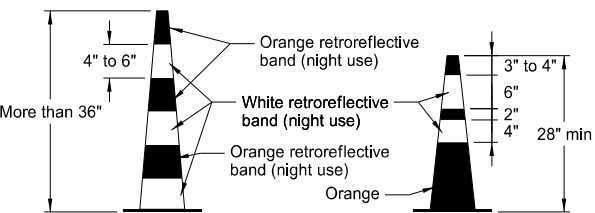
DELINEATOR DRUM

VERTICAL PANEL

STACKABLE  
Molded rubber base (min weight 30 lbs)

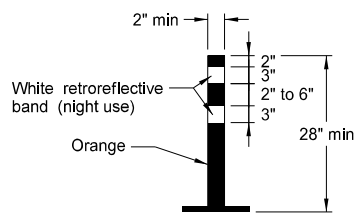
Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with 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, use a stripe width of 6 inches.



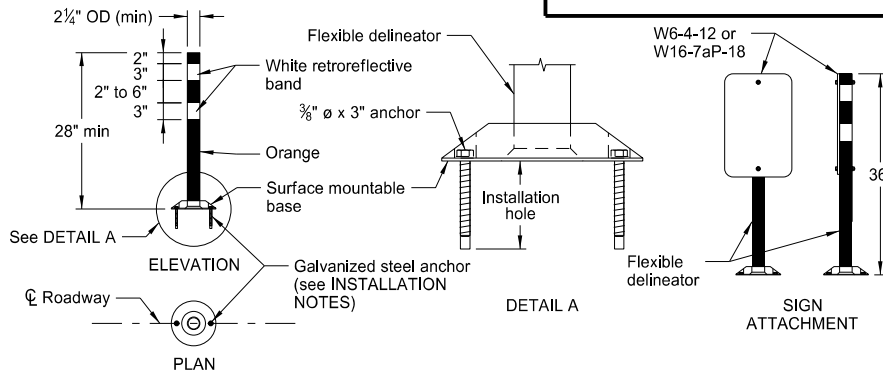
TRAFFIC CONE

Provide retroreflectORIZATION of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectORIZED space between the orange and white stripes.



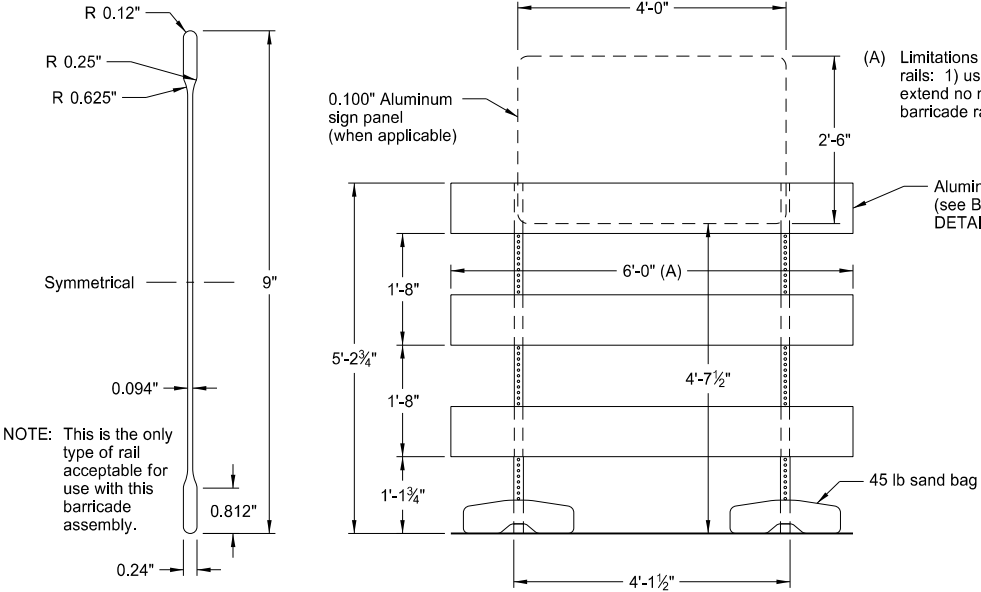
TUBULAR MARKER

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



FLEXIBLE DELINEATOR

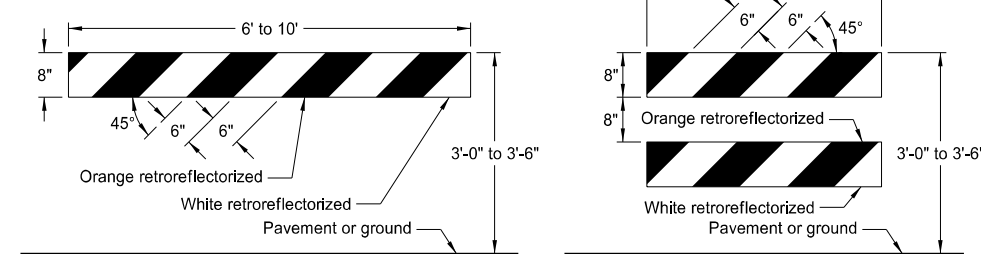
- INSTALLATION NOTES:
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
  2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
  3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl.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



BARRICADE BLADE DETAIL

ELEVATION VIEW  
BARRICADE ASSEMBLY DETAIL  
(Aluminum Barricade Rails)

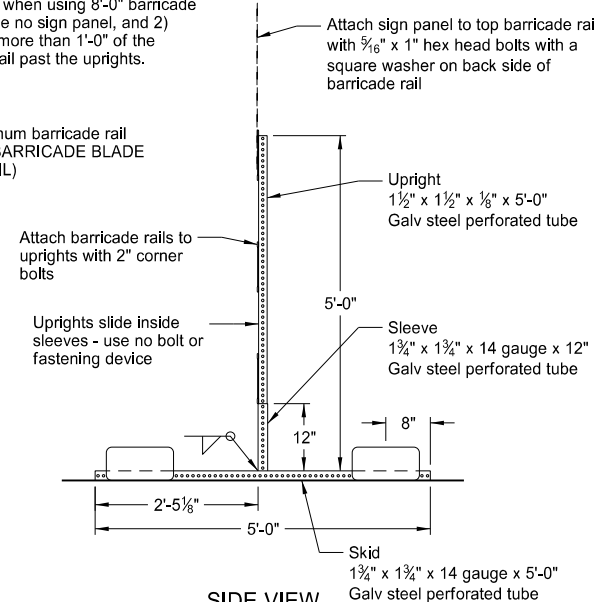
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", use a rail stripe width of 4".



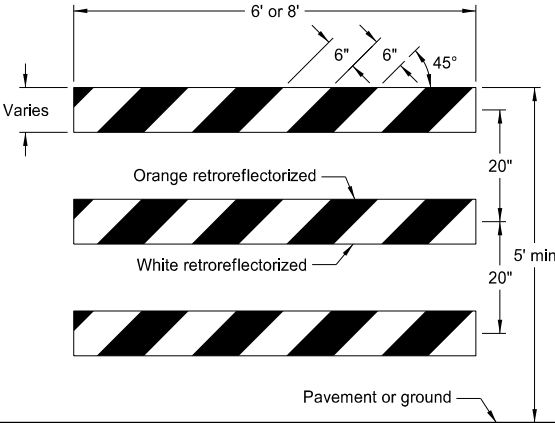
TYPE I BARRICADE

TYPE II BARRICADE

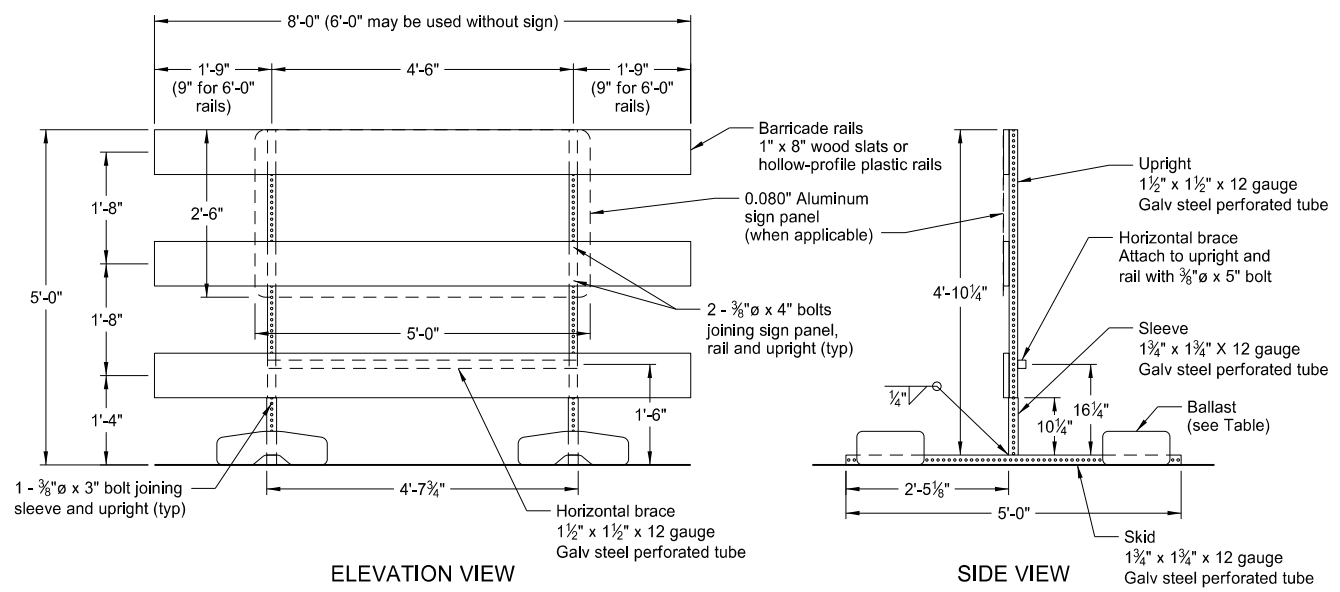
BARRICADE RAIL DETAILS



SIDE VIEW



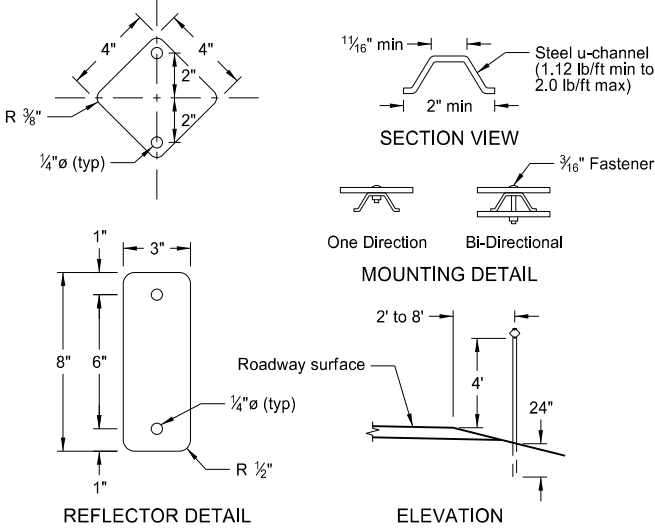
TYPE III BARRICADE



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL  
(Wood or Plastic Rails)

SIDE VIEW



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST  
(For each side of barricade support)

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

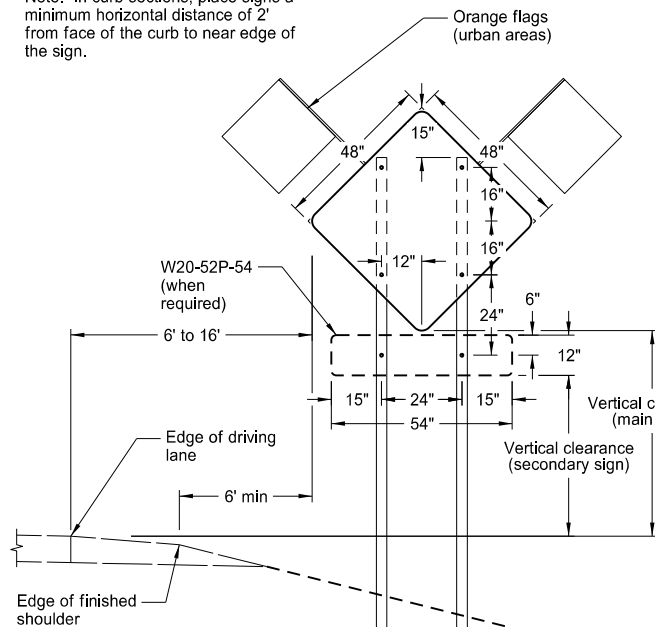
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

|                                              |                                                                       |
|----------------------------------------------|-----------------------------------------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                       |
| 10-3-13                                      |                                                                       |
| REVISIONS                                    |                                                                       |
| DATE                                         | CHANGE                                                                |
| 9-27-17<br>11-01-19                          | Updated to active voice<br>Revised details for Flexible<br>Delineator |

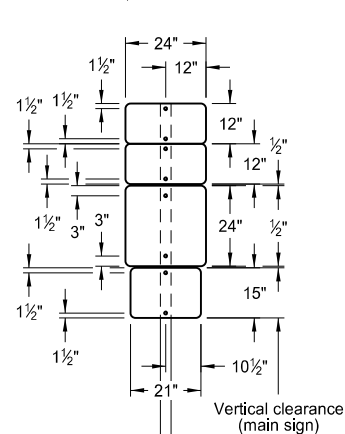
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

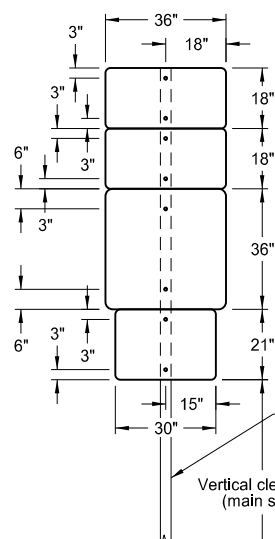
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



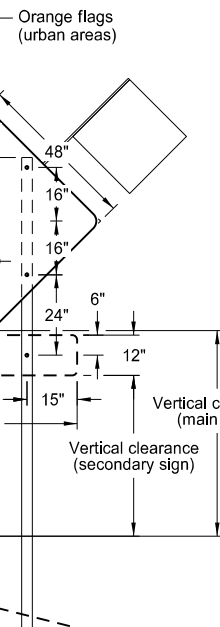
TYPICAL SECTION  
(48" x 48" diamond warning sign shown)



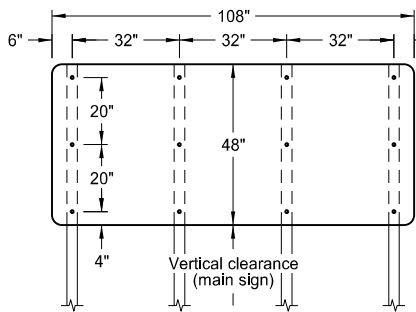
24" x 24"  
ROUTE MARKER  
ASSEMBLY



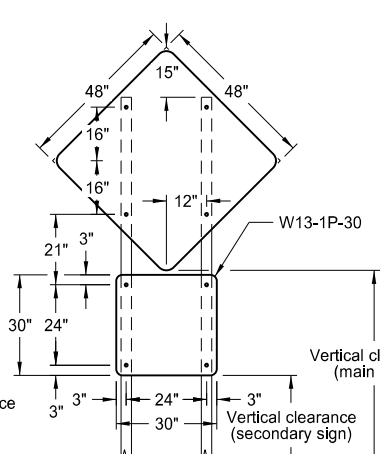
36" x 36"  
ROUTE MARKER  
ASSEMBLY



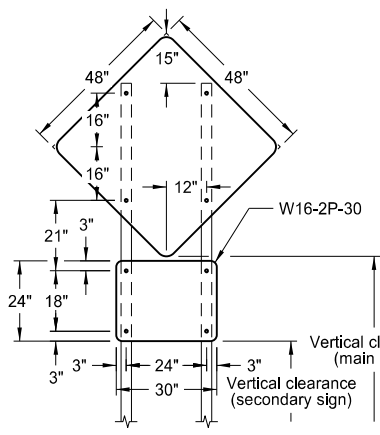
18" x 18"  
DIAMOND SIGN



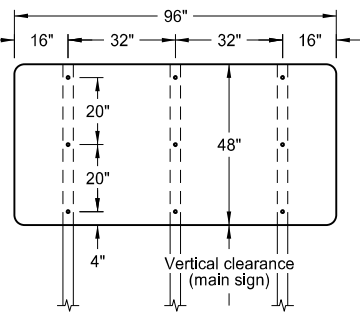
108" x 48" SIGN



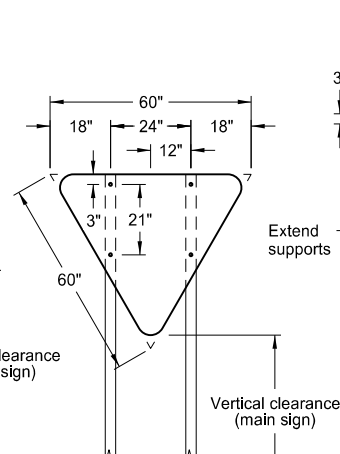
48" x 48" DIAMOND SIGN  
(with 30" x 30" secondary sign)



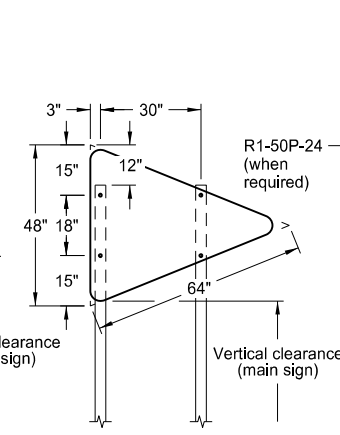
48" x 48" DIAMOND SIGN  
(with 30" x 24" secondary sign)



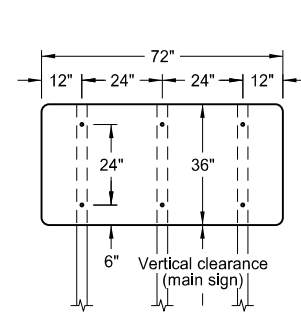
96" x 48" SIGN



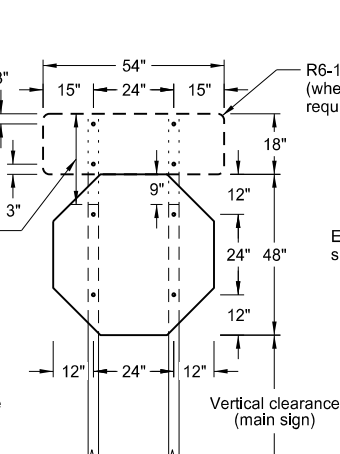
R1-2-60 - YIELD SIGN



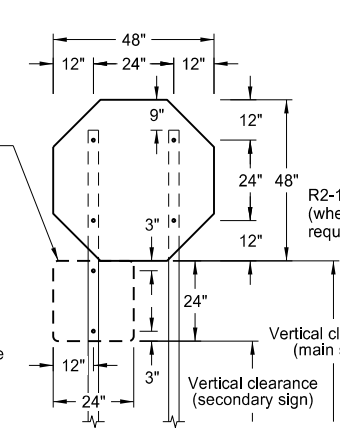
W14-3-64 - PENNANT SIGN



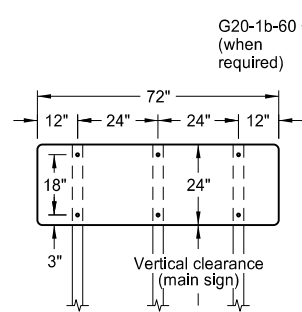
72" x 36" SIGN



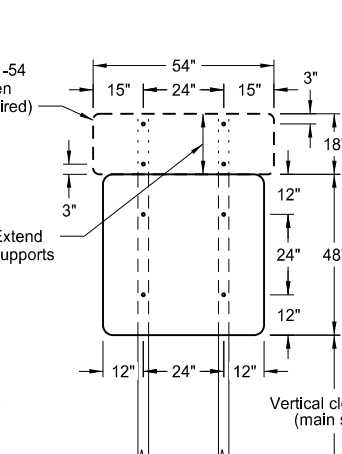
R1-1-48 - STOP SIGN  
(with R6-1-54 sign as required)



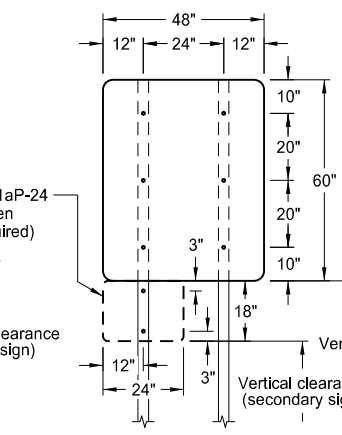
R1-1-48 - STOP SIGN  
(with R1-50P-24 sign as required)



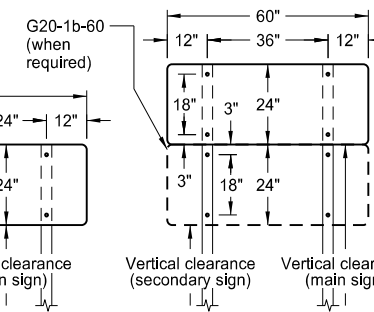
72" x 24" SIGN



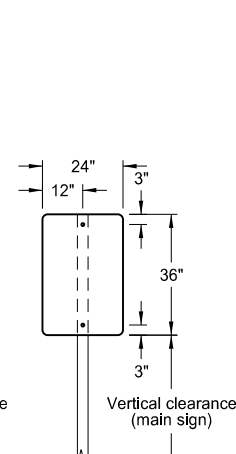
48" x 48" SIGN  
(with R6-1-54 sign as required)



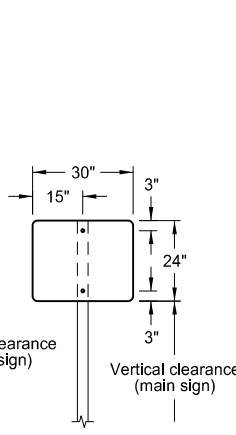
48" x 48" SIGN  
(with R2-1aP-24 sign as required)



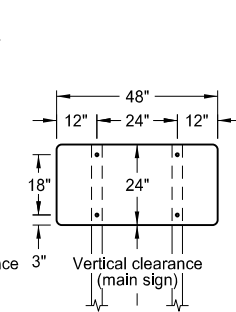
60" x 24" SIGN



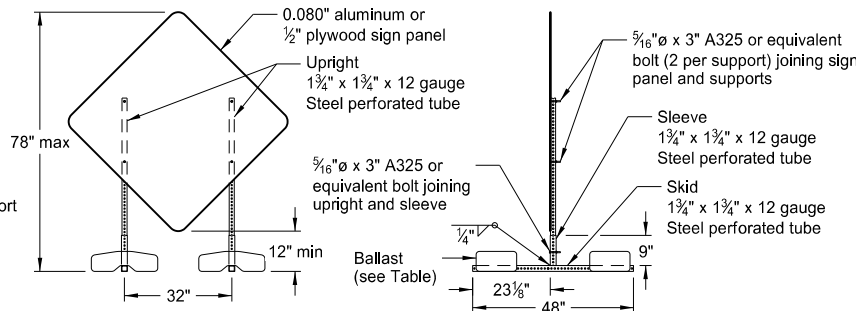
24" x 36" SIGN



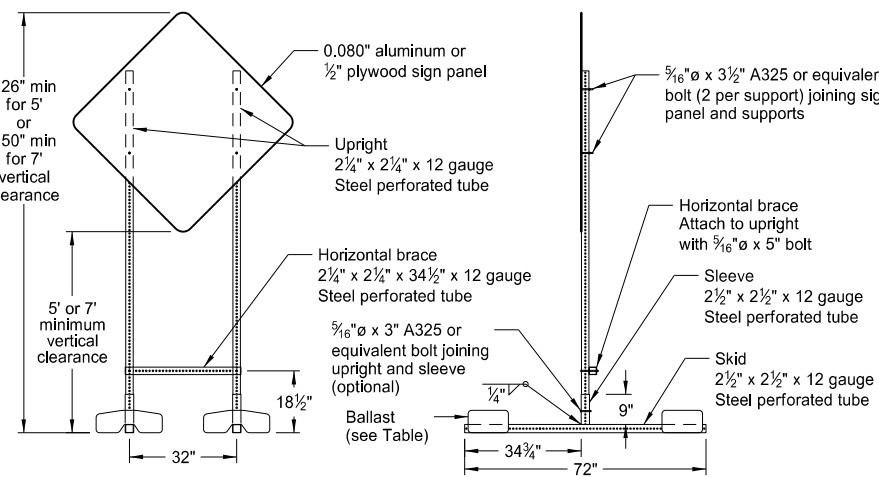
30" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT  
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT  
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Galvanize or paint supports. 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, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.  
  
Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.  
  
Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
4. 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

5. 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 stated above.

Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

6. Portable Signs: Provide portable signs that meet the vertical clearance stated above when it is necessary to place signs within the pavement surface.

Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed 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. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to 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                                              |

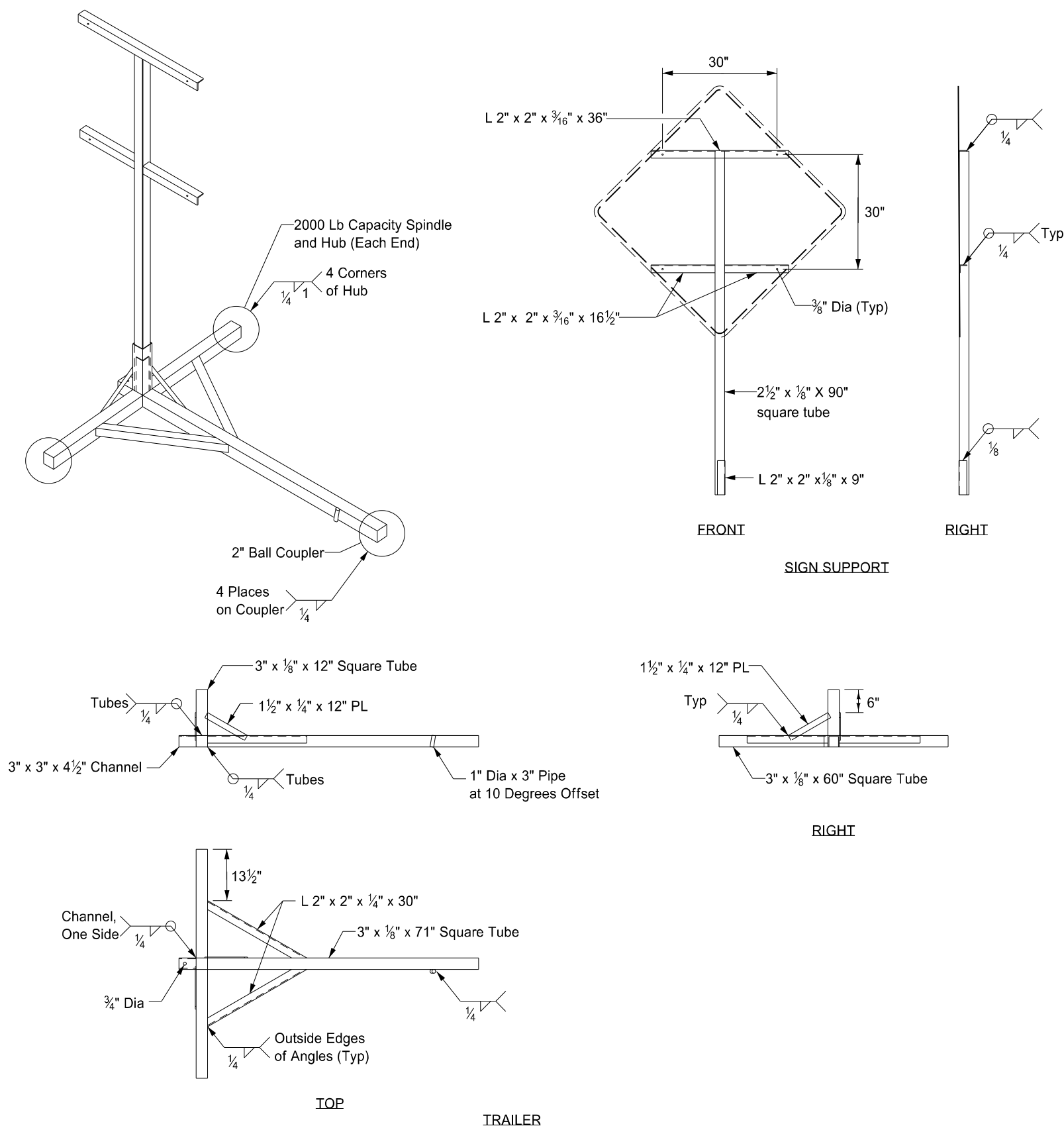
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                             |
|----------------------------------------------|-----------------------------|
| 10-4-13                                      |                             |
| REVISIONS                                    |                             |
| DATE                                         | CHANGE                      |
| 11-14-13                                     | Revised Note 6              |
| 9-27-17                                      | Updated to active voice     |
| 11-01-19                                     | Revised 60"x24" sign detail |

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PE-4683,  
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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

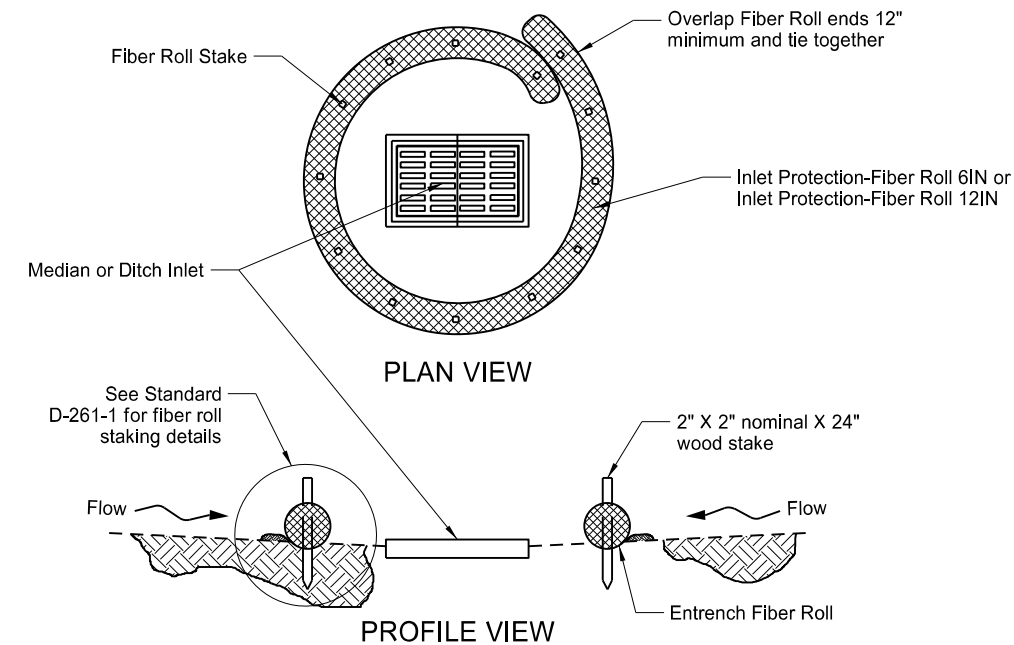


- Notes:
- 1. Maximum 250 pound weight of assembly.
  - 2. Use a 14" wheel and tire.
  - 3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
  - 4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

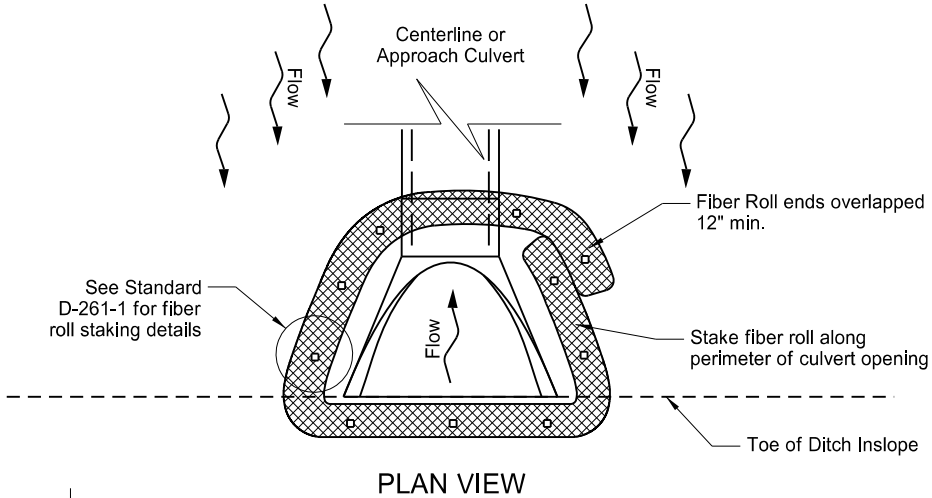
|                                              |                               |
|----------------------------------------------|-------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                               |
| 11-23-10                                     |                               |
| REVISIONS                                    |                               |
| DATE                                         | CHANGE                        |
| 12/02/2020                                   | Updated Note to active voice. |



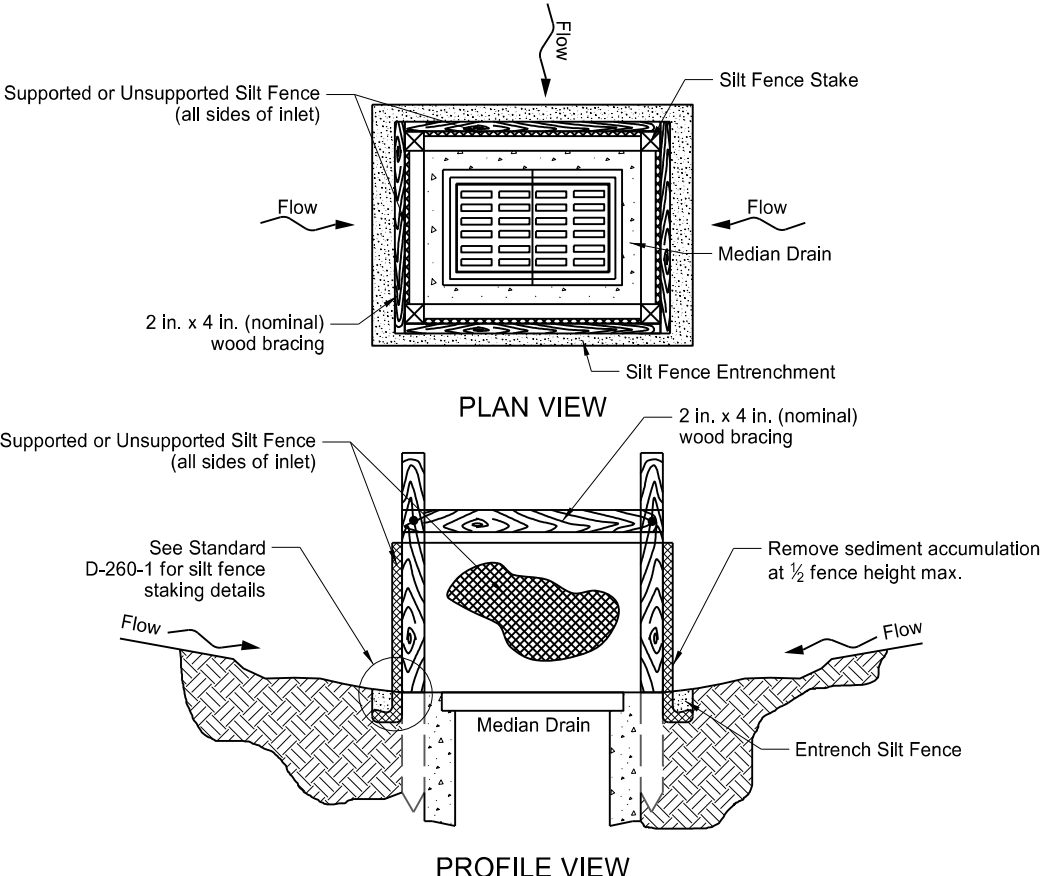
EROSION AND SILTATION CONTROLS  
MEDIAN OR DITCH INLET PROTECTION



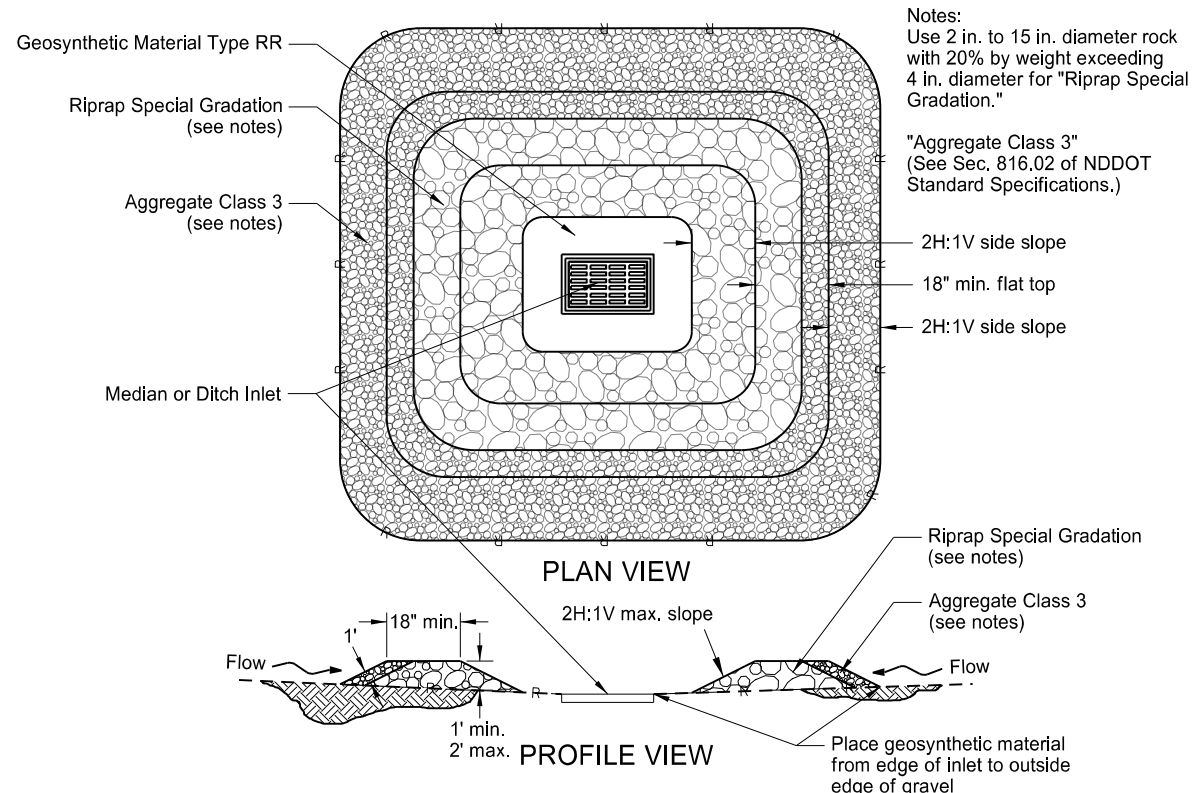
FIBER ROLL PROTECTION  
(MEDIAN OR DITCH INLET)



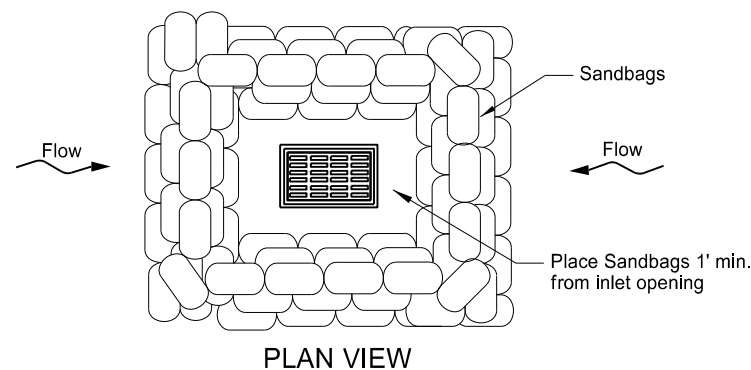
FIBER ROLL PROTECTION  
(INLET OF CULVERT)



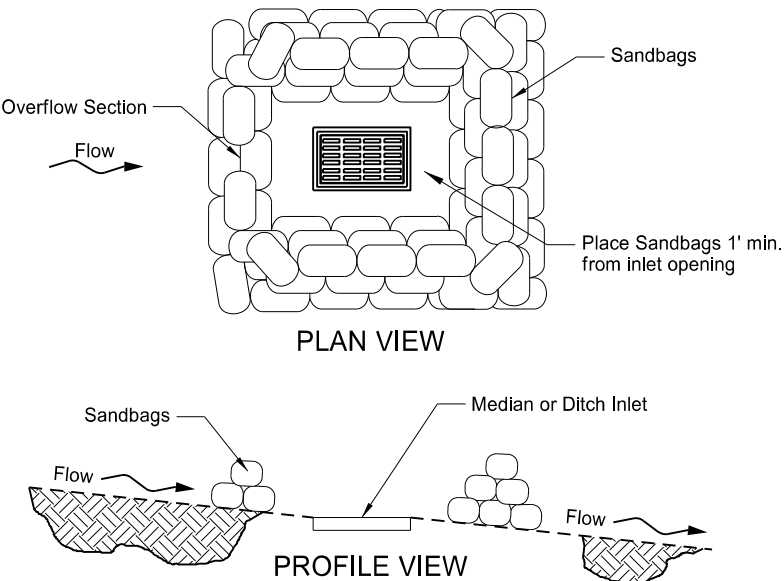
SILT FENCE PROTECTION  
(MEDIAN OR DITCH INLET)



GRAVEL INLET PROTECTION  
(MEDIAN OR DITCH INLET)



SANDBAG PROTECTION  
(LOW POINT)



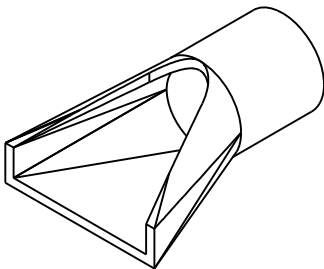
SANDBAG PROTECTION  
(ON SLOPE)

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                              |
|----------------------------------------------|------------------------------------------------------------------------------|
| 10-03-13                                     |                                                                              |
| REVISIONS                                    |                                                                              |
| DATE                                         | CHANGE                                                                       |
| 06-26-14                                     | Updated reference to standard drawing number for fiber roll staking details. |
| 10-01-14                                     | Updated reference to standard drawing number for silt fence.                 |
| 10-17-17                                     | Updated to active voice.                                                     |
| 08-27-19                                     | New Design Engineer PE Stamp.                                                |

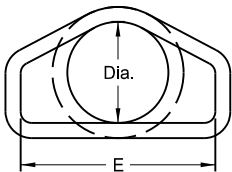
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of Transportation



| FLARED END SECTION  |                                     |                                    |                                    |                                    |        |                                 |
|---------------------|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|--------|---------------------------------|
| TERMINAL DIMENSIONS |                                     |                                    |                                    |                                    |        |                                 |
| DIA                 | A                                   | B                                  | C                                  | D                                  | E      | U                               |
| 12                  | 0'-4"                               | 2'-0"                              | 4'-0 <sup>7</sup> / <sub>8</sub> " | 6'-0 <sup>7</sup> / <sub>8</sub> " | 2'-0"  | 2"                              |
| 15                  | 0'-6"                               | 2'-3"                              | 3'-10"                             | 6'-1"                              | 2'-6"  | 2 <sup>1</sup> / <sub>4</sub> " |
| 18                  | 0'-9"                               | 2'-3"                              | 3'-10"                             | 6'-1"                              | 3'-0"  | 2 <sup>1</sup> / <sub>2</sub> " |
| 21                  | 0'-9"                               | 3'-0"                              | 3'-1"                              | 6'-1"                              | 3'-6"  | 2 <sup>3</sup> / <sub>4</sub> " |
| 24                  | 0'-9 <sup>1</sup> / <sub>2</sub> "  | 3'-7 <sup>1</sup> / <sub>2</sub> " | 2'-6"                              | 6'-1 <sup>1</sup> / <sub>2</sub> " | 4'-0"  | 3"                              |
| 27                  | 0'-10 <sup>1</sup> / <sub>2</sub> " | 4'-0"                              | 2'-1 <sup>1</sup> / <sub>2</sub> " | 6'-1 <sup>1</sup> / <sub>2</sub> " | 4'-6"  | 3 <sup>1</sup> / <sub>4</sub> " |
| 30                  | 1'-0"                               | 4'-6"                              | 1'-7 <sup>3</sup> / <sub>4</sub> " | 6'-1 <sup>3</sup> / <sub>4</sub> " | 5'-0"  | 3 <sup>1</sup> / <sub>2</sub> " |
| 36                  | 1'-3"                               | 5'-3"                              | 2'-9"                              | 8'-0"                              | 6'-0"  | 4"                              |
| 42                  | 1'-9"                               | 5'-3"                              | 2'-9"                              | 8'-0"                              | 6'-6"  | 4 <sup>1</sup> / <sub>2</sub> " |
| 48                  | 2'-0"                               | 6'-0"                              | 2'-0"                              | 8'-0"                              | 7'-0"  | 5"                              |
| 54                  | 2'-3"                               | 5'-5"                              | 2'-9 <sup>1</sup> / <sub>4</sub> " | 8'-2 <sup>1</sup> / <sub>4</sub> " | 7'-6"  | 5 <sup>1</sup> / <sub>2</sub> " |
| 60                  | 2'-11"                              | 5'-0"                              | 3'-3"                              | 8'-3"                              | 8'-0"  | 5"                              |
| 66                  | 2'-6"                               | 6'-0"                              | 2'-3"                              | 8'-3"                              | 8'-6"  | 5 <sup>1</sup> / <sub>2</sub> " |
| 72                  | 3'-0"                               | 6'-6"                              | 1'-9"                              | 8'-3"                              | 9'-0"  | 6"                              |
| 78                  | 3'-0"                               | 7'-6"                              | 1'-9"                              | 9'-3"                              | 9'-6"  | 6 <sup>1</sup> / <sub>2</sub> " |
| 84                  | 3'-0"                               | 7'-6 <sup>1</sup> / <sub>2</sub> " | 1'-9"                              | 9'-3 <sup>1</sup> / <sub>2</sub> " | 10'-0" | 6 <sup>1</sup> / <sub>2</sub> " |
| 90                  | 3'-5"                               | 7'-3 <sup>1</sup> / <sub>2</sub> " | 2'-0"                              | 9'-3 <sup>1</sup> / <sub>4</sub> " | 11'-0" | 6 <sup>1</sup> / <sub>2</sub> " |

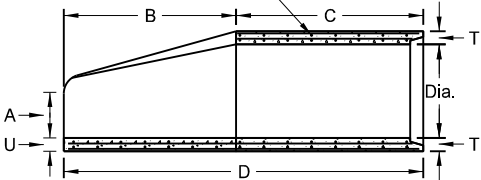


PERSPECTIVE

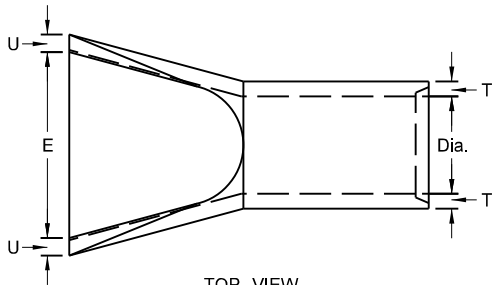


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW



TOP VIEW

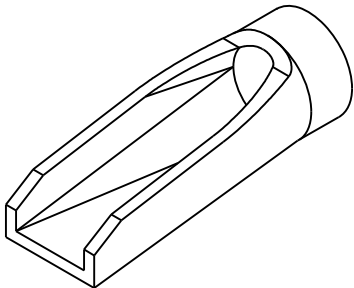
NOTES:

1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet  
66" to 108" (incl.) = not less than 6 feet
4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
5. For Class IV and Class V reinforced concrete pipe and end section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

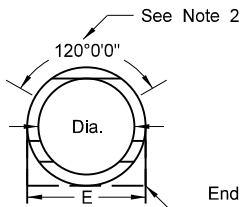
REINFORCED CONCRETE PIPE - FLARED END SECTION

Reinforcement to be equivalent to Class III RCP

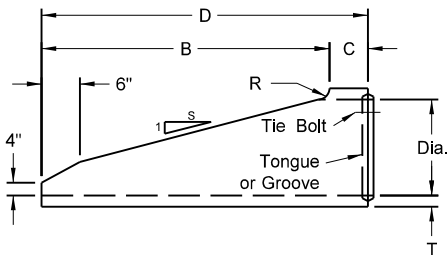
| TRAVERSABLE END SECTION |       |     |       |                                    |                                 |   |
|-------------------------|-------|-----|-------|------------------------------------|---------------------------------|---|
| DIA                     | B     | C   | D     | E                                  | R                               | S |
| 15"                     | 4'    | 9"  | 4'-9" | 1'-7 <sup>1</sup> / <sub>2</sub> " | 3"                              | 6 |
| 18"                     | 5'-9" | 9"  | 6'-6" | 1'-11"                             | 3"                              | 6 |
| 24"                     | 6'    | 1'  | 7'    | 2'-6"                              | 3"                              | 4 |
| 30"                     | 7'-6" | 1'  | 8'-6" | 3'-1"                              | 3 <sup>1</sup> / <sub>2</sub> " | 4 |
| 36"                     | 7'-3" | 15" | 8'-6" | 3'-8"                              | 3"                              | 4 |



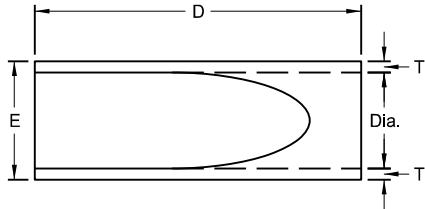
PERSPECTIVE



END VIEW



SIDE VIEW



TOP VIEW

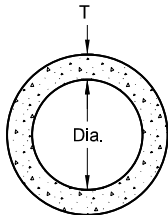
NOTES (Traversable End Section):

1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

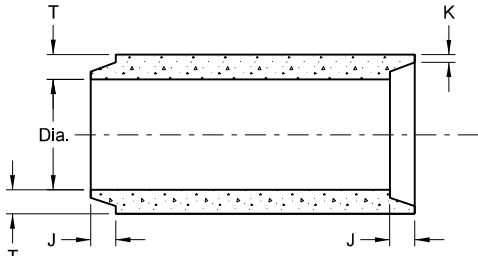
Reinforcement to be equivalent to Class III RCP

| All Classifications of Round Concrete Pipe |                            |                                        |                                                              |                               |                               |  |
|--------------------------------------------|----------------------------|----------------------------------------|--------------------------------------------------------------|-------------------------------|-------------------------------|--|
| Internal Dia. of pipe in Inches            | Cross-Sectional Water Area | Weight per Lin. Foot of pipe Std. Wall | Joint J Groove End Min./Max.                                 | Joint K Tongue Min.           | Minimum Wall Thickness (T)    |  |
| Dia                                        | Sq. ft.                    | Lbs.                                   | In.                                                          | In.                           | In.                           |  |
| 12                                         | 0.79                       | 92                                     | 1 <sup>5</sup> / <sub>8</sub> -2 <sup>3</sup> / <sub>8</sub> | 3/4                           | 2                             |  |
| 15                                         | 1.23                       | 127                                    | 1 <sup>3</sup> / <sub>4</sub> -2 <sup>1</sup> / <sub>4</sub> | 7/8                           | 2 <sup>1</sup> / <sub>4</sub> |  |
| 18                                         | 1.77                       | 168                                    | 1 <sup>1</sup> / <sub>2</sub> -2 <sup>1</sup> / <sub>2</sub> | 1                             | 2 <sup>1</sup> / <sub>2</sub> |  |
| 21                                         | 2.40                       | 214                                    | 1 <sup>1</sup> / <sub>2</sub> -3 <sup>1</sup> / <sub>8</sub> | 1 <sup>1</sup> / <sub>8</sub> | 2 <sup>3</sup> / <sub>4</sub> |  |
| 24                                         | 3.14                       | 265                                    | 2 <sup>3</sup> / <sub>4</sub> -3 <sup>1</sup> / <sub>4</sub> | 1 <sup>1</sup> / <sub>8</sub> | 3                             |  |
| 27                                         | 3.98                       | 322                                    | 2 <sup>3</sup> / <sub>4</sub> -4                             | 1 <sup>1</sup> / <sub>4</sub> | 3 <sup>1</sup> / <sub>4</sub> |  |
| 30                                         | 4.91                       | 384                                    | 3 <sup>1</sup> / <sub>4</sub> -4 <sup>1</sup> / <sub>4</sub> | 1 <sup>1</sup> / <sub>4</sub> | 3 <sup>1</sup> / <sub>2</sub> |  |
| 33                                         | 5.94                       | 452                                    | 3 <sup>1</sup> / <sub>4</sub> -4 <sup>1</sup> / <sub>4</sub> | 1 <sup>1</sup> / <sub>2</sub> | 3 <sup>3</sup> / <sub>4</sub> |  |
| 36                                         | 7.07                       | 524                                    | 3 <sup>1</sup> / <sub>4</sub> -4 <sup>1</sup> / <sub>4</sub> | 1 <sup>1</sup> / <sub>2</sub> | 4                             |  |
| 42                                         | 9.62                       | 685                                    | 3 <sup>3</sup> / <sub>4</sub> -4 <sup>3</sup> / <sub>4</sub> | 1 <sup>3</sup> / <sub>4</sub> | 4 <sup>1</sup> / <sub>2</sub> |  |
| 48                                         | 12.57                      | 685                                    | 3 <sup>3</sup> / <sub>4</sub> -4 <sup>3</sup> / <sub>4</sub> | 1 <sup>3</sup> / <sub>4</sub> | 5                             |  |
| 54                                         | 15.90                      | 1070                                   | 4 <sup>1</sup> / <sub>2</sub> -5 <sup>1</sup> / <sub>4</sub> | 2                             | 5 <sup>1</sup> / <sub>2</sub> |  |
| 60                                         | 19.63                      | 1296                                   | 4 <sup>1</sup> / <sub>2</sub> -5 <sup>1</sup> / <sub>2</sub> | 2 <sup>1</sup> / <sub>4</sub> | 6                             |  |
| 66                                         | 23.76                      | 1542                                   | 5-6                                                          | 2 <sup>3</sup> / <sub>8</sub> | 6 <sup>1</sup> / <sub>2</sub> |  |
| 72                                         | 28.27                      | 1810                                   | 5 <sup>5</sup> / <sub>8</sub> -6 <sup>3</sup> / <sub>4</sub> | 2 <sup>3</sup> / <sub>8</sub> | 7                             |  |
| 78                                         | 33.18                      | 2098                                   | 6 <sup>1</sup> / <sub>4</sub> -7 <sup>1</sup> / <sub>4</sub> | 2 <sup>3</sup> / <sub>8</sub> | 7 <sup>1</sup> / <sub>2</sub> |  |
| 84                                         | 38.48                      | 2410                                   | 5 <sup>5</sup> / <sub>8</sub> -7 <sup>3</sup> / <sub>4</sub> | 3 <sup>3</sup> / <sub>8</sub> | 8                             |  |
| 90                                         | 44.18                      | 2793                                   | 6 <sup>3</sup> / <sub>4</sub> -8 <sup>1</sup> / <sub>2</sub> | 3 <sup>3</sup> / <sub>8</sub> | 8 <sup>1</sup> / <sub>2</sub> |  |
| 96                                         | 50.27                      | 3092                                   | 7-8 <sup>1</sup> / <sub>4</sub>                              | 3 <sup>1</sup> / <sub>2</sub> | 9                             |  |
| 102                                        | 56.75                      | 3466                                   | 7-8 <sup>1</sup> / <sub>4</sub>                              | 3 <sup>1</sup> / <sub>2</sub> | 9 <sup>1</sup> / <sub>2</sub> |  |
| 108                                        | 63.62                      | 3864                                   | 7 <sup>1</sup> / <sub>4</sub> -8 <sup>1</sup> / <sub>2</sub> | 3 <sup>3</sup> / <sub>4</sub> | 10                            |  |

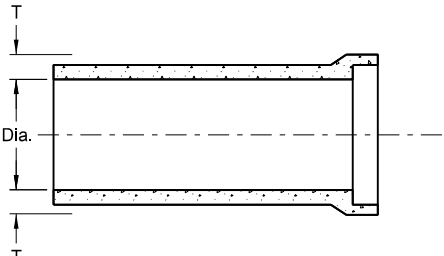


END VIEW

CIRCULAR PIPE

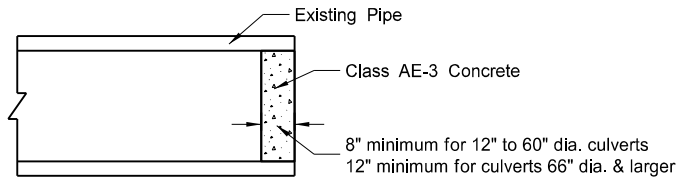


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

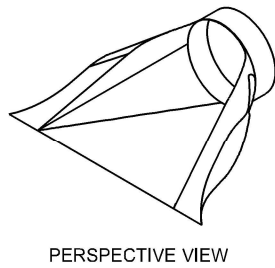
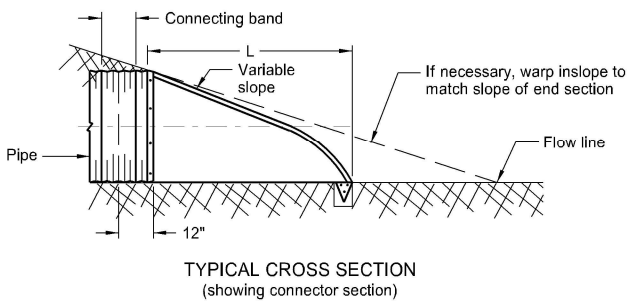
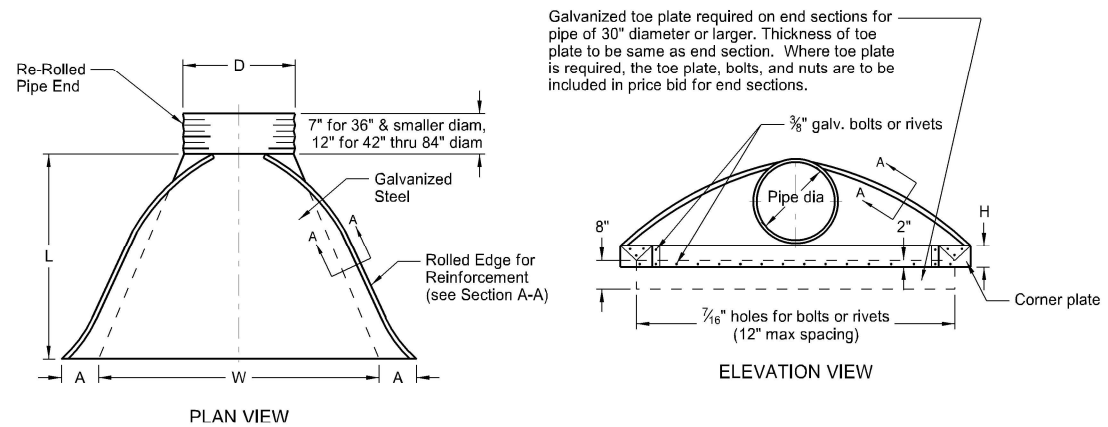
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                  |
|----------------------------------------------|----------------------------------|
| 05-12-14                                     |                                  |
| REVISIONS                                    |                                  |
| DATE                                         | CHANGE                           |
| 01-21-15                                     | Revised Note 5                   |
| 11-21-16                                     | Revised End Section Dimensions   |
| 09-18-19                                     | Updated Perspective View Details |

This document was originally issued and sealed by  
Jon Ketterling  
Registration Number  
PE- 4684,  
on 9/18/19 and the original document is stored at the  
North Dakota Department  
of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



| PIPE DIA. | GALVANIZED THICKNESS | END SECTION DIMENSIONS |    |    |    |     |         | APPROX. SLOPE RATE | BODY   |
|-----------|----------------------|------------------------|----|----|----|-----|---------|--------------------|--------|
|           |                      | A                      | B  | H  | L  | W   | IN      |                    |        |
| 15        | 0.064 - 0.079        | 7                      | 8  | 6  | 26 | 30  | 2 1/2:1 |                    | 1      |
| 18        | 0.064 - 0.109        | 8                      | 10 | 6  | 31 | 36  | 2 1/2:1 |                    | 1      |
| 24        | 0.064 - 0.109        | 10                     | 13 | 6  | 41 | 48  | 2 1/2:1 |                    | 1      |
| 30        | 0.064 - 0.109        | 12                     | 16 | 8  | 51 | 60  | 2 1/2:1 |                    | 1 or 2 |
| 36        | 0.064 - 0.109        | 14                     | 19 | 9  | 60 | 72  | 2 1/2:1 |                    | 2      |
| 42        | 0.064 - 0.138        | 16                     | 22 | 11 | 69 | 84  | 2 1/2:1 |                    | 2      |
| 48        | 0.064 - 0.168        | 18                     | 27 | 12 | 78 | 90  | 2 1/2:1 |                    | 2      |
| 54        | 0.064 - 0.168        | 18                     | 30 | 12 | 84 | 102 | 2:1     |                    | 2      |
| * 60      | 0.064 - 0.168        | 18                     | 33 | 12 | 87 | 114 | 1 1/2:1 |                    | 3      |
| * 66      | 0.064 - 0.168        | 18                     | 36 | 12 | 87 | 120 | 1 1/2:1 |                    | 3      |
| * 72      | 0.064 - 0.168        | 18                     | 39 | 12 | 87 | 126 | 1 1/2:1 |                    | 3      |
| * 78      | 0.064 - 0.168        | 18                     | 42 | 12 | 87 | 132 | 1 1/2:1 |                    | 3      |
| * 84      | 0.064 - 0.168        | 18                     | 45 | 12 | 87 | 138 | 1 1/2:1 |                    | 3      |

\* These sizes have 0.109" sides and 0.138" center panels.

\*\* Pipe diameter is equal to dimension "D" of end section.

Manufacturers tolerances of above dimensions will be allowed.

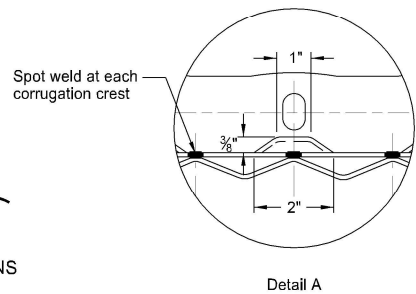
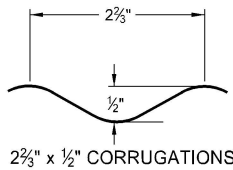
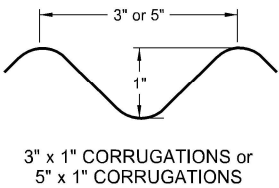
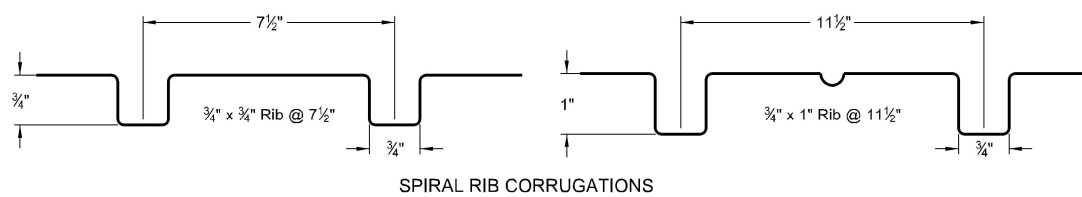
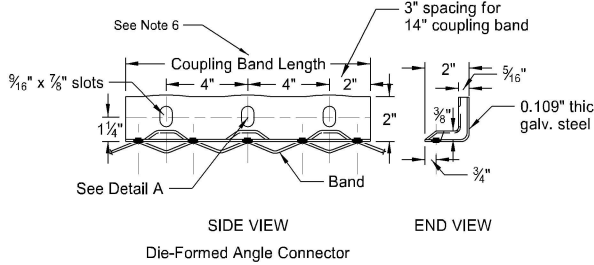
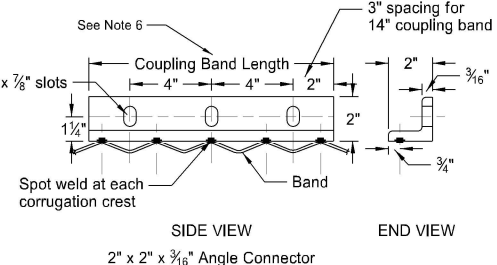
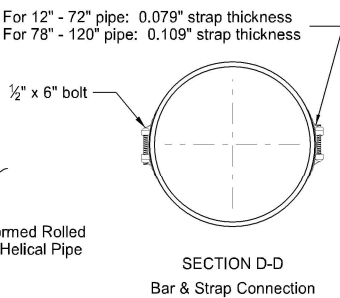
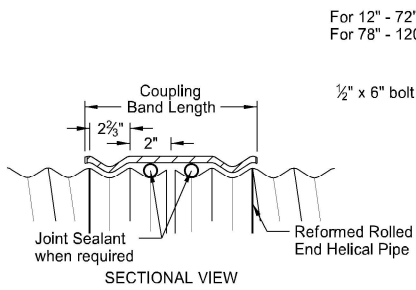
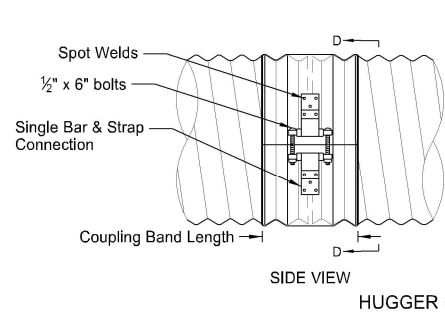
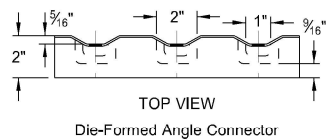
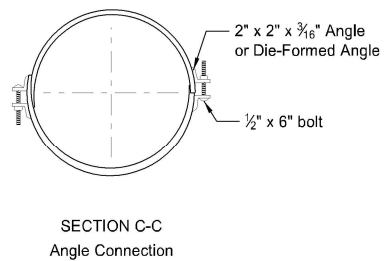
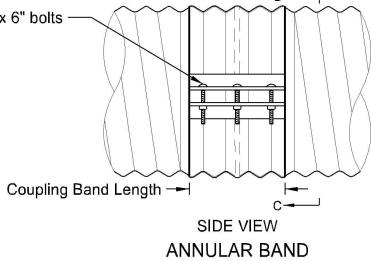
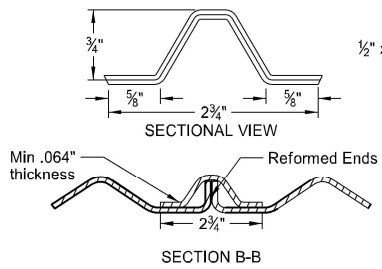
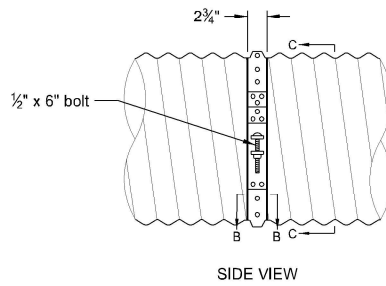
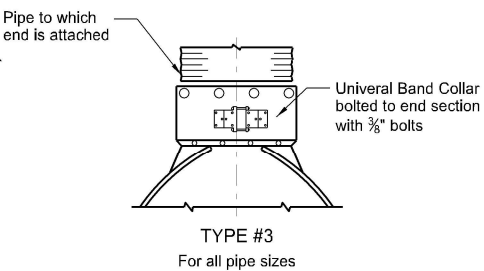
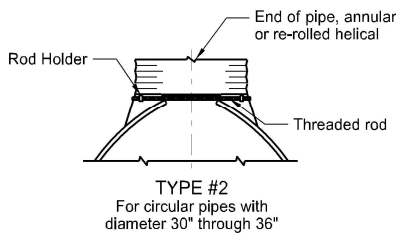
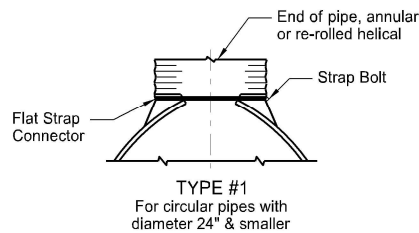
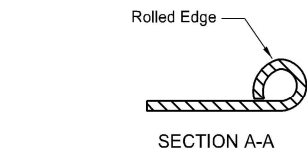
Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

NOTES:

- Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
- Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
- Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
- Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
- 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
- Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
- Length of spot welds shall be minimum 1/2".

| COUPLING BAND DIMENSIONS |                            |            |                      |                     |
|--------------------------|----------------------------|------------|----------------------|---------------------|
| COUPLING TYPE            | CORRUGATION PITCH x DEPTH  | PIPE SIZE  | COUPLING BAND LENGTH | MIN. BAND THICKNESS |
| Hat Band                 | 2 3/8" x 1/2"              | 12" - 48"  | 2 3/4"               | .064"               |
| Annular Band             | 2 3/8" x 1/2"              | 12" - 72"  | 12"                  | .052"               |
|                          |                            | 78" - 84"  | 12"                  | .079"               |
| Hugger Band              | 2 3/8" x 1/2" Rerolled End | 12" - 72"  | 10 1/2"              | .052"               |
|                          |                            | 78" - 84"  | 10 1/2"              | .079"               |
|                          | 3" x 1" Rerolled End       | 48" - 120" | 10 1/2"              | .052"               |
|                          |                            | 48" - 120" | 12"                  | .064"               |

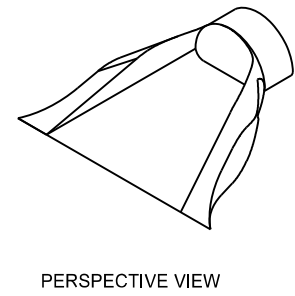
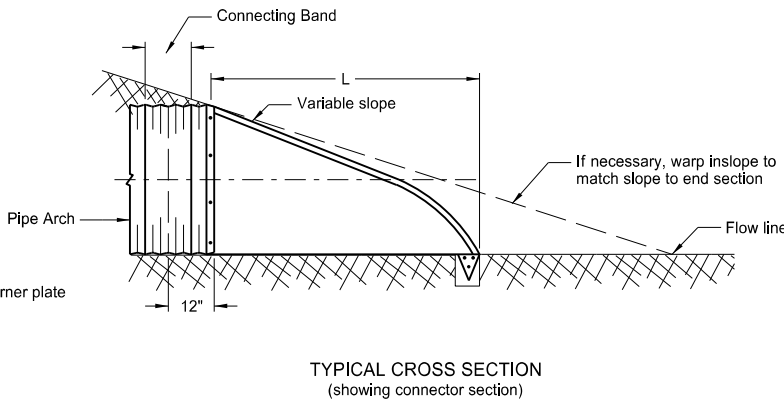
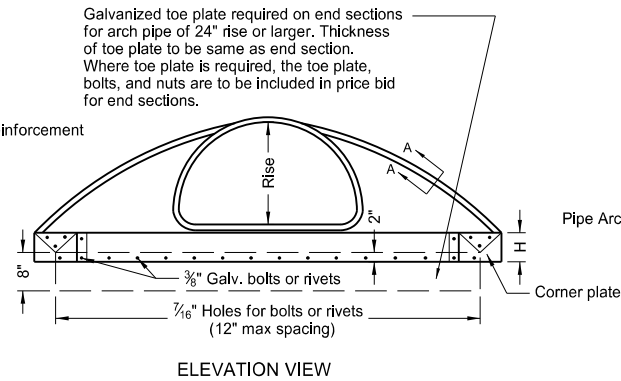
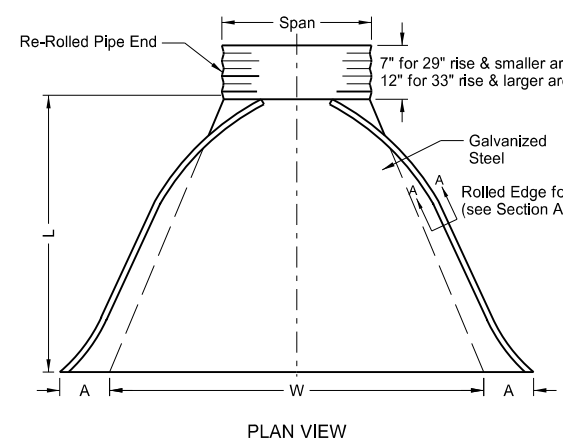


| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                               |
|----------------------------------------------|-------------------------------|
| 08-16-13                                     |                               |
| REVISIONS                                    |                               |
| DATE                                         | CHANGE                        |
| 01-07-14                                     | End Section Plan View         |
| 02-27-14                                     | 3" x 1" Corrugation Detail    |
| 09-18-19                                     | Added Perspective View Detail |
| 09-23-22                                     | Galvanized Thickness Table    |



CORRUGATED STEEL PIPE ARCH CULVERTS AND END SECTIONS

D-714-5



| PIPE ARCH DIMENSION |      | GALV. THICK. | END SECTION DIMENSIONS |    |    |    |     |      | APPROX. SLOPE | BODY |
|---------------------|------|--------------|------------------------|----|----|----|-----|------|---------------|------|
| SPAN                | RISE |              | A                      | B  | H  | L  | W   |      |               |      |
| IN                  | IN   | IN           | IN                     | IN | IN | IN | IN  | RATE | PIECE         |      |
| 17                  | 13   | 0.064        | 7                      | 9  | 6  | 19 | 30  | 2½:1 | 1             |      |
| 21                  | 15   | 0.064        | 7                      | 10 | 6  | 23 | 36  | 2½:1 | 1             |      |
| 24                  | 18   | 0.064        | 8                      | 12 | 6  | 28 | 42  | 2½:1 | 1             |      |
| 28                  | 20   | 0.064        | 9                      | 14 | 6  | 32 | 48  | 2½:1 | 1             |      |
| 35                  | 24   | 0.079        | 10                     | 16 | 6  | 39 | 60  | 2½:1 | 1 or 2        |      |
| 42                  | 29   | 0.079        | 12                     | 18 | 8  | 46 | 75  | 2½:1 | 1 or 2        |      |
| 49                  | 33   | 0.109        | 13                     | 21 | 9  | 53 | 85  | 2½:1 | 2             |      |
| 57                  | 38   | 0.109        | 18                     | 26 | 12 | 63 | 90  | 2½:1 | 2             |      |
| 64                  | 43   | 0.109        | 18                     | 30 | 12 | 70 | 102 | 2½:1 | 2             |      |
| * 71                | 47   | 0.109        | 18                     | 33 | 12 | 77 | 114 | 2½:1 | 3             |      |
| * 77                | 52   | 0.109        | 18                     | 36 | 12 | 77 | 126 | 2:1  | 3             |      |
| * 83                | 57   | 0.109        | 18                     | 39 | 12 | 77 | 138 | 2:1  | 3             |      |

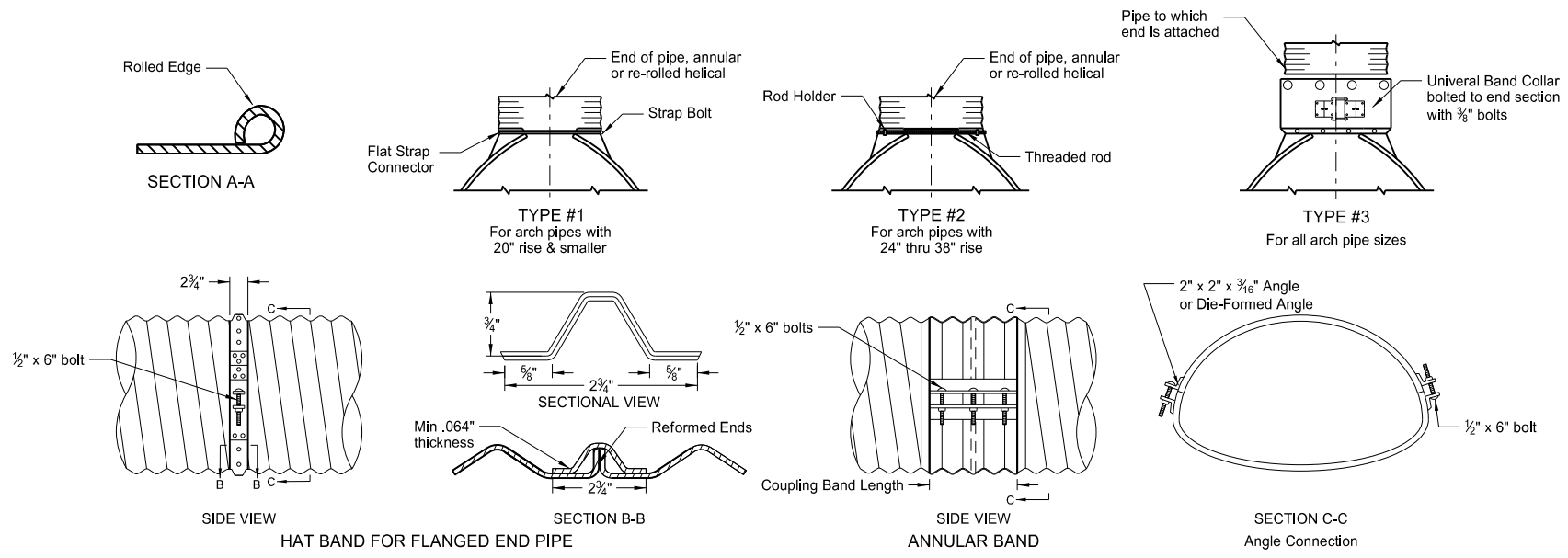
\* These sizes have 0.109" sides and 0.138" center panels.

Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

① Applicable to equivalent sizes of 3"x1" corrugations.



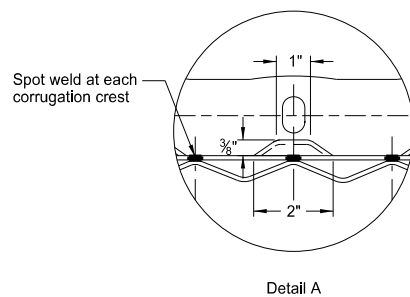
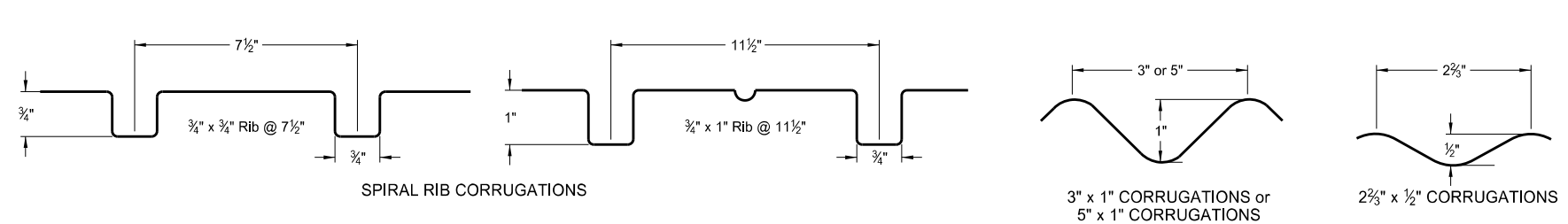
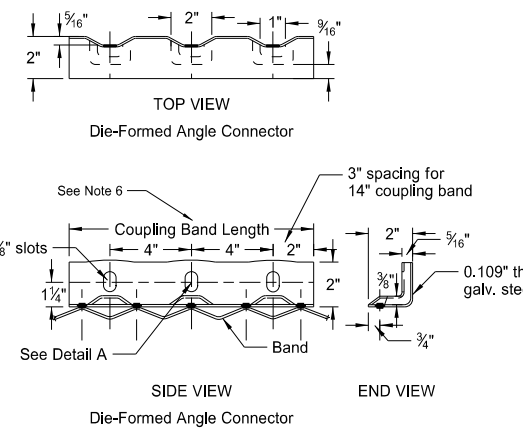
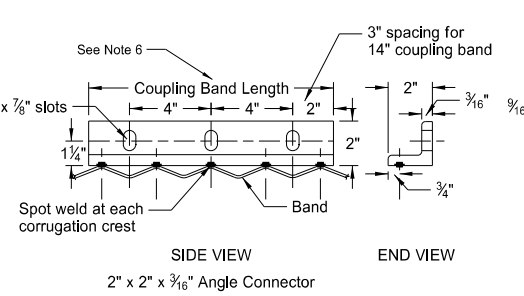
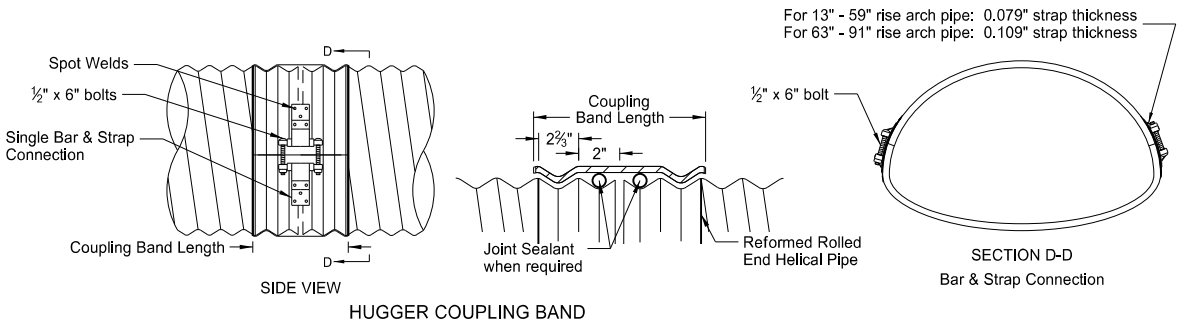
| 2 1/2" x 1/2" CORRUGATIONS |      |    | EQUIV PIPE DIA. |
|----------------------------|------|----|-----------------|
| SPAN                       | RISE | IN |                 |
| 17                         | 13   | 15 |                 |
| 21                         | 15   | 18 |                 |
| 24                         | 18   | 21 |                 |
| 28                         | 20   | 24 |                 |
| 35                         | 24   | 30 |                 |
| 42                         | 29   | 36 |                 |
| 49                         | 33   | 42 |                 |
| 57                         | 38   | 48 |                 |
| 64                         | 43   | 54 |                 |
| 71                         | 47   | 60 |                 |
| 77                         | 52   | 66 |                 |
| 83                         | 57   | 72 |                 |

| 3" x 1" CORRUGATIONS |      |     | EQUIV PIPE DIA. |
|----------------------|------|-----|-----------------|
| SPAN                 | RISE | IN  |                 |
| 53                   | 41   | 48  |                 |
| 60                   | 46   | 54  |                 |
| 66                   | 51   | 60  |                 |
| 73                   | 55   | 66  |                 |
| 81                   | 59   | 72  |                 |
| 87                   | 63   | 78  |                 |
| 95                   | 67   | 84  |                 |
| 103                  | 71   | 90  |                 |
| 112                  | 75   | 96  |                 |
| 117                  | 79   | 102 |                 |
| 128                  | 83   | 108 |                 |
| 137                  | 87   | 114 |                 |
| 142                  | 91   | 120 |                 |

For pipe arches use the same width band as for circular pipe of equal periphery.

| COUPLING BAND DIMENSIONS |                            |                |                      |                     |
|--------------------------|----------------------------|----------------|----------------------|---------------------|
| COUPLING TYPE            | CORRUGATION PITCH x DEPTH  | ARCH PIPE RISE | COUPLING BAND LENGTH | MIN. BAND THICKNESS |
| Hat Band                 | 2 2/3" x 1/2"              | 13" - 38"      | 2 3/4"               | .064"               |
| Annular Band             | 2 2/3" x 1/2"              | 13" - 57"      | 12"                  | .052"               |
|                          | 3" x 1"                    | 41" - 91"      | 14"                  | .052"               |
| Hugger Band              | 2 2/3" x 1/2" Rerolled End | 13" - 57"      | 10 1/2"              | .052"               |
|                          |                            | 63" - 67"      | 10 1/2"              | .079"               |
|                          | 3" x 1" Rerolled End       | 41" - 91"      | 10 1/2"              | .052"               |
|                          | 5" x 1" Rerolled End       | 41" - 91"      | 12"                  | .064"               |

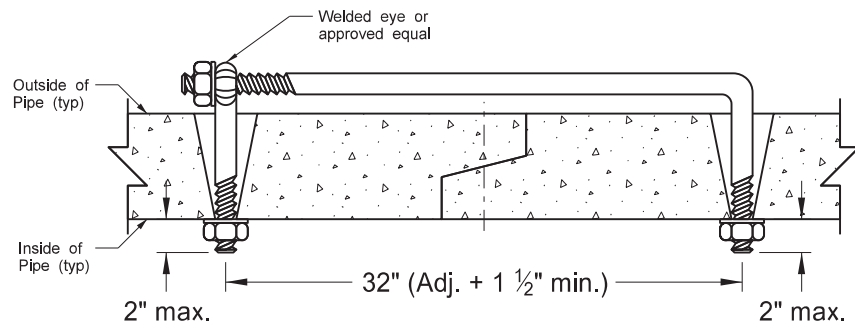
- NOTES:
- Pipe and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
  - Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" 1/4" galv. angle for 77"x52" and 83"x57" sizes. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
  - Coupling bands shall be two-piece for all arch pipes.
  - 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
  - Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection
  - Length of spot welds shall be minimum 1/2".



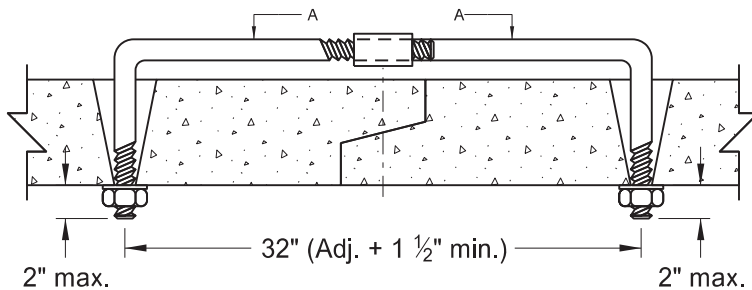
|                                              |                                                                                      |                                                                                                                                                                                                                                           |  |
|----------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                                      | This document was originally issued and sealed by<br><b>Jon Ketterling</b><br>Registration Number<br><b>PE-4684</b> ,<br>on <b>9/18/19</b> and the original document is stored at the<br><b>North Dakota Department of Transportation</b> |  |
| 08-16-13                                     |                                                                                      |                                                                                                                                                                                                                                           |  |
| REVISIONS                                    |                                                                                      |                                                                                                                                                                                                                                           |  |
| DATE                                         | CHANGE                                                                               |                                                                                                                                                                                                                                           |  |
| 01-07-14<br>02-27-14<br>09-18-19             | End Section Plan View<br>3" x 1" Corrugation Detail<br>Added Perspective View Detail |                                                                                                                                                                                                                                           |  |

CONCRETE PIPE, CATTLE PASS, OR  
PRECAST CONCRETE BOX CULVERT TIES

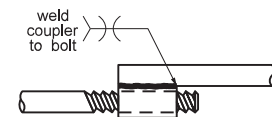
D-714-22



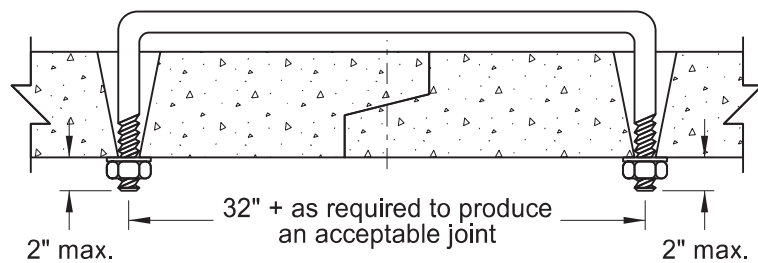
EYE BOLT TIE (PIPES ONLY)



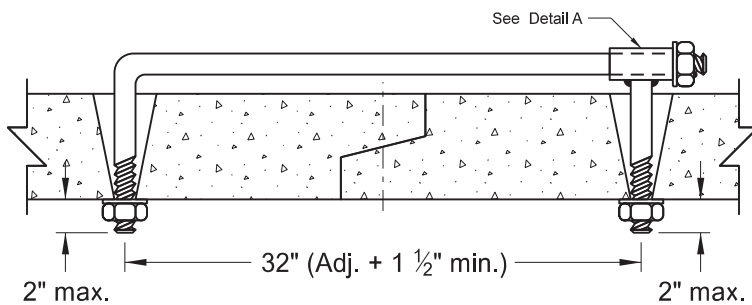
ADJUSTABLE TIE (RCB AND PIPES ONLY)



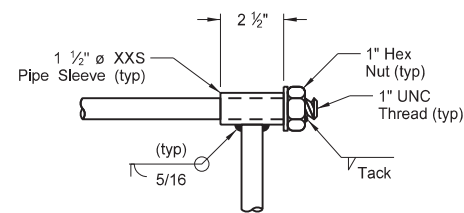
SECTION A-A



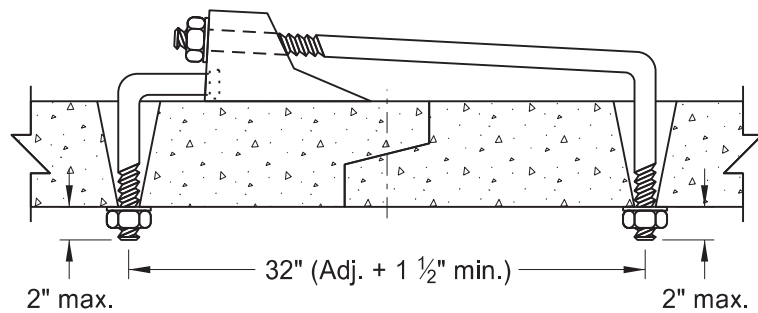
U BOLT TIE (RCB, PIPES, OR CATTLE PASSES)



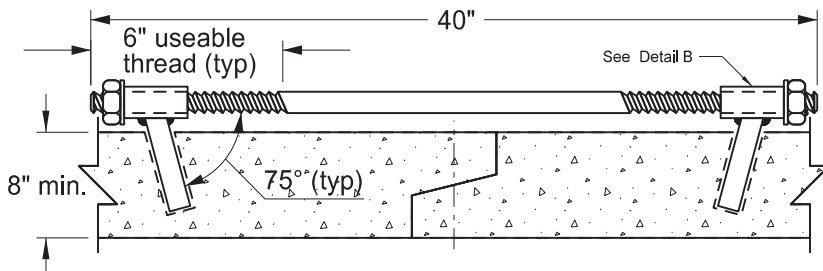
WELDED TIE (RCB AND PIPES ONLY)



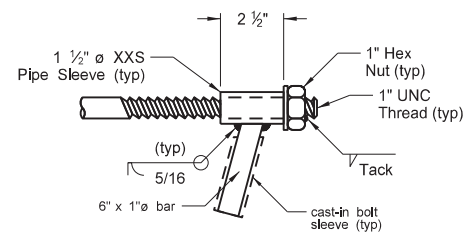
DETAIL A



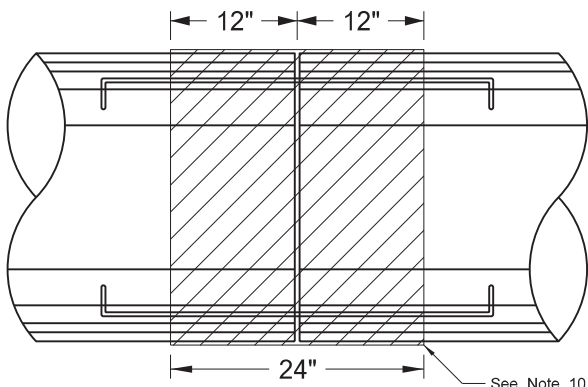
CANOPY TIE (PIPES ONLY)



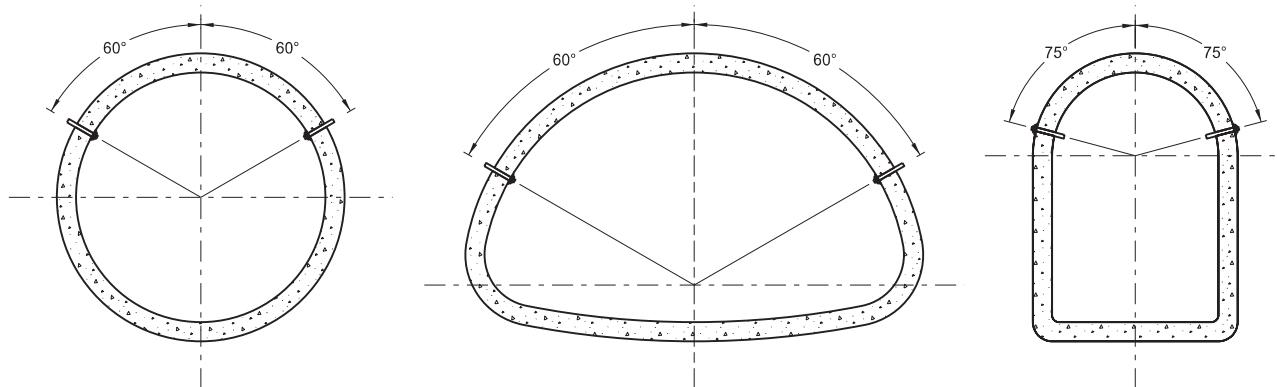
HIDDEN TIE (RCB ONLY)



DETAIL B



PLAN VIEW (PIPES ONLY)



END VIEW

| REQUIRED SIZE OF TIE BOLTS |                               |                              |
|----------------------------|-------------------------------|------------------------------|
| Pipe Size                  | Thread $\phi$                 | XXS Pipe Sleeve Inner $\phi$ |
| 18" - 24"                  | $\frac{5}{8}$ "<br>See note 3 | $\frac{3}{4}$ "              |
| 30" - 66"                  | $\frac{3}{4}$ "               | 1"                           |
| 72" - 120"                 | 1"                            | 1 $\frac{1}{4}$ "            |
| RCB/Cattle Pass            |                               |                              |

NOTES:

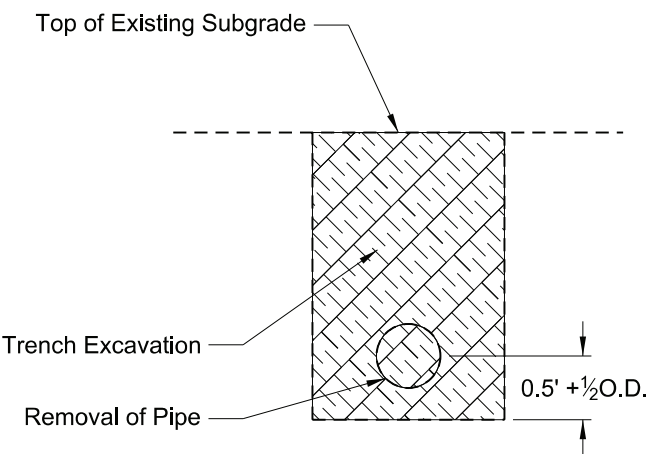
- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
- Insert pipe ties from the inside of the pipes and grout in place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
- Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Insert and grout tie bars into place where nuts and washers are not used.
- Do not use pipe ties to pull the pipe or RCB sections tight. The ties are only for holding sections together.
- Use only tie bolt assemblies that have been hot dip galvanized in accordance with ASTM A 153.
- Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Use holes that have a diameter  $\frac{1}{4}$ " larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1  $\frac{1}{4}$ ".
- Select the type of tie bolt used from those shown.
- Include the cost of precasting or drilling the required holes and furnishing and installing the tie bolts in the price bid for the appropriate conduit or RCB pay item.
- Tie all centerline and approach RCP culvert joints. Tie the first three joints including the end section of all free ends of storm drain systems. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
- Place joint wrap prior to installing ties. Firmly secure the wrap around the full perimeter. For concrete pipes, overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C877 (Type III). Provide a membrane that is a minimum of 12" wide and center it at the joint. Provide a minimum overlap of 2.5" at the seams.
- Use tie bolts that conform to ASTM A 36. Use heavy hex nuts that conform to ASTM A 563. Use washers that conform to ASTM F 436, Type 1. Use welded pipe sleeves and cast-in bolt sleeves that conform to ASTM A 53, Grade B.
- Tie RCB's at locations shown on the plans.

|                                              |                                  |
|----------------------------------------------|----------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                  |
| 3-18-14                                      |                                  |
| REVISIONS                                    |                                  |
| DATE                                         | CHANGE                           |
| 7-21-15                                      | Note 8                           |
| 6-8-17                                       | Notes 2-11, Table, Title, Labels |
| 8-11-21                                      | Notes 2-12, Table, Label         |

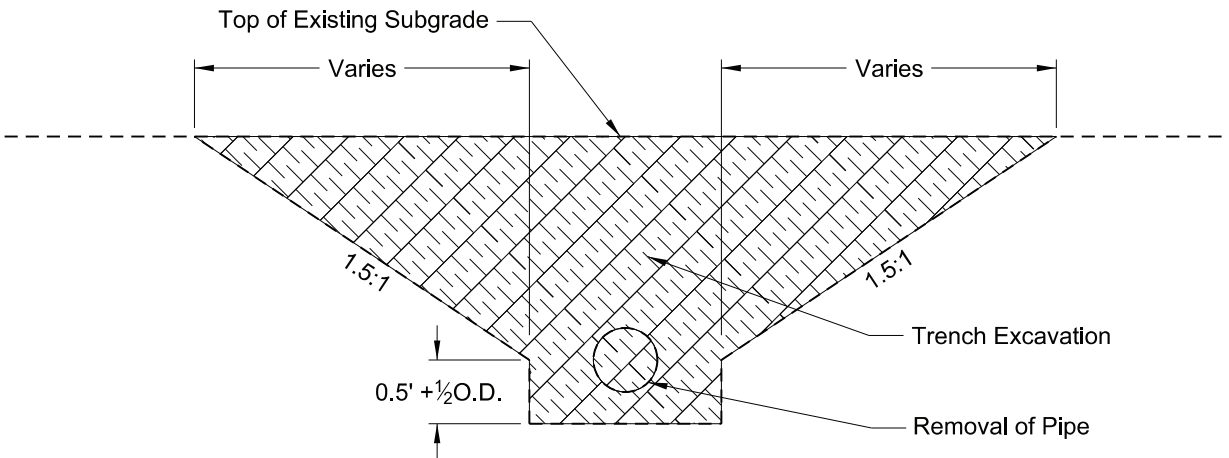




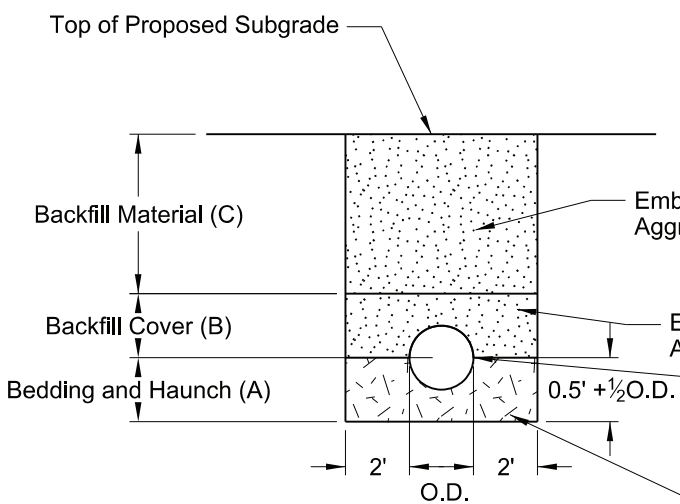
PIPE INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE  
OR PIPE NOT UNDER THE ROADWAY



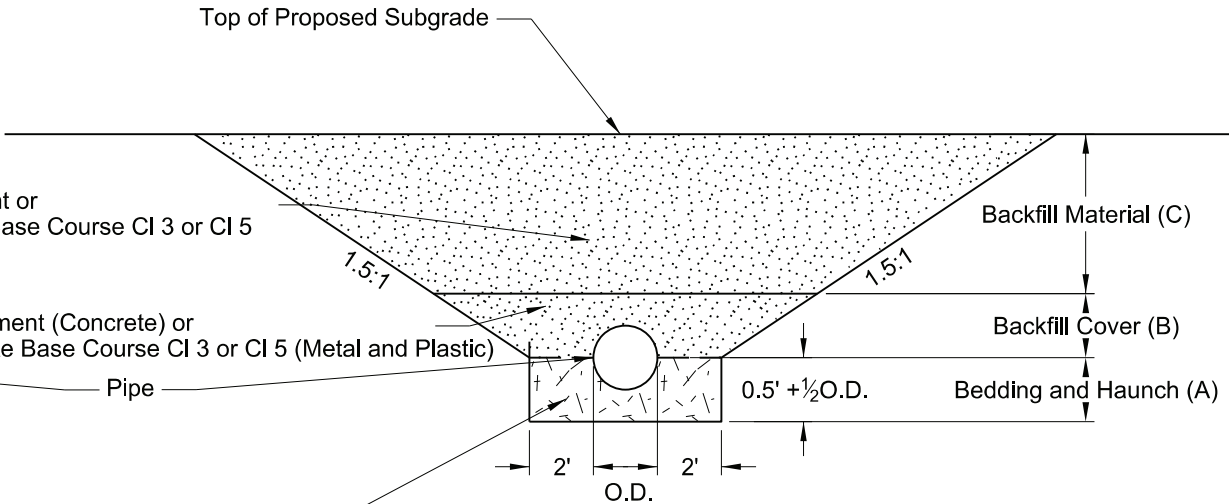
EXCAVATION DETAIL A



EXCAVATION DETAIL B



BACKFILL DETAIL A



BACKFILL DETAIL B

Pay Items  
1) Pipe\*  
2) Removal of Pipe (if required)

\*Included in Pipe Pay Item  
1) Pipe  
2) Trench excavation  
3) Aggregate base course CI 3 or CI 5  
4) Embankment

NOTES:  
1) This drawing does not apply to pipes in approaches.  
2) It is the contractor's option to select Detail A or B.  
3) Embankment may be either Borrow Excavation or Common Excavation - Type A

|                                                                                                   |
|---------------------------------------------------------------------------------------------------|
| Bedding and Haunch (A)                                                                            |
| Pipes Not Under Roadway = 0.5 O.D. + 0.5 Feet                                                     |
| Pipes Under the Roadway = 0.5 O.D. + 0.5 Feet                                                     |
| Backfill Cover (B)                                                                                |
| Concrete Pipe = 0.5 O.D.                                                                          |
| Metal and Plastic = 0.5 O.D. + 1 Foot                                                             |
| Backfill Material (C)                                                                             |
| Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course CI3 or CI 5 |
| Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A   |
| Pipe Not Under Roadway = Common Excavation - Type B                                               |

|                                              |                                         |
|----------------------------------------------|-----------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                         |
| 7-26-13                                      |                                         |
| REVISIONS                                    |                                         |
| DATE                                         | CHANGE                                  |
| 10-15-13                                     | Label Formatting                        |
| 1-21-15                                      | Nomenclature                            |
| 12-10-15                                     | Added Plastic Pipe                      |
| 5-27-20                                      | Changed bedding depth and updated table |

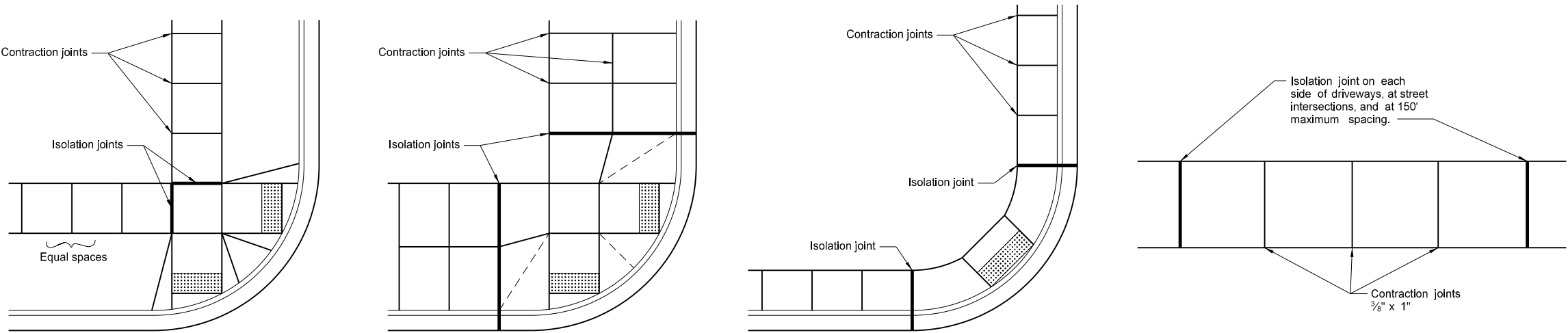


SIDEWALK

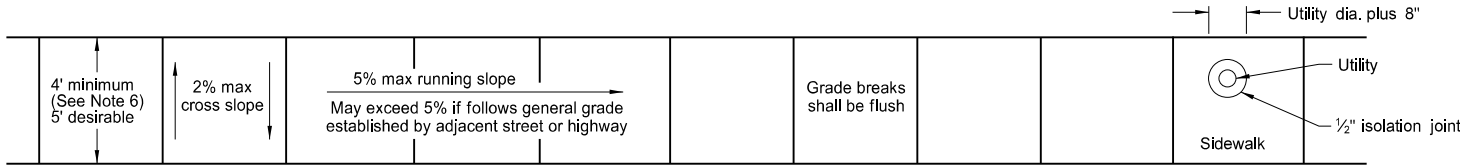
D-750-2

NOTES:

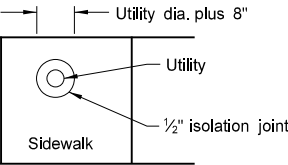
1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.  
  
Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.  
  
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.  
  
When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.  
  
Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."  
  
Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.  
  
When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.



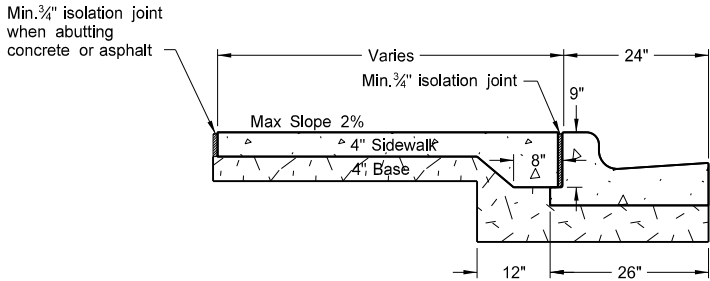
Typical Joint Layouts



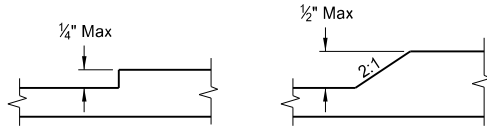
Sidewalk Width and Grade



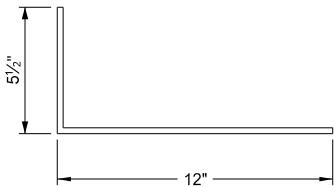
Utility Blockout



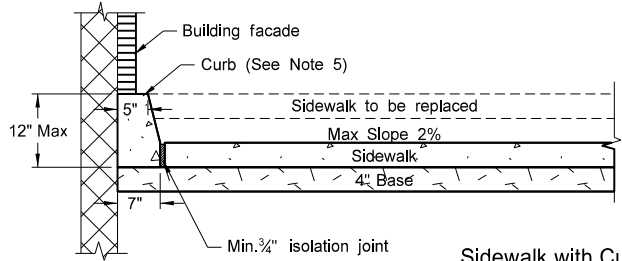
Sidewalk Detail  
(Installed adjacent to curb and gutter)



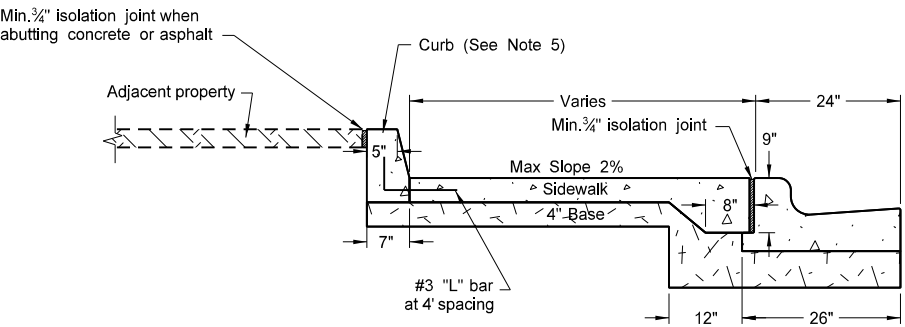
Vertical Discontinuities  
(As needed for utility covers, vaults, grating, etc..)



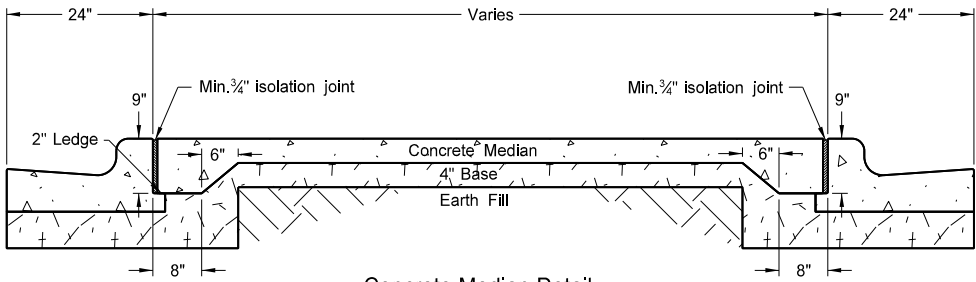
"L" Bar Detail  
#3 Bar



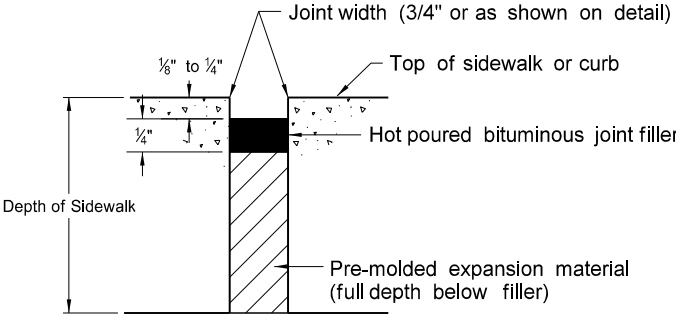
Sidewalk with Curb Detail  
(Building face application)



Sidewalk with Curb Detail  
(Adjacent property application)



Concrete Median Detail



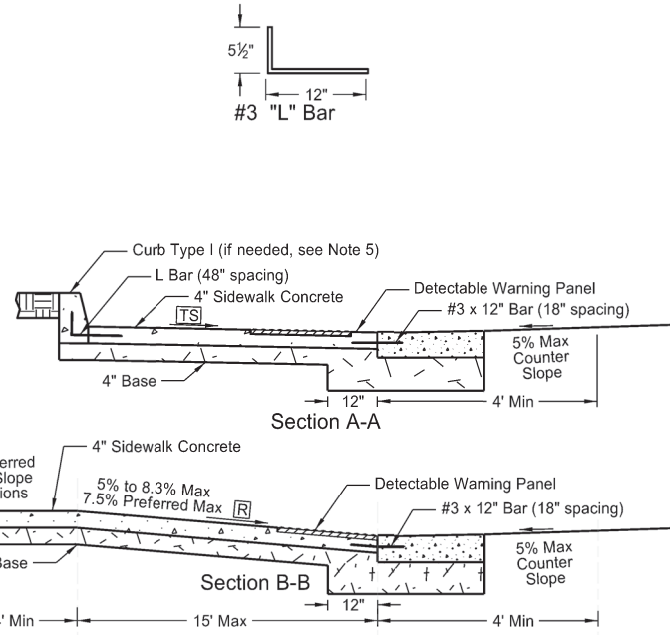
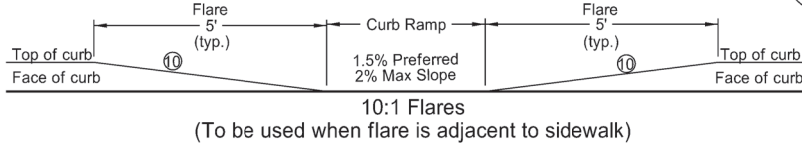
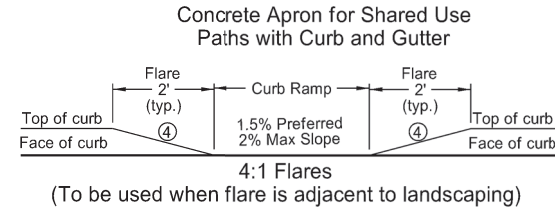
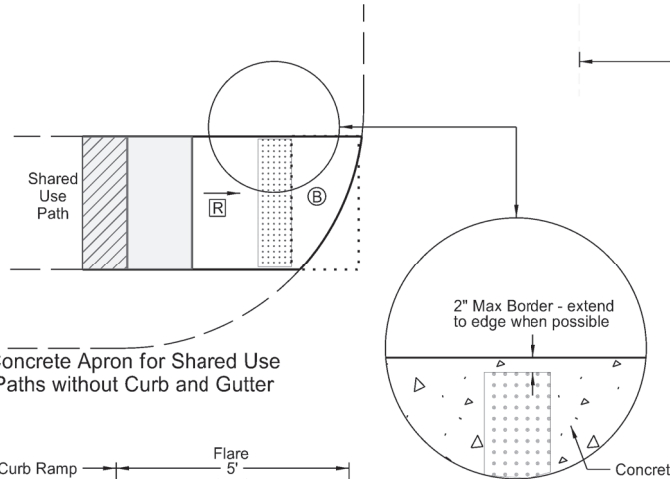
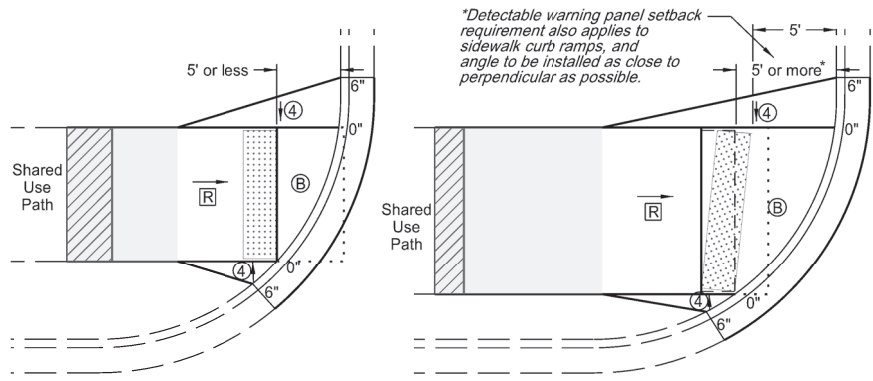
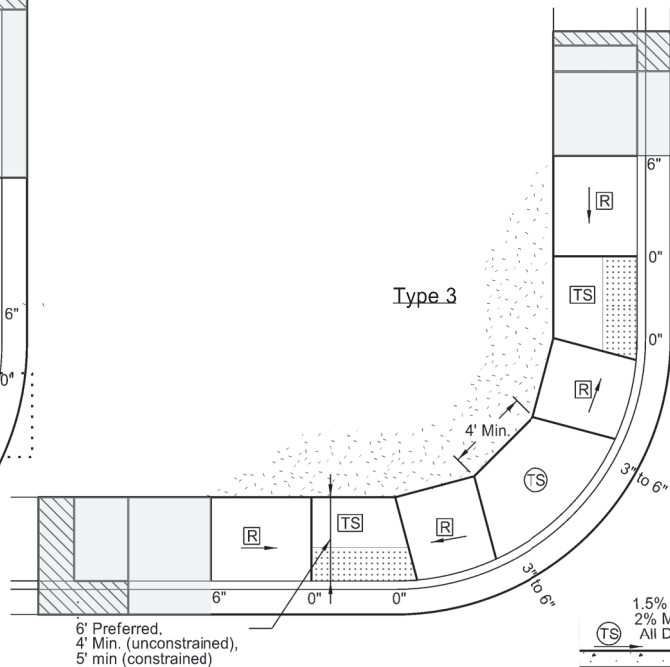
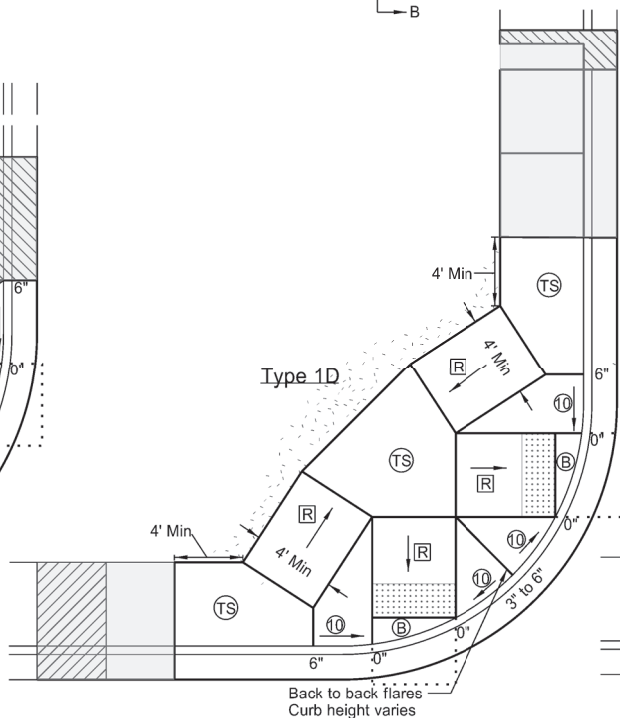
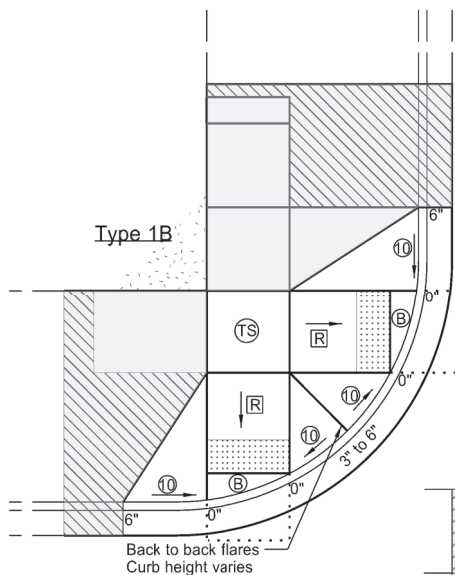
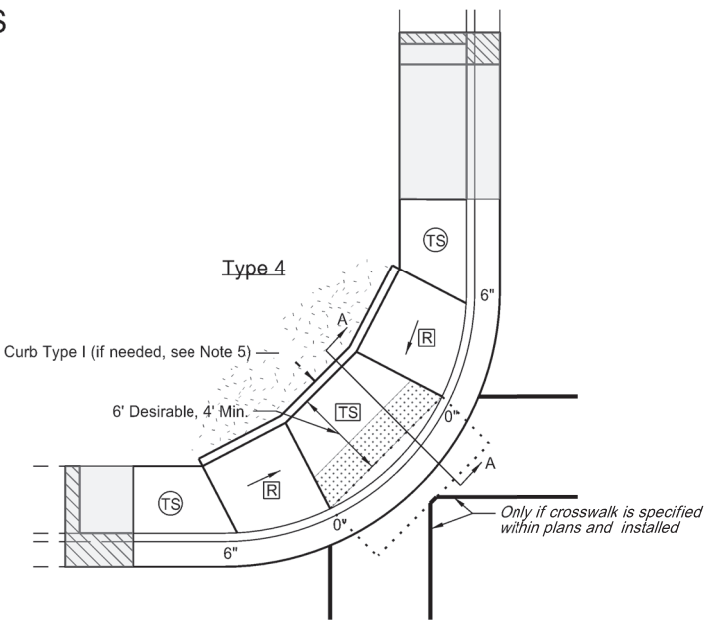
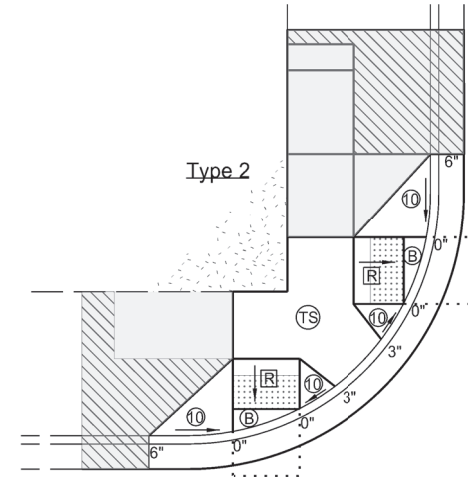
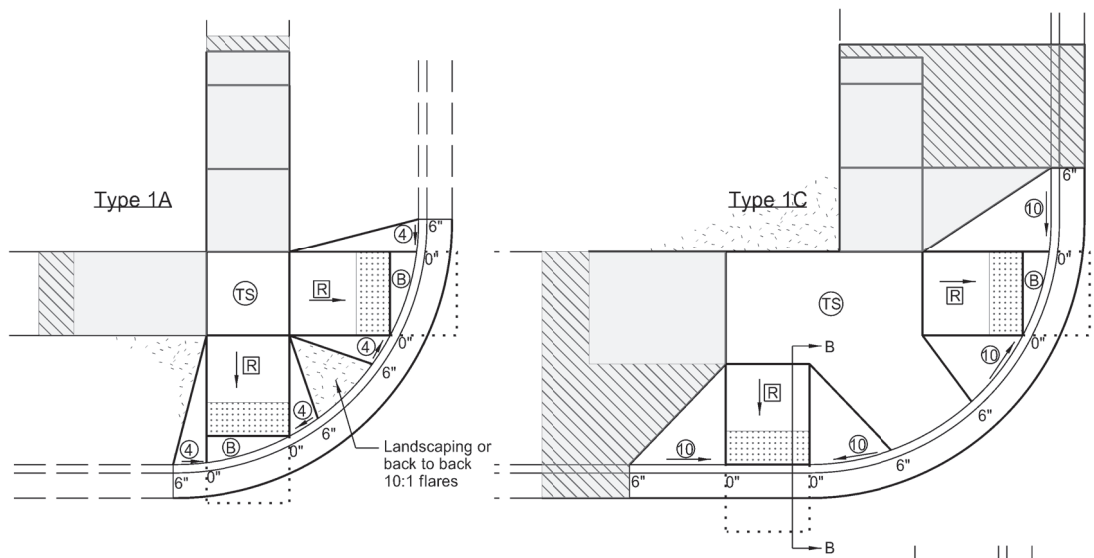
Typical Isolation Joint Seal  
(longitudinal and transverse)

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                           |
|----------------------------------------------|---------------------------------------------------------------------------|
| 11-26-13                                     |                                                                           |
| REVISIONS                                    |                                                                           |
| DATE                                         | CHANGE                                                                    |
| 10-17-17                                     | Updated to active voice.                                                  |
| 09-05-18                                     | Added sidewalk details for width and grade and passing lane requirements. |
| 08-27-19                                     | New Design Engineer PE Stamp.                                             |

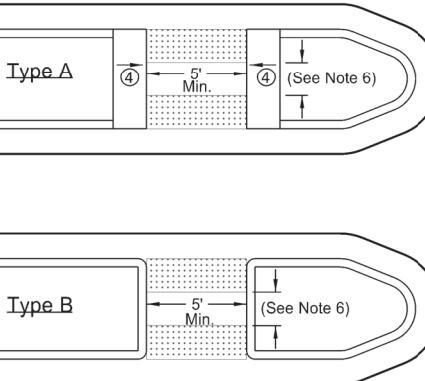
This document was originally issued and sealed by  
Kirk J Hoff,  
Registration Number  
PE- 4683,  
on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

CURB RAMP RETROFIT DETAILS

D-750-3



Median Refuge Islands (Cut-Through)



NOTES:

1. Ramp width is the useable portion of the ramp, excluding flares. Match curb ramp width to Existing Pedestrian Facility (EPF) width (4' minimum or 5' for island ramps.) Match ramp width to existing shared use path width. Maximum ramp length is 15'.
2. Provide turning space with desirable 5' x 5' size or larger and minimum 4' x 4' unconstrained size, for any change of direction. Provide landing 5' long x width of path at the bottom and top of parallel ramps and at the top of perpendicular ramps. Turning spaces and Landings may overlap.
3. Match detectable warning panel width to ramp width. Radial panels are allowed. Place detectable warning panel within the lower turning space.
4. Provide a continuous 4' minimum width EPF with 1.5% preferred cross slope and max 2% constructed cross slope.
5. Modify existing ground slope with landscaping, as needed. If not possible, use a vertical curb as detailed on Standard D-750-2. The Engineer will measure curb at the unit price bid for "Curb - Type 1" per lineal foot.
6. Islands: If the profile of the island curb ramp is 2% or less, provide a minimum distance of 2' between warning panels. If the profile of the island curb ramp is steeper than 2%, provide a turning space between the ramps.
7. Provide generally planar vertical alignments. Provide grade breaks, perpendicular to the direction of the pedestrian travel, at the top and bottom of curb ramps (1.5% preferred, 2% max constructed cross slope).
8. See Curb Ramp Retrofit Transition Details Standard D-750-4 for additional information. Also See PROWAG for full compliance in the curb ramp area.
9. Grade transitions shall be flush.

LEGEND:

- Detectable Warning Panel.
- Landscaping.
- Transitional tie-in to nearest joint, if needed.
- Curb Ramp Retrofit Transitional Area (See Standard Drawing D750-4)
- 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running and counter slope 5% maximum running and counter slope
- (TS) : Turning Space Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
- (R) : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2%.
- (B) : 1.5% preferred cross slope 2% maximum constructed cross slope running slope consistent with the EPF 4.7% preferred max counter slope 5.0% max constructed counter slope
- (10) : 10:1 maximum constructed slope.
- (4) : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.

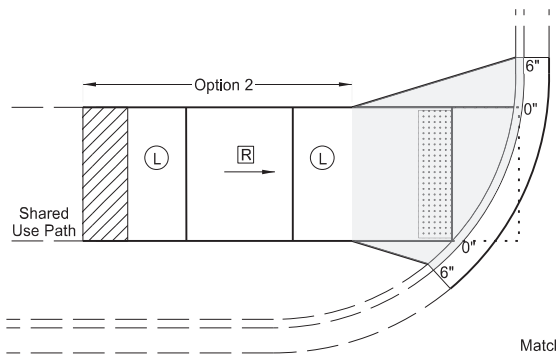
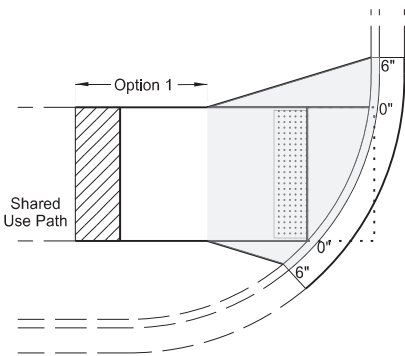
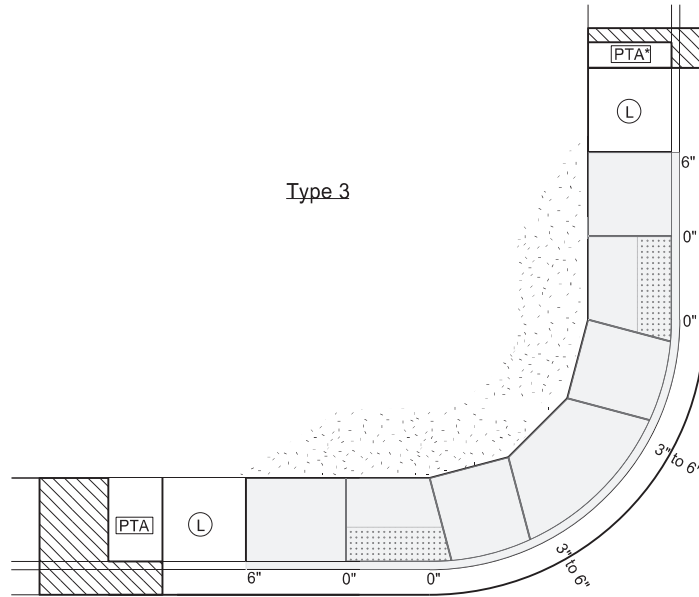
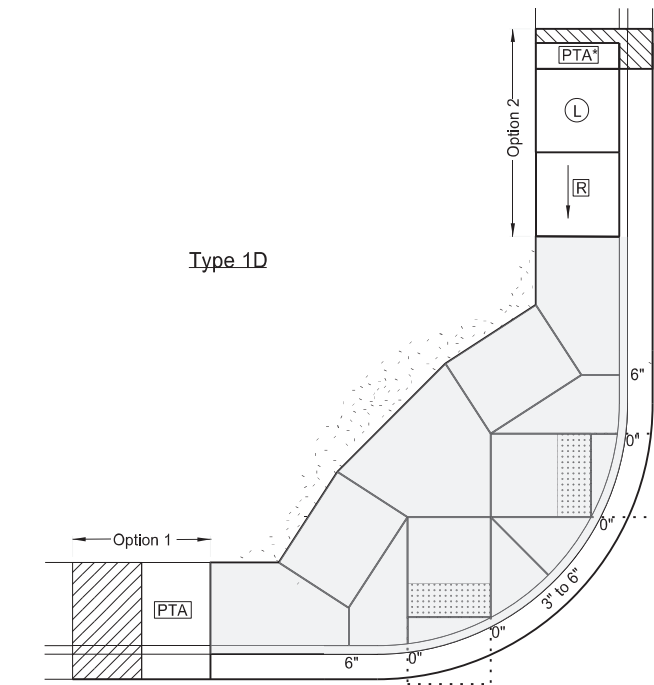
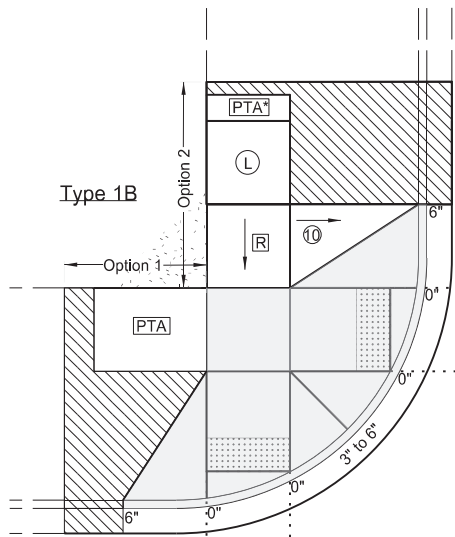
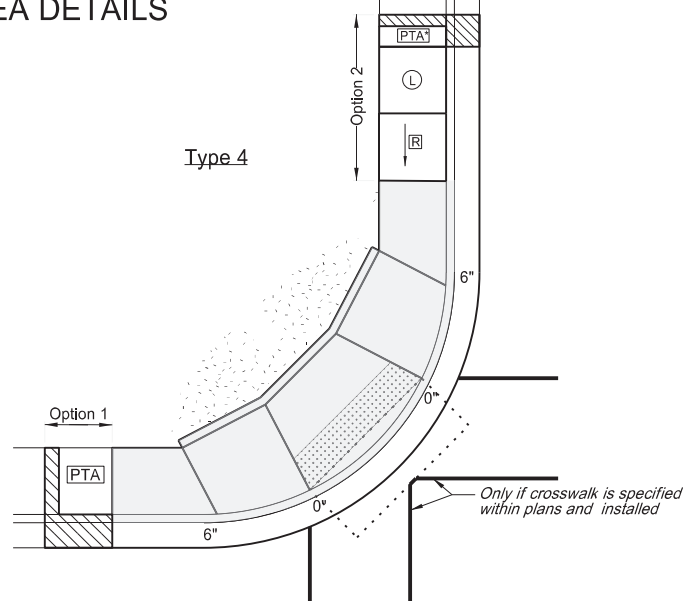
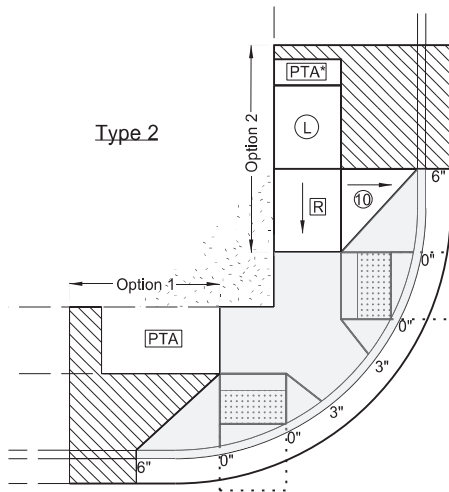
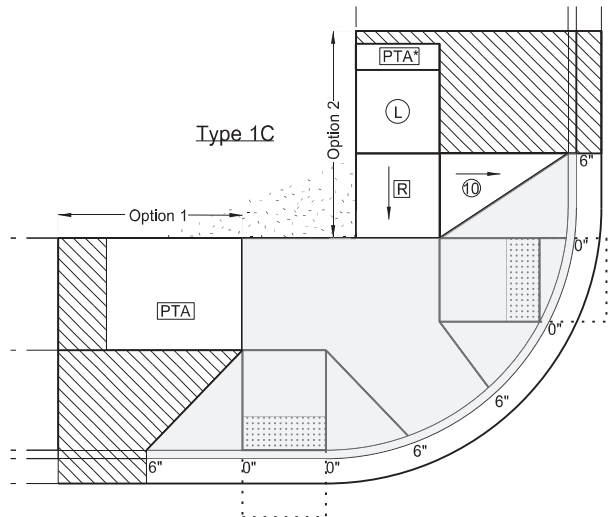
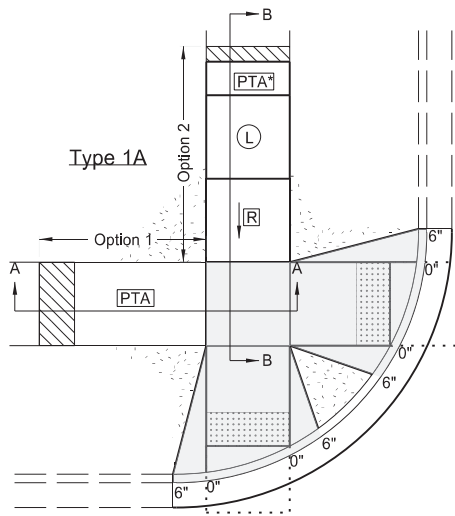
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                                                              |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 11-26-13                                     |                                                                                                              |
| REVISIONS                                    |                                                                                                              |
| DATE                                         | CHANGE                                                                                                       |
| 10-17-17                                     | Updated to active voice.                                                                                     |
| 09-05-18                                     | Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel |
| 03-15-21                                     | Slope & other clarifications.                                                                                |
| 05-19-21                                     | Separate Curb Ramp Transition Area from Curb Ramp area                                                       |



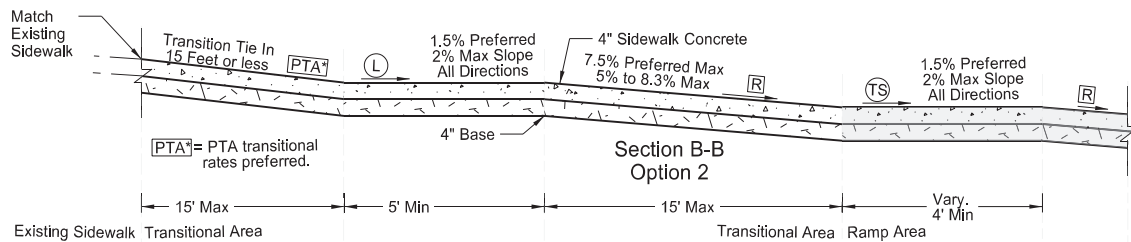
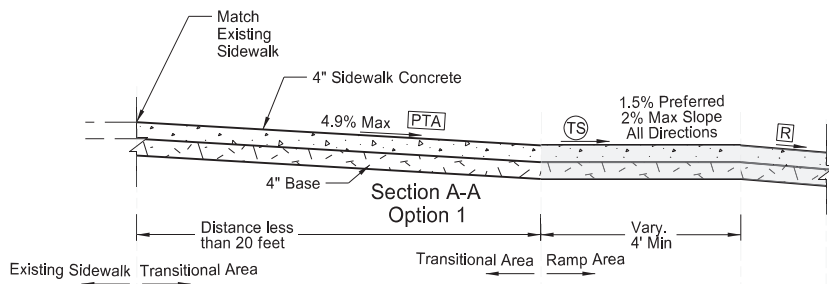


CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

D-750-4



Transition Areas for Shared Use Paths



NOTES:

1. Curb Ramp Transitional Areas are to transition from the Curb Ramp area into the Existing Pedestrian Facility (EPF). Each layout shows example transitions. Use any combination for transitions from the Ramp Area into the EPF that allows for similar or gentler slopes to that of the existing condition, yet transitions in the shortest distance possible. In some cases, if grades allow, the Ramp area can immediately transition into the EPF and no transitional area is needed.
2. Option 1: Use this transition when existing running slope grades are less than 5%. Transition from the ramp area to the EPF using the Pedestrian Access Transition Area (PTA) transition rates and in less than 20 feet.
3. Option 2: Use this transition when existing running slopes are greater than 5% and option 1 is not able to be met.  
  
Add a ramp and a landing immediately after the ramp area. Then transition from the compliant landing into the EPF using the PTA rates (preferred), or in less than 15 feet (which ever is shorter).
4. Transitional Areas for Shared Use Paths can be concrete or asphalt.
5. See Curb Ramp Retrofit Details Standard D-750-3 for additional information.

LEGEND:

- : Detectable Warning Panel.
- : Landscaping.
- : Transitional tie-in to nearest joint, if needed.
- : Curb Ramp Retrofit Area (See Standard Drawing D750-3)
- : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel.  
1.5% preferred cross slope  
2% maximum cross slope  
4.7% preferred running slope  
5% maximum running slope
- : Pedestrian Access Transition Area  
Running Slope less than 4.9%.  
Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF.
- : Turning Space/Landing  
Use at top of ramp or when changing directions.  
1.5% preferred slope (2% maximum) all directions.
- : Preferred Ramp Grade = 5% to 7.5%.  
Maximum Constructed Grade = 8.3%.  
Preferred Cross Slope = 1.5%.  
Maximum Constructed Cross Slope = 2%.  
Maximum Length = 15 feet
- : 10:1 maximum constructed slope.
- : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.

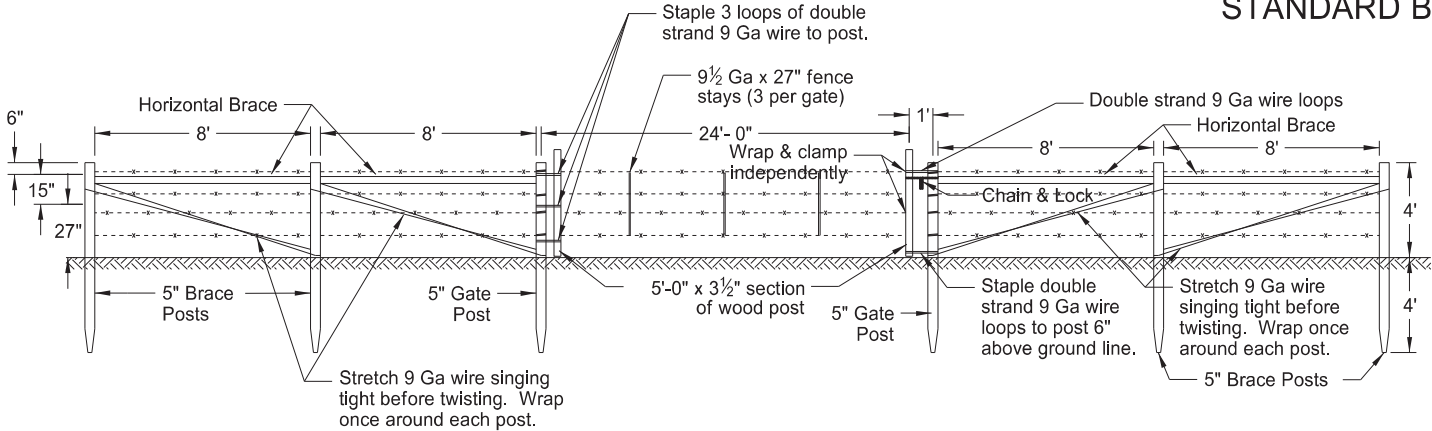
|                                              |        |
|----------------------------------------------|--------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |        |
| 05-19-21                                     |        |
| REVISIONS                                    |        |
| DATE                                         | CHANGE |
|                                              |        |
|                                              |        |



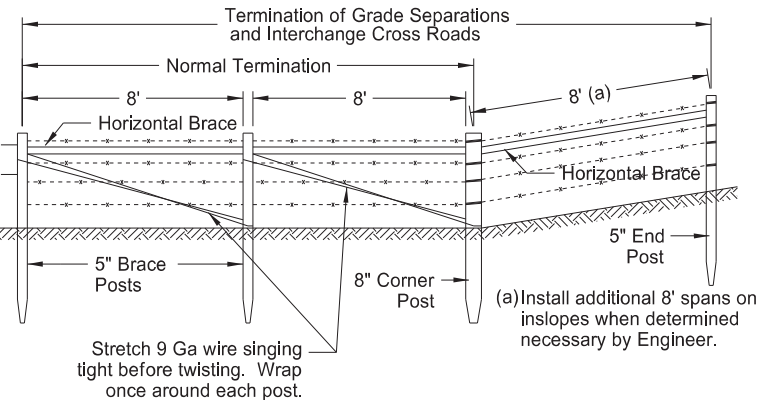
STANDARD BARBED WIRE FENCE

NOTES

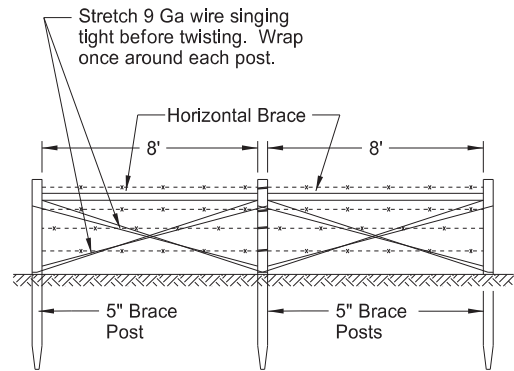
1. No deduction in measured pay length of fence made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Include all costs for abutment fencing in the price bid for fencing bid items.
2. Install double brace assemblies at locations shown on the plans or established by the Engineer. Place adjacent fence terminals, corner assemblies, or double brace assemblies at a maximum spacing of 1,320 feet.
3. Include all costs of furnishing and installing inserts and eyebolts in the unit price bid for fencing bid items. Use eyebolts galvanized according to AASHTO designation M-30; inserts of corrosion resistant material do not require galvanization. Use concrete inserts capable of developing the full strength of the 5/8" diameter threaded eyebolt, when installed in concrete.
4. Determine post type used, either wood or steel, unless otherwise specified in the plans.
5. Include the cost of bracing at vehicle gates in the price bid for "Vehicle Gate."



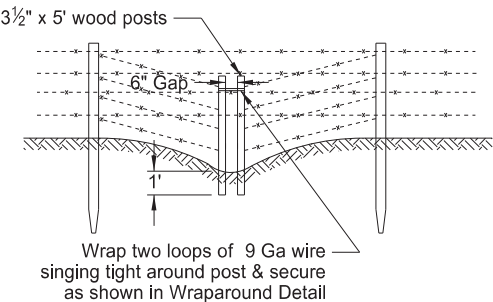
VEHICLE GATE



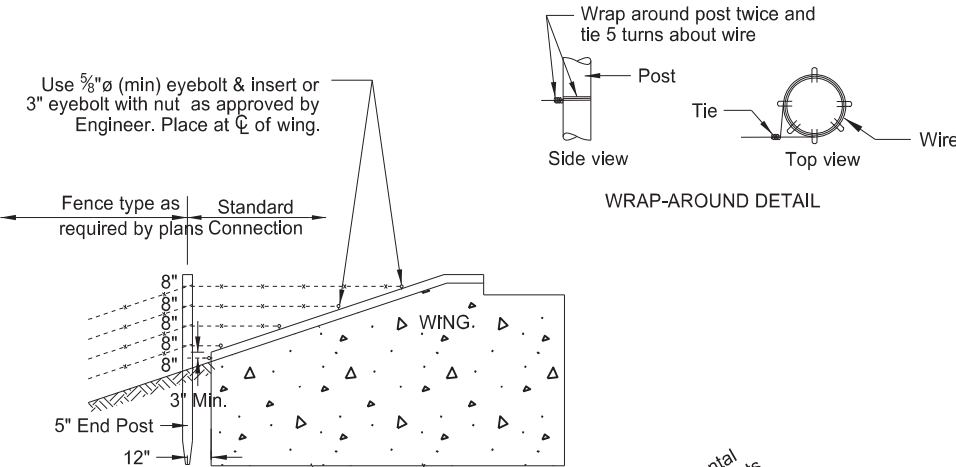
FENCE TERMINAL



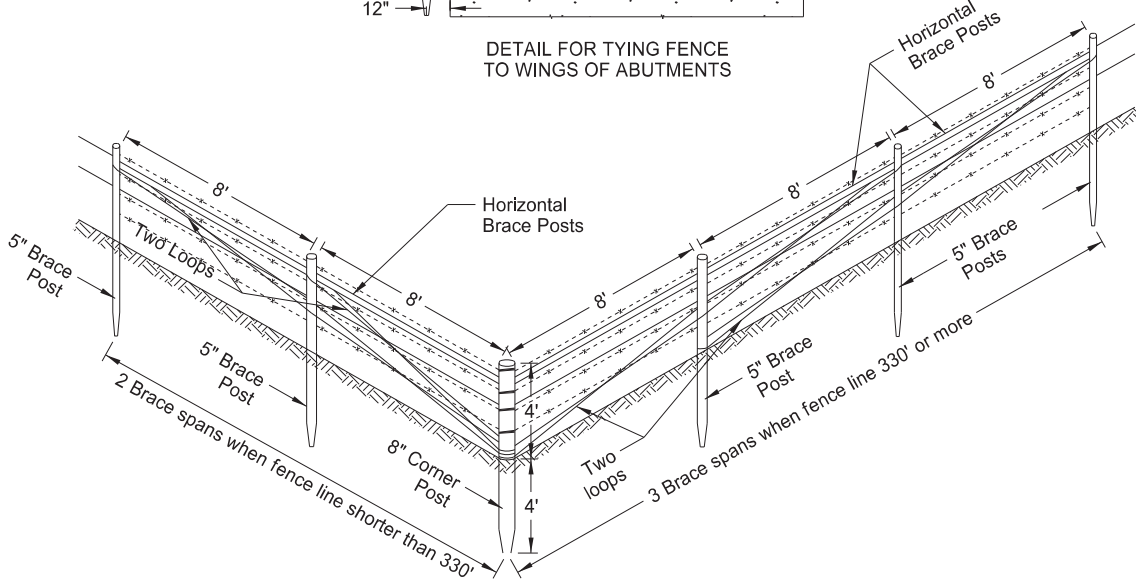
DOUBLE BRACE ASSEMBLY



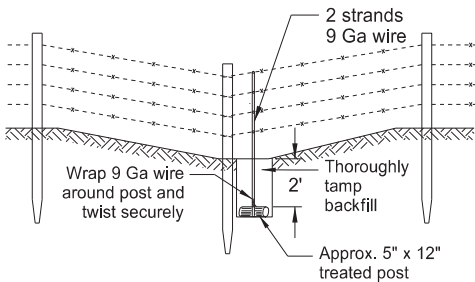
BREAK-AWAY FENCE FOR NARROW DEPRESSIONS SUBJECT TO FLOODING



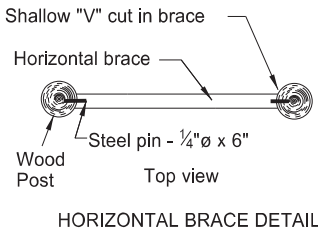
WRAP-AROUND DETAIL



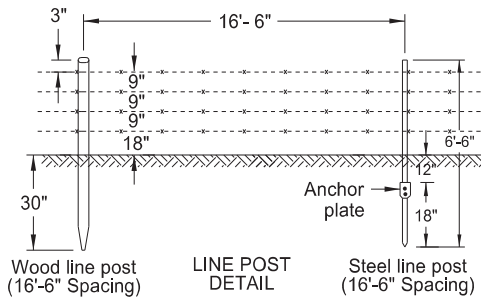
CORNER ASSEMBLY



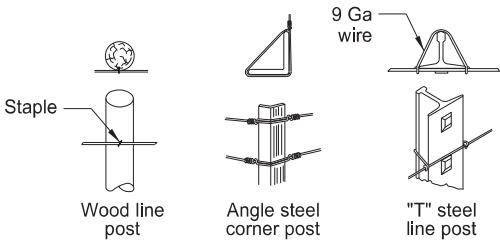
DETAIL FOR ANCHORING FENCES IN DEPRESSIONS\*  
\*Determine locations in the field and include in price bid for fencing. Use other methods of anchoring fence if approved by the Engineer.



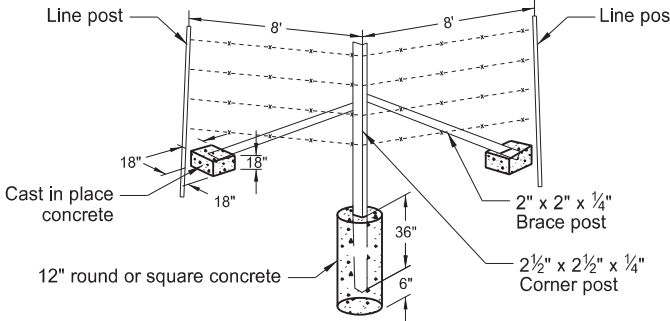
HORIZONTAL BRACE DETAIL



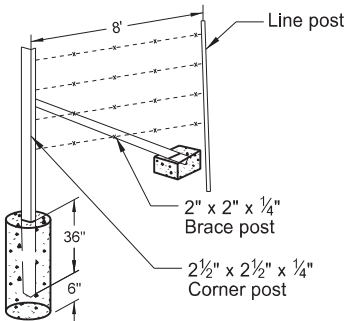
LINE POST DETAIL



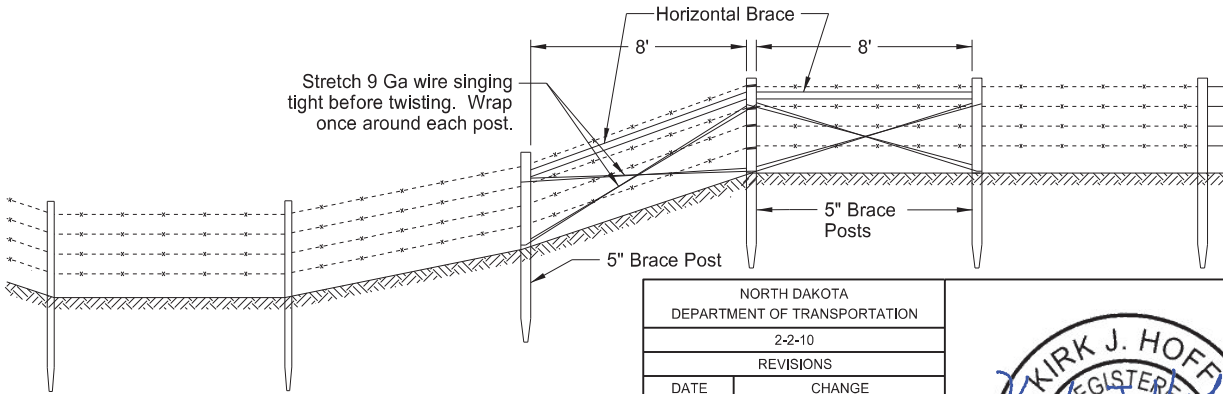
FASTENING TO POSTS



CORNER AND DOUBLE BRACE ASSEMBLY STEEL POSTS



FENCE TERMINAL STEEL POSTS



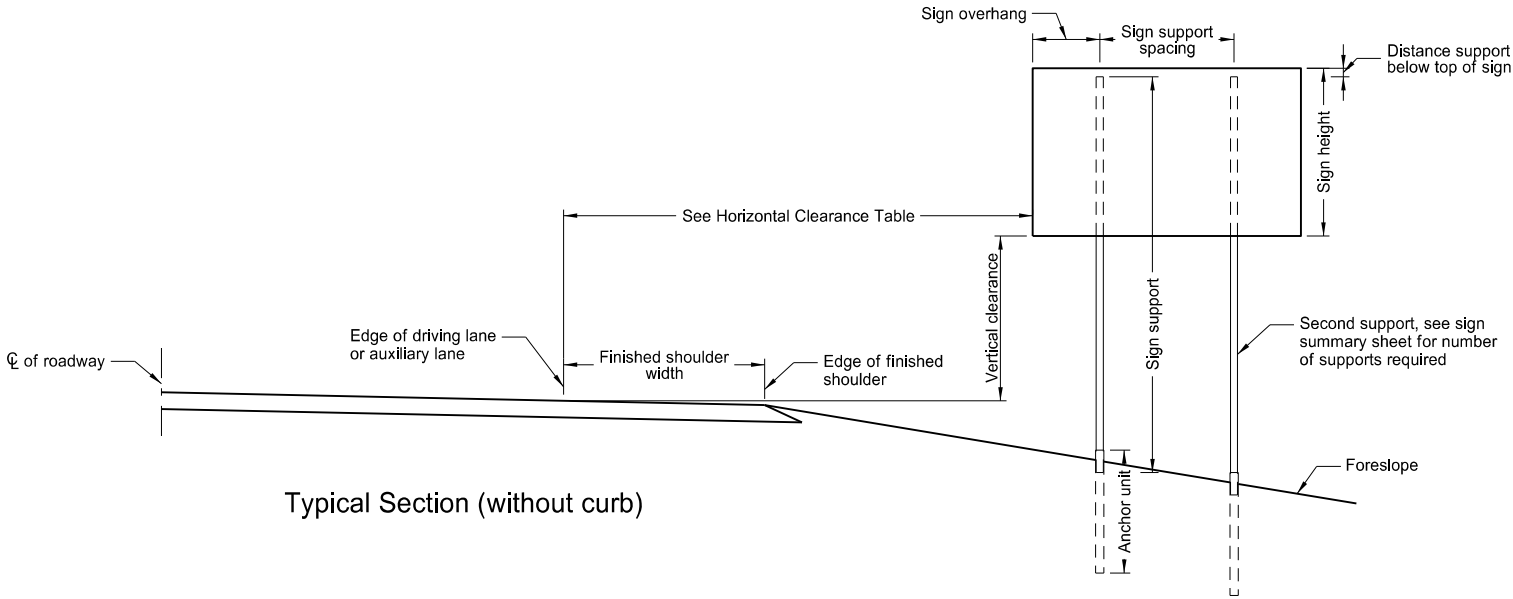
FENCING FOR WIDE DEPRESSIONS  
Use double brace installation, as shown, on opposite side of depression.  
Decrease line post spacing as needed due to terrain.

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                  |
|----------------------------------------------|----------------------------------|
| 2-2-10                                       |                                  |
| REVISIONS                                    |                                  |
| DATE                                         | CHANGE                           |
| 10-02-12                                     | Notes, steel assemblies/posts.   |
| 11-25-13                                     | Revised Vehicle Gate.            |
| 10-17-17                                     | Updated to active voice.         |
| 02-23-23                                     | Revised post spacing/brace size. |



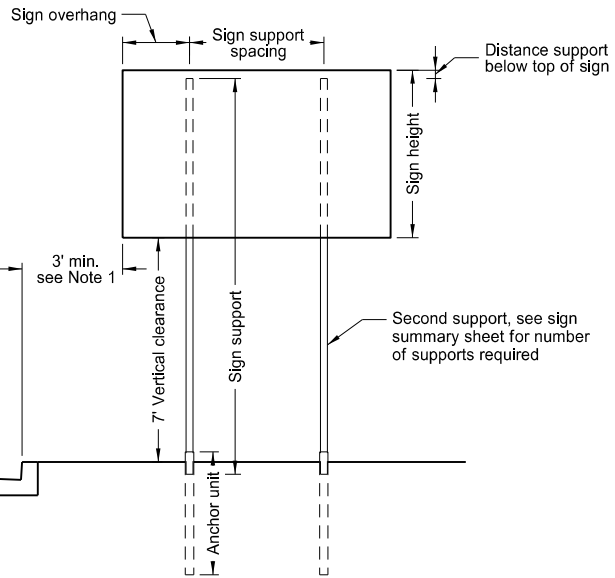
Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.
- Install signs on expressways a minimum height of 7'.
- Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.
- Maximum vertical clearance is 6" greater than the minimum vertical clearance.
3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.

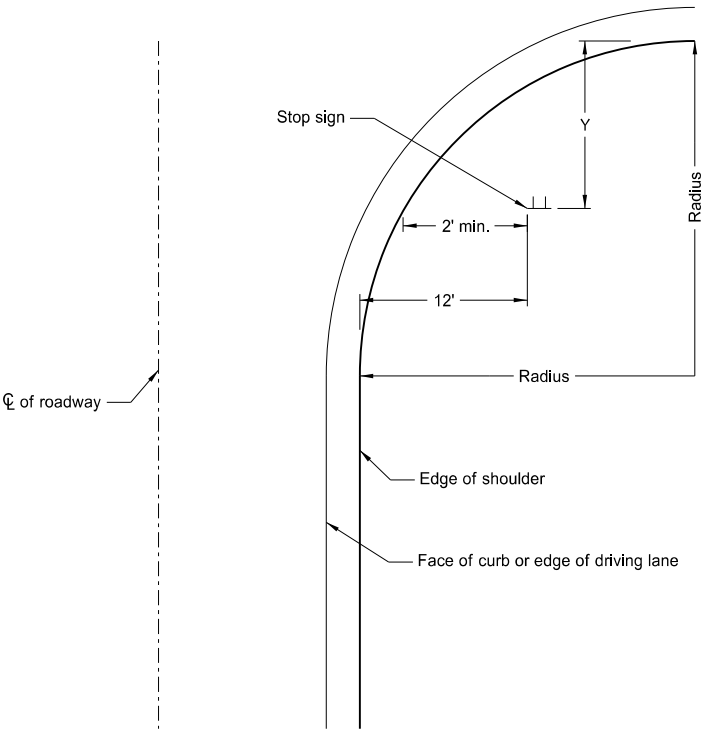


Typical Section (without curb)

| Horizontal Clearance Table |           |
|----------------------------|-----------|
| Shoulder Width ft          | Offset ft |
| 0 to 2                     | 16        |
| >2 to 4                    | 18        |
| >4 to 6                    | 20        |
| >6 to 8                    | 22        |
| >8 to 10                   | 24        |

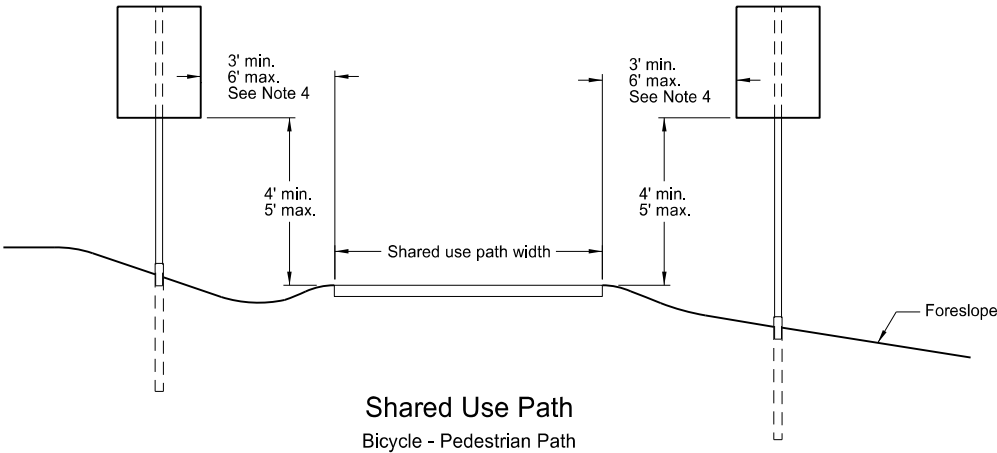


Typical Section (with curb)  
Residential or Business District



Stop Sign Location  
Wide Throat Intersection  
Use layout for the placement of "Stop" signs.

| Radius ft. | Y-max. ft. | Y-min. ft. |
|------------|------------|------------|
| 40         | 50         | 15         |
| 45         | 50         | 18         |
| 50         | 50         | 21         |
| 55         | 50         | 25         |
| 60         | 50         | 28         |
| 65         | 50         | 32         |
| 70         | 50         | 35         |
| 75         | 50         | 39         |
| 80         | 50         | 43         |



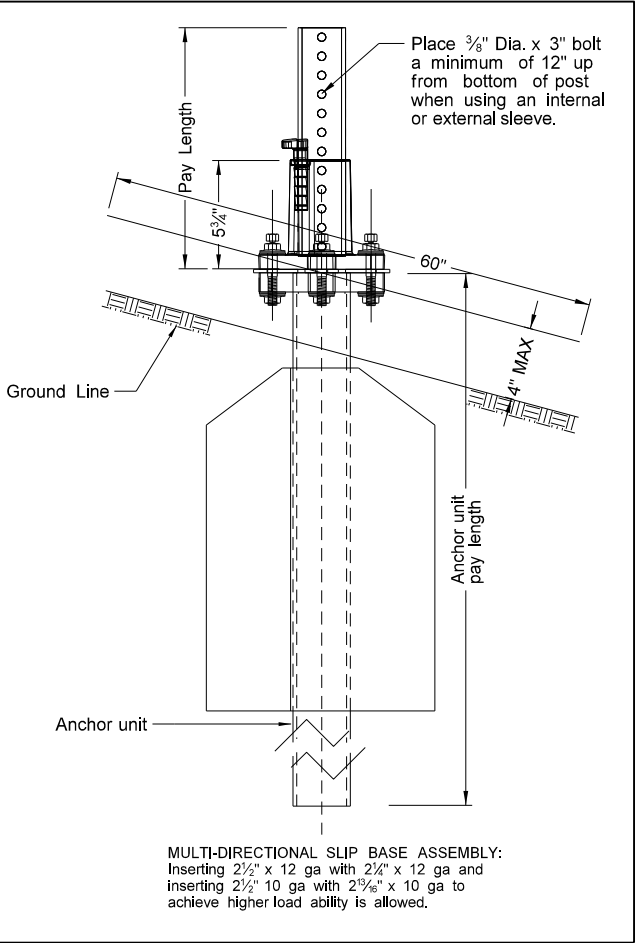
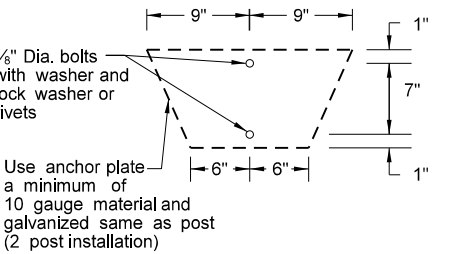
Shared Use Path  
Bicycle - Pedestrian Path

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                |
|----------------------------------------------|--------------------------------|
| 10-3-13                                      |                                |
| REVISIONS                                    |                                |
| DATE                                         | CHANGE                         |
| 7-8-14                                       | Revised note 2, added note 4.  |
| 8-30-18                                      | Updated notes to active voice. |
| 8-29-19                                      | New Design Engineer PE Stamp.  |

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Registration Number  
PE- 4683,  
on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

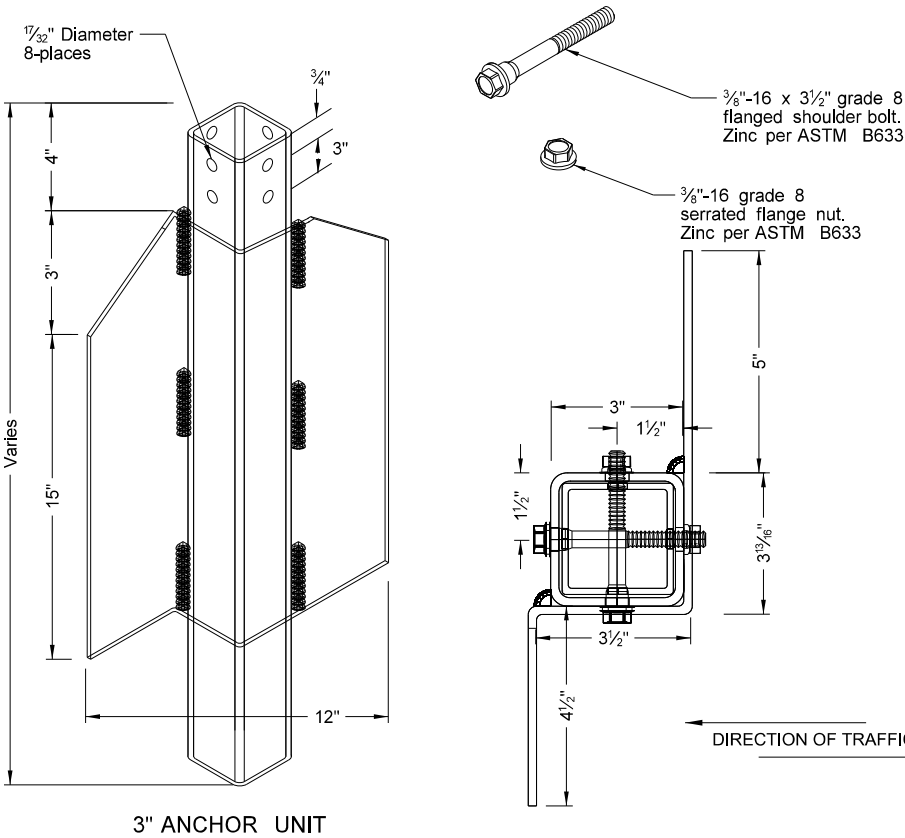
| Telescoping Perforated Tube |               |                       |                 |                       |           |                                   |                              |
|-----------------------------|---------------|-----------------------|-----------------|-----------------------|-----------|-----------------------------------|------------------------------|
| Number of Posts             | Post Size In. | Wall Thick-ness Gauge | Sleeve Size In. | Wall Thick-ness Gauge | Slip Base | Anchor Size Without Slip Base In. | Anchor Wall Thick-ness Gauge |
| 1                           | 2             | 12                    |                 |                       | No        | 2½                                | 12                           |
| 1                           | 2¼            | 12                    |                 |                       | No        | 2½                                | 12                           |
| 1                           | 2½            | 12                    |                 |                       | (B)       | 3(C)                              | 7                            |
| 1                           | 2½            | 10                    |                 |                       | Yes       |                                   | 7                            |
| 1                           | 2¼            | 12                    | 2½(D)           | 12                    | Yes       |                                   | 7                            |
| 1                           | 2½            | 12                    | 2¼              | 12                    | Yes       |                                   | 7                            |
| 2                           | 2½            | 10                    |                 |                       | Yes       |                                   | 7                            |
| 2                           | 2¼            | 12                    | 2½(D)           | 12                    | Yes       |                                   | 7                            |
| 2                           | 2½            | 12                    | 2¼              | 12                    | Yes       |                                   | 7                            |
| 3 & 4                       | 2½            | 12                    |                 |                       | Yes       |                                   | 7                            |
| 3 & 4                       | 2½            | 10                    |                 |                       | Yes       |                                   | 7                            |
| 3 & 4                       | 2½            | 12                    | 2¼              | 12                    | Yes       |                                   | 7                            |
| 3 & 4                       | 2¼            | 12                    | 2½(D)           | 12                    | Yes       |                                   | 7                            |
| 3 & 4                       | 2½            | 10                    | 2¾              | 10                    | Yes       |                                   | 7                            |

(B) - Provide a shim as specified by the manufacturer when placing 2½", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.  
(C) - 3" anchor unit  
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

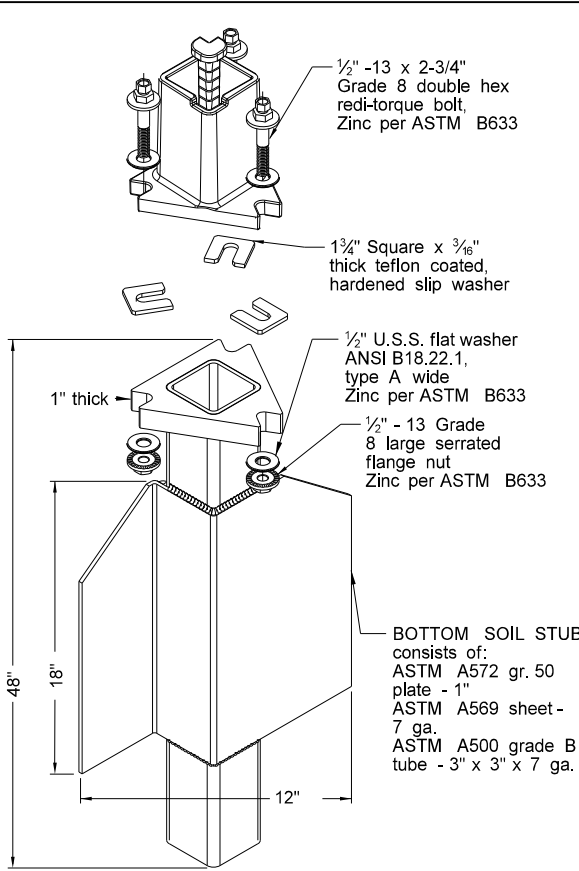


SHOULDER BOLT

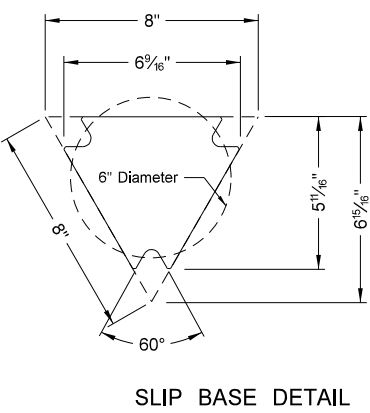
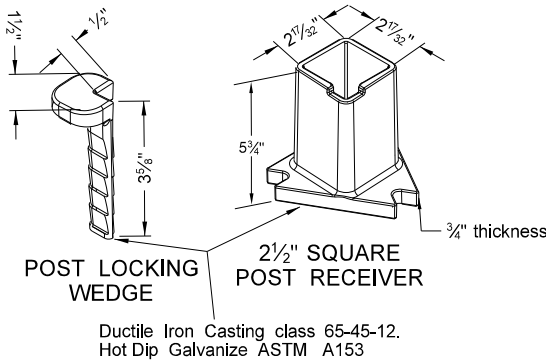
Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.  
(use standard ¾" diameter grade 8 bolt with proper shim)



Mounting Details Perforated Tube

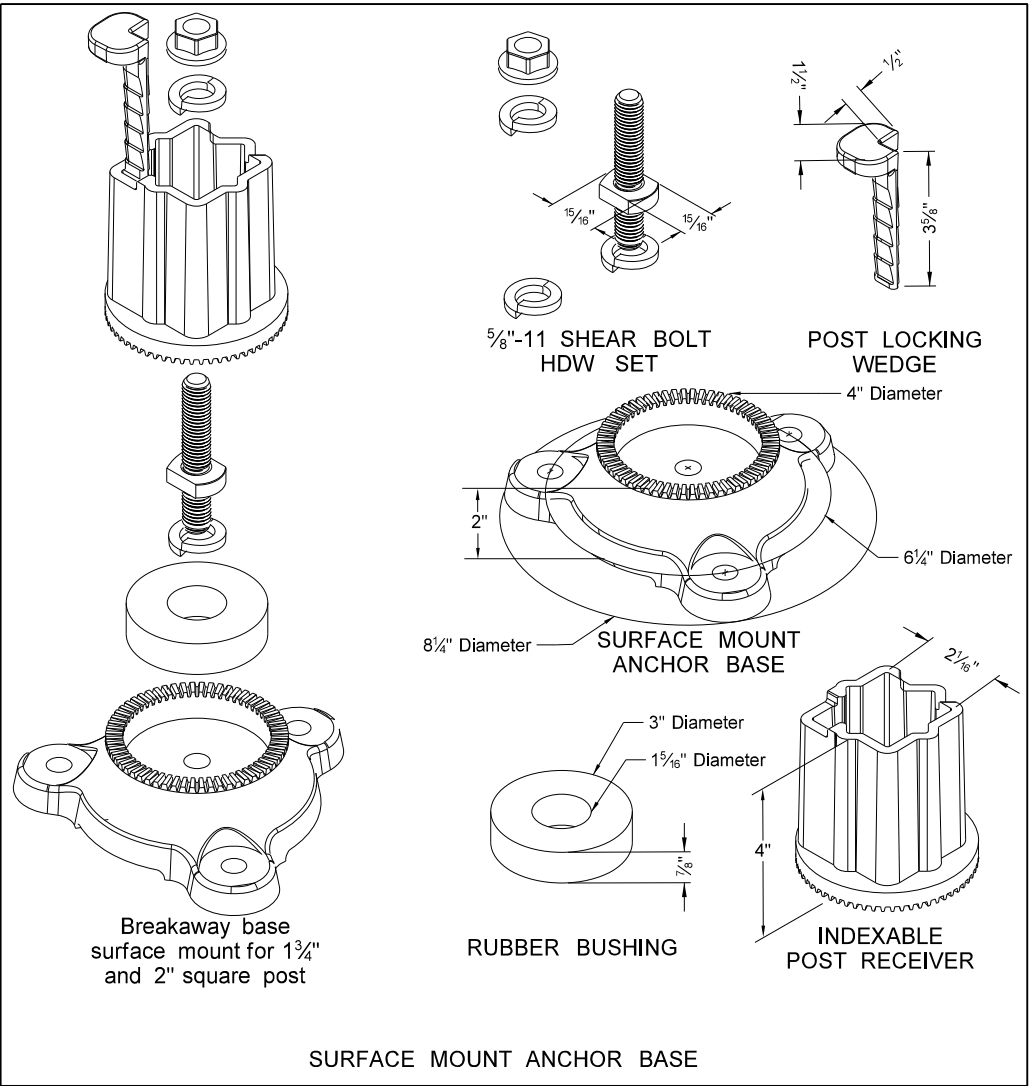


SLIP BASE FOR 2 1/2 inch POST



| Properties of Telescoping Perforated Tubes |                    |                     |                      |                                    |                                   |                                  |  |
|--------------------------------------------|--------------------|---------------------|----------------------|------------------------------------|-----------------------------------|----------------------------------|--|
| Tube Size In.                              | Wall Thickness In. | U.S. Standard Gauge | Weight Per Foot Lbs. | Moment of Inertia In. <sup>4</sup> | Cross Sect. Area In. <sup>2</sup> | Section Modulus In. <sup>3</sup> |  |
| 1½ x 1½                                    | 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                            |  |
| 2¼ x 2¼                                    | 0.105              | 12                  | 2.773                | 0.561                              | 0.695                             | 0.499                            |  |
| 2¾ x 2¾                                    | 0.135              | 10                  | 3.432                | 0.605                              | 0.841                             | 0.590                            |  |
| 2½ x 2½                                    | 0.105              | 12                  | 3.141                | 0.804                              | 0.803                             | 0.643                            |  |
| 2½ x 2½                                    | 0.135              | 10                  | 4.006                | 0.979                              | 1.010                             | 0.783                            |  |

The 2 ¾" size 10 gauge is shown as 2.19" size on the plans;  
The 2½" size is shown as 2.51" size on the plans.



NOTE:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
- Provide 7 gauge HRPO commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- Eliminate wings when anchor is used in concrete sidewalk.
- Provide a minimum 8" distance between the first and fourth post on four post signs.
- Install in accordance with manufacturers recommendation.
- Use a minimum ½" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                               |
|----------------------------------------------|---------------------------------------------------------------|
| 8-6-09                                       |                                                               |
| REVISIONS                                    |                                                               |
| DATE                                         | CHANGE                                                        |
| 8-30-18                                      | Updated notes to active voice & corrected max height of base. |
| 8-29-19                                      | New Design Engineer PE Stamp.                                 |

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Breakaway Coupler System  
for Perforated Tubes

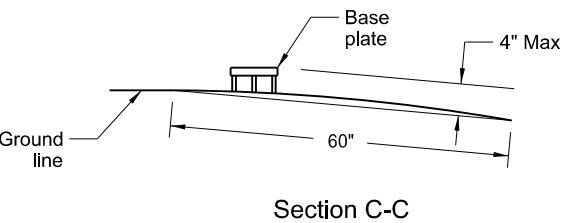
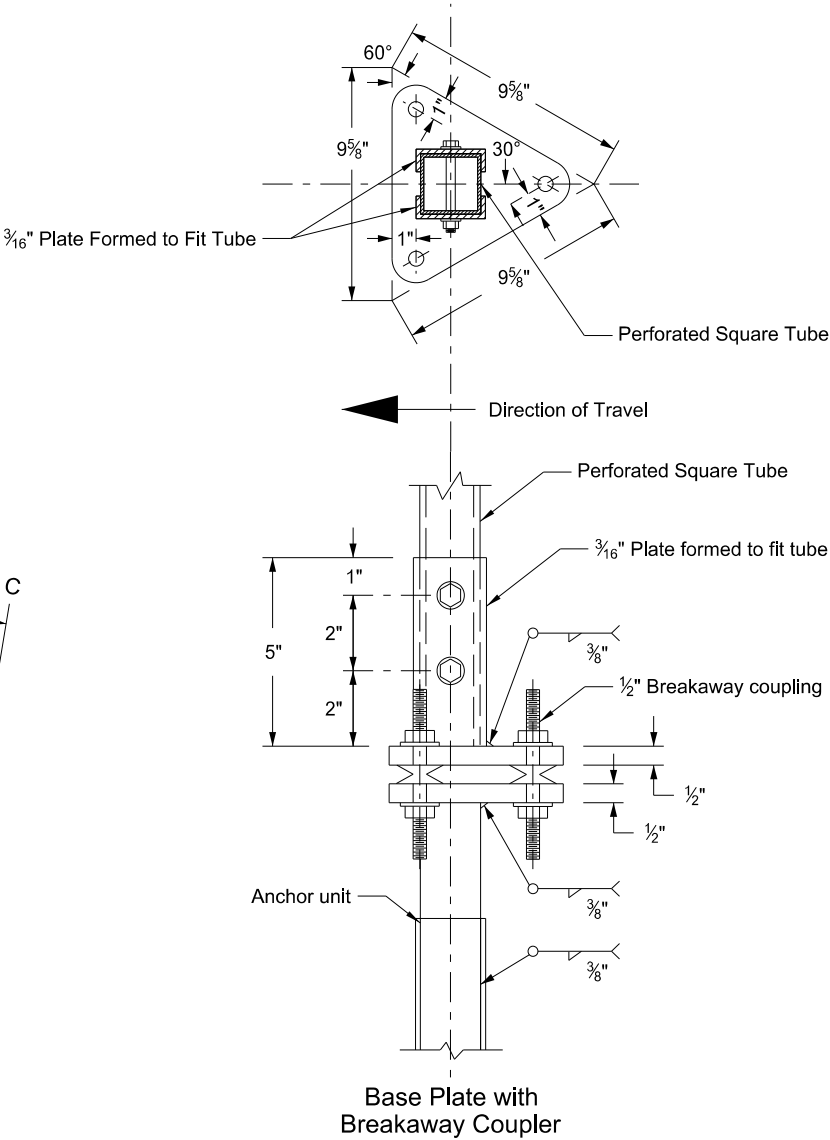
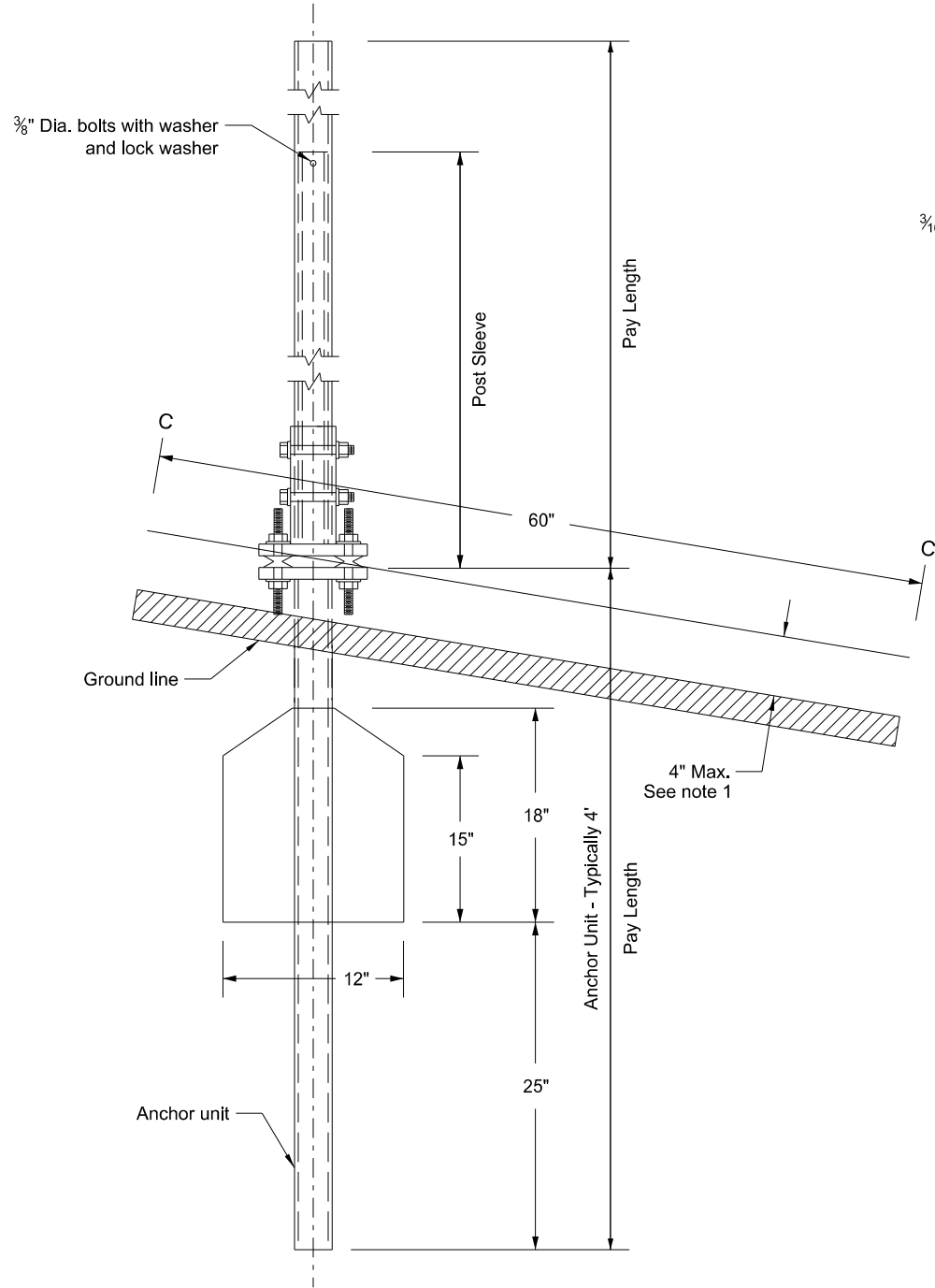
Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Use anchor unit of the same size and specification as the post.
3. Provide a minimum 8' distance between the first and fourth post on four post signs.
4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

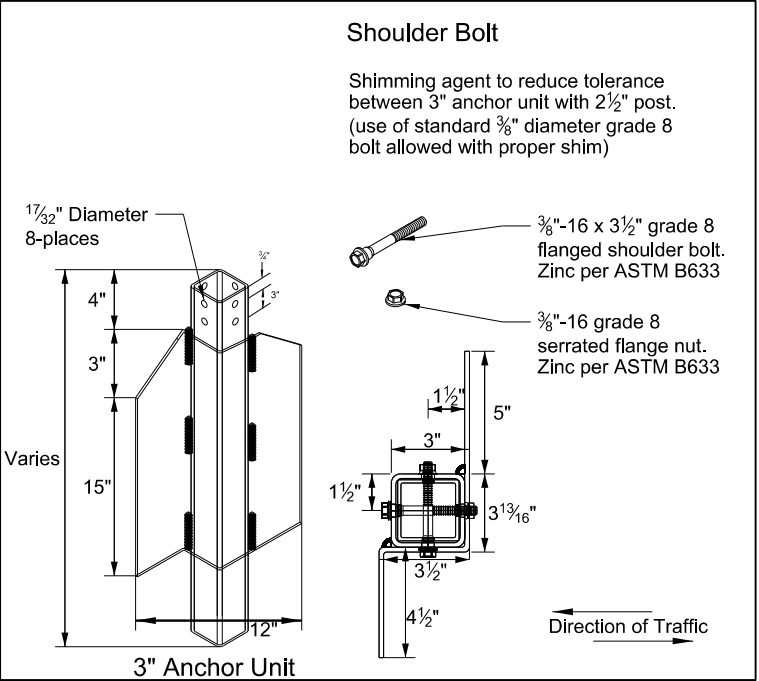
| Number of Posts | Telescoping Perforated Tube |                       |                 |                       |           |                                   |                             |
|-----------------|-----------------------------|-----------------------|-----------------|-----------------------|-----------|-----------------------------------|-----------------------------|
|                 | Post Size In.               | Wall Thick-ness Gauge | Sleeve Size In. | Wall Thick-ness Gauge | Slip Base | Anchor Size Without Slip Base In. | Anchor Wall Thickness Guage |
| 1               | 2                           | 12                    |                 |                       | No        | 2¼                                | 12                          |
| 1               | 2¼                          | 12                    |                 |                       | No        | 2½                                | 12                          |
| 1               | 2½                          | 12                    |                 |                       | (B)       | 3(C)                              | 7                           |
| 1               | 2½                          | 10                    |                 |                       | Yes       |                                   | 7                           |
| 1               | 2¼                          | 12                    | 2               | 12                    | Yes       |                                   | 7                           |
| 1               | 2½                          | 12                    | 2¼              | 12                    | Yes       |                                   | 7                           |
| 2               | 2½                          | 10                    |                 |                       | Yes       |                                   | 7                           |
| 2               | 2¼                          | 12                    | 2               | 12                    | Yes       |                                   | 7                           |
| 2               | 2½                          | 12                    | 2¼              | 12                    | Yes       |                                   | 7                           |
| 3 & 4           | 2½                          | 12                    |                 |                       | Yes       |                                   | 7                           |
| 3 & 4           | 2½                          | 10                    |                 |                       | Yes       |                                   | 7                           |
| 3 & 4           | 2½                          | 12                    | 2¼              | 12                    | Yes       |                                   | 7                           |
| 3 & 4           | 2¼                          | 12                    | 2               | 12                    | Yes       |                                   | 7                           |
| 3 & 4           | 2½                          | 10                    | 2¾              | 10                    | Yes       |                                   | 7                           |

(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

(C) - 3" anchor unit



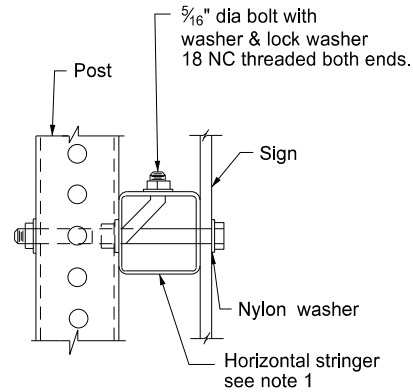
Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



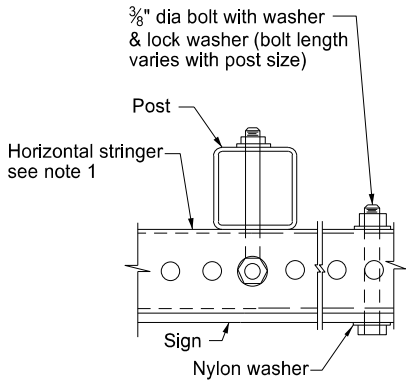
|                                              |                                                             |                                                                                                                                                                                                                    |
|----------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                             | This document was originally issued and sealed by<br><br>Kirk J Hoff,<br>Registration Number<br>PE- 4683,<br>on 8/30/19 and the original document is stored at the<br>North Dakota Department<br>of Transportation |
| 10-3-2013                                    |                                                             |                                                                                                                                                                                                                    |
| REVISIONS                                    |                                                             |                                                                                                                                                                                                                    |
| DATE                                         | CHANGE                                                      |                                                                                                                                                                                                                    |
| 8-30-18<br>8-30-19                           | Updated notes to active voice.<br>New Design Engr PE Stamp. |                                                                                                                                                                                                                    |



Mounting Details Perforated Tube

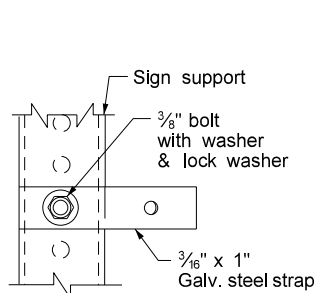


Side View

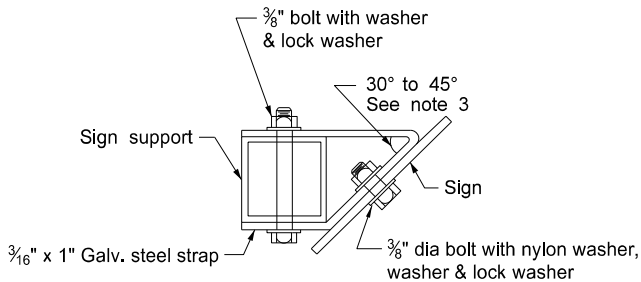


Top View

STRINGER MOUNTING  
(WITH STRINGER IN FRONT OF POST)

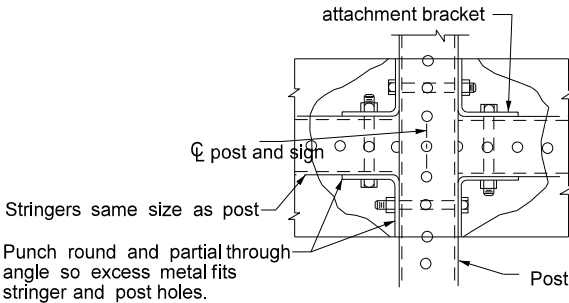


Side View

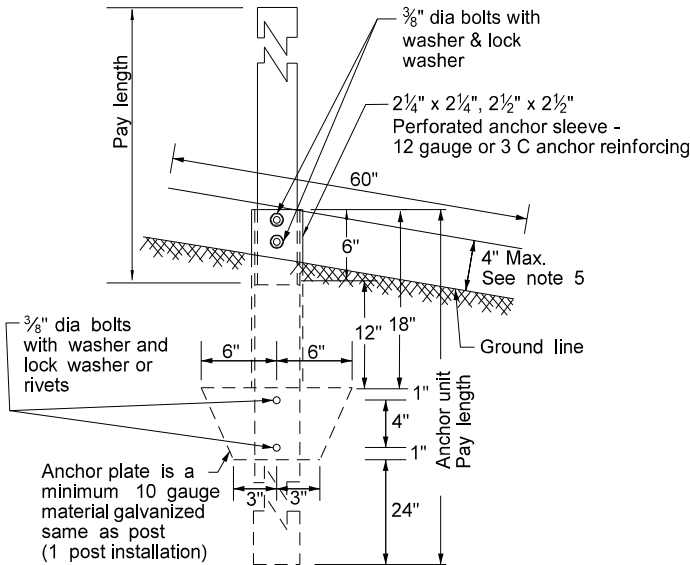


Top View

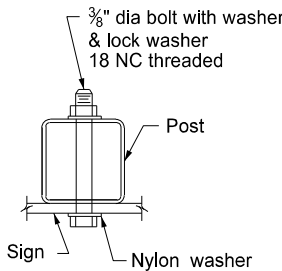
STRAP DETAIL



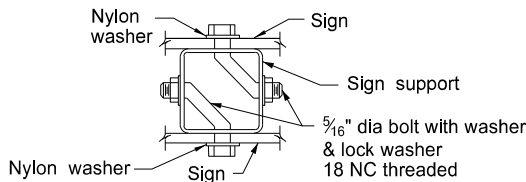
STREET NAME SIGNS AND ONE WAY SIGNS  
SINGLE POST ASSEMBLY  
ONE STRINGER OR BACK TO BACK MOUNTING



ANCHOR UNIT AND POST ASSEMBLY

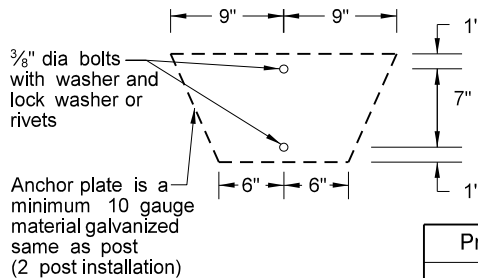


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



| Properties of Telescoping Perforated Tubes |                    |                     |                      |                                    |                                   |                                  |
|--------------------------------------------|--------------------|---------------------|----------------------|------------------------------------|-----------------------------------|----------------------------------|
| Tube Size In.                              | Wall Thickness In. | U.S. Standard Gauge | Weight Per Foot Lbs. | Moment of Inertia In. <sup>4</sup> | Cross Sect. area In. <sup>2</sup> | Section Modulus In. <sup>3</sup> |
| 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                             | 0.783                            |

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans.  
The 2 1/2" size is shown as 2.51" size on the plans.

Note:

- Horizontal stringers - Use perforated tubes or 1 3/4" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
- Use minimum outside diameter 1 5/16" ± 1/16" and 10 gauge thick metal washers on sign face.
- Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
- Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
- 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

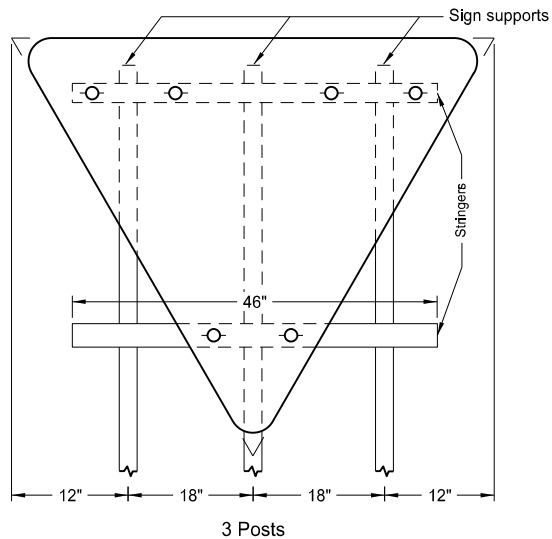
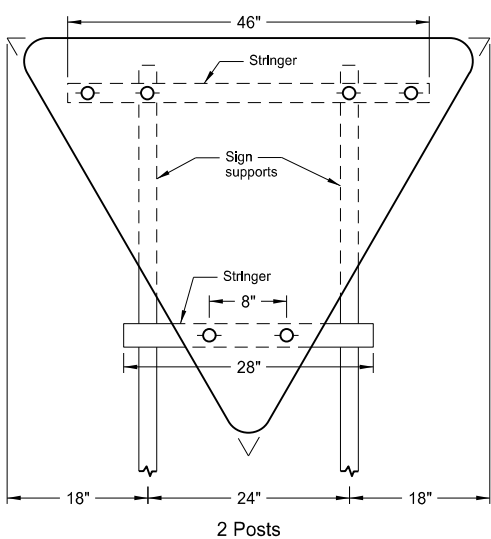
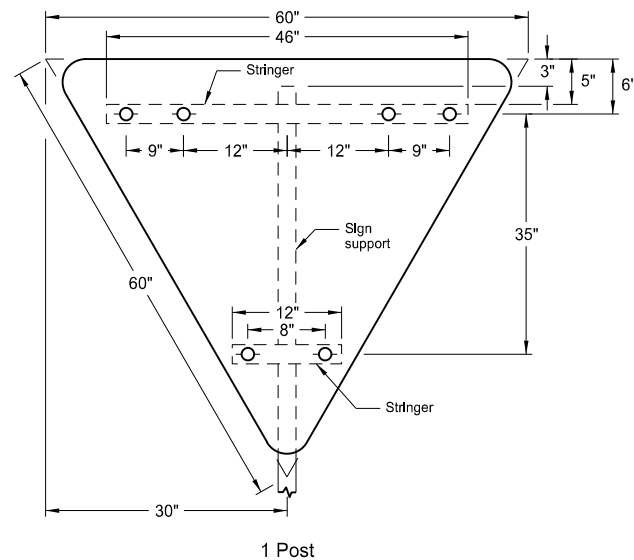
| Number of Posts | Telescoping Perforated Tube |                      |                 |                      |           |                                   |                             |
|-----------------|-----------------------------|----------------------|-----------------|----------------------|-----------|-----------------------------------|-----------------------------|
|                 | Post Size In.               | Wall Thickness Gauge | Sleeve Size In. | Wall Thickness Gauge | Slip Base | Anchor Size Without Slip Base In. | Anchor Wall Thickness Gauge |
| 1               | 2                           | 12                   |                 |                      | No        | 2 1/4                             | 12                          |
| 1               | 2 1/4                       | 12                   |                 |                      | No        | 2 1/2                             | 12                          |
| 1               | 2 1/2                       | 12                   |                 |                      | (B)       | 3(C)                              | 7                           |
| 1               | 2 1/2                       | 10                   |                 |                      | Yes       |                                   | 7                           |
| 1               | 2 1/4                       | 12                   | 2 1/2(D)        | 12                   | Yes       |                                   | 7                           |
| 1               | 2 1/2                       | 12                   | 2 1/4           | 12                   | Yes       |                                   | 7                           |
| 2               | 2 1/2                       | 10                   |                 |                      | Yes       |                                   | 7                           |
| 2               | 2 1/4                       | 12                   | 2 1/2(D)        | 12                   | Yes       |                                   | 7                           |
| 2               | 2 1/2                       | 12                   | 2 1/4           | 12                   | Yes       |                                   | 7                           |
| 3 & 4           | 2 1/2                       | 12                   |                 |                      | Yes       |                                   | 7                           |
| 3 & 4           | 2 1/2                       | 10                   |                 |                      | Yes       |                                   | 7                           |
| 3 & 4           | 2 1/2                       | 12                   | 2 1/4           | 12                   | Yes       |                                   | 7                           |
| 3 & 4           | 2 1/4                       | 12                   | 2 1/2(D)        | 12                   | Yes       |                                   | 7                           |
| 3 & 4           | 2 1/2                       | 10                   | 2 3/16          | 10                   | Yes       |                                   | 7                           |

(B) - When placing 2 1/2", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.  
(C) - 3" anchor unit  
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

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|----------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8-6-09                                       |                                                                                |                                                                                                                                                                                                                                   |
| REVISIONS                                    |                                                                                |                                                                                                                                                                                                                                   |
| DATE                                         | CHANGE                                                                         |                                                                                                                                                                                                                                   |
| 7-8-14<br>8-30-18<br>8-30-19                 | Revised Note 3.<br>Updated notes to active voice.<br>New Design Engr PE Stamp. |                                                                                                                                                                                                                                   |

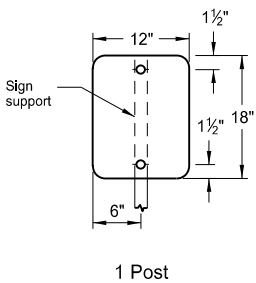


SIGN PUNCHING, STRINGER AND SUPPORT LOCATION  
DETAILS REGULATORY, WARNING AND GUIDE SIGNS

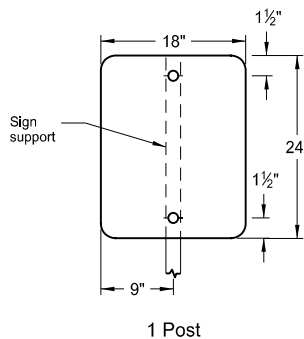


- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
  2. Use 1½" x 1½" perforated square tube stringers.
  3. Punch holes round for ⅝" bolt.

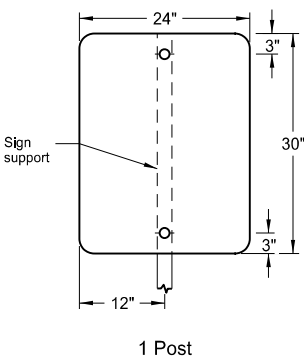
Assembly No. 6



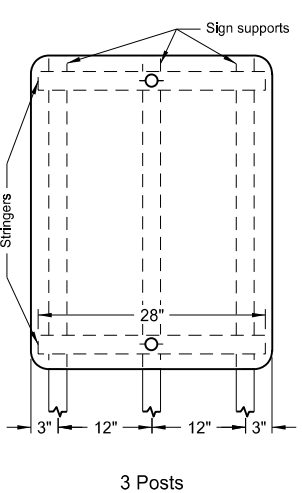
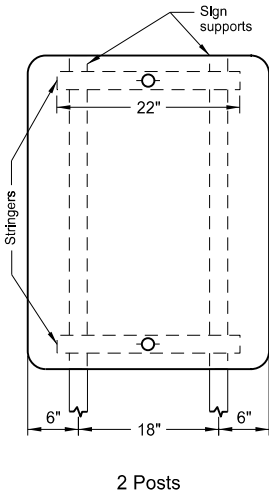
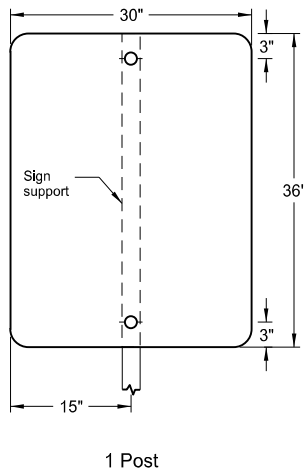
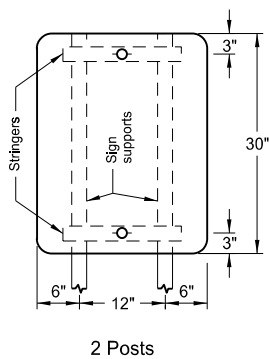
Assembly No. 7



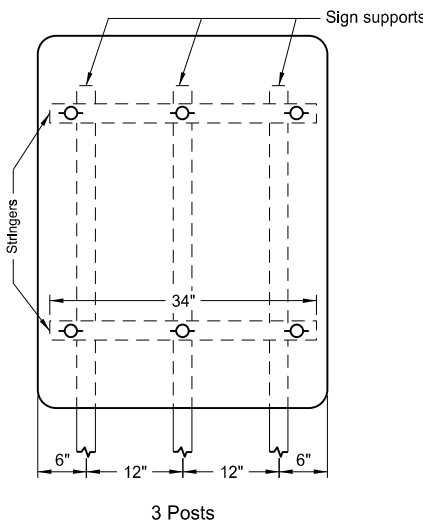
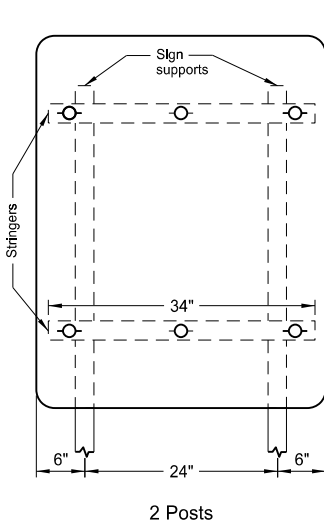
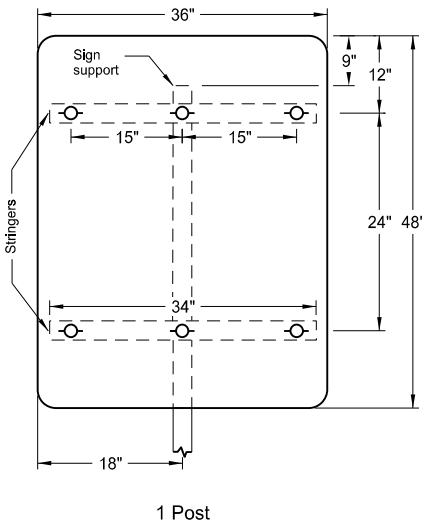
Assembly No. 8



Assembly No. 9



Assembly No. 10

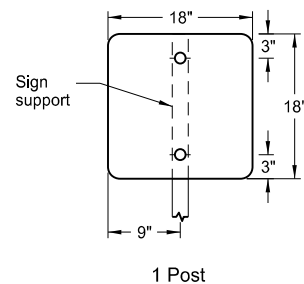
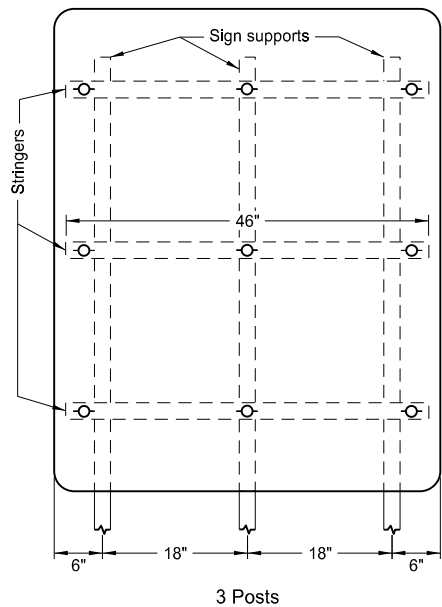
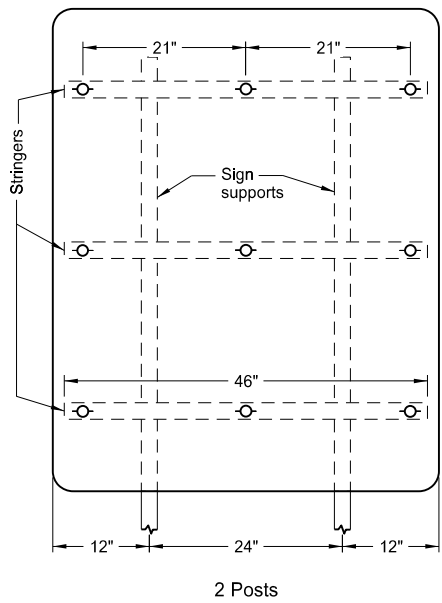
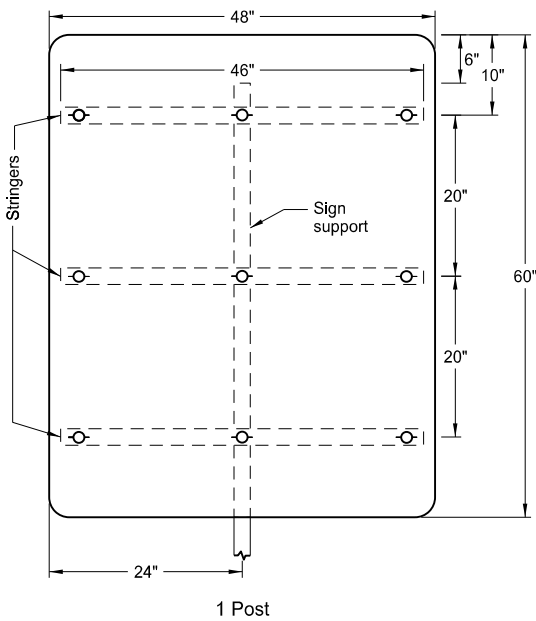


Assembly No. 11

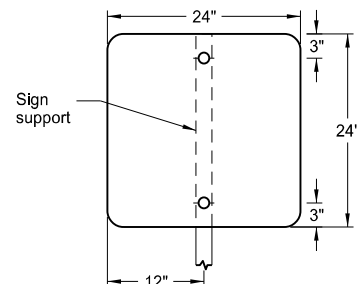
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                |
|----------------------------------------------|--------------------------------|
| 12-1-10                                      |                                |
| REVISIONS                                    |                                |
| DATE                                         | CHANGE                         |
| 8-30-18                                      | Updated notes to active voice. |
| 8-30-19                                      | New Design Engineer PE Stamp.  |

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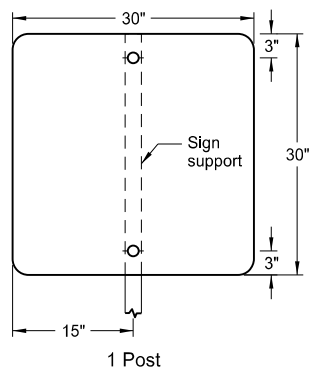
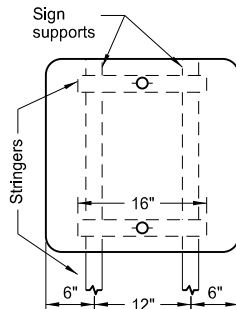
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION  
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



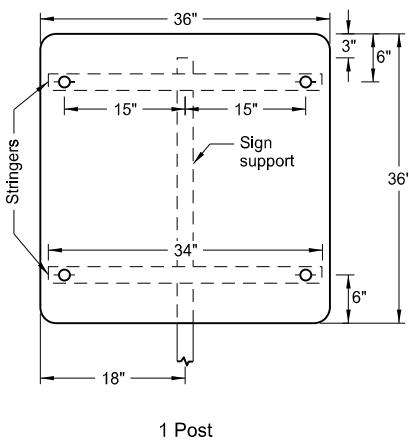
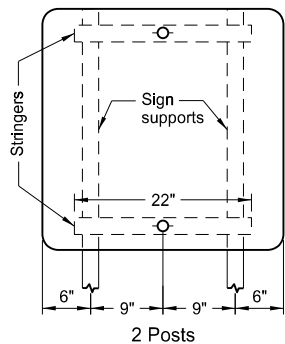
Assembly No. 13



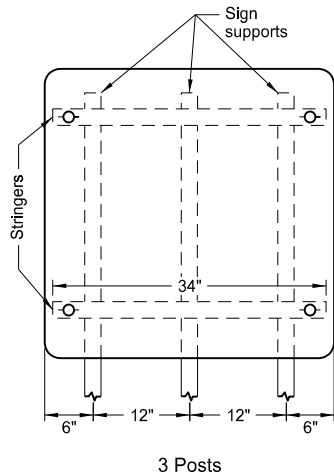
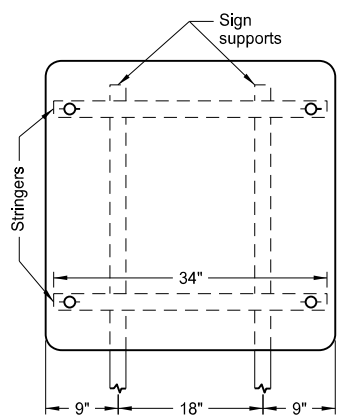
Assembly No. 14



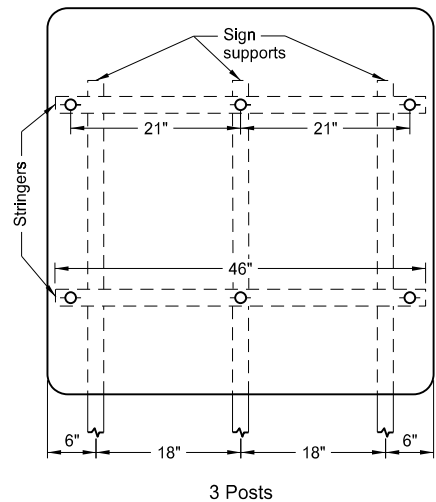
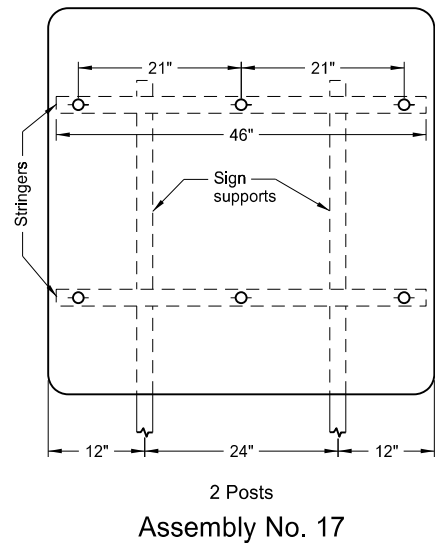
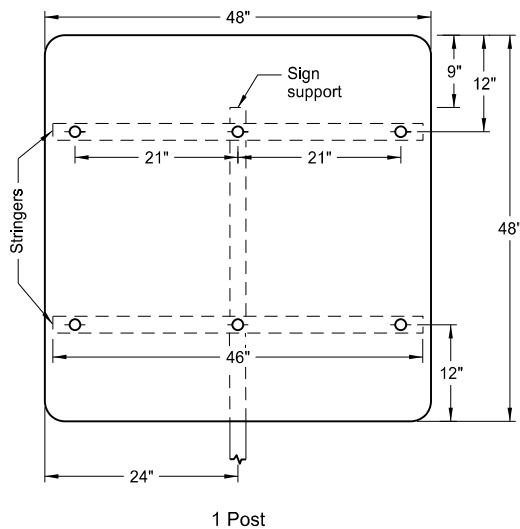
Assembly No. 15



Assembly No. 16



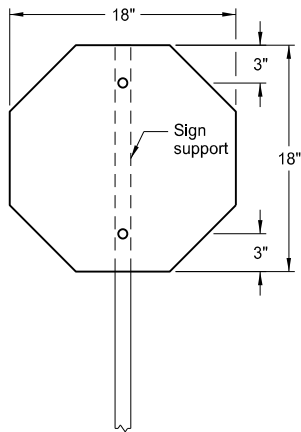
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
  2. Use 1½" x 1½" perforated square tube stringers.
  3. Punch holes round for ⅜" bolt.



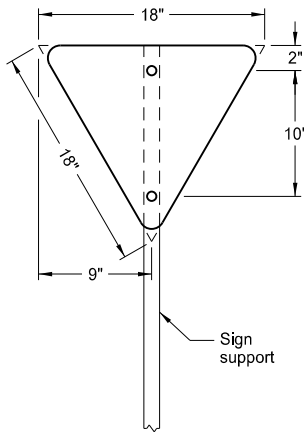
| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                             |
|----------------------------------------------|-------------------------------------------------------------|
| 12-1-10                                      |                                                             |
| REVISIONS                                    |                                                             |
| DATE                                         | CHANGE                                                      |
| 8-30-18                                      | Updated to active voice & changed Assembly 16 post spacing. |
| 8-30-19                                      | New Design Engineer PE Stamp.                               |

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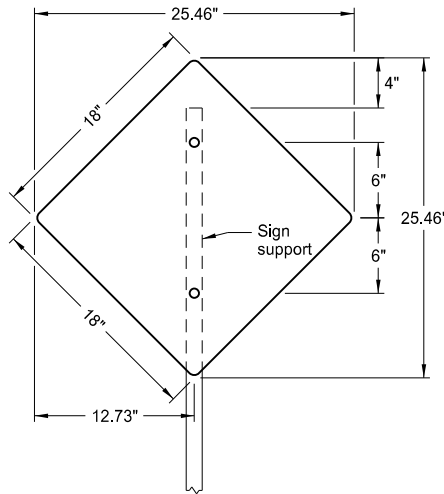
PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS  
FOR REGULATORY, WARNING AND GUIDE BIKE ROUTE SIGNS



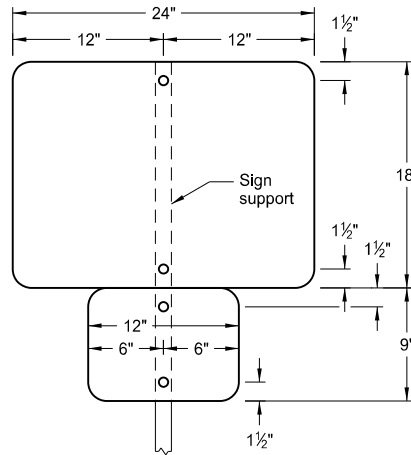
1 Post  
Assembly No. 100



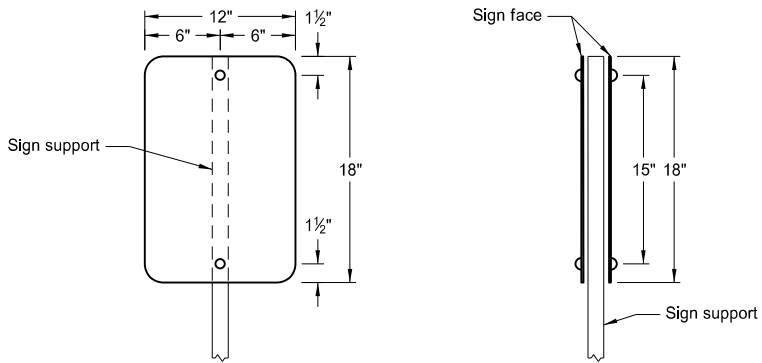
1 Post  
Assembly No. 101



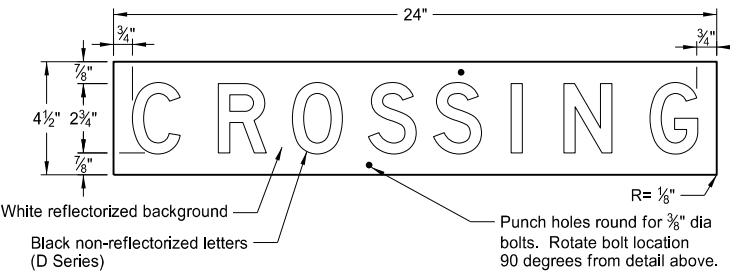
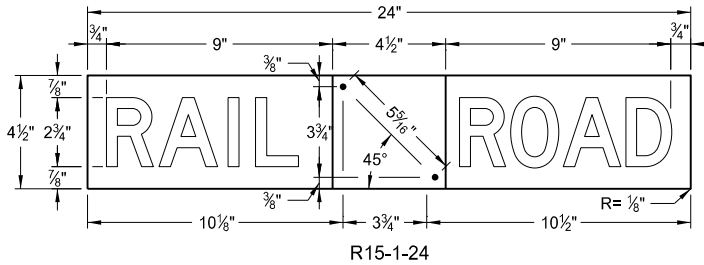
1 Post  
Assembly No. 102



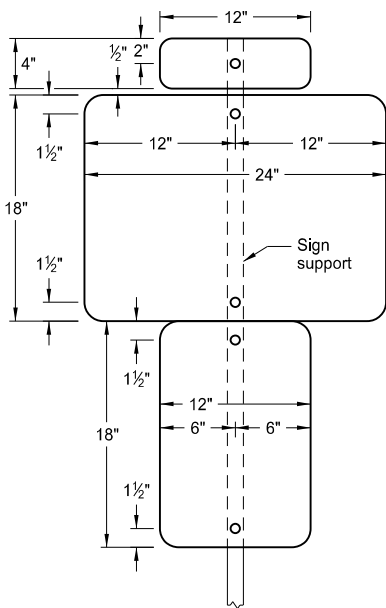
1 Post  
Assembly No. 103



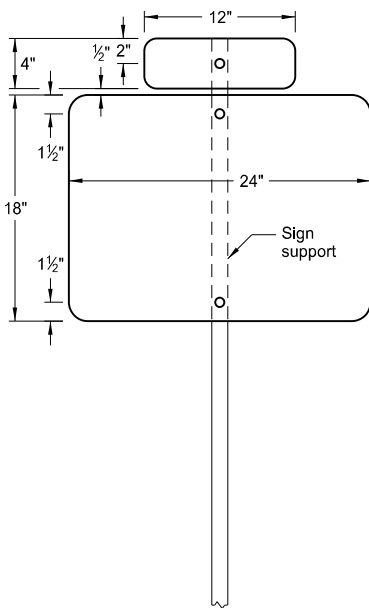
1 Post  
back to back  
Assembly No. 104



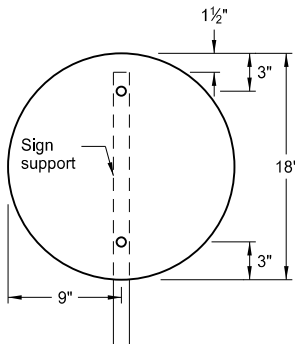
Railroad Crossing Sign Details



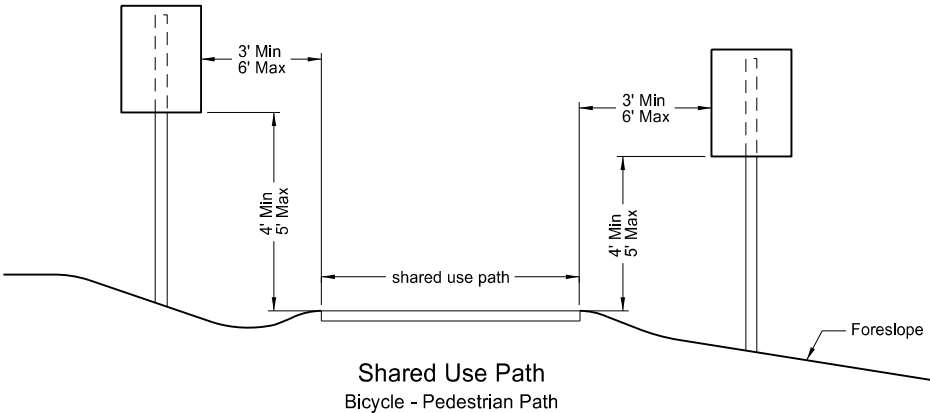
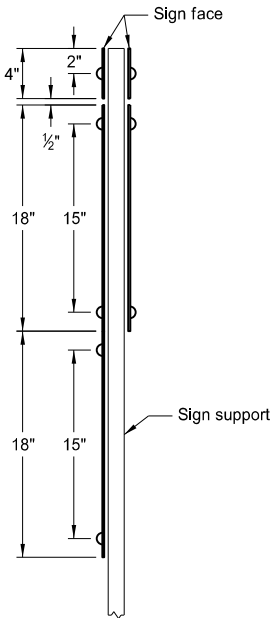
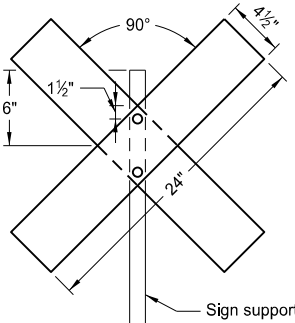
1 Post  
back to back  
Assembly No. 105



1 Post  
Assembly No. 106



1 Post  
Assembly No. 107



- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
  2. Punch holes round for 3/8" bolt.

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                |
|----------------------------------------------|--------------------------------|
| 8-22-12                                      |                                |
| REVISIONS                                    |                                |
| DATE                                         | CHANGE                         |
| 9-18-15                                      | Revised Title Name.            |
| 8-30-18                                      | Updated notes to active voice. |
| 9-04-19                                      | New Design Engineer PE Stamp.  |

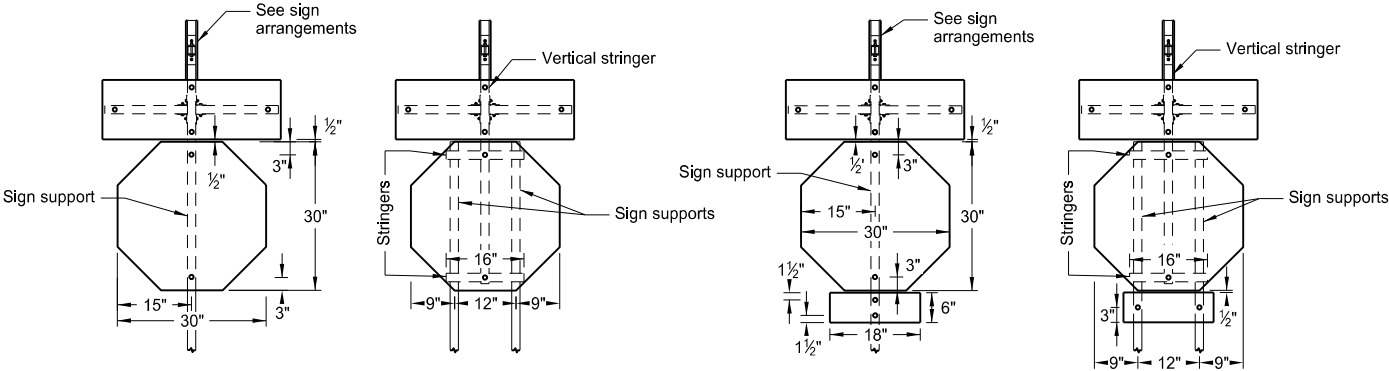
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Diagram illustrating the placement of rectangular signs on a single post versus two posts.

**1 Post:** Shows a single vertical post supporting a rectangular sign. The sign's width is indicated as "Varies". Labels include "Sign with least area" (top), "Sign with greatest area" (bottom), and "Sign support". A reference "See sign arrangements" points to the top of the post.

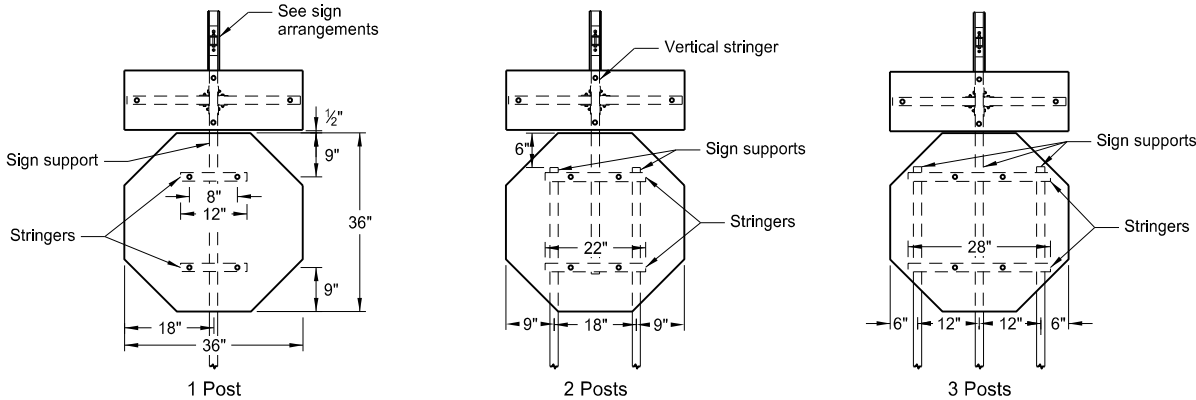
**2 Posts:** Shows two vertical posts supporting a rectangular sign. The sign's width is indicated as "Varies". Labels include "Sign support nearest roadway" (left post), "Sign support" (right post), "Sign with least area" (top), and "Sign with greatest area" (bottom). A reference "See sign arrangements" points to the top of the right post.

Special Assembly 1 (A, B, C, D or E)

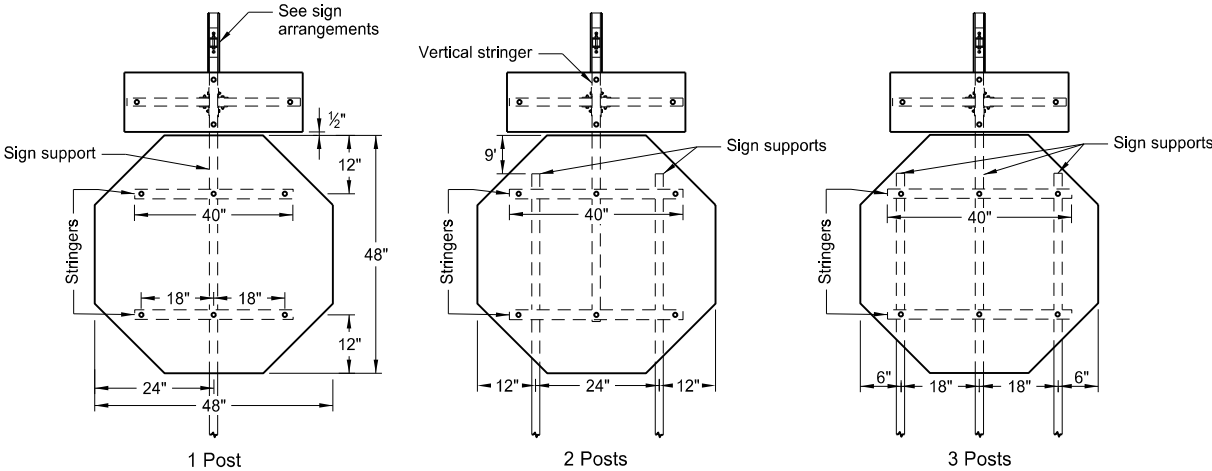


Special Assembly 2 (A, B, C, D or E)

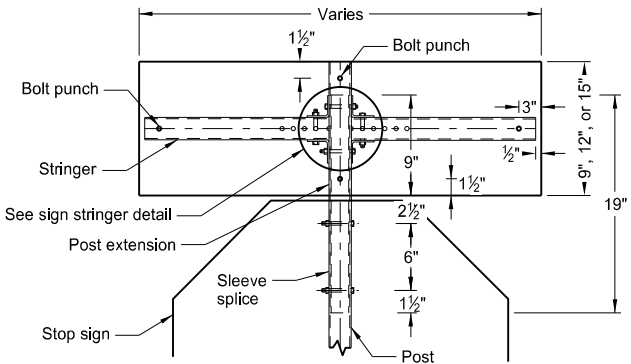
Special Assembly 3 (A, B, C, D or E)



Special Assembly 4 (A, B, C, D or E)



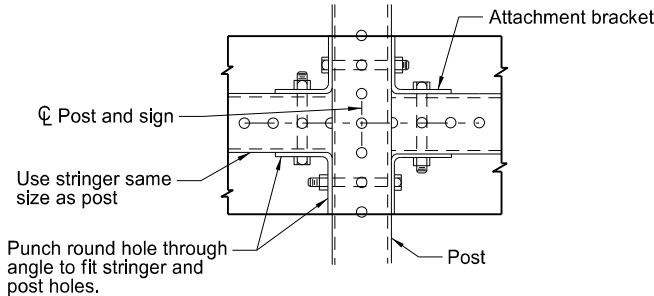
Special Assembly 5 (A, B, C, D or E)



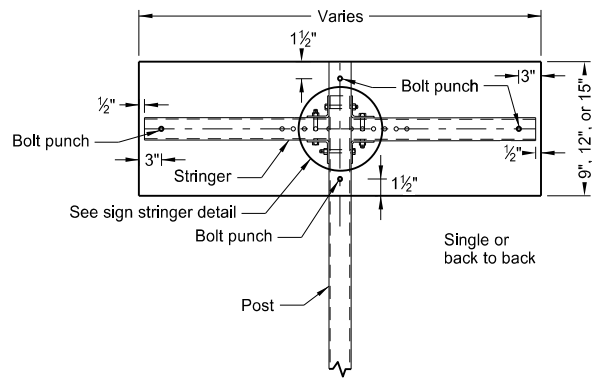
Front View

Sleeve Splice Detail

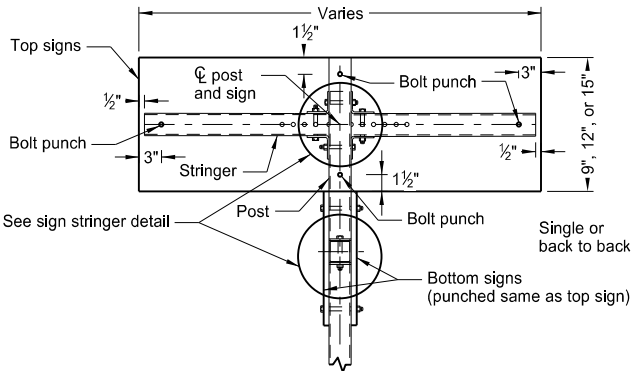
Note: Only use splice method with approval of engineer.



### Sign Stringer Detail



Detail A or B

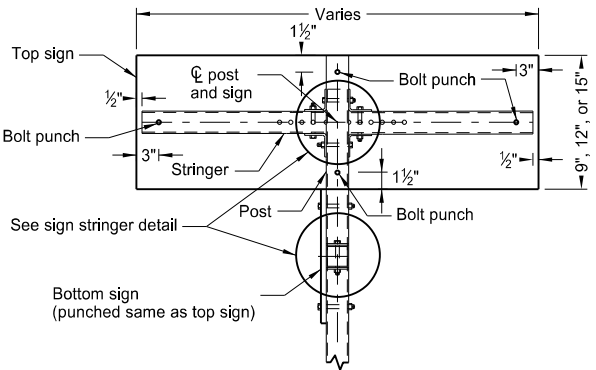


Detail D or E

Diagram illustrating the placement of a stop sign and street name signs at a street corner. The diagram shows the intersection of two roads, with the 'G of roadway' indicated by a dashed line. The 'Face of curb or edge of driving lane' is marked. The 'Edge of finished shoulder' is marked. The distance from the curb to the signs is specified as '20' min. 30' max.'. The distance from the curb to the 'Stop sign' is marked as '14''. The distance from the curb to the 'Street Name or 911 Signs' is marked as '14''. The 'Stop sign' is placed on the 'G of roadway'.

## Intersection Layout

Note: Use layout for street name signs or 911 signs with Special Assembly 1.



### Detail C

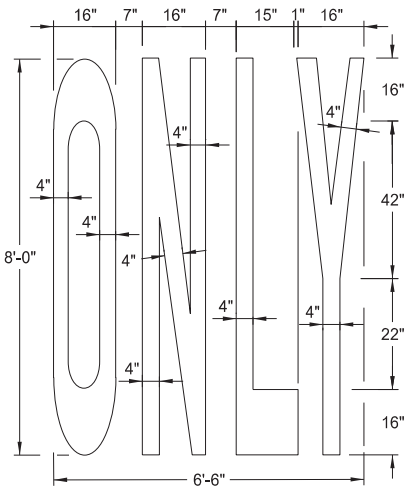
## Sign Arrangements

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                                                |
|----------------------------------------------|----------------------------------------------------------------|
| 10-3-13                                      |                                                                |
| REVISIONS                                    |                                                                |
| DATE                                         | CHANGE                                                         |
| 8-30-18                                      | Added 2 post layout for SA1 and Updated notes to active voice. |
| 9-05-19                                      | New Design Engineer PE Stamp.                                  |

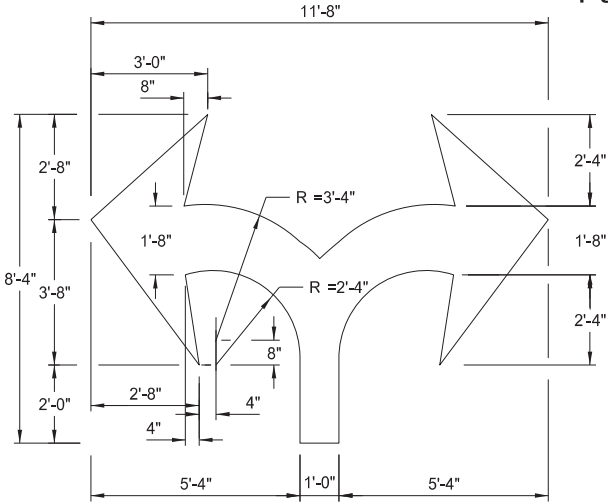
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on 9/05/19 and the original document is stored at the  
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of Transportation

Pavement Marking Message Details

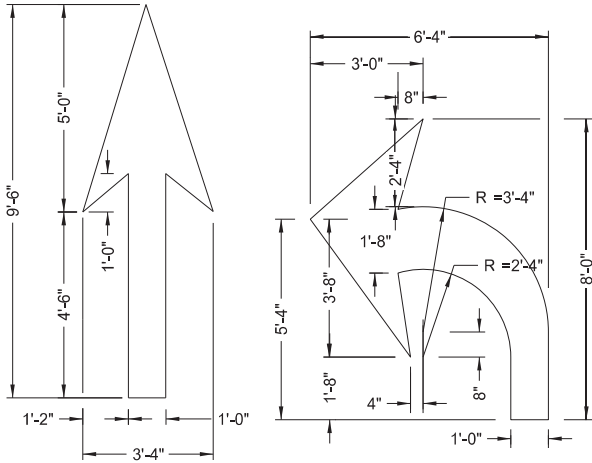
D-762-1



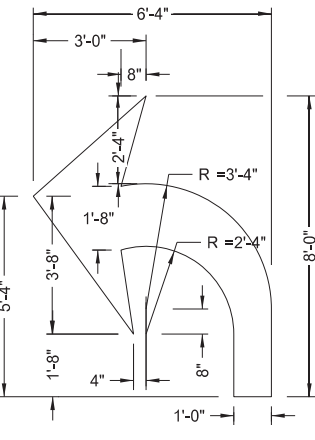
22 S. F.



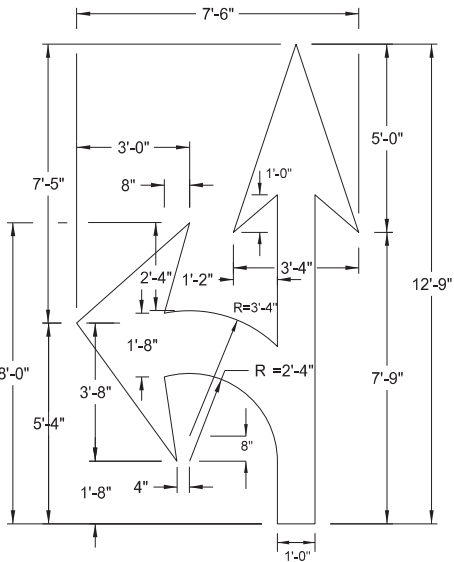
29 S. F.



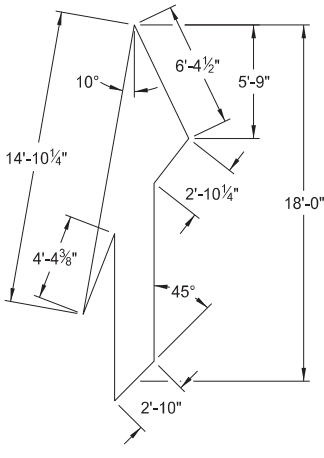
12 S. F.



16 S. F.



27 S. F.

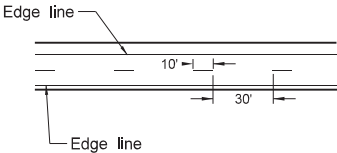


41 S. F.

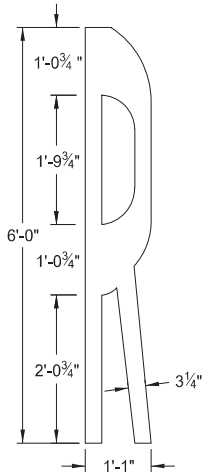
Note: Rotate merge arrow 20° from edge of roadway.

| Speed Limit      | Chevron Width | Chevron Spacing 45° to Traffic |
|------------------|---------------|--------------------------------|
| 0-25 mph         | 8"            | 5'                             |
| 30-40 mph        | 8"            | 15'                            |
| 45 mph and above | 12"           | 25'                            |

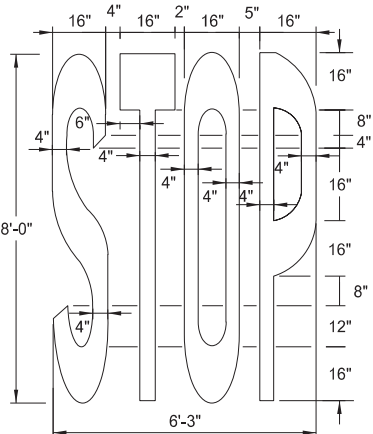
Chevron Crosshatching Table



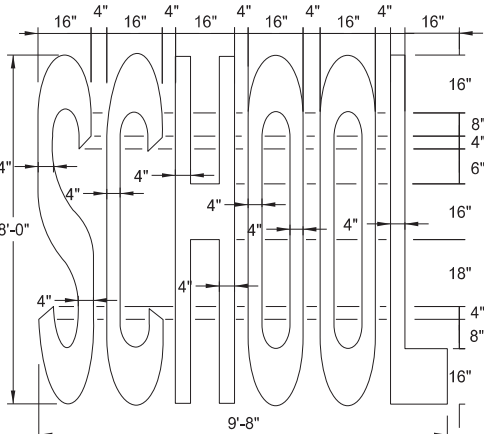
Centerline Pavement Marking Skip Spacing Detail



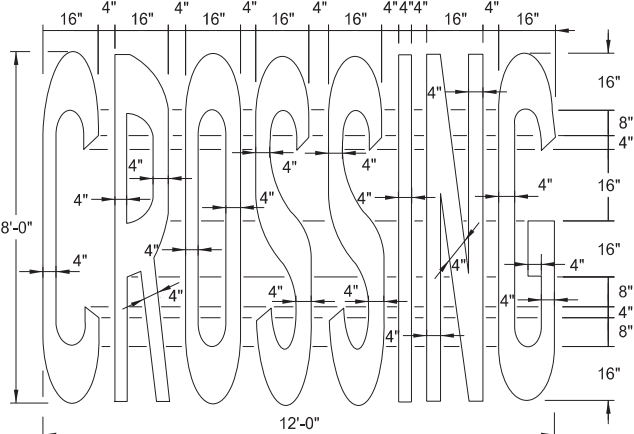
4 S. F.



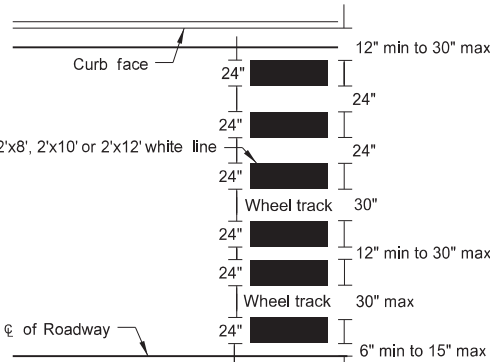
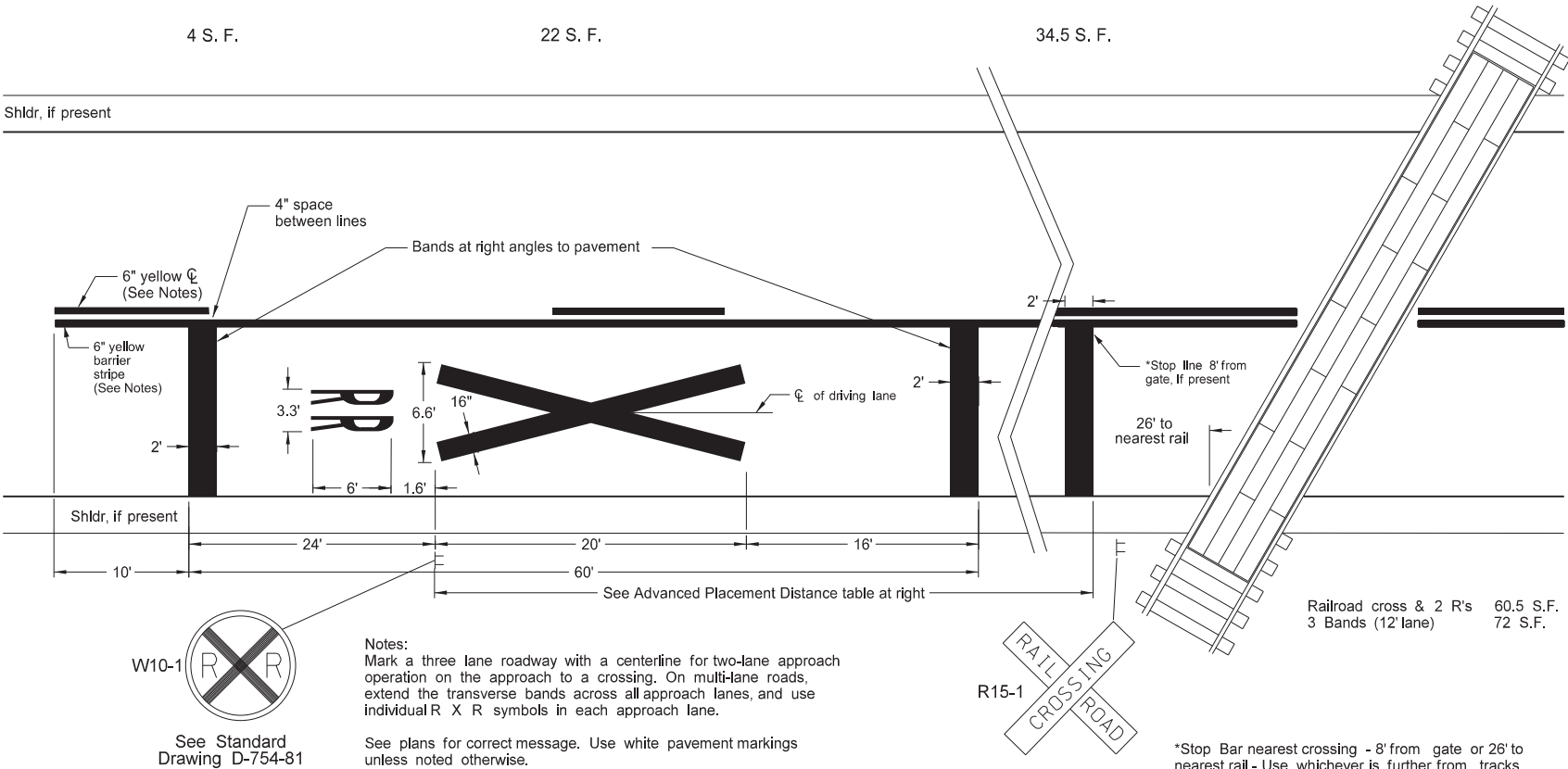
22 S. F.



34.5 S. F.



46 S. F.



Continental Crosswalk Detail

- NOTES:
1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
  2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

| Posted or 85th Percentile Speed | Advance Distance |
|---------------------------------|------------------|
| 20 mph                          | min. 100 ft      |
| 25 mph                          | min. 100 ft      |
| 30 mph                          | min. 100 ft      |
| 35 mph                          | min. 100 ft      |
| 40 mph                          | 125 ft           |
| 45 mph                          | 175 ft           |
| 50 mph                          | 250 ft           |
| 55 mph                          | 325 ft           |
| 60 mph                          | 400 ft           |
| 65 mph                          | 475 ft           |
| 70 mph                          | 550 ft           |

| NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |                                        |
|----------------------------------------------|----------------------------------------|
| 12-6-11                                      |                                        |
| REVISIONS                                    |                                        |
| DATE                                         | CHANGE                                 |
| 10-17-17                                     | Updated to active voice.               |
| 06-27-19                                     | New Design Engineer PE Stamp.          |
| 01-28-2020                                   | Revised min Stop Bar distance to rail. |
| 11-22-2023                                   | Revised pavement marking widths.       |

