DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2015	Pass: 3060	Trucks: 340	Total: 3400	
Forecast 2035	Pass: 5850	Trucks: 650	Total: 6500	
Clear Zone Distance: 12' - 14'		Design Speed: 25		
Minimum Sight Dist. for Stopping: 155'		Bridges: NA		
Minimum Sight Dist. for Safe Passing: 450				
Sight Dist. for No Passing Zone:				
Pavement Design Life 20 (years)				

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20158	1	1

JOB # 17

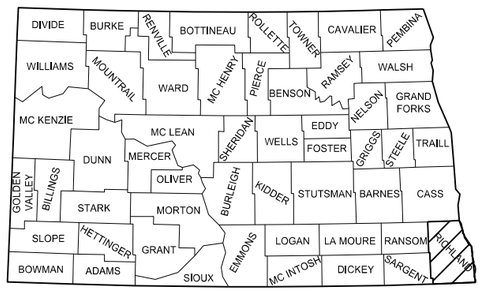
CITY OF WAHPETON

SU-TAU-8-991(032)029

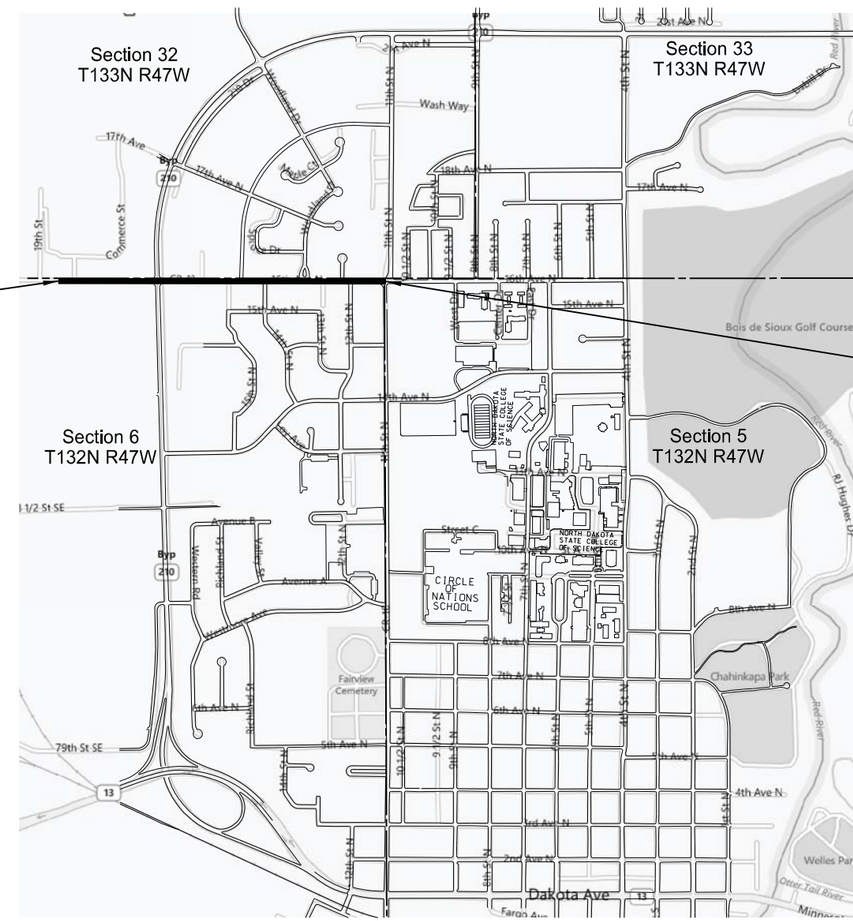
16th Ave N from Commerce St to11th St N
Richland County, Wahpeton, North Dakota
Street Reconstruction and Shared Use Path with
Hot Mix Asphalt, Salvaged Base Course,
Storm Sewer, Lighting, and Traffic Signal Modification.

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SU-TAU-8-991(032)029	0.672	0.672



STATE COUNTY MAP



Begin Project
Sta 8+00

End Project
Sta 43+50

DESIGNERS	
Michael L. Bassingthwaite, PE	
Jesse Sedler, PE	Zach Hatting
Tim Pearson	Shelley Terfehr
LKA Engineers	
Chuck Strum, PE	

APPROVED DATE November 27, 2015

Dennis Miranowski /s/
CITY OF WAHPETON
PUBLIC WORKS DIRECTOR

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

APPROVED DATE November 27, 2015

Michael L. Bassingthwaite /s/
INTERSTATE ENGINEERING, INC.

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INTERSTATE ENGINEERING

TABLE OF CONTENTS

Section No.	Sheet No.	Description
1	1	Title Sheet
2	1	Table of Contents
	2	List of Standard Drawings
4	1	Scope of Work
6	1-6	Notes
	7	Environmental Commitments
8	1-2	Estimate of Quantities
10	1	Basis of Estimate
11	1	Earthwork and Salvaged Base Summary
20	1	Reinforced Concrete Driveway and Tree Planting
	2	Stabilized Construction Access & Ditch Block
	3	Inlet Protection
	4	Water Details
	5	Water Details
	6	Pipeline Insulation Details
	7	Underdrain Details
	8	Splash Pad Detail
	9	Pump Station Detail
	10	Block Retaining Wall Details
30	1	Existing Typical Sections
	2-3	Proposed Typical Sections
40	1-9	Removals
50	1-2	Inlet & Manhole Summary
55	1-8	Storm Sewer Layouts
60	1-10	Plan & Profile Sheets
76	1-7	Temporary Erosion Control
77	1-7	Permanent Erosion Control and Tree Plantings
81	1	Survey Coordinate and Curve Data
82	1-7	Survey Data Layouts
	8	Intersection Grades
100	1-7	Work Zone Traffic Control
110	1-14	Signing
120	1-8	Pavement Marking
140	1-6	Lighting
150	1-9	Traffic Signals
200	1-47	Cross Sections

Special Provisions

SP 0003(14) Temporary erosion and sediment best managed practices
SP 216(14) Methyl Methacrylate (MMA) Pavement Marking

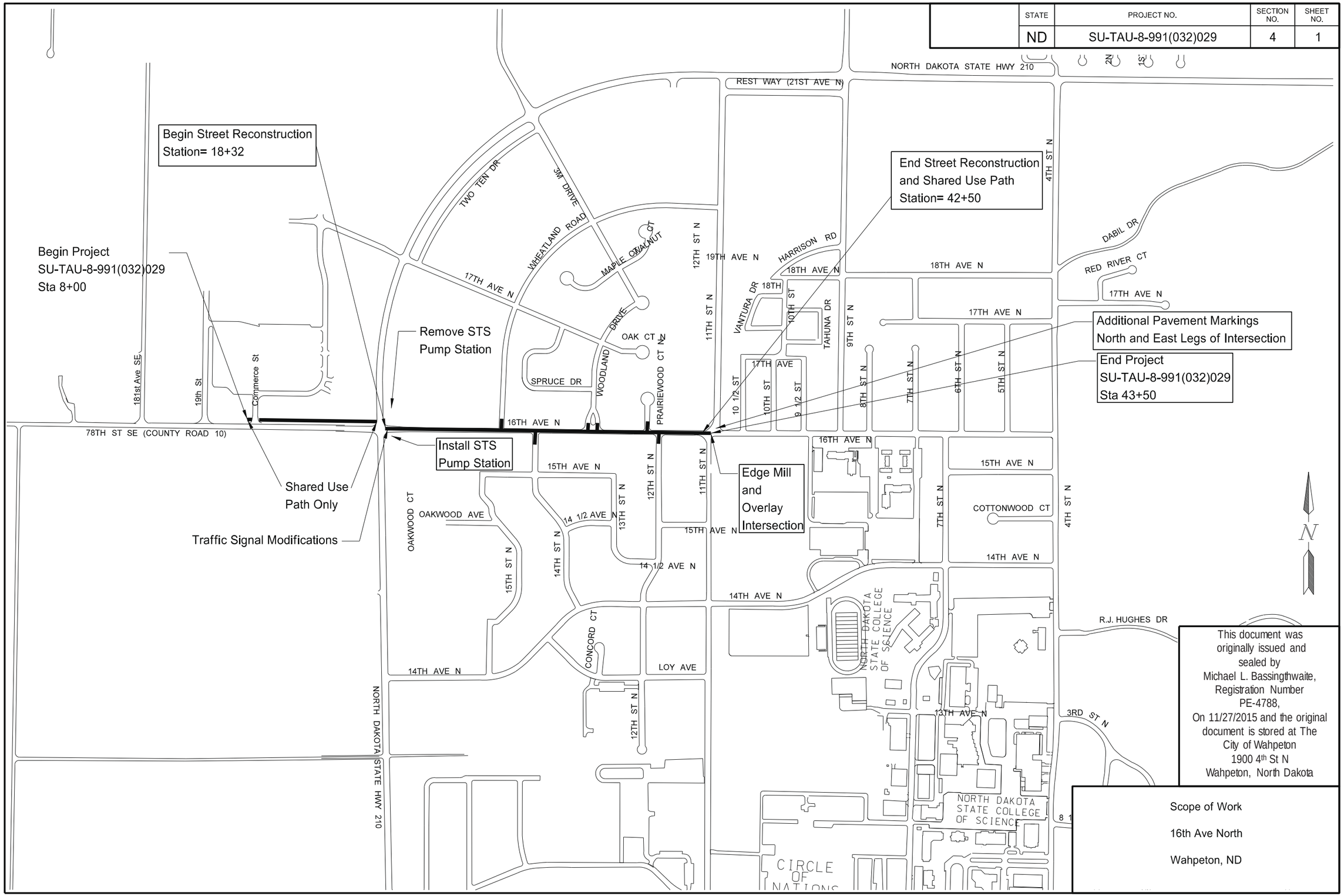
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	2	2

LIST OF STANDARD DRAWINGS

Standard No.	Description
D101-01	NDDOT Abbreviations
D101-02	NDDOT Abbreviations
D101-03	NDDOT Abbreviations
D101-10	NDDOT Utility Company Abbreviations
D101-20	Line Styles
D101-21	Line Styles
D101-30	Symbols
D101-31	Symbols
D101-32	Symbols
D261-01	Erosion Control - Fiber Roll Placement Details
D704-04	Work Zone Business Sign Details
D704-07	Breakaway System For Construction Zone Signs Perforated Tube
D704-08	Breakaway Systems For Construction Zone Signs
D704-09	Construction Sign Details - Terminal and Guide Signs
D704-10	Construction Sign Details - Regulatory Signs
D704-11	Construction Sign Details - Warning Signs
D704-13	Barricade and Channelizing Device Details
D704-14	Construction Sign Punching and Mounting Details
D704-15	Road Closure Layouts
D704-16	Lane Closure on a Two Lane Road Using Traffic Control Signals
D704-19	Road Closure and Lane Closure on a Two Way Road Layouts
D704-21	Detour and Roadway Diversion Sign Layouts
D704-22	Construction Truck and Temporary Detour Layouts
D704-23	Short Term Urban Detour and Lane Closure on a Dived Highway Layouts
D704-24	Shoulder Closure and Bridge Painting Layouts
D704-25	Lane Closure on Urban Streets Layouts
D704-26	Miscellaneous Sign Layouts
D706-01	Bituminous Field Laboratory
D708-06	Erosion Control Median or Ditch Inlet Protection
D714-01	Reinforced Concrete Pipe Culvert and End Section
D714-27	Pipe Installation Detail for longitudinal Mainline Pipe or Pipe Not Under the Roadway
D720-01	Standard Right of Way Markers and Monuments
D722-01A	Inlet – Catch Basin
D722-01B	Inlet – Special
D722-02	Inlet – Type 2
D722-05	Manhole Details

Standard No.	Description
D724-01	Water Works
D748-01	Curb & Gutter and Valley Gutter
D750-01	Concrete Driveway - Urban
D750-02	Sidewalk
D750-03	Curb Ramp Details
D754-09	Letter and Arrow Details For Variable Length Sign
D754-23	Perforated Tube Assembly Details
D754-24	Mounting Details Perforated Tube
D754-24A	Breakaway Coupler System for Perforated Tubes
D754-25	Mounting Details Perforated Tube
D754-26	Sign Punching, Stringer, and Support Location Details Regulatory, Warning, and Guide Signs
D754-27	Sign Punching, Stringer, and Support Location Details Regulatory, Warning, and Guide Signs
D754-28	Sign Punching, Stringer, and Support Location Details Regulatory, Warning, and Guide Signs
D754-46	Bike Route Signs - Punching, Stringer, Support Location Details for Regulatory Warning and Guide Signs
D754-86	911 Sign Support Information and Sign Details
D754-87	Sign Punching, Stringer, and Support Location Details for Street Name Signs and 911 Signing
D762-01	Pavement Marking Message Detail
D762-04	Pavement Marking
D770-01	Concrete Foundations (Traffic Signals and Highway Lighting)
D770-02	Feed Points (Roadway Lighting)
D770-03	Pull Box Details
D770-04	Lighting and Signal Details
D770-05	Light Standard Details
D772-04	Traffic Signal Head Mounting

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	4	1



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Scope of Work

16th Ave North

Wahpeton, ND

NOTES

100-P01 WEEKLY PLANNING/REPORTING MEETING: Organize a weekly meeting to coordinate efforts between subcontractors, utilities, local authorities, and others.

Send a knowledgeable representative to conduct the weekly reporting/planning meeting. Prepare minutes for each meeting and make the appropriate distribution of the minutes. Have the minutes approved by the Engineer before distribution.

Provide a written schedule of the next week's work and a tentative schedule of the following week. Include a discussion of problems encountered during the current week; also include information of interest to local authorities, subcontractors, and utilities.

Invite interested agencies to the meeting. Include the following agencies and any other agencies that are necessary:

a. North Dakota Department of Transportation
b. Public Works Director's representative
c. Project Engineer
d. Police department
e. Fire department
f. Ambulance service
g. Telephone Co.
h. Power Co.
i. Cable T.V.
j. Gas Co.
k. Subcontractors
l. Wahpeton Daily News
m. Wahpeton Radio Station

Provide a suitable meeting facility as approved by the Engineer.

100-P02 DETOURS: Maintain the streets used as detours (as shown in the plans) and repair areas damaged by the detoured traffic as needed and directed by the engineer during the course of the project if needed and as directed by the Engineer. Patch intermittently during the course of the project. Restore the streets to a condition at least equal to that which existed at the time traffic was routed over them at the completion of the project.

A pre and post haul road inspection will be required per spec 107.

100-P03 GROUNDWATER: Groundwater may be present on this project. Dewatering may be required in excavations to allow installation of storm sewer, water, and sanitary sewer in dry conditions.

Fluctuations in the groundwater level may occur due to rainfall, spring thaw, drainage, or other factors. The contractor should recognize the possibility of changes in the existing water conditions. The contractor is responsible for examining the site of the proposed work, becoming familiar with the site conditions both soil and water conditions before submitting a proposal. The NDDOT and the City of Wahpeton assumes no responsibility for the soil and water conditions encountered during construction. The submission of a bidding proposal will be considered conclusive evidence that the contractor is satisfied with the conditions to be encountered in performing the work and as to the requirements of the proposed contract.

No additional compensation will be paid for costs associated with dewatering.

105-110 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic.

Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection. Use a vacuum or pick-up type sweeper to perform this work.

107-P01 HAUL ROAD RESTRICTIONS: Supply materials and equipment to and from the project via the intersection of ND 210 and 16th Avenue.

Contact the appropriate State, County, Township, or City officials to determine if there are any "No Haul Routes" prior to preparing a bid for this project.

107-P02 MAINTAINING ACCESS: Provisions have been provided for vehicular access to several residences on the traffic control plans. One business will not have access during construction therefore a temporary gravel road on City property has been provided as shown on the traffic control plans. Four inches of topsoil shall be stripped from the existing grass area prior to placing the traffic surface aggregate. Full removal of the aggregate will be required after the project along with replacement of the topsoil and seeding of the area. Topsoil removal and replacement shall be included in the cost of the traffic surface aggregate. Seeding shall be paid for separately.

Final details on location of access points and construction procedures shall be worked out with the engineer in the field prior to the start of the project. The Contractor will be responsible for coordinating and communicating with adjacent landowners and residents regarding access control.

202-P01 PAVEMENT REMOVAL: The volume of concrete and pavements paid for as removal has been deducted from the common excavation quantity.

202-P02 SAW BITUMINOUS SURFACING-FULL DEPTH: include all equipment, materials, and labor necessary to saw bituminous or existing concrete pavement, driveways, sidewalks, medians, curbs, parking lots, or any other bituminous items.

202-P03 REMOVAL OF PAVEMENT: Removal of pavement consists of removing and salvaging bituminous pavement, curb and gutter, sidewalk, side street surfacing, parking lots, and driveways. Haul all salvaged concrete and bituminous material to the stockpile site. See section 202.05 of the standard specification for further information.

202-P04 REMOVAL OF MANHOLES AND INLETS: Deliver all manhole castings, lids, inlet castings, and grates removed to the City of Wahpeton Street Department Shop 604 4th Street South. Contact Steve Fehr Public Works Superintendent 48 hours before delivery at (701) 642-6565.

203-P01 COMPACTION AND DENSITY CONTROL: Compact material as specified in Section 203.01 E.2.b, "ND T-99". Manipulate embankment material with disking equipment.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	6	2

NOTES

203-P02 TOPSOIL: Existing depth is estimated at a depth of 6 inches. If no area is available within the right of way the contractor shall find a suitable location to stockpile the topsoil.

Spread topsoil evenly over the areas to be seeded to a minimum depth of 6 inches. Excess topsoil shall be disposed of as excess excavation.

203-P03 COMMON EXCAVATION LIMITS: The limits of common excavation are shown on the cross sections. Include all embankment in the contract unit price of common excavation. Payment will be made at plan quantity unless changes are made by the Engineer.

220-P01 STOCKPILE SITE: Supply a pit release with the signatures of the controlling local government entity (city, township, county, etc.). All sites within the City limits shall be approved by the Engineer prior to use.

The stockpile site shall be used to stockpile and process bituminous and concrete materials that are salvaged.

If the contractor uses multiple sites for his operation they shall be included in the payment for one site.

230-P01 SUBGRADE PREPARATION: Subgrade preparation Type A shall be required to a depth of 12 inches under the roadbed including curb and gutter. All costs associated with completing this item shall be included in the price bid for common excavation.

230-P02 SUBGRADE PREPARATION-TYPE A: Preform subgrade preparation to a depth of 6 inches under the 12 foot shared use path base.

251-P01 SEEDING CLASS III: Provide the seed mix as follows:

Species	Pound Pure Live Seed/Acre
Kentucky Bluegrass	50
Perennial Rye Grass	20
Six-Week Fescue or Dural-hard Fescue	30
Annual Rye Grass	50
	150

100% of the seed shall be sown prior to hydraulic mulching. Apply the fertilizer mix provided in section 251 of the standard specifications. Topsoil thickness limitation specification for fertilizer shall not apply to this project.

265-P01 STABILIZED CONSTRUCTION ACCESS: Locations requiring stabilized access shall be determined by the Engineer however one access shall be required at the west end of the reconstruction portion of the project for connection to the primary haul route identified for this project.

302-P01 SALVAGED BASE COURSE: Salvaged Base Course will be measured as in-place compacted volume (CY). The measured volume will not be adjusted for shrinkage.

430-P01 HMA: The requirements of specification section 430.04 C.2 shall not apply on this project.

430-P02 PATCHING: Use a commercial grade HMA per the standard specifications. All costs for labor, materials, and equipment to place the Patching, including tack and asphalt cement, shall be included in the unit price bid for “Patching”.

704-P01 FLAGGING: Flagging hours in the contract are for use as needed for traffic signal modifications and shared use path construction in the ND 210 right-of-way and for the edge mill and paving of the intersection of 11th Street. Flagging shall also be required when materials / equipment are moved into and out of the project work zone on adjacent public streets.

708-P01 INLET PROTECTION SPECIAL: A variety of inlet protection devices are shown in the plans. The contractor shall use whatever device is suitable for the type of storm drain inlet being protected. Section 76 of the plans shows the inlets that will require protection prior to the start of earthmoving operations. Inlet protection will required modifications throughout the course of the project as items are completed. Section 77 of the plans details the final protections required after construction and prior to grass growth.

The unit price bid for “Inlet Protection-Special” shall be considered full compensation for installing, cleaning, removing sediment, maintaining, replacing damaged devices from the project. The price bid will be paid once for each inlet on the project. All devices shall remain in place until the turf has been established.

714-P01 TELEVISING STORM SEWERS: All newly installed storm sewer main and inlet lead pipe shall receive a television inspection by the Contractor. The television inspection shall consist of viewing the inside of all storm sewer main and inlet lead pipe installed to determine proper alignment, jointing, properly installed service connections, infiltration, etc. The Contractor shall correct, at his own expense, any defects discovered because of televising the pipe. Any areas of repair shall be re-televised at the contractor’s expense.

The expense of any additional televising will be borne entirely by the Contractor. The Contractor shall be required to repair all areas of infiltration and other deficiencies. This televising shall be from the nearest upstream manhole to the downstream manhole and from inlets to the main. Videos must be in color and the camera shall be able to rotate to look up services. The Contractor shall furnish two paper televising reports and two electronic (video) to the Engineer for each pipe televised, the cost of which shall be included in the price bid for storm sewer pipe.

714-P02 PIPE BEDDING / BACKFILL: All pipe backfill for storm drain pipe shall follow the requirements of Standard Drawings D-714-27 for pipes not under a roadway regardless of the location of the pipe on this project. The additional 2 feet of bedding under storm drain pipes shown on the detail for pipes under the roadway is deleted by this note. Regardless of pipe depth the backfill material (C) shall consist of Common Excavation – Type A.

714-P03 PLUG PIPE-ALL TYPES & SIZES: At locations shown on the plans the contractor shall blow the existing 60” CSP storm sewer full of sand or pump the pipe full of controlled density backfill to prevent any future collapse or failure of the abandoned pipe. All labor, materials, and equipment necessary to perform this described work shall be included in the price bid for “Plug Pipe – All Types & Sizes”.

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NOTES

722-100 INLETS AND MANHOLES: Inlets and manholes were designed with a minimum 4 foot riser height. Fill the bottom of each drainage structure with concrete, up to the lowest invert elevation.

722-P01 ADJUSTMENT OF MANHOLES: At locations shown in the plans, existing manholes are to be adjusted. Approximate adjustments are shown on the plan and profile pages. Methods of adjustment and the work to be performed are as follows:

Minor Adjustment	Sanitary Sewers: Adjustment shall be made by adding or removing adjusting rings, replacing the casting, and installing a chimney seal per city standards. The maximum number of rings shall not exceed a 12-inch height.
Major Adjustment	Sanitary Sewers: Adjustment requires the removal of the existing conical section, the addition of a new manhole section, replacement of the conical section, new adjusting rings, installing a chimney seal per city standards and a new casting.

Minor adjustments shall be paid for as "Adjust Manhole." New casting shall be paid for as “Manhole Casting”. Major adjustments shall be paid for as "Adjust Manhole Special" and includes the cost of adjusting rings, mortar leveling, and the chimney seal. The new manhole riser shall be paid for as "Manhole Riser 48 Inch" regardless of riser size and the casting shall be paid for as “Manhole Casting”.

All riser lengths shall be verified by the contractor and approved by the engineer prior to ordering materials. Payment will be in accordance to the actual work performed.

722-P02 ADJUST UTILITY APPURTENANCE: If an extension is needed; remove the adjustable valve box top, install a midsection piece, and then reinstall the adjustable valve box top to desired grade.

722-P03 ADJUST OF INLETS: Adjust inlets by adding or removing adjusting rings.

722-P04 MANHOLE TEE: Contract price shall include manhole tee with a minimum length of 8 feet and the first foot of riser above the pipe, manhole or inlet casting, precast cover, and manhole adjusting rings.

Manholes Risers shall be per Standard Drawing D722-5.

724-P01 WATER MAINS, VALVES & HYDRANTS: Gate vales shall be required to have a resilient (vulcanized synthetic rubber coating) seat attached to the wedge, manufactured and designed in accordance with the latest revisions of AWWA Standard C-509. Resilient seated gate valve body and bonnet shall be coated, inside and out, with a fusion bonded epoxy in accordance with AWWA C-550. The resilient rubber seat shall be molded and bonded to the wedge. The waterway shall have a full unobstructed flow without recesses in the bottom. All exposed nuts, bolts, and washers shall be stainless steel. The valve boxes furnished shall be of a quality equal to the manufactured by Tyler Company 6860 Series 3, Star Pipe products VB-0002 or approved equal with sufficient length to provide 8 feet of cover. An extension stem to install the square wrench nut near the top of the valve installed shall also be furnished. Covers shall be marked “Water”. A valve box adaptor shall be installed on the valve bonnet prior to installing the valve box. The valve box adaptor eliminates shifting of the valve box, protects the coatings, centers the valve box, and seals the valve box with a resilient material. The adaptor shall be incidental to the valve box. The valve box adaptor shall be installed per the manufacturer’s recommendations. The valve box adaptor shall be a “Valve Box Adaptor II” as manufactured by Adaptor Inc., a “Valve Box Self-Centering Alignment Ring” as manufactured by American Flow Control, Diversified Fabricators Inc., or an approved equal.

Hose and pumper threads for fire hydrants shall conform to City of Wahpeton Standards. The minimum barrel length of hydrants shall be 18 inches from lowest nozzle to future ground line with 8 feet of cover over the top of the hydrant lead. Break-away flanges shall be provided on hydrants. All exposed nuts and bolts shall be stainless steel. Thrust blocking shall be as shown in the details.

All fittings, valves, fire hydrants, etc. shall be mechanically restrained (EBAA Iron Megalugs, Ford Uni-Flange or approved equal). Bolts, nuts, and washers for mechanical joint fittings shall be 304 stainless steel.

Water Main pipe shall be PVC.

All fittings, valves, and hydrant barrels shall be installed with polyethylene encasement conforming to AWWA C-150, ANSI A21.5 with an 8MIL nominal film thickness. Joint wrap for encasement shall be 3M Scotchwrap 50, Northtown Polywrap or approved equal.

All existing fire hydrants and gate valves indicated to be removed shall be delivered to the City of Wahpeton Street Department Shop at 605 4th Street South.

724-P02 TRACER WIRE SYSTEM: Tracer wire shall be a direct bury wire that meets or exceeds the following requirements.

1. Conductor: 12 AWG solid strand soft drawn copper per ASTM B-3, or B-8. The breaking pounds of the wire shall be a minimum of 124 with an O.D. of 0.154 inch. All wire shall be spark tested at 7500 VAC.
2. Insulation: Conductor shall be insulated with low density high molecular weight polyethylene insulation suitable for direct bury applications per ASTM D-1248. The minimum insulation thickness shall be 0.045 inch. The color of the insulation shall be blue with a print line saying “WATER”.
3. Splices and or Connectors: Splices and or Connectors should be capable of handling from 2 to 4 wires per connector and designated as “Water-proof”. PVC adhesives or sealing compounds are not acceptable.
4. Tracer Wire Access Box: Tracer wires shall be terminated using a small terminal box suitable for flush burial with a 2 ½ inches lockable cast iron top, integral stainless terminals and a minimum 12 in. ABS bottom section.
5. Tracer Wire System Manufacturers:
   - Tracing Wire – Kris Tech Wire Co. Inc., Paige Electric Corporation, or approved equal.
   - Splice Kit/Connectors – 3M epoxy type compounds fusible heat shrink tubing, 3M DBY connectors, or Snaploc LV 9000 direct bury wire connectors, or approved equal.
   - Tracer Wire Access Box – Valvco Pipe Tracer Wire Terminal Box Bingham & Taylor Locating Box, or approved equal.

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NOTES

Tracer wire shall be installed along with all water pipes as follows:

The tracer wire shall be extended along with the water main. The wire shall be installed along the top of the pipe and shall be securely anchored to the pipe every 4 feet horizontally with an adhesive tape. The tracer wire shall be extended along all water main branches and hydrant leads as well. At fire hydrant leads two (2) tracer wires (the upstream tracer wire and the downstream tracer wire) shall be brought along the lead and brought to the surface at the fire hydrant. The upstream and downstream tracer wire at fire hydrants shall not be tied together as this is intended to allow independent tracing of the down and upstream main.

A Tracer Wire Access Box shall be installed at Fire Hydrants in all cases and at valve boxes. The Tracer Wire Access Box shall be centered 6 inches to 12 inches behind the fire hydrant. Both the upstream and the downstream tracer wires shall be installed in the Tracer Wire Access Box. The tracer wires shall be taped to the Fire Hydrant Barrel in at least five (5) Locations below the ground surface. The tracer wire shall be extended at least three (3) feet above the top of the Access Box, the wires connected to the Access Box Lid, the wires folded, and inserted back into the Access Box for storage. The wire shall be easily retrievable for connection to and subsequent tracing.

All tracer wire connections shall use “pig-tails”. All splices and “pig-tails” shall be accomplished by stripping the wires to be connected, twisting the wires together, securing the connection by using an appropriately sized wire nut, and then preserving the splice, or “pig-tail” by using a direct bury splice kit.

The Engineer shall inspect all underground splices and “pig-tails” prior to backfilling.

The main line tracer wire shall run continuous along the main(s) from fire hydrant to fire hydrant but shall not be continuous at fire hydrants. At fire hydrants two tracer wires shall be installed, one wire is the main line wire from downstream of the fire hydrants and the second wire is the main line wire going upstream of the fire hydrant. The main line tracer wire shall not be interconnected at the fire hydrant or at the main. This is intended to allow independent tracing of the downstream main from the upstream main and vise a versa.

As a condition of project acceptance, Public Works Department personnel shall be able to successfully electronically trace all newly installed tracer wire/water mains. Utility maintenance personnel should be able to connect to tracing wires at every Fire Hydrant location and energize all water mains between that fire hydrant and the surrounding fire hydrants. The contractor is responsible for coordinating conductivity testing with Public Works personnel prior to finish surfacing activities. If the tracer wire does not function as intended, the Contractor shall repair the system to the satisfaction of the Engineer.

The tracer wire system shall be included in the price bid for Water Main _IN PVC.

724-P03 DUCTILE IRON FITTINGS: All water fittings shall be ductile iron mechanical joint with retainer glands. The fittings shall meet AWWA C153/A21.53 and AWWA C111/A21.11. The Tyler/Union utilities catalog was used to calculate the fittings weight. All weights are calculated without accessories.

724-P04 PRESSURE TESTING WATER MAINS: Water Main shall be pressure tested with water at 150 p.s.i. for one (1) hour. The maximum allowable pressure drop during the test period shall not be greater than two (2) p.s.i. Flush out the main before the test to remove air and insert taps if necessary to blow off trapped air. All joints shall be carefully examined during the time the pressure test is being performed and pipe showing visible leakage shall be refitted.

Contractor shall provide all test pumps, test plugs, pipe and gauges, pipe tapping and make all required piping connections. Defective pipe or fittings disclosed during test shall be replaced and test repeated until requirements have been met. Cost of pressure testing Water Mains shall be included in the price bid for Water Main Pipe.

724-P05 CHLORINATION OF WATER SYSTEM: After mains and valve extensions have been tested they shall be flushed until all foreign material has been removed. Chlorination applications shall be made under the Engineers supervision in accordance with AWWA C651.

The chlorine shall be flushed from the main through hydrants until all excess chlorine has been removed. No chlorination water will be permitted in the Water Main trench. The Contractor shall furnish all tools, equipment and material to chlorinate.

After the chlorinated water has been flushed from the Water Main, the Water Main shall be tested for bacteriological quality in accordance with AWWA C651. The Contractor shall notify the Engineer at least 24 hours prior to the time that collection of samples is to occur. At least two samples shall be collected from each segment of the pipeline being tested. The Contractor shall be responsible for transporting all samples to the North Dakota Department of Health and paying the required fee. If the initial disinfection fails to produce satisfactory bacteriological results, the Water Main must be reflushed and resampled. If check samples show the presence of coliform organisms, the main shall then be rechlorinated and procedures repeated until satisfactorily results are obtained. A minimum of two successive sets of samples, taken at 24 hour intervals, shall indicate microbiologically satisfactory water before the facility is placed into operation.

Any water which has a high chlorine content and is disposed of using the storm sewer system shall be dechlorinated prior to discharge. No chlorination or testing water shall go to the sanitary sewer.

724-P06 CONNECTION TO EXISTING MAIN: Where a new Water Main will be connected to an existing Water Main and the connection will remain part of the completed project the connection will be paid for. Where Water Main will be connected, straight and transition coupling shall be of a quality equal to that manufactured by ROMAC Industries, Multi Fittings or approved equal. All nuts, bolts and washers shall be stainless steel.

724-P07 RESTOCKING: The Contractor will be required to have on hand the necessary fittings, valves and corporation stops to complete the project. If the Contractor is required to take back any of the fittings, valves, corporation stops, etc., the cost of restocking shall be considered incidental to the project.

744-P01 POLYSTYRENE INSULATION BOARD: Polystyrene insulation board shall be placed in locations where storm drain pipe crosses waterlines and sanitary sewer lines in accordance with the section 20 sheets 4, 5, and 6.

Polystyrene insulation board shall have a closed cell structure with an R value of 5 per inch of thickness. Maximum water absorption shall be 0.1% by volume and minimum compressive strength shall be 100 psi.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	6	5

NOTES

748-P01 CURB ENDS: On street returns and other locations where the new curb and gutter ends and does not abut existing curb and gutter, the end 2 feet of the curb shall be tapered from 6 inch height to zero. A ½" premolded expansion joint which is full depth and the same shape as the curb and gutter shall be installed just ahead of the taper. An 18" tie bar shall be installed across the joint. All costs shall be included in the price bid for curb and gutter.

770-100 CONCRETE FOUNDATIONS: Install and tighten anchor bolts as specified in Section 754.04 D.5, "Overhead Sign Structures".

770-P01 LIGHT STANDARDS: The light standards shall be of the davit type and designed for 6' mast arms and shall be galvanized. The base shall be of the anchor type. Mounting heights shall be as noted in the plans.

770-P02 MULTIPLE UNDERGROUND CABLE: The plans call for using Multiple Underground Cable and Conduit in various locations. In lieu of the Multiple Underground Cable, the contractor may furnish and install rigid conduit and single RHW conductors of the same size as shown in the plans for the Multiple Underground Cable.

The conduit size shall be as specified in the National Electric Code. If the contractor chooses to use the conduit and single conductors, the cost to furnish conduit and conductors shall be paid for at the contract price bid for Multiple Underground Cable. The cost of installing conduit with single conductors shall be paid for at the contract bid price for "Cable Trench."

The conduit shown in the plans under Roadways for Installing Multiple Underground Cable will continue to be paid for as conduit.

770-P03 LUMINAIRES: The high-pressure sodium vapor luminaires shall be internal ballast-constant wattage, 120x240 voltage, operated on 240 volts.

770-P04 REMOVE LIGHT STANDARD: The existing lighting shown on the plans is owned by the local utility company and will be removed by the utility during construction. The contractor shall coordinate removal with the utility (Ottertail Power Company 701-642-6684). Lighting shall remain in place until construction activities require its removal.

770-P05 FEED POINT: Meter trim for lighting furnished by the contractor shall be compatible with the local utility company's requirements. The cost of the meter trim shall not be bid separately but shall be included in the price bid for each feed point. Branch circuit breakers and power requirements shall be in accordance with the details provided in the plans.

770-P06 LIGHT STANDARD FOUNDATION: The light standard foundation shall have a 30" square top (top 24" of base), be 30" minimum in diameter below the top, and shall be 8' in total depth. The elevation of the top of the base shall be verified with the engineer. A minimum of 4 anchor bolts per base are required.

772-P01 REVISE PULL BOX: Two existing pull boxes on the project will require extensions to adjust tops to finished grade. The total raise will be 1.5 feet. The existing pull boxes are of the PVC type shown standard drawing D-770-3. The extension shall conform to the future adjustment shown on the detail.

772-P02 REVISE CONTROLLER: The existing controller shall be replaced with an actuated NEMA TS2 Controller conforming to the NDDOT standard specifications Section 896. All work associated with this item shall be included in the total price of this bid item.

772-P03 RELOCATE CONTROLLER CABINET: The existing controller cabinet will require a grade raise of 2.5 feet. This shall be completed by removing the controller cabinet, extending the PVC conduit, removing and replacing the concrete foundation, and remounting the controller cabinet. The concrete foundation shall conform to standard drawing D-770-1. All work associated with this item shall be included in the total price of this bid item.

910-P01 CONTROLLED DENSITY BACKFILL: Controlled density backfill shall be placed in trenches of all storm sewer pipe placed under the roadway to ½ the diameter of the pipe. It shall also be placed around all inlets and catch basins within the roadway to the same height as the adjacent pipe. Controlled density backfill shall not be placed until the pipes in these structures have been grouted inside and out. The properties of the backfill shall be a blend of cement, water, pozzuolanic materials, and fillers. The material shall be fluid on placement to flow around and fill voids around pipes in the backfill area. The material shall be able to support normal loads after six hours and shall have a compressive strength in the rage of 75 psi to 125 psi at 28 days. The material shall be such that it lends itself to easy removal with a tractor backhoe. If the mix design shown is used, no further testing will be required. The mix designs yield approximately one cubic yard of flowable mortar.

MIX DESIGN	
Cement	100 lbs
Flyash	300 lbs
Fine Aggr	2600 lbs
Water	70 gals

920-P01 PUMP HOUSE: Relocate existing pump station as shown on the project details. All costs of this work for reinstallation shall be included in this bid item.

970-P01 TREES: This work shall consist of furnishing and planting trees of the species, variety, grade, and size specified at the locations directed by the Engineer. All trees shall be a minimum of 2.5" in diameter. The size indicated is the diameter of the tree 24" above the ground level.

All trees for this project shall be balled and burlaped, nursery grown and typical of their species or variety. All plants shall have normal well developed branches, with full foliage when in leaf, and vigorous root systems. They shall be sound, healthy, vigorous, and free of defects, disfiguring knots, sunscald injury, plant diseases, insect eggs, borers, and any other forms of infestations.

As a condition for delivery and approval of the plant stock, the Contractor shall furnish the Engineer with a certificate of compliance stating that the plants furnished are in conformance with the specification requirements. The certificate of compliance will state the species, sizes, and quantities furnished and the name of the nursery grower.

Trees shall not be planted closer than ten (10) feet from water service connections or five (5) feet from gas lines. The Contractor shall be responsible for moving trees after planting if they interfere with existing utilities.

Insofar as practical, trees shall be installed on the day of delivery to the project site. After being dug and until planted, the roots of all plants shall be kept covered at all times with suitable moisture-holding material such as straw, saw dust, moss, or soil, and this material shall be kept continuously moist except during freezing

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NOTES

weather. In case winter planting is specified and the tree roots are encased in frozen soil, the tree balls shall be protected from sudden changes in temperatures and shall not be allowed to thaw out or be exposed to rain until planting has been accomplished.

No more trees shall be delivered to planting sites than can be planted and watered on the day of delivery. Those plants which cannot be planted on the day of delivery shall be temporarily stored by placing them in a well-ventilated, cool moist storage place. Planting holes shall be centered at the locations staked. Minimum dimensions of plant hole excavation and backfill shall be larger than the diameter of the roots. Trees shall be installed plumb and shall be set so that after backfill consolidation the plants will be at the same depth with respect to the specific backfill level (bottom of a 3 inch deep saucer), as they were growing in the nursery. The backfill shall consist of planting soil. Care shall be taken not to injure the root system while placing and compacting the backfill material. Balled and burlaped plants shall be installed without removing the burlap covering but before completing the backfill the burlap shall be loosened at the top and folded back to expose the entire top of the ball.

Within two hours after being installed, each tree shall be watered sufficiently to thoroughly saturate the backfill material. Within five days after installation and initial watering of each day's planting, the backfill around each plant shall be brought to the specified level with additional soil, at which time if any tree is improperly positioned with respect to depth and plumbness it shall be reset or replaced as necessary. Also, on the same day or not later than the following day those plants shall be watered thoroughly again for the second time until complete saturation of the backfill is obtained.

The contractor shall have available on the project at all times sufficient watering equipment and forces to carry out a complete watering cycle of all plants once each week until the work has been accepted. Every plant shall receive a thorough watering at intervals averaging between 7 and 10 days throughout the growing season. Watering intervals may be varied only in consideration of prevailing soil moisture and weather conditions.

When watering trees, application rate and pressure must be sufficient to allow water to soak into the soil to the full root depth without washing away any mulch, plants, seed or soil.

All excavated materials shall be removed from the planting areas and be disposed of to the engineer's satisfaction within three days after excavation thereof.

Upon completion of the initial planting operations the contractor shall maintain the work and care for trees installed until the end of the warranty period.

After starting the planting operations and until expiration of the warranty period the contractor shall keep all trees in healthy growing condition using good horticultural practice performed on a day-by-day basis during the growing season with necessary replacements being made at the appropriate times and as soon as practical depending on the plant species involved.

The plant establishment work shall consist of maintaining adequate (but not Excessive) soil moisture at all times, staking, planting soil, furnishing and installing replacement plants as needed including new planting soil, and of maintaining the trees in an upright position.

The bid price for each type of tree shall be full compensation for all costs associated with planting the trees.

970-P02 GUARANTEE AND REPLACEMENT-ESTABLISHMENT PERIOD: The Contractor shall maintain all plantings for 1 year after the completion of the plantings. An inspection will be held 15 days prior to the final planting inspection so that replacement that are necessary will be accomplished prior to the final planting inspection. The cost shall be included in the price bid for the trees. During the maintenance period, the Contractor shall properly maintain all plant material planted under this contract, and shall replace all unacceptable plant material in the spring planting season or as directed by the Engineer.

The maintenance procedures shall include: protective measures against pests and diseases (including rabbit and/or other rodent protection); watering as often as required by necessity or direction of the Engineer or both; repairing damage to the watering basins; and other maintenance procedures as deemed necessary by the Engineer including the removal of any dead plant material from the project.

The Engineer will make an inspection of the plant material and maintenance procedures. Maintenance procedures that have not been performed shall be brought to the Contractor's attention and may cause the establishment period to be extended.

Any plant material that is 25% dead or more shall be considered dead and must be replaced by the Contractor. Trees shall be considered dead when the main leader has died back, or 25% of the crown is dead. Removal of dead plant material shall occur immediately; replacement shall occur immediately or as soon as possible.

970-P03 BENCH: Benches shall be provided and installed along the project. The benches shall be Fairweather SF Bench Model No. PL-1.5, Dumor Bench Model No. 120-60, or approved equal. Approved equal needs to meet the following:

1. Bench to be constructed of 2 ductile cast iron end frames, 1 fully welded seat section and 1 stretcher bar. All parts are to be drilled and precisely formed for assembly. Seat sections shall be fabricated with 2" sch. 40 pipe and ¼" x 1-1/2" mild steel strap. Steel shall conform to ASTM A36 hot rolled steel. All steel shall be wheel calibrated prior to fabrication. Stretcher bar shall be ¾" cold rolled steel rod.
2. Hardware to be ½' x 2" stainless steel pinned buttonhead bolts, 3/8" x 1-1/4" stainless steel buttonhead bolts, ½" friction rings and 3/16" x 2 ¼" powder coated washers.
3. An 8 foot long by 6 foot wide section of sidewalk concrete will be placed along the shared use path to place the benches on.
4. Bench shall be surface mounted with four (4), galvanized 3/8" diameter expansion bolts or anchor bolts with washers and nuts. Bolts shall extend into concrete 3" minimum.
5. Following fabrication, the bench shall be cleaned and treated with an iron phosphate process prior to the coating application. This process shall include a non-chromatic alkaline cleaner and an iron phosphate treatment followed with an acidic sealer for maximum adhesion. The protective coating shall be either polyester or polyester TGIC powder applied by the dry electrostatic method. Following application the parts shall be baked until properly cured. The resultant coating shall be a minimum of 4 mills thick on all surfaces. Color shall be black.

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ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS: The City of Wahpeton, the North Dakota Department of Transportation, and the Federal Highway Administration have made several environmental commitments to various agencies and the public to secure approval of this project. The environmental commitments are:

EC- 1: Impacted urban trees within the project right-of-way and easements must be mitigated for.

ACTION REQUIRED /TAKEN: There are multiple urban trees within the project right-of-way and easements. Approximately ten of these trees will be impacted during construction and mitigated for as identified by the municipality and in conjunction with the NDDOT. Ten trees will be mitigated at a 2:1 ratio in location(s) shown in these plans.

Based on the NEPA documentation, no additional permits or environmental commitments have been identified beyond what is covered by the NDDOT's Standard Specification of Road and Bridge Construction.

Wetland Number	Cowardin Classification	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands	Impacts to Wetlands	
						Temp.	Perm.
NO WETLANDS PRESENT							
TOTALS:			0.00			0.00	0.00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	8	1

ESTIMATED QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	SU FUND QUANTITIES	TAP FUND QUANTITIES	CITY FUND QUANTITIES	STORM SEWER MAIN	TOTAL QUANTITIES
103	0100	CONTRACT BOND	L SUM	0.9	0.1			1
201	0380	REMOVAL OF TREES 18IN	EA	9				9
202	0104	REMOVAL OF STRUCTURE	EA	1				1
202	0136	REMOVAL OF PAVEMENT	TON	3822	5			3827
202	0153	SAW BITUMINOUS SURFACING-FULL DEPTH	LF	484				484
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	4				4
202	0174	REMOVAL OF PIPE ALL TYPES & SIZES	LF	1599				1599
202	0210	REMOVAL OF MANHOLES	EA	3				3
202	0230	REMOVAL OF INLETS	EA	3				3
202	0293	REMOVE RETAINING WALL	LF	189				189
203	0101	COMMON EXCAVATION-TYPE A	CY	14787	38			14825
203	0109	TOPSOIL	CY	4631	315			4946
216	0100	WATER	M GAL	150	20			170
220	0100	PREPARE STOCKPILE SITE	L SUM	1				1
220	0200	RESTORE STOCKPILE SITE	L SUM	1				1
230	0300	SUBGRADE PREPARATION - TYPE A	Sta		33			33
251	0300	SEEDING CLASS III	ACRE	4.6	0.4			5
253	0201	HYDRAULIC MULCH	ACRE	4.6	0.4			5
261	0106	FIBER ROLLS 6IN	LF	610	895			1505
261	0107	REMOVE FIBER ROLLS 6IN	LF	610	895			1505
265	0100	STABILIZED CONSTRUCTION ACCESS	EA	2				2
265	0101	REMOVE STABILIZED CONSTRUCTION ACCESS	EA	2				2
302	0101	SALVAGED BASE COURSE	CY	4558	605			5163
302	0314	TEMPORARY TRAFFIC SURFACE AGGREGATE	TON	1000				1000
401	0050	TACK COAT	GAL	1242	167			1409
430	0043	SUPERPAVE FAA 43	TON	3796	740			4536
430	1000	CORED SAMPLE	EA	25				25
430	2000	PATCHING	TON	50				50
430	6434	PG 64-34 ASPHALT CEMENT	TON	232	46			278
550	0107	6IN REINF CONCRETE PAVEMENT CL YE	SY	13				13
702	0100	MOBILIZATION	L SUM	0.9	0.1			1
704	0100	FLAGGING	MHR	80				80
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1858	58			1916
704	1052	TYPE III BARRICADE	EA	64	1			65
704	1060	DELINEATOR DRUMS	EA	20	20			40
704	1067	TUBULAR MARKERS	EA	30	10			40
706	0500	AGGREGATE LABORATORY	EA	1				1
706	0550	BITUMINOUS LABORATORY	EA	1				1
706	0600	CONTRACTOR'S LABORATORY	EA	1				1
708	1530	INLET PROTECTION FIBER ROLL 6IN	EA	19				19
708	1532	REMOVE INLET PROTECTION FIBER ROLL 6IN	EA	19				19
708	1540	INLET PROTECTION -SPECIAL	EA	15	3			18
708	1541	REMOVE INLET PROTECTION -SPECIAL	EA	15	3			18
709	0161	GEOSYNTHETIC MATERIAL TYPE S1	SY	14,000				14000
714	0105	PIPE CONC REINF 12IN CL III-STORMDRAIN	LF	146				146
714	0210	PIPE CONC REINF 15IN CL III-STORMDRAIN	LF	514				514
714	0310	PIPE CONC REINF 18IN CL III	LF	35				35
714	0315	PIPE CONC REINF 18IN CL III-STORMDRAIN	LF	359				359
714	0615	PIPE CONC REINF 24IN CL III	LF	192				192
714	0620	PIPE CONC REINF 24IN CL III-STORMDRAIN	LF	124				124
714	0825	PIPE CONC REINF 30IN CL III-STORMDRAIN	LF	536				536
714	0905	PIPE CONC REINF 36IN CL III	LF	12				12
714	0910	PIPE CONC REINF 36IN CL III-STORMDRAIN	LF	62				62
714	1212	PIPE CONC REINF 54IN CL III-STORMDRAIN	LF				354	354
714	1512	PIPE CONC REINF 72IN CL III-STORMDRAIN	LF				662	662
714	3010	END SECTION-CONC REINF 18IN	EA	1				1
714	3020	END SECTION-CONC REINF 24IN	EA	2				2
714	3035	END SECTION-CONC REINF 36IN	EA	1				1
714	3065	END SECTION-CONC REINF 72IN	EA	1				1
714	4990	PIPE CORR STEEL .064IN 10IN	LF		24			24
714	9680	PLUG PIPE-ALL TYPES AND SIZES	EA	1				1
714	9720	UNDERDRAIN PIPE PVC PERFORATED 4IN	LF	5,200				5200
722	0110	MANHOLE 60IN	EA	6				6
722	0140	MANHOLE 96IN	EA	1				1
722	0202	MANHOLE 120IN	EA	1				1
722	0237	MANHOLE TEE 54IN X 48IN	EA	2				2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	8	2

ESTIMATED QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	SU FUND QUANTITIES	TAP FUND QUANTITIES	CITY FUND QUANTITIES	STORM SEWER MAIN	TOTAL QUANTITIES
722	0243	MANHOLE TEE 72IN X 48IN	EA	3				3
722	0315	MANHOLE CASTING	EA	3				3
722	1100	MANHOLE RISER 48IN	LF	5.7				5.7
722	1110	MANHOLE RISER 60IN	LF	28.7				28.7
722	1140	MANHOLE RISER 96IN	LF	8.5				8.5
722	1205	MANHOLE RISER 120IN	LF	8				8
722	3510	INLET-TYPE 2	EA	9				9
722	3520	INLET-TYPE 2 DOUBLE	EA	2				2
722	4020	INLET CATCH BASIN 9IN BEEHIVE	EA	6				6
722	4060	INLET MOUNTABLE CURB-TYPE B	EA	3				3
722	6160	ADJUST INLET	EA	2				2
722	6200	ADJUST MANHOLE	EA	3				3
722	6201	ADJUST MANHOLE SPECIAL	EA	2				2
722	6240	ADJUST UTILITY APPURTENANCE	EA	4				4
724	0210	FITTINGS-DUCTILE IRON	LBS	400		800		1200
724	0300	GATE VALVE & BOX 6IN	EA	1		2		3
724	0411	6IN HYDRANT	EA	1		1		2
724	0430	REMOVE HYDRANT	EA	2				2
724	0810	WATERMAIN 6IN PVC	LF	30		100		130
724	0850	WATERMAIN 12IN PVC	LF	50		20		70
724	0944	CONNECTION TO EXISTING MAIN	EA	3		3		6
744	0100	POLYSTYRENE INSULATION BOARD	BD FT	400				400
748	0140	CURB & GUTTER-TYPE 1	LF	5106	40			5146
748	0151	MOUNTABLE CURB & GUTTER-TYPE 1 SEC B	LF	253				253
750	0115	SIDEWALK CONCRETE 4IN	SY		162			162
750	1016	DRIVEWAY CONCRETE 6IN REINFORCED	SY	932				932
750	2115	DETECTABLE WARNING PANELS	SF		220			220
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	99	11.8			110.8
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	128				128
754	0206	STEEL GALV POSTS-TELE PERF TUBE	LF	293	106			399
754	0592	RESET SIGN PANEL	EA	4	1			5
754	0593	RESET SIGN SUPPORT	EA	5	2			7
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	LF	6602				6602
762	0122	PREF PATTERN PVMT MK-MESSAGE (GROOVED)	SF	532				532
762	0816	METHYL METHACRYLATE PVMT MK 16IN LINE	LF	196	24			220
762	0824	METHYL METHACRYLATE PVMT MK 24IN LINE	LF		1380			1380
762	1309	PREF PATTERN PVMT MK 8IN LINE -GROOVED	LF	306				306
762	1317	PREF PATTERN PVMT MK 16IN LINE -GROOVED	LF	54				54
770	0020	CONCRETE FOUNDATION-HIGHWAY LIGHTING	EA	19				19
770	0060	CONCRETE FOUNDATION-FEED POINT-TYPE B	EA	1				1
770	0210	CABLE TRENCH-TYPE I	LF	2370				2370
770	0330	2IN DIAMETER RIGID CONDUIT	LF	343				343
770	0423	MUTIPLE UG CABLE 2NO2-1NO6 STYLE USE	LF	2839				2839
770	0735	FEED POINT-TYPE II-PAD MOUNTED	EA	1				1
770	1066	LT STD 6FT MA 30FT MT HT	EA	3				3
770	2260	LT STD TWIN 6FT MA 30FT MT HT	EA	12				12
770	4091	ORNAMENTAL LT STD 17FT MT HT	EA	4				4
770	4120	HP SODIUM VAPOR LUMINAIRE-150 WATT	EA	12				12
770	4140	HP SODIUM VAPOR LUMINAIRE-250 WATT	EA	15				15
770	4495	ORNAMENTAL LT FIXTURE-250 WATT	EA	4				4
770	9270	MODIFY EXISTING FEED POINT	EA	1				1
772	0220	1.5IN DIAMETER RIGID CONDUIT	LF		100			100
772	0400	NO12 AWG 2 CONDUCTOR CABLE	LF		100			100
772	1812	1-WAY 3 SEC HEAD W/ 12IN LENS-MA MTD	EA	2				2
772	1822	1-WAY 4 SEC HEAD W/ 12IN LENS-MA MTD	EA	2				2
772	2060	PED COUNTDOWN SIGNAL HEAD-POST MTD	EA		2			2
772	2200	PEDESTRIAN PUSHBUTTON POST	EA		2			2
772	2215	PEDESTRIAN PUSHBUTTON & SIGN	EA		2			2
772	2953	REVISE PULL BOX	EA		2			2
772	2990	REVISE CONTROLLER	EA	1				1
772	3002	RELOCATE CONTROLLER CABINET	EA		1			1
772	3005	RELOCATE FEEDPOINT	EA		1			1
920	0200	PUMP HOUSE	LS	1				1
930	9543	RETAINING WALL	SF	189				189
970	0075	WOOD MULCH	SY	211				211
970	0300	BENCH	EA		4			4
970	2011	AMUR MAPLE	EA		2			2
970	2055	SNOWBIRD HAWTHORN	EA		4			4
970	2083	EUROPEAN MOUNTAIN ASH	EA		2			2
970	2220	CANANDA RED CHERRY	EA		4			4
970	3590	DWAFT ALBERTA SPRUCE	EA	2				2
970	3600	BLACK HILLS SPRUCE	EA	4				4

BASIS OF ESTIMATE

Removal of Pavement

Concrete @ 2 Ton/CY
- Driveways & Sidewalks – 6” thickness
- Curb & Gutter – 1.56 SF cross sectional area
- Pavement – 8” thickness

Bituminous @ 2 Ton/CY
- Mainline thickness utilized=6”
- Driveways – 3”

Superpave FAA 43

2 Ton/CY + 10% - 0.05556 ton/SY/in

PG 64 - 34 Asphalt Cement

6.1% of HMA - 0.0034 ton/SY/in

HBP Tack Coat

0.05 Gal/SY (two applications of tack for 3 lifts)

Common Excavation

Any existing aggregate base under the roadway is included in the Common Excavation Quantity
Payment shall be plan quantity

Topsoil

Payment shall be plan quantity
Area is calculated between right-of-way lines @ 6”

Water

20 MGal/Mile for Dust Palliative
30 Gal/CY for Salvaged Base Course

HBP Cored Samples

	A	B	C	D			
Specification Section	**Distance(Ft)/2000**	**Lanes**	**Lifts**	**Sublots (AxBxC)**	**Quantity (Dx2)**	**Quantity (1 per mile)**	**Unit**
430.04 I.2.b(1), "General"	1	3	3	9	18	1	EA
40.04 I.2.b(2), "Pavement Thickness Determination Cores"					N/A	N/A	EA
				Total	18	1	EA

Estimated Quantites for Detour Route HMA Patching

Tack Coat (not a pay item)	135	GAL
Hot Mix Asphalt Patching	50	TON
PG 58-28 Asphalt Cement (Not a pay item)	3	TON

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8--991(032)029	11	1

EARTHWORK SUMMARY

Location	Excavation				Embankment			Balance	
	Excavation (A) CY	Pavement Removal from Excavation Areas (B) CY	Common Excavation Pay Item (C)=A-B CY	Topsoil Pay Item (D) CY	Compacted Volume (E) CY	Common Excavation Required Volume (F)=E*1.25 CY	Topsoil Embankment (G) CY	Excess Excavation (Note 1) (H)=C-F CY	Topsoil (Borrow)/Waste (I)=D-G CY
16th Avenue N									
Sta 18+32 to Sta 42+50	17371	3765	13606	4558	6030	7538	3621	6069	937
16th Avenue N Shared Use Path									
Sta 8+75 to Sta 17+25	38	0	38	315	182	228	94	-190	221
Woodland Drive	1181	0	1181	73	9	11	60	1170	13
TOTAL	18590	3765	14825	4946	6221	7776	3775	7049	1171

Note 1: Pipe excavation waste is not included

SALVAGED BASE SUMMARY

Location	Removals HBP (A) Ton	Removals Concrete (B) Ton	Removals Curb&Gutter (C) Ton	Total Removals (D)=A+B+C Ton	Total Removals (E)=D/2 CY	Salvaged Base Course Required (F) Ton	Salvaged Base Course Required (G)=F/1.875 CY
16th Avenue N	3333	372	122	3827	1914	9681	5163

Salvaged Base Course Breakdown

Removals (D)	3827	TON
10% Loss	373	TON
Salvage Base Allowable	3454	TON
Salvage Base Required (F)	9681	TON
Additional Salvage Base Required	6227	TON

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Earthwork and Salvaged Base Summary

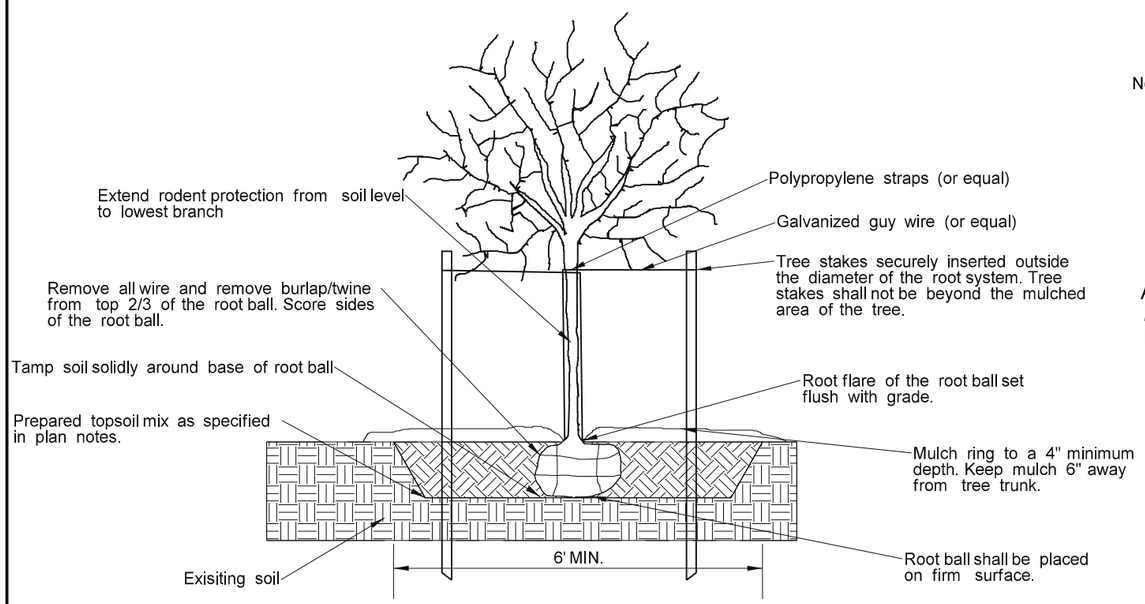
16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	1

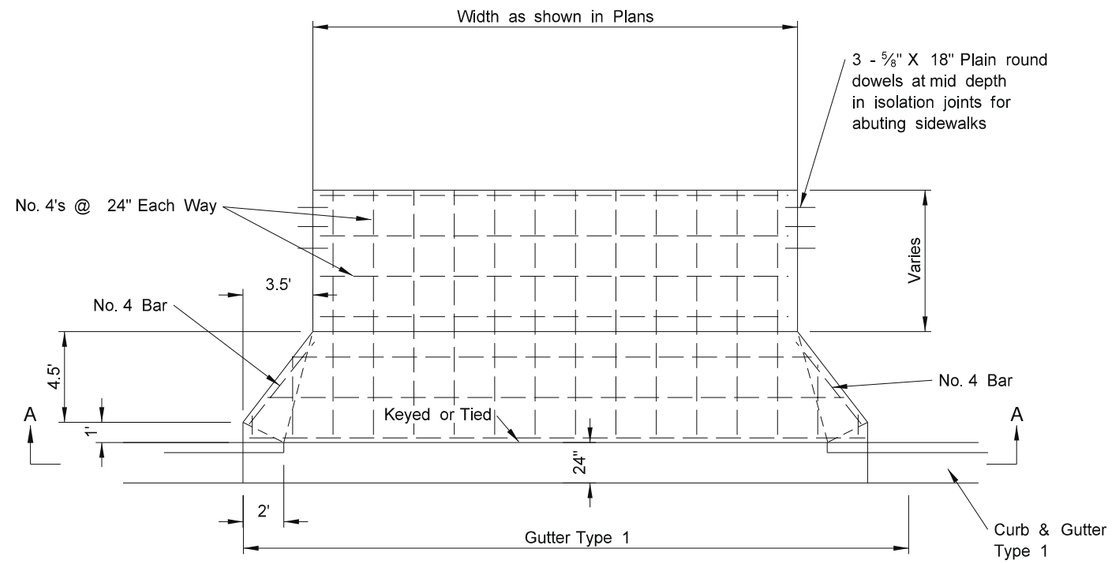
Planting Dates

Deciduous Trees, Shrubs, and Vines	
Spring	Fall
April 15	Sept. 15
to	to
June 15	Oct. 15

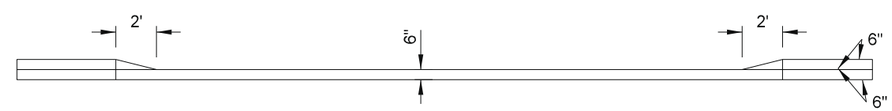


Balled & Burlapped Deciduous Tree Detail

No To Scale



Driveway Type 1 Reinforced



Section A-A

This Detail is Intended to Show Reinforcing Requirements.
See Standard Drawings D-750-1 & For Further Details

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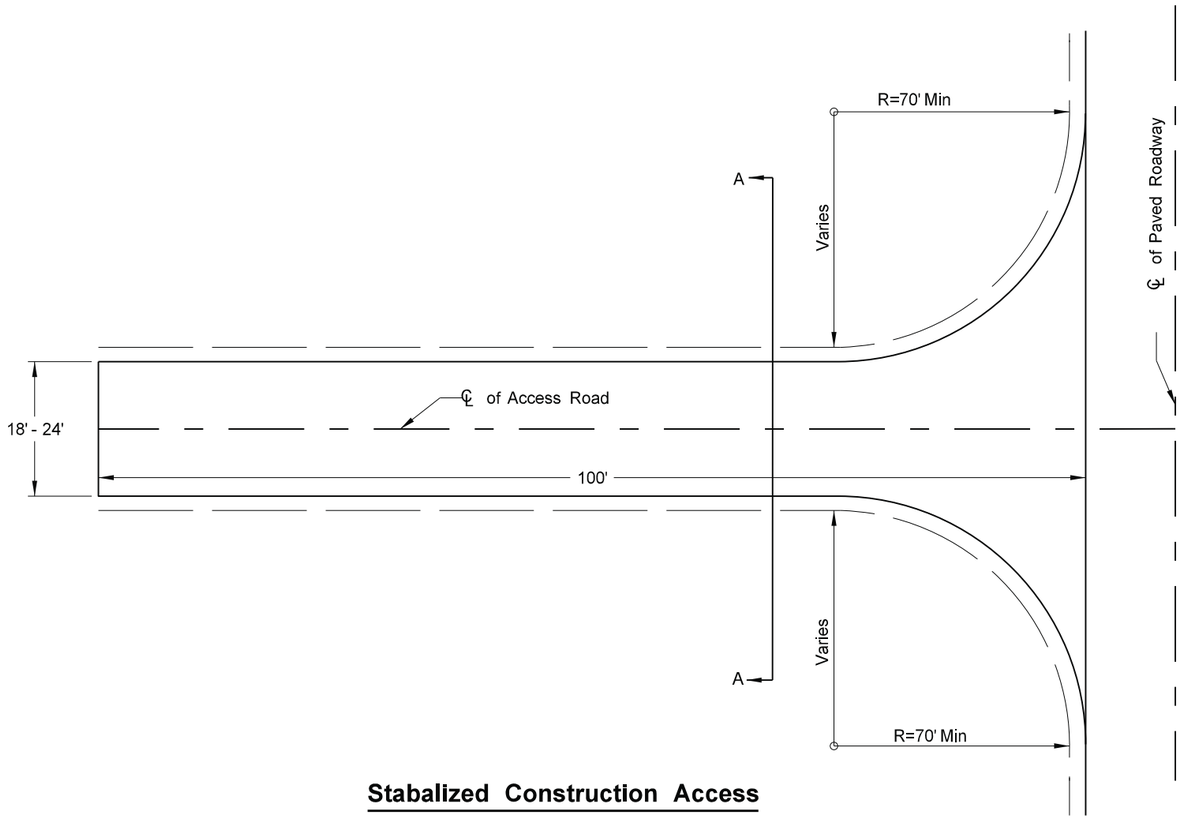
Reinforced Concrete Driveway Detail and Tree Planting

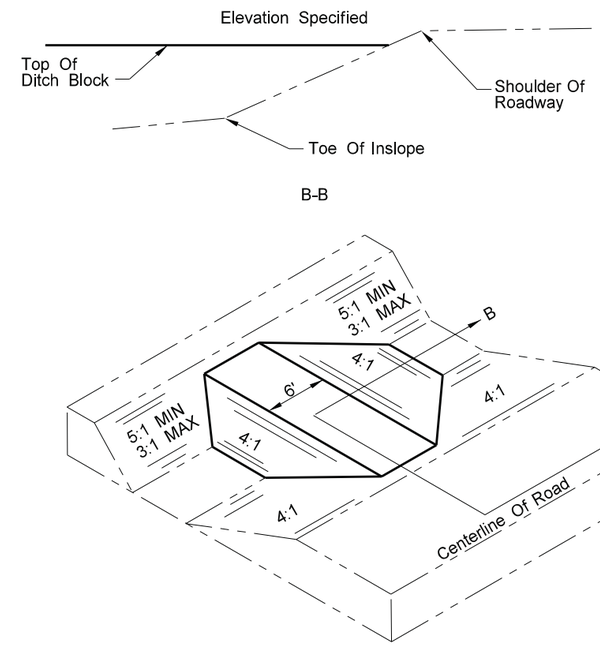
16th Ave North

Wahpeton, ND

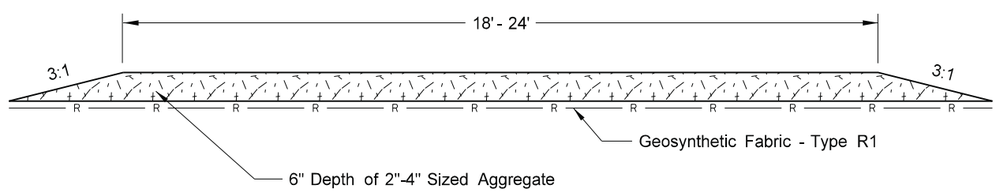
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	2



Stabalized Construction Access



Ditch Block Detail



A - A Cross Section

Note: The cost of the labor, equipment, and materials to install ditch blocks will be included in the price bid for "Commom Excavation Type - A."

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Stabilized Construction Access

Ditch Block Detail

16th Ave North

Wahpeton, ND

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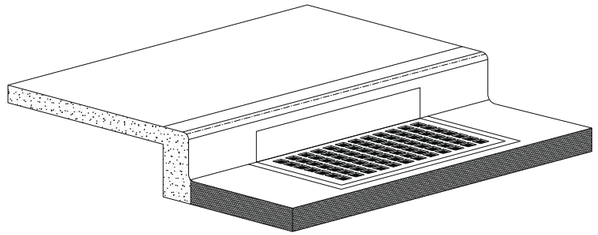
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	3



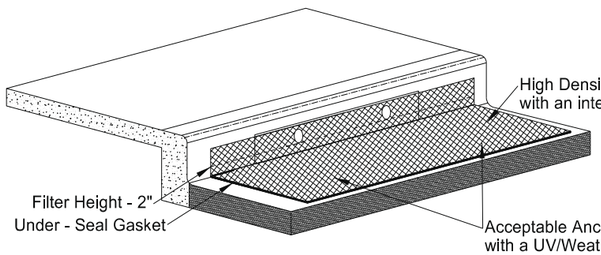
Inlet Protection Device

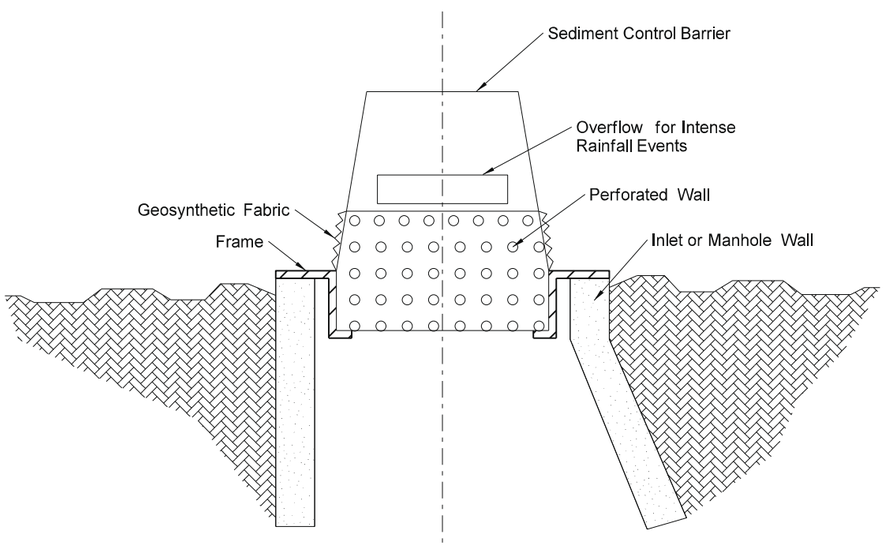
Installation Notes:

1. Place device tightly against drain opening and cover entire grate. The device should extend at least 2 inches past grate toward street.

2. Overlap the segments at longer openings.

3. Anchor the device so that water cannot flow behind it.



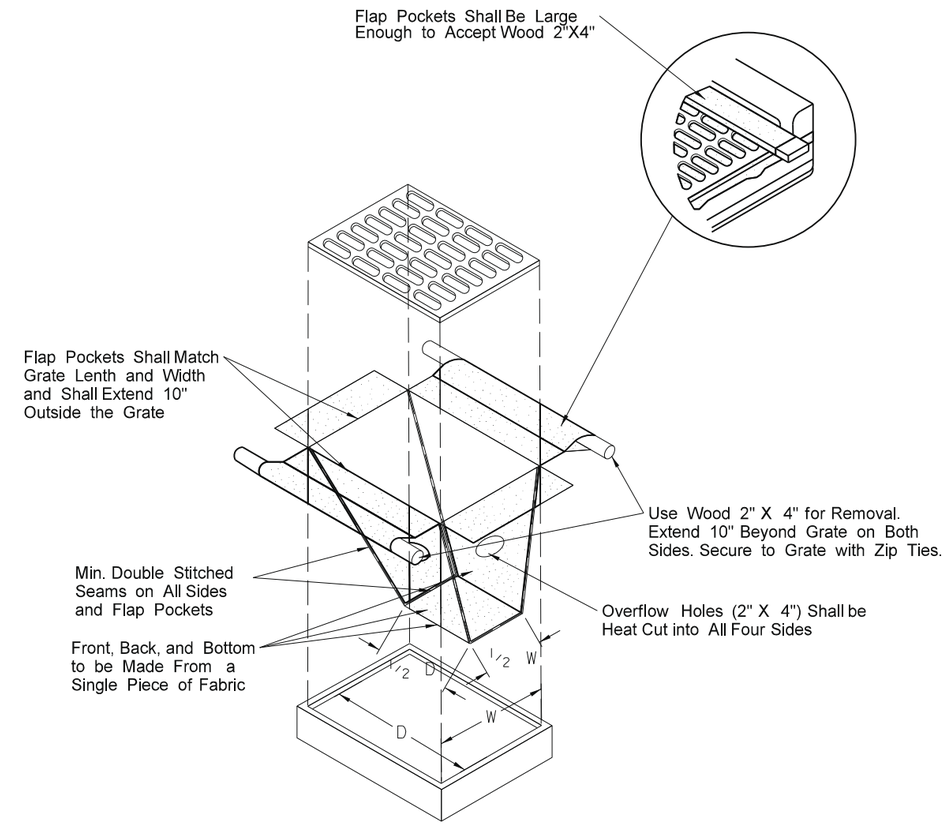


Notes:

Alternate inlet protection devices may be allowed subject to engineer's approval.

When removing or maintaining inlet protection, care shall be taken to insure that sediment trapped on the geosynthetic fabric does not fall into the inlet. Any material falling into inlet shall be immediately removed.

Any inlet protection used shall be equipped with an emergency overflow to minimize the threat of street flooding during an intense rainfall event.



Notes:
The bag shall have a minimum side clearance of 3 inches between the inlet walls and the bag measured at the bottom of the overflow holes. Where necessary the contractor shall clinch the bag using plastic zip ties to achieve the 3 inch side clearance.

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Inlet Protection

16th Ave North

Wahpeton, ND

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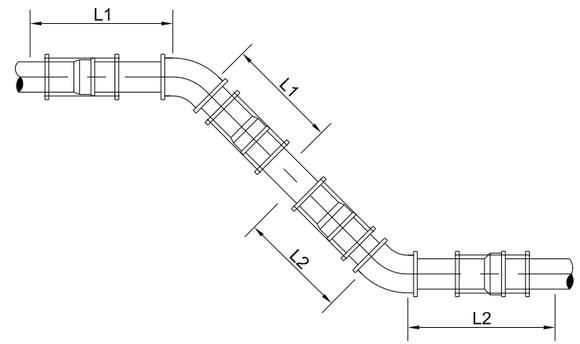
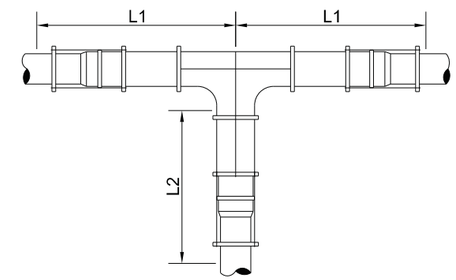
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	4

Fitting Type	Normal Pipe Size	Bend Angle	L1	L2	Branch Size	Small Size	Feet of Offset	L3
Horizontal Bend	6	90	8					
Horizontal Bend	6	45	4					
Horizontal Bend	6	22 1/2	2					
Horizontal Bend	6	11 1/4	1					
Horizontal Bend	12	90	15					
Horizontal Bend	12	45	6					
Horizontal Bend	12	22 1/2	3					
Horizontal Bend	12	11 1/4	2					
Tee	6		17	1	6			
Tee	6		11	2	6			
Tee	6		5	3	6			
Tee	6		1	4	6			
Tee	12		36	1	12			
Tee	12		30	2	12			
Tee	12		24	3	12			
Tee	12		18	4	12			
Tee	12		12	5	12			
Tee	12		6	6	12			
Tee	12		1	7	12			
Dead End	6		23					
Dead End	12		43					
Vertical Offset	6	45	10				up to 4	3
Vertical Offset	12	45	18				up to 4	4



Horizontal Offset

Not To Scale

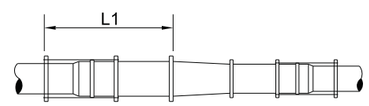


Tee

Not To Scale

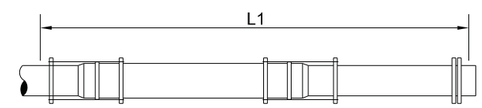
NOTE 1:
Pipe bedded in compacted granular material to the centerline of the pipe, 4 inches minimum under the pipe. Compacted granular or select material to top of pipe. (Approximately 90 percent Standard Proctor, AASHTO T-180)

NOTE 2:
Contractor to excavate existing watermain to measure length from first joint to item being installed.



Reducer

Not To Scale



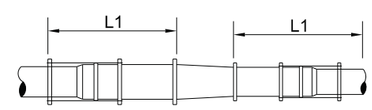
NOTE:
Fire hydrants are to be treated as dead ends.

Dead End

Not To Scale

Minimum Lengths of Restraints for Water Main

Contractor to furnish the length of restraints (L) Calculations to the engineer with the shop drawings.



NOTE:
Gate, Butterfly and Plug Valves are to be treated as dead ends.

Valve

Not To Scale

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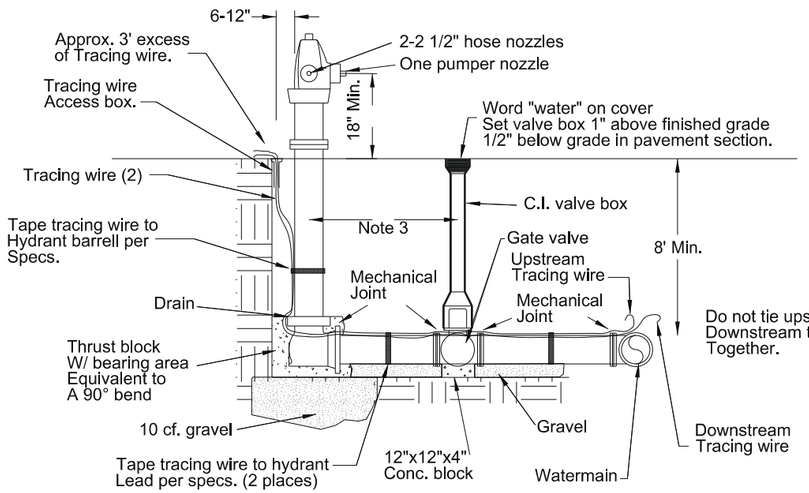
Water Details

16th Ave North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	5

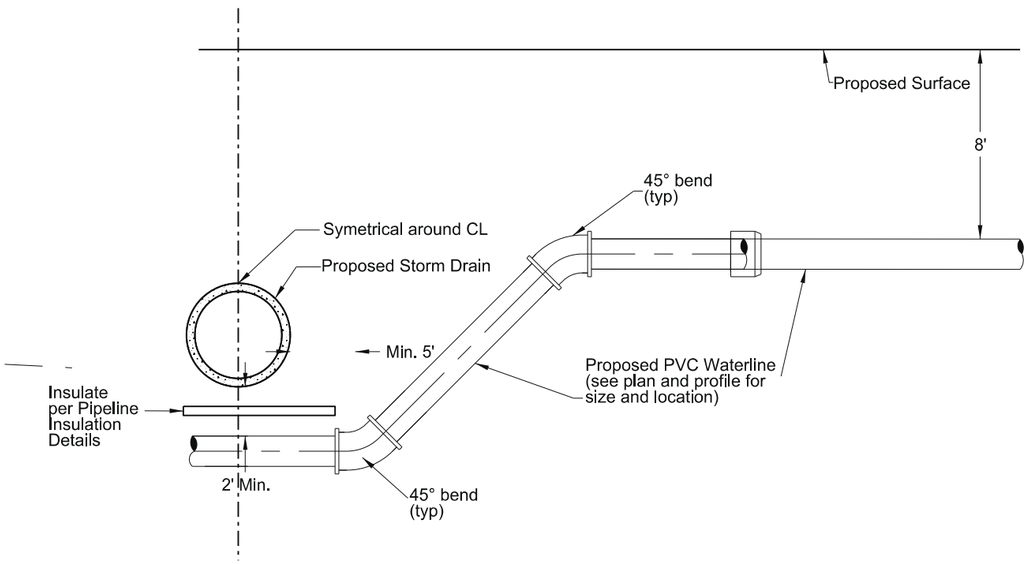


Hydrant Detail

Not To Scale

NOTES:

1. Hydrant to be placed with nozzle facing the street
2. No bends preferred on hydrants lead use 1/8 bends if required
3. Dimension shall be 6' or as shown in plans.

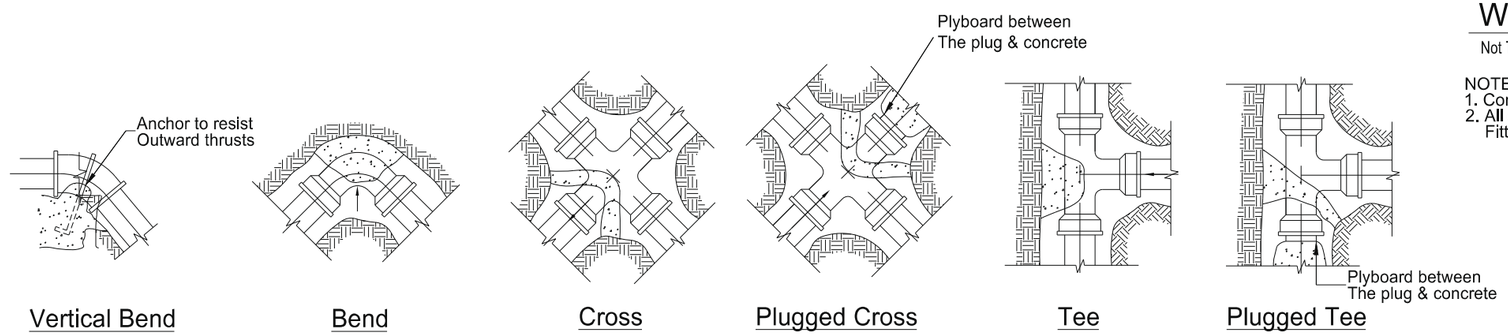


Watermain Lowering Detail

Not To Scale

NOTE:

1. Contractor to ensure proper restraint and thrust blocking of bends.
2. All costs shall be included in pay items for "Watermain", "Ductile Iron Fittings", and "Poly Styrene Insulation".



Thrust Blocking Detail

Not to Scale

Minimum Bearing Area Of Thrust Block In Square Feet				
Fitting Size	Tee, Dead End & 90° Bend	45° Bend	22 1/2° Bend	11 1/4° Bend
6"	3.0	1.6	0.8	0.4
8"	5.3	2.9	1.5	0.7
12"	12.0	6.5	3.3	1.7

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Water Details

16th Ave North

Wahpeton, ND

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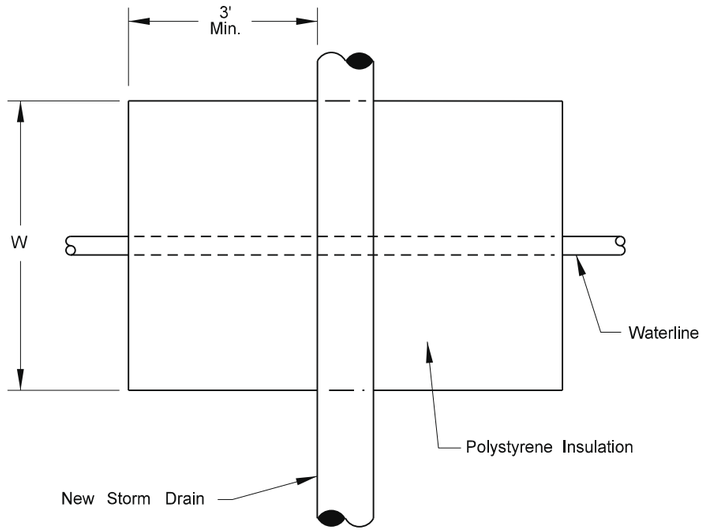
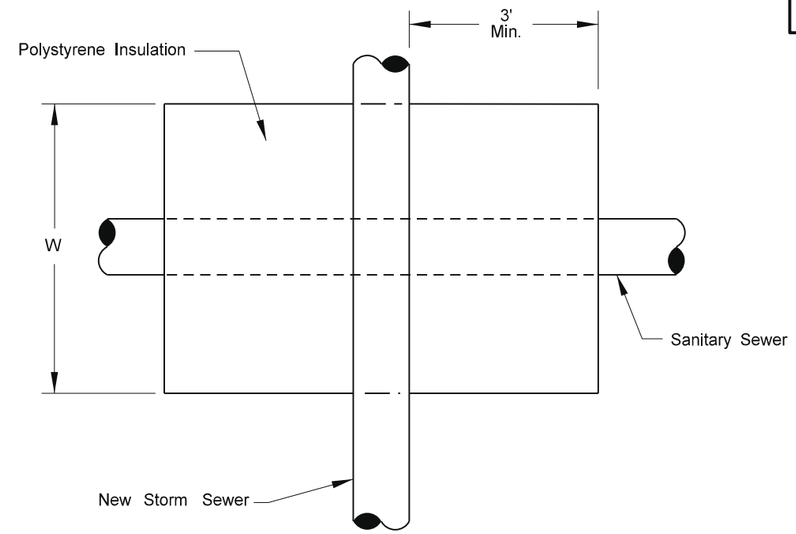
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	6



Plan View

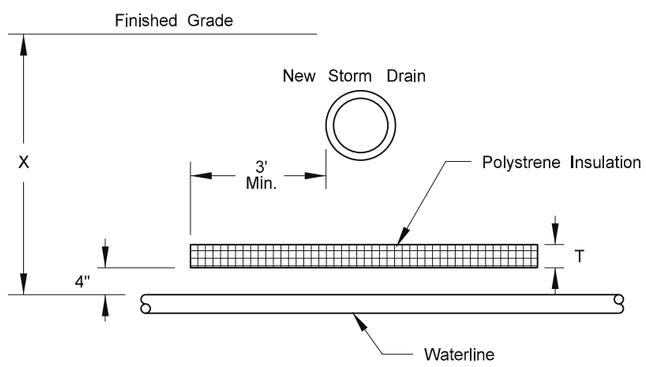
Any water and sewer lines encountered in the field during installation of new storm drain shall be insulated according to the details as shown.



Plan View

Insulation Board Chart		
Depth "X"	Width "W"	Thickness "T"
4' to 4.99'	6'	4"
5' to 5.99'	4'	3"
6' to 6.99'	4'	2"

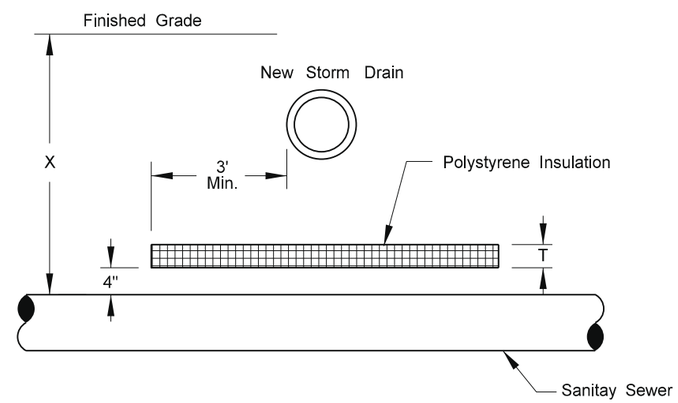
When crossing a water main or service, the insulation board shall extend a minimum of 3' beyond the outside edge on each side of the new pipe.



Section View

Waterline Isulation Detail

Not To Scale



Section View

Pipeline Insulation Detail

Not To Scale

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Pipeline Insulation Details

16th Ave North

Wahpeton, ND

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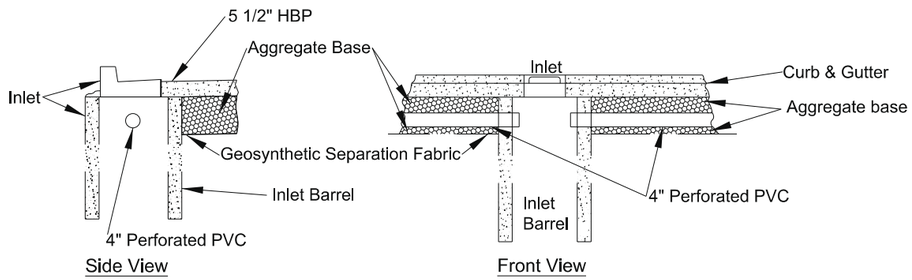
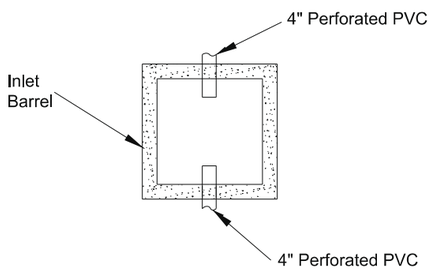
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	7



Side View

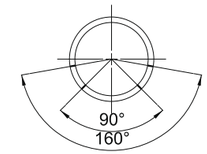
Front View



Note:
Cost of knockouts and grouting of pvc into inlets to be included in the price bid for inlets.

Perforated Pipe - Inlet Connection Detail

Not To Scale



Angular Position of Rows

Pipe Size	Rows of Perforations	No. of Perforation Per Row*
4"	4	48

*For 12.5 foot pipe laying lengths

Perforated PVC Sewer Pipe

1. Type of Pipe The pipe shall be polyvinyl chloride schedule 40 pipe with Elastomeric Seal (Gasketed) Joints as specified in ASTM F-949 or Cemented Joints as specified in ASTMD-3034.

2. Perforations shall be circular and 1\4"+1\16" in diameter. They should be arranged in rows parallel to the axis of the pipe and shall be spaced approximately 3" center to center along the ROWS. The spigot end of the pipe shall be un-perforated for a length equal to the depth of the socket. The placement and total number of the ROWS shall be as shown above with an allowable tolerance of +10°. The spigot and bell end shall be un-perforated for a length equal to the depth of the spigot.

3. The nominal laying length of the pipe shall be 12.5 feet. Shorter or longer laying lengths shall be provided if required.

4. All bends required for the installation of drain tile around the radii of curb and gutter at intersections shall be included in the price bid for underdrain pipe PVC perforated 4".

5. A type D3 or D4 geosynthetic fabric sock shall be installed around the under drain pipe and shall be included in the price bid for underdrain pipe PVC perforated 4".

PVC Underdrain Detail

Not To Scale

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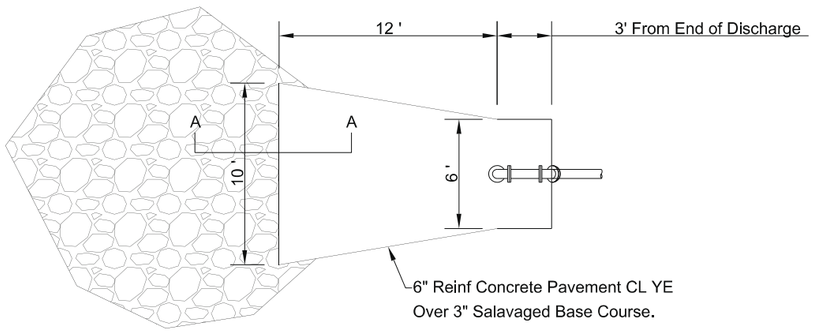
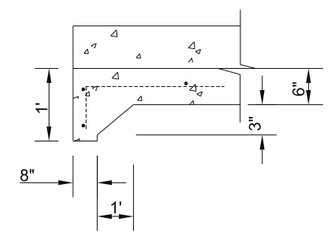
Under Drain Details

16th Ave North

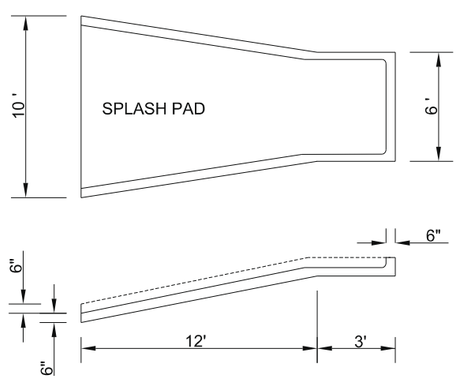
Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	8





End Of Concrete Erosion Pad
Section A-A



NOTES:
Reinforcing Steel: All bars shall be No. 4 deformed reinforcing bars spaced 18" center to center. Rebar shall be placed mid-depth with a 2" minimum cover from the edge of the concrete erosion pad. Spliced rebar shall have a minimum overlap of 9".

Construction Joints: All construction joints are to be tied with No. 4 bars, 24" long, spaced 18" on center.

Joint Spacing: The transverse joint spacing for the concrete erosion pad shall be 5' average.

Joint Sealing: All longitudinal and transverse joints shall be sawed or tooled $\frac{1}{4}$" wide and 2" deep and sealed with hot poured elastic type joint sealer.

All costs for labor, equipment and material necessary to construct and seal joints shall be included in the price bid for "6 in. Reinf. Concrete Pavement CL YE.

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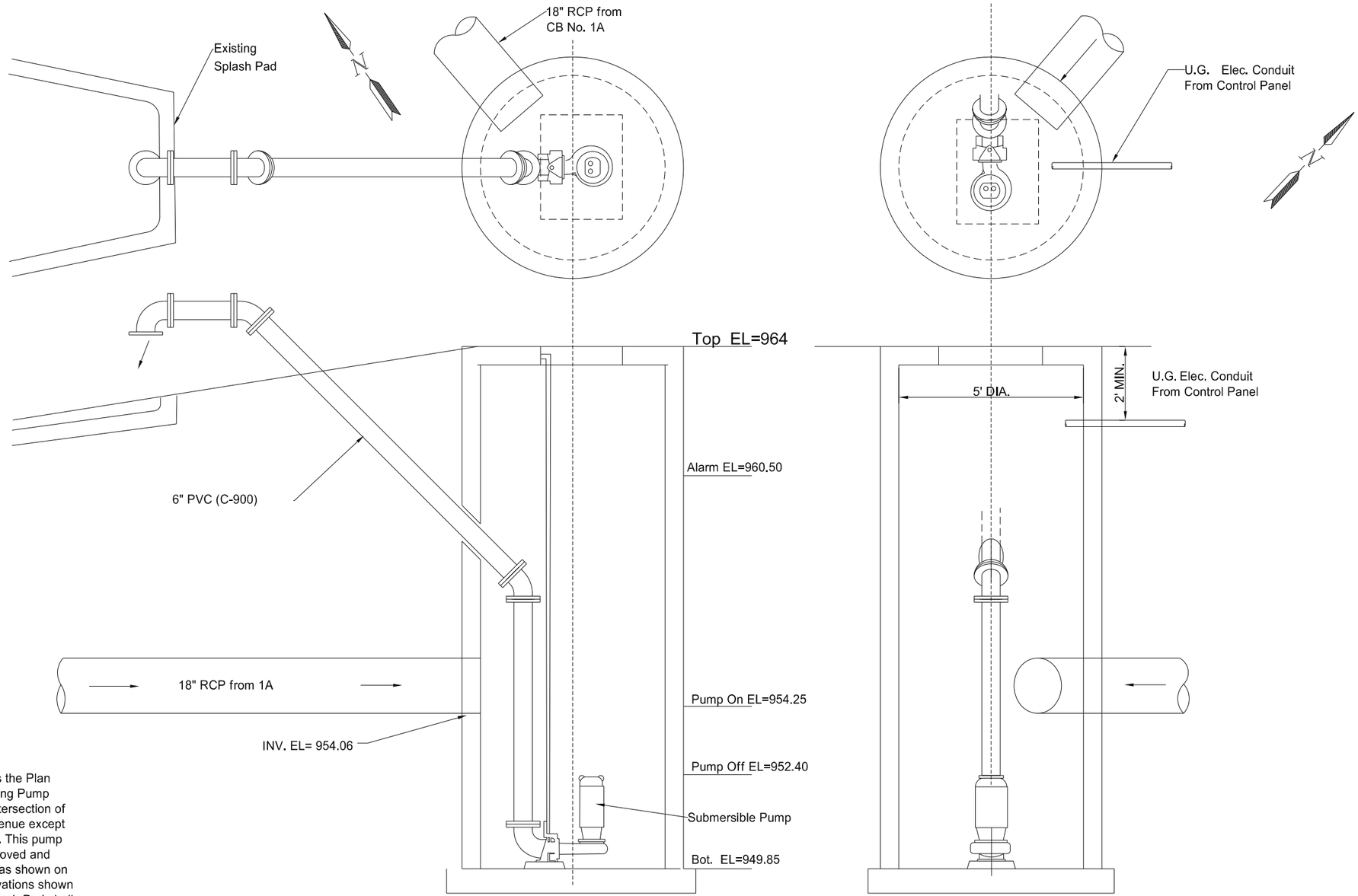
Splash Pad Detail

16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	9



Note:

Drawing Represents the Plan Details for the Existing Pump Station NE of the intersection of ND210 and 16th Avenue except for elevation shown. This pump Station shall be removed and salvaged and reset as shown on the plans to the elevations shown in here. Existing Splash Pad shall be removed and disposed of.

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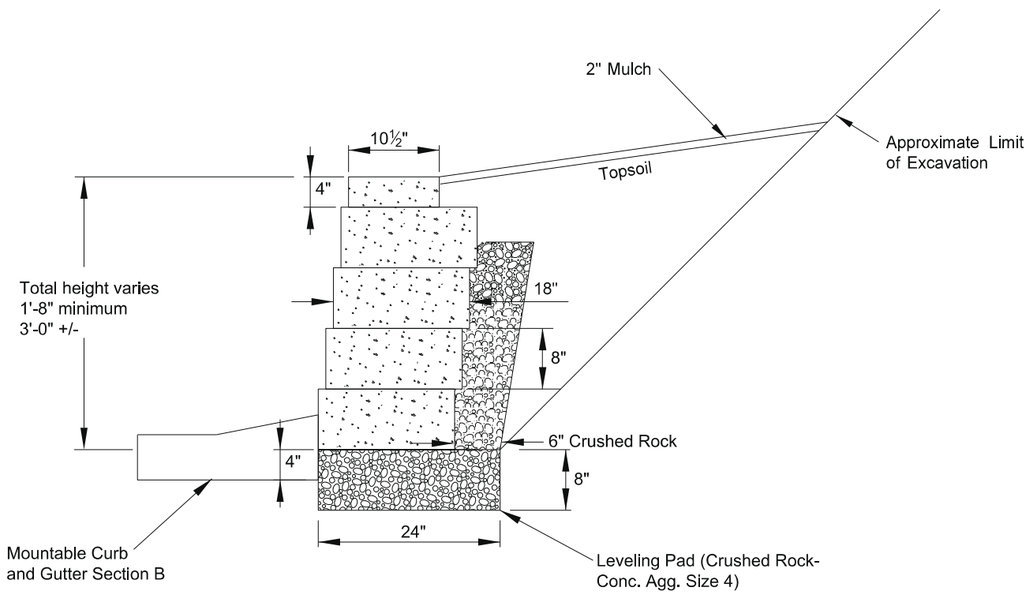
Pump House/ Pumping Equiptment Details

16th Ave N.

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	20	10



RETAINING WALL DETAIL

NOT TO SCALE

1.) Modular Retaining Wall System (MRWS) quantity for measurement shall be based on the vertical distance from bottom of base block to top of the cap block. Length shall be based on the horizontal exposed length of each course. Furnishing and installing masonry units, crushed rock, backfill and all appurtenances there to shall be included in the price bid for "Retaining wall". Mountable Curb and Gutter shall be paid for separately.

2.) Backfill behind the MRWS shall be topsoil obtained from the project excess.

3.) MRWS masonry units shall conform to the following minimum dimensions.
Cap Block - 18" w x 10" d x 4" h
Wall Units 18" w x 18" d x 8" h

4.) The MRWS shall be Keystone Verso-Lok or equal. the color of the MRWS shall be determined by the owner prior to ordering.

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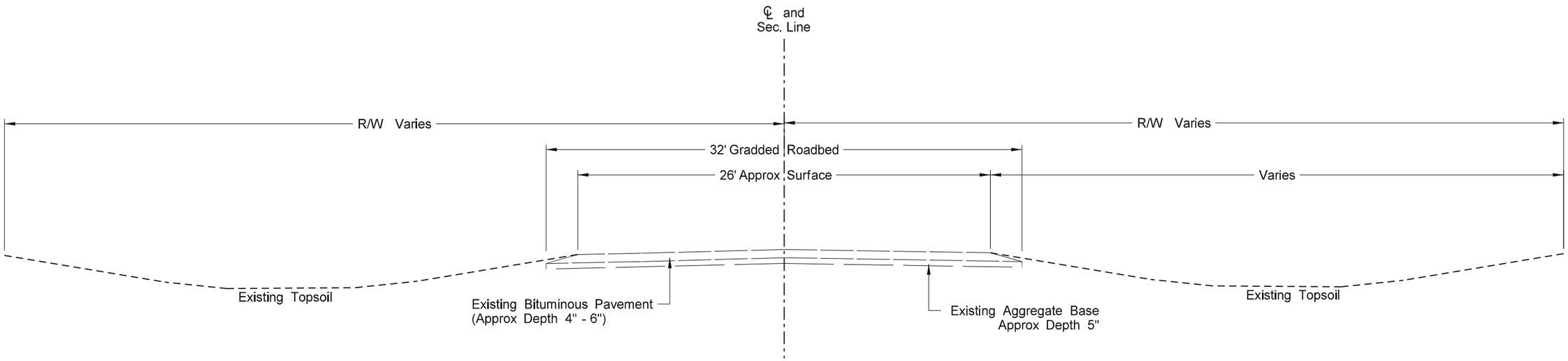
Retaining Wall Detail

16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	30	1



Existing Typical Section
16th Ave North

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Existing Typical Section

16th Ave South

Wahpeton, ND

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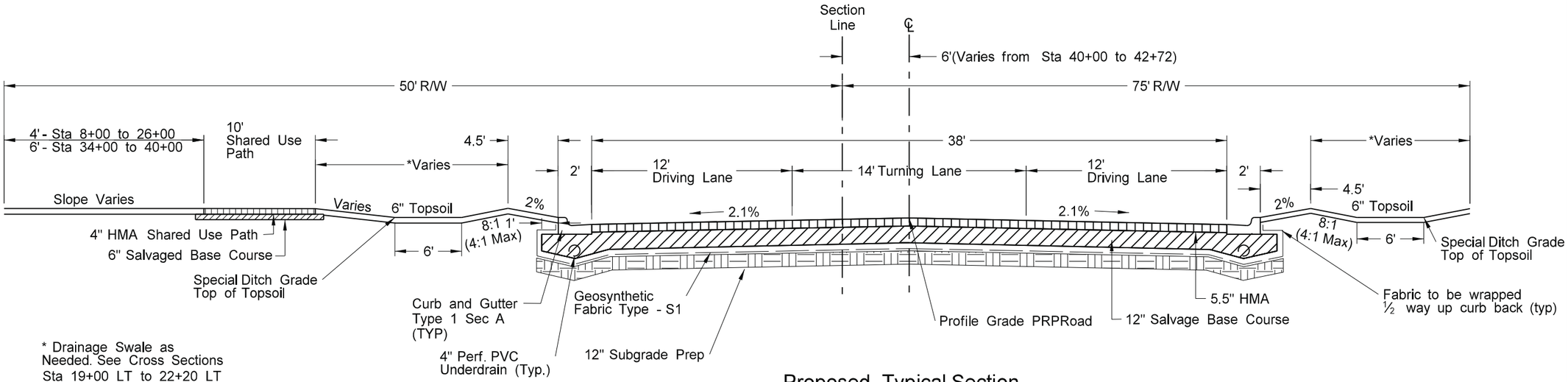
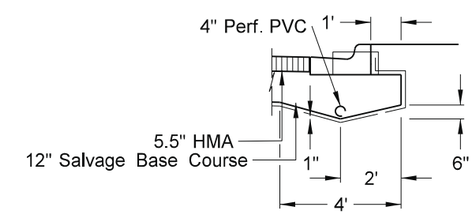
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	30	2

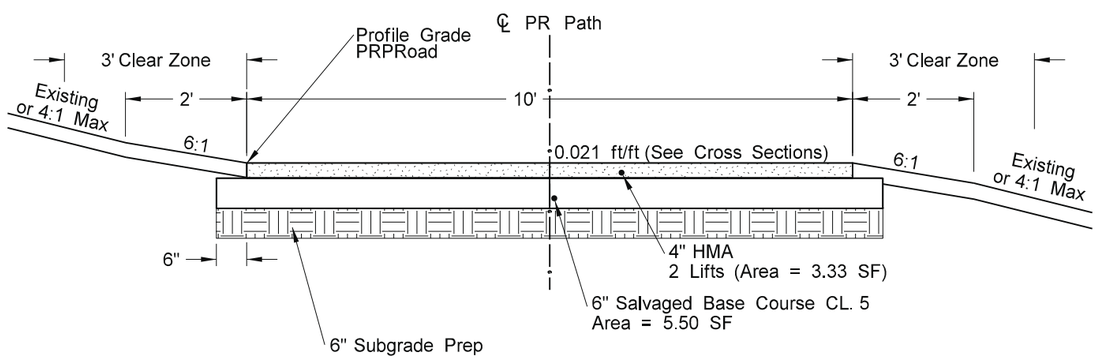


* Drainage Swale as Needed. See Cross Sections
Sta 19+00 LT to 22+20 LT
Sta 28+50 LT to 33+00 LT
Sta 28+00 RT to 36+00 RT
Sta 36+00 RT to 38+00 RT
Sta 34+40 LT to 37+70 LT
Sta 39+50 LT to 41+50 LT
Sta 38+00 RT to 41+10 RT

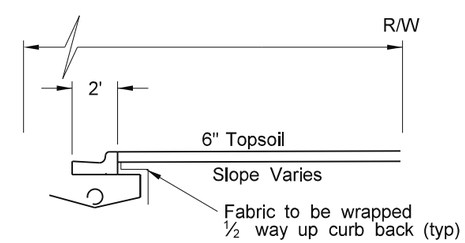
Proposed Typical Section
16th Ave North
Sta 18+32 to Sta 42+50



Underdrain Pipe PVC Perforated 4IN Detail



Proposed Shared Use Path
Typical Section
16th Ave North
Sta 8+00 to Sta 42+50



Alternate Boulevard Section
Sta 20+45 RT to 30+00 RT
Sta 23+00 LT to 26+00 LT

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Proposed Typical Section

16th Ave North

Wahpeton, ND

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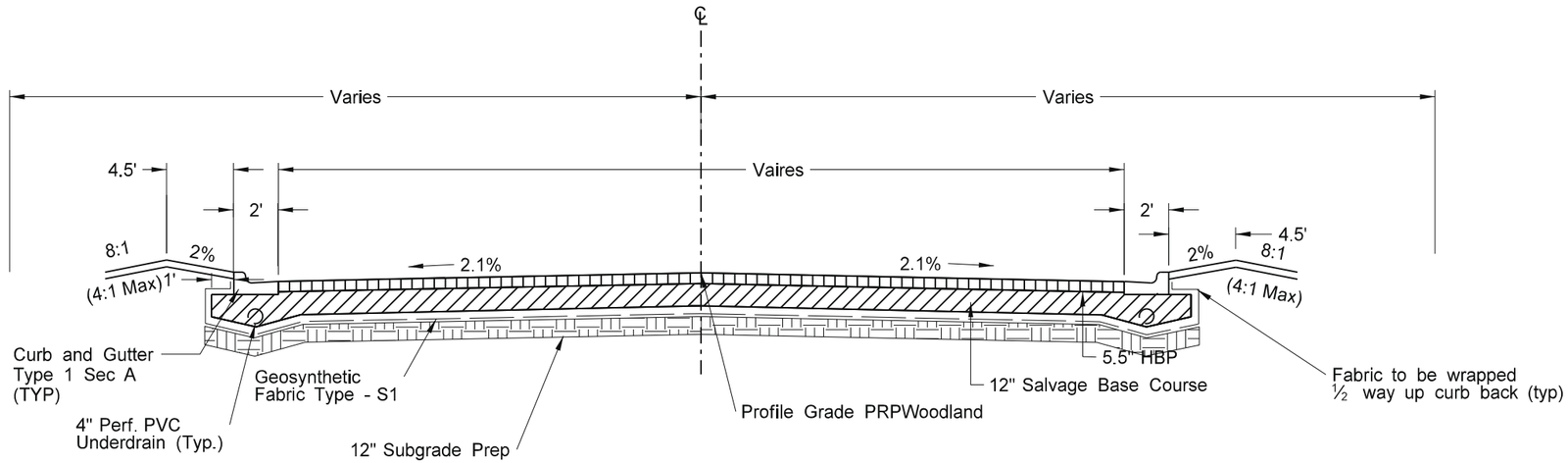
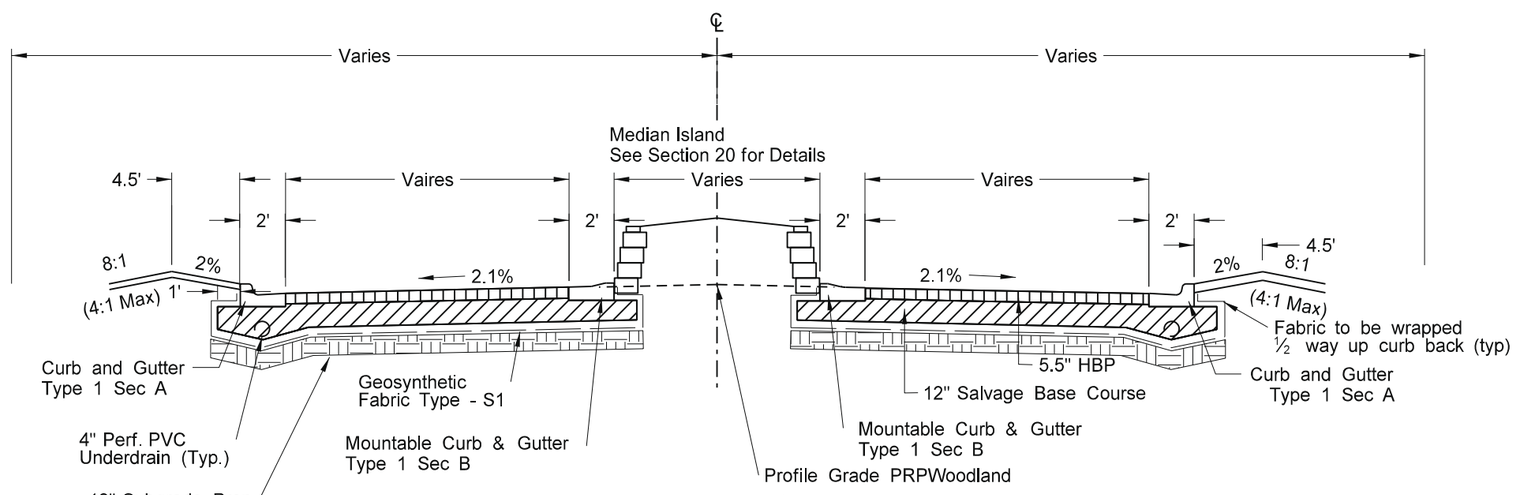
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	30	3



Proposed Typical Section
Woodland Drive

Sta 0+19 to Sta 0+55.77
Sta 1+34.08 to Sta 2+10

Note:
Mountable Curb and Gutter, Type 1 (Sec A)
shall be placed from Sta 1+64 to Sta 2+10



Proposed Typical Section
Woodland Drive

Sta 0+55.77 to Sta 1+34.08

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Proposed Typical Section

Woodland Drive

Wahpeton, ND

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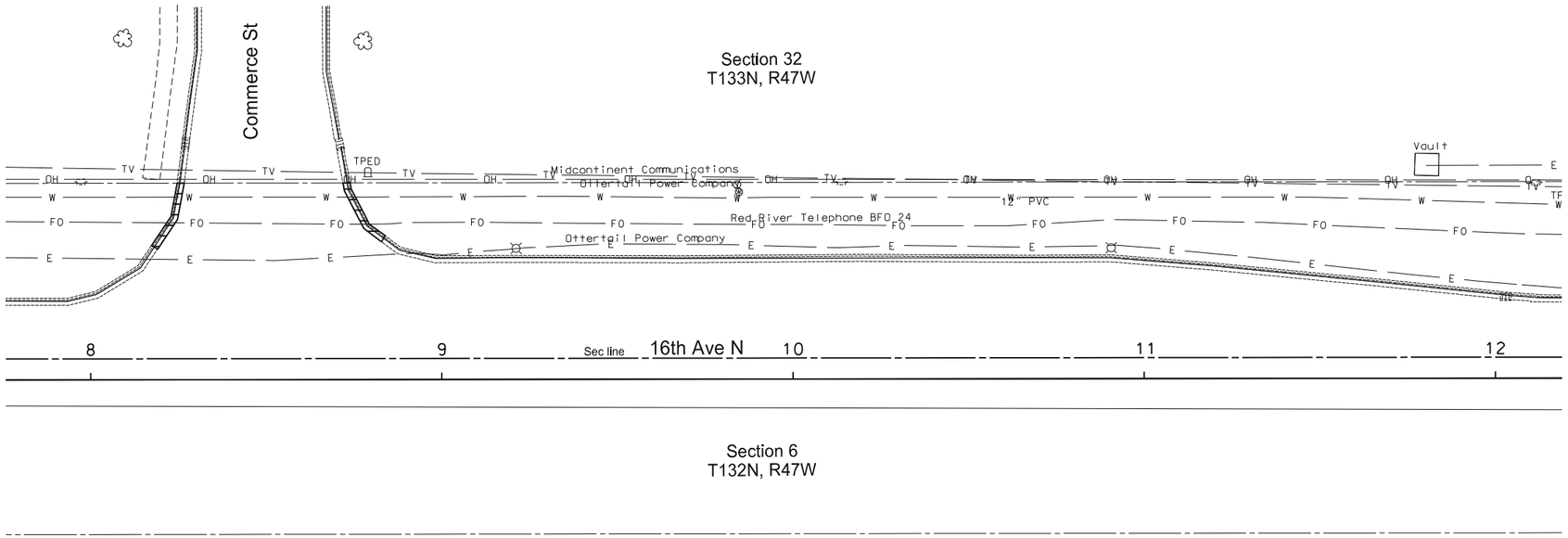
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	1

REMOVAL OF PAVEMENT
CURB AND GUTTER

Sta 8+25 LT	2.5 TON
Sta 8+75 LT	2.5 TON



Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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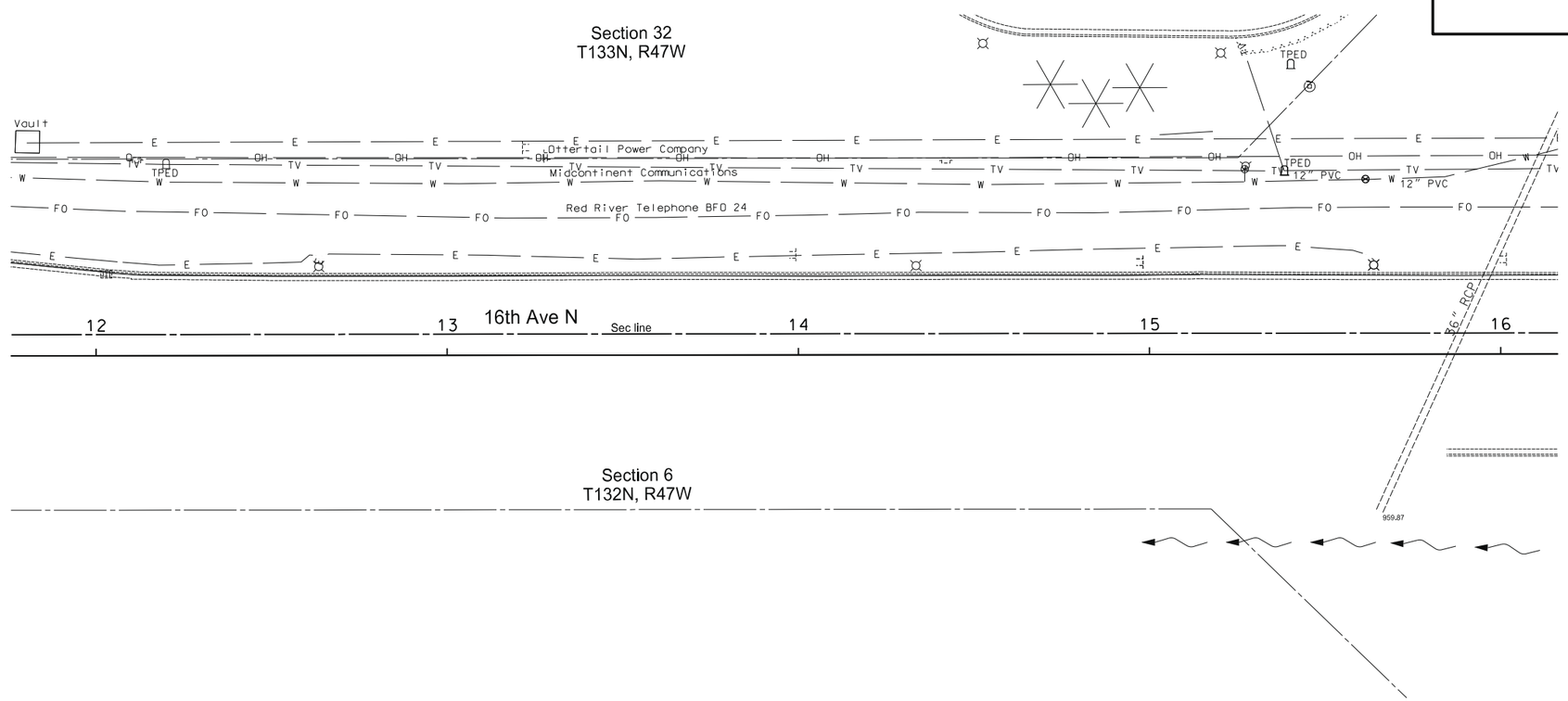
Removal Layouts

Sta 8+00 to 12+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	2



Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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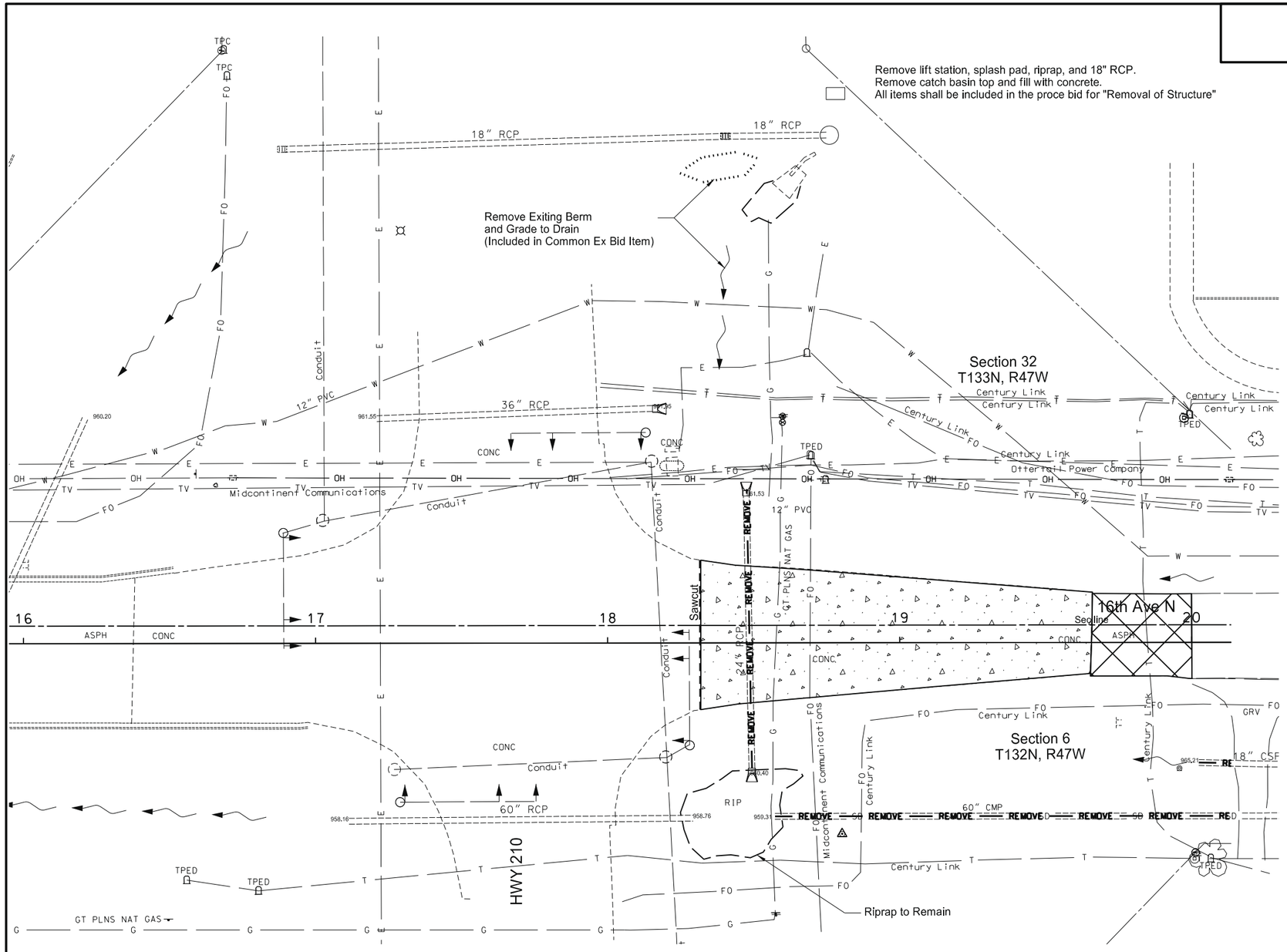
Removal Layouts

Sta 12+00 to 16+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	3



SAW BITUMINOUS SURFACING - FULL DEPTH

Sta 18+32	℄	52 LF

REMOVAL OF PAVEMENT

BITUMINOUS

Sta 19+66 to 20+00		36 TON

CONCRETE

Sta 18+32 to 19+66		242 TON

REMOVAL OF PIPES ALL TYPES AND SIZES

Sta 18+48	℄ (24" RCP)	94 LF
Sta 18+55 to 20+00	RT (60" CMP)	185 LF

REMOVAL OF STRUCTURE

Sta 18+70	LT	1 LS

REMOVAL OF END SECTION - ALL TYPES AND SIZES

Sta 18+50	RT(24")	1 EA
Sta 18+50	LT(24")	1 EA
Sta 18+15	LT(36")	1 EA

Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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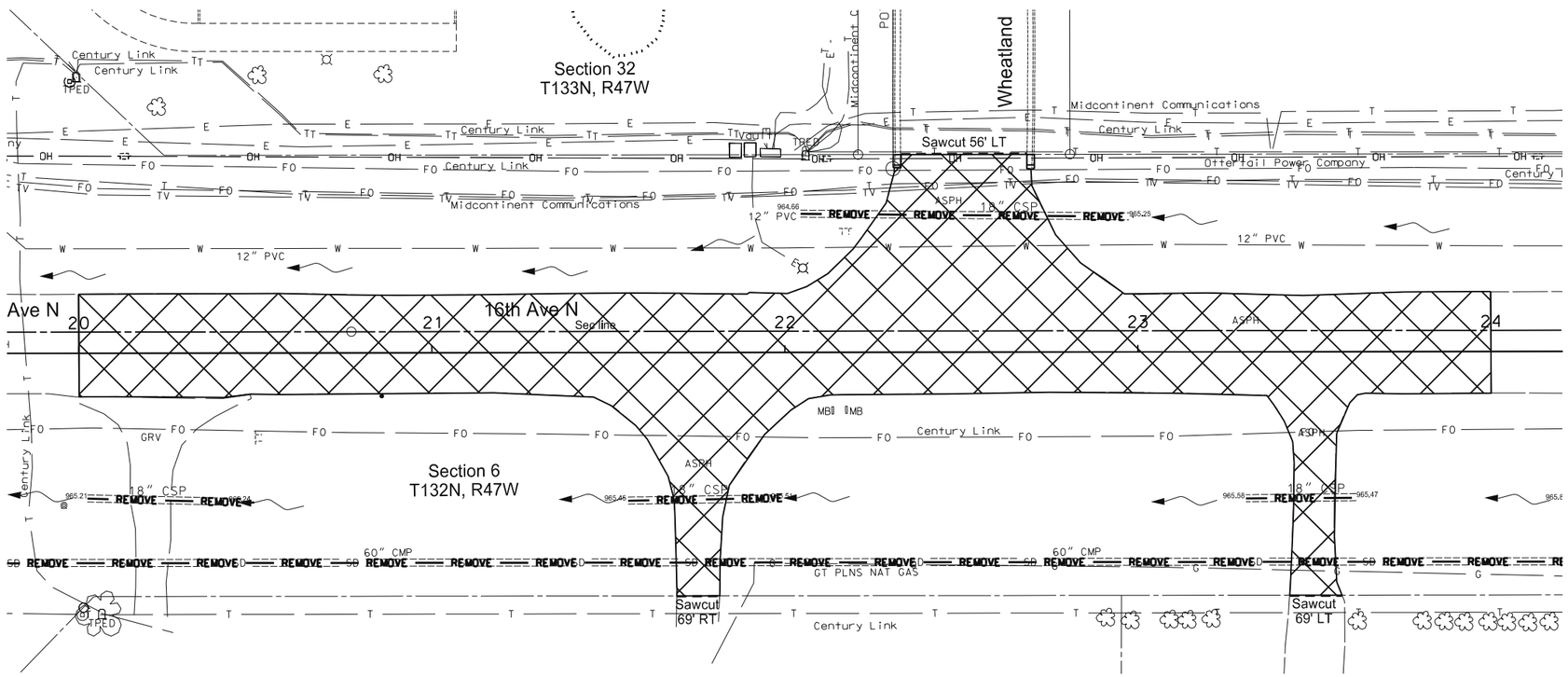
Removal Layouts

Sta 16+00 to 20+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	4



SAW BITUMINOUS SURFACING - FULL DEPTH

Sta 21+75	12 LF
Sta 22+52	40 LF
Sta 23+50	15 LF

REMOVAL OF PAVEMENT

BITUMINOUS

Sta 20+00 to 24+00		505 TON

DRIVEWAY

Sta 21+75	RT	23 TON
Sta 23+50	RT	14 TON

CURB AND GUTTER

Sta 22+32	LT	0.75 TON
Sta 22+68	LT	0.75 TON

REMOVAL OF PIPES ALL TYPES AND SIZES

Sta 20+00 to 29+00	RT(60" CMP)	400 LF
Sta 20+02 to 20+42	RT(18" CSP)	40 LF
Sta 21+56 to 21+96	RT(18" CSP)	40 LF
Sta 22+04 to 22+99	LT(18" CSP)	95 LF
Sta 23+31 to 23+63	RT(18" CSP)	32 LF

Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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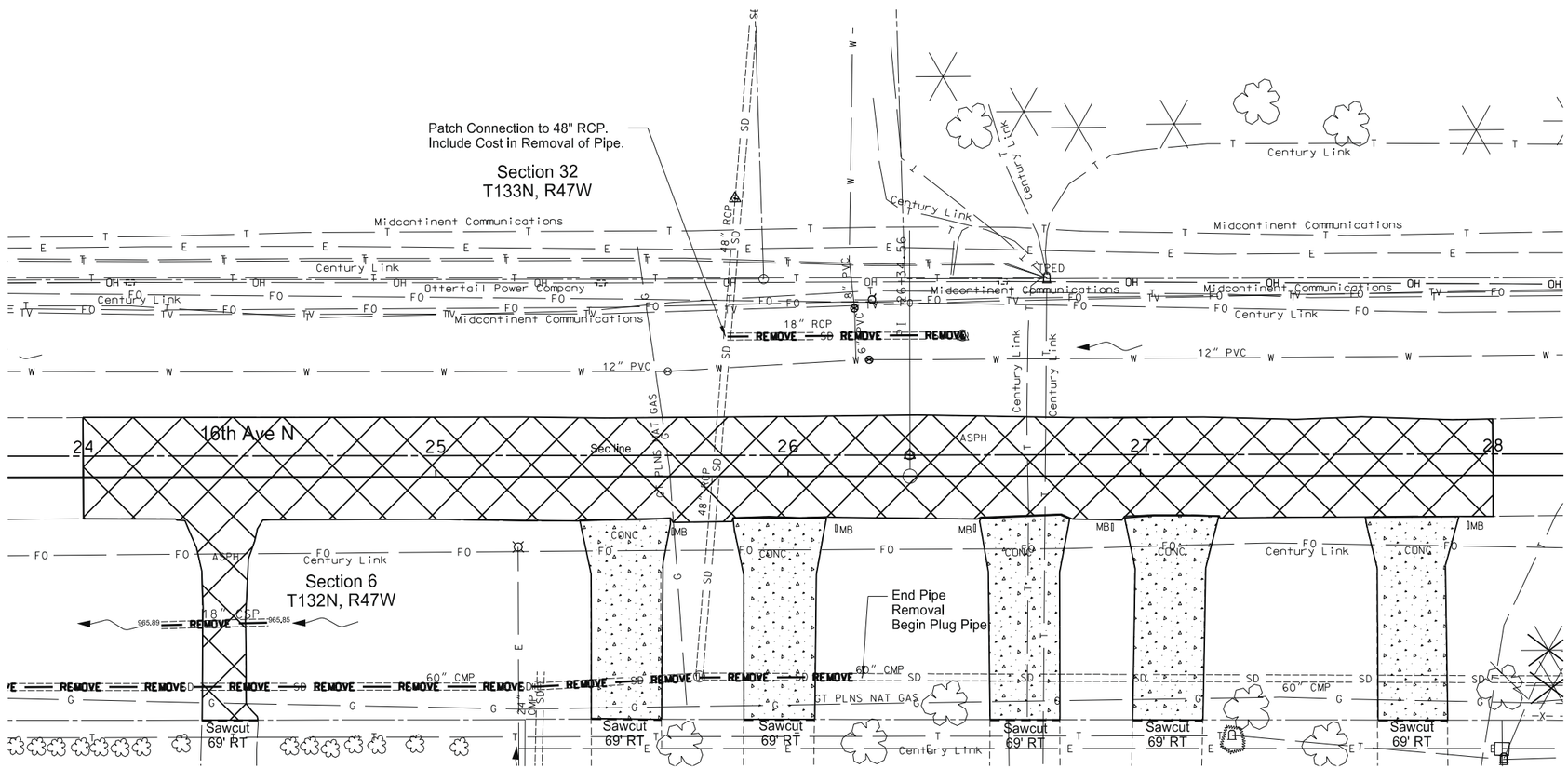
Removal Layouts

Sta 20+00 to 24+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	5



SAW BITUMINOUS SURFACING - FULL DEPTH

Sta 24+42	16 LF
Sta 25+54	20 LF
Sta 25+98	21 LF
Sta 26+67	20 LF
Sta 27+08	20 LF
Sta 27+77	20 LF

REMOVAL OF PAVEMENT

BITUMINOUS

Sta 24+00 to 28+00		425 TON

DRIVEWAY

Sta 24+29 to 24+51	RT	15 TON

DRIVEWAY (CONCRETE)

Sta 25+54	RT	22 TON
Sta 25+98	RT	22.5 TON
Sta 26+39	RT	22 TON
Sta 27+09	RT	22.5 TON
Sta 27+77	RT	22 TON

REMOVAL OF PIPES ALL TYPES AND SIZES

Sta 24+22 to 24+53	LT(18" CSP)	31 LF
Sta 24+00 to 26+20	RT(60" CMP)	220 LF

REMOVAL OF INLETS

Sta 26+48	LT	1 EA

REMOVAL OF MANHOLES

Sta 25+28	RT	1 EA
Sta 25+75	RT	1 EA

PLUG PIPE - ALL TYPES AND SIZES

Sta 26+20 RT to Sta 28+30 RT 60" CMP		1 EA

REMOVE HYDRANT

Sta 26+25	LT	1 EA

Legend

- Removal of Bituminous
- Removal of Concrete
- Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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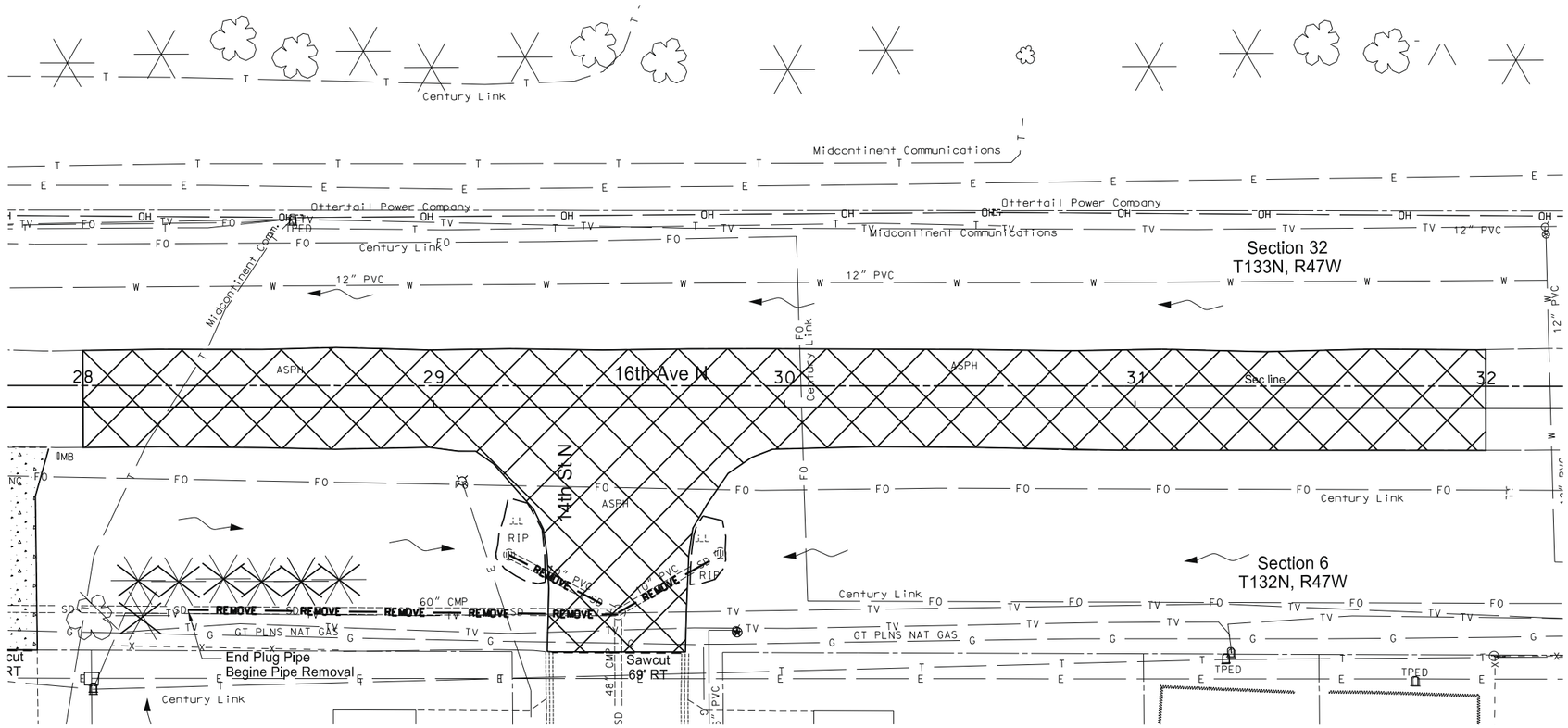
Removal Layouts

Sta 24+00 to 28+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	6



SAW BITUMINOUS SURFACING - FULL DEPTH

Sta 29+32 to 29+72	40 LF

REMOVAL OF PAVEMENT

BITUMINOUS

Sta 28+00 to 32+00	522 TON

REMOVAL OF PIPE ALL TYPES AND SIZES

Sta 28+30 to 29+53	RT(60" CMP)	123 LF
Sta 29+22 to 29+53	RT(10" PVC)	31 LF
Sta 29+53 to 29+82	RT(10" PVC)	29 LF

REMOVAL OF INLET

Sta 29+22	RT	1 EA
Sta 29+82	RT	1 EA

REMOVAL OF MANHOLE

Sta 29+53	RT	1 EA

REMOVAL OF TREES 18IN

Sta 28+16	RT	1 EA
Sta 28+17	RT	1 EA
Sta 28+27	RT	1 EA
Sta 28+40	RT	1 EA
Sta 28+51	RT	1 EA
Sta 28+62	RT	1 EA
Sta 28+73	RT	1 EA

REMOVE HYDRANT

Sta 29+85	RT	1 EA

Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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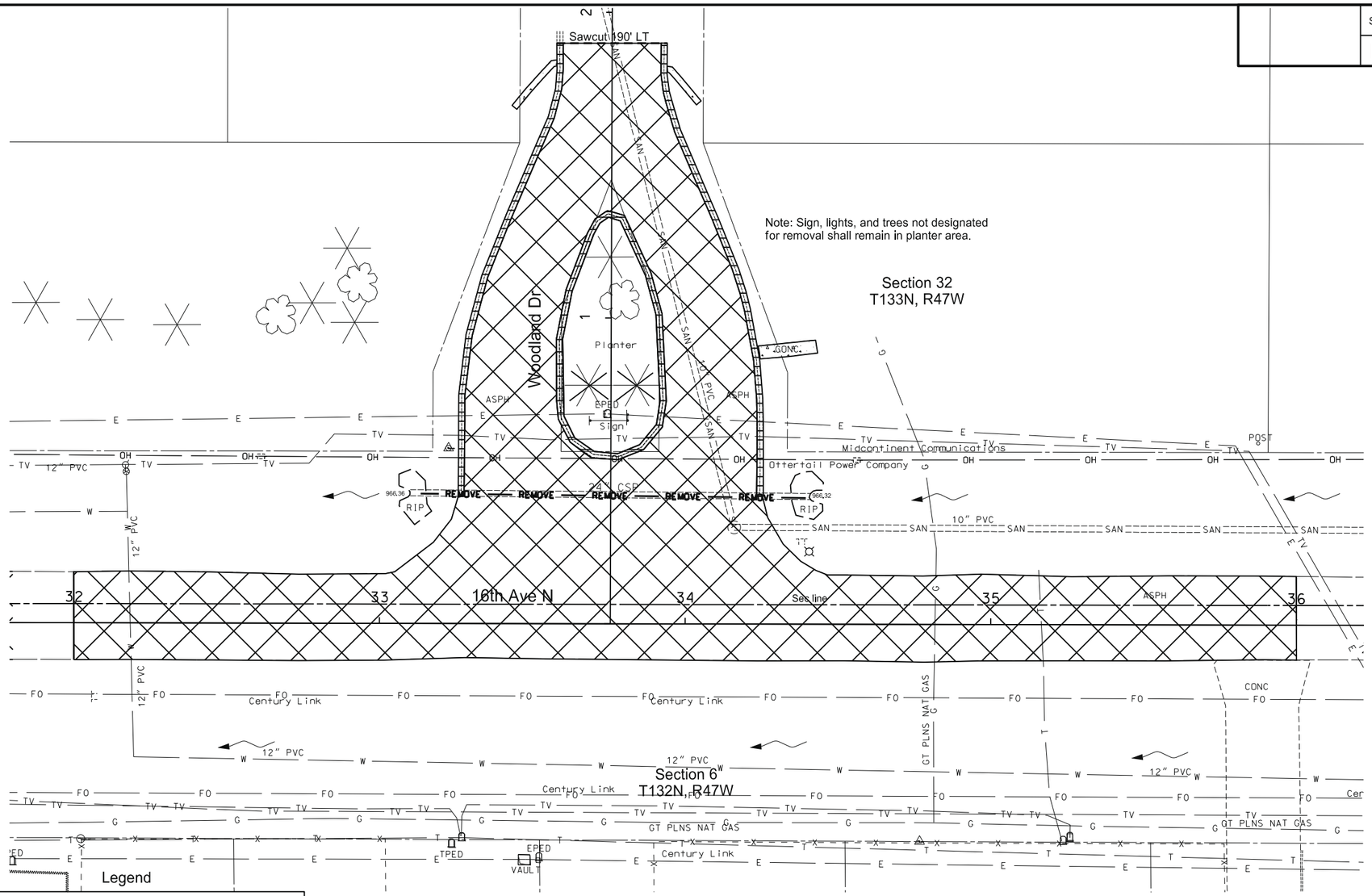
Removal Layouts

Sta 28+00 to 32+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	7



SAW BITUMINOUS SURFACING - FULL DEPTH

Sta 33+75		36 LF

REMOVAL OF PAVEMENT

BITUMINOUS

Sta 32+00 to 36+00		830 TON

CURB AND GUTTER

Sta 33+27	LT	35 TON
Sta 34+25	LT	35 TON
Sta 33+60 to Sta 33+95	LT	22 TON

CONCRETE

Sta 33+45	LT	3 TON
Sta 34+00	LT	3 TON
Sta 34+30	LT	2 TON

REMOVAL OF PIPES ALL TYPES AND SIZES

Sta 33+10 to 34+41	LT(24" CSP)	131 LF

REMOVAL OF TREES 18IN

STA 33+65	LT	1 EA
STA 33+85	LT	1 EA

REMOVE RETAINING WALL

Sta 33+55 to Sta 33+95	LT	189 LF

Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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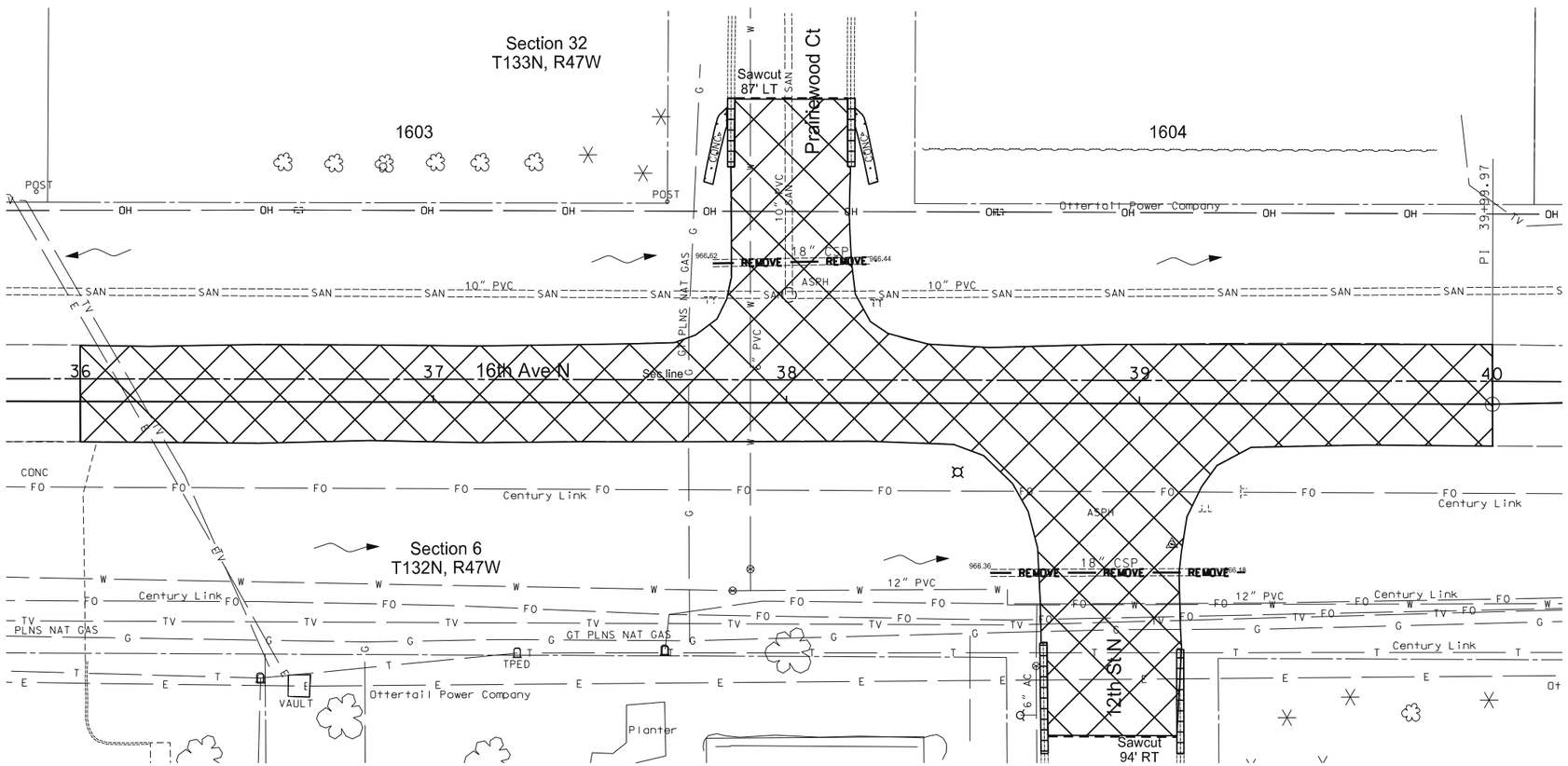
Removal Layouts

Sta 32+00 to 36+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	8



SAW BITUMINOUS SURFACING - FULL DEPTH

Sta 38+00		36 LF
Sta 38+92		41 LF

REMOVAL OF PAVEMENT

BITUMINOUS

Sta 36+00 to 40+00		603 TON

CURB AND GUTTER

Sta 37+80	LT	5 TON
Sta 38+20	LT	2.5 TON
Sta 38+70	RT	3.5 TON
Sta 39+10	RT	3 TON

CONCRETE

Sta 37+75	LT	2 TON
Sta 38+30	LT	2 TON

REMOVAL OF PIPES ALL TYPES AND SIZES

Sta 37+79 to 38+24	RT(18" CSP)	45 LF
Sta 38+58 to 39+24	LT(18" CSP)	66 LF

Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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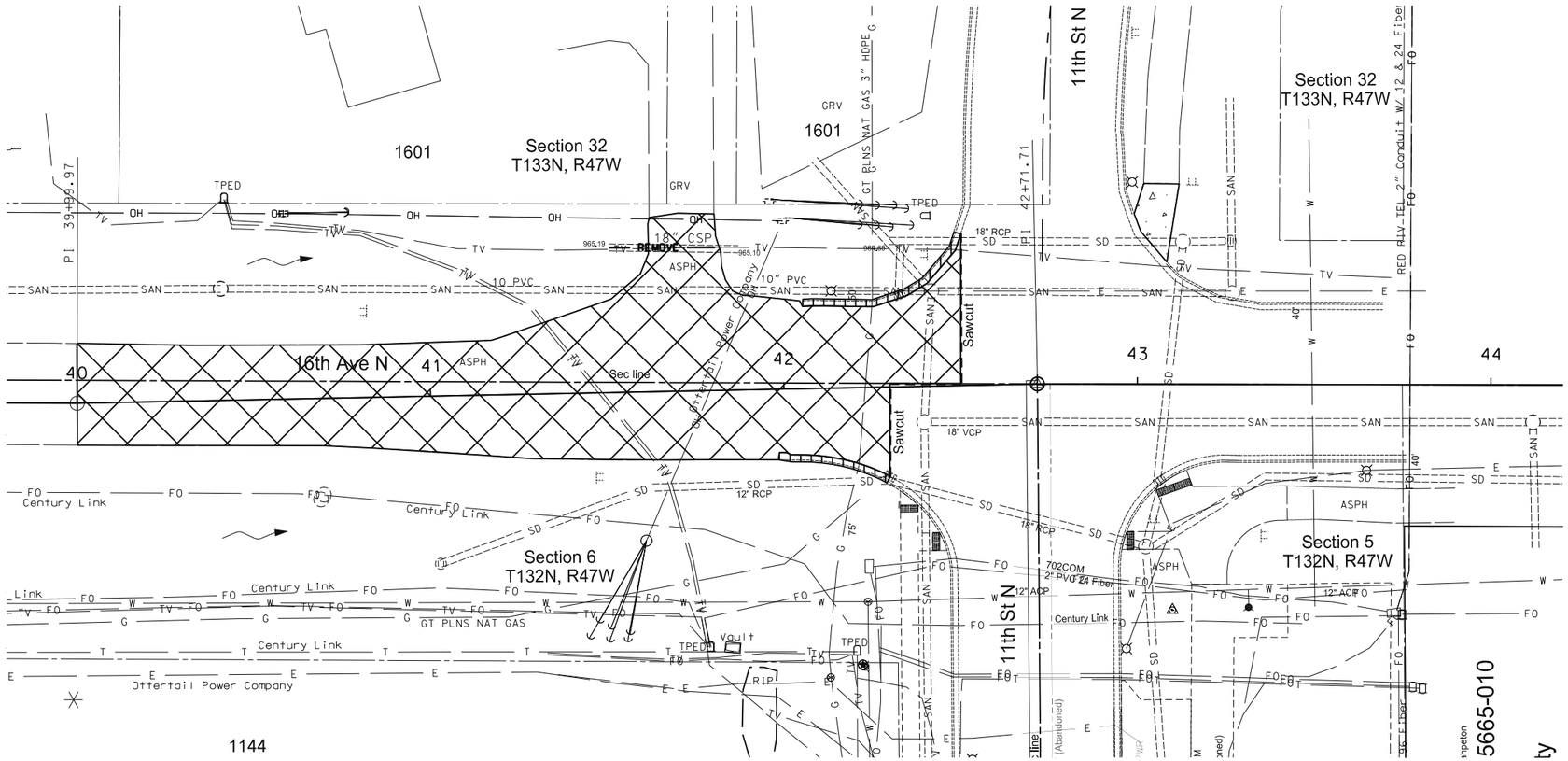
Removal Layouts

Sta 36+00 to 40+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	40	9



REMOVAL OF PAVEMENT

BITUMINOUS

Sta 40+00 to 42+00		350 TON

DRIVEWAY

Sta 41+72	LT	10 TON

CONCRETE

Sta 43+05	LT	7 TON

CURB AND GUTTER

Sta 42+00 to 42+25	RT	3.5 TON
Sta 42+05 LT to 42+50 LT		6 TON

REMOVAL OF PIPES ALL TYPES AND SIZES

Sta 41+50 to 41+87	LT(18" CSP)	37 LF

SAW BITUMINOUS SURFACING - FULL DEPTH

Sta 42+50	CL to LT	50 LF
Sta 42+30 to 42+50	CL	20 LF
Sta 42+30	CL to RT	25 LF

REMOVAL OF END SECTION ALL TYPES AND SIZES

Sta 42+30	LT(18" RCP)	1 EA

Legend

- Removal of Bituminous
- Removal of Concrete
- REMOVE — Removal of Pipe
- Sawcut
- Removal of Tree
- Removal of Curb and Gutter

N

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Removal Layouts

Sta 40+00 to 42+71.68

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	50	1

Manhole No.	1 - Manhole Tee 72IN X 48IN
Station	20+00 - 50'RT
Top Elev.	966.5
Base Elev.	N/A
Invert Elev.	956.88
Riser	0.5
Pipe	18IN RCP N 960.00

Outlet No.	1A
Type	72" RCES
Station	18+82.14 - 65.67'RT
Invert Elev.	956.75

Inlet No.	1B
Type	Inlet - Type 2
Grate Style	D
Station	20+00 - 20' RT
Grate Elev.	966.25
Base Elev.	959.50
Invert Elev.	960.25
H' Dist.	6.00
Pipe	18IN RCP S 960.25
Pipe	15IN RCP N 960.50

Inlet No.	1C
Type	Inlet - Type 2
Grate Style	D
Station	20+00 - 20' LT
Grate Elev.	966.25
Base Elev.	959.50
Invert Elev.	961.00
H' Dist.	6.00
Pipe	15IN RCP S 961.00
Pipe	12IN RCP NE 961.25

Inlet No.	1D
Type	Inlet - Catch Basin
Grate Style	9IN Beehive
Station	20+50 - 32.5' LT
Grate Elev.	966.50
Base Elev.	961.50
Invert Elev.	961.75
H' Dist.	4.00
Pipe	12IN RCP SW 961.75

Inlet No.	1E
Type	Inlet - Catch Basin
Grate Style	9IN Beehive
Station	18+75 - 60' LT
Grate Elev.	956.75
Base Elev.	951.75
Invert Elev.	955.00
H' Dist.	4.00
Pipe	18IN RCP S 955.00

Manhole No.	2 - Manhole Tee 72IN X 48IN 9IN Beehive)
Station	23+00 - 50'RT
Top Elev.	967.00
Base Elev.	N/A
Invert Elev.	957.18
Riser	0.75

Manhole No.	3 - Manhole Tee 72IN X 48IN
Station	25+30 - 50'RT
Top Elev.	967.70
Base Elev.	NA
Invert Elev.	957.41
Riser	1.25
Pipe	18IN RCP N 960.50
Pipe	24IN RCP S 959.70

Inlet No.	3A
Type	Inlet - Type 2
Grate Style	D
Station	25+30 - 20'RT
Grate Elev.	966.30
Base Elev.	959.55
Invert Elev.	960.75
H' Dist.	6.00
Pipe	15IN RCP N 961.00
Pipe	18IN RCP S 960.75

Inlet No.	3B
Type	Inlet - Mountable Curb - Type B
Grate Style	D
Station	25+30 - 20'LT
Grate Elev.	966.30
Base Elev.	959.55
Invert Elev.	961.50
H' Dist.	6.00
Pipe	15IN RCP S 961.50

Manhole No.	4 - 120IN
Station	25+75.74 - 36'RT
Top Elev.	967.40
Base Elev.	956.87
Invert Elev.	957.45
Riser	8.0
Pipe	72IN RCP W 957.45
PIpe	54IN RCP E 958.00
Pipe	48IN RCP N 959.00

Manhole No.	5 - Manhole Tee 54IN X 48IN
Station	27+40 - 36'RT
Top Elev.	968.00
Base Elev.	n/a
Invert Elev.	958.13
Riser	2.4
Pipe	18IN RCP N 960.50

Inlet No.	5A
Type	Inlet - Type 2
Grate Style	V
Station	27+40 - 20'RT
Grate Elev.	967.30
Base Elev.	960.55
Invert Elev.	960.75
H' Dist.	6.00
Pipe	15IN RCP N 961.00
Pipe	18IN RCP S 960.75

Inlet No.	5B
Type	Inlet - Type 2
Grate Style	V
Station	27+40 - 20'LT
Grate Elev.	967.30
Base Elev.	960.55
Invert Elev.	961.25
H' Dist.	6.00
Pipe	15IN RCP S 961.50
Pipe	12IN RCP N 961.75

Inlet No.	5C
Type	Inlet - Catch Basin
Grate Style	9IN Beehive
Station	27+15 - 42'LT
Grate Elev.	965.00
Base Elev.	960.00
Invert Elev.	962.00
H' Dist.	4.00
Pipe	12IN RCP SW 962.00

Manhole No.	6 - Manhole Tee 54IN X 48IN (9IN Beehive)
Station	28+50 - 36'RT
Top Elev.	967.00
Base Elev.	n/a
Invert Elev.	958.22
Riser	1.3

Manhole No.	7 - 96IN
Station	29+52 - 36'RT
Top Elev.	968.12
Base Elev.	957.84
Invert Elev.	958.30
Riser	8.5
Pipe	54IN RCP W 958.30
PIpe	36IN RCP E 960.10
Pipe	48IN RCP S 958.30

Manhole No.	8 - 60IN
Station	30+20 - 36'RT
Top Elev.	968.00
Base Elev.	959.90
Invert Elev.	960.20
Riser	6.5
Pipe	36IN RCP W 960.20
PIpe	30IN RCP E 960.40
Pipe	18IN RCP N 961.75

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Inlet & Manhole Summary

16th Avenue N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	50	2

Inlet No.	8A
Type	Inlet - Type 2
Grate Style	D
Station	30+20 - 20'RT
Grate Elev.	967.15
Base Elev.	960.40
Invert Elev.	962.50
H' Dist.	6.00
Pipe	15IN RCP N 962.25
Pipe	18IN RCP S 962.00

Inlet No.	8B
Type	Inlet - Type 2
Grate Style	D
Station	30+20 - 20'LT
Grate Elev.	967.15
Base Elev.	960.40
Invert Elev.	963.25
H' Dist.	6.00
Pipe	15IN RCP S 962.50
Pipe	12IN RCP N 962.75

Inlet No.	8C
Type	Inlet - Catch Basin
Grate Style	9IN Beehive
Station	30+20 - 40'LT
Grate Elev.	967.00
Base Elev.	962.00
Invert Elev.	963.00
H' Dist.	4.00
Pipe	12IN RCP SW 963.00

Manhole No.	9 - 60IN (9IN Beehive)
Station	31+80 - 36'RT
Top Elev.	967.00
Base Elev.	960.45
Invert Elev.	960.75
Riser	4.7
Pipe	30IN RCP W 960.75
Pipe	30IN RCP E 960.75

Manhole No.	10 - 60IN
Station	33+12 - 36'RT
Top Elev.	967.66
Base Elev.	960.75
Invert Elev.	961.05
Riser	5.3
Pipe	15IN RCP N 962.25

Inlet No.	10A
Type	Inlet - Mountable Curb - Type B
Grate Style	D
Station	1+84 - 17' LT
Grate Elev.	967.75
Base Elev.	961.00
Invert Elev.	962.05
H' Dist.	6.00
Pipe	15IN RCP S 963.00
Pipe	12IN RCP E 963.25

Inlet No.	10B
Type	Inlet - Mountable Curb - Type B
Grate Style	D
Station	1+84 - 17' RT
Grate Elev.	967.75
Base Elev.	961.00
Invert Elev.	963.50
H' Dist.	6.00

Manhole No.	11 - 60IN (9IN Beehive)
Station	35+60 - 36'RT
Top Elev.	967.15
Base Elev.	961.21
Invert Elev.	961.51
Riser	4.34
Pipe	30IN RCP W 961.51
Pipe	30IN RCP E 961.76

Manhole No.	12 - 60IN (9IN Beehive)
Station	37+55 - 36'RT
Top Elev.	967.50
Base Elev.	962.00
Invert Elev.	962.25
Riser	4.0
Pipe	24IN RCP W 962.25
Pipe	18IN RCP E 962.50
Pipe	18IN RCP N 962.50

Inlet No.	12A
Type	Inlet - Type 2
Grate Style	D
Station	37+55 - 20' RT
Grate Elev.	967.40
Base Elev.	960.65
Invert Elev.	962.75
H' Dist.	6.00
Pipe	18IN RCP N 962.80
Pipe	18IN RCP S 962.75

Inlet No.	12B
Type	Inlet - Type 2 Double
Grate Style	D
Station	37+55 - 20' LT
Grate Elev.	967.40
Base Elev.	960.65
Invert Elev.	963.00
H' Dist.	6.00
Pipe	18IN RCP S 963.00
Pipe	15IN RCP E 963.25
Pipe	12IN RCP NW 963.25

Inlet No.	12C
Type	Inlet - Catch Basin
Grate Style	9IN Beehive
Station	37+40 - 32'RT
Grate Elev.	967.00
Base Elev.	962.00
Invert Elev.	963.55
H' Dist.	4.00
Pipe	12IN RCP SE 963.55

Inlet No.	12D
Type	Inlet - Type 2 Double
Grate Style	D
Station	38+44 - 20'LT
Grate Elev.	967.75
Base Elev.	961.00
Invert Elev.	963.50
H' Dist.	6.00
Pipe	15IN RCP W 963.50

Manhole No.	13 - 60IN
Station	39+38 - 45'RT
Top Elev.	968.50
Base Elev.	962.70
Invert Elev.	962.96
Riser	4.2
Pipe	18IN RCP W 962.96
Pipe	18IN RCP N 963.00

Inlet No.	13A
Type	Inlet - Type 2
Grate Style	D
Station	30+38 - 20'LT
Grate Elev.	968.10
Base Elev.	961.35
Invert Elev.	963.20
H' Dist.	6.00
Pipe	15IN RCP N 963.40
Pipe	18IN RCP S 963.20

Inlet No.	13B
Type	Inlet - Catch Basin
Grate Style	9IN Beehive
Station	39+50 - 33'LT
Grate Elev.	967.00
Base Elev.	962.00
Invert Elev.	963.70
H' Dist.	4.00
Pipe	15IN RCP S 963.7

Inlet No.	13C
Type	18" RCES
Station	41+58.67 - 48.75' LT
Invert Elev.	965.00

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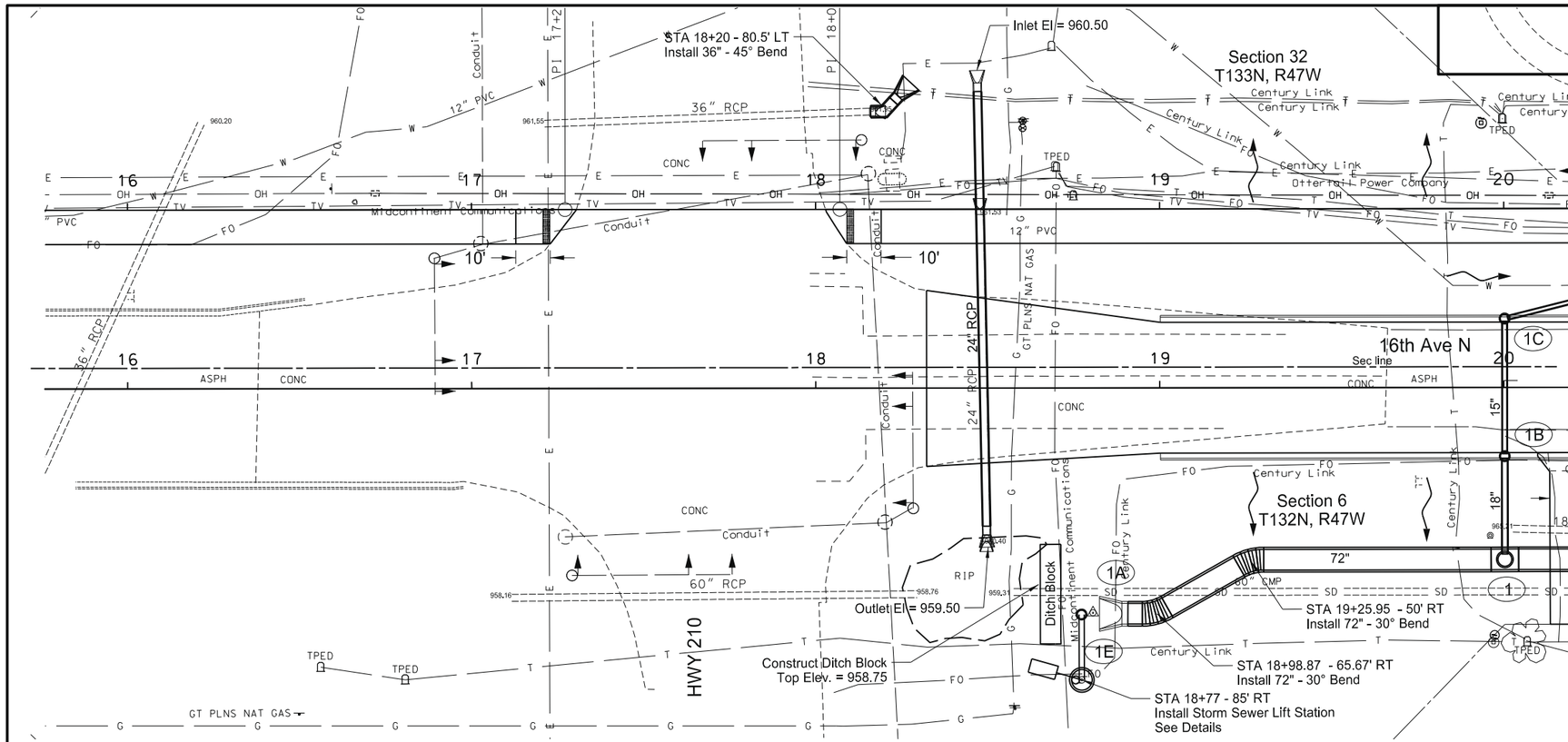
Inlet & Manhole Summary

16th Avenue N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	1



PIPE CONC REINF 15IN CLIII
1B to 1C 39 LF

PIPE CONC REINF 18IN CLIII
1 to 1b 28 LF
1E to Lift Station 20 LF

PIPE CONC REINF 24IN CLIII
Sta 18+48.5 - ℄ 124 LF

END SECT-CONC REINF 24IN
Sta 18+48.5 - LT 1 EA
Sta 18+48.4 - RT 1 EA

PIPE CONC REINF 36IN CLIII
Sta 18+20 - 80'LT 12 LF

END SECT-CONC REINF 36IN
Sta 18+27 - 88'LT 1 EA

PIPE CONC REINF 72IN CLIII
1A to 1 108 LF

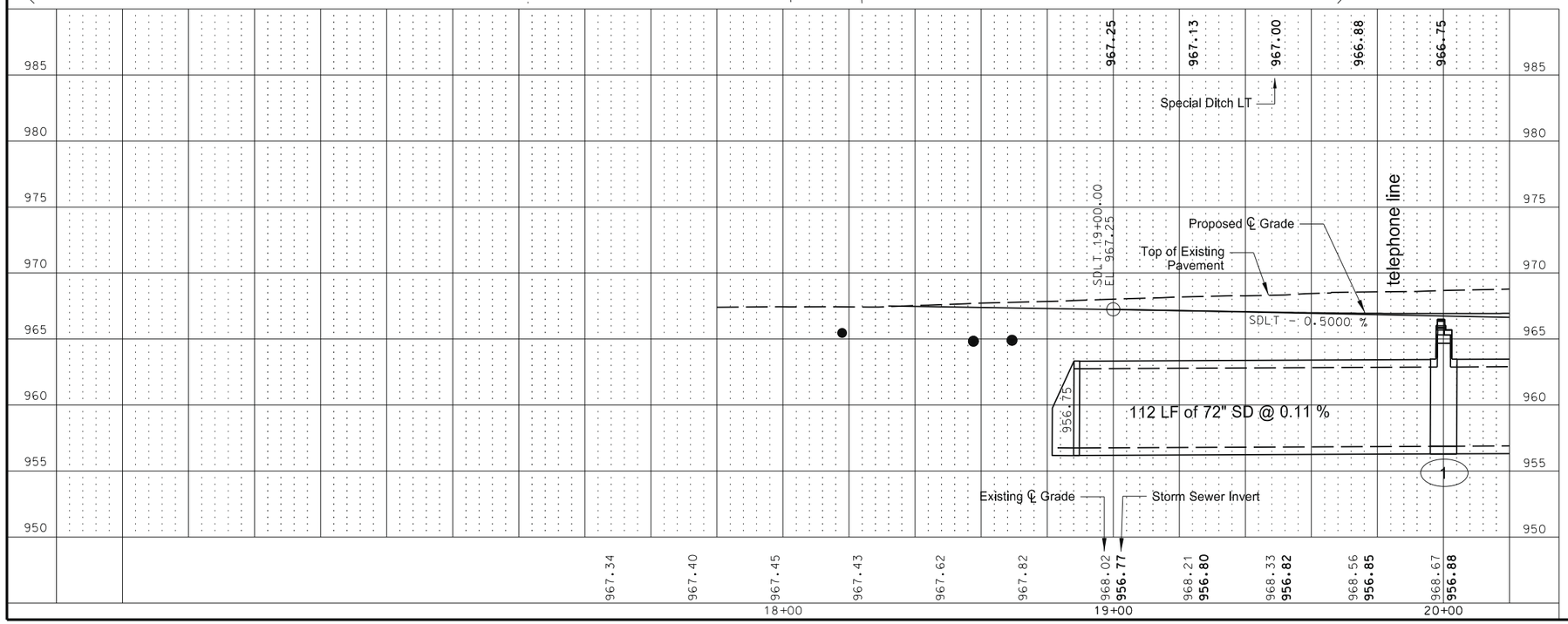
END SECT-CONC REINF 72IN
1A 1 EA

INLET-TYPE 2
1B 1 EA
1C 1 EA

INLET CATCH BASIN 9IN BEEHIVE
1E 1 EA

MANHOLE TEE 72IN X 48IN
1 1 EA

MANHOLE RISER 48IN
1 0.5 LF



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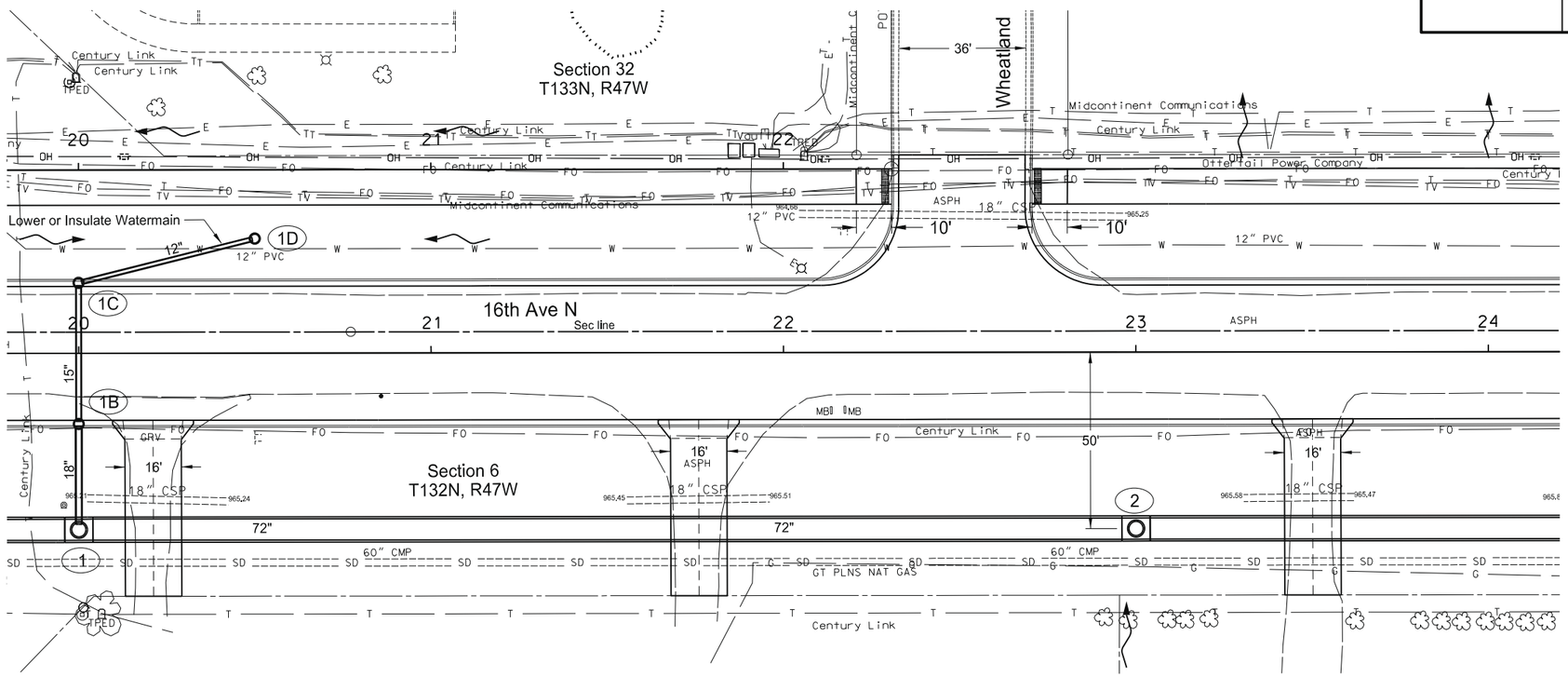
Storm Sewer

Sta 16+00 to Sta 20+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	2



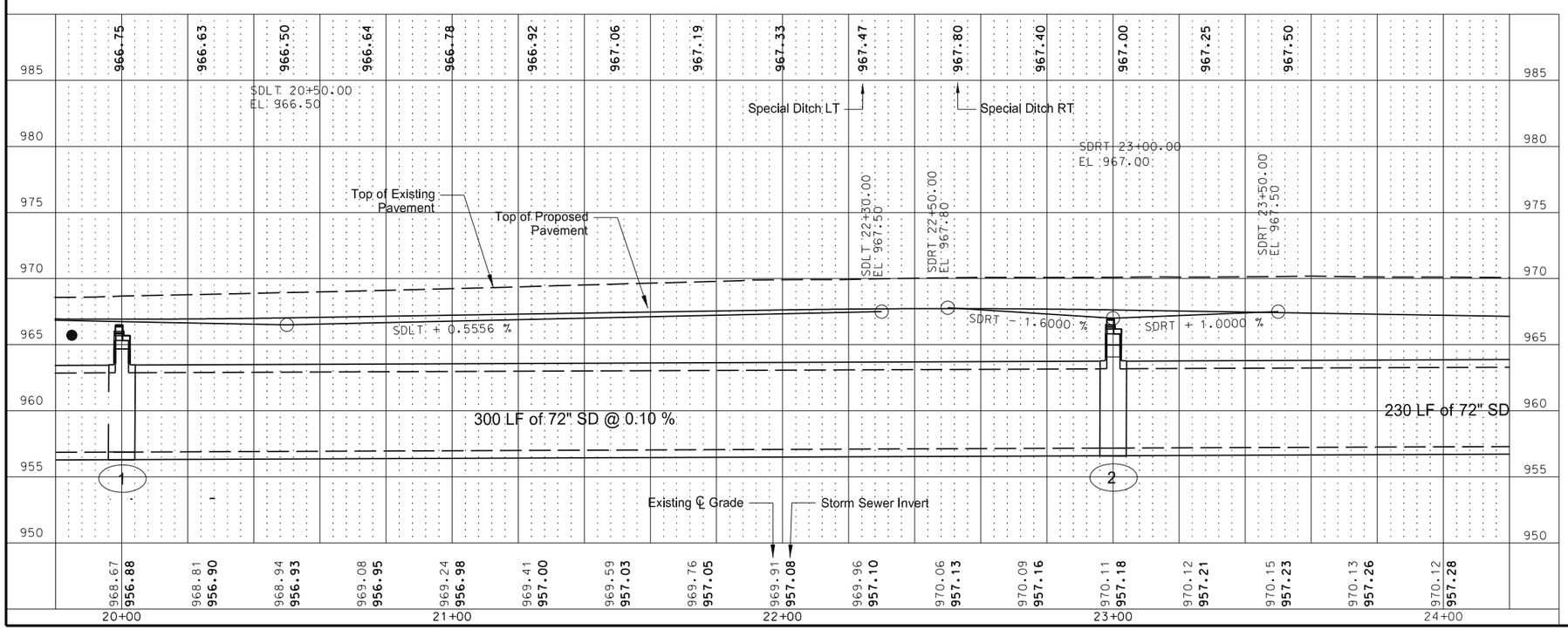
PIPE CONC REINF 12IN CLIII
1D to 1C 50 LF

PIPE CONC REINF 72IN CLIII
1 to 2 292 LF
2 to 24+00 96 LF

INLET CATCH BASIN 9IN BEEHIVE
1D 1 EA

MANHOLE TEE 72IN X 48IN
2 1 EA

MANHOLE RISER 48IN
2 0.75 LF



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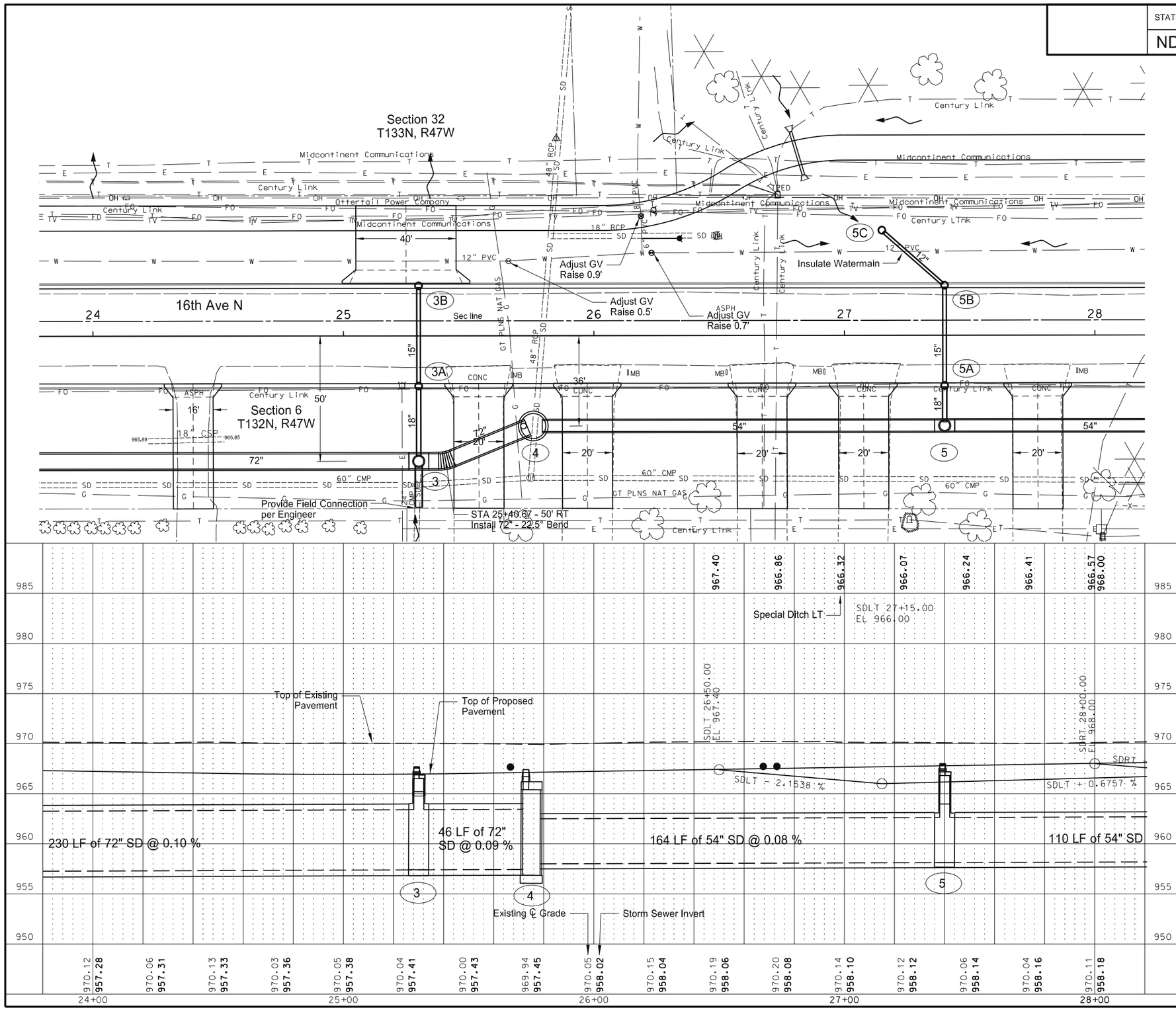
Storm Sewer

Sta 20+00 to Sta 24+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	3



PIPE 10IN CSP (0.064")
Sta 26+79 - 83.8'LT to STA 26+84 - 66.6'LT 24 LF

PIPE CONC REINF 12IN CL III
5C to 5B 32 LF

PIPE CONC REINF 15IN CLIII
3A to 3B 39 LF
5A to 5B 39 LF

PIPE CONC REINF 18IN CLIII
3 to 3A 28 LF
5 to 5A 16 LF

PIPE CONC REINF 30IN CLIII
3 8 LF

PIPE CONC REINF 54IN CLIII
4 to 5 158 LF
5 to Sta 28+00 56 LF

PIPE CONC REINF 72IN CLIII
Sta 24+00 to 3 126 LF
3 to 4 40 LF

INLET-TYPE 2
5A 1 EA
5B 1 EA

INLET-TYPE 2
3A 1 EA

INLET MOUNTABLE CURB - TYPE B
3B 1 EA

INLET CATCH BASIN 9IN BEEHIVE
5C 1 EA

MANHOLE TEE 54IN X 48IN
5 1 EA

MANHOLE RISER 48IN
5 2.4 LF
3 1.5 LF

MANHOLE 120IN
4 1 EA

MANHOLE RISER 120IN
4 8.0 LF

6" HYDRANT
Sta 26+40 LT 1 EA

MANHOLE TEE 72IN X 48IN
3 1 EA

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Storm Sewer

Sta 24+00 to Sta 28+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	4

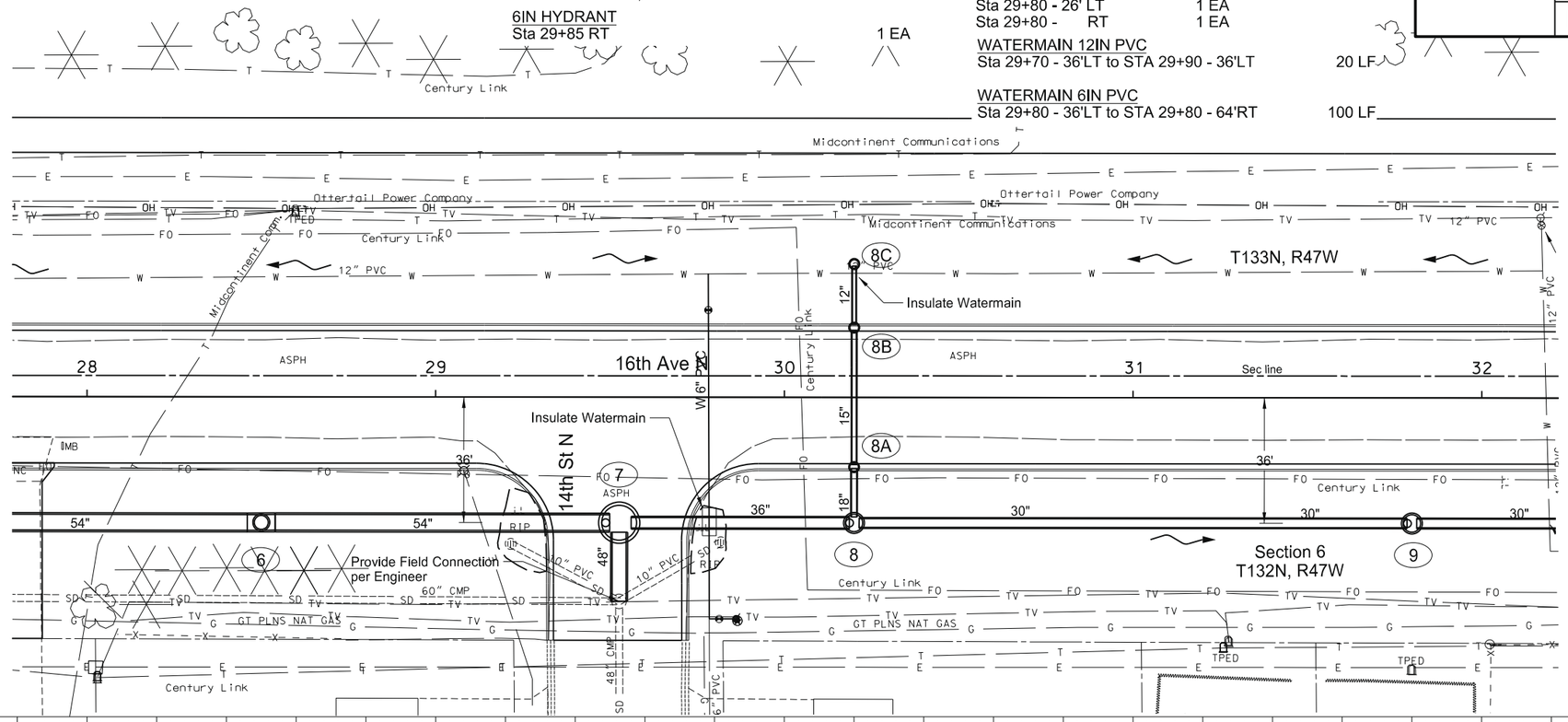
FITTINGS - DUCTILE IRON — SEE DETAILS

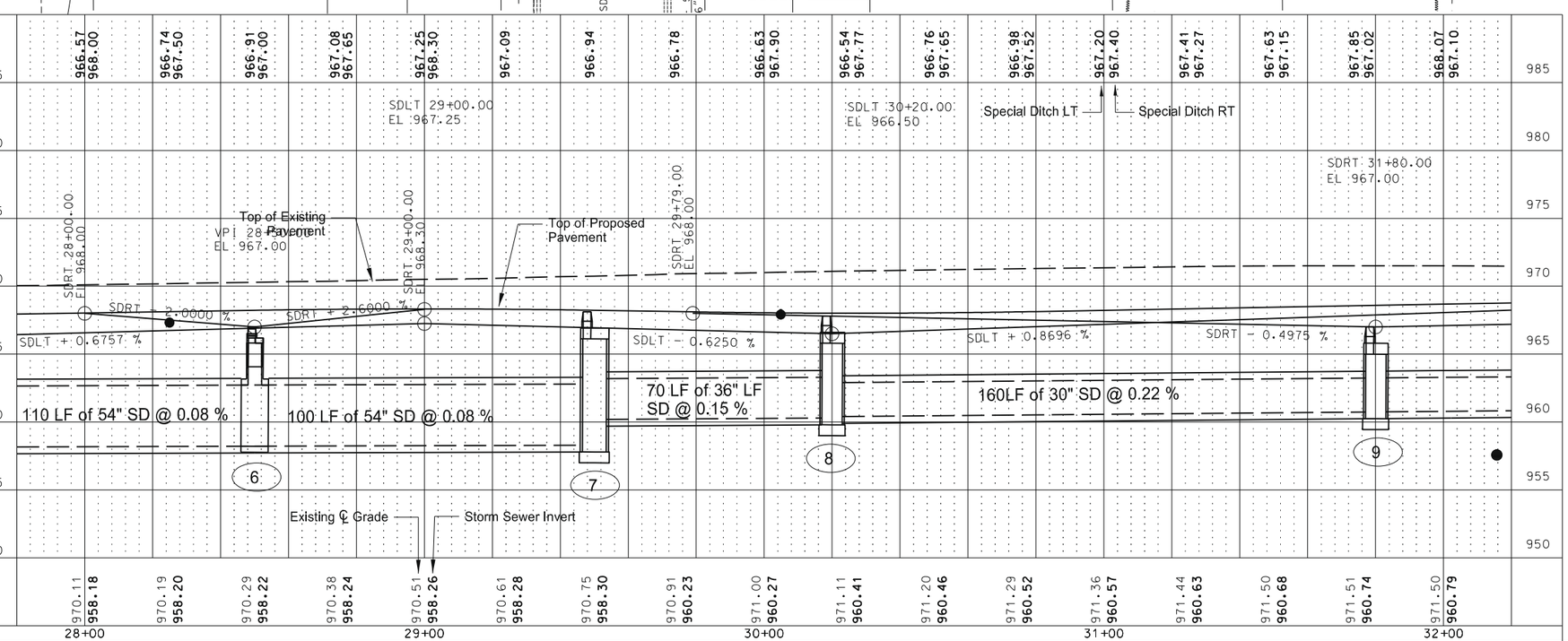
6IN HYDRANT
Sta 29+85 RT — 1 EA

GATE VALVE & BOX 6IN
Sta 29+80 - 26' LT — 1 EA
Sta 29+80 - RT — 1 EA

WATERMAIN 12IN PVC
Sta 29+70 - 36'LT to STA 29+90 - 36'LT — 20 LF

WATERMAIN 6IN PVC
Sta 29+80 - 36'LT to STA 29+80 - 64'RT — 100 LF





PIPE CONC REINF 12IN CLIII
8C to 8b — 16 LF

PIPE CONC REINF 15IN CLIII
8A to 8B — 39 LF

PIPE CONC REINF 18IN CLIII
8 to 8a — 12 LF

PIPE CONC REINF 30IN CLIII
8 to 9 — 156 LF
9 to Sta 32+00 — 18 LF

PIPE CONC REINF 36IN CLIII
7 to 8 — 62 LF

PIPE CONC REINF 48IN CLIII
7 to Sta 29+52 - 60'LT — 24 LF

PIPE CONC REINF 54IN CLIII
Sta 28+00 to 6 — 46 LF
6 to 7 — 94 LF

INLET-TYPE 2
8A — 1 EA
8B — 1 EA

INLET CATCH BASIN 9IN BEEHIVE
8C — 1 EA

MANHOLE TEE 54IN X 48IN
6 — 1 EA

MANHOLE RISER 48IN
6 — 0.8 LF

MANHOLE 60IN
8 — 1 EA
9 — 1 EA

MANHOLE RISER 60IN
8 — 6.5 LF
9 — 4.7 LF

MANHOLE 96IN
7 — 1 EA

MANHOLE RISER 96IN
7 — 8.5 LF

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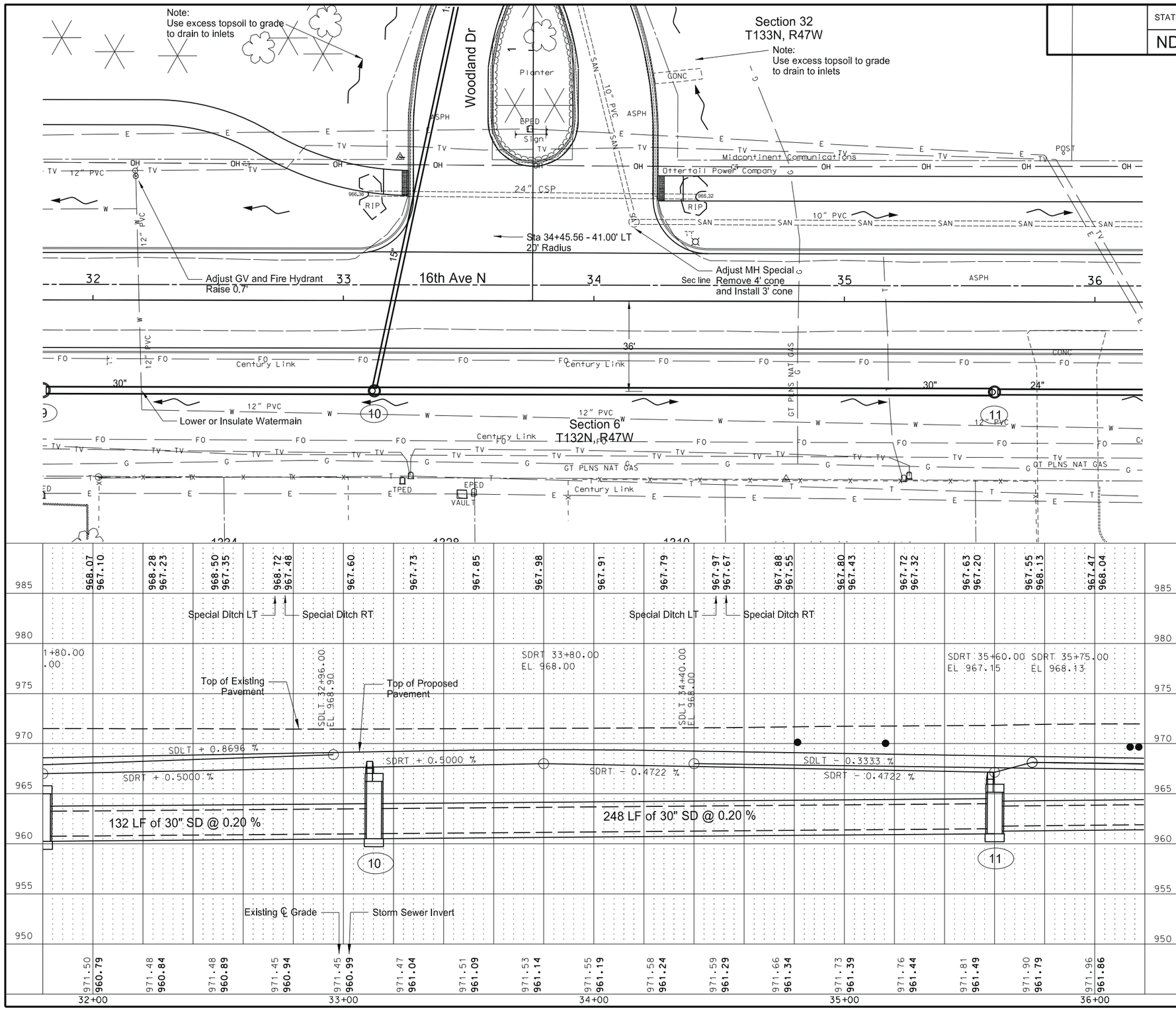
Storm Sewer

Sta 28+00 to Sta 32+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	5



PIPE CONC REINF 24IN CLIII
11 to Sta 36+00 38 LF

PIPE CONC REINF 30IN CLIII
Sta 32+00 to 10 110 LF
10 to 11 244 LF

MANHOLE 60IN
11 1 EA
10 1 EA

MANHOLE RISER 60IN
11 4.0 LF
10 5.3 LF

N

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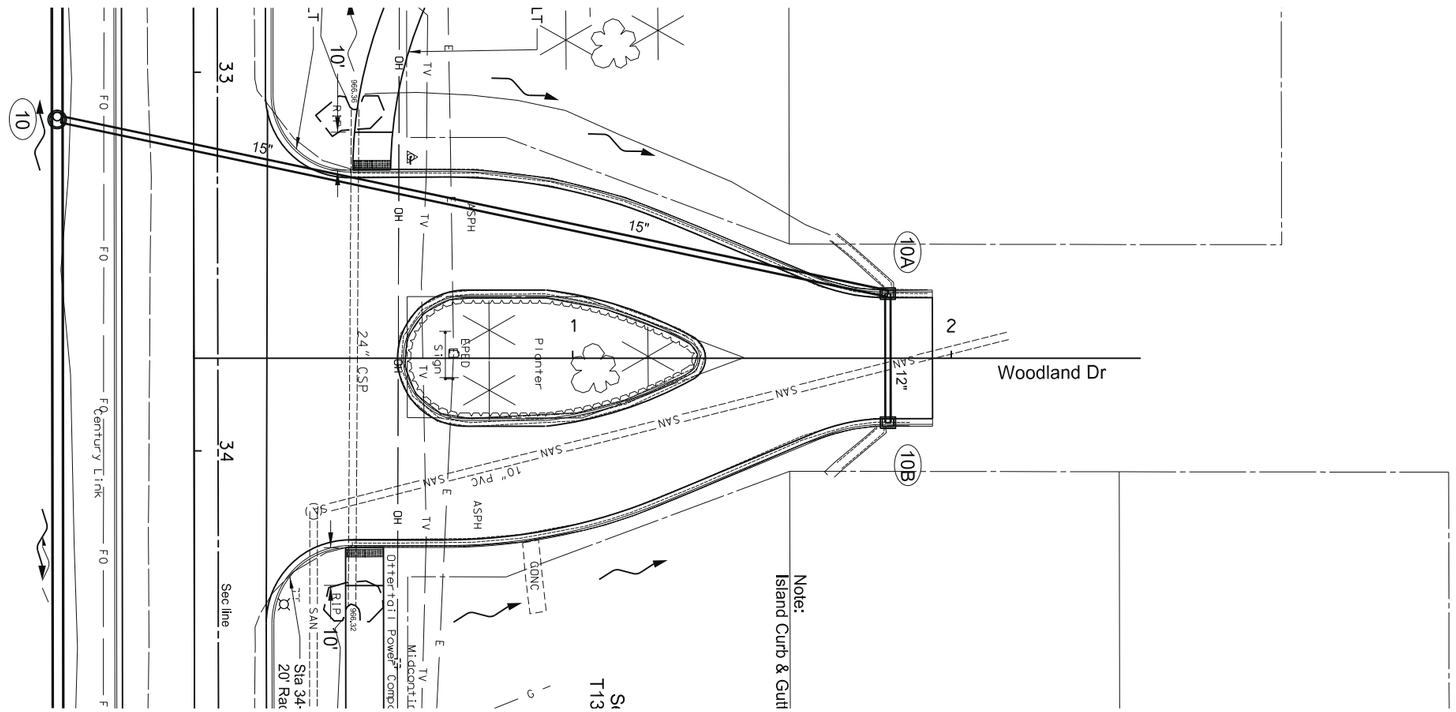
Storm Sewer

Sta 32+00 to Sta 36+00

16th Ave N Wahpeton, ND

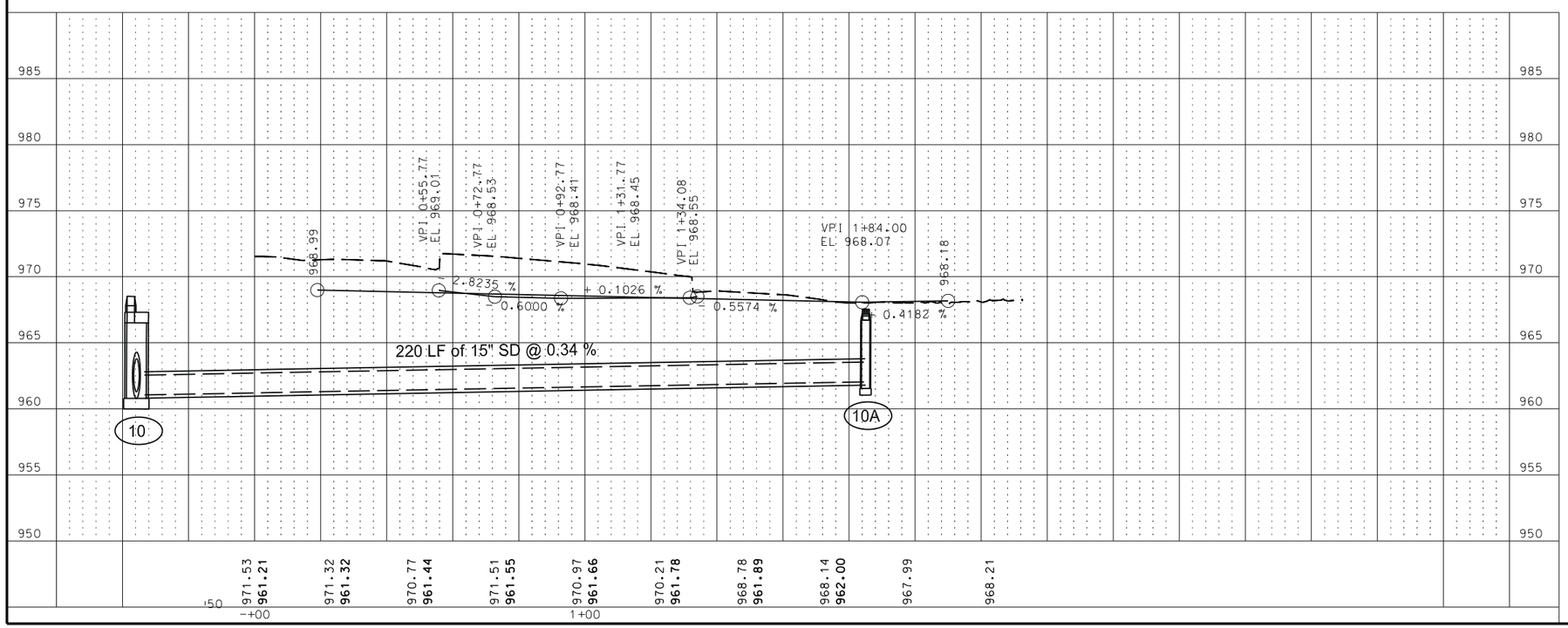
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	6



PIPE CONC REINF 12IN CLIII
10A to 10B 32 LF

PIPE CONC REINF 15IN CLIII
10 to 10A 220 LF

INLET - MOUNTABLE - TYPE B
10A 1 EA
10B 1 EA



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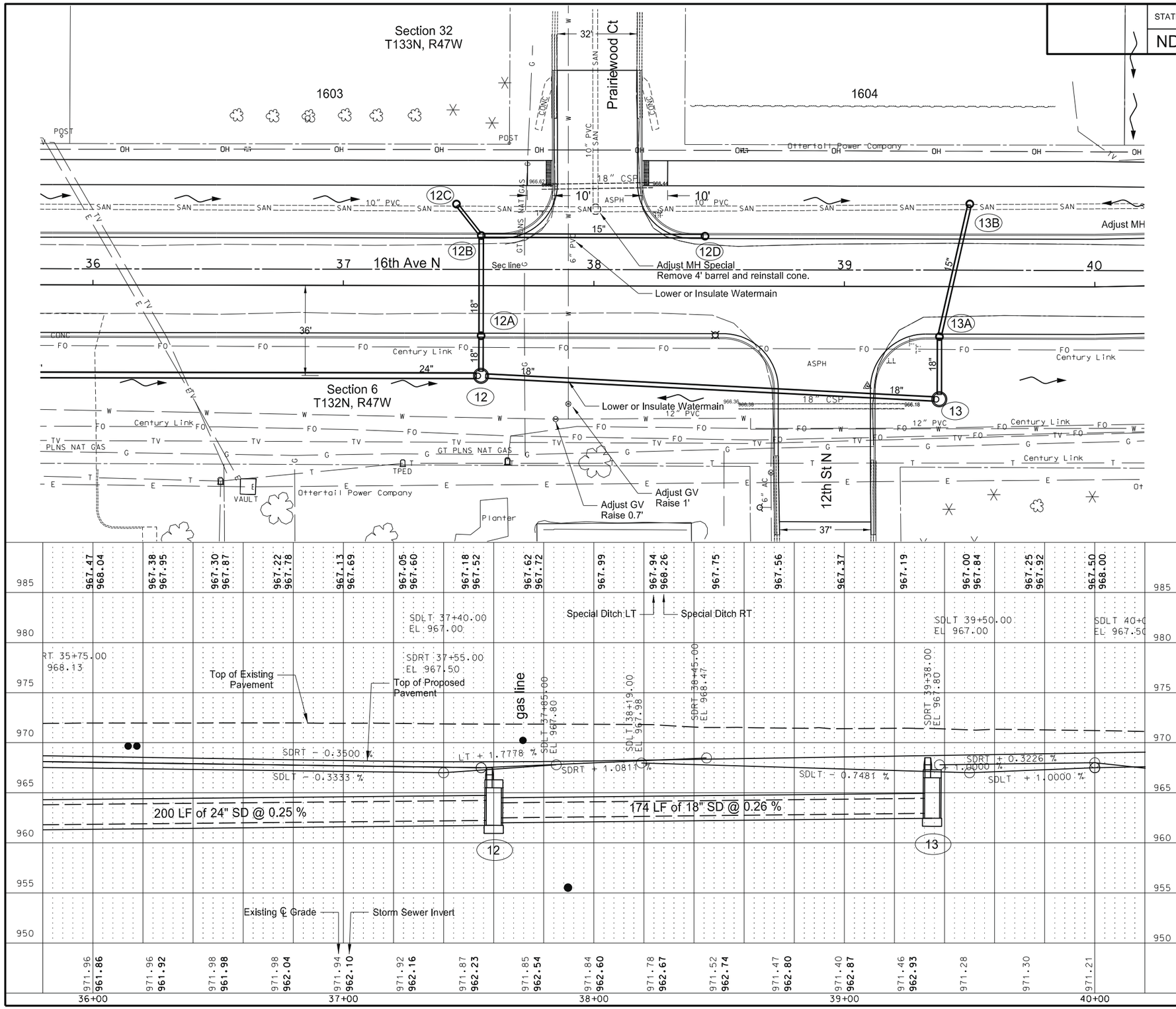
Storm Sewer

Sta 0+00 to 2+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	7



PIPE CONC REINF 12IN CLIII
12C to 12B 16 LF

PIPE CONC REINF 15IN CLIII
12D to 12B 88 LF
13B to 13A 50 LF

PIPE CONC REINF 18IN CLIII
12 to 12A 12 LF
12A to 12B 39 LF
12 to 13 180 LF
13 to 13A 24 LF

PIPE CONC REINF 24IN CLIII
Sta 36+00 TO 12 154 LF

INLET-TYPE 2
12A 1 EA
13A 1 EA

INLET-TYPE 2 DOUBLE
12D 1 EA
12B 1 EA

INLET CATCH BASIN 9IN BEEHIVE
13B 1 EA
12C 1 EA

MANHOLE 60IN
12 1 EA
13 1 EA

MANHOLE RISER 60IN
12 4.0 LF
13 3.5 LF

N

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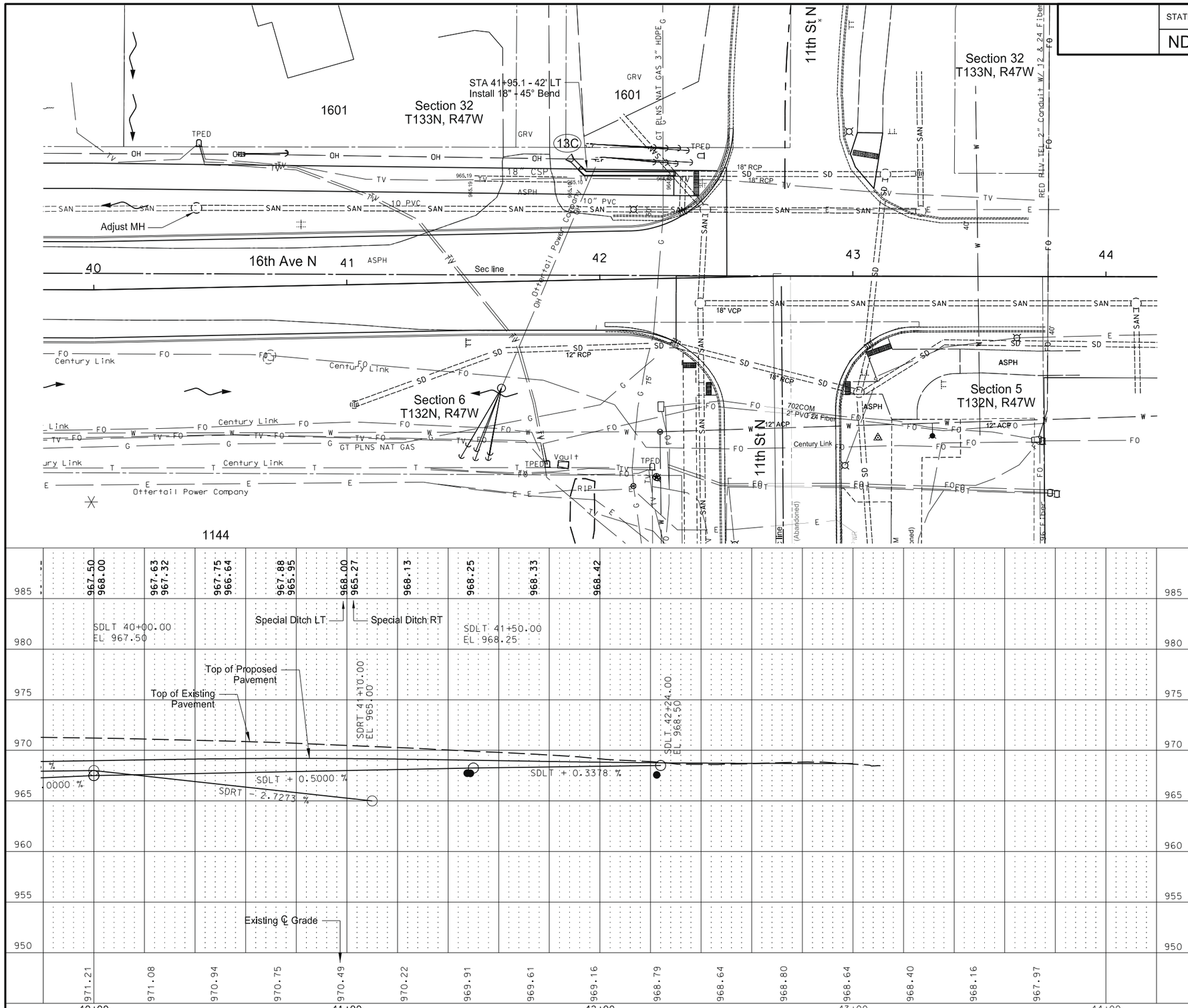
Storm Sewer

Sta 36+00 to Sta 40+00

16th Ave N Wahpeton, ND

8:11:36 AM Shelley.Terfehr Q:\2012\W12s\W1200157\CADD\Design\Sheets\Section_55\055PP_007.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	55	8



PIPE CONC REINF 18IN CLIII
13C TO Sta 42+30 - 42' LT 35 LF

END SECT-CONC REINF 18IN
Sta 41+58 - 49'LT 1 EA

N

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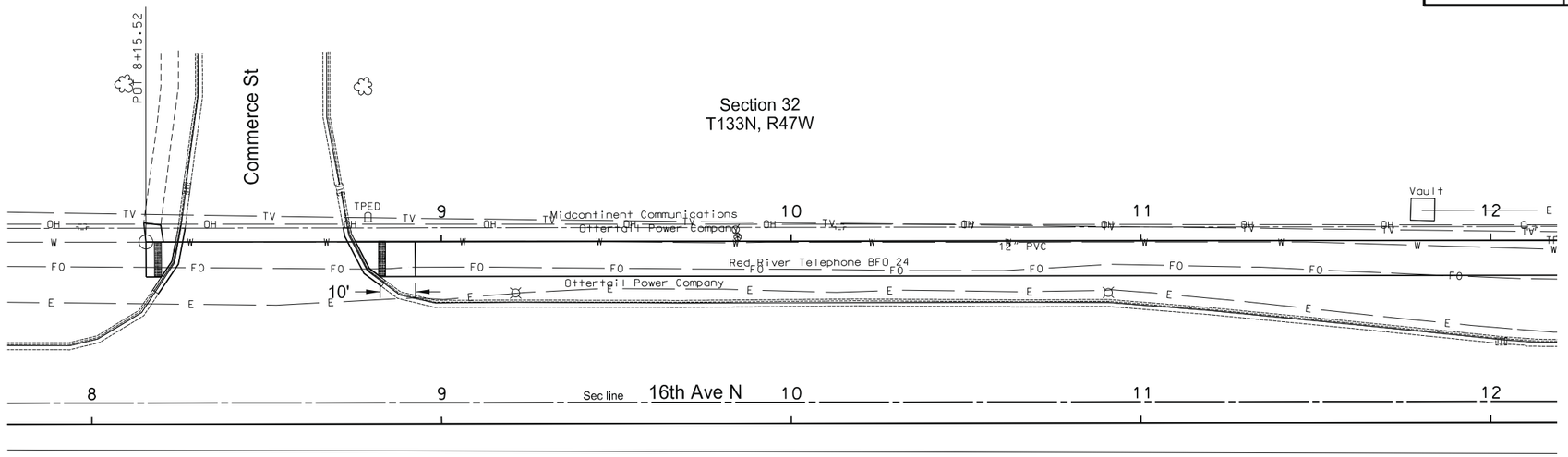
Storm Sewer

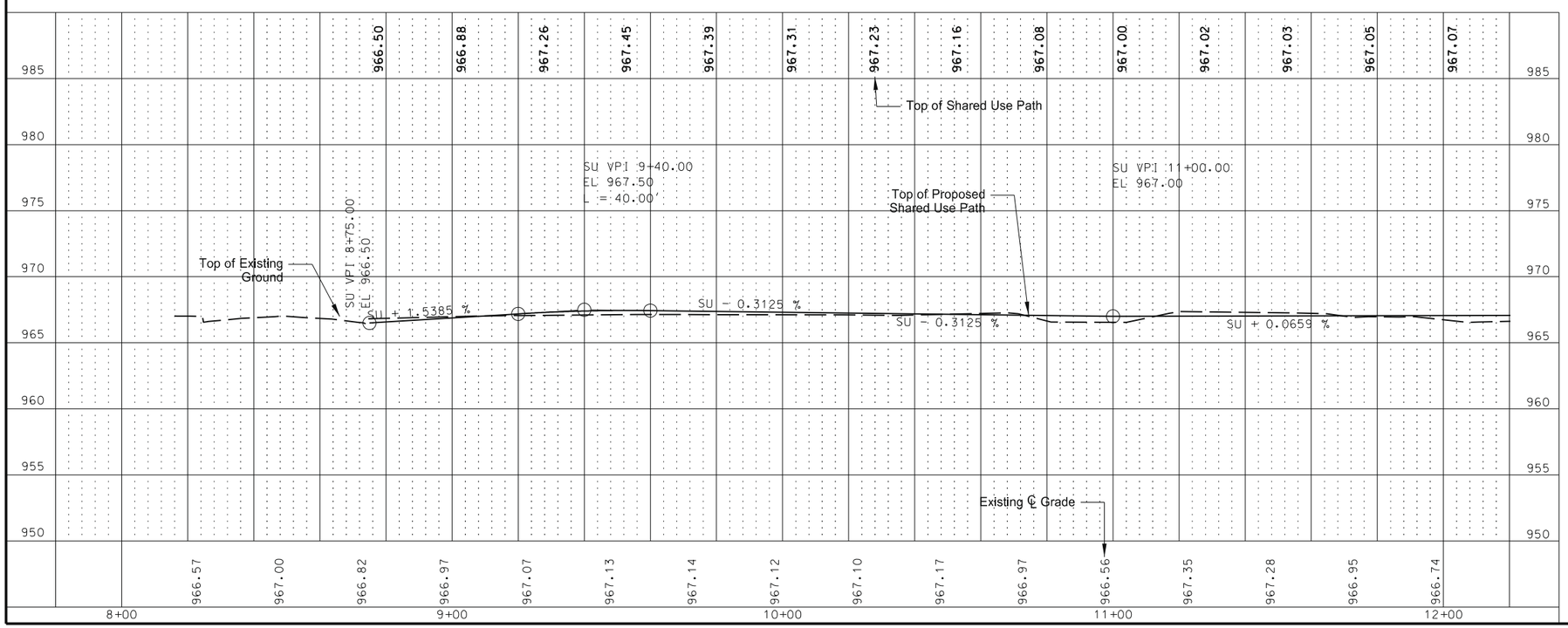
Sta 40+00 to Sta 42+71.68

16th Ave N Wahpeton, ND

3:28:31 PM Shelley.Terfehr Q:\2012\W12s\W1200157\CADD\Design\Sheets\Section_55\055PP_008.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	1





SUPERPAVE FAA43

Sta 8+76 to 12+00		357 SY

SIDEWALK CONCRETE 4IN

Sta 8+15	LT	11 SY
Sta 8+85	LT	11 SY

DETECTABLE WARNING PANEL

Sta 8+15	LT	20 SF
Sta 8+85	LT	20 SF

CURB AND GUTTER - TYPE 1

Sta 8+15	LT	20 LF
Sta 8+85	LT	20 LF

N

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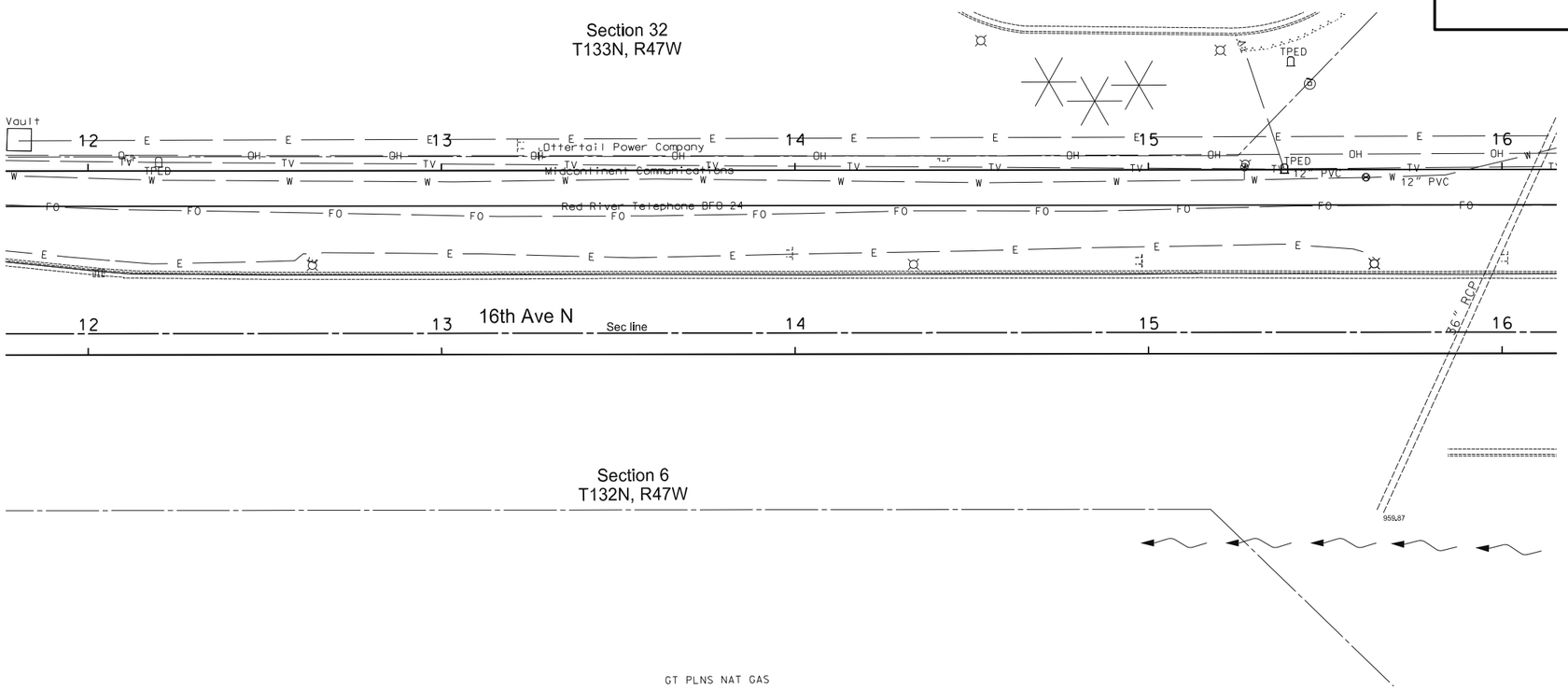
Plan and Profiles

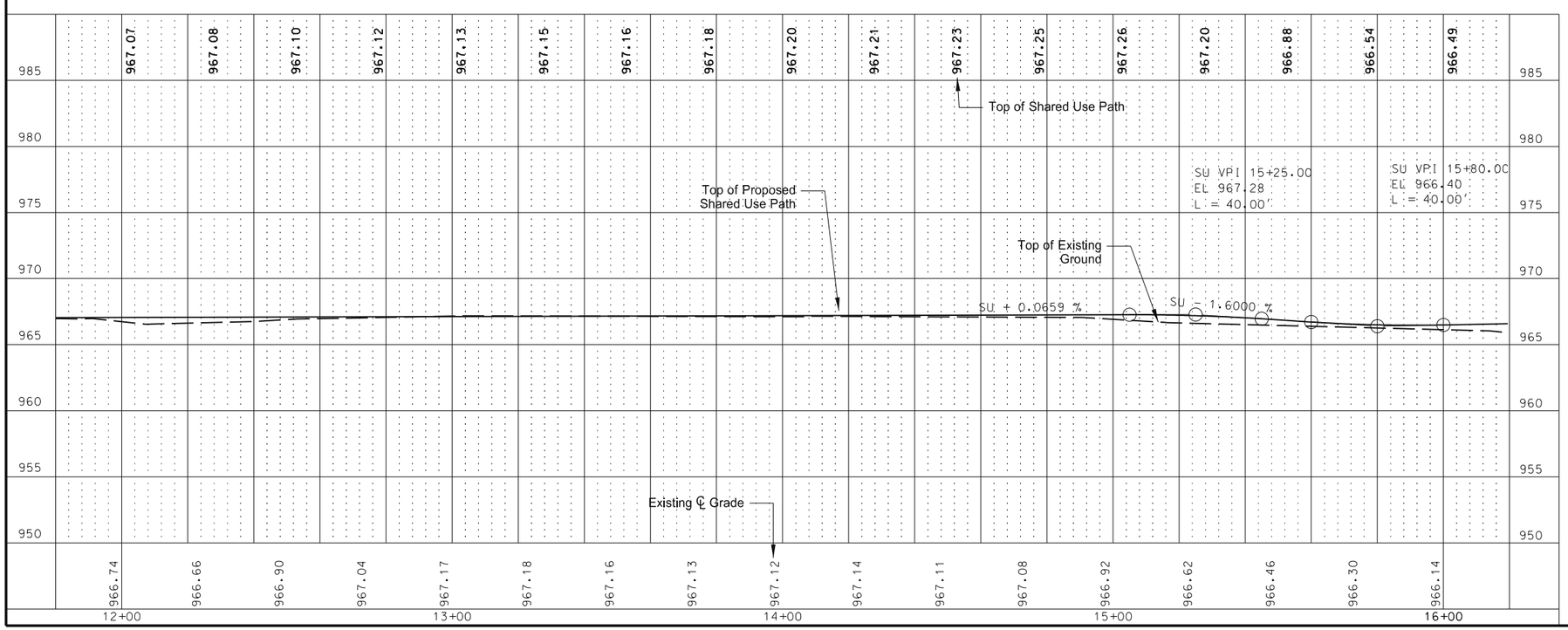
Sta 8+00 to Sta 12+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	2

SUPERPAVE FAA43
Sta 12+00 to 16+00 444.4 SY





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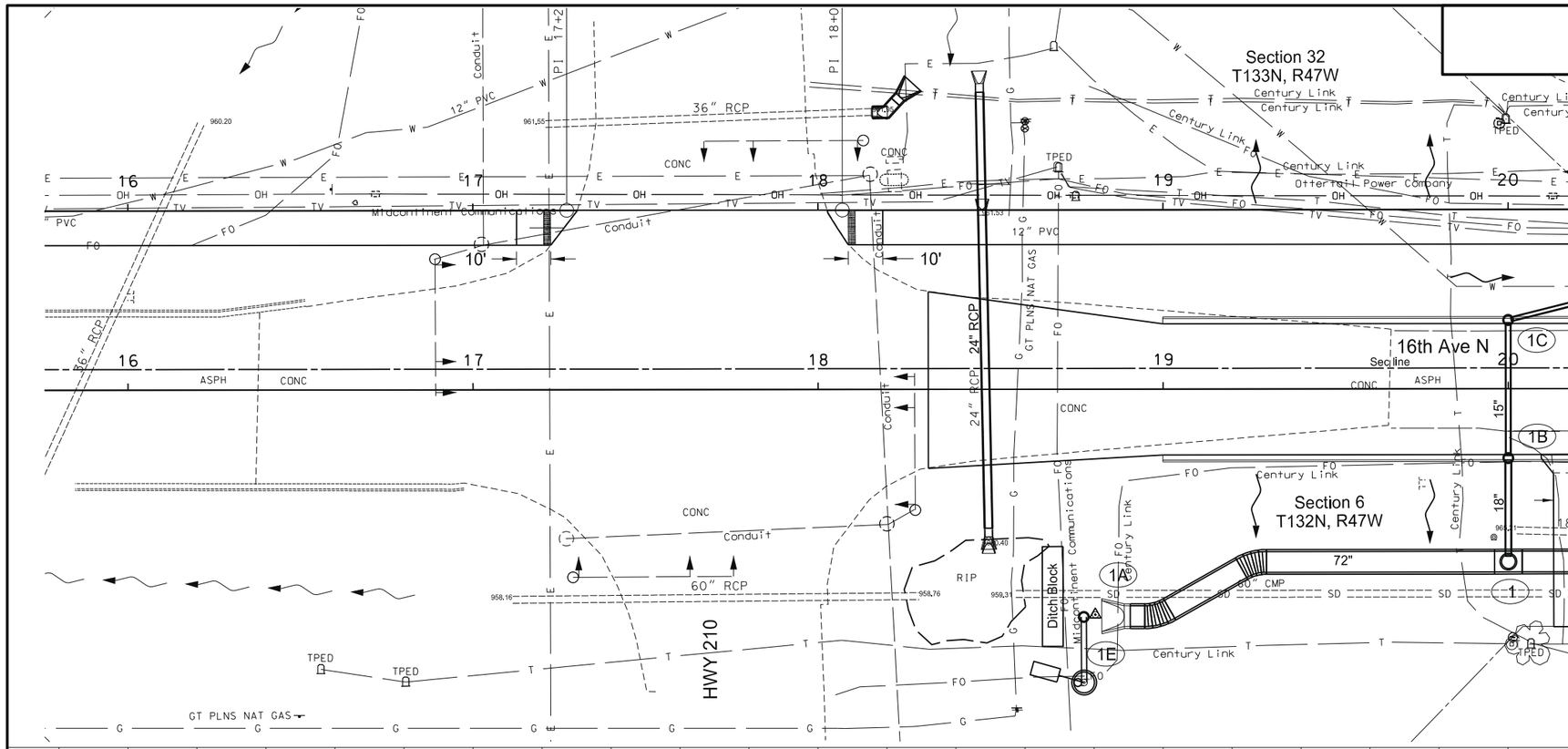
Plan and Profile

Sta 12+00 to Sta 16+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	3



SUPERPAVE FAA43

Sta 18+32 to 20+00		759 SY
Sta 16+00 to 17+30	LT	129 SY
Sta 18+03 to 20+00	LT	205 SY

CURB AND GUTTER - TYPE 1

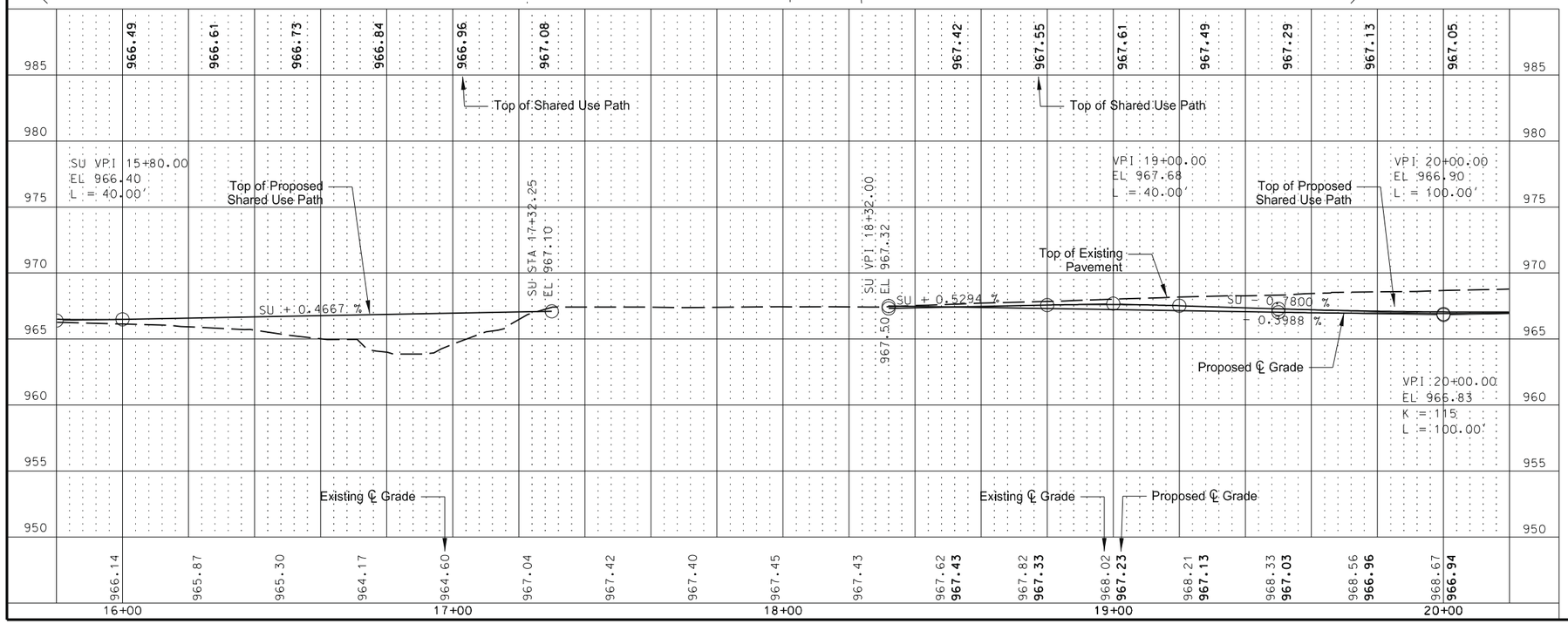
Sta 19+00 to 20+00	LT	100 LF
Sta 19+00 to 20+00	RT	100 LF

SIDEWALK CONCRETE 4IN

Sta 17+20 to 17+30	LT	11 SY
Sta 18+03 to 18+13	LT	11 SY

DETECTABLE WARNING PANEL

Sta 17+21	LT	20 SF
Sta 18+10	LT	20 SF



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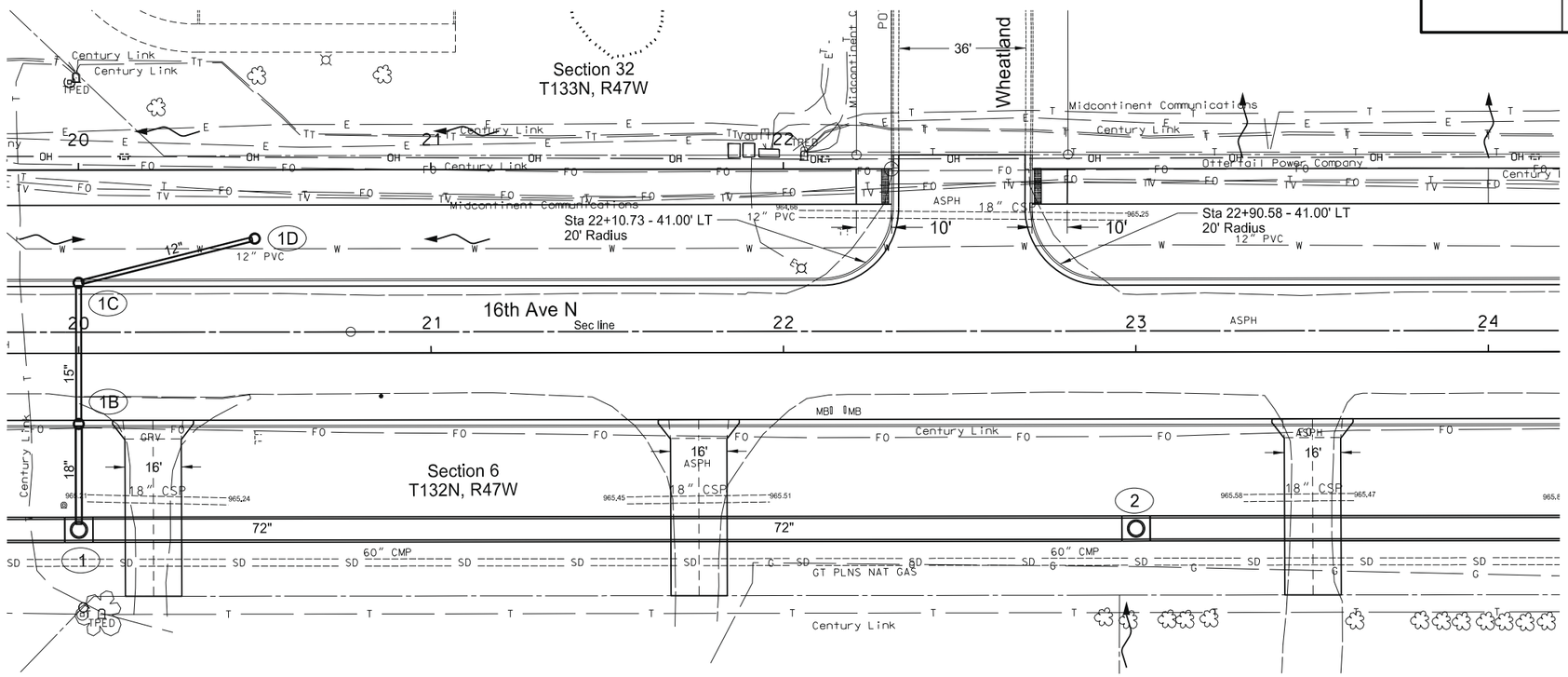
Plan and Profiles

Sta 16+00 to Sta 20+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	4



SUPERPAVE FAA43

Sta 20+00 to 24+00		1859 SY
Sta 20+00 to 22+31	LT	234 SY
Sta 22+71 to 24+00	LT	122 SY

DRIVEWAY CONCRETE 6IN REINFORCED

Sta 20+21	RT	91 SY
Sta 21+76	RT	91 SY
Sta 23+50	RT	91 SY

CURB AND GUTTER - TYPE 1

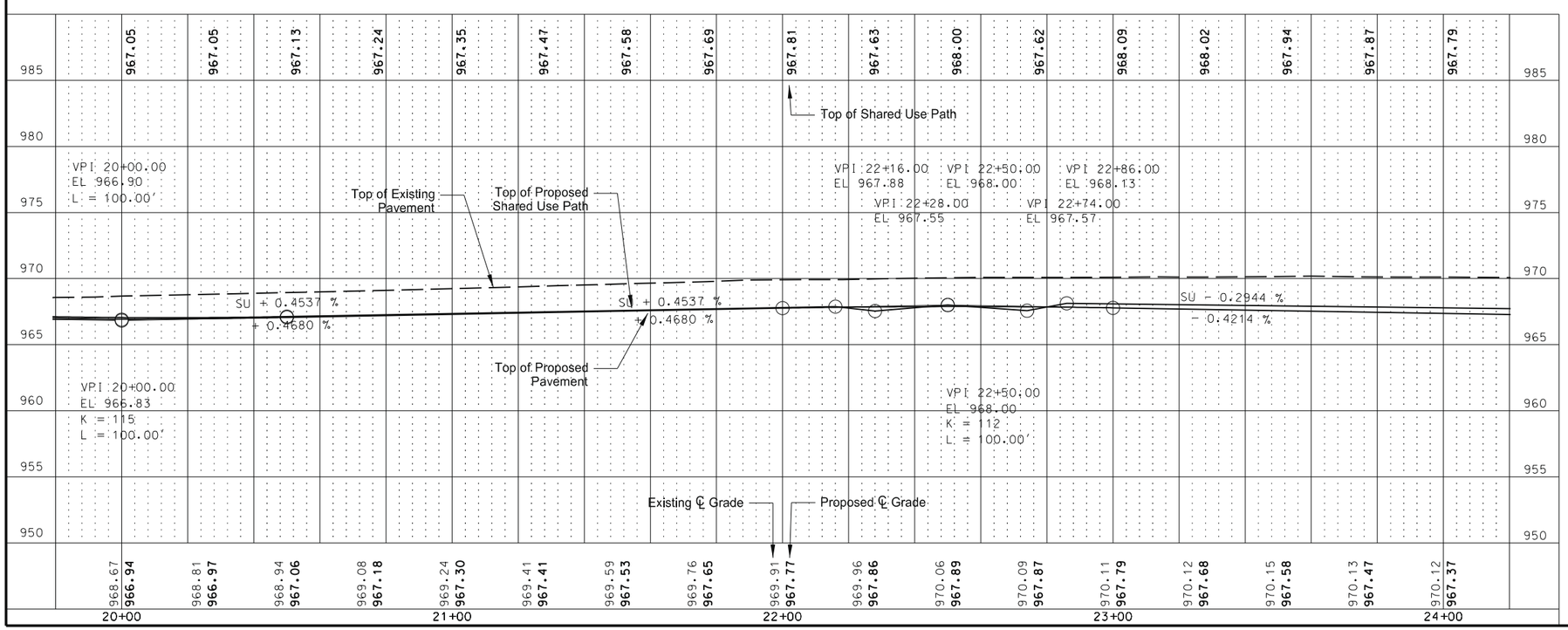
Sta 20+00 to 22+33	LT	258 LF
Sta 22+69 to 24+00	LT	156 LF
Sta 20+00 to 24+00	RT	400 LF

DETECTABLE WARNING PANELS

Sta 22+27	LT	20 SF
Sta 22+74	LT	20 SF

SIDEWALK CONCRETE 4IN

Sta 22+21 to 22+31	LT	11 SY
Sta 22+71 to 22+81	LT	11 SY



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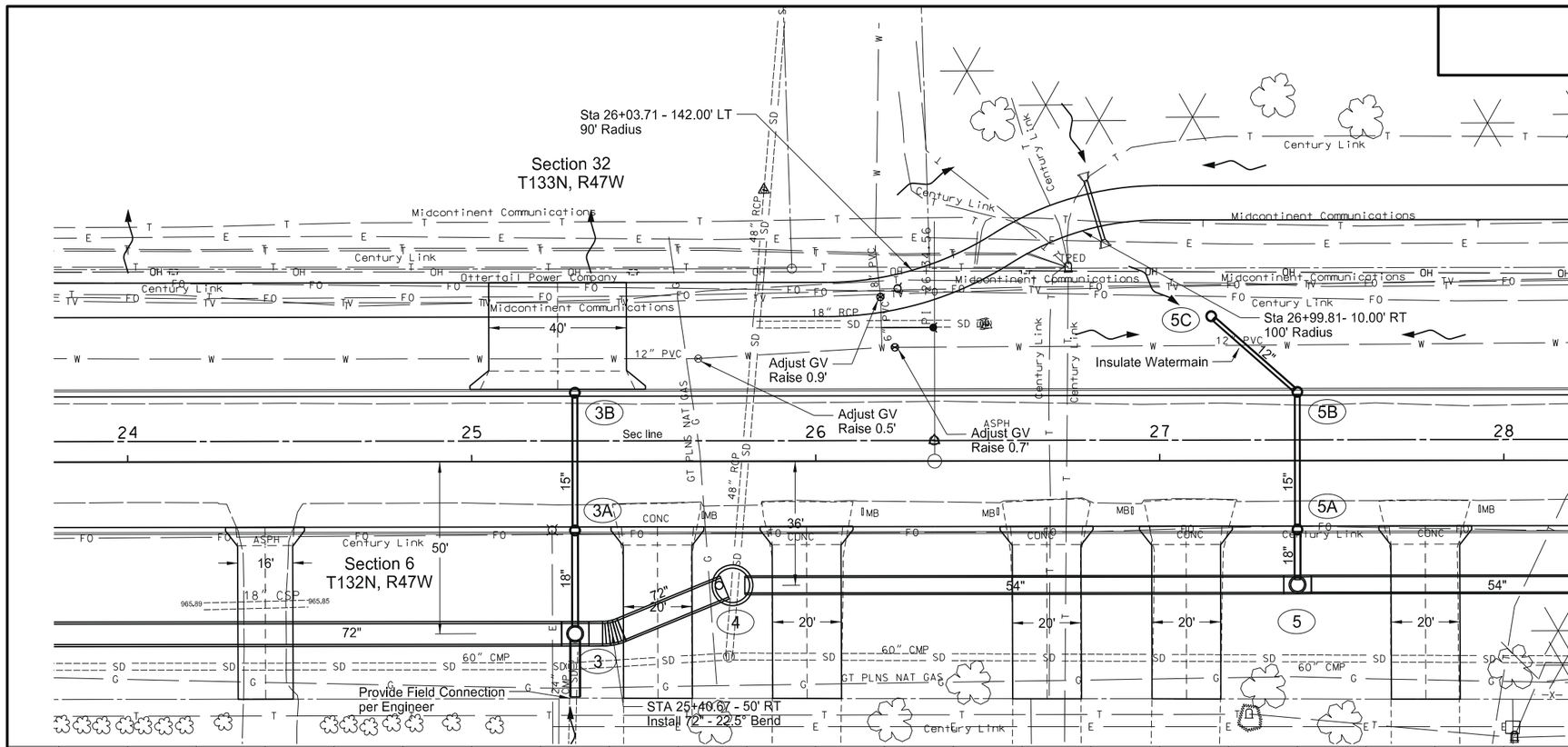
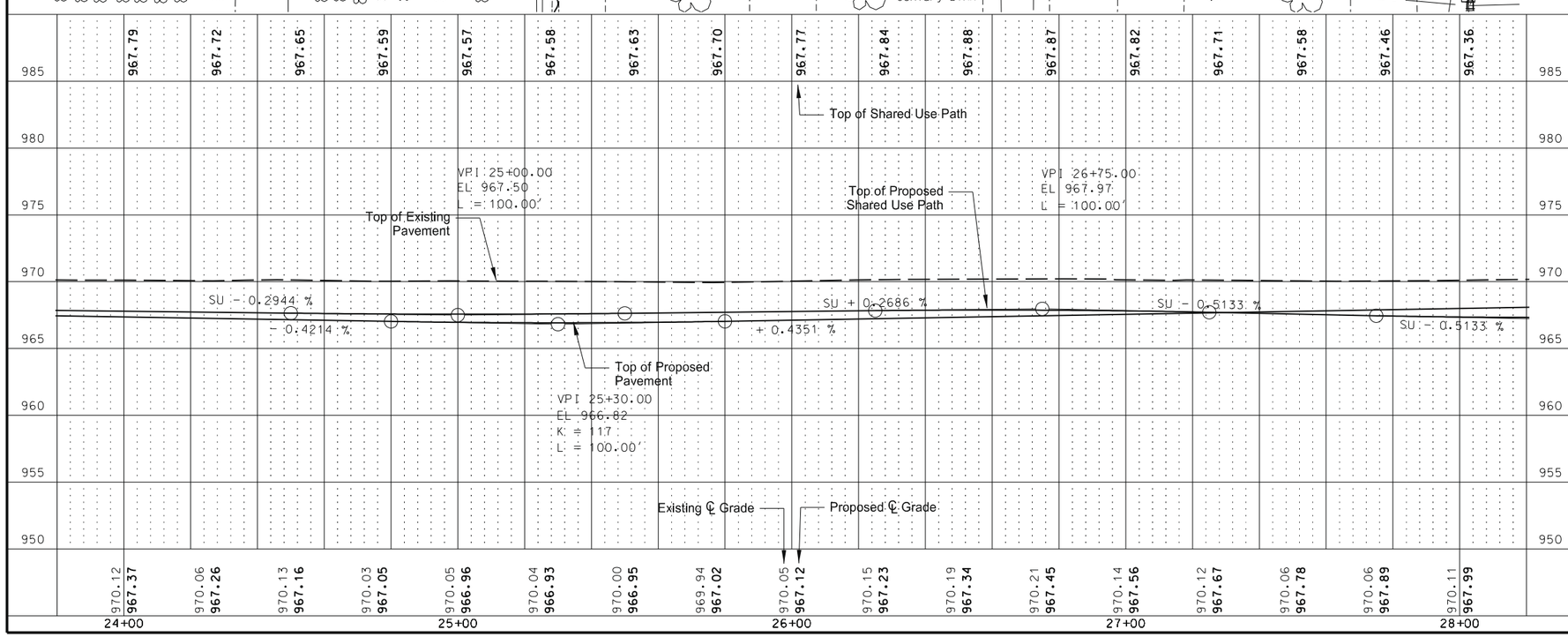
Plan and Profile

Sta 20+00 to Sta 24+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	5





SUPERPAVE FAA43

Sta 24+00 to 28+00		1688 SY
Sta 24+00 to 28+00	LT	444 SY

CURB AND GUTTER - TYPE 1

Sta 24+00 to 28+00	LT	400 LF
Sta 24+00 to 28+00	RT	400 LF

DRIVEWAY CONCRETE 6IN REINFORCED

Sta 24+40	RT	91 SY
Sta 25+54	RT	113 SY
Sta 26+00	RT	113 SY
Sta 26+67	RT	114 SY
Sta 27+07	RT	114 SY
Sta 27+77	RT	114 SY

ADJUST UTILITY APPURTENANCE

Sta 25+65	LT(WV)	1 EA
Sta 26+25	LT(WV)	1 EA

N

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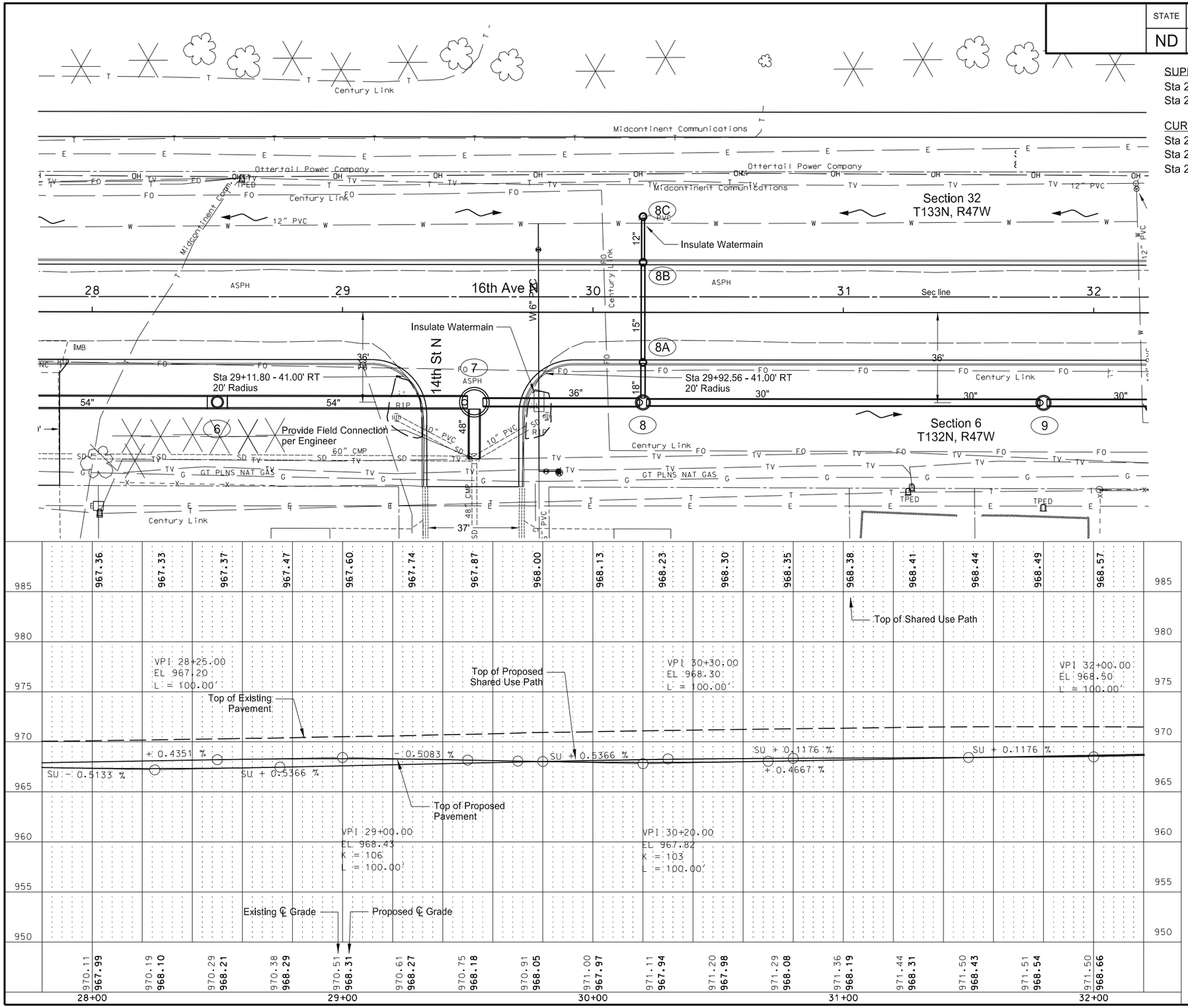
Plan and Profiles

Sta 24+00 to Sta 28+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	6



SUPERPAVE FAA43

Sta 28+00 to 32+00		1919 SY
Sta 28+00 to 32+00	LT	444 SY

CURB AND GUTTER - TYPE 1

Sta 28+00 to 29+34	RT	173 LF
Sta 29+70 to 32+00	RT	268 LF
Sta 29+00 to 32+00	LT	400 LF

N

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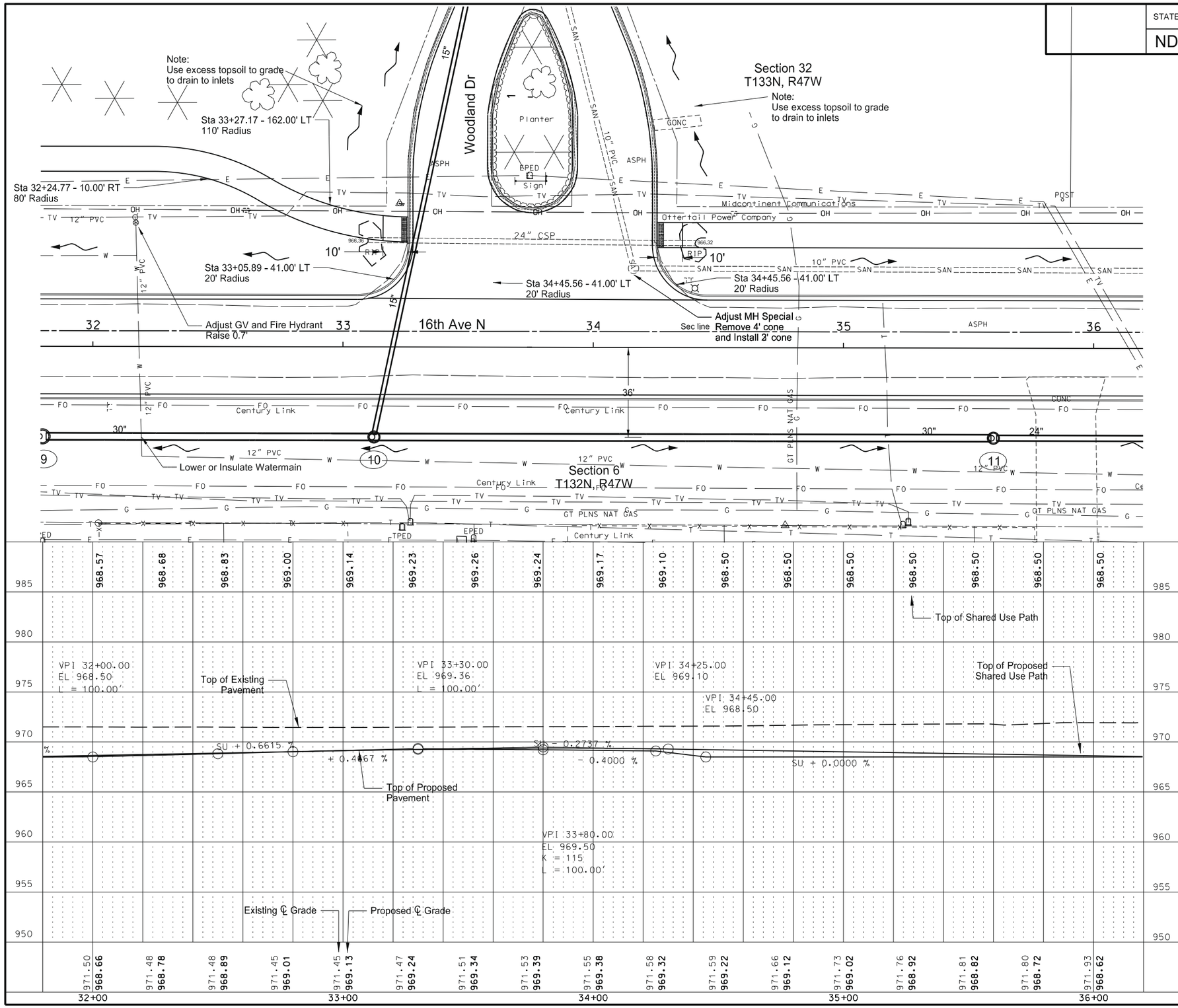
Plan and Profiles

Sta 28+00 to Sta 32+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	7



SUPERPAVE FAA43

Sta 32+00 to 36+00	LT	2862 SY
Sta 32+00 to 33+26	LT	126 SY
Sta 34+26 to 36+00	LT	183 SY

CURB AND GUTTER - TYPE 1

Sta 32+00 to 33+40	LT	149 LF
Sta 34+09 52' LT to 36+00	LT	198 LF
Sta 32+00 to 36+00	RT	400 LF

DETECTABLE WARNING PANELS

Sta 33+22	LT	10 SF
Sta 34+29	LT	10 SF

SIDEWALK CONCRETE 4IN REINFORCED

Sta 33+16 to 33+26	LT	11 SY
Sta 34+26 to 34+36	LT	11 SY

MOUNTABLE CURB & GUTTER - TYPE 1 SECTION B

Sta 33+30 to 34+00	LT	189 LF

ADJUST MANHOLE SPECIAL

Sta 34+18	LT	1 EA

N

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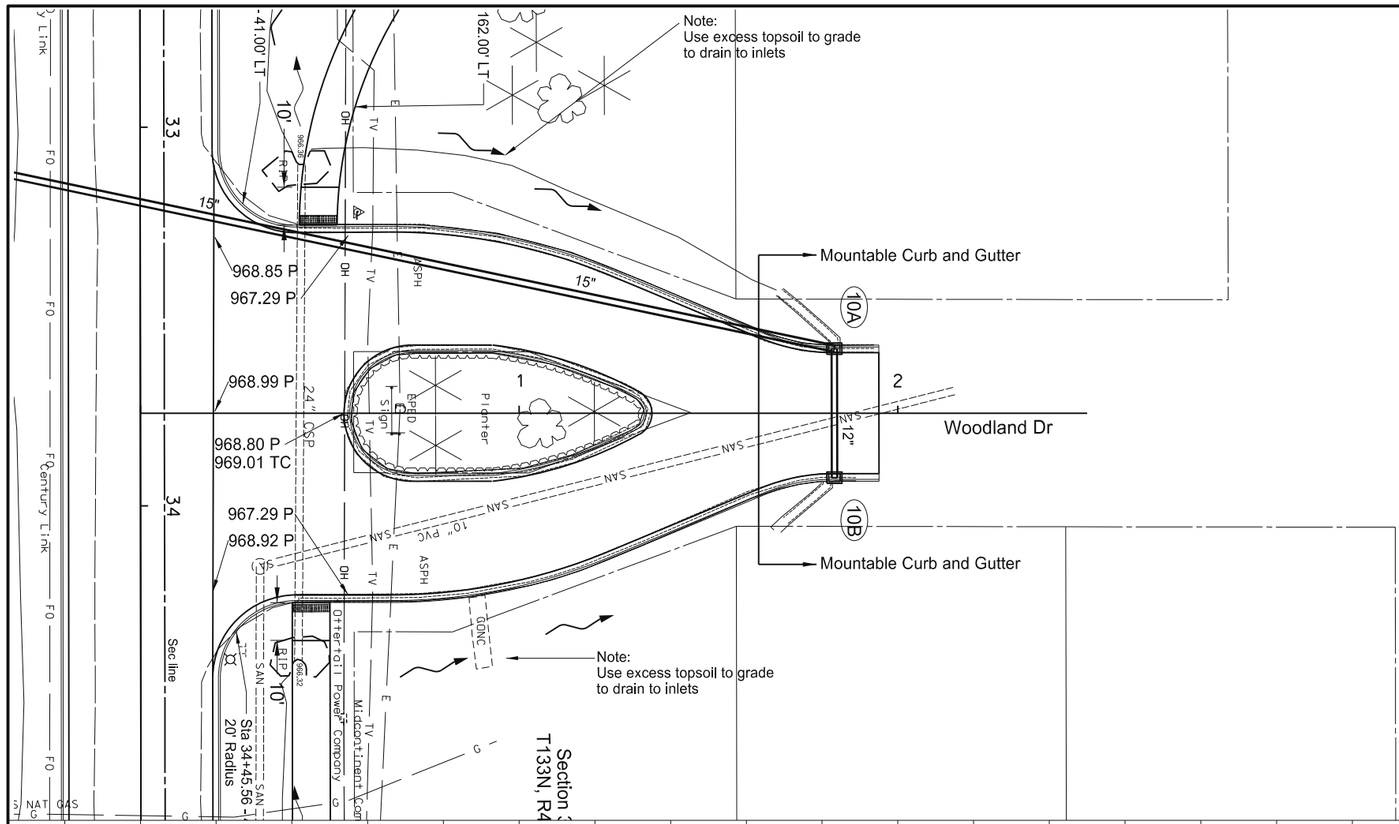
Plan and Profiles

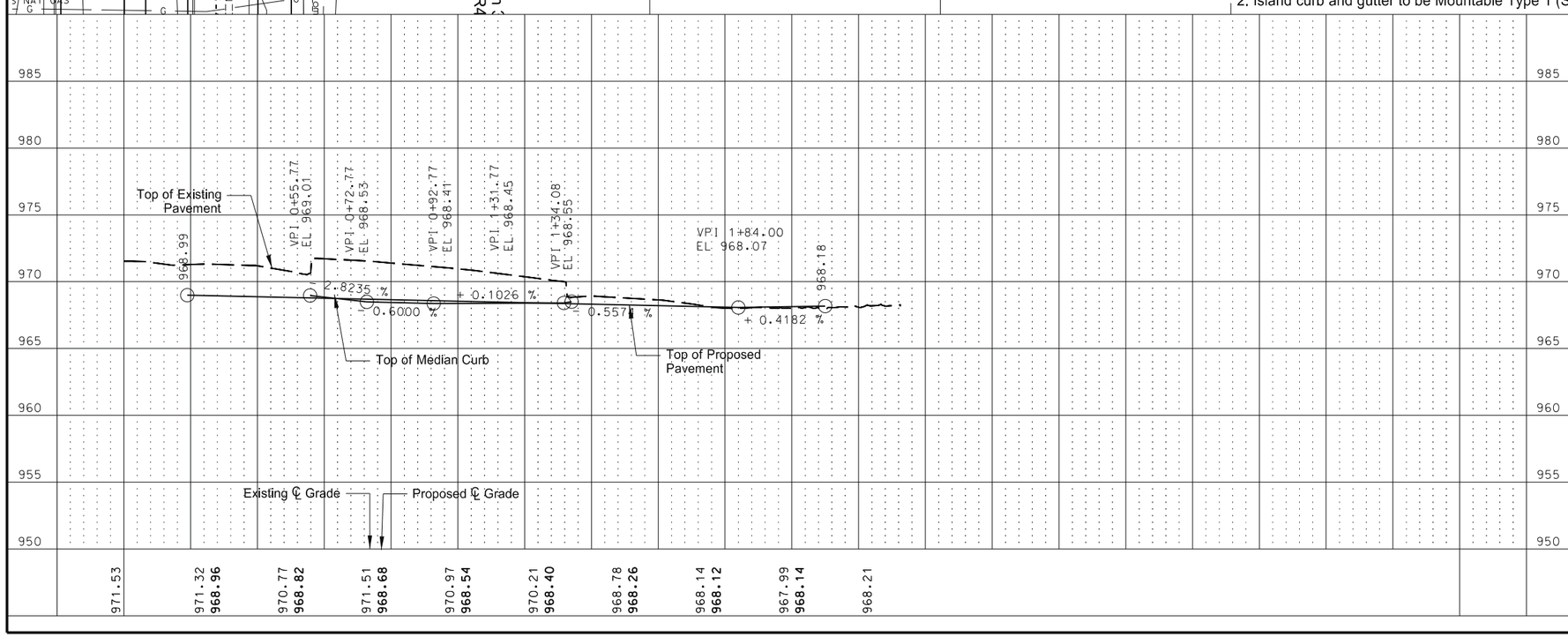
Sta 32+00 to Sta 36+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	8



Note: 1. Top of Curb Grades for Island are symmetrical
2. Island curb and gutter to be Mountable Type 1 (Sec B)



MOUNTABLE CURB & GUTTER - TYPE 1 SECTION B

Sta 1+63 to 1+95	LT	32 LF
Sta 1+63 to 1+95	RT	32 LF

RETAINING WALL

Sta 33+50 to 34+00	LT	189 SF

CURB AND GUTTER - TYPE 1

Sta 0+52 to 1+63	LT	117 LF
Sta 0+52 to 1+63	RT	117 LF

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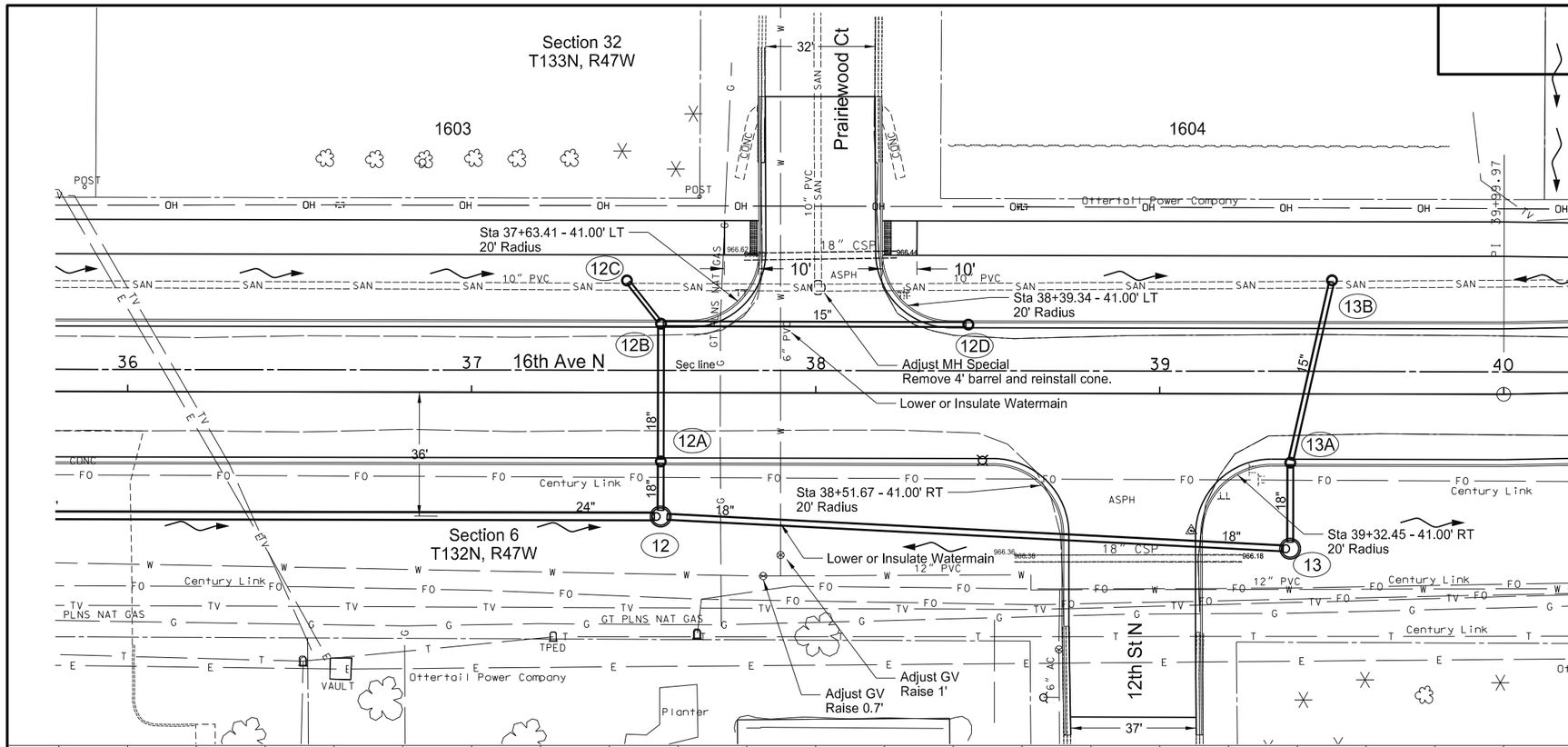
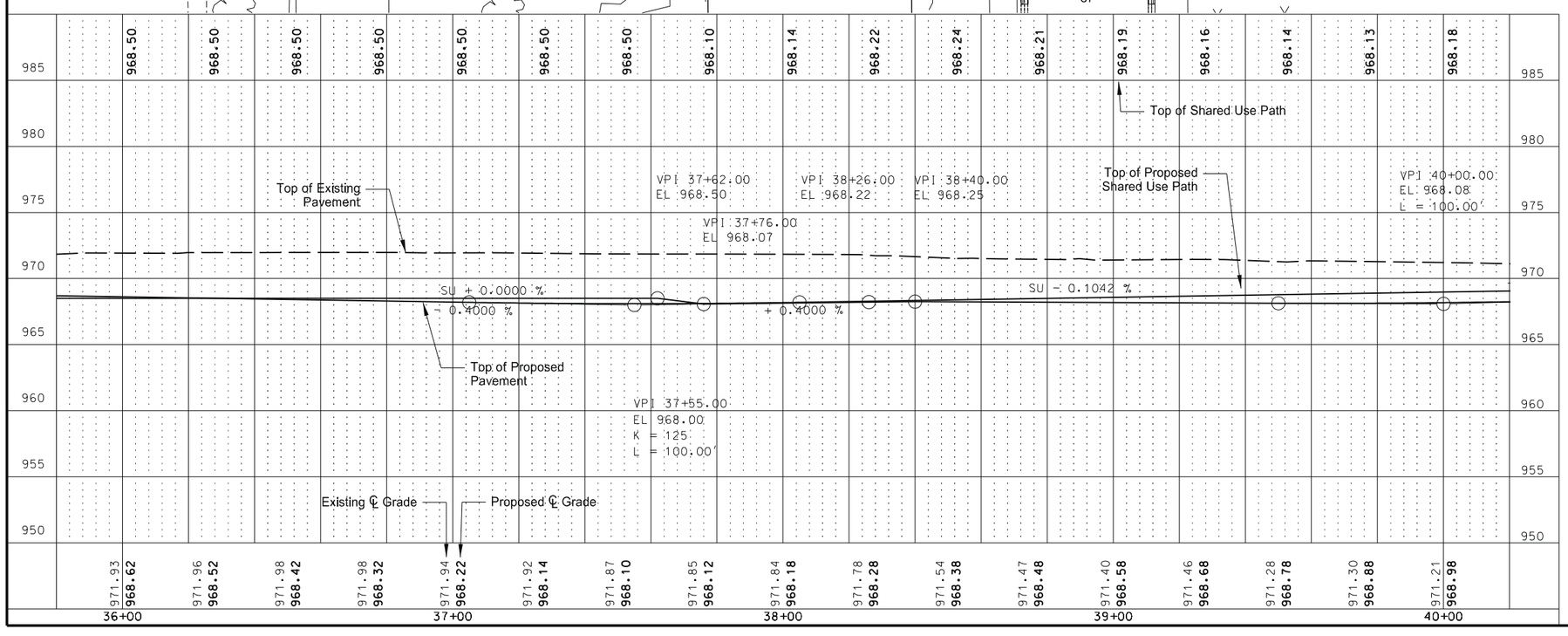
Plan and Profiles

Sta 0+00 to 2+00

16th Ave N Wahpeton,ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	9





SUPERPAVE FAA43

Sta 26+00 to 40+00		2279 SY
Sta 36+00 to 37+85	LT	193 SY
Sta 38+17 to 40+00LT		190 SY

CURB AND GUTTER - TYPE 1

Sta 36+00 to 37+85	LT	240 LF
Sta 38+17 to 40+00	LT	237 LF
Sta 36+00 to 38+74	RT	342 LF
Sta 39+10 to 40+00	RT	157 LF

DETECTABLE WARNING PANELS

Sta 37+79	LT	20 SF
Sta 38+22	LT	20 SF

SIDEWALK CONCRETE 4IN REINFORCED

Sta 37+75 to 37+85	LT	11 SY
Sta 38+17 to 38+27	LT	11 SY

ADJUST MANHOLE SPECIAL

Sta 38+02	LT (SAS)	1 EA

ADJUST UTILITY APPURTENANCE

Sta 37+85	RT (WV)	1 EA
Sta 37+90	RT (WV)	1 EA

N

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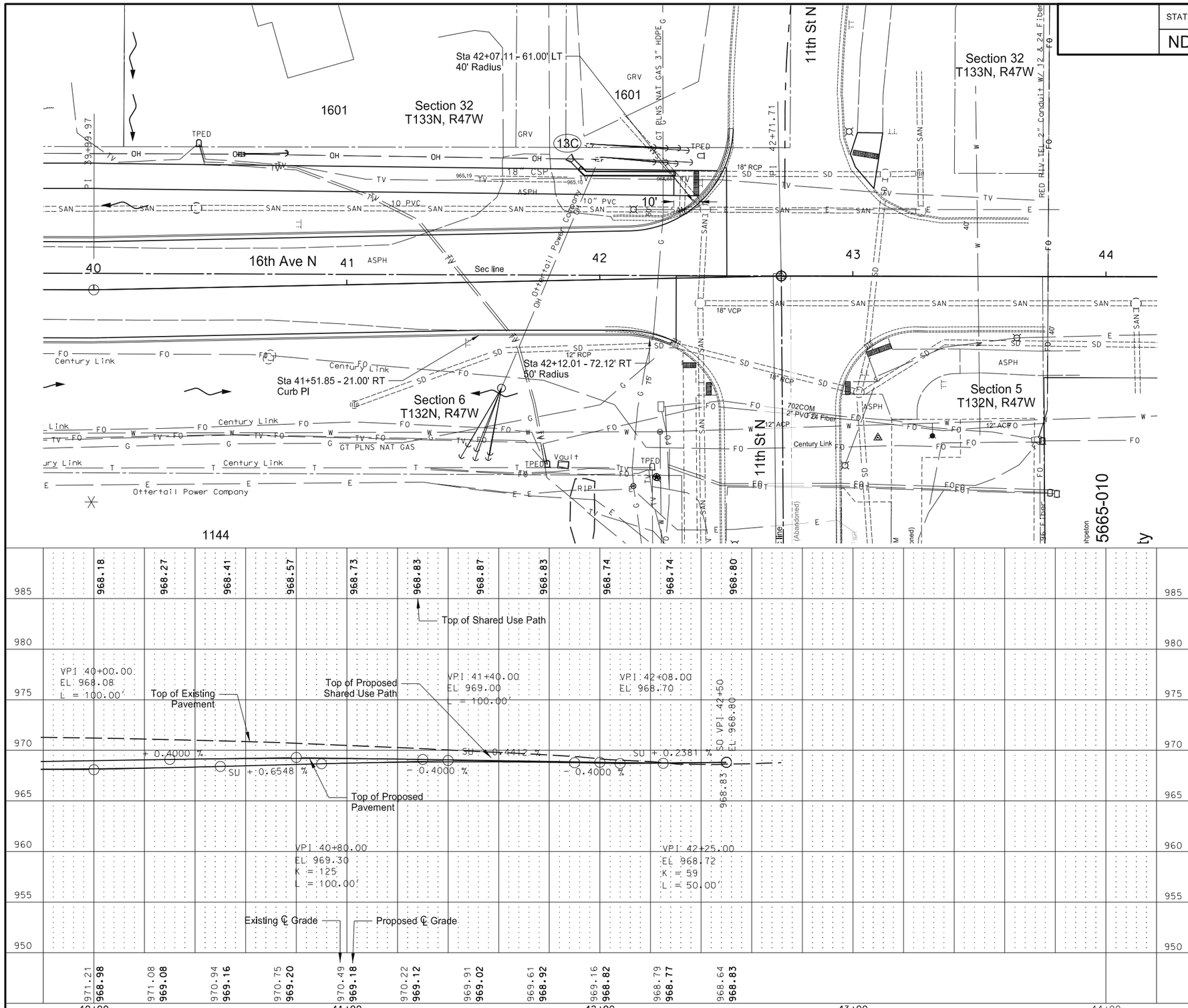
Plan and Profiles

Sta 36+00 to Sta 40+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	60	10



SUPERPAVE FAA43

Sta 40+00 to 42+50		1054 SY
Sta 40+00 to 42+46	LT	259 SY

CURB AND GUTTER - TYPE 1

Sta 40+00 to 42+53	LT	265 LF
Sta 40+00 to 42+28	RT	229 LF

DETECTABLE WARNING PANELS

Sta 42+37	LT	20 SF
Sta 43+00	LT	20 SF

SIDEWALK CONCRETE 4IN REINFORCED

Sta 42+40 to 42+50	11 SY
Sta 42+99 to 43+12	20 SY

ADJUST MANHOLE

Sta 40+00	LT (SAS)	1 EA
Sta 42+40	LT (SAS)	1 EA
Sta 42+40	RT (SAS)	1 EA

N

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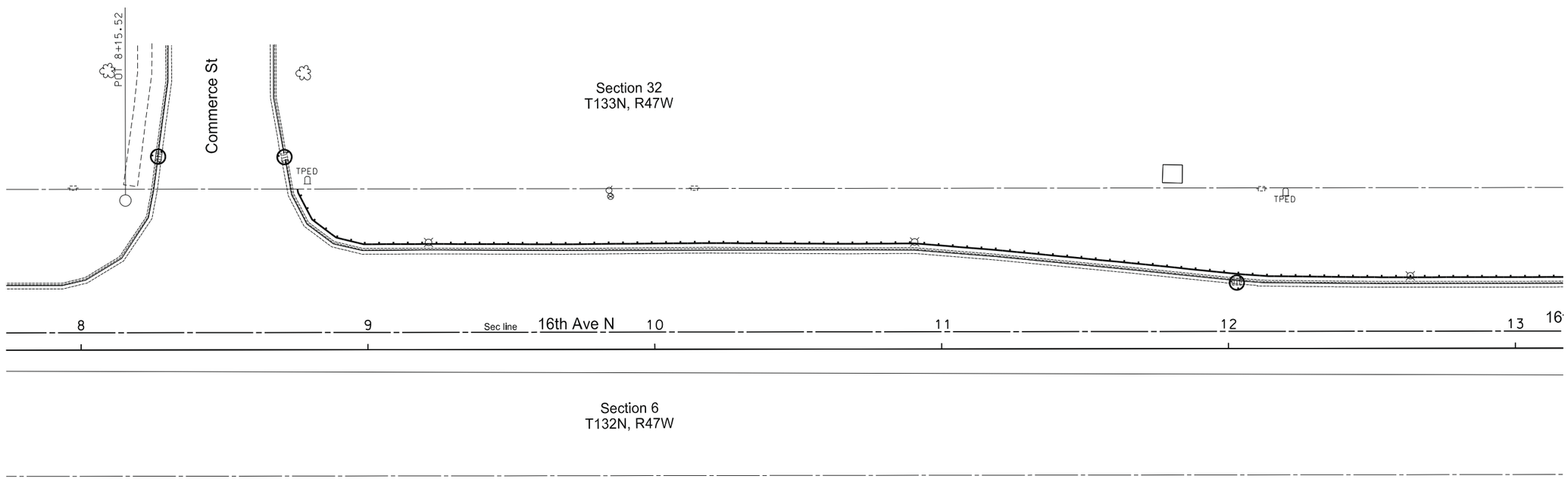
Plan and Profiles

Sta 40+00 to Sta 42+71.68

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	76	1



INLET PROTECTION - SPECIAL

Sta 8+22	LT	1 EA
Sta 8+71	LT	1 EA
Sta 12+03	LT	1 EA

FIBER ROLLS 6IN

Sta 8+75LT to Sta 13+00 LT	470 LF

Inlet Protection

Fiber Rolls 6IN

N

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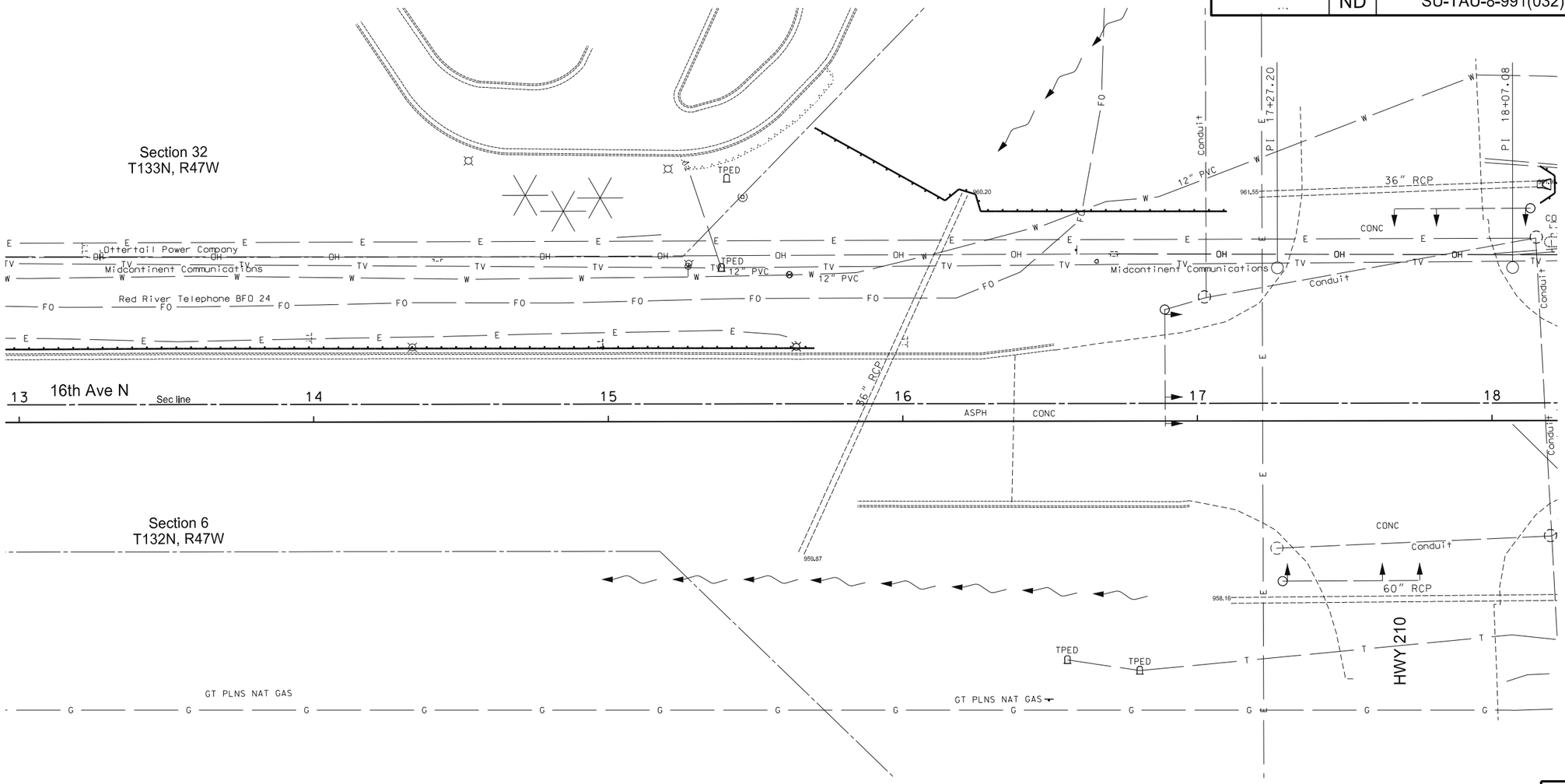
Temporary Erosion Control

Sta 8+00 to 13+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	76	2



FIBER ROLLS - 6IN

Sta 16+21	LT	15 LF
Sta 13+00LT to Sta 15+70LT		270 LF
Sta 15+00LT to Sta 17+00LT		140 LF

Inlet Protection

Fiber Rolls 6IN

N

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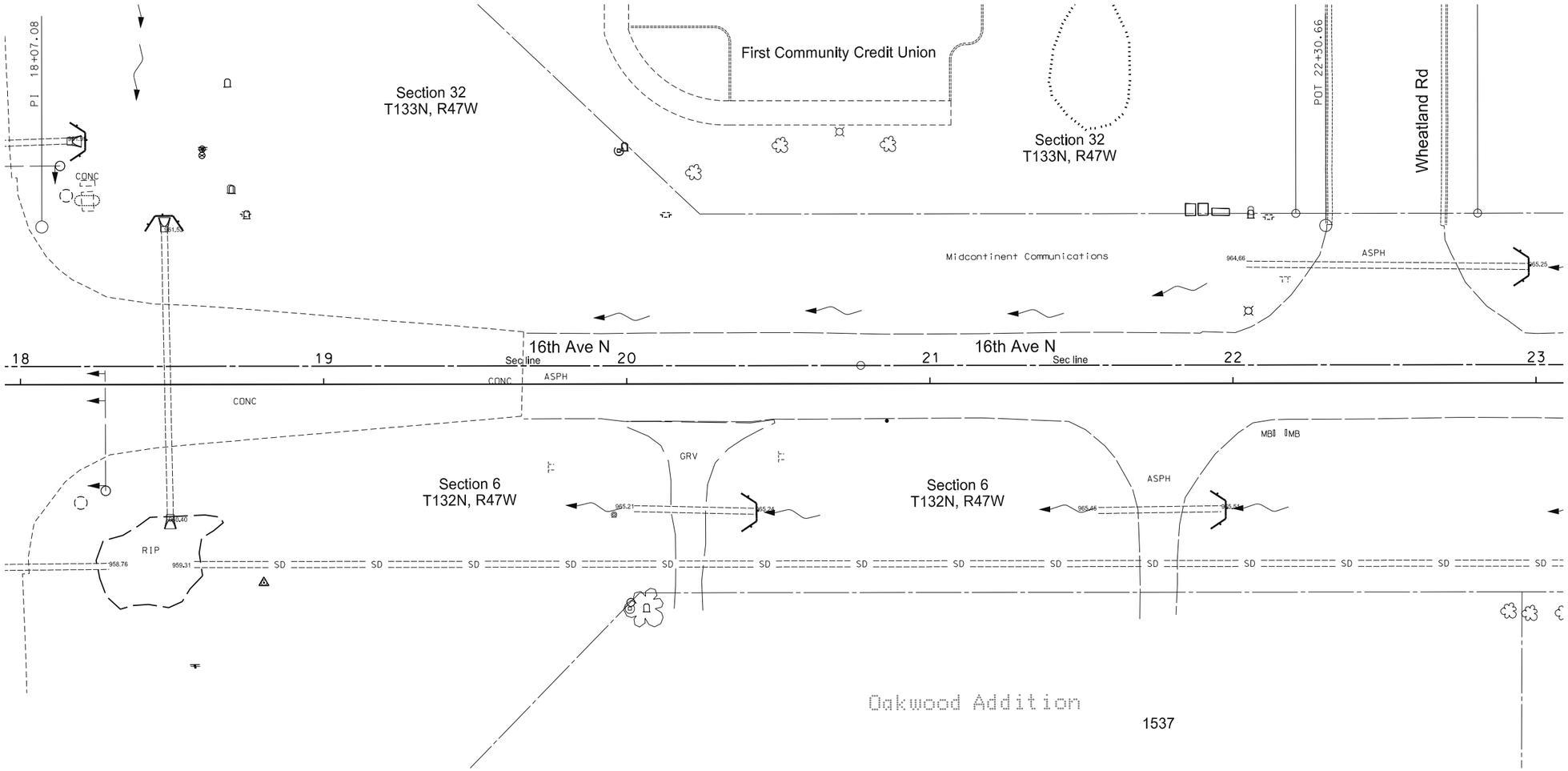
Temporary Erosion Control

Sta 13+00 to 18+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	76	3



FIBER ROLL 6IN

Sta 18+22	LT	15 LF
Sta 18+47	LT	15 LF
Sta 20+42	RT	15 LF
Sta 21+97	RT	15 LF
Sta 22+98	LT	15 LF

Inlet Protection

Fiber Rolls 6IN

N

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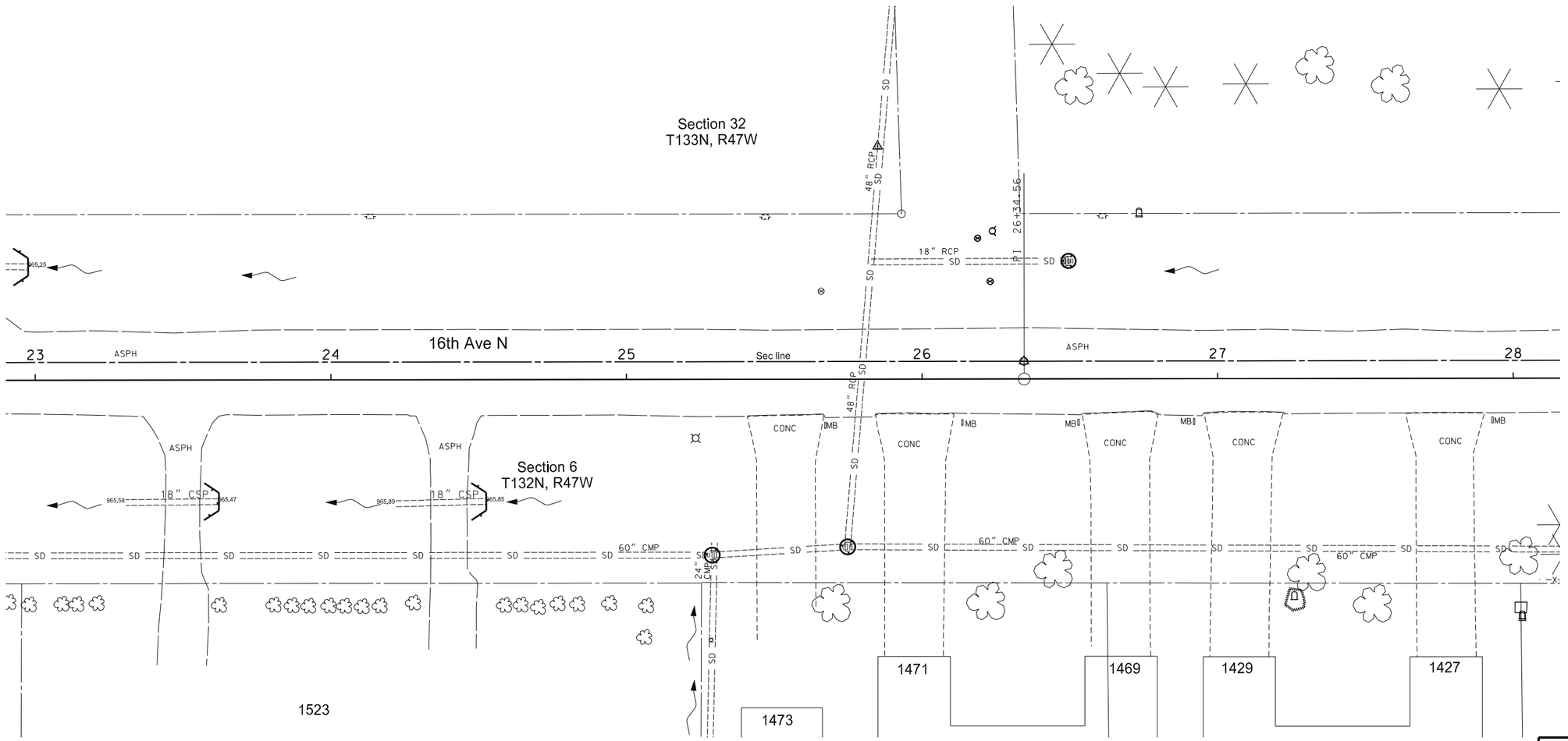
Temporary Erosion Control

Sta 18+00 to 23+00

16th Ave. N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	76	4



INLET PROTECTION - FIBER ROLL 6IN

Sta 25+29	RT	1 EA
Sta 25+74	RT	1 EA
Sta 26+50	LT	1 EA

FIBER ROLLS - 6IN

Sta 23+65	RT	15 LF
Sta 24+55	RT	15 LF

Inlet Protection

Fiber Rolls 6IN

N

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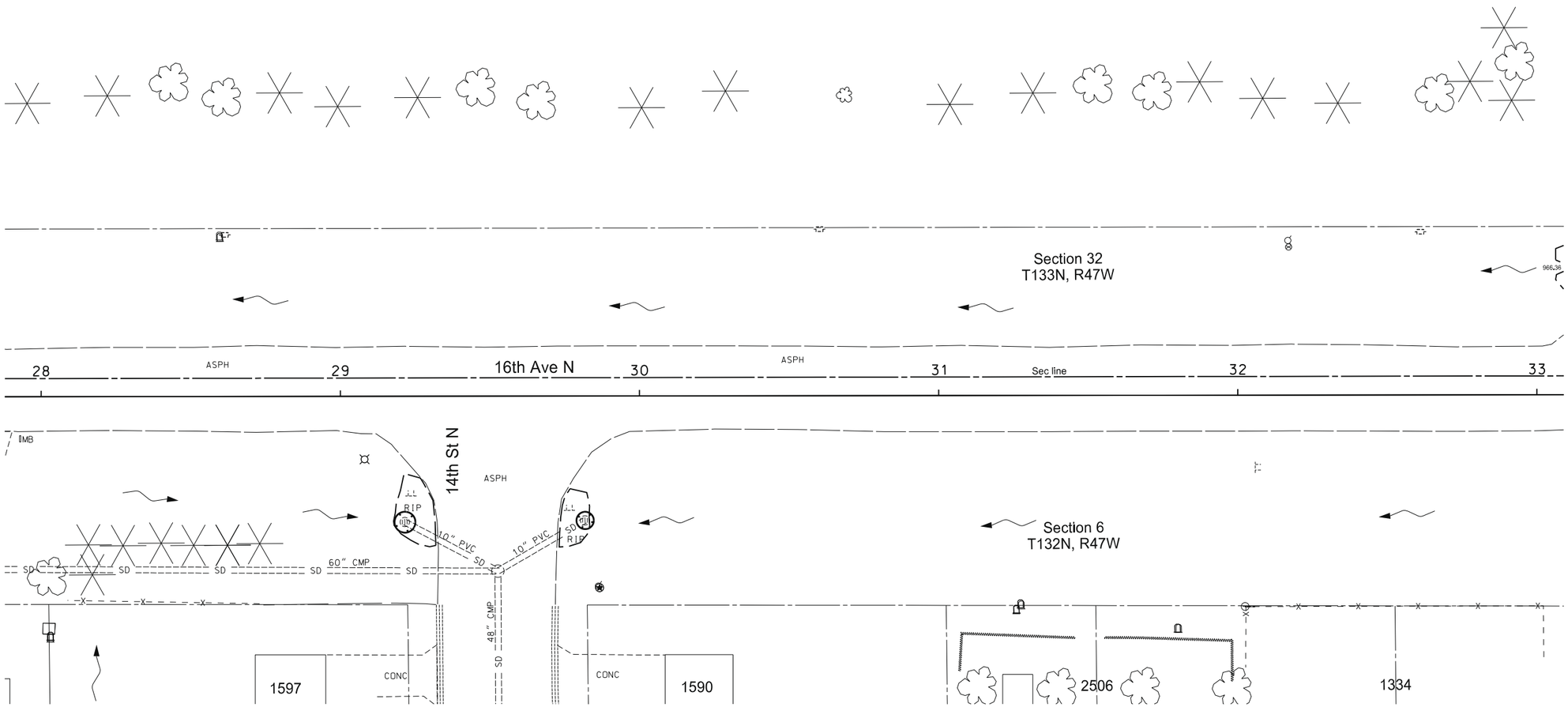
Temporary Erosion Control

Sta 23+00 to 28+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	76	5



INLET PROTECTION - FIBER ROLL 6IN

Sta 29+21	RT	1 EA
Sta 29+82	RT	1 EA

Inlet Protection

Fiber Rolls 6IN

N

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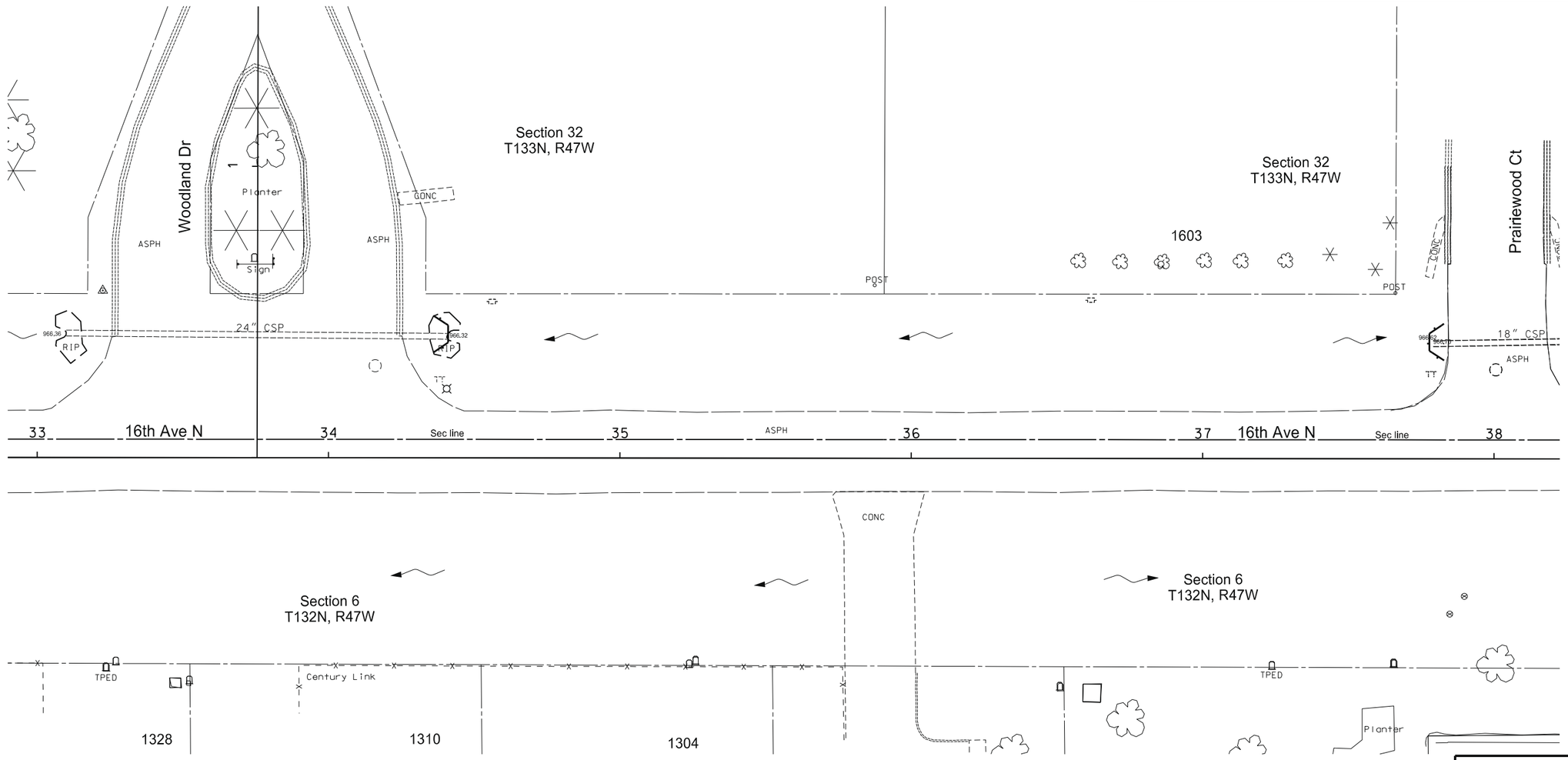
Temporary Erosion Control

Sta 28+00 to 33+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	76	6



FIBER ROLLS - 6IN

Sta 34+40	LT	15 LF
Sta 37+78	LT	15 LF

Inlet Protection

Fiber Rolls 6IN

N

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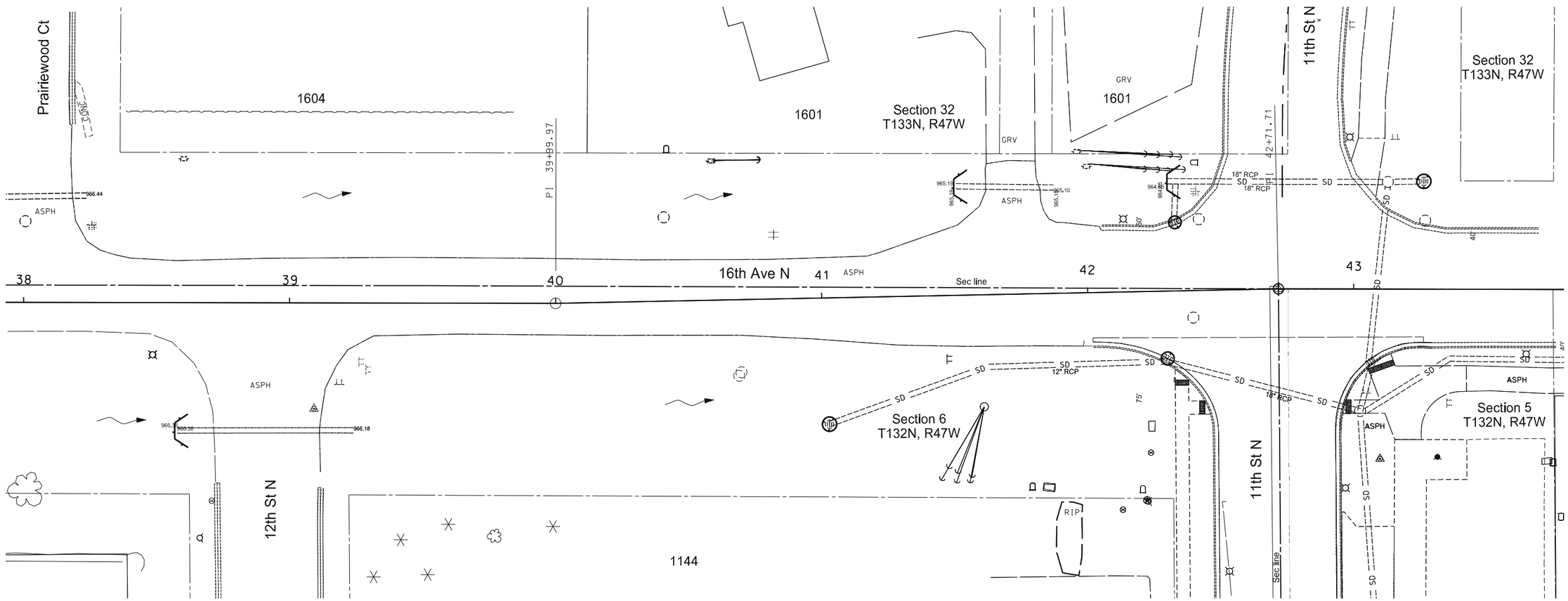
Temporary Erosion Control

Sta 33+00 to 38+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	76	7



INLET PROTECTION - FIBER ROLL 6IN

Sta 41+03	RT	1 EA
Sta 42+30	RT	1 EA
Sta 42+33	LT	1 EA
Sta 43+26	LT	1 EA

FIBER ROLLS - 6IN

Sta 38+57	RT	15 LF
Sta 41+50	LT	15 LF
Sta 42+30	LT	15 LF

Inlet Protection

Fiber Rolls 6IN

N

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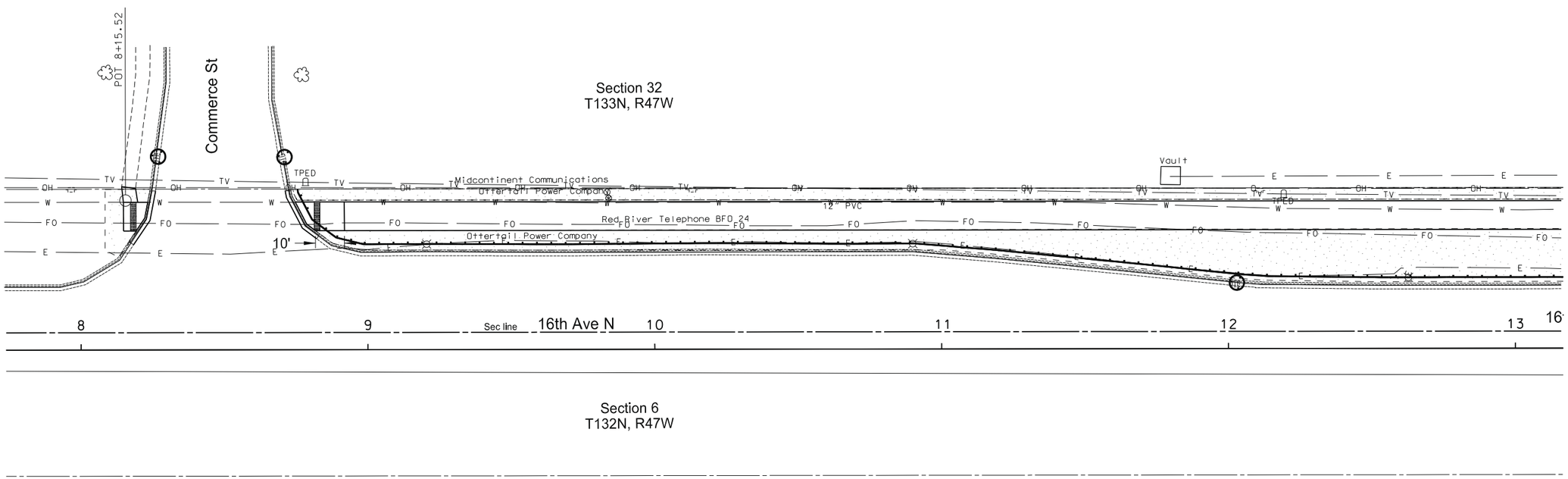
Temporary Erosion Control

Sta 38+00 to Sta 42+71.67

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	77	1



SEEDING CLASS III - HYDRAULIC MULCH
Sta 8+74 to 13+00 LT 0.12 ACRE

Seeding
Inlet Protection
Fiber Rolls 6IN

N

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Note: Inlet protection and fiber rolls from temporary erosion control shall remain in place.

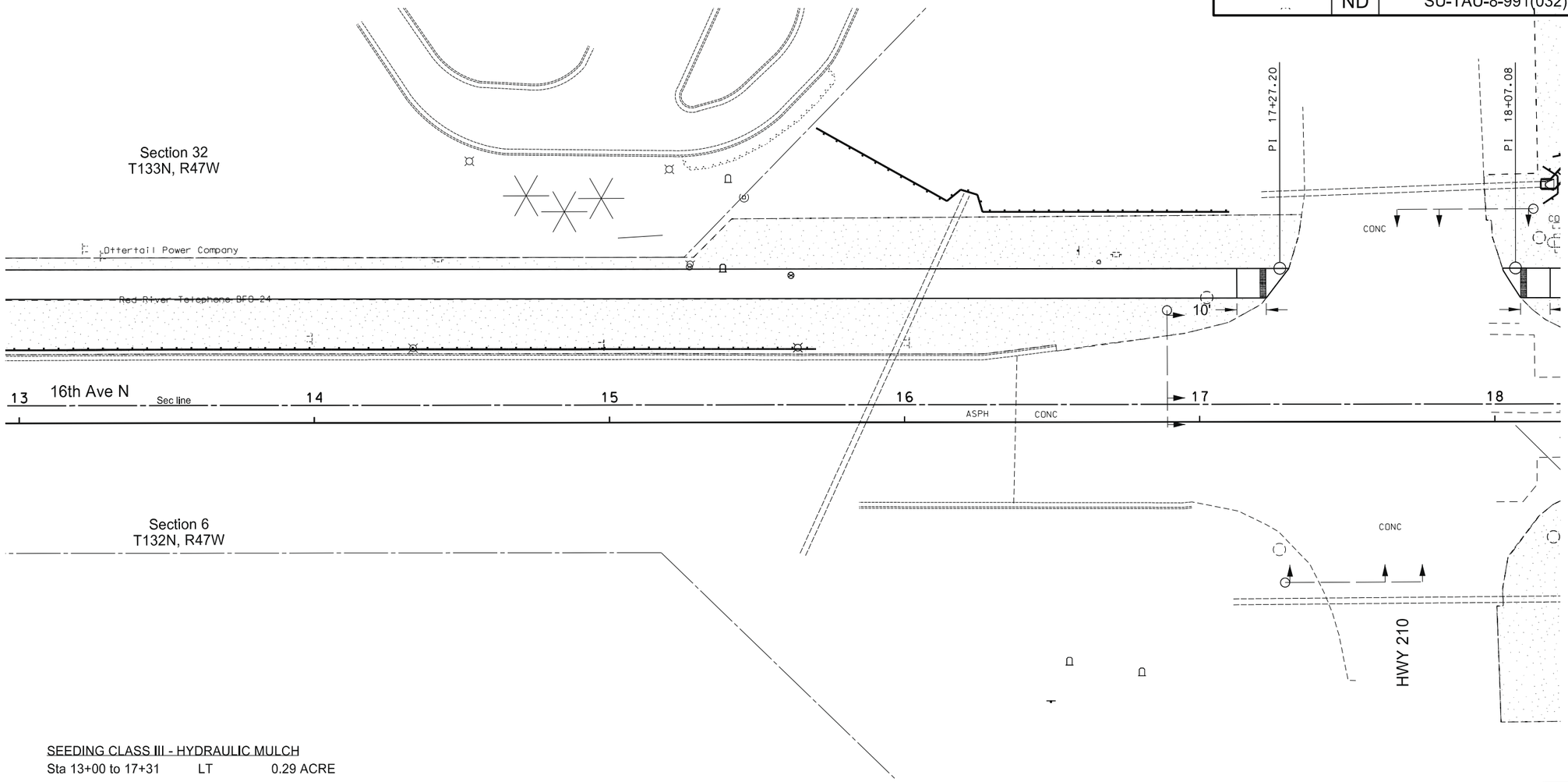
Permanent Erosion Control

& Tree Plantings

Sta 8+00 to 13+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	77	2



SEEDING CLASS III - HYDRAULIC MULCH

Sta 13+00 to 17+31 LT 0.29 ACRE

Seeding

Inlet Protection

Fiber Rolls 6IN

N

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Note: Inlet protection and fiber rolls from temporary erosion control shall remain in place.

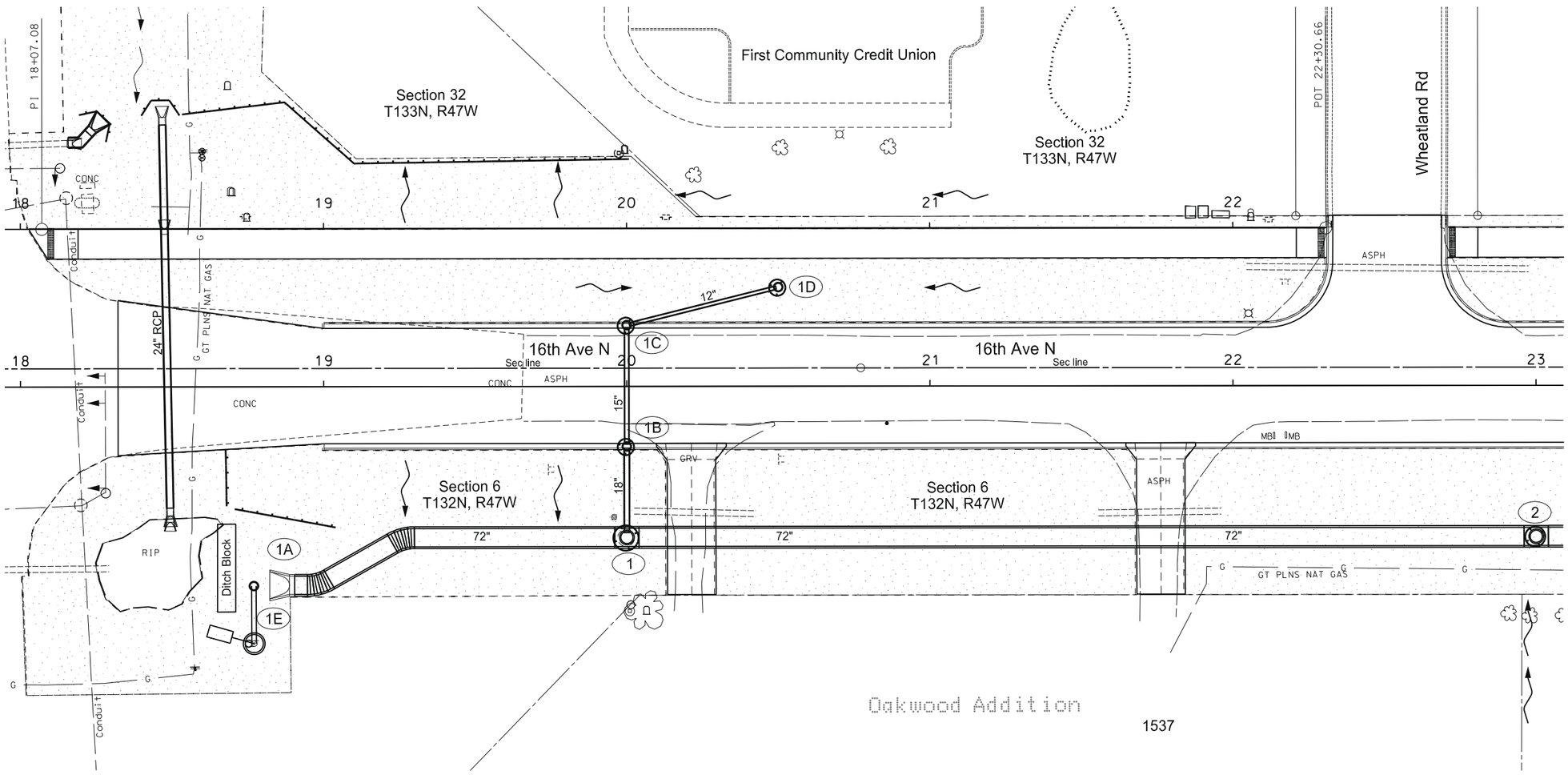
Permanent Erosion Control

& Tree Plantings

Sta 13+00 to 18+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	77	3



INLET PROTECTION-SPECIAL

1B & 1C	2 Ea

INLET PROTECTION FIBERROLL 6 IN

1 D	1 Ea

SEEDING CLASS III - HYDRAULIC MULCH

Sta 18+00 to 23+00	LT	0.37 ACRE
Sta 18+00 to 23+00	RT	0.50 ACRE

FIBER ROLLS-6 IN

Sta 18+32 Lt	15 LF
Sta 18+50 Lt	15 LF
Sta 18+60 to 19+00 Rt	50 LF
Sta 18+50 to 20+00 Lt	200 LF

Seeding

Inlet Protection

Fiber Rolls 6IN

N

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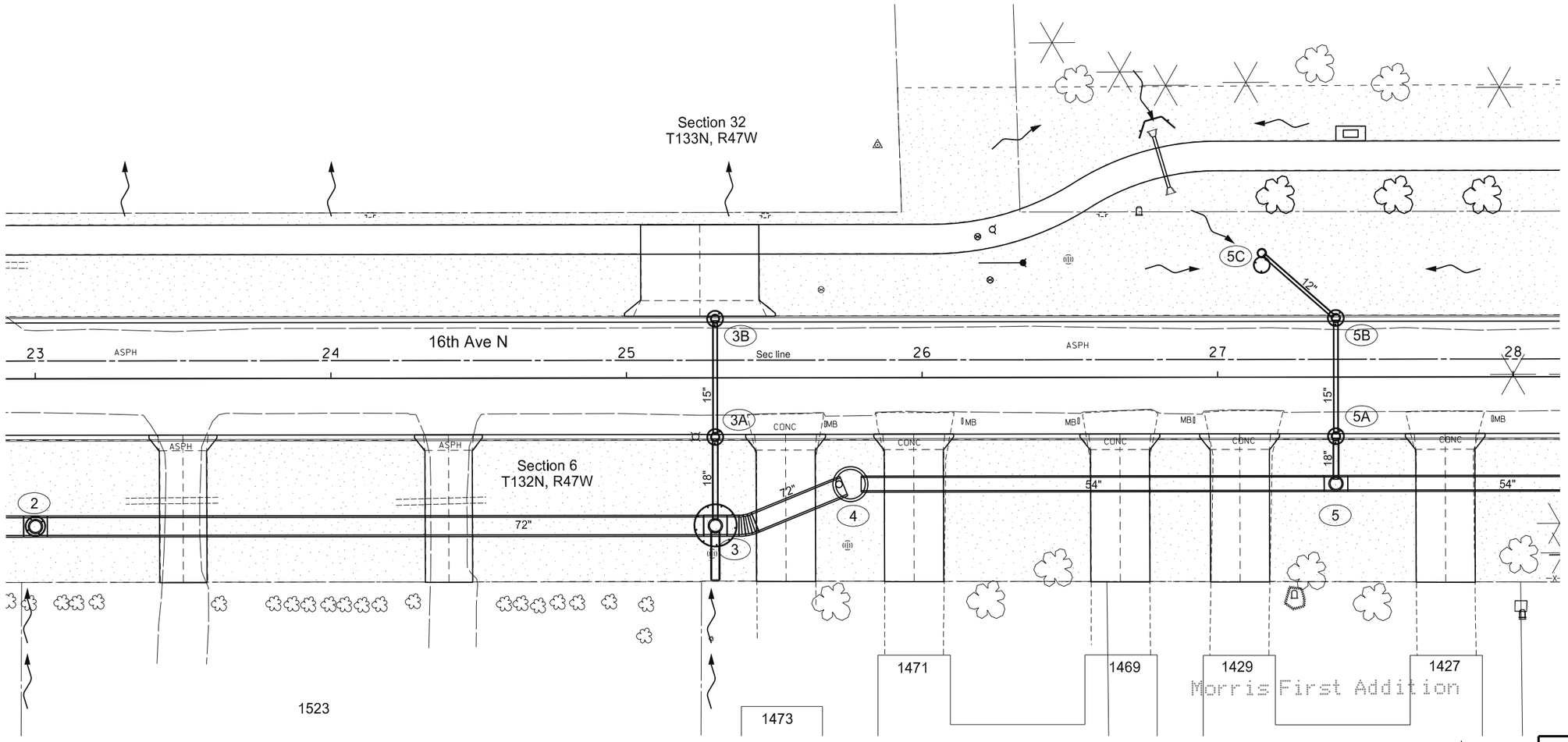
Permanent Erosion Control

& Tree Plantings

Sta 18+00 to 23+00

16th Ave. N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	77	4



SEEDING CLASS III - HYDRAULIC MULCH

Sta 23+00 to 28+00	LT	0.47 ACRE
Sta 33+00 to 28+00	RT	0.41 ACRE

INLET PROTECTION-SPECIAL

3A & 3B	2 EA
5A & 5B	2 EA

INLET PROTECTION FIBERROLL 6 IN

3	1 EA
5C	1 EA
2	1 EA

BENCH

Sta 24+45	LT	1 EA

FIBER ROLLS-6 IN

Sta 26+80 Lt	15 LF

EUROPEAN MOUNTAIN ASH

Sta 27+20 Lt	1 EA

CANADA RED CHERRY

Sta 27+60 Lt	1 EA
Sta 27+90 Lt	1 EA

SIDEWALK CONCRETE 4IN

Sta 24+45	LT	5.3 SY

Seeding
Inlet Protection
Fiber Rolls 6IN
Deciduous Tree
Coniferous Tree

N

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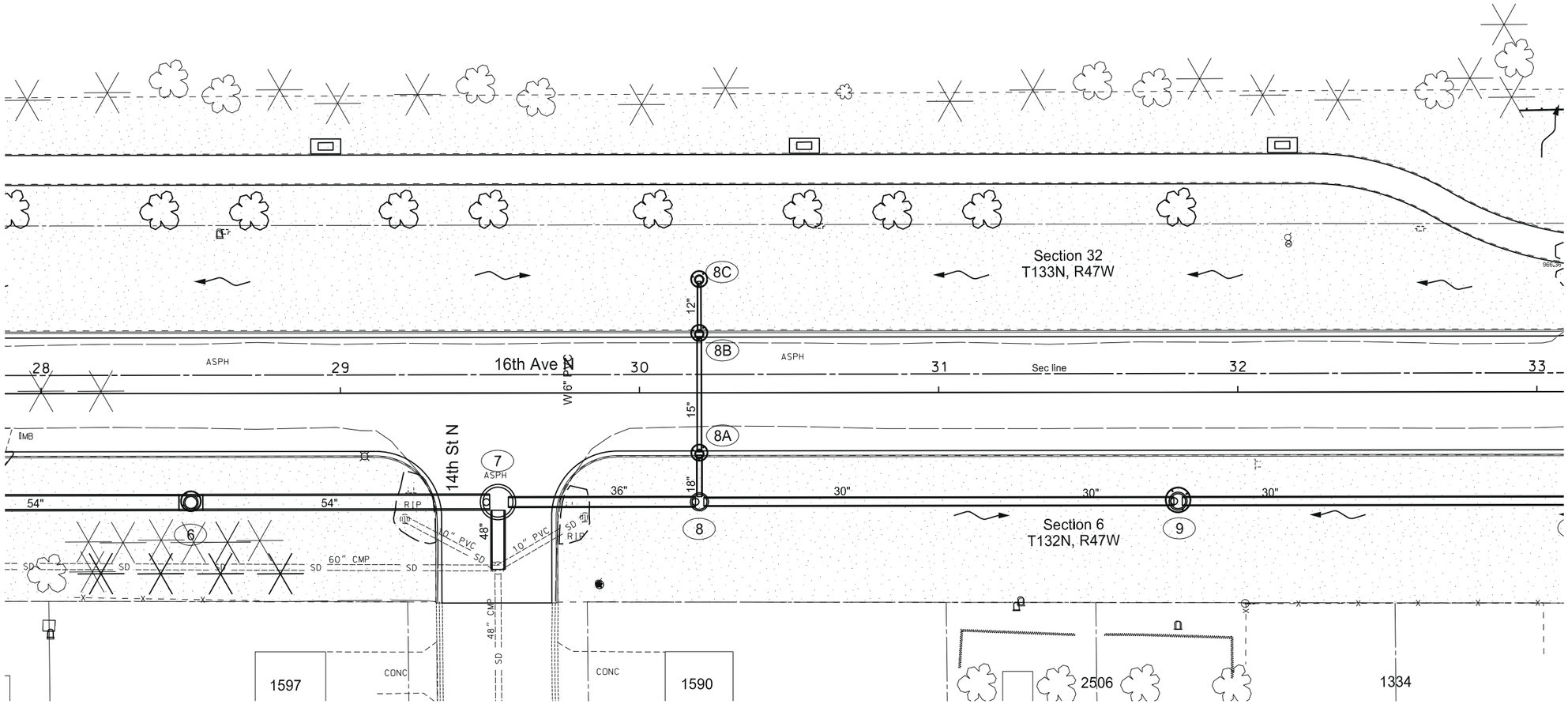
Permanent Erosion Control

& Tree Plantings

Sta 23+00 to 28+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	77	5



BENCH

Sta 28+95	LT	1 EA
Sta 30+55	LT	1 EA
Sta 30+55	LT	1 EA

SEEDING CLASS III - HYDRAULIC MULCH

Sta 28+00 to 33+00	LT	0.80 ACRE
Sta 28+00 to 33+00	RT	0.50 ACRE

BLACK HILLS SPRUCE

Sta 28+20	RT	1 EA
Sta 28+40	RT	1 EA
Sta 28+60	RT	1 EA
Sta 28+80	RT	1 EA

SIDEWALK CONCRETE 4IN

Sta 28+95	LT	5.3 SY
Sta 30+55	LT	5.3 SY
Sta 30+55	LT	5.3 SY

INLET PROTECTION-SPECIAL

8A & 8B	2 Ea

EUROPEAN MOUNTAIN ASH

Sta 31+80	LT	1 EA

INLET PROTECTION FIBERROLL 6 IN

6	1 Ea
8C	1 Ea
9	1 Ea

SNOWBIRD HAWTHORN

Sta 28+40	LT	1 EA
Sta 28+70	LT	1 EA
Sta 30+05	LT	1 EA
Sta 30+15	LT	1 EA

CANADA RED CHERRY

Sta 30+05	LT	1 EA
Sta 30+55	LT	1 EA

AMUR MAPLE

Sta 29+20	LT	1 EA
Sta 29+50	LT	1 EA

Seeding
Inlet Protection
Fiber Rolls 6IN
Deciduous Tree
Coniferous Tree

N

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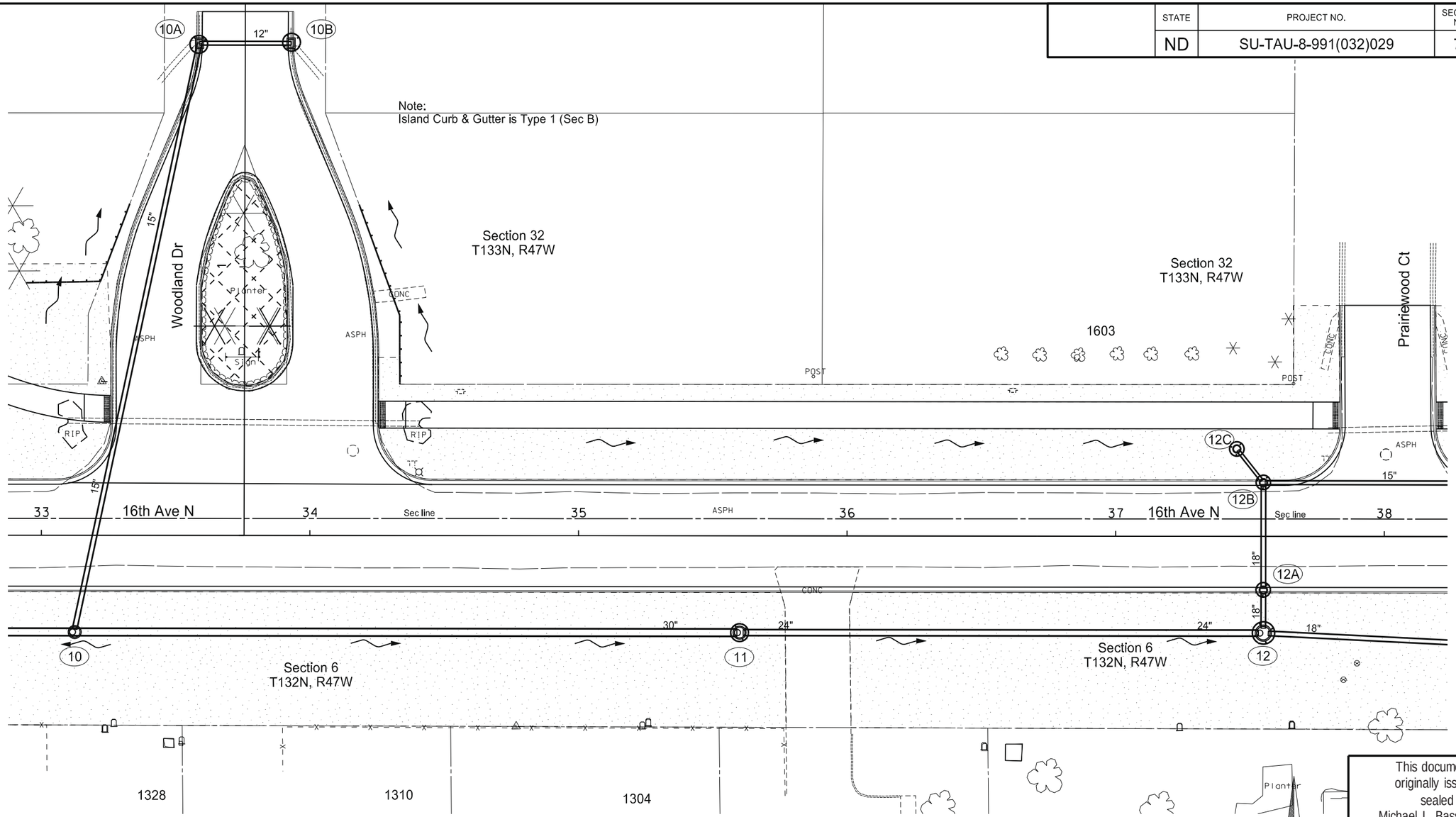
Permanent Erosion Control

& Tree Plantings

Sta 28+00 to 33+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	77	6



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SEEDING CLASS III - HYDRAULIC MULCH

Sta 13+00 to 17+31	LT	0.29 ACRE
Sta 13+00 to 17+31	RT	0.55 ACRE

INLET PROTECTION-SPECIAL

12A & 12B	2 Ea
10A & 10B	2 Ea

INLET PROTECTION FIBERROLL 6 IN

11	1 Ea
12C	1 Ea

DWARF ALBERTA SPRUCE

Sta 33+25	LT	1 EA
Sta 33+85	LT	1 EA

FIBER ROLLS-6 IN

Sta 33+00 to Sta 33+30	LT	55 LF
Sta 34+10 to Sta 34+35	LT	65 LF

WOOD MULCH

Sta 33+80	LT	211 SY

Seeding
Inlet Protection
Fiber Rolls 6IN
Wood Mulch
Deciduous Tree
Coniferous Tree

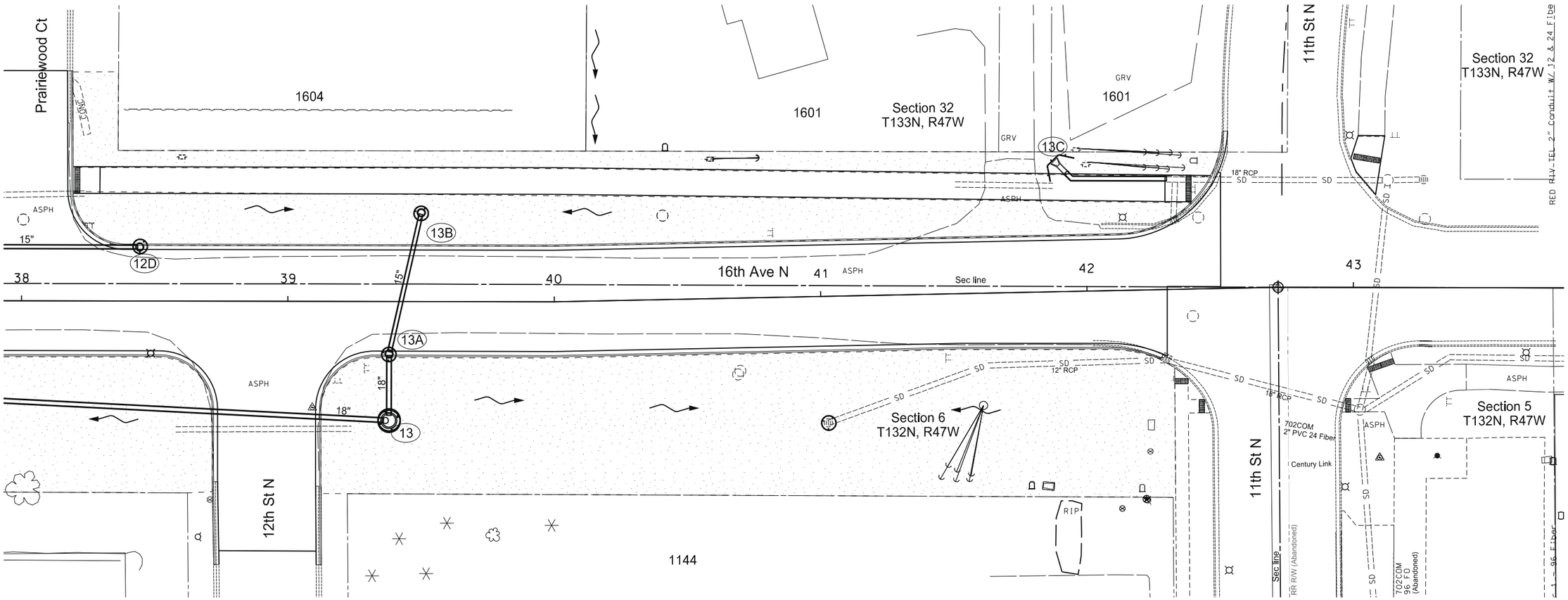
Permanent Erosion Control

& Tree Plantings

Sta 33+00 to 38+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	77	7



SEEDING CLASS III - HYDRAULIC MULCH

Sta 38+00 to 43+00	LT	0.25 ACRE
Sta 38+00 to 43+00	RT	0.48 ACRE

INLET PROTECTION-SPECIAL

13A & 13B	2 Ea
12D	1 Ea

INLET PROTECTION FIBERROLL 6 IN

Existing	1 Ea

FIBER ROLLS-6 IN

Sta 41+80 Lt	15 LF

Seeding

Inlet Protection

Fiber Rolls 6IN

N

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Permenent Erosion Control

& Tree Plantings

Sta 38+00 to Sta 42+71.67

16th Ave N Wahpeton, ND

SURVEY COORDINATE AND CURVE DATA - 16th Avenue North

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Chain ALIGN1 Description			
7001	0+00.00	195,121.52	472,668.62
7002	26+34.56	195,110.17	475,303.16
7003	39+99.97	195,104.46	476,668.56
7004	42+71.71	195,109.33	476,940.25
7005	44+71.71	195,108.48	477,140.25
Chain SUPATH Description:			
9000	8+15.52	195,170.07	473,484.36
9001	17+27.20	195,166.08	474,396.03
9002	18+07.08	195,165.73	474,475.91
9003	22+30.66	195,163.91	474,899.49
Chain WOODLND Description:			
10000	0+00.00	195,107.07	476,044.08
10001	2+50.00	195,357.07	476,045.48

CURVE DATA

ARC DEFINITION

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
NWSEC	5-132-47	195109.329	476940.252
SESEC	32-132-47	195105.067	477937.390
SWSEC	32-133-47	195127.583	472668.598

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	CONTROL POINT DESCRIPTION
21	194436.536	476904.080	968.42	42+23.50	672.04	CP21 CP21
50	195065.005	476577.648	970.91	39+09.23	39.84	CP50 12TH
51	195164.631	475991.300	970.81	33+22.47	-57.34	CP51 ROSEWOOD
52	195189.194	475253.992	967.15	25+85.06	-78.81	CP52 CP52
55	195045.326	476978.315	969.21	43+10.05	63.84	CP20 FH
78	165047.930	474548.613	965.11			CP 78 16TH Ave 18+80.23 65.34' Rt Wahpeton City Coord System #78

NOTES:

Date Survey Completed 2/24/14

☐ Assumed Coordinates

☒ All coordinates on this sheet are Wahpeton City Coordinate System ground coordinates. They are derived from the NAD83(Opus) reference frame; Minnesota Wilkin County, Combination Factor (cf) = 1.0000000

All coordinates and measurements on this document derived from the US Foot definition.

INITIALIZING BENCH MARK

☒ NAVD-88
☐ NGVD-29
☐ GEOID 09 ☐ _____
☒ GEOID 03

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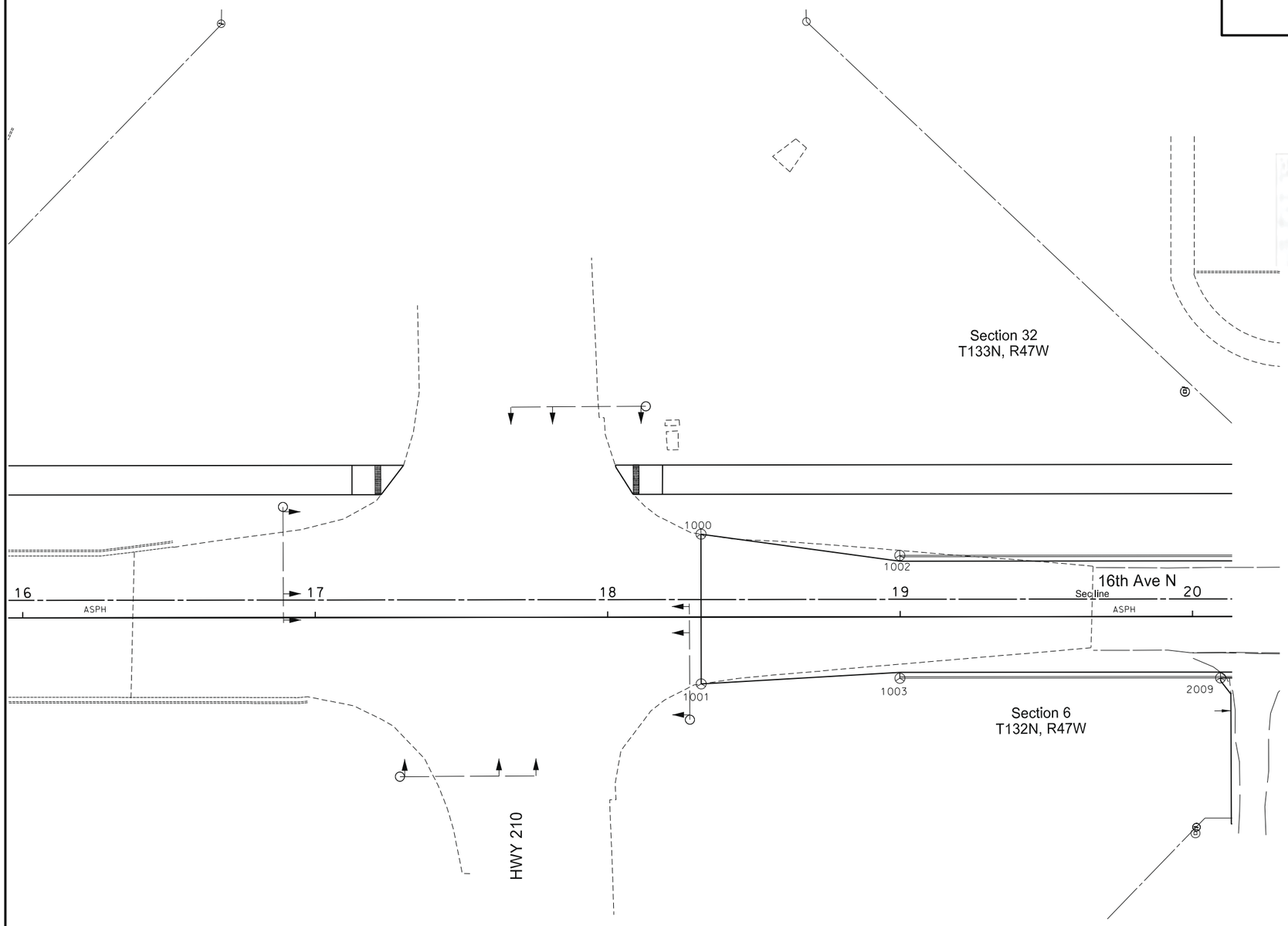
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	1



POINT	NORTH	EAST	STATION	OFFSET
1000	195141.9823	474500.6757	18+31.95	-28.36
1001	195090.8015	474500.4553	18+31.95	22.83
1002	195134.3345	474568.6024	18+99.91	-21.00
1003	195092.3349	474568.4215	18+99.91	21.00

N

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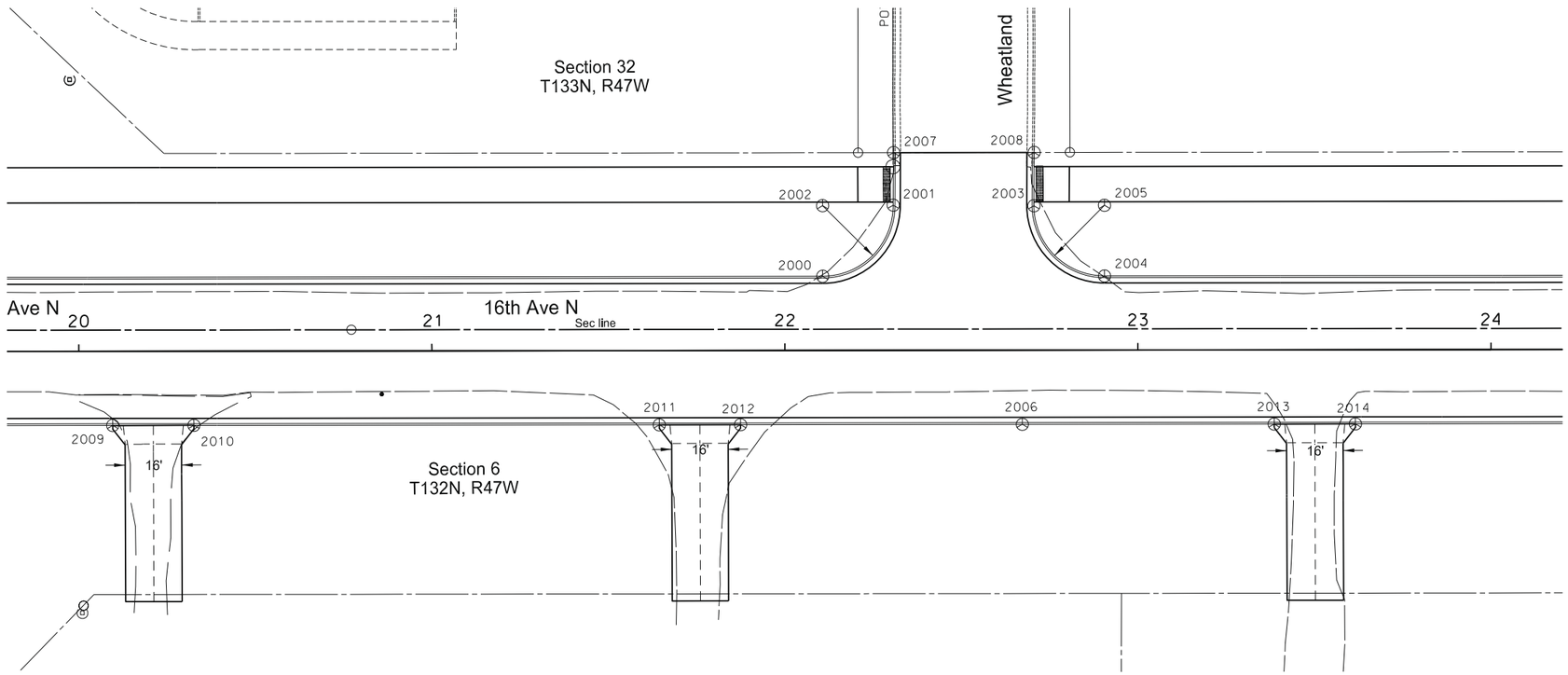
Survey Data

Sta 16+00 to 20+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	2



POINT	NORTH	EAST	STATION	OFFSET
2000	195132.996	474879.4161	22+10.73	-21.00
2001	195153.0206	474899.5022	22+30.73	-41.11
2002	195152.9958	474879.5022	22+10.73	-41.00
2003	195152.6272	474939.355	22+70.58	-40.89
2004	195132.6522	474959.2689	22+90.58	-21.00
2005	195152.652	474959.355	22+90.58	-41.00
2006	195090.753	474935.7459	22+67.24	21.00
2007	195167.9026	474899.6888	22+30.85	-55.99
2008	195167.7317	474939.511	22+70.67	-55.99
2009	195091.8627	474678.0742	20+09.56	21.00
2010	195091.7636	474701.074	20+32.56	21.00
2011	195091.1959	474832.9168	21+64.41	21.00
2012	195091.0968	474855.9166	21+87.41	21.00
2013	195090.4458	475007.0855	23+38.58	21.00
2014	195090.3468	475030.0853	23+61.58	21.00

N

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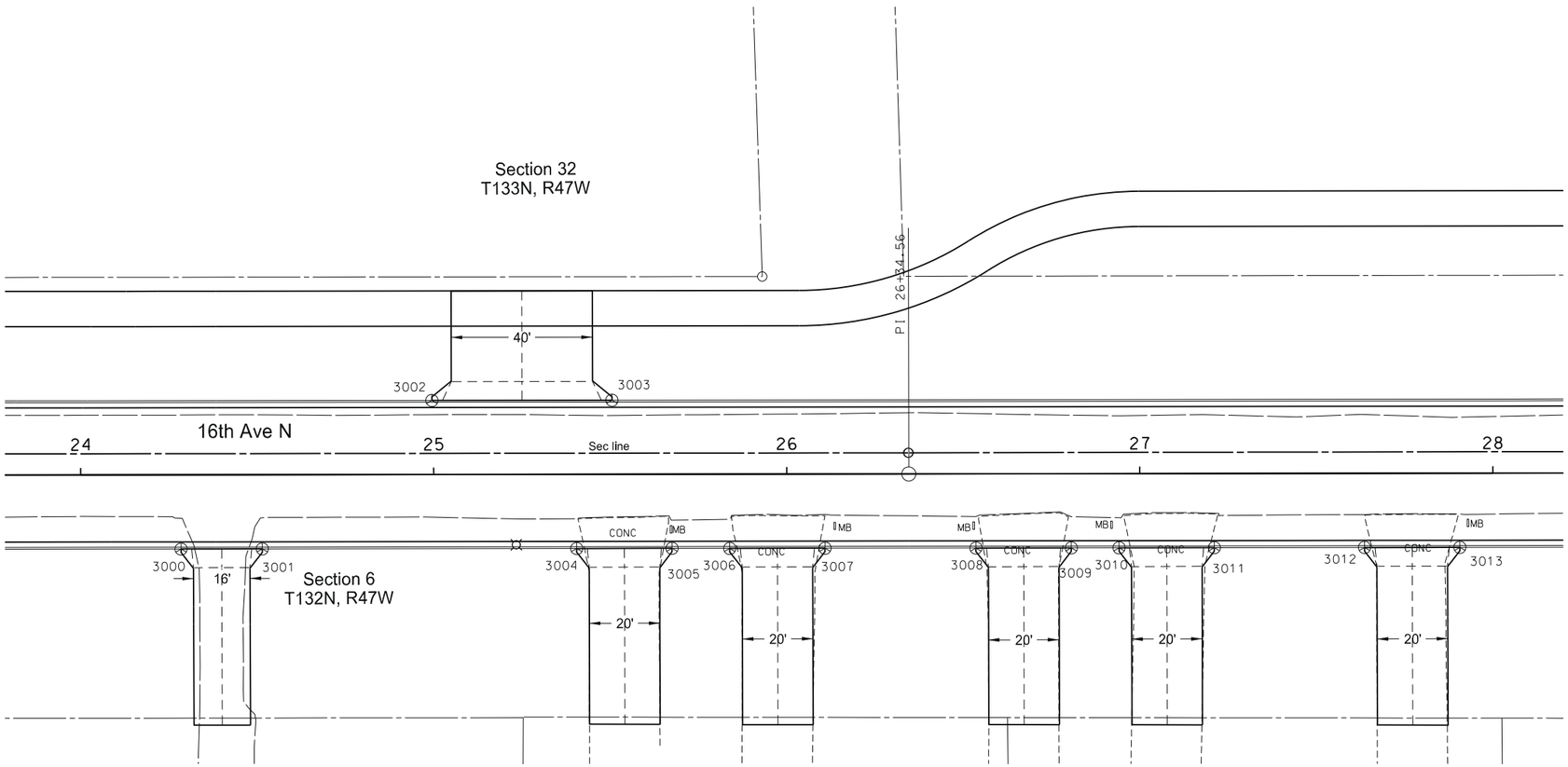
Removal Layouts

Sta 20+00 to 24+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	3



POINT	NORTH	EAST	STATION	OFFSET
3000	195090.059	475096.9127	24+28.41	21.00
3001	195089.9599	475119.9125	24+51.41	21.00
3002	195131.7525	475168.1873	24+99.50	-21.00
3003	195131.5329	475219.1868	25+50.50	-21.00
3004	195089.5764	475208.9835	25+40.48	21.00
3005	195089.4601	475235.9833	25+67.48	21.00
3006	195089.3897	475252.327	25+83.82	21.00
3007	195089.2734	475279.3268	26+10.82	21.00
3008	195089.0918	475322.0764	26+53.57	21.00
3009	195088.9789	475349.0762	26+80.57	21.00
3010	195088.9224	475362.5957	26+94.09	21.00
3011	195088.8096	475389.5955	27+21.09	21.00
3012	195088.6318	475432.1299	27+63.62	21.00
3013	195088.519	475459.1297	27+90.62	21.00

N

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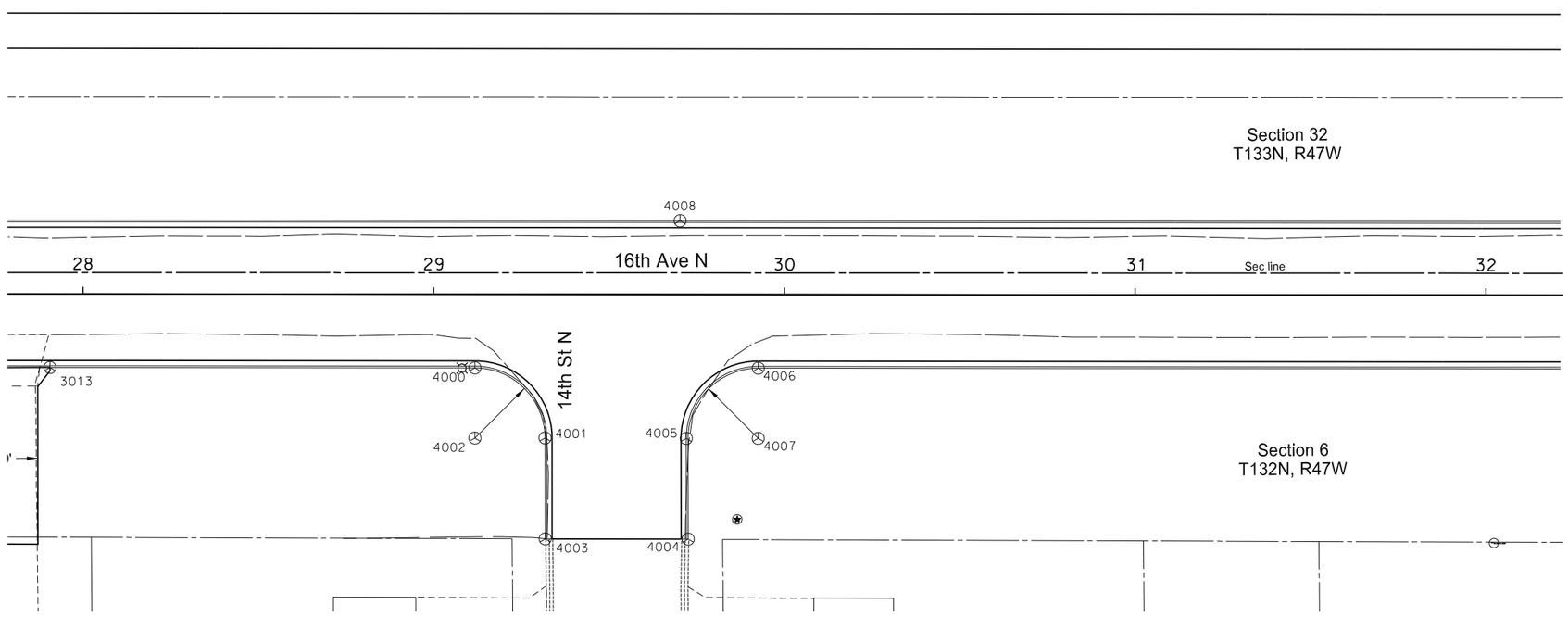
Removal Layouts

Sta 24+00 to 28+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	4



POINT	NORTH	EAST	STATION	OFFSET
4000	195088.0125	475580.3043	29+11.80	21.00
4001	195067.9748	475600.2207	29+31.80	40.95
4002	195068.0127	475580.2207	29+11.80	41.00
4003	195039.2155	475600.1661	29+31.86	69.71
4004	195039.036	475640.9173	29+72.62	69.72
4005	195067.7224	475640.985	29+72.56	41.04
4006	195087.675	475661.0686	29+92.56	21.00
4007	195067.6752	475660.985	29+92.56	41.00
4008	195129.768	475638.9085	29+70.23	-21.00

N

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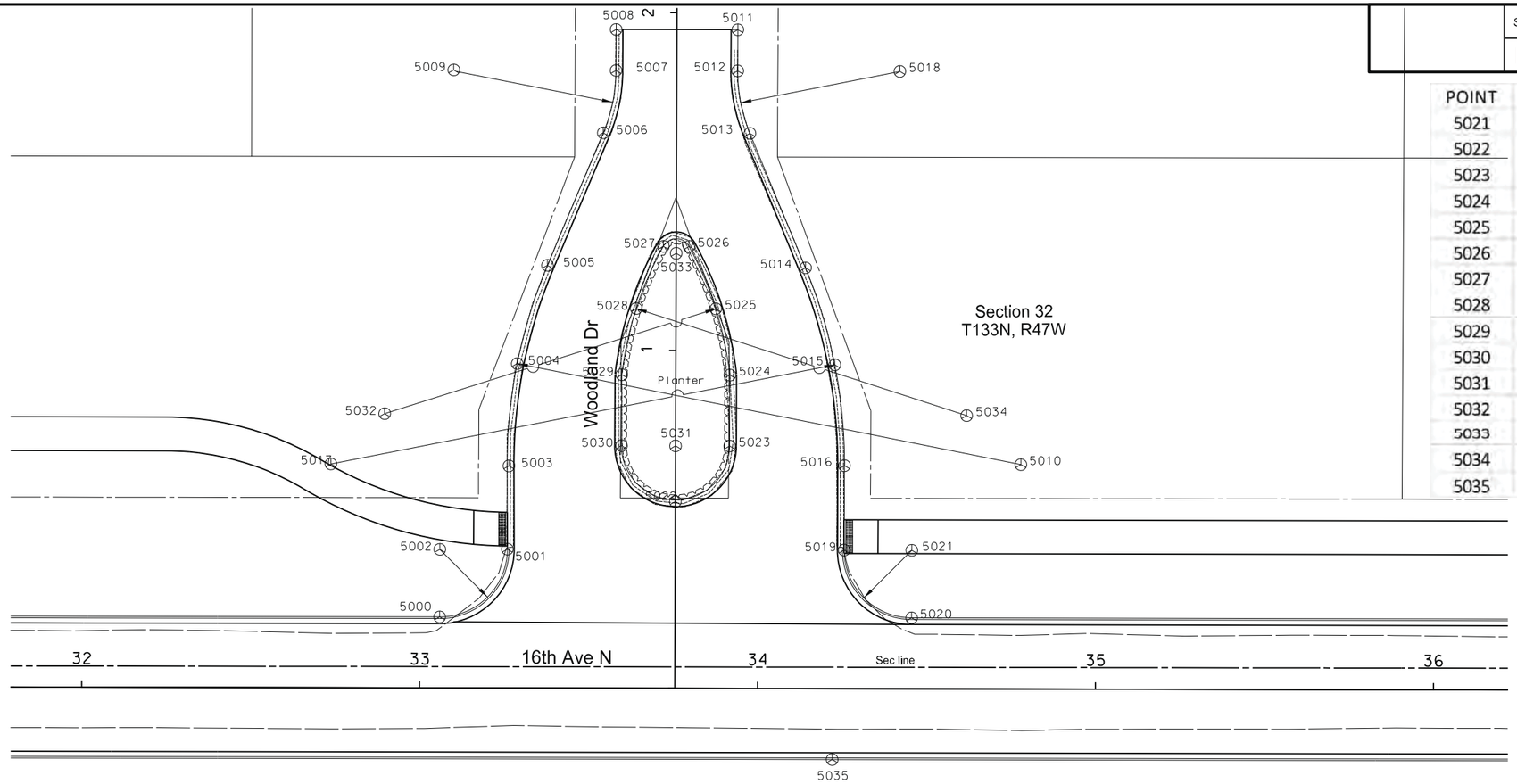
Removal Layouts

Sta 28+00 to 32+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	5



POINT	NORTH	EAST	STATION	OFFSET
5021	195147.7812	476114.319	34+45.56	-41.00
5022	195162.8444	476044.3965	33+75.57	-55.77
5023	195178.7546	476060.4858	33+91.60	-71.75
5024	195199.7543	476060.6034	33+91.63	-92.75
5025	195219.3999	476056.4815	33+87.42	-112.38
5026	195237.8695	476048.6194	33+79.48	-130.81
5027	195237.9121	476041.0138	33+71.88	-130.82
5028	195219.5316	476032.9455	33+63.89	-112.41
5029	195199.9334	476028.6039	33+59.63	-92.79
5030	195178.9337	476028.4863	33+59.60	-71.79
5031	195178.8442	476044.4861	33+75.60	-71.77
5032	195188.5739	475958.4385	32+89.51	-81.14
5033	195235.8316	476044.8051	33+75.68	-128.76
5034	195187.6098	476130.6372	34+61.71	-80.90
5035	195085.8798	476090.6169	34+22.12	21.00

Section 6
T132N, R47W

POINT	NORTH	EAST	STATION	OFFSET
5000	195128.3651	475974.5711	33+05.89	-21.00
5001	195148.3684	475994.6547	33+25.89	-41.09
5002	195148.3649	475974.6547	33+05.89	-41.00
5003	195173.0278	475994.6505	33+25.79	-65.75
5004	195203.3013	475997.6904	33+28.70	-96.03
5005	195232.3629	476006.6989	33+37.59	-125.13
5006	195271.5464	476023.3041	33+54.03	-164.38
5007	195290.0068	476027.1081	33+57.75	-182.86
5008	195302.1496	476027.1761	33+57.77	-195.00
5009	195290.2755	475979.1089	33+09.75	-182.93
5010	195173.054	476146.6505	34+77.78	-66.41

POINT	NORTH	EAST	STATION	OFFSET
5011	195301.9935	476063.1758	33+93.77	-195.00
5012	195289.8052	476063.1075	33+93.75	-182.81
5013	195271.3034	476066.7046	33+97.43	-164.32
5014	195231.4536	476083.0684	34+13.96	-124.54
5015	195202.7236	476091.6678	34+22.68	-95.85
5016	195172.8644	476094.4591	34+25.59	-66.00
5017	195173.7154	475942.4615	32+73.59	-66.22
5018	195289.5365	476111.1068	34+41.75	-182.74
5019	195147.8932	476094.3193	34+25.56	-41.03
5020	195127.7814	476114.2354	34+45.56	-21.00

N

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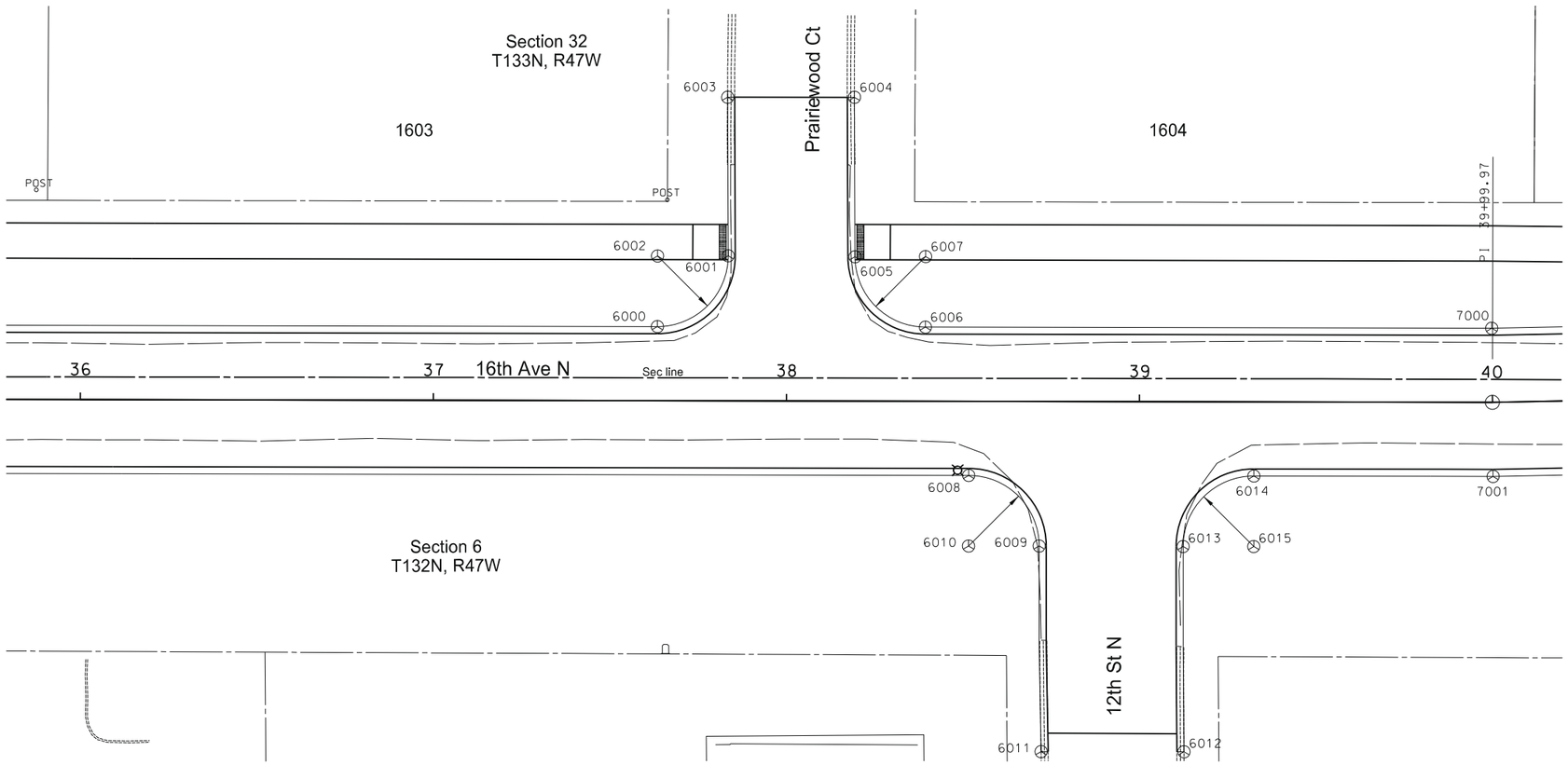
Removal Layouts

Sta 32+00 to 36+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	6



POINT	NORTH	EAST	STATION	OFFSET
6000	195126.453	476432.084	37+63.41	-21.00
6001	195146.467	476452.1676	37+83.41	-41.10
6002	195146.4528	476432.1676	37+63.41	-41.00
6003	195191.4087	476452.1357	37+83.19	-86.04
6004	195191.3024	476488.042	38+19.10	-86.08
6005	195146.1132	476488.0923	38+19.34	-40.89
6006	195126.1357	476508.0087	38+39.34	-21.00
6007	195146.1355	476508.0923	38+39.34	-41.00
6008	195084.0345	476520.1652	38+51.67	21.00
6009	195064.0137	476540.0816	38+71.67	40.96
6010	195064.0347	476520.0816	38+51.67	41.00
6011	195005.773	476540.499	38+72.33	99.23
6012	195005.6472	476580.9776	39+12.81	99.18
6013	195063.7366	476580.8632	39+12.45	41.03
6014	195083.7169	476600.9467	39+32.45	21.00
6015	195063.7171	476600.8631	39+32.45	41.00

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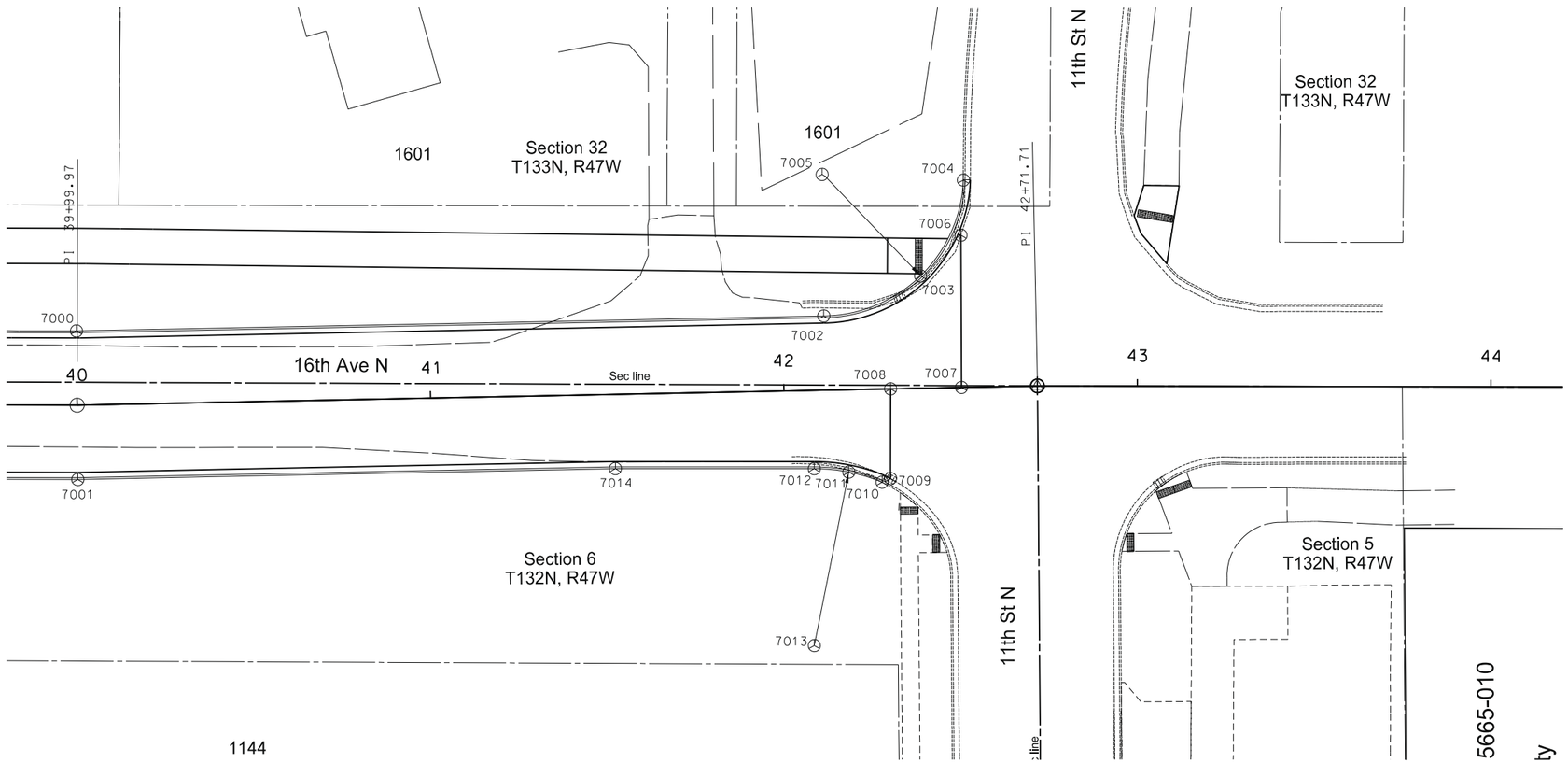
Removal Layouts

Sta 36+00 to 40+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	7



POINT	NORTH	EAST	STATION	OFFSET
7000	195125.4653	476668.4145	39+99.74	-21.00
7001	195083.4637	476668.7027	39+99.97	21.00
7002	195129.2507	476879.8368	42+11.66	-21.00
7003	195140.4993	476907.2816	42+39.30	-31.76
7004	195167.5558	476919.4347	42+51.94	-58.59
7005	195169.249	476879.4705	42+12.01	-61.00
7006	195151.9808	476918.7211	42+50.95	-43.03
7007	195108.9442	476918.7604	42+50.22	0.00
7008	195108.5851	476898.704	42+30.16	0.00
7009	195083.2074	476898.636	42+29.63	25.37
7010	195082.189	476896.2496	42+27.23	26.35
7011	195085.0719	476886.8488	42+17.88	23.30
7012	195086.0607	476877.0658	42+08.12	22.13
7013	195036.0608	476876.9538	42+07.11	72.12
7014	195086.1857	476820.7898	41+51.85	21.00

N

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Removal Layouts

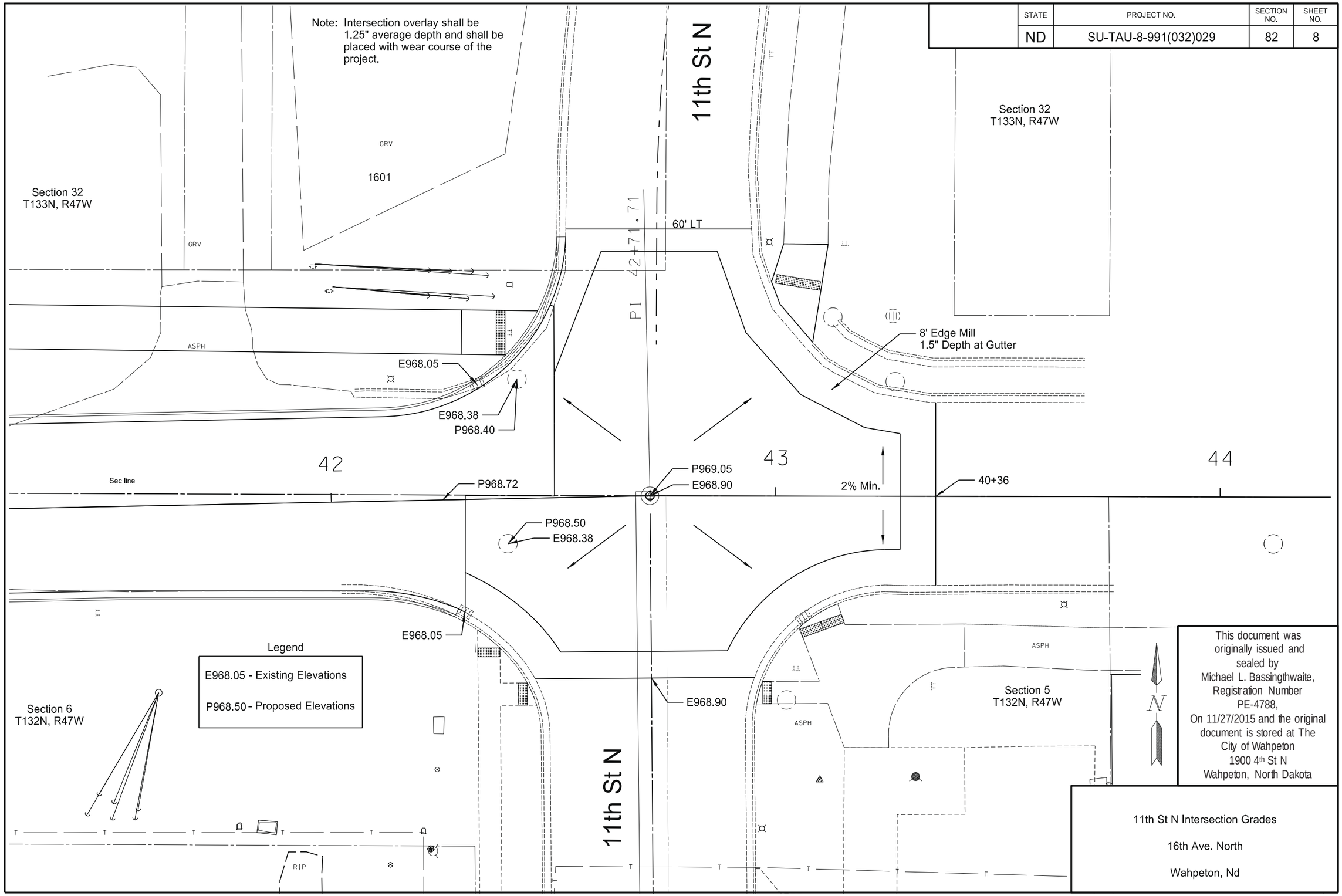
Sta 40+00 to 42+71.68

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	82	8

Note: Intersection overlay shall be 1.25" average depth and shall be placed with wear course of the project.



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11th St N Intersection Grades

16th Ave. North

Wahpeton, Nd

3:29:21 PM Shelley.Terfehr Q:\2012\W12s\W1200157\CADD\Design\Sheets\Section_82\082LO_008_11th.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	48"x24"	END ROAD WORK		19	
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		37	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	**24"x12"**	**DETOUR (Mounted on route marker post)**	**5**	**7**	**35**
M4-9-30	**30"x24"**	**DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT**	**5**	**15**	**75**
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	**21"x15"**	**ARROW AHD (Mounted on route marker post)**	**5**	**7**	**35**
R1-1-48	**48"x48"**	**STOP**	**3**	**32**	**96**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**3**	**5**	**15**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1a-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	**48"x30"**	**STREET CLOSED**	**18**	**28**	**504**
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	**60"x30"**	**STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY**	**2**	**31**	**62**
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	**48"x48"**	**STOP AHEAD SYMBOL**	**2**	**35**	**70**
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**3**	**35**	**105**
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT.**	**4**	**35**	**140**
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	48"x48"	ROAD WORK AHEAD or _FT or _ MILE		35	
W20-2-48	**48"x48"**	**DETOUR AHEAD or __ FT**	**4**	**35**	**140**
W20-3-48	**48"x48"**	**ROAD or STREET CLOSED AHEAD or __ FT.**	**4**	**35**	**140**
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.		35	
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**3**	**35**	**105**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1a-48	**48"x48"**	**WORKERS SYMBOL**	**3**	**35**	**105**
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	**48"x48"**	**SHOULDER WORK**	**3**	**35**	**105**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
M4-8a-48	**48"x24"**	**END DETOUR**	**2**	**19**	**38**
W16-2-30	**30"x18"**	**___ FEET**	**3**	**18**	**54**

SPECIAL SIGNS

Consign	**29"x36"**	**BUISNESS SIGN**	**4**	**23**	**92**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1916**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**80**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**65**
704-1060	**DELINEATOR DRUMS**	**EACH**	**40**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**40**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-1185	PILOT CAR	MHR	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-1500	OBLITERATION OF PVMT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

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

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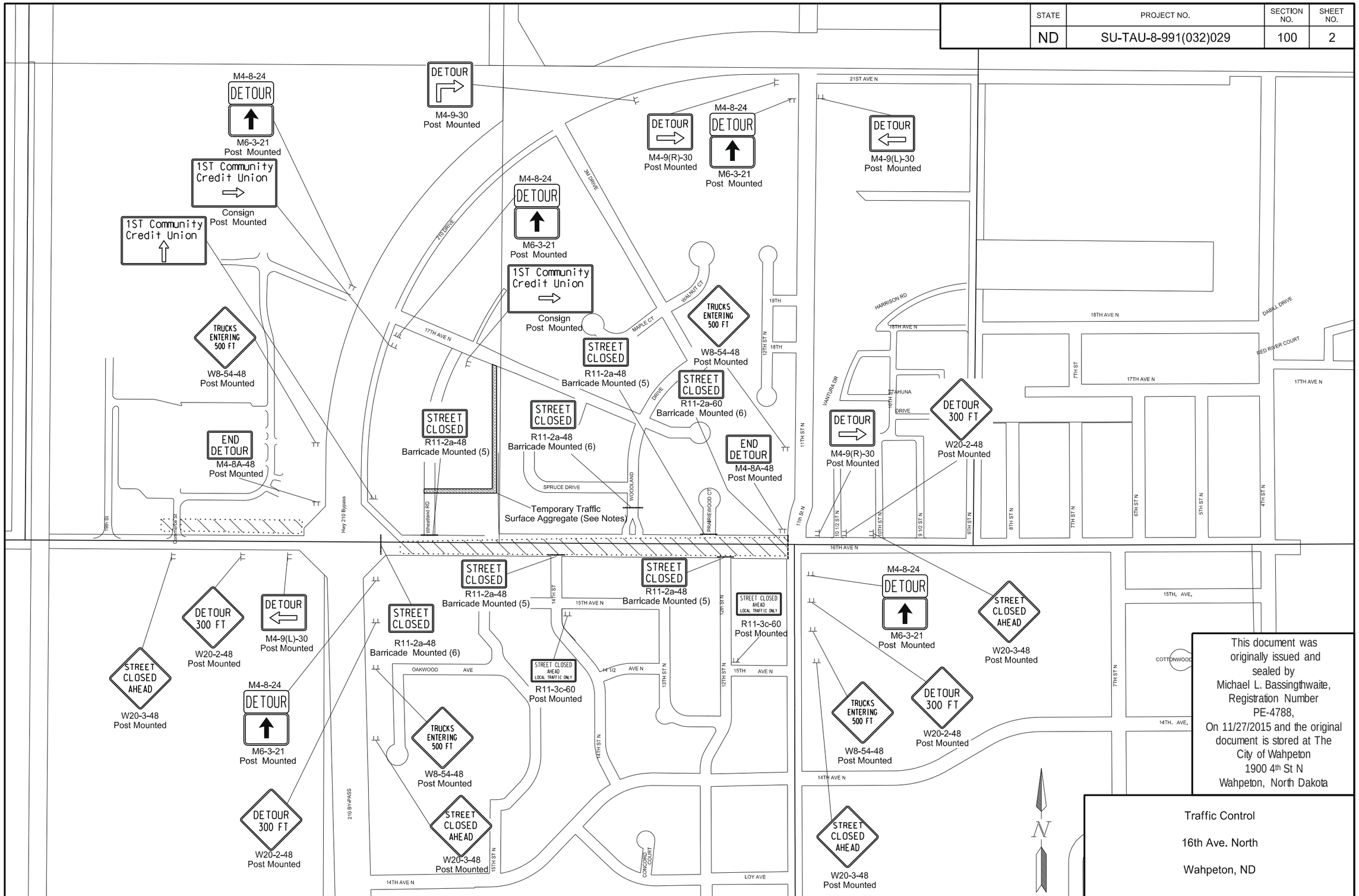
Traffic Control Devices List

SU-TAU-8-991(032)029

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	100	2



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Traffic Control

16th Ave. North

Wahpeton, ND

3:29:25 PM Shelley.Terfehr Q:\2012\W12s\W1200157\CADD\Design\Sheets\Section_100\CONSIGN_100WZ_002_CS.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	100	3

Suitable vehicle access shall be maintained. Coordinate with engineer and property owner. Temporary traffic surface aggregate and tubular markers have been provided for this purpose in the estimated quantities.

Type III Barricade

Note: Turn lane shall be closed when path is under active construction only.

Commerce St

Hwy 210 Bypass

First Community Credit Union

16th Ave N

Delineator Drums

WALMART

Consign
Post Mounted

Note: Access shall be maintained to Commerce Street at all times. Quantities for tubular markers, and delineator drums have been provided in the estimated quantities to provide suitable access for motor vehicles. Access locations and details shall be coordinated with the engineer.

SHOULDER WORK

W21-5-48
Post Mounted

1537

STREET CLOSED

R11-2a-48
2- Type III Barricade

N

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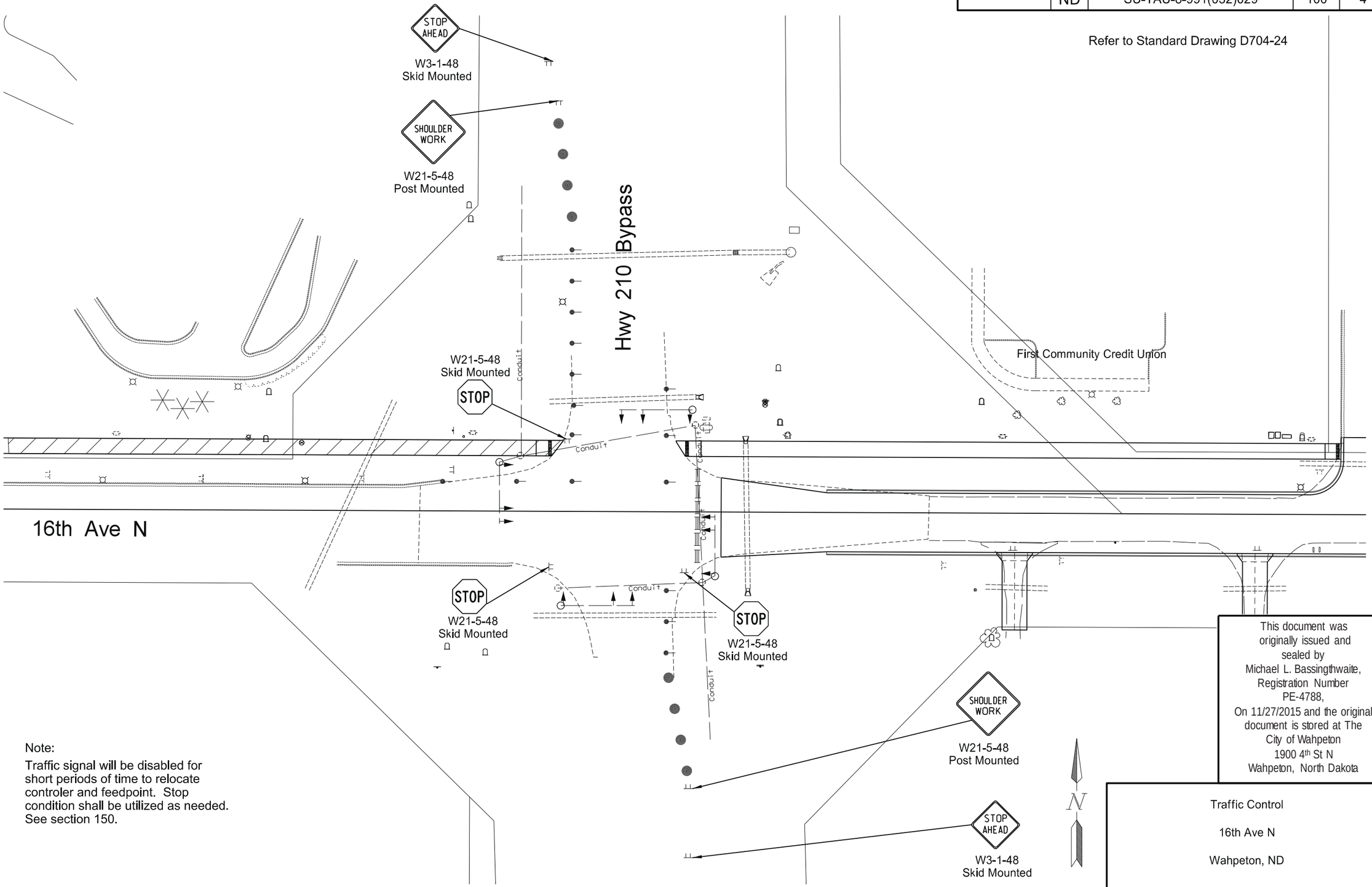
Traffic Control

16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	100	4

Refer to Standard Drawing D704-24



Note:

Traffic signal will be disabled for short periods of time to relocate controler and feedpoint. Stop condition shall be utilized as needed. See section 150.

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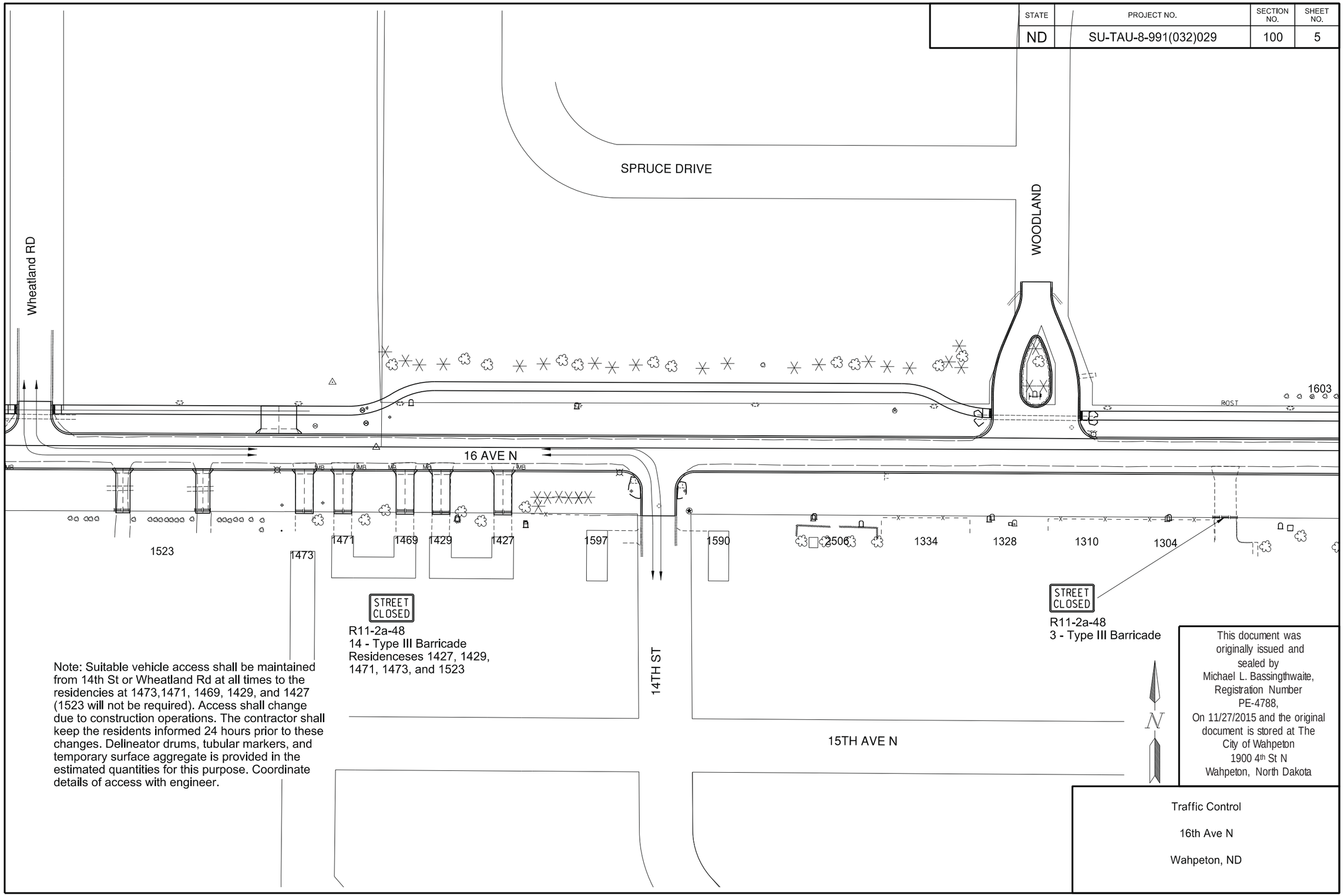
Traffic Control

16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	100	5



Note: Suitable vehicle access shall be maintained from 14th St or Wheatland Rd at all times to the residencies at 1473,1471, 1469, 1429, and 1427 (1523 will not be required). Access shall change due to construction operations. The contractor shall keep the residents informed 24 hours prior to these changes. Delineator drums, tubular markers, and temporary surface aggregate is provided in the estimated quantities for this purpose. Coordinate details of access with engineer.

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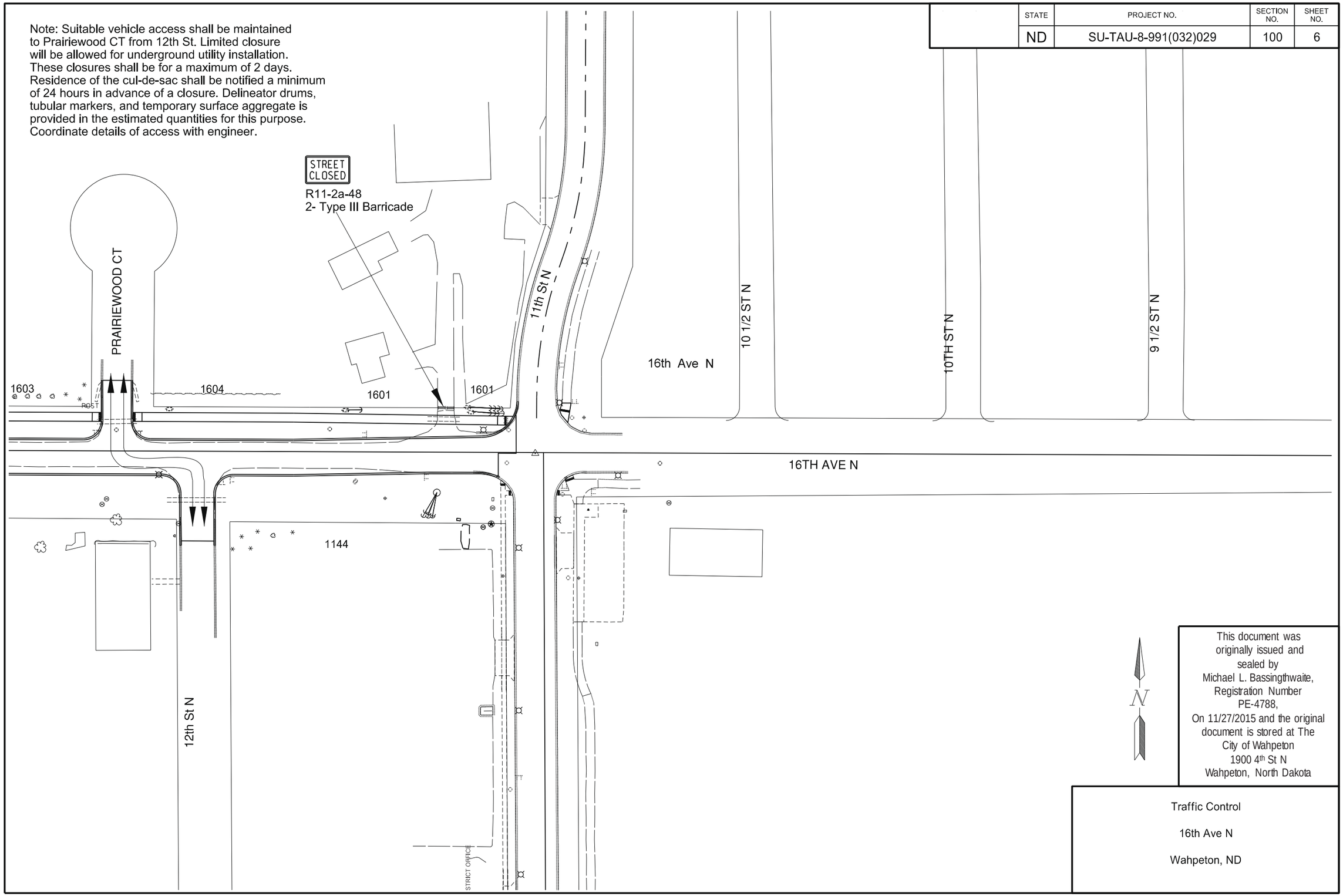
Traffic Control

16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	100	6

Note: Suitable vehicle access shall be maintained to Prairiewood CT from 12th St. Limited closure will be allowed for underground utility installation. These closures shall be for a maximum of 2 days. Residence of the cul-de-sac shall be notified a minimum of 24 hours in advance of a closure. Delineator drums, tubular markers, and temporary surface aggregate is provided in the estimated quantities for this purpose. Coordinate details of access with engineer.



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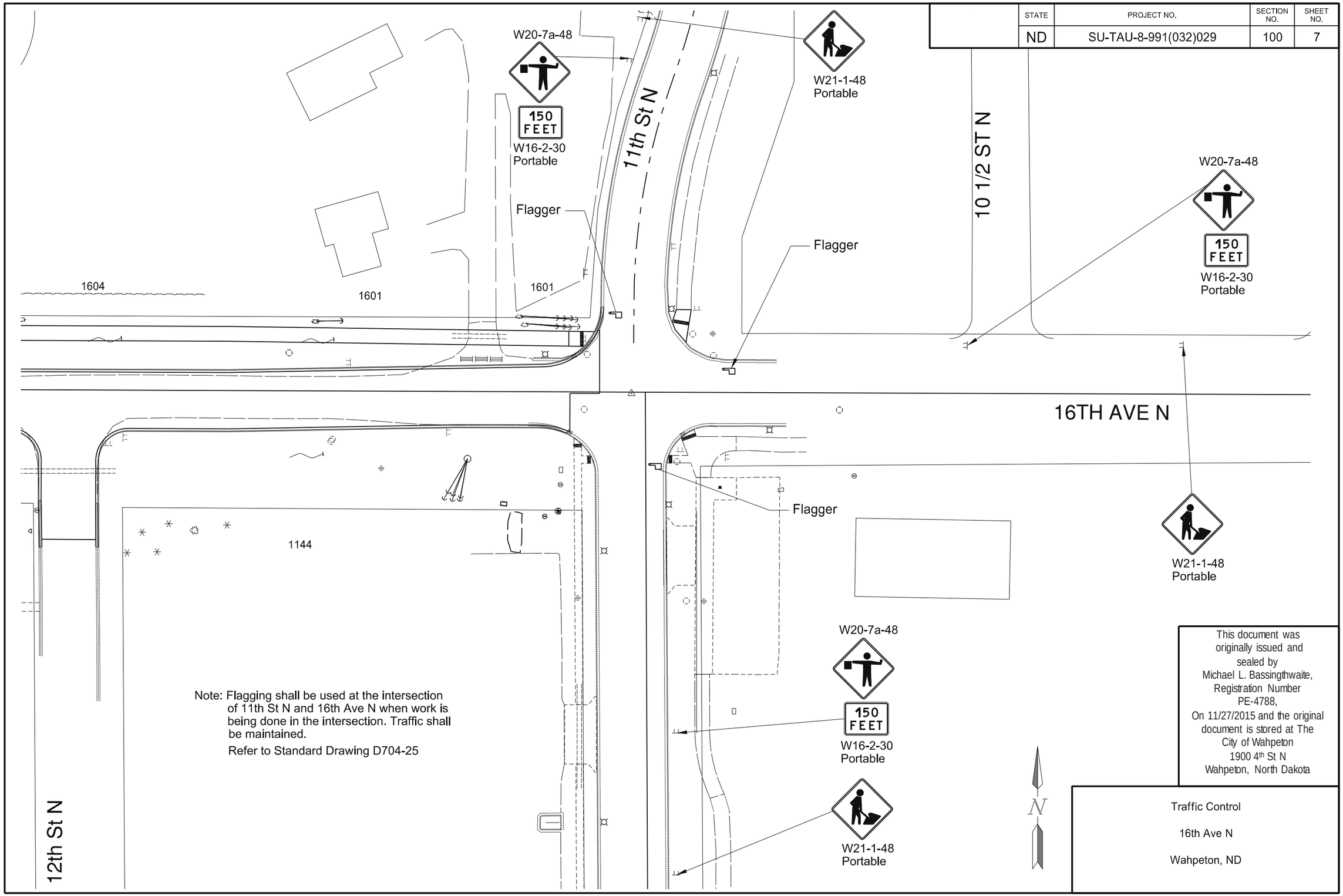
Traffic Control

16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	100	7



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Traffic Control

16th Ave N

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SU-TAU-8-991(032)029	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	Sign Support Length 2nd LF	Sign Support Length 3rd LF	Sign Support Length 4th LF	Support Size	Max Post Len LF	Sleeve Length 1st LF	Sleeve Length 2nd LF	Sleeve Length 3rd LF	Sleeve Length 4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
8+17 Lt									2 x 2 12 ga										1	2		Special Assembly 3E
8+75 Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				
16+89 Lt	7		16.0																			Mount on Mast Arm
17+15 Lt		100		1.9	6.7				2 x 2 12 ga	21.4						1	4	2.25 x 2.25 12 ga				
17+29 Rt	7		16.0																			Mount on Mast Arm
18+13 Lt		100		1.9	6.7				2 x 2 12 ga	21.4						1	4	2.25 x 2.25 12 ga				
18+14 Lt	7		16.0																			Mount on Mast Arm
18+28 Rt	7		16.0																			Mount on Mast Arm
19+00 Rt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
19+78 Rt		10		7.5	10.7				2.5 x 2.5 12 ga	13.3						1	4	3 x 3 7 ga				
20+53 Rt		14		4.0	9.2				2 x 2 12 ga	13.0						1	4	2.25 x 2.25 12 ga				
20+60 Lt		7		1.5																		Mount on Light Standard
21+28 Rt		9		5.0	9.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
22+20 Lt		2		7.5	9.7				2.5 x 2.5 12 ga	12.1						1	4	3 x 3 7 ga				
22+25 Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				
22+81 Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				
22+81. Lt	1,2		13.6		8.7				2.25 x 2.25 12 ga	10.1						1	4	2.5 x 2.5 12 ga				
23+00 Rt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
24+50 Lt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
27+20 Rt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
28+15 Lt		7		1.5																		Mount on Light Standard
29+76 Rt	1, 3		11.2	7.5	11.2				2.5 x 2.5 10 ga	12.7	2.9				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga			1	Special Assembly 4E
30+50 Rt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
31+30 Lt		9		5.0																		Mount on Light Standard
31+76 Rt		9		5.0	9.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
32+85 Lt		7		1.5																		Mount on Light Standard
33+19 Lt		2		7.5	9.7				2.5 x 2.5 12 ga	12.1						1	4	3 x 3 7 ga				
33+19. Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				
34+30 Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				
34+35 Lt	1, 4		13.6		8.7				2.25 x 2.25 12 ga	10.1						1	4	2.5 x 2.5 12 ga				Special Assembly 4
35+00 Rt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
36+50 Lt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
37+79 Lt		2		7.5	9.7				2.5 x 2.5 12 ga	12.1						1	4	3 x 3 7 ga				
37+79. Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated
using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"
Rural Roadway - 60"
Bike route - 60"

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Sign Summary
Perforated Tube

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SU-TAU-8-991(032)029	110	2

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	Sign Support Length 2nd LF	Sign Support Length 3rd LF	Sign Support Length 4th LF	Support Size	Max Post Len LF	Sleeve Length 1st LF	Sleeve Length 2nd LF	Sleeve Length 3rd LF	Sleeve Length 4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
38+20 Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				
38+28 Lt	1, 5		14.2		8.4				2.5 x 2.5 12 ga	11.0	1.9				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	Special Assembly 4
38+48 Rt		7							2 x 2 12 ga										1	1		
39+00 Lt		9		5.0																		Mount on Light Standard
39+19 Rt	1, 6		11.2	7.5	11.2				2.5 x 2.5 10 ga	12.7	2.9				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga			1	Special Assembly 4E
39+75 Rt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
39+91 Lt		7		1.5	8.7				2 x 2 12 ga	25.5						1	4	2.25 x 2.25 12 ga				
40+55 Lt		14		4.0																		Mount on Light Standard
41+41 Lt		10		7.5	10.7				2.5 x 2.5 12 ga	13.3						1	4	3 x 3 7 ga				
41+47 Rt		7							2 x 2 12 ga										1	1		
41+74 Rt		15							2 x 2 12 ga										1	1		
42+30 Lt		101		1.0	6.5				2 x 2 12 ga	32.3						1	4	2.25 x 2.25 12 ga				
42+41 Lt									2 x 2 12 ga										1	2		
Sub Total			127.8	110.3		**Total**	270.0									**Total**	128		5	7	3	
Grand Total			127.8	110.3		**Total**	270.0									**Total**	128		5	7	3	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated
using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"
Rural Roadway - 60"
Bike route - 60"

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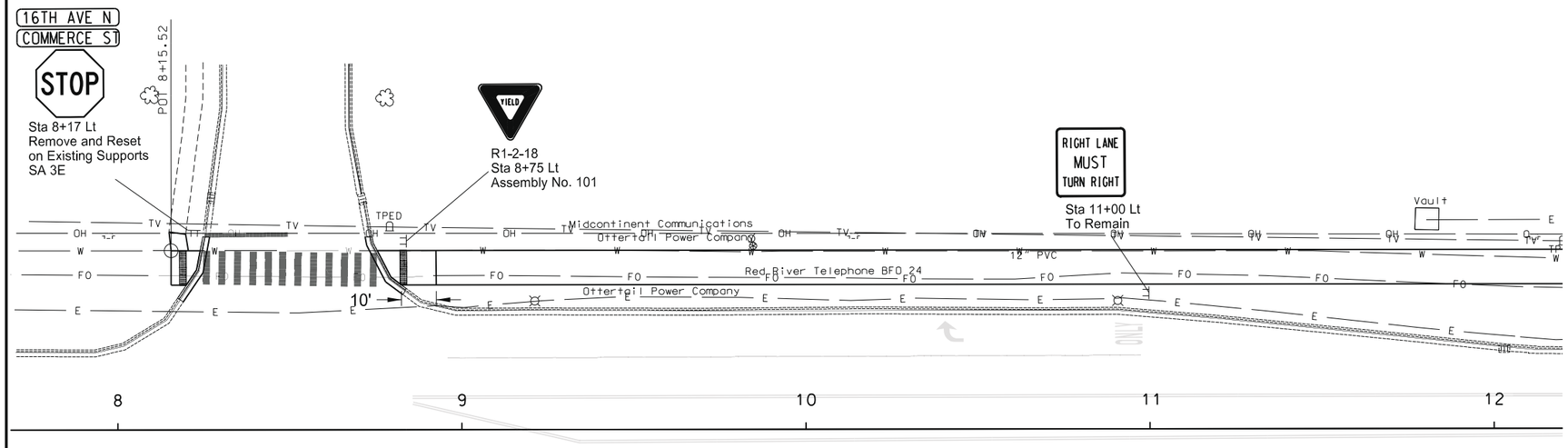
Sign Summary
Perforated Tube

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	3



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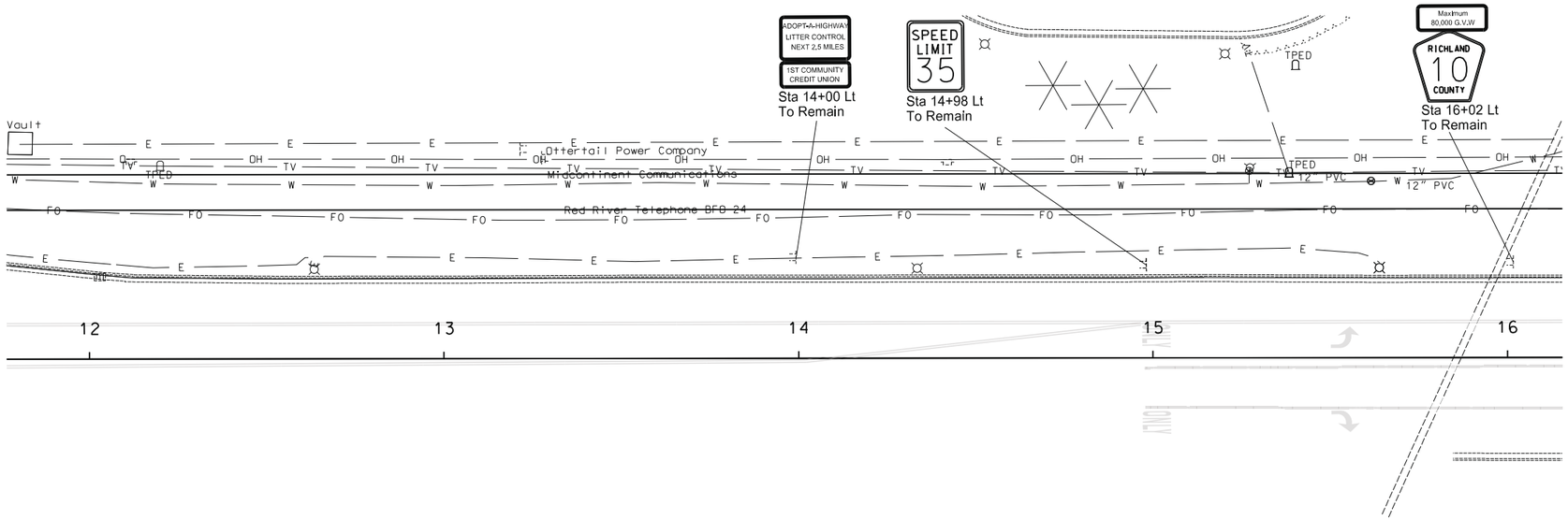
Signing Layout

Sta 8+00 to 12+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	4



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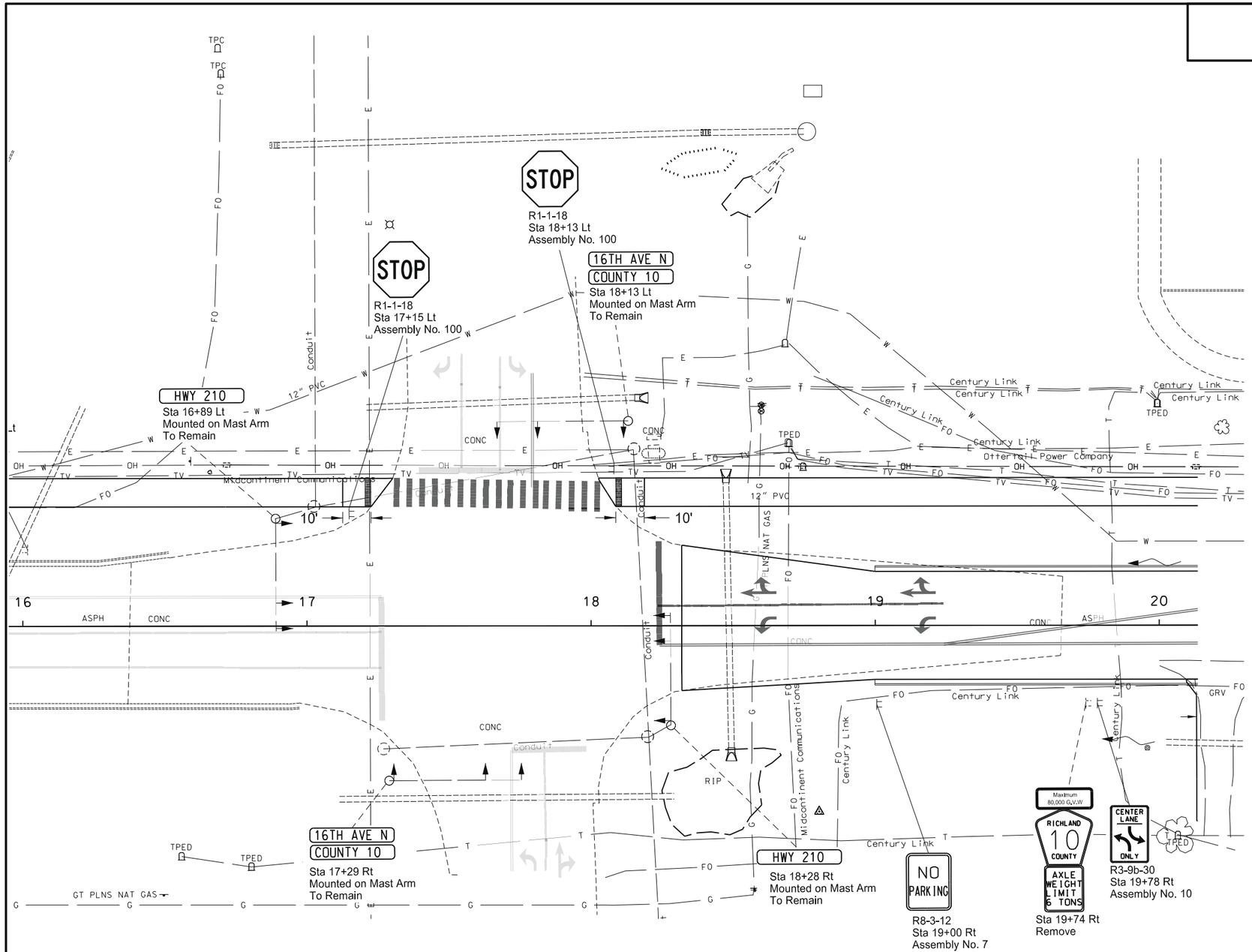
Sign Layouts

Sta 12+00 to 16+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	5



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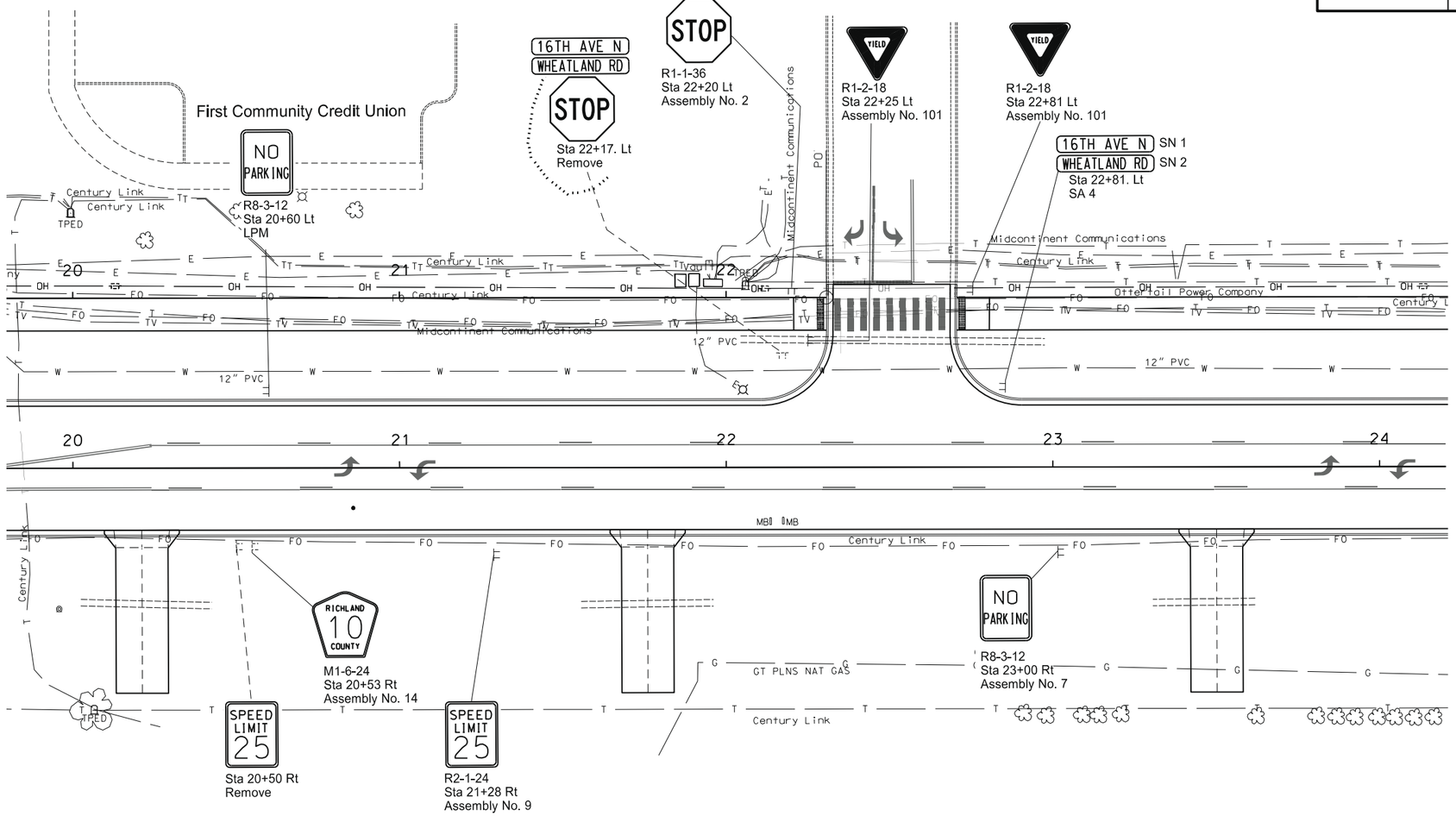
Sign Layouts

Sta 16+00 to 20+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	6



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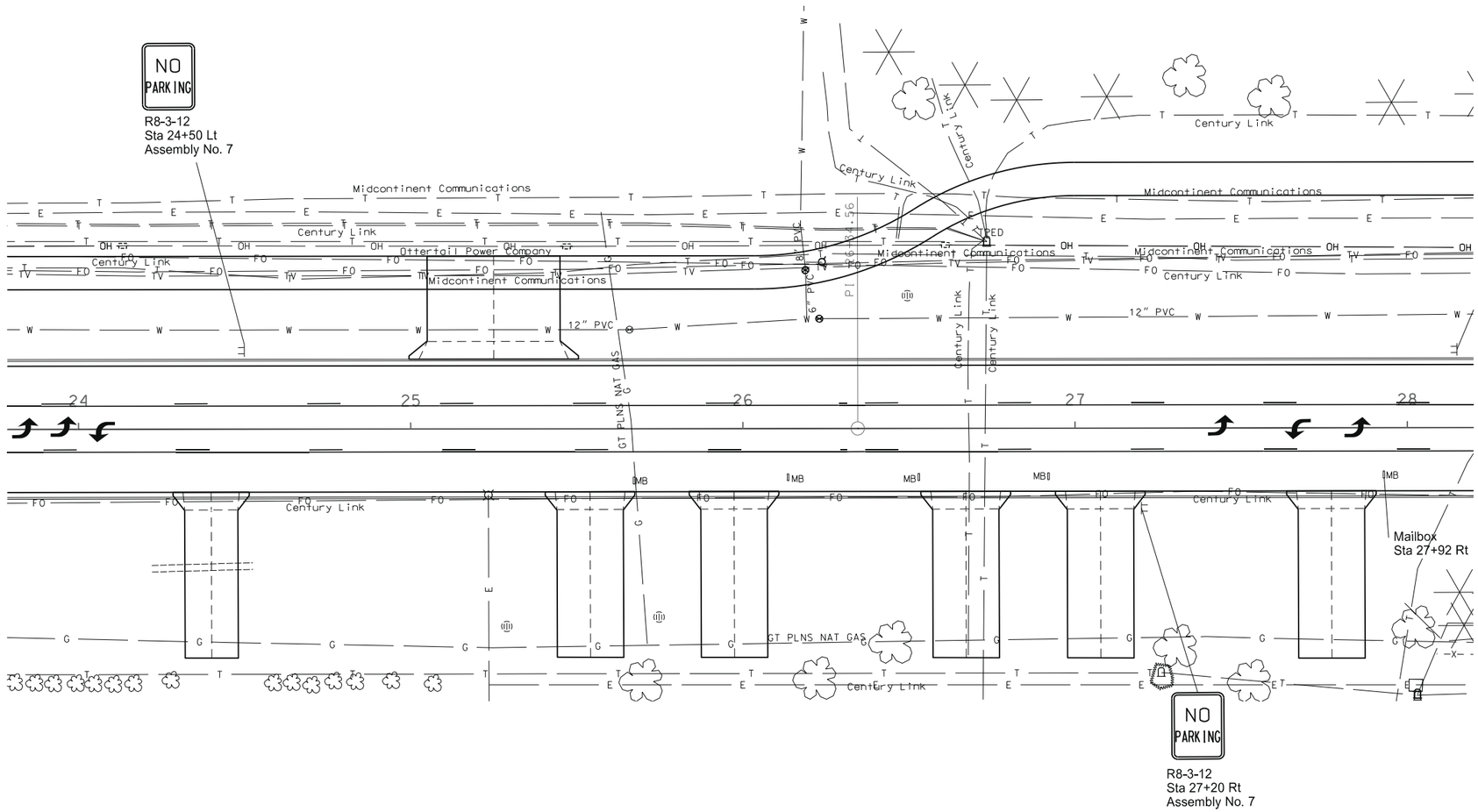
Signing Layouts

Sta 20+00 to 24+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	7



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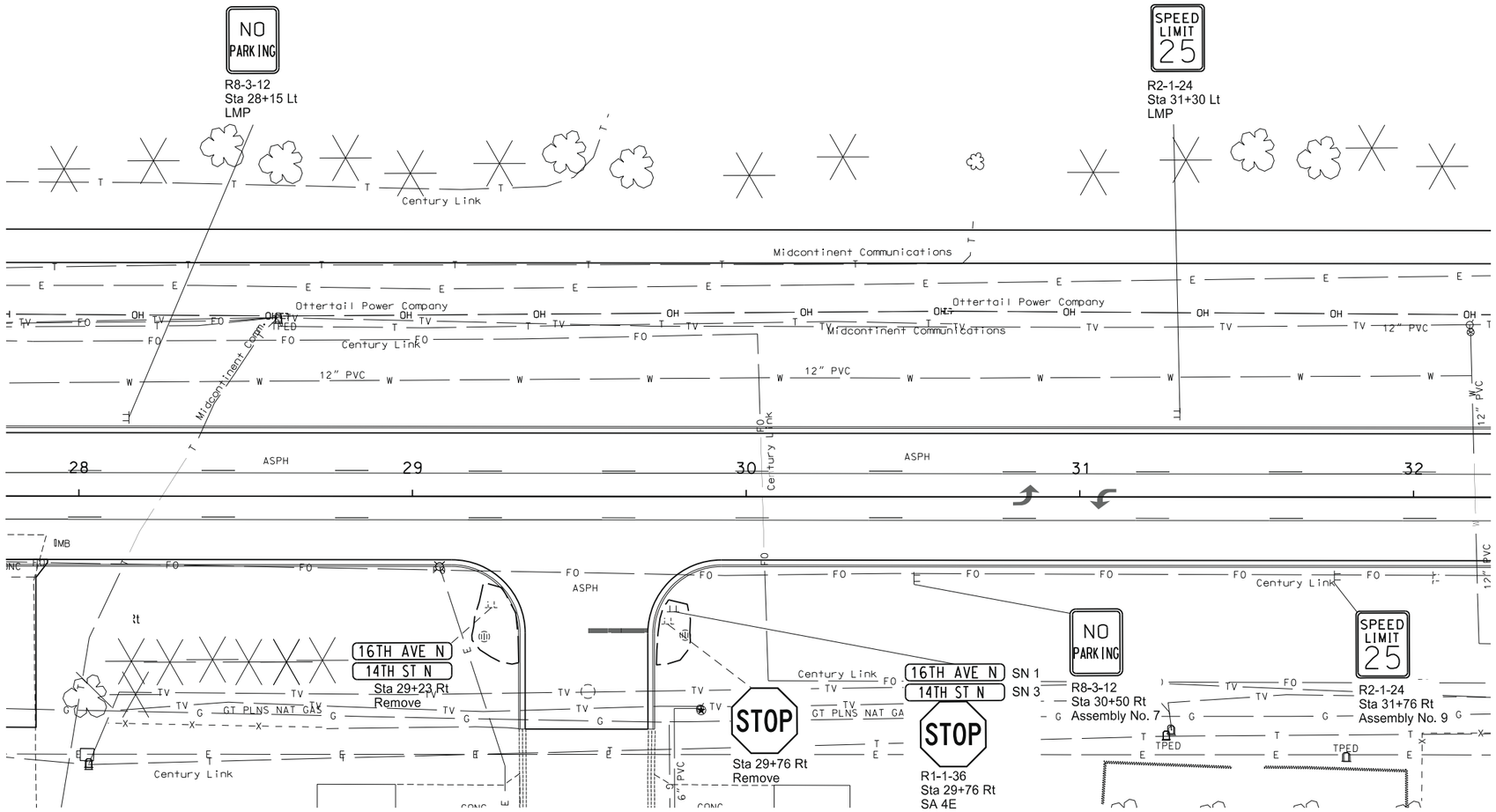
Signing Layouts

Sta 24+00 to 28+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	8



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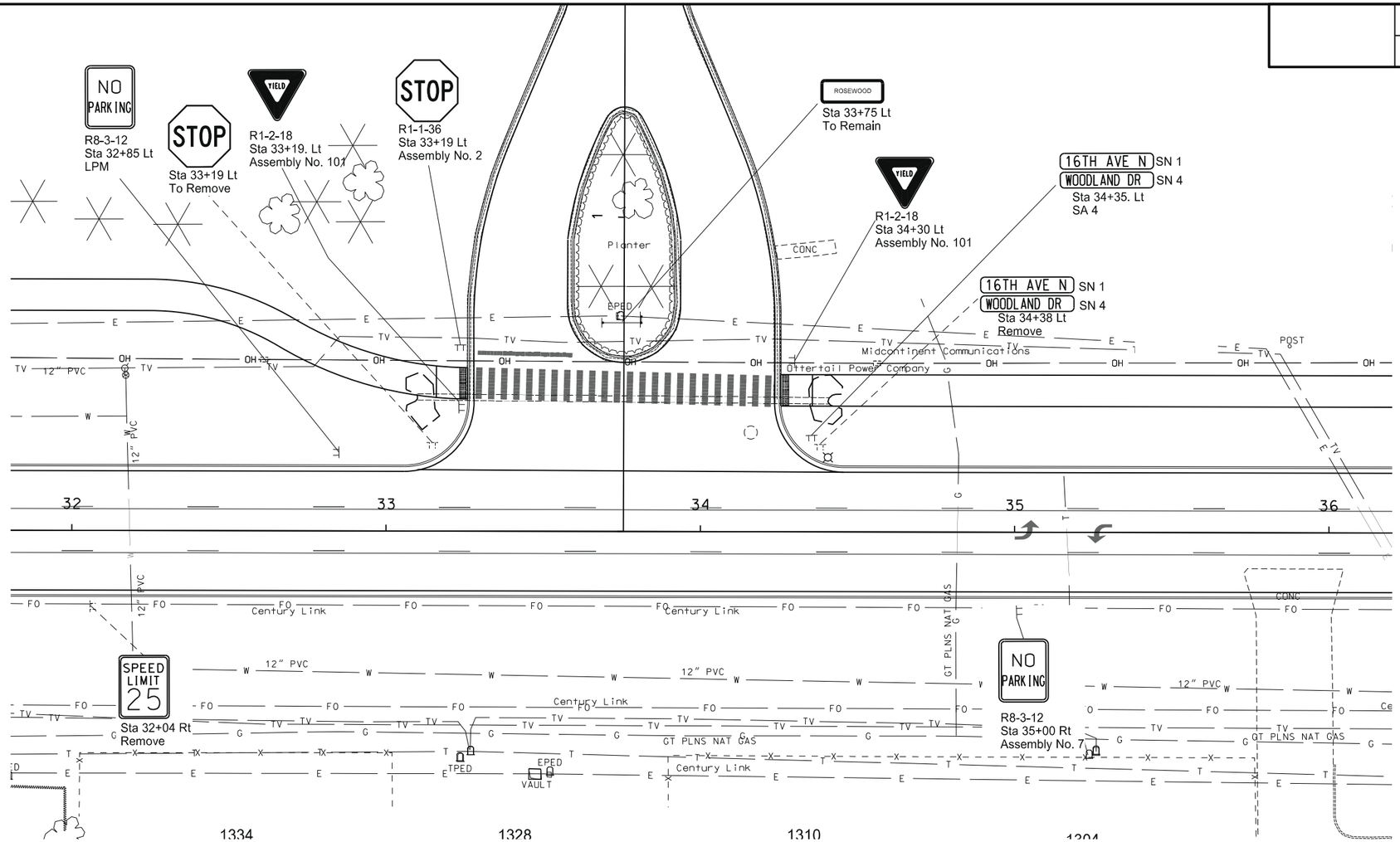
Signing Layouts

Sta 28+00 to 32+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	9



N

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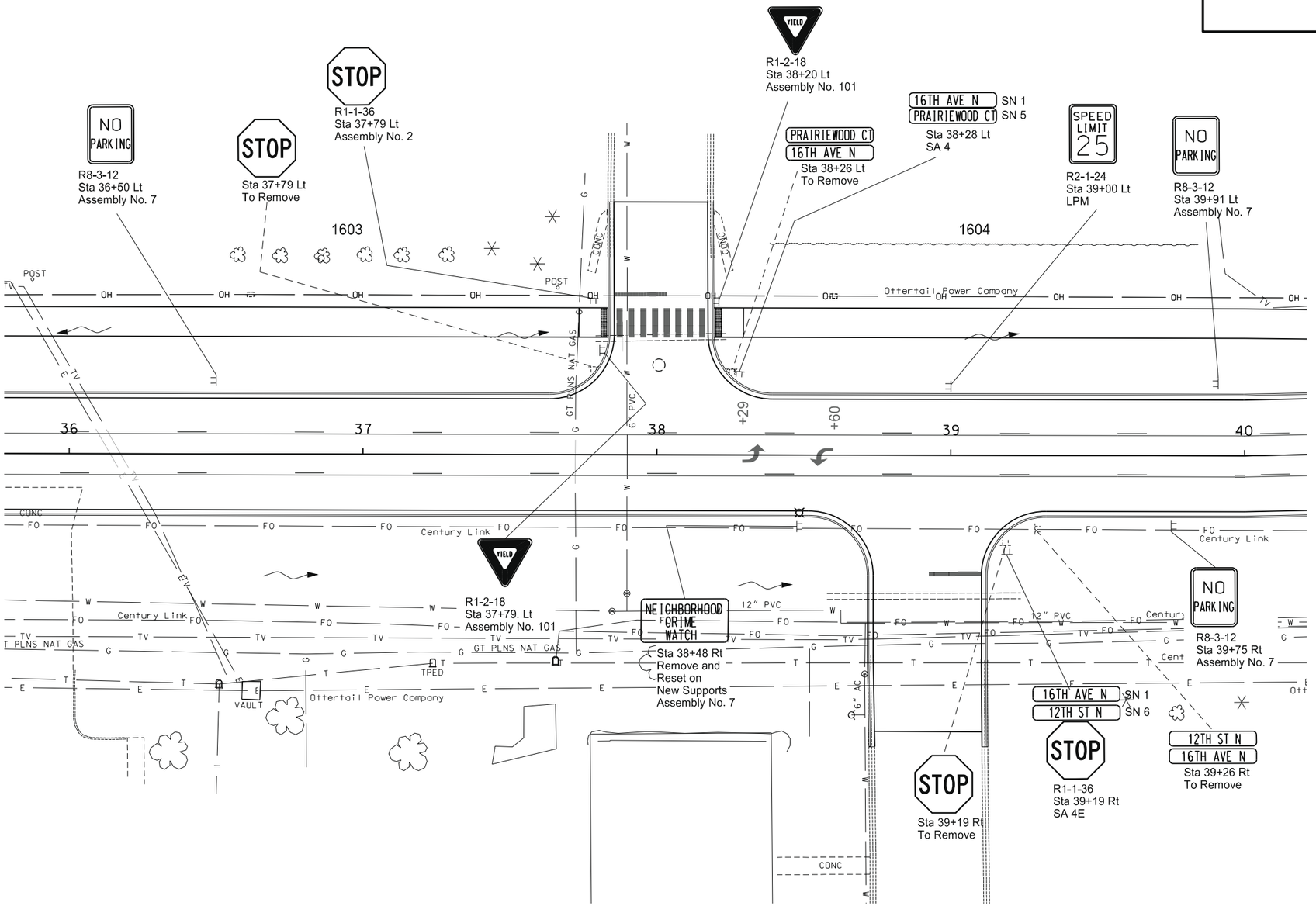
Signing Layouts

Sta 32+00 to 36+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	10



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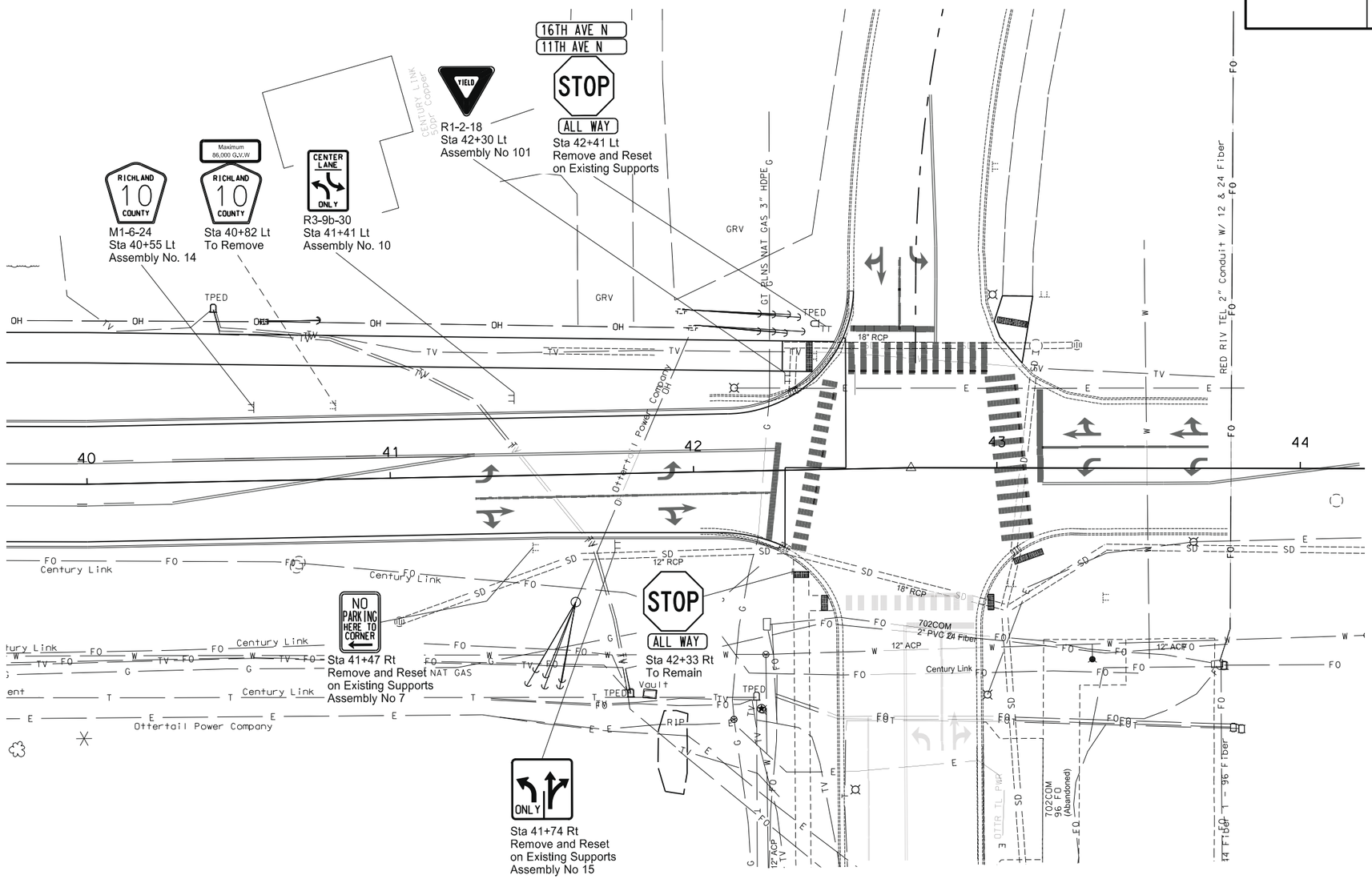
Signing Layouts

Sta 36+00 to 40+00

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	11



N

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Signing Layouts

Sta 40+00 to 42+71.68

16th Ave. North

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	12

SIGN NUMBER	SN 1
WIDTH x HEIGHT	4'-0" x 0'-9"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
Sta. 22+81 LT
Sta. 29+76 RT
Sta. 34+35 LT
Sta. 38+28 LT
Sta. 39+19 RT

AREA: 3.0 Sq.Ft.

Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Street_Name_Conv.ssl

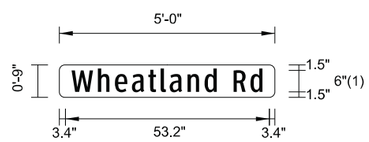
LETTER POSITION (X)																			LENGTH	SIZE	SERIES
1	6	t	h		A	v	e		N										40.1	6/4.9	ClearviewHwy-2-W
3.9	7.5	12	15.4	18.6	22.9	27.8	32.3	35.8	40.3												

SIGN NUMBER	SN 2
WIDTH x HEIGHT	5'-0" x 0'-9"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
Sta. 22+81 LT

AREA: 3.8 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Street_Name_Conv.ssl

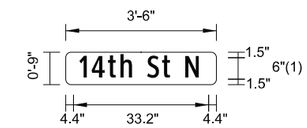
LETTER POSITION (X)																			LENGTH	SIZE	SERIES
W	h	e	a	t	l	a	n	d		R	d								53.2	6/4.9	ClearviewHwy-2-W
3.4	10.8	15.5	20.2	24.8	28.2	30.7	35.7	40.4	43.8	48.5	53.2										

SIGN NUMBER	SN 3
WIDTH x HEIGHT	3'-6" x 0'-9"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
Sta. 29+76 RT

AREA: 2.6 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Street_Name_Conv.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
1	4	t	h		S	t		N											33.2	6/4.9	ClearviewHwy-2-W
4.4	7.7	12.3	15.8	19	23.2	27.4	29.5	33.9													

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Sign Details

16th Ave. North

Wahpeton, North Dakota

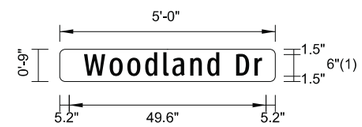
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	110	13

SIGN NUMBER	SN 4
WIDTH x HEIGHT	5'-0" x 0'-9"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
Sta. 34+35 LT

AREA: 3.8 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Street_Name_Conv.ssl

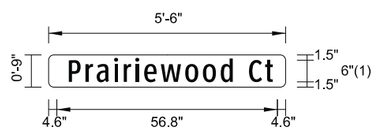
LETTER POSITION (X)												LENGTH	SIZE	SERIES
W	o	o	d	l	a	n	d		D	r		49.6	6/4.9	ClearviewHwy-2-W
5.2	12.4	17.3	22.3	27.3	29.8	34.8	39.6	42.9	47.6	52.7				

SIGN NUMBER	SN 5
WIDTH x HEIGHT	5'-6" x 0'-9"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
Sta. 38+28 LT

AREA: 4.1 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Street_Name_Conv.ssl

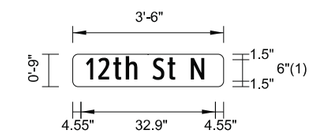
LETTER POSITION (X)														LENGTH	SIZE	SERIES
P	r	a	i	r	i	e	w	o	o	d		C	t	56.8	6/4.9	ClearviewHwy-2-W
4.6	9.3	12.4	17.2	19.9	23.1	25.6	30.2	37	42	46.9	50.3	54.8	59.3			

SIGN NUMBER	SN 6
WIDTH x HEIGHT	3'-6" x 0'-9"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
Sta. 39+19 RT

AREA: 2.6 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Street_Name_Conv.ssl

LETTER POSITION (X)														LENGTH	SIZE	SERIES
1	2	t	h		S	t		N						32.9	6/4.9	ClearviewHwy-2-W
4.5	7.9	12.2	15.6	18.9	23.1	27.3	29.4	33.7								

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Sign Details

16th Ave. North

Wahpeton, North Dakota

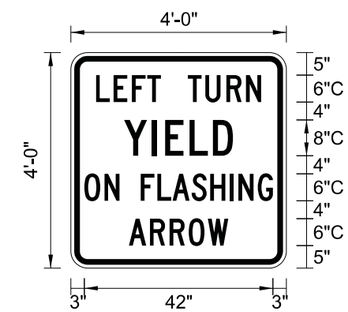
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-9-991(032)029	110	14

SIGN NUMBER	SN 7
WIDTH x HEIGHT	4'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Overhead
BACKGROUND	TYPE: IV Reflective
	COLOR: White
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
See Sign Summary

AREA: 16.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Misc_Regulatory.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
L	E	F	T		T	U	R	N											36.8	6	C 2000
5.6	9.5	13.6	17	20.1	26.1	30	34.7	39													
Y	I	E	L	D															24.2	8	C 2000
11.9	18.1	21	26.4	31.6																	
O	N		F	L	A	S	H	I	N	G									42	6	C 2000
3	7.5	10.8	15.6	19.3	22.6	26.9	31.1	35.5	37.3	41.6											
A	R	R	O	W															22.1	6	C 2000
12.9	17.6	22	26.3	30.5																	

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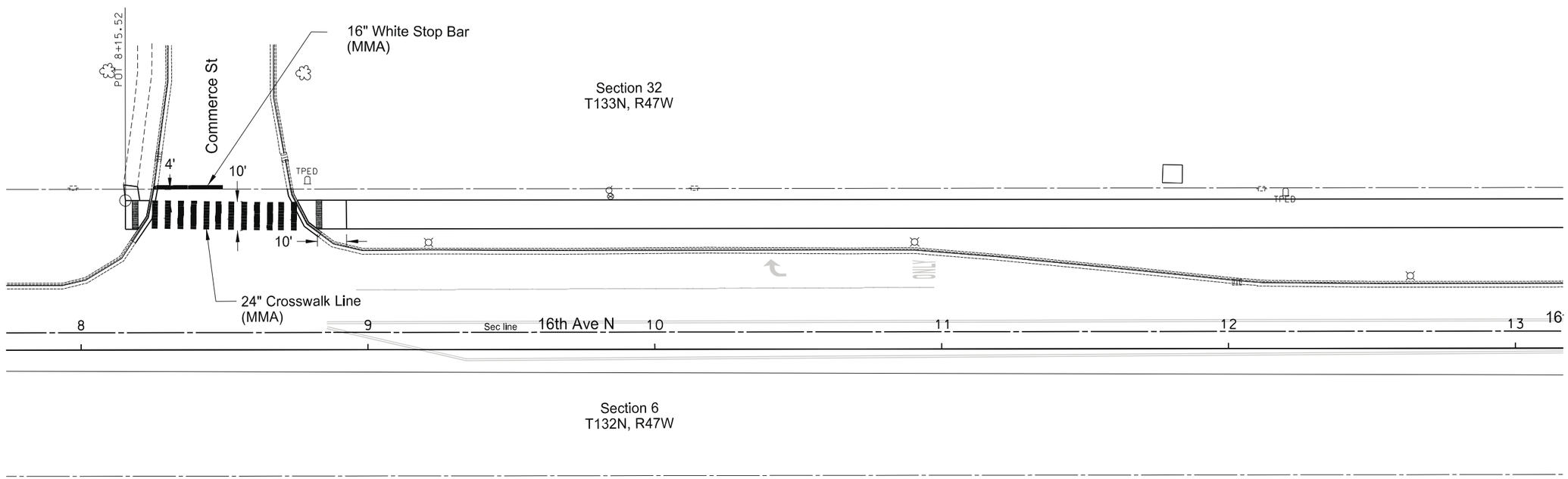
Sign Details

16th Ave. North

Wahpeton, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	1



METHYL METHACRYLATE PVMT MK 24IN LINE

24" Crosswalk Line	240 LF

METHYL METHACRYLATE PVMT MK 16IN LINE

16" Stop Bar	24 LF

N

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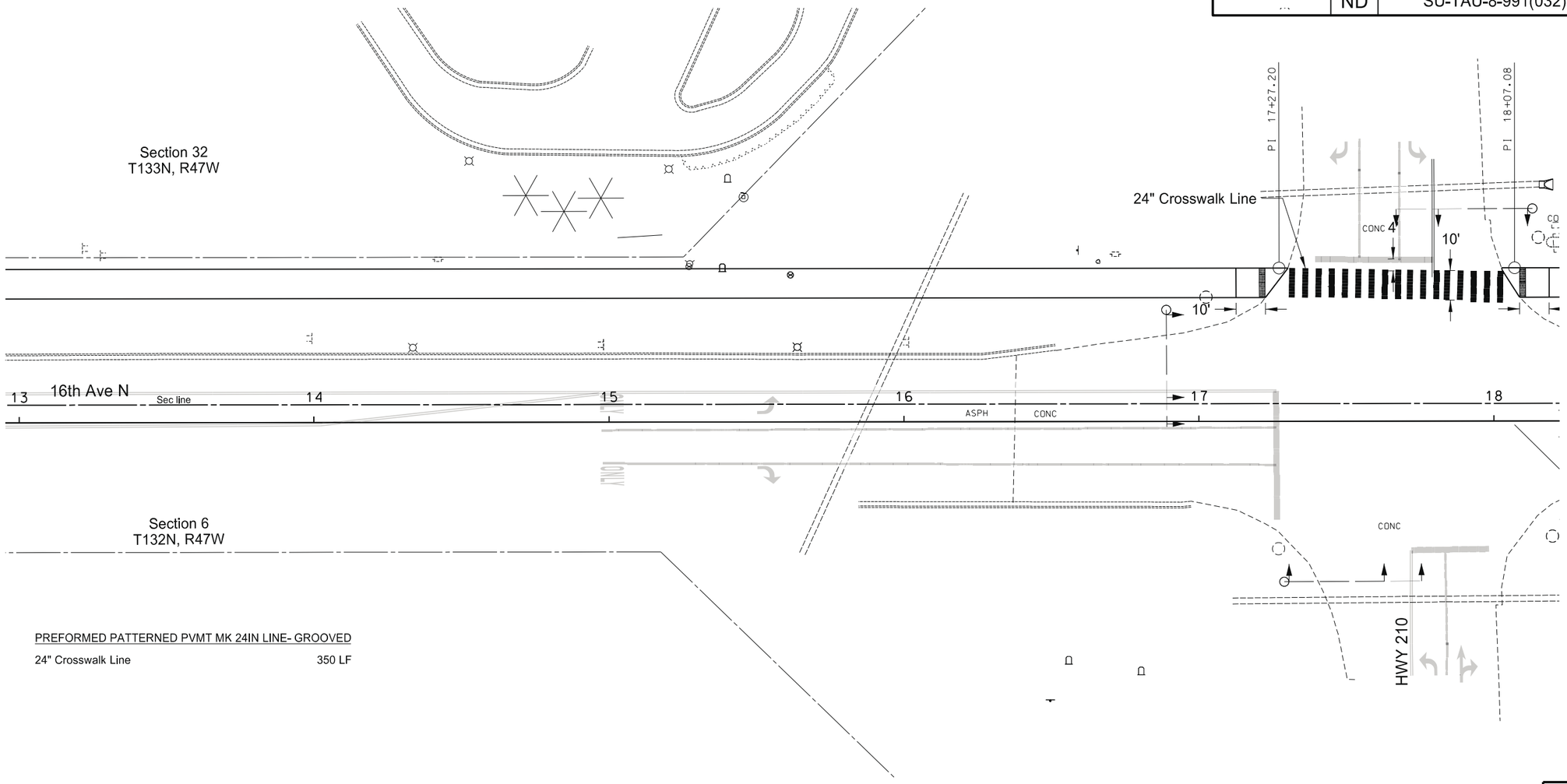
Pavement Marking

Sta 8+00 to 13+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	2



PREFORMED PATTERNED PVMT MK 24IN LINE- GROOVED

24" Crosswalk Line	350 LF

N

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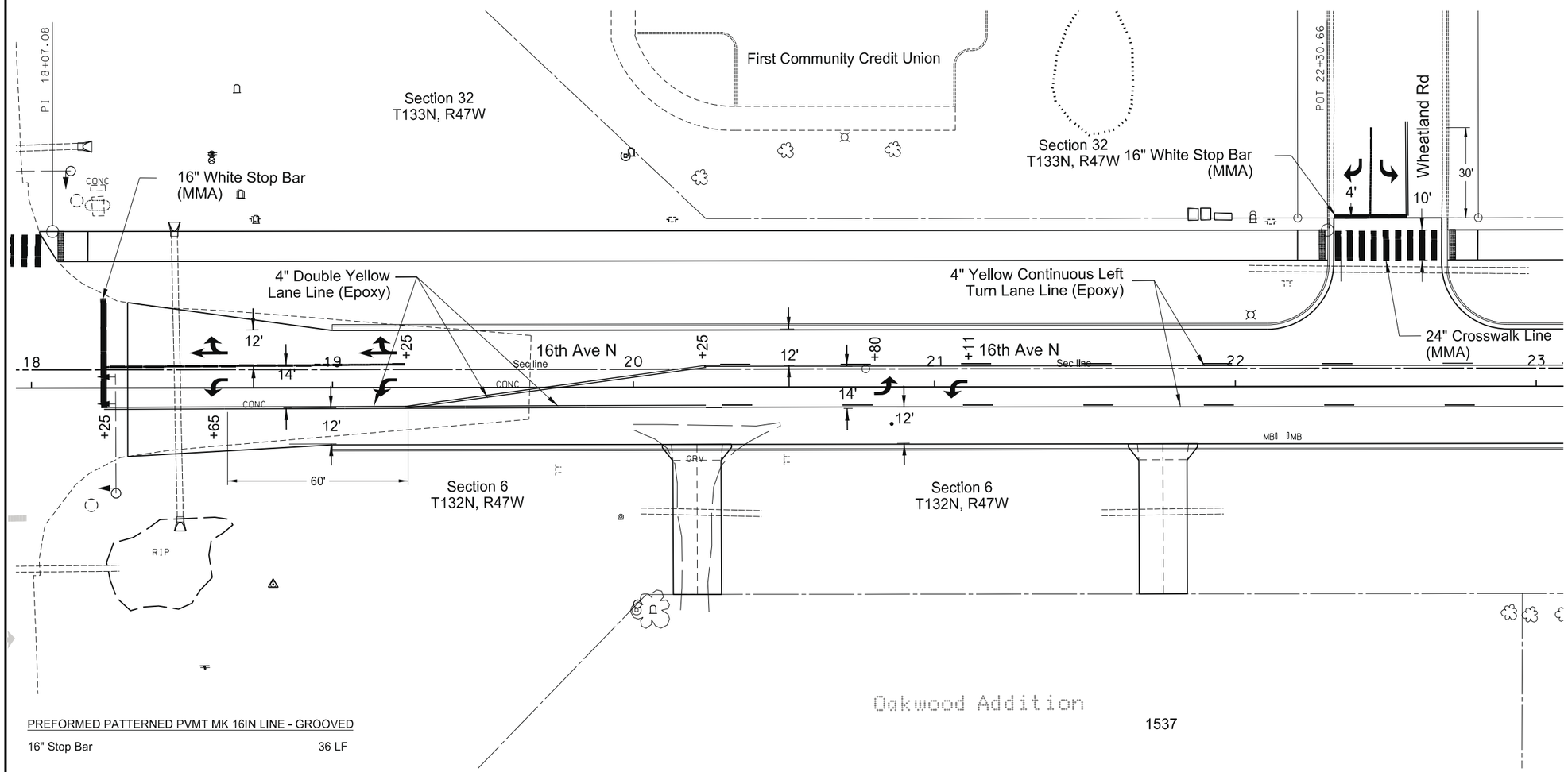
Pavement Marking

Sta 13+00 to 18+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	3



PREFORMED PATTERNED PVMT MK 16IN LINE - GROOVED

16" Stop Bar	36 LF

PREFORMED PATTERNED PVMT MK 8IN LINE - GROOVED

8" White Channel Line	130 LF

PREFORMED PATTERNED PVMT MK MESSAGE - GROOVED

Left Arrow (5)	80 SF
Right Turn Thru Arrow (2)	56 SF
Right Arrow (1)	16 SF

EPOXY PVMT MK 4IN LINE - GROOVED

4" Dbl Yellow Barrier (4" Between)	600 LF
4" Yellow Continuous Left Turn Lane	692 LF

METHYL METHACRYLATE PVMT MK 24IN LINE

24" Crosswalk	180 LF

METHYL METHACRYLATE PVMT MK 16IN LINE

16" Stop Bar	24 LF

N

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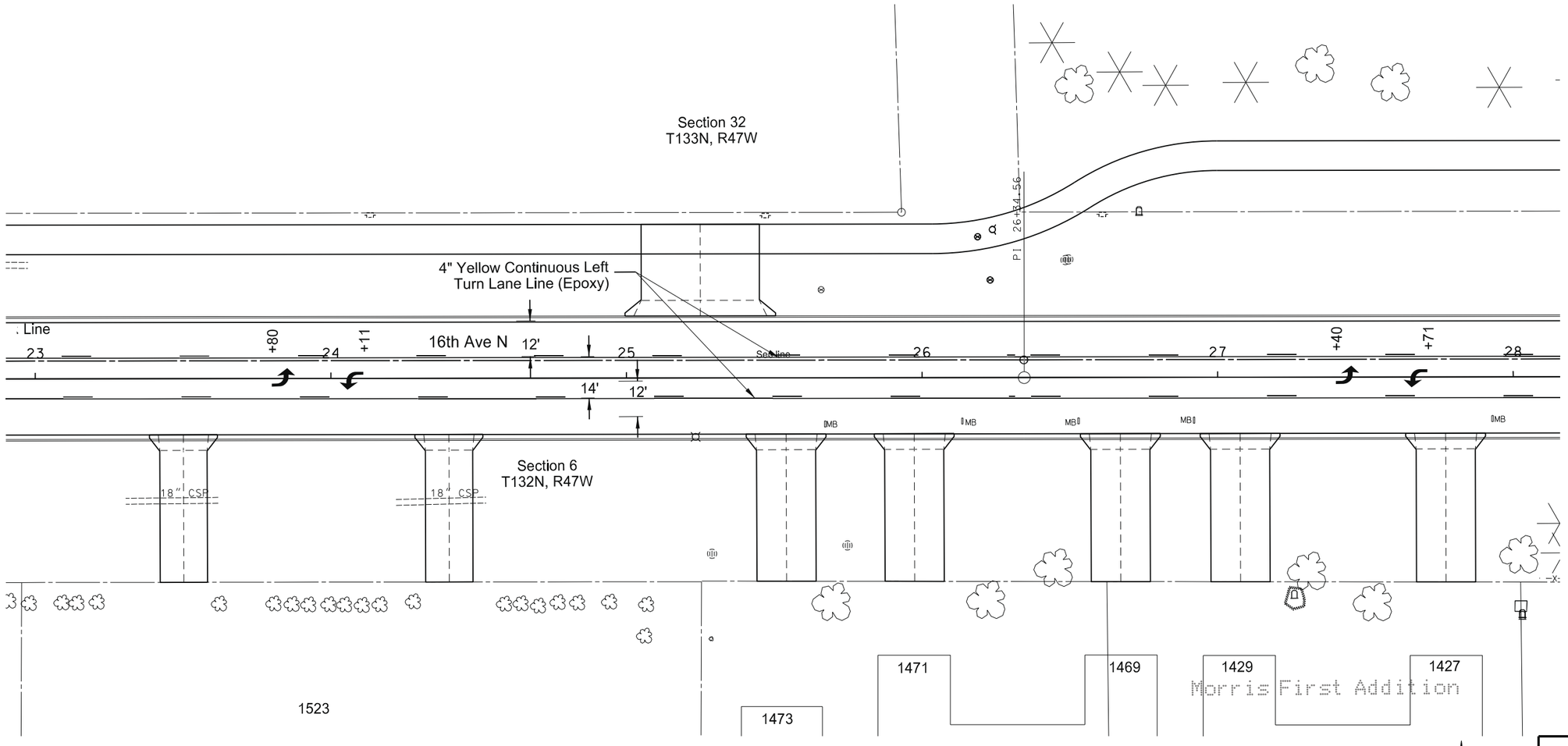
Pavement Marking

Sta 18+00 to 23+00

16th Ave. N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	4



PREFORMED PATTERNED PVMT MK MESSAGE - GROOVED

Left Arrow (4)	64 LF

EPOXY PVMT MK 4IN LINE - GROOVED

4" Yellow Continuous Left Turn Lane	1260 LF

N

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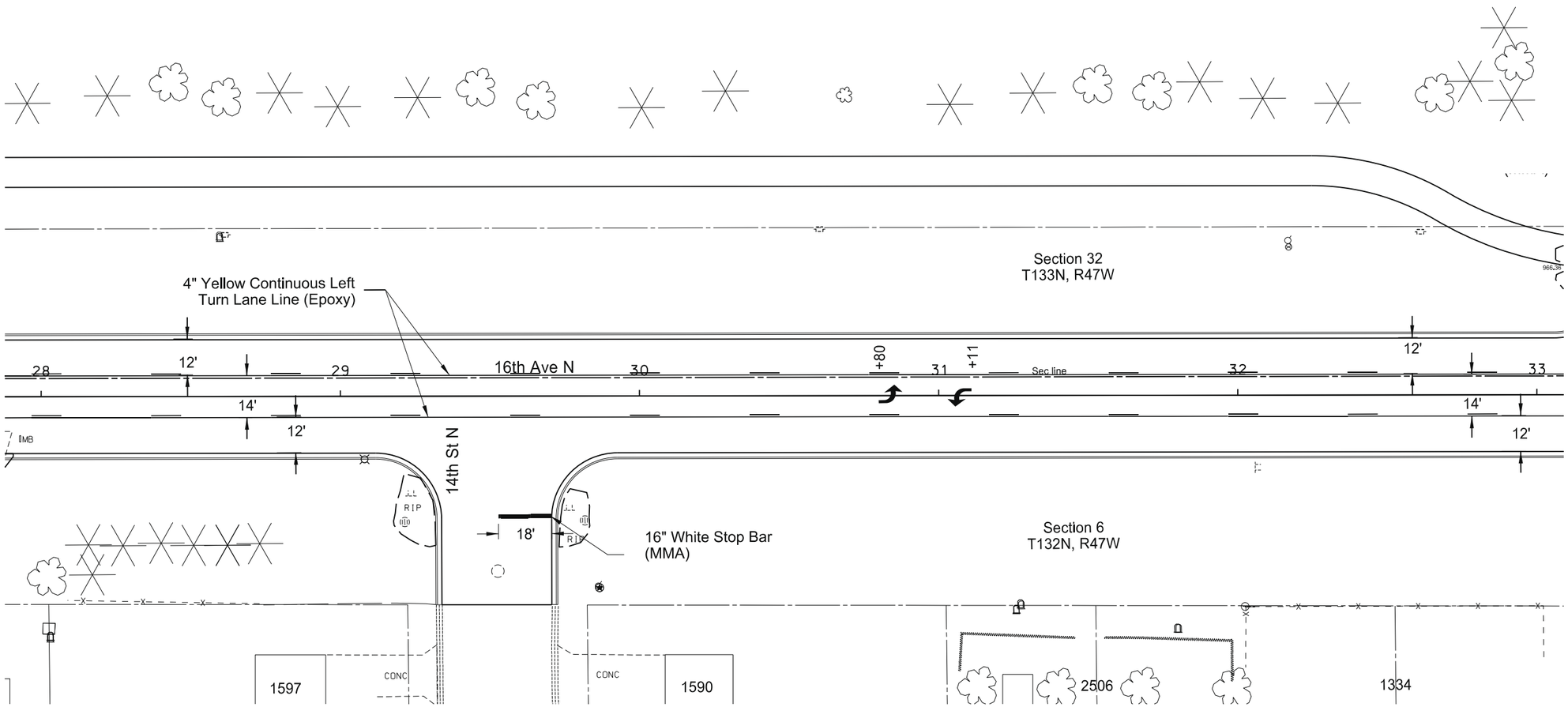
Pavement Marking

Sta 23+00 to 28+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	5



PREFORMED PATTERNED PVMT MK MESSAGE - GROOVED

Left Arrow (2)	32 SF

EPOXY PVMT MK 4IN LINE - GROOVED

4" Yellow Continous Left Turn Lane	1260 LF

METHYL METHACRYLATE PVMT MK 16IN LINE

16" Stop Bar	18 LF

N

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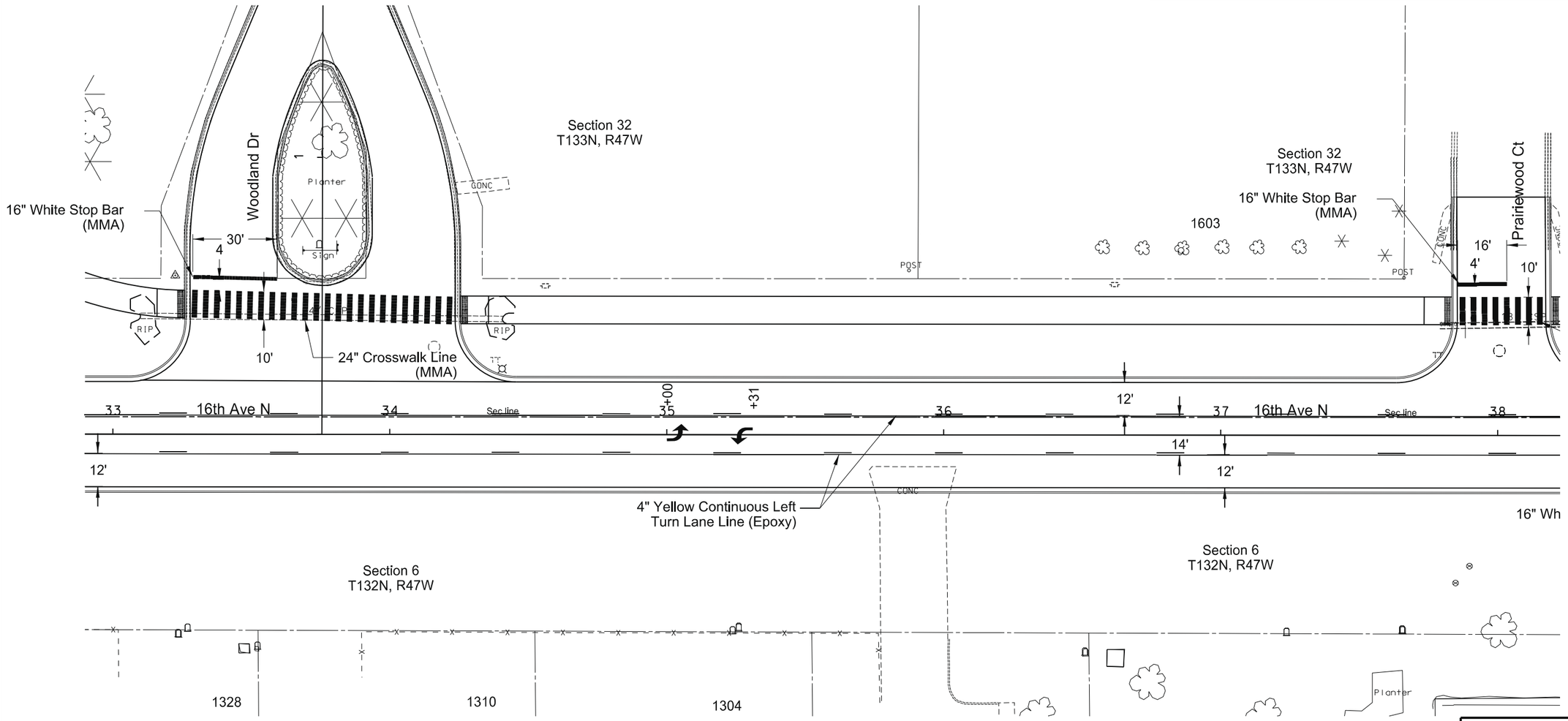
Pavement Marking

Sta 28+00 to 33+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	6



METHYL METHACRYLATE PVMT MK 24IN LINE

24" Crosswalk	640 LF

METHYL METHACRYLATE PVMT MK 16IN LINE

16" Stop Bar	46 LF

PREFORMED PATTERNED PVMT MK MESSAGE - GROOVED

Left Arrow (2)	32 SF

EPOXY PVMT MK 4IN LINE - GROOVED

4" Yellow Continuous Left Turn Lane	1260 LF

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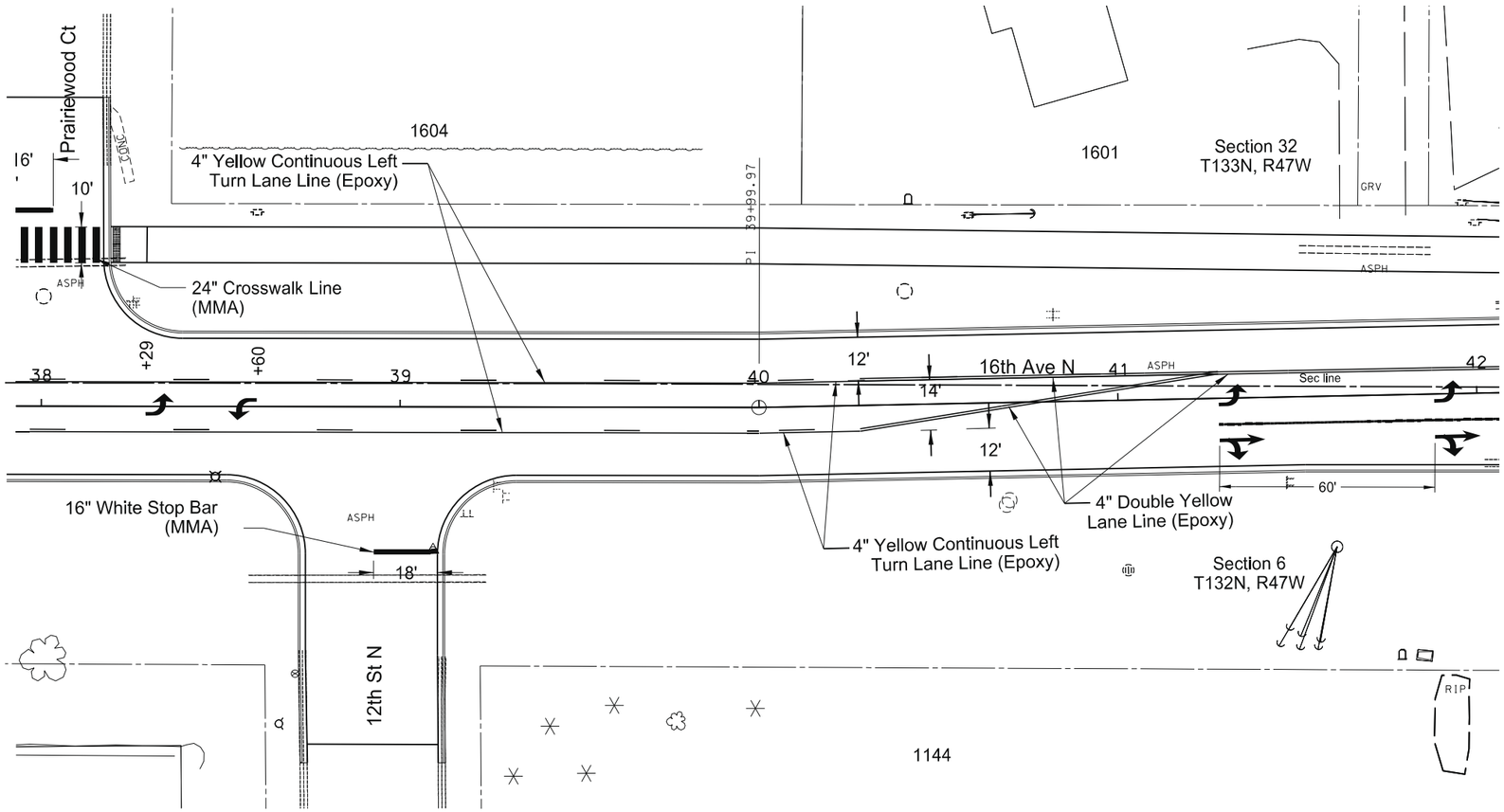
Pavement Marking

Sta 33+00 to 38+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	7



PREFORMED PATTERNED PVMT MK 16IN LINE - GROOVED

16" Stop Bar	18 LF

PREFORMED PATTERNED PVMT MK 8IN LINE - GROOVED

8" White Channel Line	72 LF

PREFORMED PATTERNED PVMT MK MESSAGE - GROOVED

Left Arrow (4)	64 SF
Right Turn Thru Arrow (2)	56 SF

EPOXY PVMT MK 4IN LINE - GROOVED

4" Dbl Yellow Barrior (4" Between)	550 LF
4" Yellow Continuous Left Turn Lane	560 LF

METHYL METHACRYLATE PVMT MK 16IN LINE

16" Stop Bar	18 LF

N

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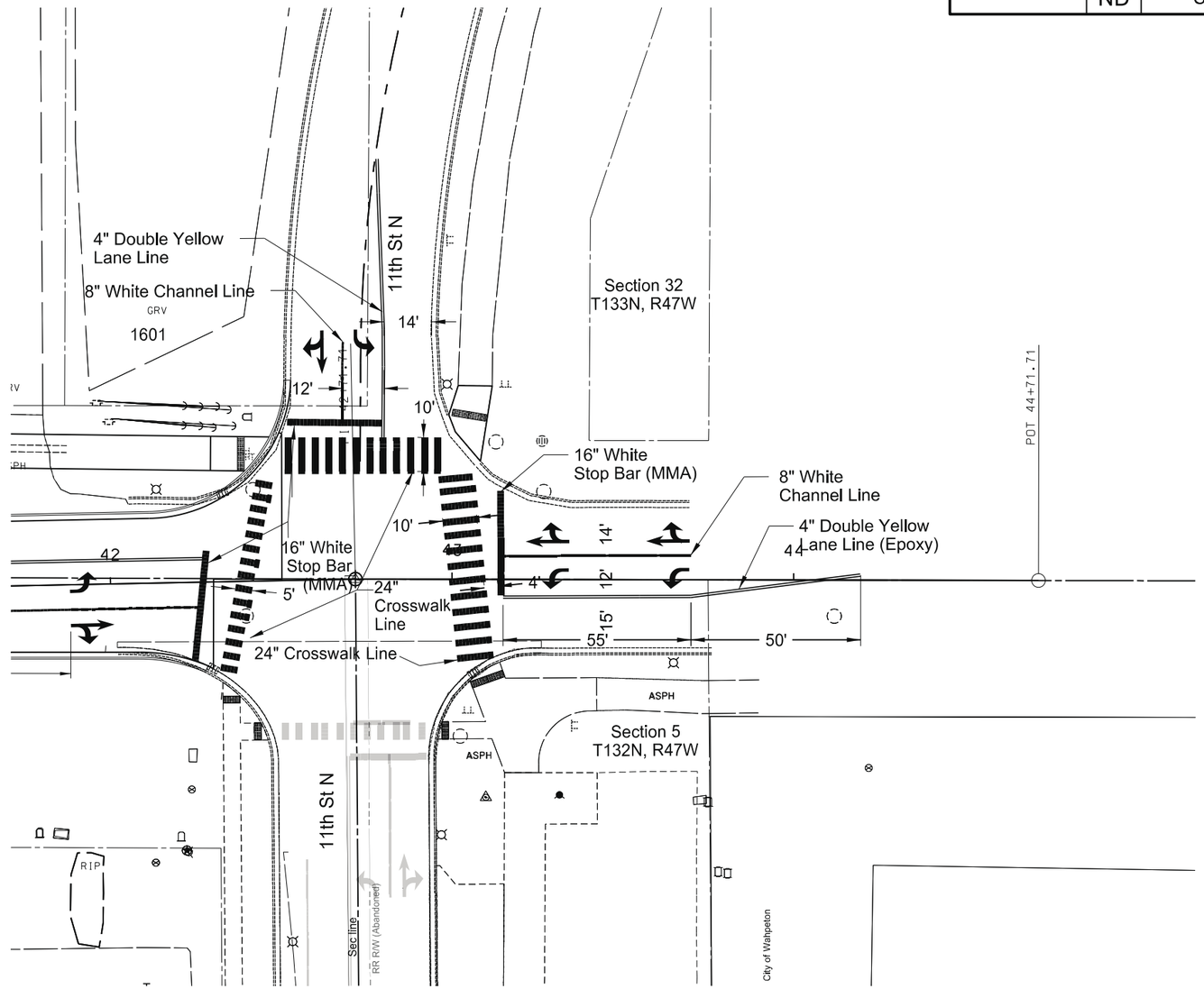
Pavement Marking

Sta 38+00 to Sta 42+00

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	120	8



PREFORMED PATTERNED PVMT MK 8IN LINE - GROOVED

8" White Channel Line	104 LF

PREFORMED PATTERNED PVMT MK MESSAGE - GROOVED

Left Arrow (3)	48 SF
Right Turn Thru Arrow (3)	84 SF

EPOXY PVMT MK 4IN LINE - GROOVED

4" Dbl Yellow Barrior (4" Between)	420 LF

METHYL METHACRYLATE PVMT MK 24IN LINE

24" Crosswalk	320 LF

METHYL METHACRYLATE PVMT MK 16IN LINE

16" Stop Bar	90 LF

N

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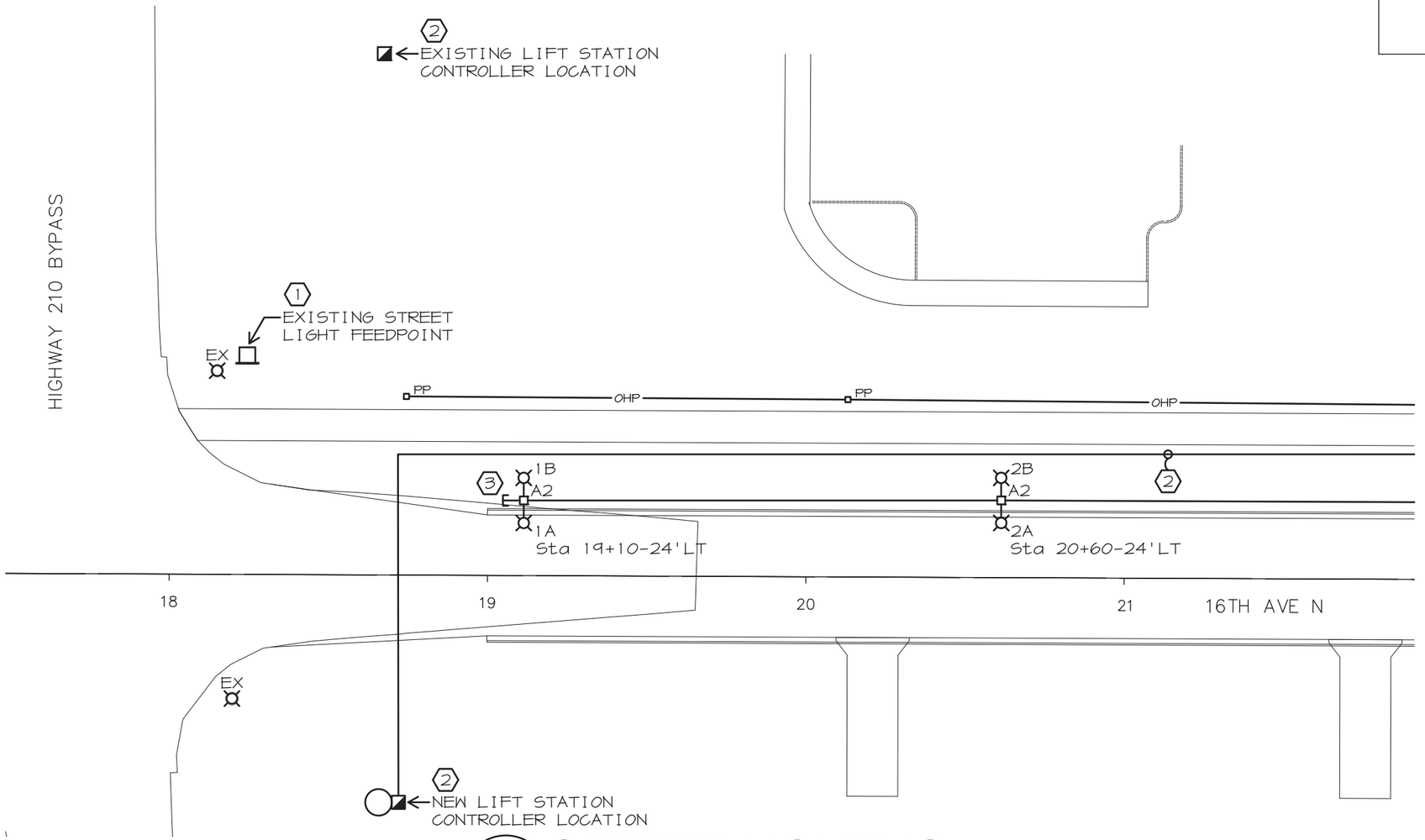
Pavement Marking

Sta 42+00 to Sta 44+71

16th Ave N Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	140	1



1/1 STREET LIGHTING
SCALE: 1"=40'-0"

PLAN NOTES:

1. THE EXISTING STREET LIGHTING FEEDPOINT SHALL BE RAISED 30" ABOVE THE EXISTING ELEVATION TO MATCH NEW GRADELINE. DISCONNECT, REMOVE, AND TEMPORARILY LOCATE TO AN ADJACENT SPACE. PROVIDE TEMPORARY CONNECTION TO UTILITY, TRAFFIC SIGNAL CIRCUITS, AND STREET LIGHT CIRCUITS TO MAINTAIN STREET LIGHT OPERATION. DEMOLISH EXISTING CONCRETE PAD, SALVAGE ALL STREET LIGHTING BRANCH CIRCUIT CONDUCTORS. COORDINATE WITH G.C. TO PROVIDE A NEW CONCRETE PAD AT NEW ELEVATION. THE ELECTRICAL CONTRACTOR SHALL PROVIDE A NEW STAINLESS STEEL ENCLOSURE TO REPLACE THE EXISTING ENCLOSURE. REMOVE THE CONTROL EQUIPMENT BACKBOARD FROM THE EXISTING CONTROLLER AND REINSTALL IN NEW STAINLESS STEEL ENCLOSURE. THE STAINLESS STEEL ENCLOSURE SHALL BE SIZED TO MATCH EXISTING (14"X 26"X 56") AND SHALL BE NEMA 3R GASKETED EQUAL TO HOFFMAN. REINSTALL ENCLOSURE ON NEW CONCRETE PAD, RECONNECT AS EXISTING.

2. DISCONNECT, REMOVE, AND STORE CONTROL PANEL ENCLOSURE, ASSOCIATED METER SOCKET AND SERVICE DISCONNECT. STORE FOR REINSTALLATION. REINSTALL THE CONTROL ASSEMBLY AT THE NEW LIFT STATION LOCATION WHERE STAKED BY FIELD ENGINEER. REINSTALL THE SERVICE EQUIPMENT AT THE NEW LOCATION Sta 22+05-55' AS STAKED BY FIELD ENGINEER. PROVIDE CONCRETE PEDESTAL FOR LIFTS STATION CONTROLLER TO MATCH EXISTING. PROVIDE 1" STUB OUT FOR COMMUNICATION LINE CONNECTION. PROVIDE ROUGH-INS FOR POWER CONNECTION AND TO WET WELL TO MATCH EXISTING. REINSTALL LIFT STATION CONTROLLER ENCLOSURE ON NEW CONCRETE PEDESTAL. WIRE AND CONNECT PUMP AND FLOAT SYSTEM FOR A COMPLETELY OPERATIONAL SYSTEM. PROVIDE FEEDER FROM SERVICE DISCONNECT TO CONTROLLER ENCLOSURE AS DESCRIBED IN PLAN SET.

3. PROVIDE 2" STUB-OUT AT BASE FOR FUTURE USE.

FEEDPOINT A CIRCUIT 1	CABLE TRENCH TYPE I	2 IN. DIAMETER CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE FEEDPOINT A CIRCUIT 1
19+10-24'LT TO 20+60-24'LT	150 LF	--	158 LF
20+60-24'LT TO 22+10-24'LT	150 LF	--	158 LF

FIXTURE NUMBER	STATION & OFFSET	LUMINAIRE WATTAGE	LUMINAIRE DISTRIBUTION	POLE HEIGHT	MAST ARM
1A	19+10-24'LT	250W	MSC III	30 FT	6 FT
1B	19+10-24'LT	150W	MSC III	30 FT	6 FT
2A	20+60-24'LT	250W	MSC III	30 FT	6 FT
2B	20+60-24'LT	150W	MSC III	30 FT	6 FT

QUANTITIES			
770	0020	CONCRETE FOUNDATION - HIGHWAY LIGHTING	2 EA
770	0210	CABLE TRENCH - TYPE I	300 LF
770	0424	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE	316 LF
770	2260	LT STD TWIN 6FT MA 30FT MT HT	2 EA
770	4120	HP SODIUM VAPOR LUMINAIRE 150 WATT	2 EA
770	4140	HP SODIUM VAPOR LUMINAIRE 250 WATT	2 EA
770	9270	MODIFY EXISTING FEEDPOINT	1 EA
772	3005	RELOCATE FEEDPOINT	1 EA

N

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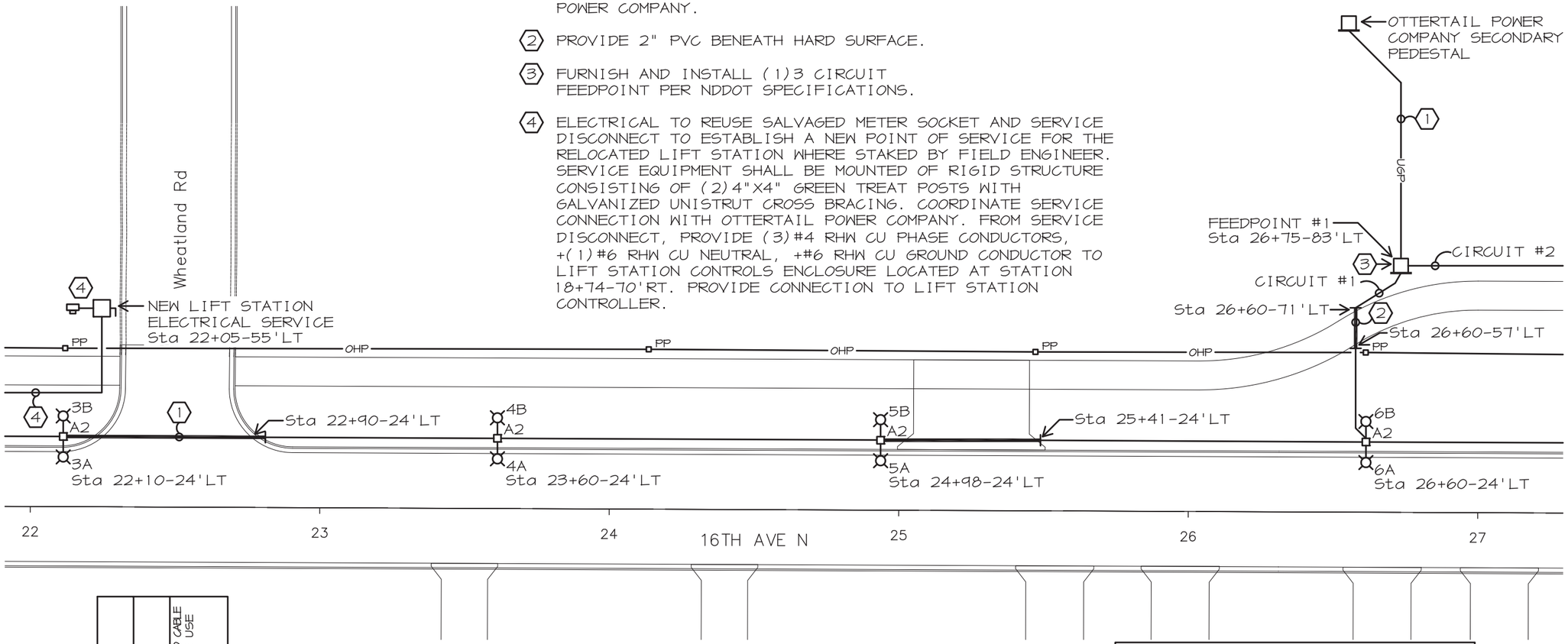
Lighting Layout
Feedpoint/Lift Station Location
Sta 17+40 to 21+90
16th Ave North
Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	140	2

PLAN NOTES:

1. SECONDARY UNDERGROUND CONDUCTOR FROM UTILITY PEDESTAL TO FEEDPOINT TO BE FURNISHED AND INSTALLED BY OTTERTAIL POWER COMPANY.
2. PROVIDE 2" PVC BENEATH HARD SURFACE.
3. FURNISH AND INSTALL (1)3 CIRCUIT FEEDPOINT PER NDDOT SPECIFICATIONS.
4. ELECTRICAL TO REUSE SALVAGED METER SOCKET AND SERVICE DISCONNECT TO ESTABLISH A NEW POINT OF SERVICE FOR THE RELOCATED LIFT STATION WHERE STAKED BY FIELD ENGINEER. SERVICE EQUIPMENT SHALL BE MOUNTED OF RIGID STRUCTURE CONSISTING OF (2)4"X4" GREEN TREAT POSTS WITH GALVANIZED UNISTRUT CROSS BRACING. COORDINATE SERVICE CONNECTION WITH OTTERTAIL POWER COMPANY. FROM SERVICE DISCONNECT, PROVIDE (3)#4 RHW CU PHASE CONDUCTORS, +(1)#6 RHW CU NEUTRAL, +#6 RHW CU GROUND CONDUCTOR TO LIFT STATION CONTROLS ENCLOSURE LOCATED AT STATION 18+74-70'RT. PROVIDE CONNECTION TO LIFT STATION CONTROLLER.



1/2 STREET LIGHTING

SCALE: 1"=40'-0"

FEEDPOINT A CIRCUIT 1	CABLE TRENCH TYPE I	2 IN. DIAMETER CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE FEEDPOINT A CIRCUIT 1
22+10-24'LT TO 22+90-24'LT	--	80 LF	84 LF
22+90-24'LT TO 23+60-24'LT	70 LF	--	74 LF
23+60-24'LT TO 24+98-24'LT	138 LF	--	146 LF
24+98-24'LT TO 25+41-24'LT	--	43 LF	47 LF
25+41-24'LT TO 26+60-24'LT	119 LF	--	123 LF
26+60-24'LT TO 26+60-57'LT	33 LF	--	37 LF
26+60-57'LT TO 26+60-71'LT	--	14 LF	14 LF
26+60-71'LT TO 26+75-83'LT	24 LF	--	28 LF
26+60-24'LT TO 28+15-24'LT	155 LF	--	163 LF

FEEDPOINT A CIRCUIT 2	CABLE TRENCH TYPE I	2 IN. DIAMETER CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE FEEDPOINT A CIRCUIT 2
26+75-83'LT TO 27+40-83'LT	79 LF	--	87 LF

FIXTURE NUMBER	STATION & OFFSET	LUMINAIRE WATTAGE	LUMINAIRE DISTRIBUTION	POLE HEIGHT	MAST ARM
3A	22+10-24'LT	250W	MSC III	30 FT	6 FT
3B	22+10-24'LT	150W	MSC III	30 FT	6 FT
4A	23+60-24'LT	250W	MSC III	30 FT	6 FT
4B	23+60-24'LT	150W	MSC III	30 FT	6 FT
5A	24+98-24'LT	250W	MSC III	30 FT	6 FT
5B	24+98-24'LT	150W	MSC III	30 FT	6 FT
6A	26+60-24'LT	250W	MSC III	30 FT	6 FT
6B	26+60-24'LT	150W	MSC III	30 FT	6 FT

QUANTITIES			
770	0020	CONCRETE FOUNDATION HIGHWAY LIGHTING	4 EA
770	0060	CONCRETE FOUNDATION FEEDPOINT TYPE B	1 EA
770	0210	CABLE TRENCH TYPE I	618 LF
770	0330	2 IN DIA. RIGID CONDUIT	137 LF
770	0424	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE	803 LF
770	0735	FEEDPOINT TYPE II PAD MOUNTED	1 EA
770	2260	LT STD TWIN 6FT MA 30FT MT HT	4 EA
770	4140	HP SODIUM VAPOR LUMINAIRE 250 WATT	4 EA
770	4120	HP SODIUM VAPOR LUMINAIRE 150 WATT	4 EA

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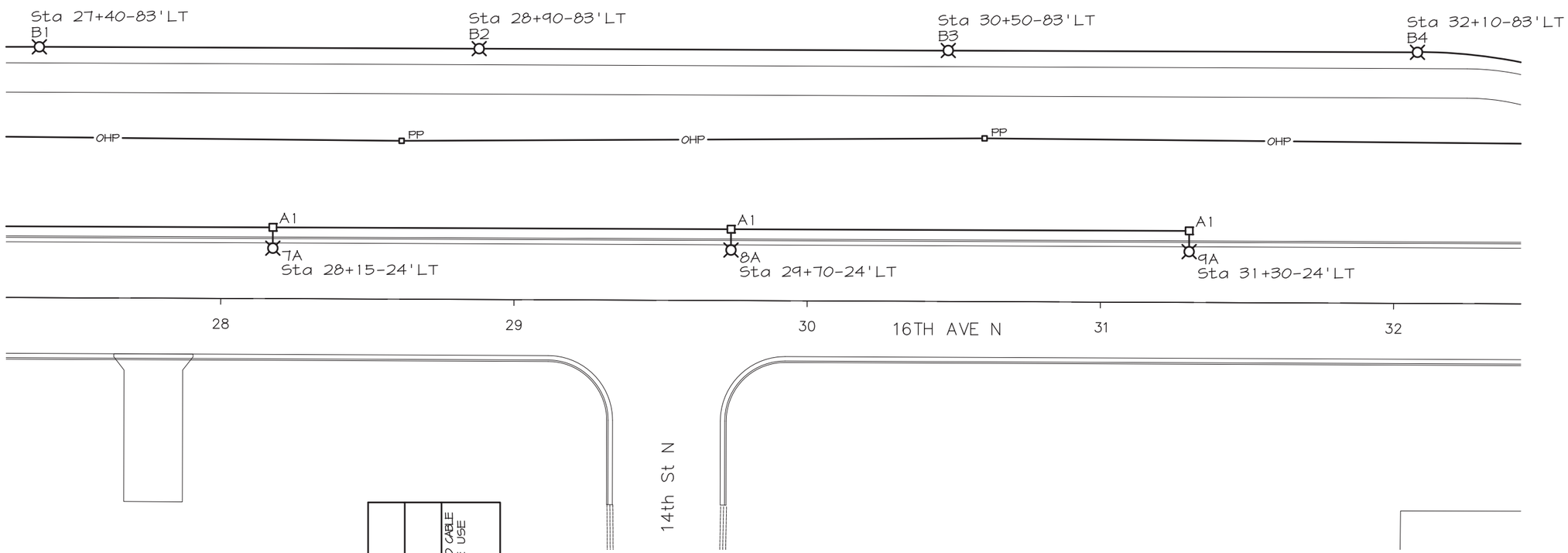
Lighting Layout
Feedpoint/Lift Station Location
Sta 21+90 to 27+20
16th Ave North
Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	140	3



1/3 STREET LIGHTING
SCALE: 1"=40'-0"

FEEDPOINT A CIRCUIT 1	CABLE TRENCH TYPE I	2 IN. DIAMETER CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE FEEDPOINT A CIRCUIT 1
28+15-24'LT TO 29+70-24'LT	155 LF	--	163 LF
29+70-24'LT TO 31+30-24'LT	160 LF	--	168 LF

FEEDPOINT A CIRCUIT 2	CABLE TRENCH TYPE I	2 IN. DIAMETER CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE FEEDPOINT A CIRCUIT 2
27+40-83'LT TO 28+90-83'LT	150 LF	--	158 LF
28+90-83'LT TO 30+50-83'LT	160 LF	--	168 LF
30+50-83'LT TO 32+10-83'LT	160 LF	--	168 LF
32+10-83'LT TO 32+85-62'LT	84 LF	--	88 LF
32+85-62'LT TO 32+85-48'LT	--	14 LF	14 LF
32+85-48'LT TO 32+85-24'LT	24 LF	--	28 LF

FIXTURE NUMBER	STATION & OFFSET	LUMINAIRE WATTAGE	LUMINAIRE DISTRIBUTION	POLE HEIGHT	MAST ARM
7A	28+15-24'LT	250W	MSC III	30 FT	6 FT
8A	29+70-24'LT	250W	MSC III	30 FT	6 FT
9A	31+30-24'LT	250W	MSC III	30 FT	6 FT
B1	27+40-83'LT	150W	MSC III	14 FT	--
B2	28+90-83'LT	150W	MSC III	14 FT	--
B3	30+50-83'LT	150W	MSC III	14 FT	--
B4	32+10-83'LT	150W	MSC III	14 FT	--

QUANTITIES			
770	0020	CONCRETE FOUNDATION HIGHWAY LIGHTING	7 EA
770	0210	CABLE TRENCH TYPE I	893 LF
770	0330	2 IN DIA. RIGID CONDUIT	14 LF
770	0424	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE	955 LF
770	1066	LT STD (1) 6FT MA 30FT MT HT	3 EA
770	4088	ORNAMENTAL LT STD 14FT MT HT	4 EA
770	4140	HP SODIUM VAPOR LUMINAIRE 250 WATT	3 EA
770	4493	ORNAMENTAL LIGHT FIXTURE - 150 WATT	4 EA

N

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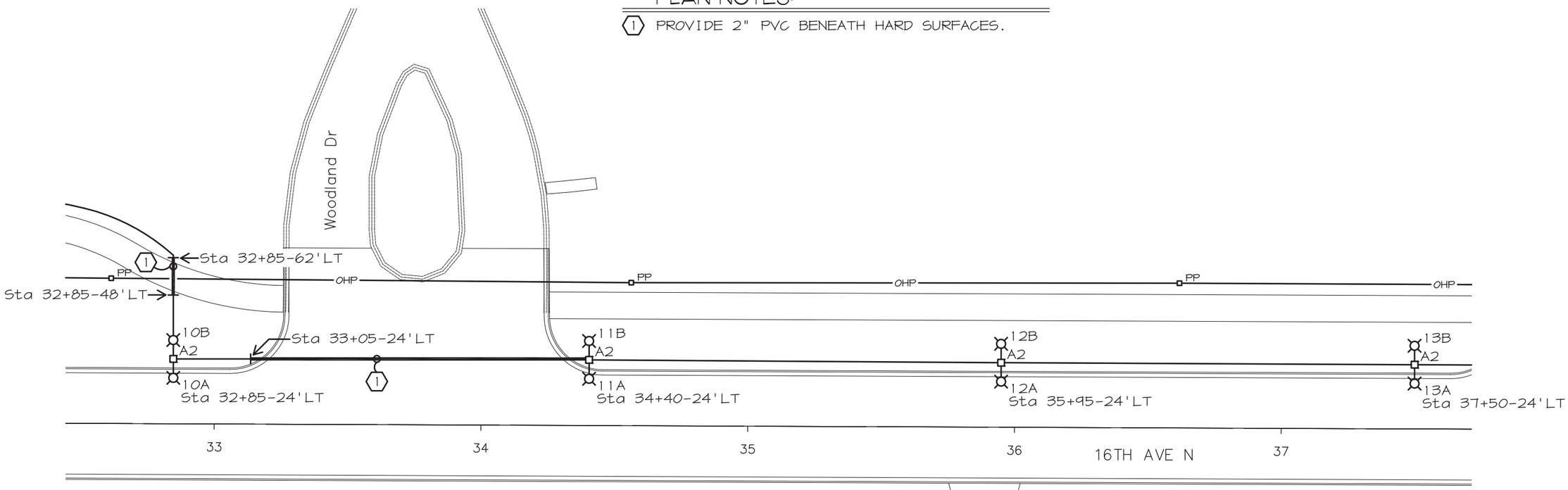
Lighting Layout
Feedpoint/Lift Station Location
Sta 27+20 to 32+45
16th Ave North
Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	140	4

PLAN NOTES:

(1) PROVIDE 2" PVC BENEATH HARD SURFACES.



STREET LIGHTING

1/4 SCALE: 1"=40'-0"

FEEDPOINT A CIRCUIT 2	CABLE TRENCH TYPE I	2 IN. DIAMETER CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE FEEDPOINT A CIRCUIT 2
32+85-24'LT TO 33+05-24'LT	20 LF	--	24 LF
33+05-24'LT TO 34+40-24'LT	--	135 LF	139 LF
34+40-24'LT TO 35+95-24'LT	155 LF	--	163 LF
35+95-24'LT TO 37+50-24'LT	155 LF	--	163 LF
37+50-24'LT TO 37+70-24'LT	20 LF	--	24 LF

FIXTURE NUMBER	STATION & OFFSET	LUMINAIRE WATTAGE	LUMINAIRE DISTRIBUTION	POLE HEIGHT	MAST ARM
10A	32+85-24'LT	250W	MSC III	30 FT	6 FT
10B	32+85-24'LT	150W	MSC III	30 FT	6 FT
11A	34+40-24'LT	250W	MSC III	30 FT	6 FT
11B	34+40-24'LT	150W	MSC III	30 FT	6 FT
12A	35+95-24'LT	250W	MSC III	30 FT	6 FT
12B	35+95-24'LT	150W	MSC III	30 FT	6 FT
13A	37+50-24'LT	250W	MSC III	30 FT	6 FT
13B	37+50-24'LT	150W	MSC III	30 FT	6 FT

QUANTITIES			
770	0020	CONCRETE FOUNDATION HIGHWAY LIGHTING	4 EA
770	0210	CABLE TRENCH TYPE I	350 LF
770	0330	2 IN. DIA. RIGID CONDUIT	135 LF
770	0424	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE	513 LF
770	2260	LT STD TWIN 6FT MA 30FT MT HT	4 EA
770	4140	HP SODIUM VAPOR LUMINAIRE 250 WATT	4 EA
770	4120	HP SODIUM VAPOR LUMINAIRE 150 WATT	4 EA

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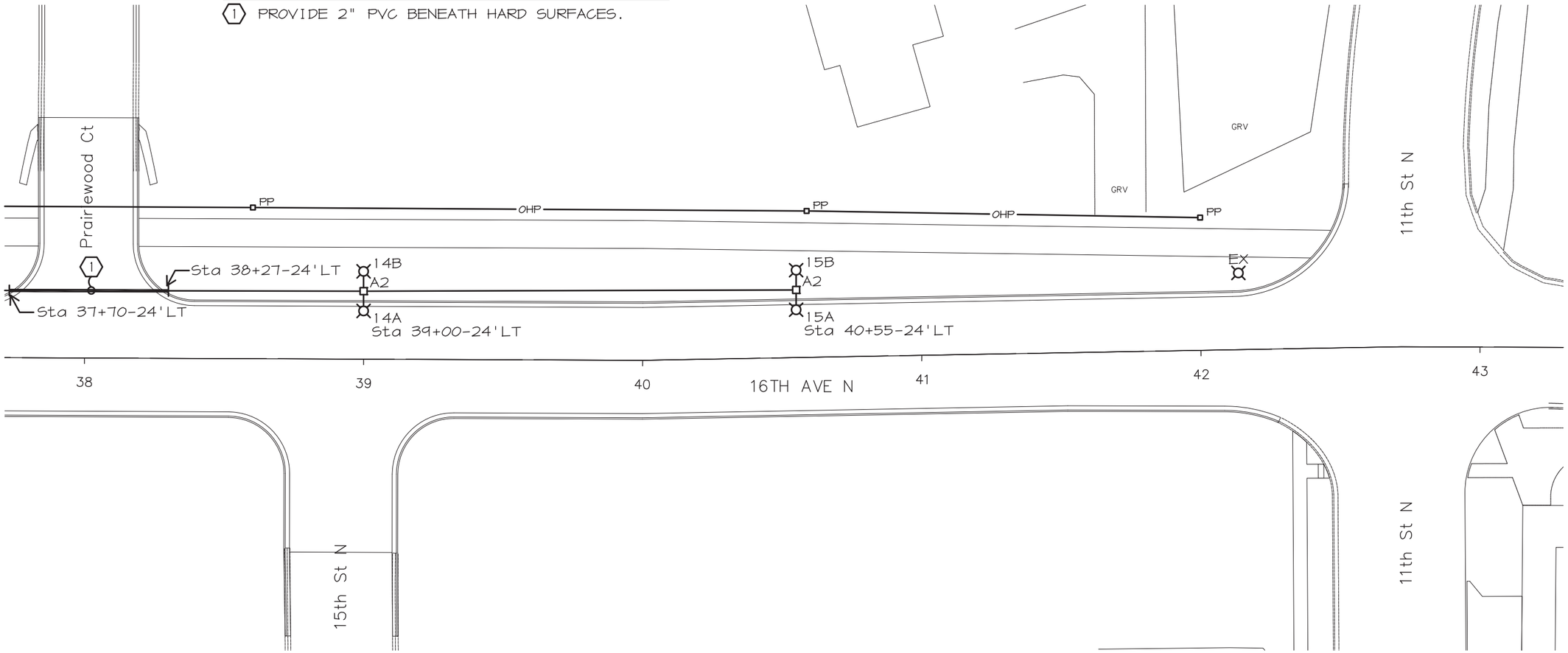
Lighting Layout
Feedpoint/Lift Station Location
Sta 32+45 to 37+60
16th Ave North
Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	140	5

PLAN NOTES:

(1) PROVIDE 2" PVC BENEATH HARD SURFACES.



1/5 STREET LIGHTING

SCALE: 1"=40'-0"

FEEDPOINT A CIRCUIT #2	CABLE TRENCH TYPE I	2 IN DIAMETER CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE FEEDPOINT A CIRCUIT 2
37+70-24'LT TO 38+27-24'LT	--	57 LF	57 LF
38+27-24'LT TO 39+00-24'LT	73 LF	--	77 LF
39+00-24'LT TO 40+55-24'LT	155 LF	--	163 LF

FIXTURE NUMBER	STATION & OFFSET	LUMINAIRE WATTAGE	LUMINAIRE DISTRIBUTION	POLE HEIGHT	MAST ARM
14A	39+00-24'LT	250W	MSC III	30 FT	6 FT
14B	39+00-24'LT	150W	MSC III	30 FT	6 FT
15A	40+55-24'LT	250W	MSC III	30 FT	6 FT
15B	40+55-24'LT	150W	MSC III	30 FT	6 FT

QUANTITIES			
770	0020	CONCRETE FOUNDATION HIGHWAY LIGHTING	2 EA
770	0210	CABLE TRENCH TYPE I	228 LF
770	0330	2 IN. DIA. RIGID CONDUIT	57 LF
770	0424	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE	297 LF
770	2260	LIGHT STANDARD TWIN 6FT MAST ARM 30FT POLE	2 EA
770	4140	HP SODIUM VAPOR LUMINAIRE 250 WATT	2 EA
770	4120	HP SODIUM VAPOR LUMINAIRE 150 WATT	2 EA

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Lighting Layout
Feedpoint/Lift Station Location
Sta 37+60 to 43+20
16th Ave North
Wahpeton, ND

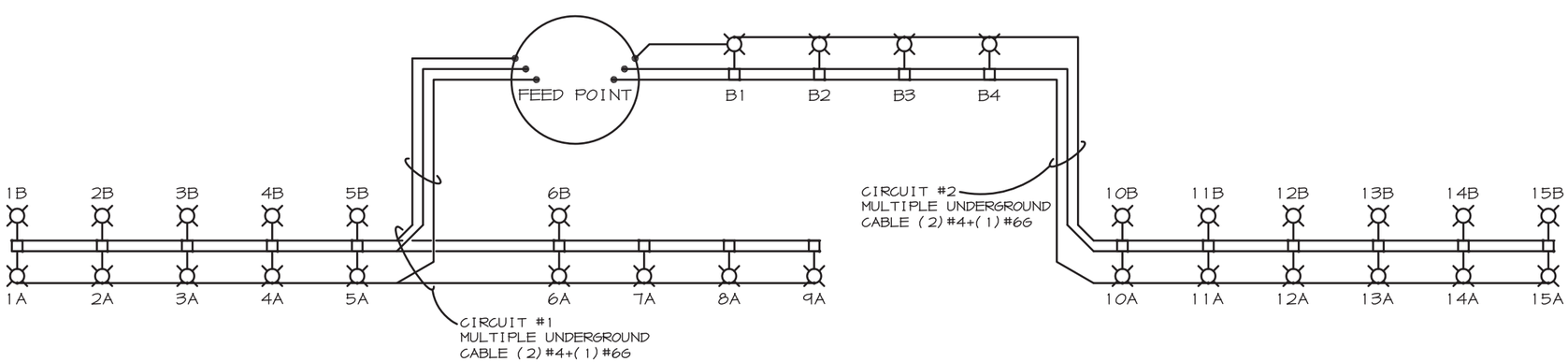
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	140	6

POLE/FIXTURE ASSEMBLY SCHEDULE

TYPE	MFG.	SERIES	VOLT.	LAMP	BLST	SIZE	FIN.	MTG	REMARKS
A1	AMERICAN ELECTRIC LIGHTING OR EQUAL	315	240	(1) 150W HPS	HPF	27"L. 13"W. 11"D.	POWDER COAT FINISH	6' DAVIT ARM	PROVIDE 30', EIGHT SIDED, GALVANIZED POLE WITH SINGLE 6' DAVIT ARM PER NDDOT STANDARDS. POLE SHALL BE A MILLERBERND EA-06-300-G OR APPROVED EQUAL.
A2	(1) AEL (1) AEL OR EQUAL	315 315	240	(1) 250W HPS (1) 150W HPS	HPF	27"L. 13"W. 11"D.	POWDER COAT FINISH	6' DAVIT ARM	PROVIDE 30', EIGHT SIDED, GALVANIZED POLE WITH TWIN 6' DAVIT ARM PER NDDOT STANDARDS. POLE SHALL BE A MILLERBERND EA-(2)06-300-G OR APPROVED EQUAL.
B	STERNBERG OR EQUAL	B740 AVENUE SERIES	240	(1) 150W HPS	HPS	29"T. 14"W.	BLACK	POST TOP	PROVIDE 14', ORNAMENTAL POLE. THE POLE SHALL BE ALUMINUM, ONE PIECE. THE 17"D. CAST ALUMINUM FLUTED BASE SHALL BE CONSTRUCTED WITH A 4"OD STRAIGHT FLUTED SHAFT. THE POLE SHALL BE A STERNBERG AUGUSTA 4200 SERIES OR APPROVED EQUAL.

QUANTITIES

770	0020	CONCRETE FOUNDATION - HIGHWAY LIGHTING	19 EA	
770	0060	CONCRETE FOUNDATION - FEED POINT TYPE B	1 EA	
770	0210	CABLE TRENCH - TYPE I	2389 LF	
770	0330	2 IN. DIAMETER RIGID CONDUIT	343 LF	
770	0424	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE	2884 LF	
770	0735	FEED POINT TYPE II - PAD MOUNTED	1 EA	
770	1066	LT STD 6 FT MA 30FT MT HT	3 EA	
770	2260	LT STD TWIN 6FT MA 30FT MT HT	12 EA	
770	4088	ORNAMENTAL LT STD 14FT MT HT	4 EA	
770	4120	HP SODIUM VAPOR LUMINAIRE - 150 WATT	12 EA	
770	4140	HP SODIUM VAPOR LUMINAIRE - 250 WATT	15 EA	
770	4493	ORNAMENTAL LIGHT FIXTURE - 150 WATT	4 EA	
770	9270	MODIFY EXISTING FEEDPOINT	1 EA	2
772	3005	RELOCATE FEEDPOINT	1 EA	1



1/6 ONE-LINE DIAGRAM
SCALE: NONE

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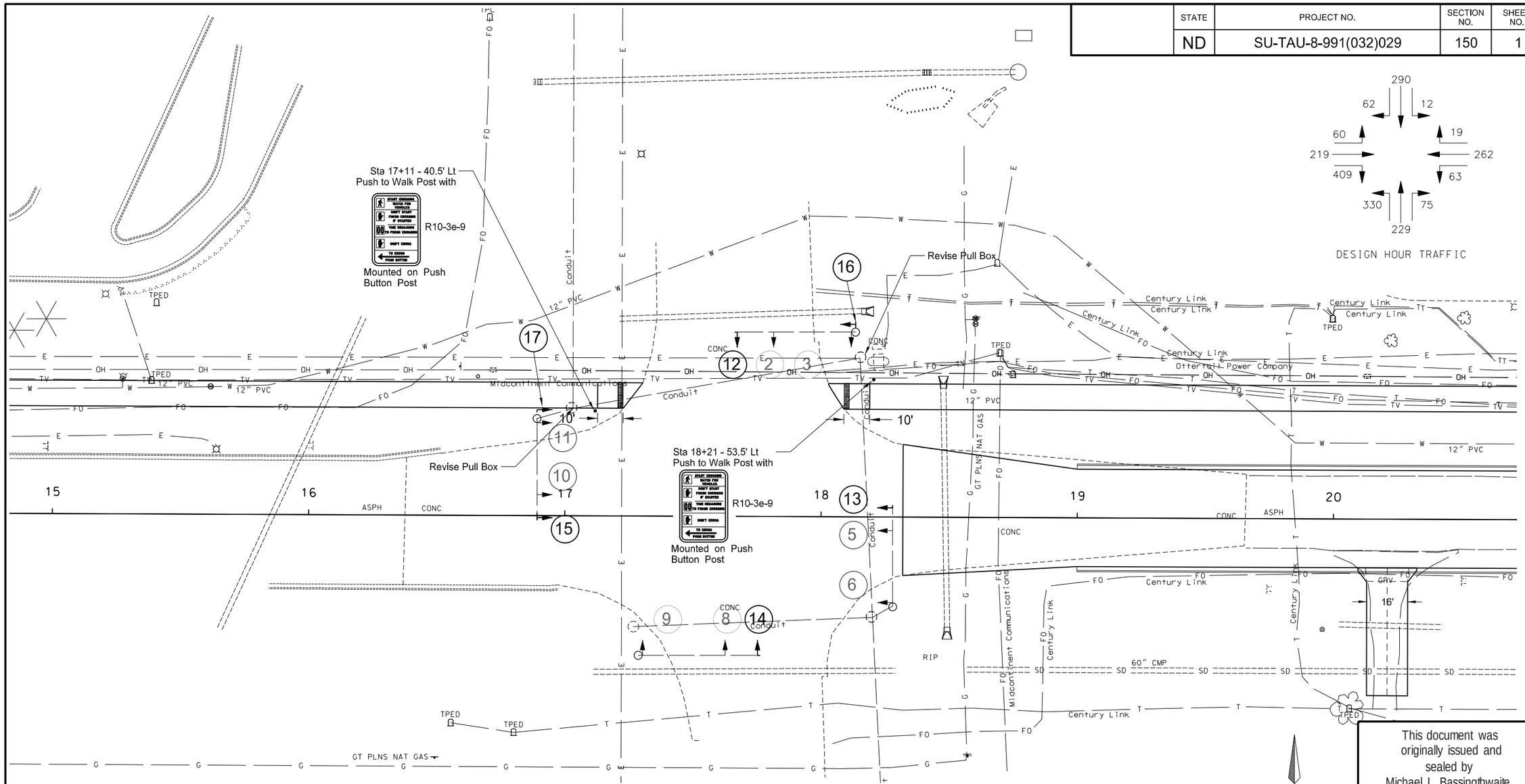
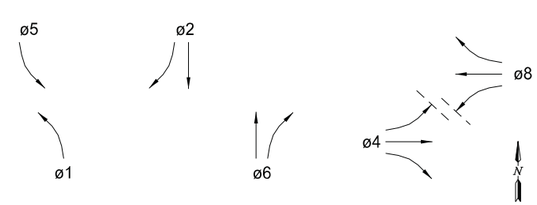
Lighting Layout
Feedpoint/Lift Station Location
Sta 37+60 to 43+20
16th Ave North
Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	1

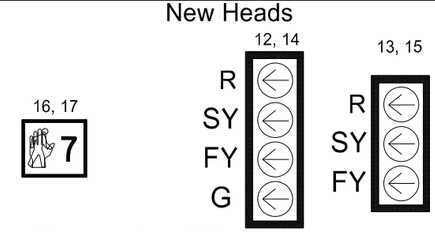


General Notes:
1. Stationing Is Based Off the 16th Avenue North Alignment.

Signal Phasing



New Heads



7 = Remaining seconds left in PED Phase
LED Displays

12" Lenses
5" Louvered Backplate
w/ yellow retroreflective borders
LED Displays

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Signal Layout

Traffice Signal Improvements

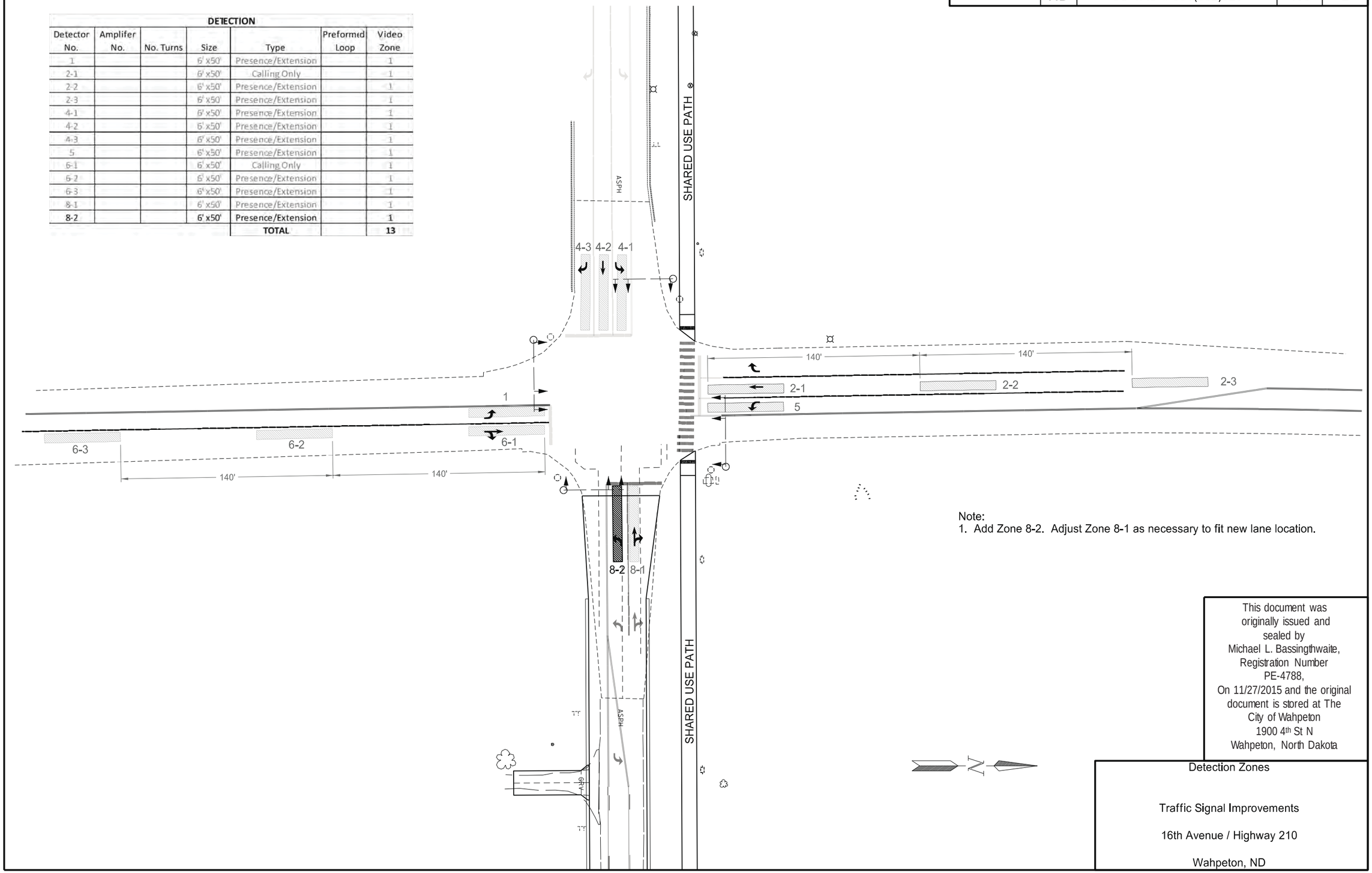
16th Avenue / Highway 210

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	2

DETECTION

Detector No.	Amplifer No.	No. Turns	Size	Type	Preformed Loop	Video Zone
1			6' x50'	Presence/Extension		1
2-1			6' x50'	Calling Only		1
2-2			6' x50'	Presence/Extension		1
2-3			6' x50'	Presence/Extension		1
4-1			6' x50'	Presence/Extension		1
4-2			6' x50'	Presence/Extension		1
4-3			6' x50'	Presence/Extension		1
5			6' x50'	Presence/Extension		1
6-1			6' x50'	Calling Only		1
6-2			6' x50'	Presence/Extension		1
6-3			6' x50'	Presence/Extension		1
8-1			6' x50'	Presence/Extension		1
8-2			**6' x50'**	**Presence/Extension**		**1**
				TOTAL		**13**



Note:
1. Add Zone 8-2. Adjust Zone 8-1 as necessary to fit new lane location.

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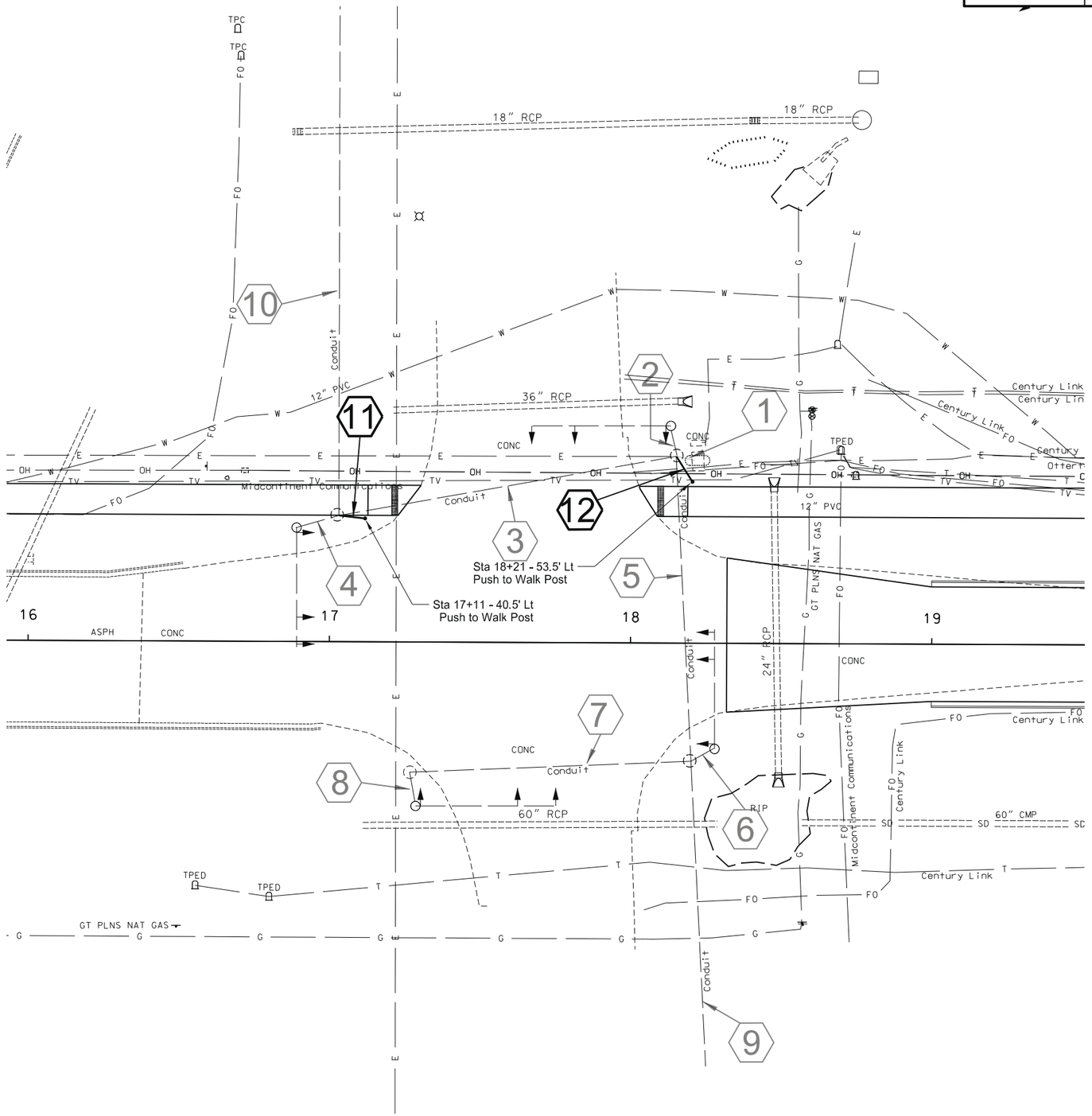
Detection Zones

Traffic Signal Improvements

16th Avenue / Highway 210

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-8-991(032)029	150	3



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Conduit Layout

Traffic Signal Improvements

16th Avenue / Highway 210

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	4

Conduit and Cable Runs

Run No.	Station	Conduit Runs		Cable Runs	
		Conduit Length (ft.)	Conduit Size (in.)	Cable Length (ft.)	Cable Types
1	62+86.83 51.1' RT to 62+92.33 42.9' RT	9.8	4"	75.2 75.2 37.6 75.2 59.4	Cables 1, 2, 3, 4 Cables 5, 6, 7, 8 (Video Detection - Power) Cable 9, 10 (Flashing Beacons) (4) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
2	62+92.33 42.9' RT to 62+97.81 40.9' RT	5.8	3"	11.8 11.8 11.8 44.4	Cable 1 Cable 5 (Video Detection - Power) (1) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
3	62+92.33 42.9' RT to 62+68.92 71.8' LT	117.1	3"	123.1 123.1 123.1 123.1 369.3	Cable 4 Cable 10 (Flashing Beacon) Cable 6 (Video Detection - Power) (1) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
4	62+68.92 71.8' LT to 62+68.43 84.7' LT	12.9	3"	18.9 18.9 18.9 65.7	Cable 4 Cable 6 (Video Detection - Power) (1) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
5	62+92.33 42.9' RT to 61+82.62 44.5' RT	109.8	4"	231.6 231.6 115.8 231.6 365.4	Cable 2, 3 Cable 7, 8 (Video Detection - Power) Cable 9 (Flashing Beacon) (2) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
6	61+82.62 44.5' RT to 61+88.73 51.2' RT	9.2	3"	15.2 15.2 15.2 54.6	Cable 2 Cable 7 (Video Detection - Power) (1) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
7	61+82.62 44.5' RT to 61+77.23 51.4' LT	96.0	3"	102.0 102.0 102.0 324.0	Cable 3 Cable 8 (Video Detection - Power) (1) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
8	61+77.23 51.4' LT to 61+74.09 49.1' LT	3.4	3"	9.4 9.4 9.4 37.2	Cable 3 Cable 8 (Video Detection - Power) (1) Cable A (Video Detection - Coax) (2) No. 6 RHW + No. 6 RHWG (Luminaire)
9	61+82.62 44.5' RT to 56+82.83 46.9' RT	499.5	2"	514.5	Cable 9 (Flashing Beacon)
10	62+68.92 71.8' LT to 67.83.72 54.0' LT	520.0	2"	535.0	Cable 10 (Flashing Beacon)
11	**17+02 - 42.0' LT to 17+11 - 40.5' LT**	**9**	**2"**	**142**	**Cable 11 (PPB #1)**
12	**18+15 - 62' LT to 18+21 - 53.5' LT**	**10**	**2"**	**26**	**Cable 12 (PPB #2)**

Quantity Totals

2" conduit	**19**
2c 16 AWG	**168**

16th Avenue / ND Hwy. 210 - Cables & Conductors

CABLE 1 (12c AWG 12)

CONDUCTOR	BASE	TRACER	HEAD	INDICATION
1	Black		**12**, 2, 3	Green
2	White			Neutral
3	Red		**12**, 2, 3	Red
4	Green			Ground
5	Orange		**12**, 2, 3	Yellow
6	**Blue**		**16**	**Don't Walk**
7	**White**	**Black**	**16**	**Walk**
8	**Red**	**Black**	**1**	**Flash. Yellow**
9	Green	Black		Spare
10	Orange	Black		Spare
11	Blue	Black		Spare
12	Black	Black		Spare

CABLE 2 (12c AWG 12)

CONDUCTOR	BASE	TRACER	HEAD	INDICATION
1	Black		**13**, 5, 6	Green
2	White			Neutral
3	Red		**13**, 5, 6	Red
4	Green			Ground
5	Orange		**13**, 5, 6	Yellow
6	Blue			Don't Walk
7	White	Black		Walk
8	Red	Black	6	Gr. Arrow
9	Green	Black		Spare
10	Orange	Black	6	Yell. Arrow
11	Blue	Black		Spare
12	Black	Black		Spare

CABLE 3 (12c AWG 12)

CONDUCTOR	BASE	TRACER	HEAD	INDICATION
1	Black		**14**, 8, 9	Green
2	White			Neutral
3	Red		**14**, 8, 9	Red
4	Green			Ground
5	Orange		**14**, 8, 9	Yellow
6	Blue			Don't Walk
7	White	Black		Walk
8	**Red**	**Black**	**14**	**Flash. Yellow**
9	Green	Black		Spare
10	Orange	Black		Spare
11	Blue	Black		Spare
12	Black	Black		Spare

CABLE 4 (12c AWG 12)

CONDUCTOR	BASE	TRACER	HEAD	INDICATION
1	Black		**10, 11, 15**	Green
2	White			Neutral
3	Red		**10, 11, 15**	Red
4	Green			Ground
5	Orange		**10, 11, 15**	Yellow
6	**Blue**		**17**	**Don't Walk**
7	**White**	**Black**	**17**	**Walk**
8	**Red**	**Black**	**15**	**Flash. Yellow**
9	Green	Black		Spare
10	Orange	Black		Spare
11	Blue	Black		Spare
12	Black	Black		Spare

CABLE 5 (No. 10 AWG 2c)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	Black		Video Camera #1	Video Power
2	White			Neutral

CABLE 6 (No. 10 AWG 2c)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	Black		Video Camera #2	Video Power
2	White			Neutral

CABLE 7 (No. 10 AWG 2c)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	Black		Video Camera #3	Video Power
2	White			Neutral

CABLE 8 (No. 10 AWG 2c)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	Black		Video Camera #4	Video Power
2	White			Neutral

CABLE 9 (2c AWG 10)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	Black		Flasher	Flasher Pwr.
2	White			Neutral

CABLE 10 (2c AWG 10)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	Black		Flasher	Flasher Pwr.
2	White			Neutral

CABLE 11 (No. 16 AWG 2c)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	**Black**		**PPB #1**	**Power**
2	**White**			**Neutral**

CABLE 12 (No. 16 AWG 2c)

CONDUCTOR	BASE	TRACER	TERMINUS	PURPOSE
1	**Black**		**PPB #2**	**Power**
2	**White**			**Neutral**

PPB = Pedestrian Push Button

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Conduit and Conductor Runs

Traffic Signal Improvements

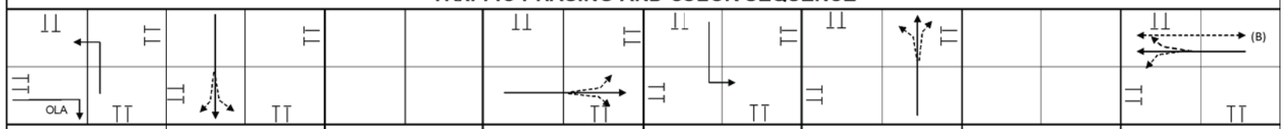
16th Avenue / Highway 210

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	5

TRAFFIC PHASING AND COLOR SEQUENCE

N



HEAD NO.	PHASE 1				PHASE 2				PHASE 3 (future phase)				PHASE 4				PHASE 5				PHASE 6				PHASE 7 (future phase)				PHASE 8			
	R/W	CLEAR TO PHASE 2+6	CLEAR TO PHASE 1+6	CLEAR TO PHASE A/O	R/W	CLEAR TO PHASE 6	CLEAR TO PHASE A/O		R/W	CLEAR TO PHASE	CLEAR TO PHASE	CLEAR TO PHASE	R/W	CLEAR TO PHASE 8	CLEAR TO PHASE A/O		R/W	CLEAR TO PHASE 2+5	CLEAR TO PHASE 1+6	CLEAR TO PHASE A/O	R/W	CLEAR TO PHASE 2	CLEAR TO PHASE A/O		R/W	CLEAR TO PHASE	CLEAR TO PHASE	CLEAR TO PHASE	R/W	CLEAR TO PHASE 4	CLEAR TO PHASE A/O	
12 (arrow)	G	SY	G	SY	R	FY	R						R	R	R		R	R	SY	R	FY	SY	SY						R	R	R	
2, 3	R	R	G	R	R	R	R						R	R	R		R	R	R	R	G	G	Y						R	R	R	
14 (arrow)	R	R	R	R	FY	SY	SY						R	R	R		G	G	SY	SY	R	R	R						R	R	R	
8, 9	R	R	R	R	G	G	Y						R	R	R		R	R	R	R	R	R	R						R	R	R	
13	R	R	R	R	R	R	R						FY	SY	SY		R	R	R	R	R	R	R						R	R	R	
5	R	R	R	R	R	R	R						G	G	Y		R	R	R	R	R	R	R						R	R	R	
6 (ball)	R	R	R	R	R	R	R						G	G	Y		R	R	R	R	R	R	R						R	R	R	
6 (arrow)	G	Y	G	Y	-	-	-						-	-	-		G	Y	Y	Y	G	Y	Y						-	-	-	
10, 11	R	R	R	R	R	R	R						R	R	R		R	R	R	R	R	R	R						G	G	Y	
15	R	R	R	R	R	R	R						R	R	R		R	R	R	R	R	R	R						FY	SY	SY	

R= Red
G= Green
SY= Steady Yellow
FY= Flashing Yellow

CHART A	
ON PHASE	NON-CONFLICTING PHASE ALLOWED TO TIME CONCURRENTLY
1	5 OR 6
2	5 OR 6
3	–
4	8
5	1 OR 2
6	1 OR 2
7	–
8	4

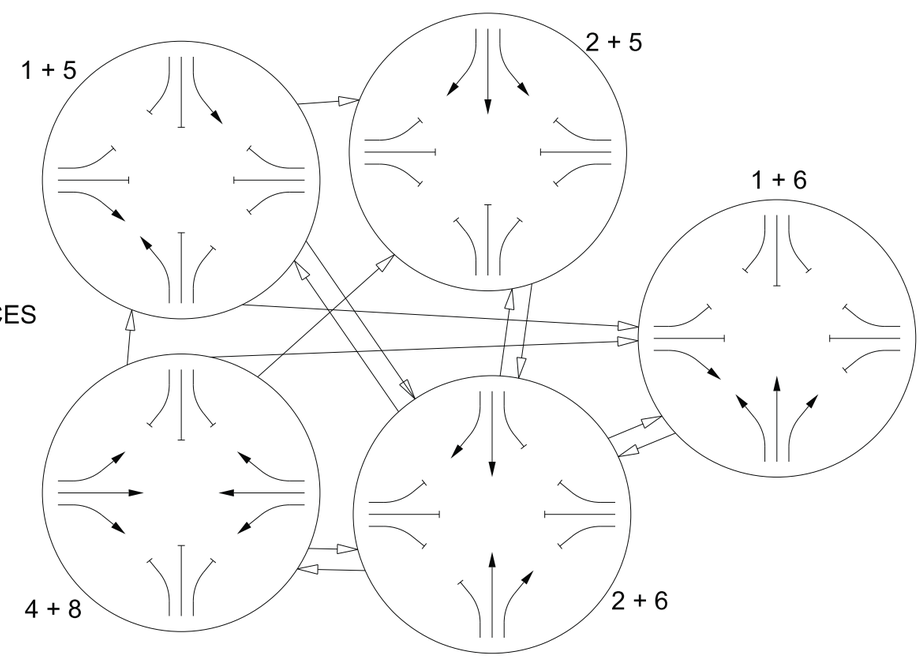
A / O = All Other Phases

Protected Movement

Permitted Movement

(A) When one phase is on alone, any non-conflicting phase may start timing concurrently without a clearance interval (See Chart A).
(B) Pedestrian Movements, upon actuation

ALLOWED PHASE SEQUENCES



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Signal Details - Traffic Phasing & Color Sequence

Traffic Signal Improvements

16th Avenue / Highway 210

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	6

CONTROLLER SETTINGS - 16TH AVENUE NORTH / ND HWY. 210

		PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7	PHASE 8
BASIC INTERVALS (OR FUNCTIONS)		NBL	SB		EB	SBL	NB		WB
Minimum Initial		4	10		8	4	10		8
Vehicle Extension		2	1.5		2	2	1.5		2
Maximum (Maximum Green or Ext. Time)		18	40		28	8	40		28
Yellow Change		4.3	4.3		3.6	4.3	4.3		3.6
Red Clearance		2.1	2.1		2.6	2.1	2.1		2.6
Overlap B (See Notes 3 & 4)			6				6		
Walk (See Note 5)					7				7
Pedestrian Clearance (See Note 5)					21				21
Flash Time		8	8			8	8		
VOLUME DENSITY TIMING OPTIONS									
Variable Initial Timing Options									
Added Initial									
Minimum Initial									
Added Initial Per Actuation									
Actuations Before Added Initial									
Computed Initial									
Minimum Initial									
Maximum Initial									
Actuations to Reach Maximum Initial									
Extensible Initial									
Minimum Initial									
Maximum Initial									
Added Initial Per Actuation									
TIME WAITING GAP REDUCTION OPTIONS									
Passage Time									
Minimum Gap									
Time to Reduce Minimum Gap									
Reduce Gap Every									
Reduce Gap Every Second By									
Reduce Gap By									
Locking Memory									
Non-Locking Memory		X	X		X	X	X		X
Flashing - Normal & Conflict Monitor		R	Y		R	R	Y		R
Start Up Phasing		R	G		R	R	G		R
Type of Detector Loop (see detection zone sheet)	Presence	X			X	X			X
	Calling								
	Passage		X				X		
Emergency Vehicle Preemption									

1. Phases 2 & 6 shall be placed in recall.
2. Detection for Eastbound 16th Avenue right turn lane (detector zone 4-3) shall be programmed with a 10 second delay.
3. Overlap B interval for Phases 4 & 8 shall be utilized for ND210 flashing beacon activation in advance of Phases 4 or 8.
4. Pedestrian phase timing only upon actuation.

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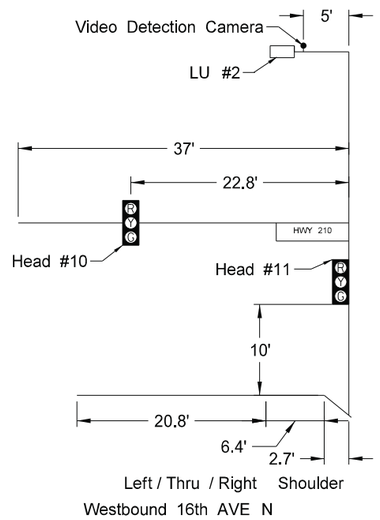
Signal Details - Controller Settings

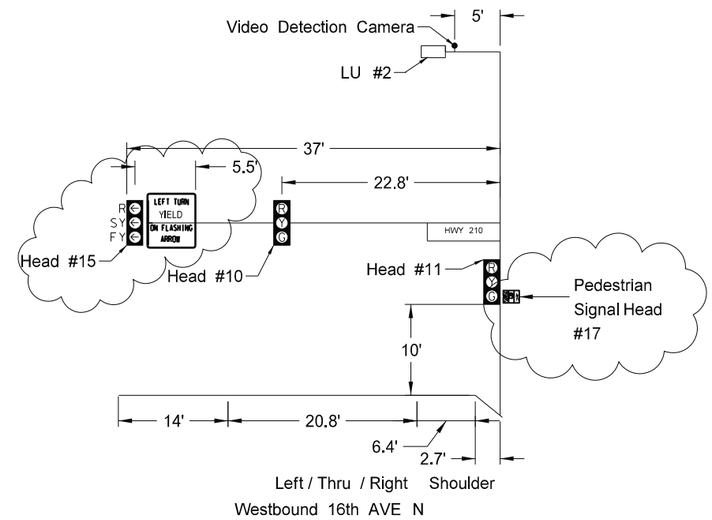
Traffic Signal Improvements

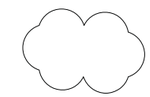
16th Avenue / Highway 210

Wahpeton, ND

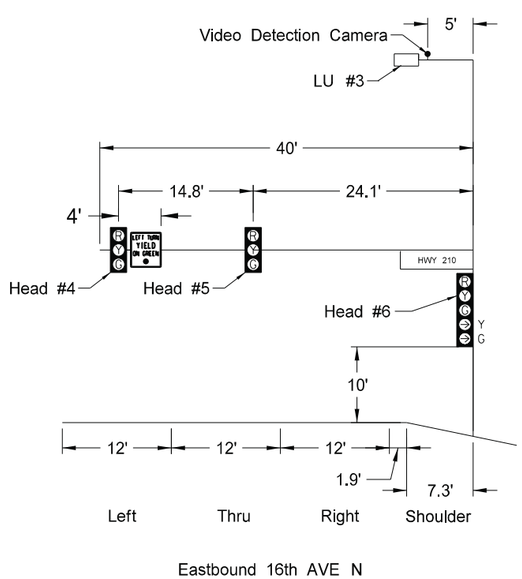
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	7



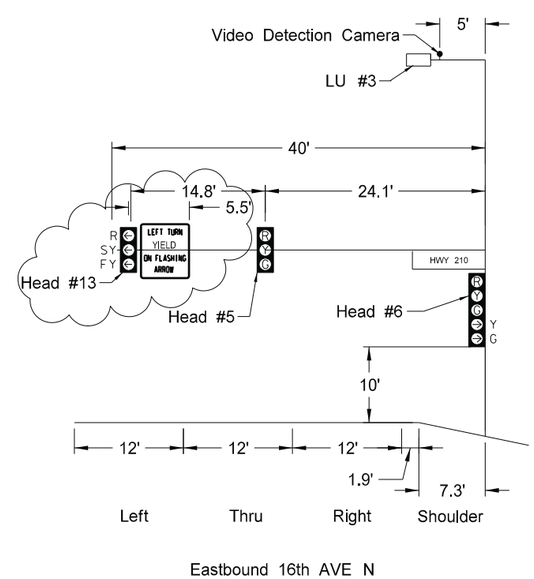




Modified or Added Signal Head



EXISTING WEST AND EAST BOUND SIGNALS



PROPOSED WEST AND EAST BOUND SIGNALS

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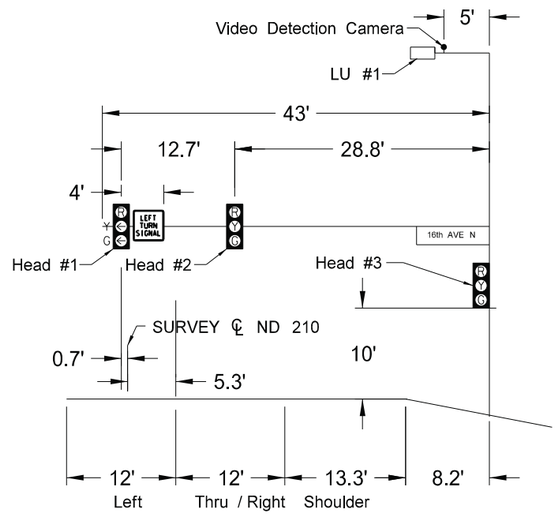
Signal Details - Signal Standard & Head Locations

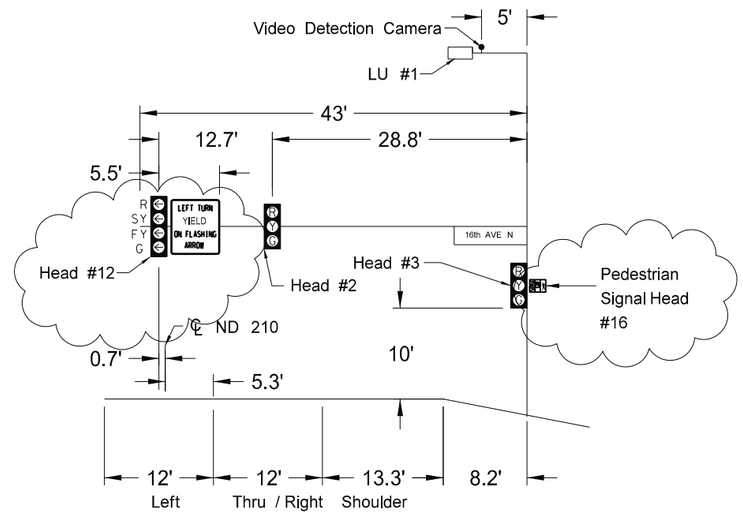
Traffic Signal Improvements
West and East Bound Signals
16th Avenue / Highway 210

Wahpeton, ND

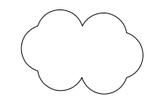
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	8



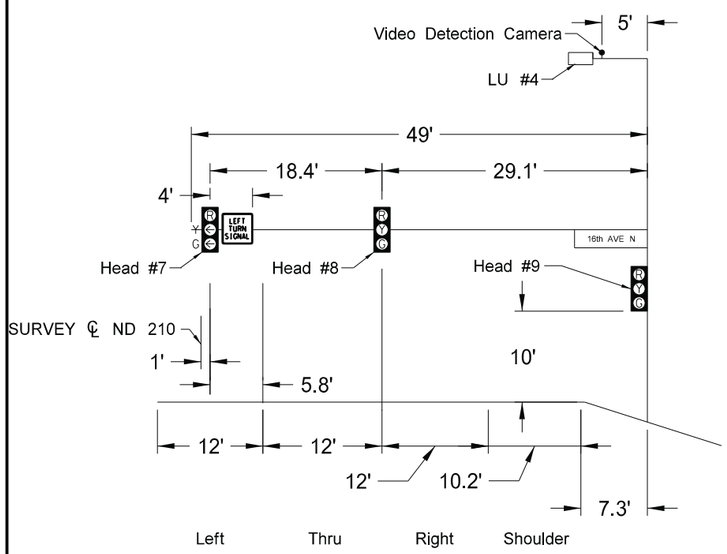
Northbound ND 210



Northbound ND 210

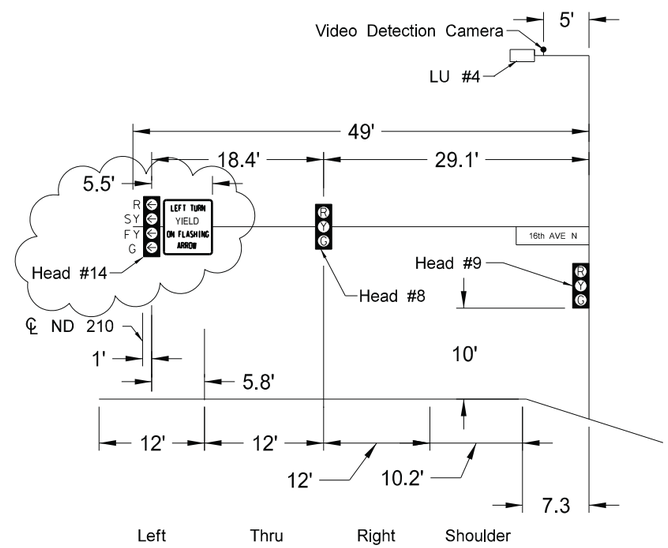


Modified or Added Signal Head



Southbound ND 210

EXISTING NORTH AND SOUTH BOUND SIGNALS



Southbound ND 210

PROPOSED NORTH AND SOUTH BOUND SIGNALS

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Signal Details - Signal Standard & Head Locations

Traffic Signal Improvements
North and South Bound Signals
16th Avenue / Highway 210

Wahpeton, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SU-TAU-8-991(032)029	150	9

TRAFFIC SIGNAL QUANTITIES

STATION	Adjust Pull Box	2" Dia. Rigid Conduit	No. 16 AWG 2 Conductor Cable	Feed Point - Combo Lighting & Signals - Pad Mount	1-Way 3 Sec. Head w/12" LED Lens - Mast Arm Mounted	Controller Type 2	Flashing Yellow Arrow	APS Pedestrian Push Button Post Mounted
	EA	LF	LF	EA	EA	EA	EA	EA
62+97.84 40.9' Rt.							1	
62+68.49 84.7' Lt.					1			
61+74.09 49.1' Lt.							1	
61+88.73 51.2' Rt.					1			
62+86.89 51.1' Rt.				1		1		
17+11 - 40.5' Lt.		9	142					1
18+21 - 53.5' Lt.		10	26					1
Various Locations	2							
TOTAL	2	19	168	1	2	1	2	2

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Summary of Signal Quantities

Traffic Signal Improvements

16th Avenue / Highway 210

Wahpeton, ND

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.
Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
A	ampere
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Az	azimuth
Bk	back
BF	back face
Bs	backsight
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
Brg	bearing
BI	beehive inlet
Beg	begin
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
Bd Ft	board feet
BH	bore hole
BS	both sides
Bot	bottom
Blvd	Boulevard
Bndry	boundary
BC	brass cap
Brkwy	breakaway
Br	bridge
Bldg	building
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
CI or ℄	centerline
Cm	centimeter
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Co S	coal slack
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSP	corrugated steel pipe
C	coulomb
Co	County
Crse	course
C Gr	course gravel
CS	course sand
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	Crossroad
Crn	crown
CF	cubic feet
M3	cubic meter
M3/s	cubic meters per second
CY	cubic yard
Cy/mi	cubic yards per mile
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
CS	curve to spiral
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Deg or D	degree
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Eq	equation
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
F	Fahrenheit
FS	far side
F	farad
Fed	Federal
FP	feed point
Ft	feet/foot
Fn	fence
Fn P	fence post
FO	fiber optic
FB	field book
FD	field drive
F	fill
FAA	fine aggregate angularity
FS	fine sand
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fs	foresight
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser

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

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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed
Gal	gallon
Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Geod	geodetic
GIS	Geographical Information System
G	giga
GPS	Global Positioning System
Gov	government
Grd	graded/grade
Gr	gravel
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ha	hectare
Ht	height
HI	height of instrument
Hel	helical
H	henry
Hz	hertz
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hr	hour(s)
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
In or "	inch
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IM	iron monument

I Pn	Iron Pin
IP	iron Pipe
Jt	joint
J	joule
Jct	junction
K	kelvin
Kn	kilo newton
Kpa	kilo pascal
Kg	kilogram
Kg/m3	kilogram per cubic meter
Km	kilometer
K	Kip(s)
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
Ln	lane
Lg	large
Lat	latitude
Lt	left
L	length of curve
Lens	lenses
Lvl	level
LB	level book
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Lig Co	lignite coal
Lig Sl	lignite slack
LF	linear foot
Liq	liquid
LL	liquid limit
L	litre
Lm	loam
Loc	location
LC	long chord
Long.	longitude
Lp	loop
LD	loop detector
Lm	lumen
Lum	luminaire
L Sum	lump sum
Lx	lux
ML	main line
M Hr	man hour
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain

MC	medium curing
M	mega
Mer	meridian
M	meter
M/s	meters per second
M	mid ordinate of curve
Mi	mile
MM	mile marker
MP	mile post
Ml	milliliter
Mm	millimeter
Mm/hr	millimeters per hour
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Mun	municipal
N	nano
NGS	National Geodetic Survey
NS	near side
Neop	neoprene
Ntwk	network
N	newton
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number
Obsc	obscure(d)
Obsn	observation
Ocpd	occupied
Ocpy	occupy
Off Loc	office location
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PK	Parker-Kalon nail
Pa	pascal
PSD	passing sight distance
Pvmt	pavement

Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl	plate
Pt	point
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
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
Lb or #	pounds
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
08-03-15	General Revisions

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NDDOT ABBREVIATIONS

D-101-3

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

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
AGC	Assiociated General Contractors of America
All Pl	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users Association
AMOCO Pl	Amoco Pipeline Company
AMRDA HESS	Amerada Hess Corporation
AT&T	AT&T Corporation
B PAW	Bear Paw Energy Incorporated
BAKER ELEC	Baker Electric
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe Railway
BOEING	Boeing
BRNS RWD	Barnes Rural Water District
BURK-DIV ELEC	Burke-Divide Electric Cooperative
BURL WU	Burleigh Water Users
Cable One	Cable One
CABLE SERV	Cable Services
CAP ELEC	Capital Electric Cooperative Incorporat
CASS CO ELEC	Cass County Electric Cooperative
CASS RWU	Cass Rural Water Users Incorporated
CAV ELEC	Cavalier Rural Electric Cooperative
CBLCOM	Cablecom Of Fargo
CENEX PL	Cenex Pipeline
CENT PL WATER DIST	Central Pipe Line Water District
CENT PWR ELEC	Central Power Electric Cooperative
COE	Corps of Engineers
CONS TEL	Consolidated Telephone
CONT RES	Continental Resource Inc
CPR	Canadian Pacific Railway
D O E	Department Of Energy
DAK CARR	Dakota Carrier Network
DAK CENT TEL	Dakota Central Telephone
DAK RWD	Dakota Rural Water District
DGC	Dakota Gasification Company
DICKEY R NET	Dickey Rural Networks
DICKEY RWU	Dickey Rural Water Users Association
DICKEY TEL	Dickey Telephone
DNRR	Dakota Northern Railroad
DOME PL	Dome Pipeline Company
DVELEC	Dakota Valley Electric Cooperative
DVMW	Dakota, Missouri Valley & Western
ENBRDG	Enbridge Pipelines Incorporated
ENVENTIS	Enventis Telephone
FALK MNG	Falkirk Mining Company
FHWA	Federal Highway Administration
G FKS-TRL WD	Grand Forks-traill Water District
GETTY TRD & TRAN	Getty Trading & Transportation
GLDN W ELEC	Golden West Electric Cooperative
GRGS CO TEL	Griggs County Telephone
GT PLNS NAT GAS	Great Plains Natural Gas Company
HALS TEL	Halstad Telephone Company
IDEA1	Idea1
INT-COMM TEL	Inter-Community Telephone Company
KANEB PL	Kaneb Pipeline Company
KEM ELEC	Kem Electric Cooperative Incorporated
KOCH GATH SYS	Koch Gathering Systems Incorporated
LKHD PL	Lakehead Pipeline Company
LNGDN RWU	Langdon Rural Water Users Incorporated
LWR YELL R ELEC	Lower Yellowstone Rural Electric
MCKNZ CON	McKenzie Consolidated Telcom
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
MID-CONT CABLE	Mid-Continent Cable
MIDSTATE TEL	Midstate Telephone Company
MINOT CABLE	Minot Cable Television
MINOT TEL	Minot Telephone Company
MISS W W S	Missouri West Water System
MNKOTA PWR	Minnkota Power
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MRE LBTY TEL	Moore & Liberty Telephone
MUNICIPAL	City Water And Sewer
MUNICIPAL	City Of '.....'
N CENT ELEC	North Central Electric Cooperative
N VALL W DIST	North Valley Water District
ND PKS & REC	North Dakota Parks And Recreation
ND TEL	North Dakota Telephone Company
NDDOT	North Dakota Department of Transportation
NDSU SOIL SCI DEPT	NDSU Soil Science Department
NEMONT TEL	Nemont Telephone
NODAK R ELEC	Nodak Rural Electric Cooperative
NOON FRMS TEL	Noonan Farmers Telephone Company
NPR	Northern Plains Railroad
NSP	Northern States Power
NTH PRAIR RW	Northern Prairie Rural Water Association
NTHN BRDR PL	Northern Border Pipeline
NTHN PLNS ELEC	Northern Plains Electric Cooperative Incorporated
NTHWSTRN REF	Northwestern Refinery Company
NW COMM	Northwest Communication Cooperation
ONEOK	Oneok gas
OSHA	Occupational Safety and Health Administration
OTTR TL PWR	Otter Tail Power Company
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
PVT ELEC	Private Electric
QWEST	Qwest Communications
R&T W SUPPLY	R & T Water Supply Association
RAMSEY R SEW	Ramsey Rural Sewer Association
RAMSEY RW	Ramsey Rural Water Association
RAMSEY UTIL	Ramsey County Rural Utilities
RED RIV TEL	Red River Rural Telephone
RESVTN TEL	Reservation Telephone
ROBRTS TEL	Roberts Company Telephone
R-RIDER ELEC	Roughrider Electric Coop
RRVW	Red River Valley & Western Railroad
RSR ELEC	R.S.R. Electric Cooperative
S E W U	South East Water Users Incorporated
SCOTT CABLE	Scott Cable Television Dickinson
SHERDN ELEC	Sheridan Electric Cooperative
SHEYN VLY ELEC	Sheyenne Valley Electric Cooperative
SKYTECH	Skyland Technologies Incorporated
SLOPE ELEC	Slope Electric Cooperative Incorporated
SOURIS RIV TELCOM	Souris River Telecommunications
ST WAT COMM	State Water Commission
STATE LN WATER	State Line Water Cooperative
STER ENG	Sterling Energy
STUT RWU	Stutsman Rural Water Users
SW PL PRJ	Southwest Pipeline Project
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
TESORO HGH PLNS PL	Tesoro High Plains Pipeline
TRI-CNTY WU	Tri-County Water Users Incorporated
TRL CO RWU	Traill County Rural Water Users
UNTD TEL	United Telephone
UPPR SOUR WUA	Upper Souris Water Users Association
US SPRINT	U.S. Sprint
USAF MSL CABLE	U.S.A.F. Missile Cable
USFWS	US Fish and Wildlife Service
USW COMM	U.S. West Communications
VRNDRY ELEC	Verendrye Electric Cooperative
W RIV TEL	West River Telephone Incorporated
WEB	W. E. B. Water Development Association
WILLI RWA	Williams Rural Water Association
WILSTN BAS PL	Williston Basin Interstate Pipeline Company
WLSH RWD	Walsh Water Rural Water District
WOLVRTN TEL	Wolverton Telephone
XLENER	Xcel Energy
YSVR	Yellowstone Valley Railroad

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

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D-101-20

Line Styles

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Sight Distance Triangle Line
- Small Hidden Object
- Dimension Leader
- Existing Ground
- Existing Topsoil (Cross Section View)
- Large Hidden Object
- Edge Drain
- D — Geotextile Fabric Type D
- E — Existing Electrical
- FO — Existing Fiber Optic Line
- FO — Existing TV Fiber Optic
- G — Existing Gas Pipe
- Geo — Geogrid
- OH — Existing Overhead Utility Line
- P — Existing Power
- PL — Existing Fuel Pipeline
- PL — Existing Undefined Above Ground Pipe Line
- R — Geotextile Fabric Type R
- R — Geotextile Fabric Type R1
- REMOVE — Remove Line
- RR — Geotextile Fabric Type RR
- S — Geotextile Fabric Type S
- S — Floating Silt Curtain
- T — Existing Telephone Line
- TV — Existing TV Line
- Void — Existing Assumed Ground (Not Surveyed)
- Void — Tentative Ground Line
- W — Existing Water or Steam Line
- Existing Under Drain
- Under Drain
- Wall
- Existing Slotted Drain
- Existing Cemetary Boundary
- 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
- Wetland Mitigation
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Easement
- Existing Concrete
- Existing Easement
- Existing Gravel Surface
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Riprap
- Existing Underground Vault or Lift Station
- Tangent Line
- Hidden Object
- Existing Dirt Surface
- Existing Conduit
- Topsoil Profile
- Existing Conductor
- Conductor
- Fiber Optic
- Existing Loop Detector
- Subgrade, Subcut or Ditch Grade
- Existing Asphalt Surface
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar
- Existing Tie Point Line
- Existing State or International Line
- Existing Quarter Section Line
- Existing County
- Existing Section Line
- Existing Township
- Existing Railroad Centerline
- Centerline
- Existing Centerline
- Supplemental Contour
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Failure Line
- Existing Conditions
- Existing Ground (Details)
- Existing Sixteenth Section Line
- Existing Right of Way Not State Owned
- Phantom Object
- Centerline Main
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Excavation Limits
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines

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

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D-101-21

Line Styles

- Subgrade Reinforcement
- Existing Down Guy Wire Down Guy
- Existing Fence
- Existing Railroad
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Fence
- Silt Fence
- Existing Field Line
- Exst Flow
- Flow
- Existing Culvert
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Overhead Sign Structure
- Existing Micro Loop Detector
- Micro Loop Detector
- Existing Overhead Sign Structure Cantilever
- Existing Railroad Switch
- Overhead Sign Structure Cantilever
- 24 Inch Pipe
- Reinforced Concrete Pipe
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm
- Tie Bar at Random Spacing
- 3-Cable w Posts
- Existing 3-Cable w Posts
- Site Boundary
- Fiber Rolls
- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Depression Contours
- Existing City Corporate Limits or Reservation Boundary
- Gravel Pit - Borrow Area
- Existing Tree Boundary
- Tree Row
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Retaining Wall (Plan View)
- Sheet Piling
- W-Beam w Posts
- Existing W-Beam Guardrail with Posts
- Exst Wet Area-Vegetation Break
- Existing Wetland Delineated

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

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Symbols

D-101-30

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

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

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Symbols

D-101-31

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

Symbols

D-101-32

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

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

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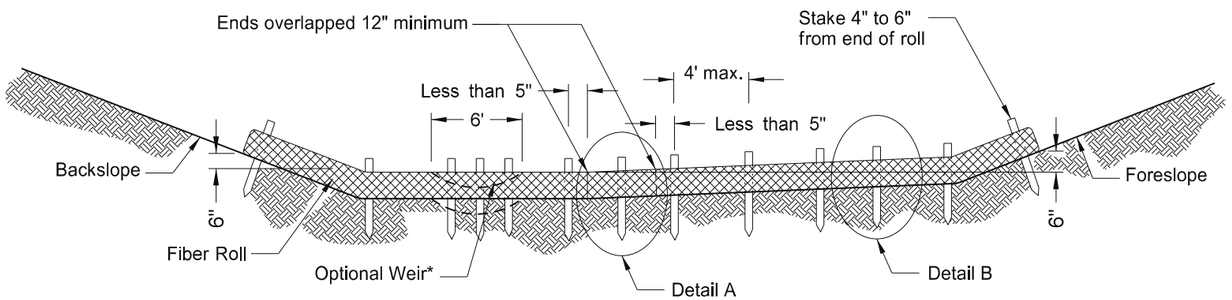
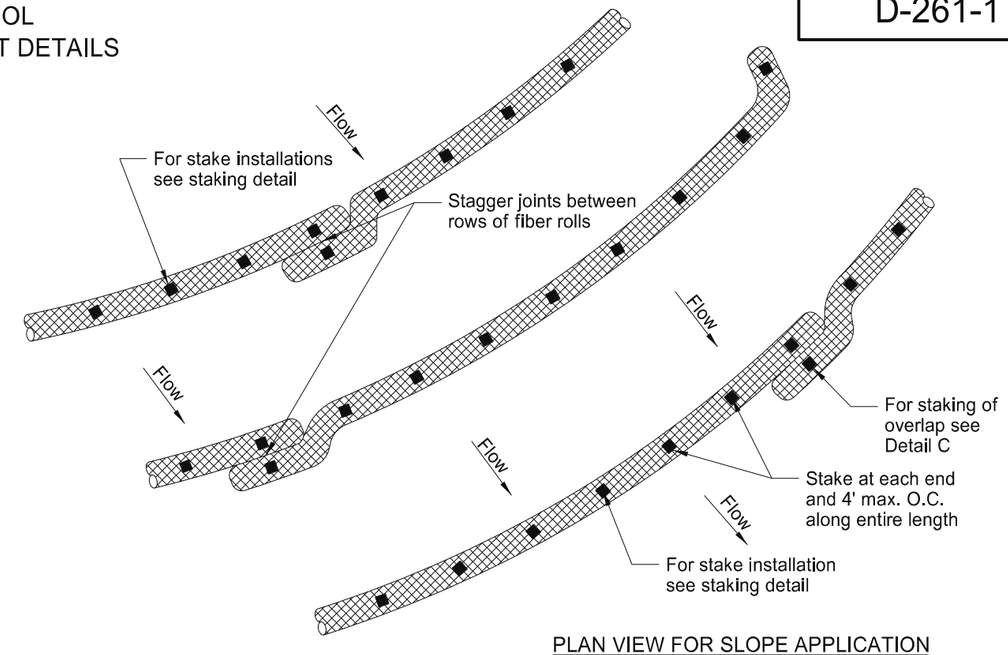
EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1

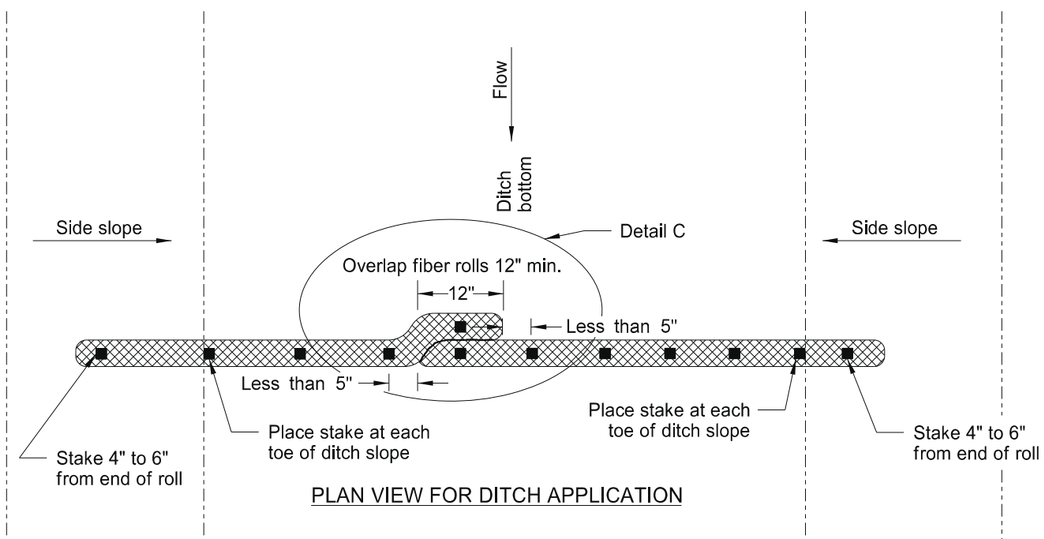


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up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

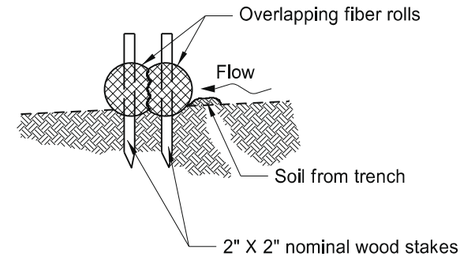
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

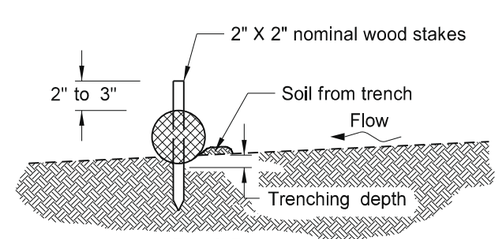


PLAN VIEW FOR DITCH APPLICATION



Detail A

Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-18-10

REVISIONS

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

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WORK ZONE BUSINESS SIGN DETAILS

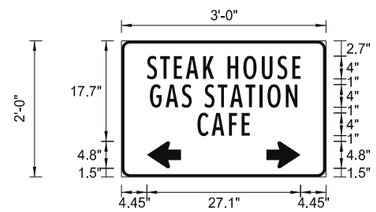
D-704-4

SIGN NUMBER	Con Sign
WIDTH x HEIGHT	3'-0" x 2'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Blue
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	4.5	1.5	4.8	6	180
ARDD	25.5	1.5	4.8	6	0

STATION(S):

AREA: 6.0 Sq.Ft.



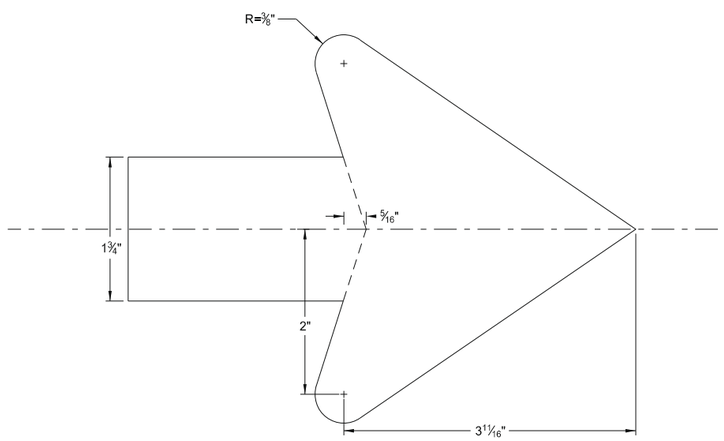
Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
S	T	E	A	K		H	O	U	S	E									27.1	4	ClearviewHwy-1-W
4.5	6.8	9.2	11.3	14.4	16.3	18.7	21.5	24.7	27.4	30.1											
G	A	S		S	T	A	T	I	O	N									26	4	ClearviewHwy-1-W
5	7.8	10.6	12.4	14.6	16.9	19.1	21.9	24.3	25.7	28.9											
C	A	F	E																9.2	4	ClearviewHwy-1-W
13.4	15.9	18.9	21.2																		

Note:

The ground mounted business name sign area has been calculated using a 36"x 24" sign panel.
The contractor shall determine the size needed and the exact length required to accommodate the message. The maximum size of the sign shall be 36"x24". The letters shall be 4" Clearview 1-W.
The color shall be blue background with white legend and border. The sign shall be post mounted.
The arrow shall be positioned either on the right or left side of the sign as required.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revised sheeting to type IV

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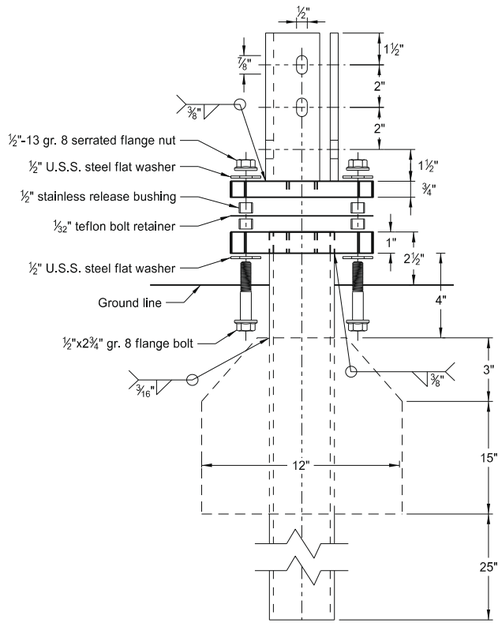
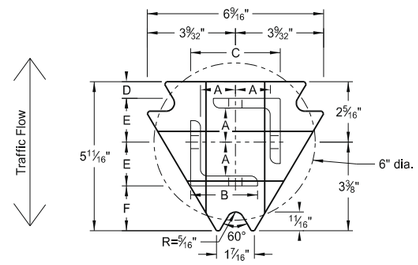
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

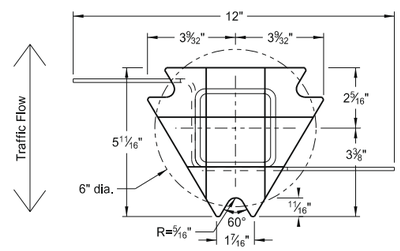
D-704-7



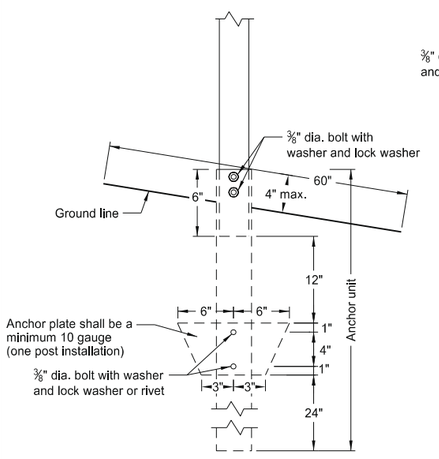
Multi-Directional
Slip Base Assembly



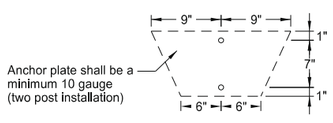
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle

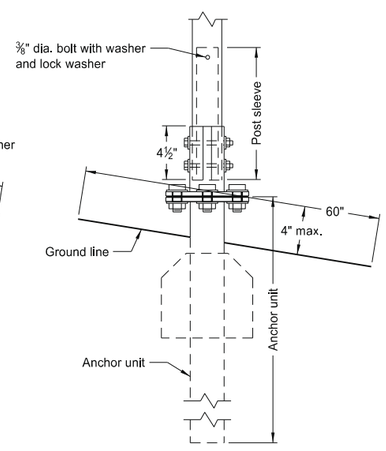


Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

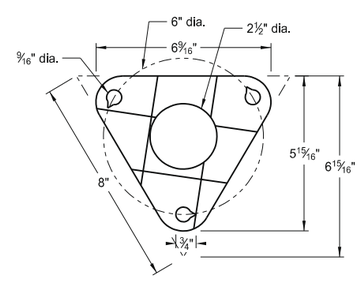


Anchor Unit and Post Assembly





Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



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

Notes:

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

Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2 3/16	10	Yes	

(A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.

(B) The 2 3/16"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.^{4}	Cross Sec. Area in.^{2}	Section Modulus in.^{3}
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
2 3/16 x 2 3/16	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	0.785

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1⅞"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
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DATE	CHANGE

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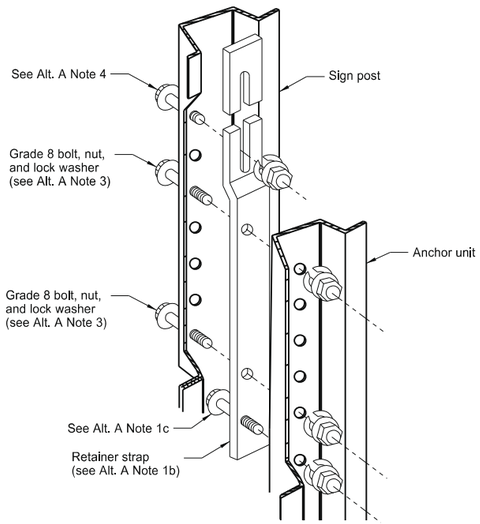
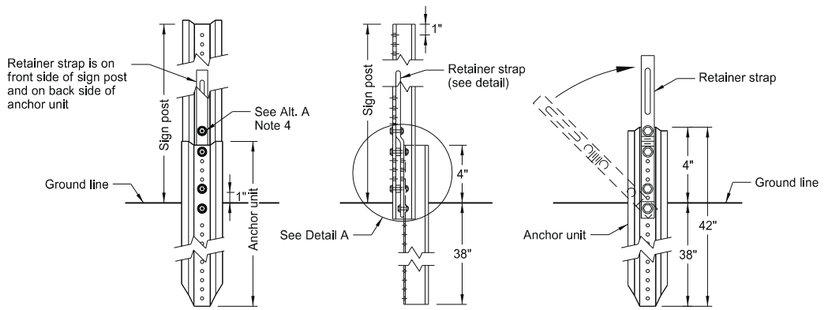
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



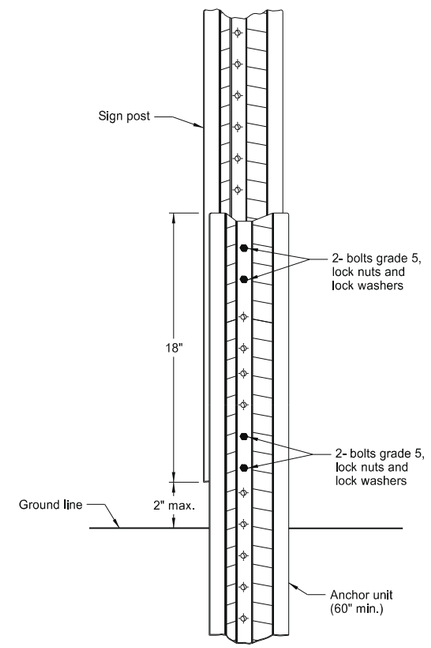
Detail A



Front View | Side View | Back View

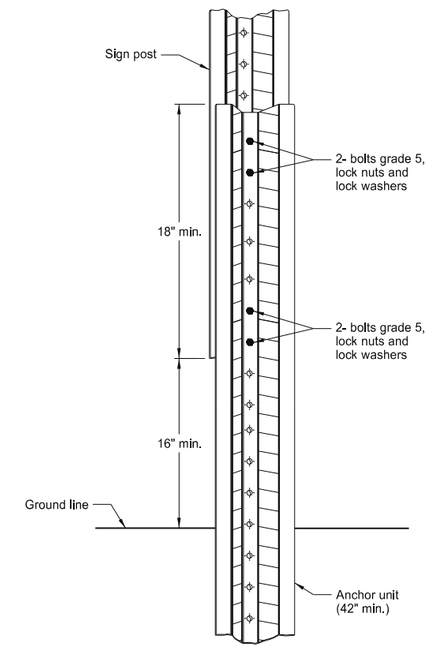
Breakaway U-Channel Detail
Alternate A

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



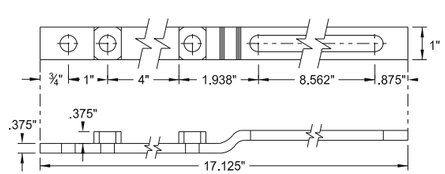
Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

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



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

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



Retainer Strap Detail

Alternate A Steps of Installation:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
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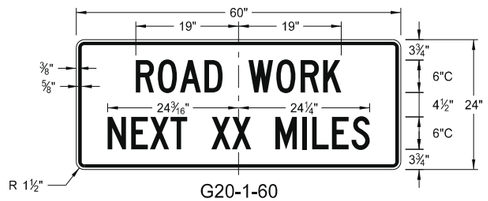
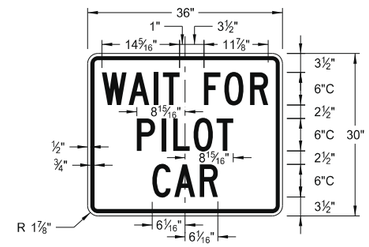
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

D-704-9



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



G20-4b-36
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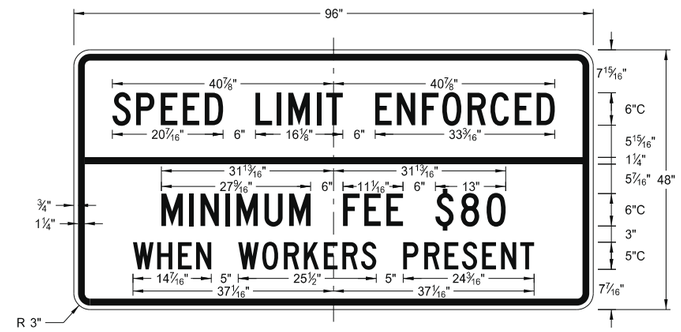
Background; orange



G20-55-96
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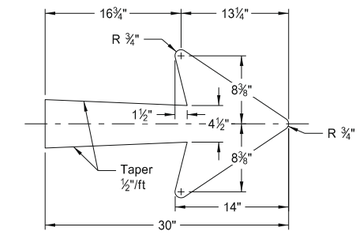
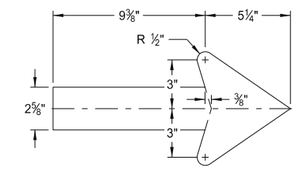
Background: orange



E5-1-48



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

G20-1b-60
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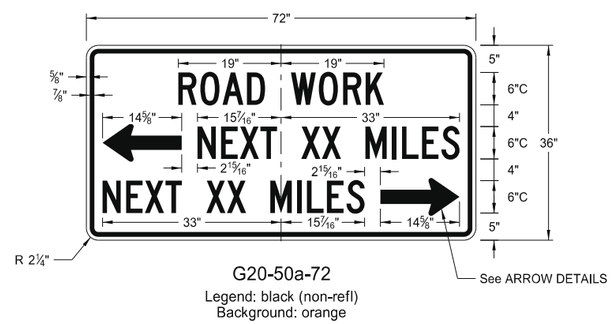
Background: orange



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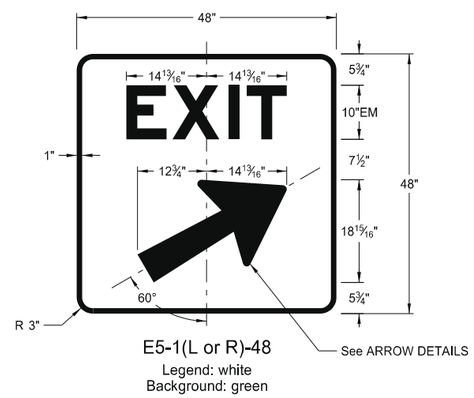
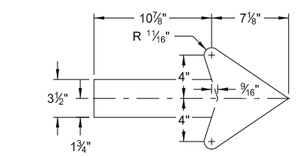
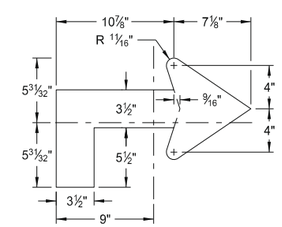
Background: orange



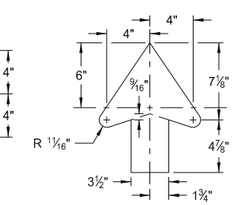
E5-1(L or R)-48
Legend: white
Background: green



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

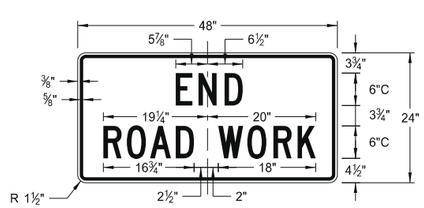


M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS



G20-2-48
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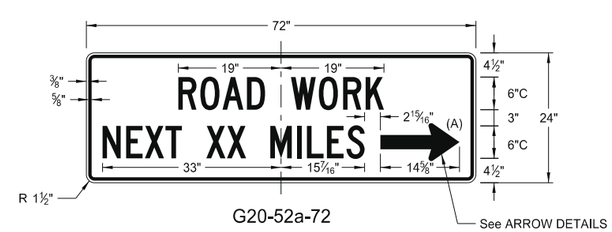
Background: orange



G20-52a-72
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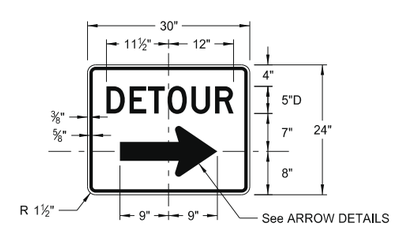

M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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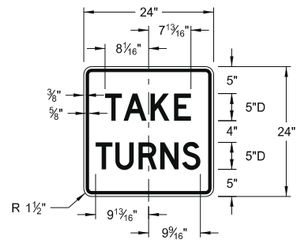
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50-24
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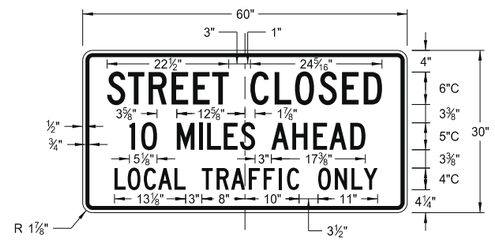
Background: white



R11-3c-60
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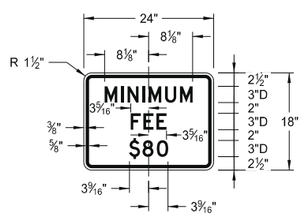
Background: white



R2-1a-24
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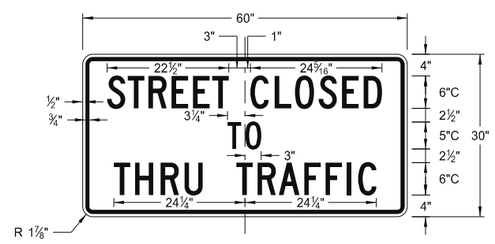

R11-4a-60
Legend: black (non-refl)
Background: white

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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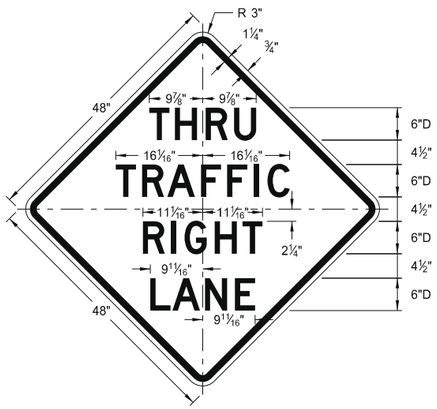
D-704-11

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



W5-8-48
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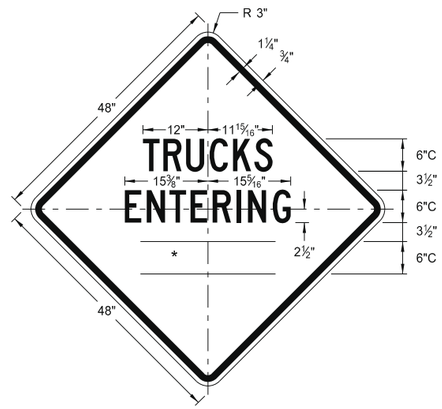
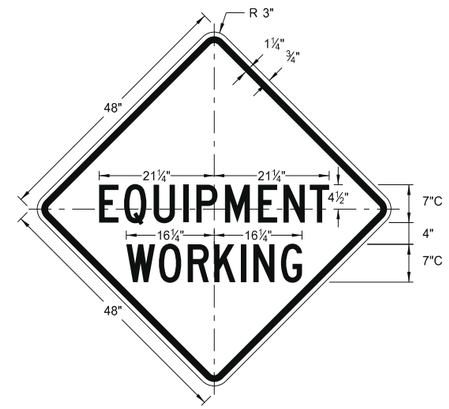
Background: orange



W8-54-48
Legend: black (non-refl)
Background: orange



W20-51-48
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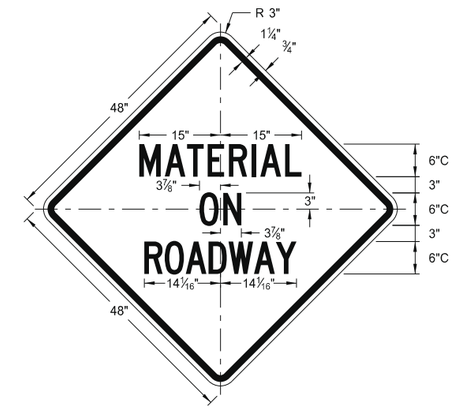
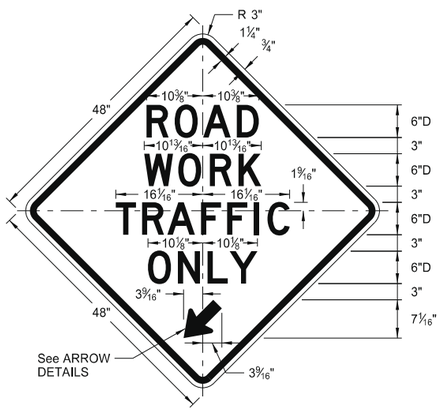


W21-51-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



W5-9-48
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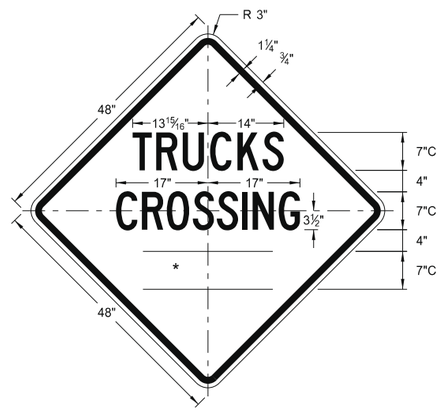

W8-55-48
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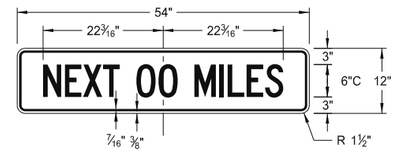
Background: orange



W20-52-54
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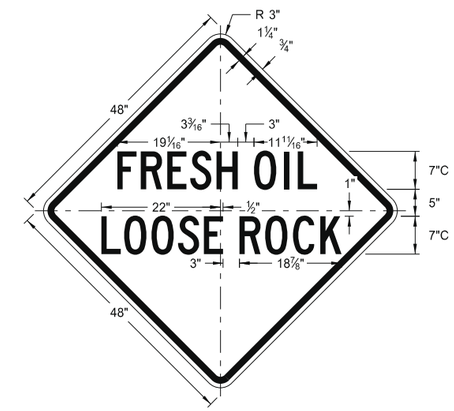
Background: orange



W22-8-48
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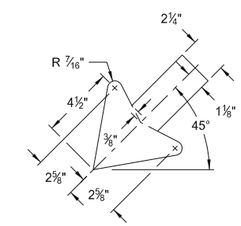
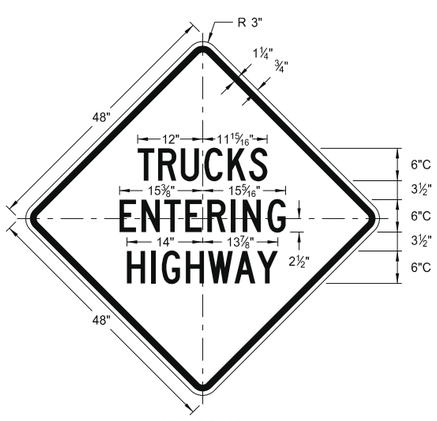
Background: orange



W5-9-48

ARROW DETAILS



W8-53-48
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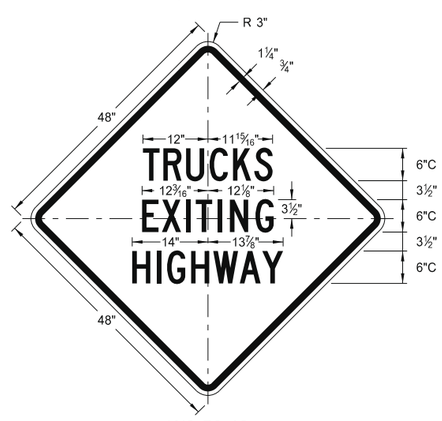
Background: orange



W8-56-48
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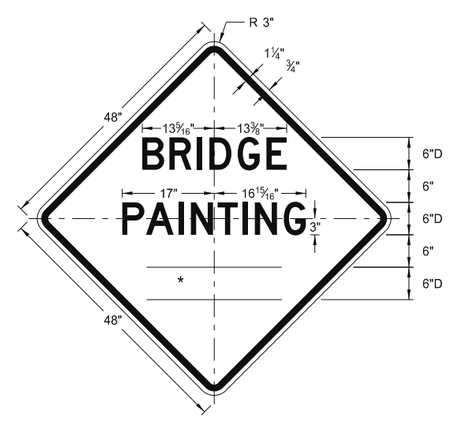
Background: orange



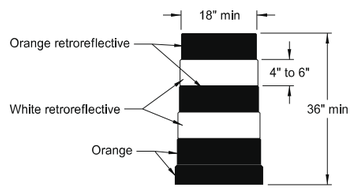
W21-50-48
Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 8/13/13 and the original document is stored at the North Dakota Department of Transportation

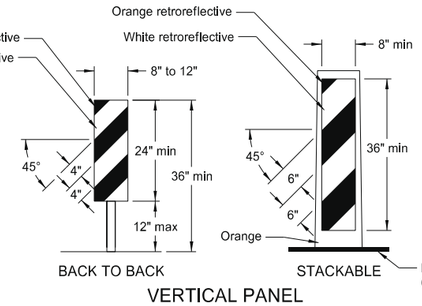
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



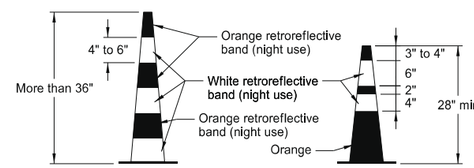
DELINEATOR DRUM

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



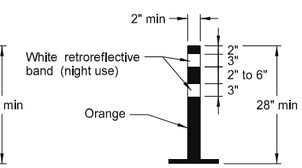
VERTICAL PANEL

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



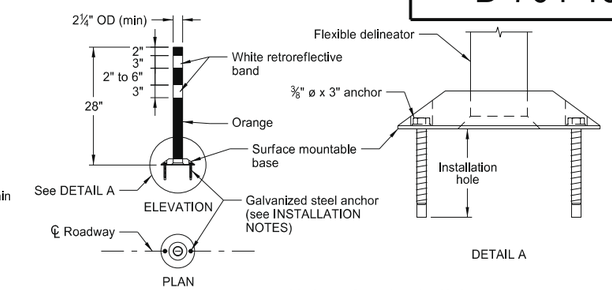
TRAFFIC CONE

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



TUBULAR MARKER

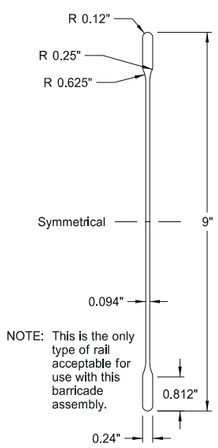
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

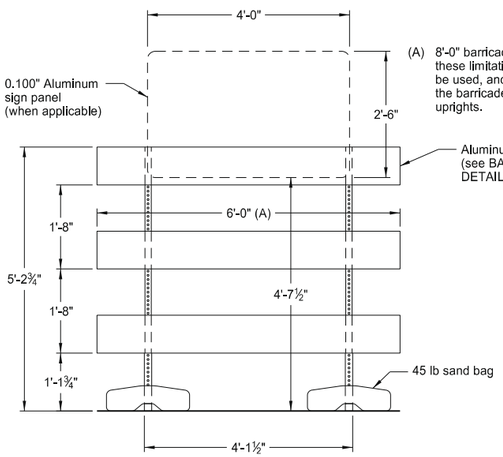
INSTALLATION NOTES:

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



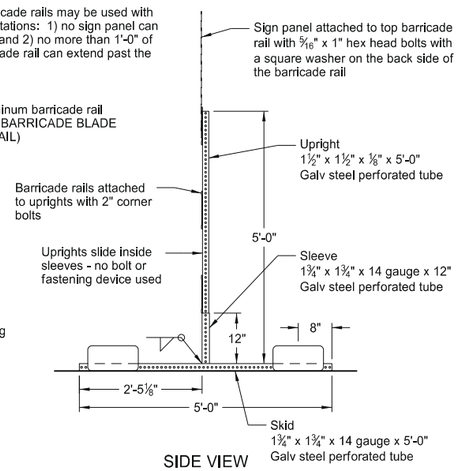
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



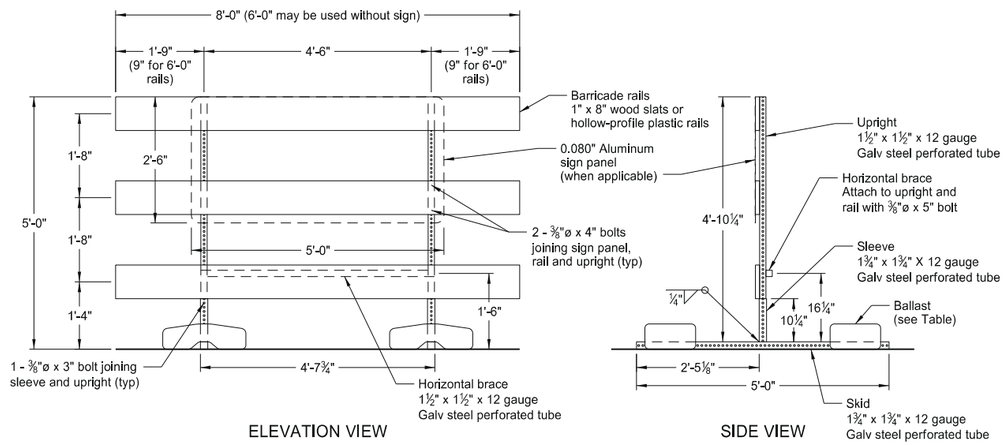
(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.

ELEVATION VIEW



SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

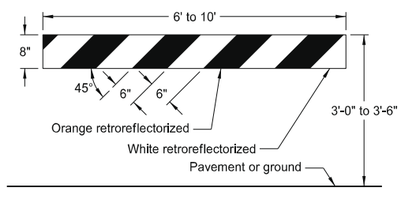


ELEVATION VIEW

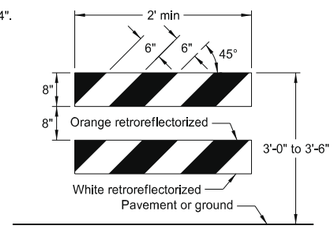
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

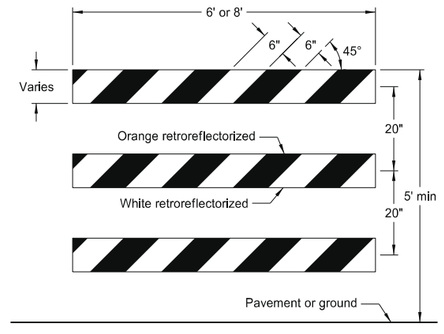
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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



TYPE I BARRICADE

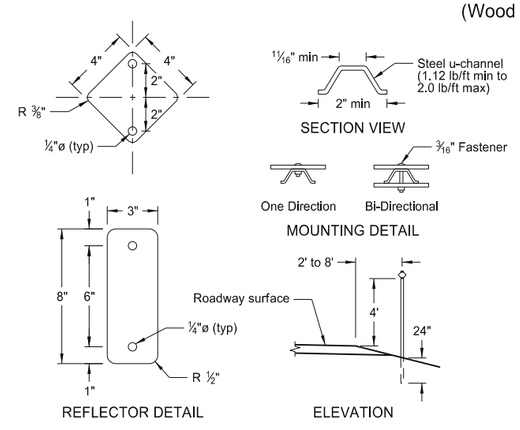


TYPE II BARRICADE



TYPE III BARRICADE

BARRICADE RAIL DETAILS



DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

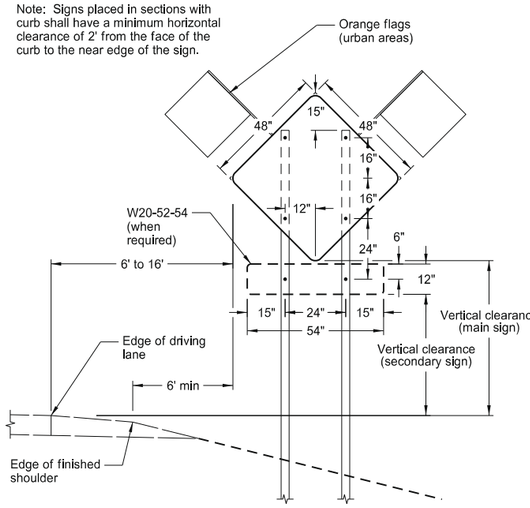
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 10/3/13 and the original document is stored at the North Dakota Department of Transportation

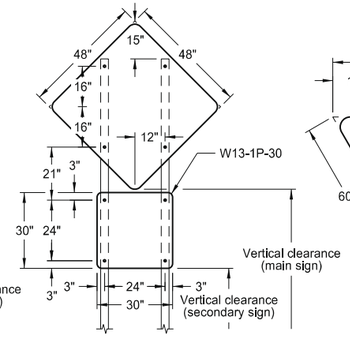
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

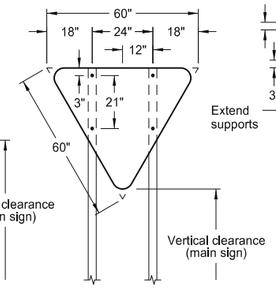
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



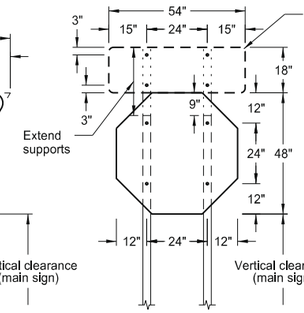
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



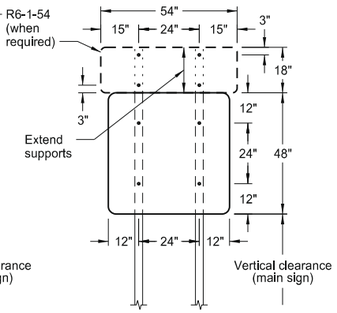
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



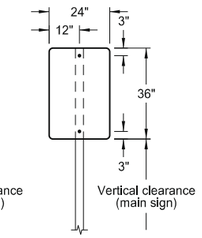
R1-2-60 - YIELD SIGN



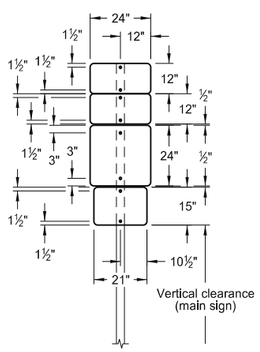
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



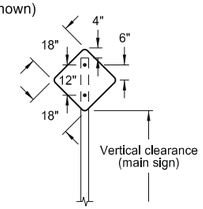
48" x 48" SIGN
(with R6-1-54 sign as required)



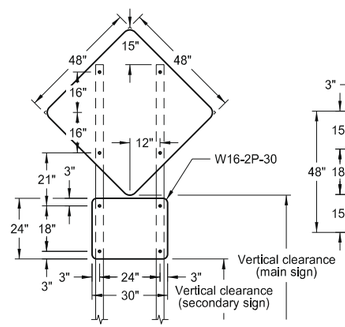
24" x 36" SIGN



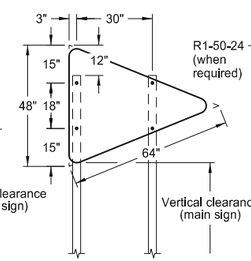
24" x 24"
ROUTE MARKER
ASSEMBLY



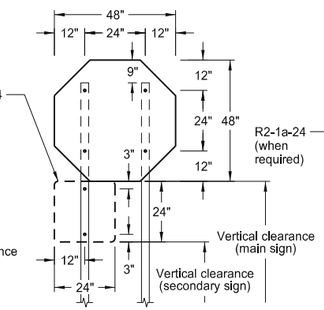
18" x 18"
DIAMOND SIGN



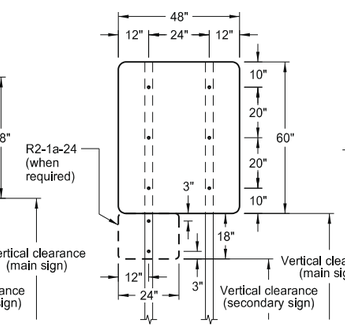
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



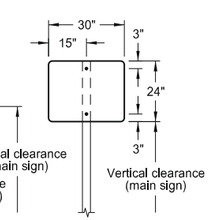
W14-3-64 - PENNANT SIGN



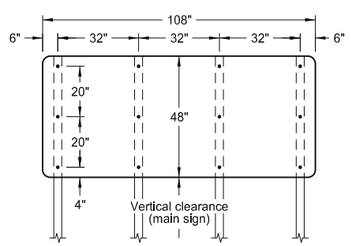
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



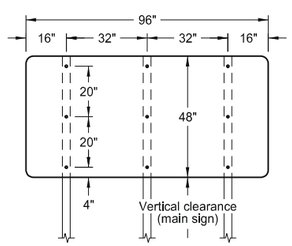
48" x 48" SIGN
(with R2-1a-24 sign as required)



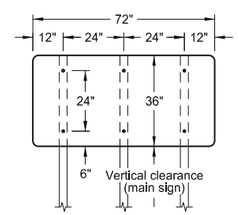
30" x 24" SIGN



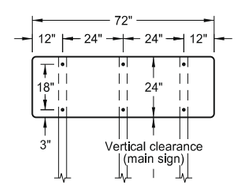
108" x 48" SIGN



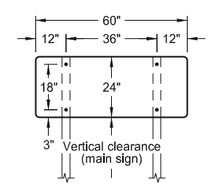
96" x 48" SIGN



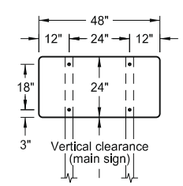
72" x 36" SIGN



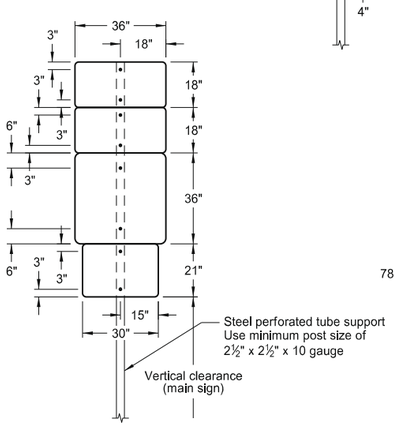
72" x 24" SIGN



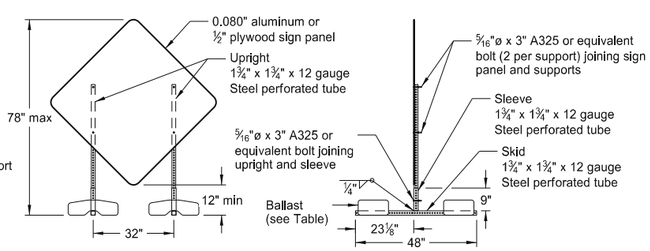
60" x 24" SIGN



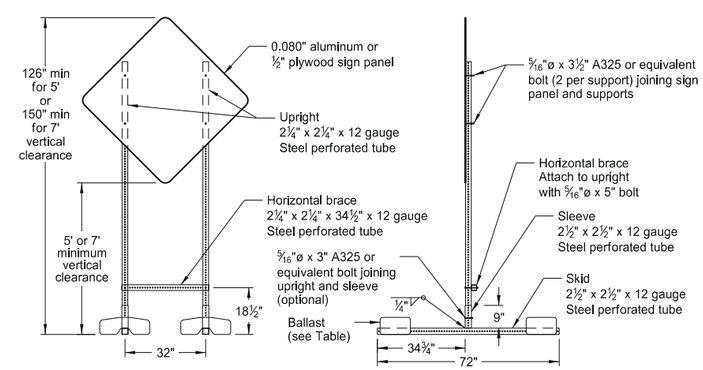
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

   Signs over 50 square feet should be installed on 2½" x 2½" perforated tube supports as a minimum.

   Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)

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 as stated above.

   Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

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

   When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

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

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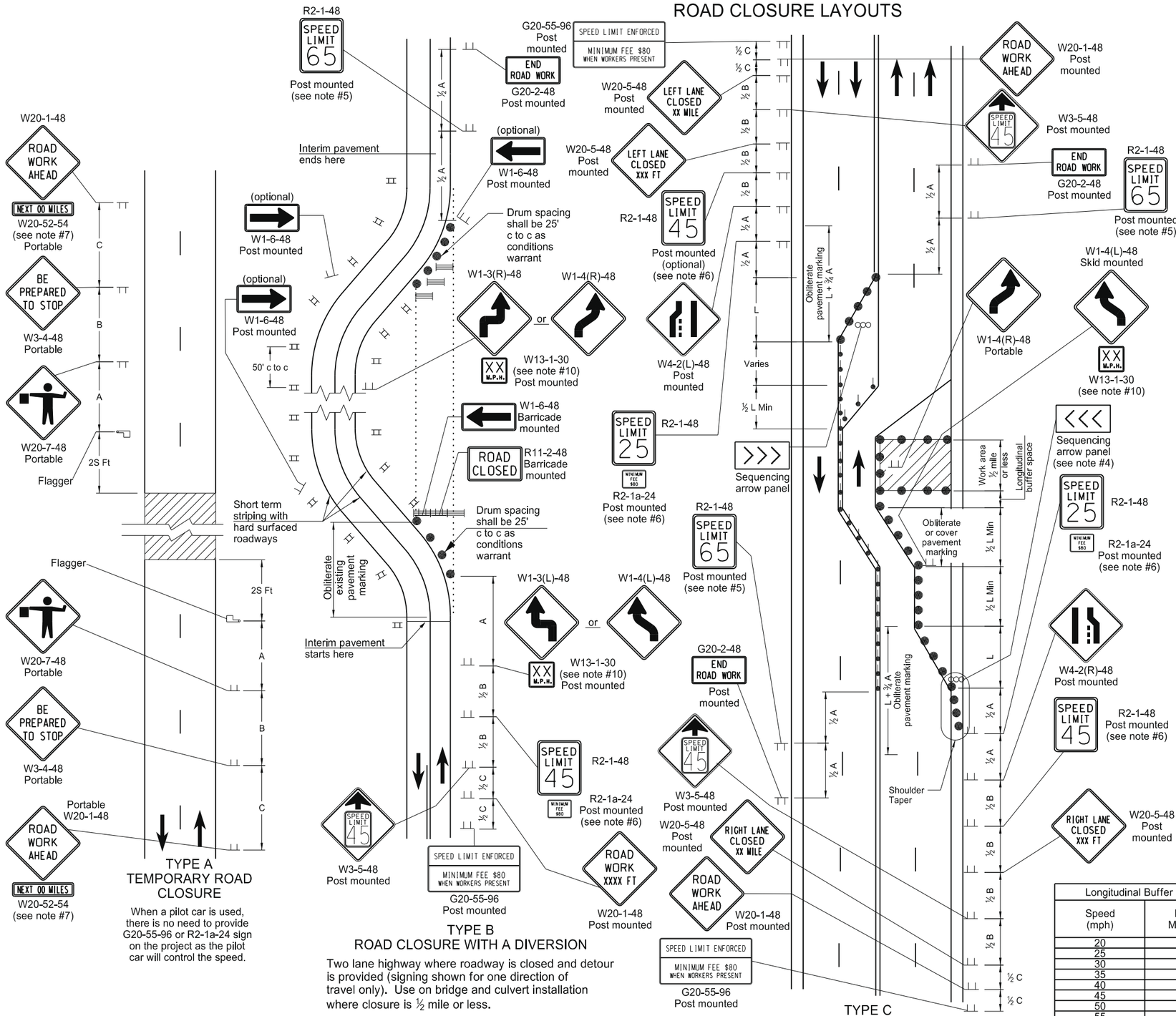
D-704-15

ROAD CLOSURE LAYOUTS



Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
3. Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
4. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
7. Use when work area is 1 mile or longer.
8. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
9. Existing speed limit signs within a reduced speed zone shall be covered.
10. Where necessary, safe speed to be determined by the Engineer.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
12. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

	Type III barricade		Work area
	Sign		Flagger
	Delineator drum		Sequencing arrow panel
	Tubular markers		Vertical panels back to back

Longitudinal Buffer Space

Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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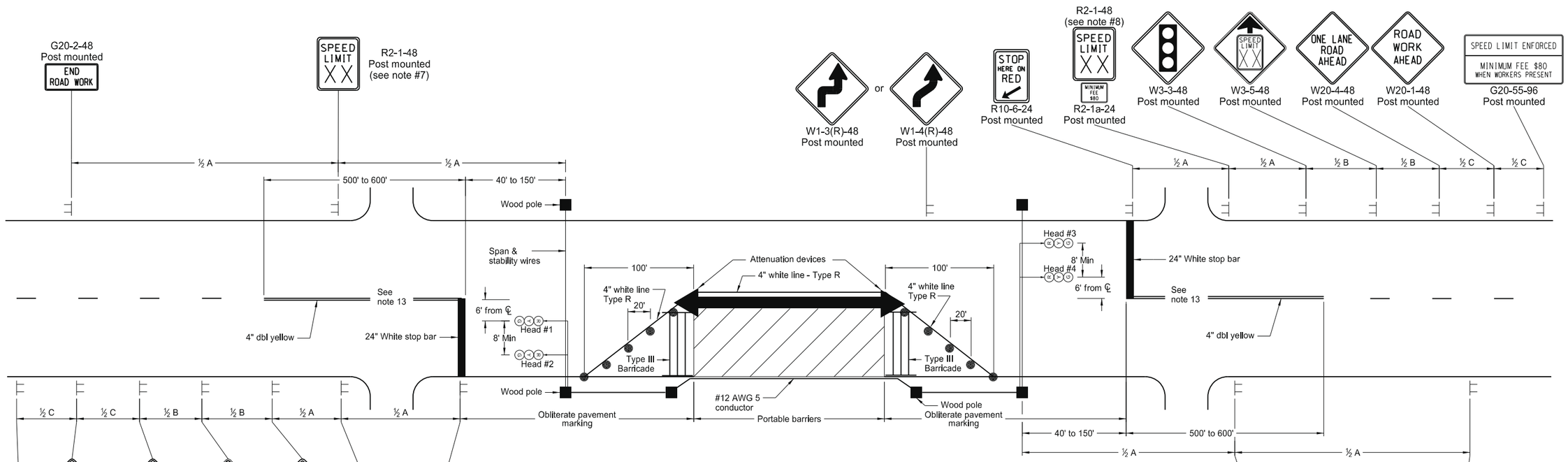
LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

D-704-16



KEY

- Work Area
- Type III Barricade
- Sign
- Delineator Drum

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

SUGGESTED TIMING AND SIGNAL SEQUENCE						
Heads 1 & 2	Green	Yellow	Red			
Heads 3 & 4	Red			Green	Yellow	Red
Time Cycle = 90 seconds	18.0	4.5	22.5	18.0	4.5	22.5
Percent of Cycle	20	5	25	20	5	25

Notes

1. Conductor shall be overhead span between poles except on bridges, where it may be either attached and supported by the bridge structure or overhead span. If the conductor is supported by the bridge structure, it shall be attached in such a way as not to interfere with bridge construction. Conductor is shown attached to side of bridge. It may be installed on either side of the bridge as determined by field personnel.
2. The controller may be located on any of the wood poles in the cable run between the signal heads for through traffic movements.
3. The timing schedule is suggested trial setting. Frequent checks of signals in operation shall be made to obtain the most efficient timing schedule.
4. The wood poles shall be placed a minimum of 16 feet from the edge of the driving lane. The wood poles shall be of sufficient length to provide a minimum of 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
5. Traffic signal heads shall have 12 inch red, yellow and green lenses with 5 inch louvered backplates.
6. For interim traffic construction detail see standard drawing "Interim Traffic Signals".
7. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
8. The reduced speed limit shall be determined dependent on the in-place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
9. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
10. Existing speed limit signs within a reduced speed zone shall be covered.
11. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
12. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
13. Double yellow centerline shall continue thru private drives.
14. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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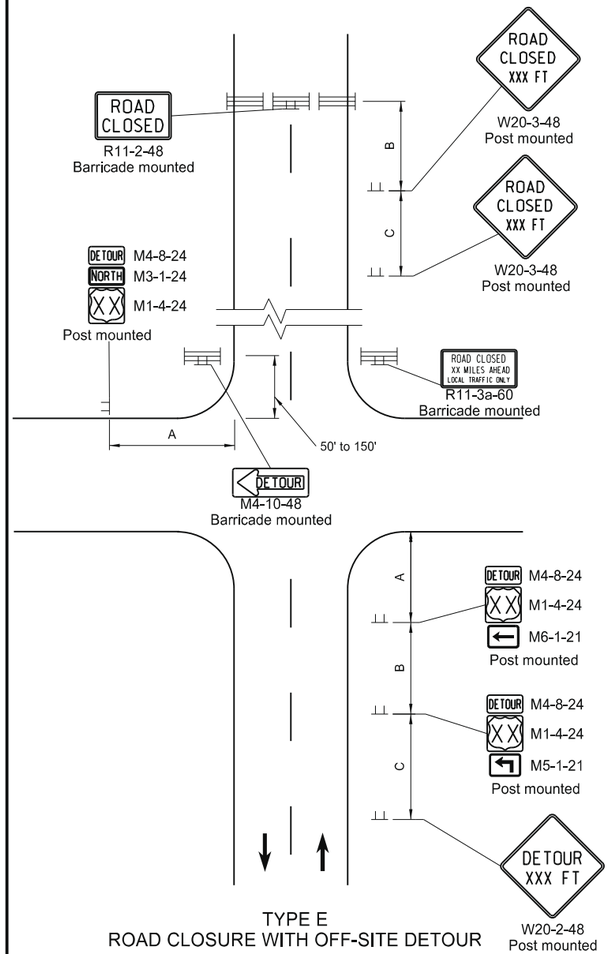
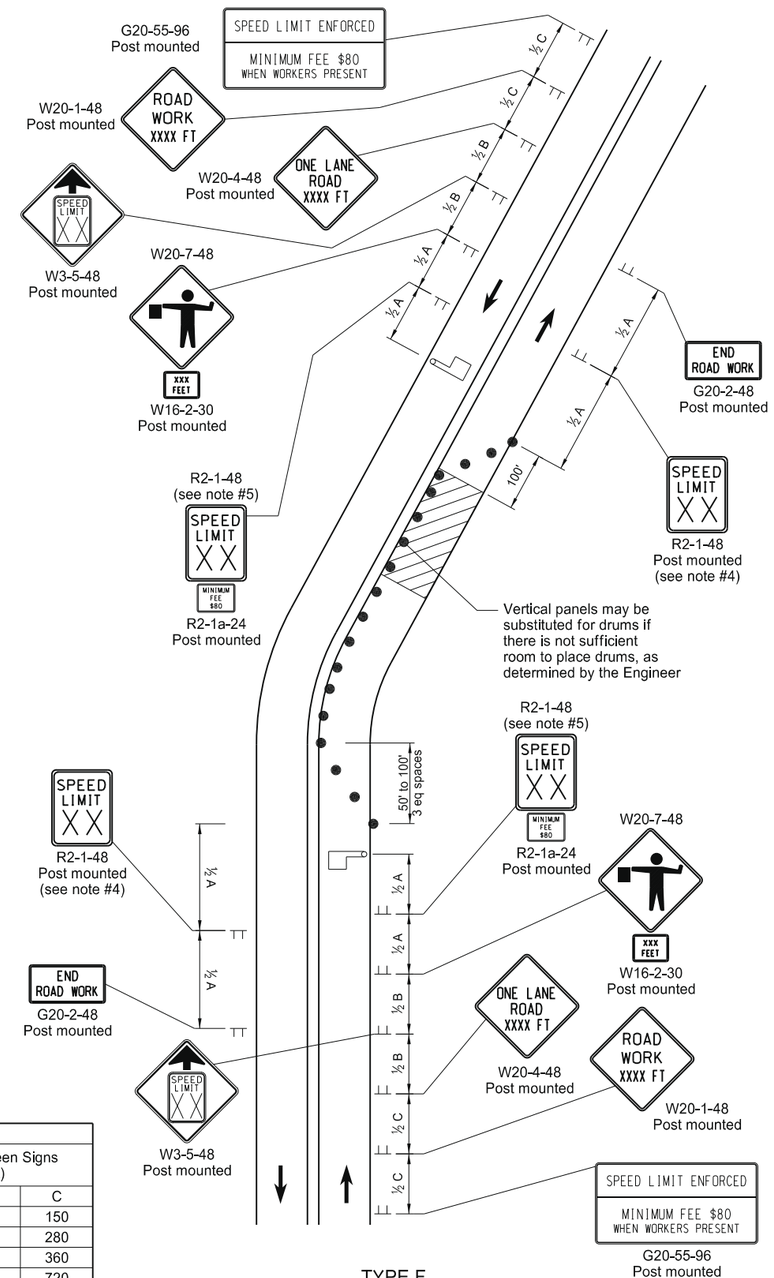
ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

D-704-19



TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR

Used where a road is closed beyond a detour point. Signing shown for one direction only. Sign not shown on detour shall be shown in plans and installed and maintained by the contractor.



TYPE F
LANE CLOSURE ON A TWO LANE ROAD USING FLAGGERS

Two lane highway with one lane closed. Flagger is at a point where it is visible to approaching traffic.

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
3. Delineator drums used for tapering traffic shall be placed at 3 equal spaces. Delineator drums for tangents shall be spaced at 2 times dimension "S".
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
6. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. Where necessary, safe speed to be determined by the Engineer.
9. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
10. G20-55-96 or R2-1a-24 sign are not required when a pilot car operation is used, if this standard is part of other traffic control layouts, or the work is less than 15 days.
11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
    a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
    b. A "Do Not Stop on Tracks" sign (R8-8-24) should be placed near the cross buck in each direction while the lane closure is in the vicinity of the tracks.
    c. A buffer space between the work zone and the lane closure transition should be extended upstream of the highway-rail grade crossing so a queue created by the flagging operation will not extend across the highway-rail grade crossing.
    d. If the queuing of vehicles across active rail tracks cannot be avoided, a flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic warning devices are in place.

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

- Delineator Drum
- Type III Barricade
- Flagger
- Sign
- Work/Hazard Area

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
3-13-14	Revised Sign Cell "ROAD WORK XXX FT"

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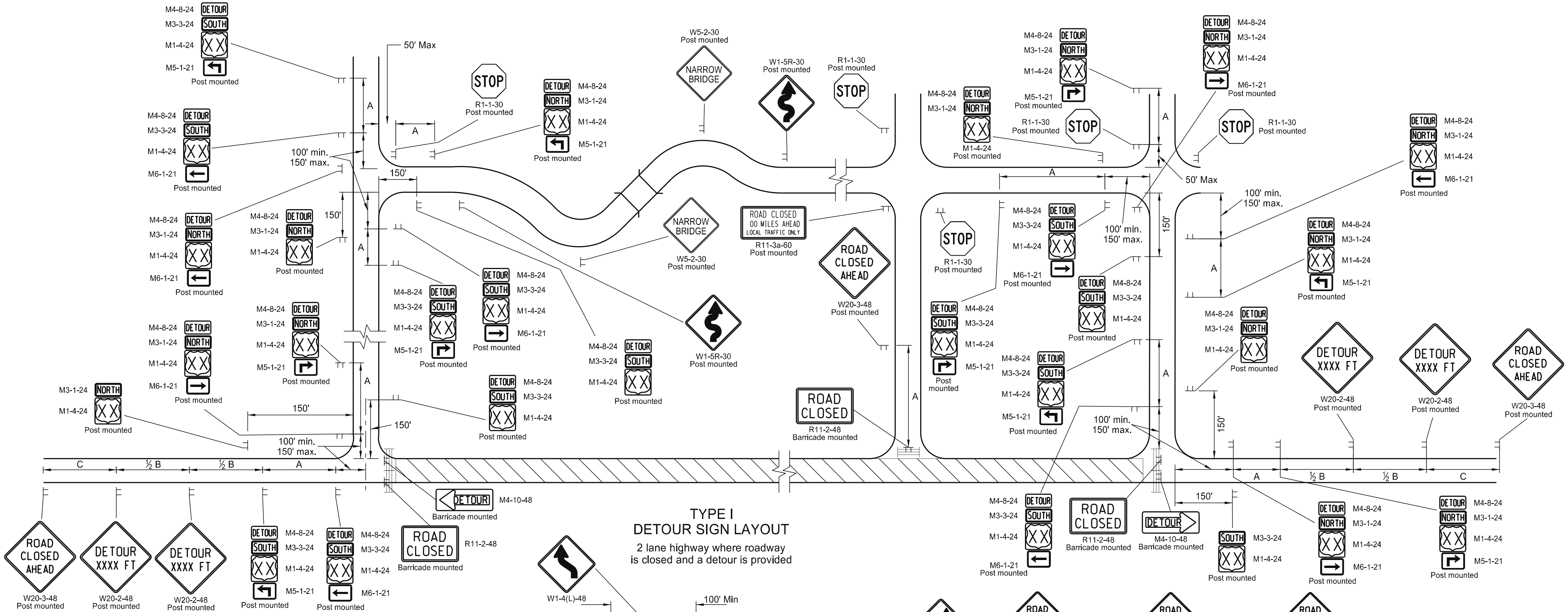
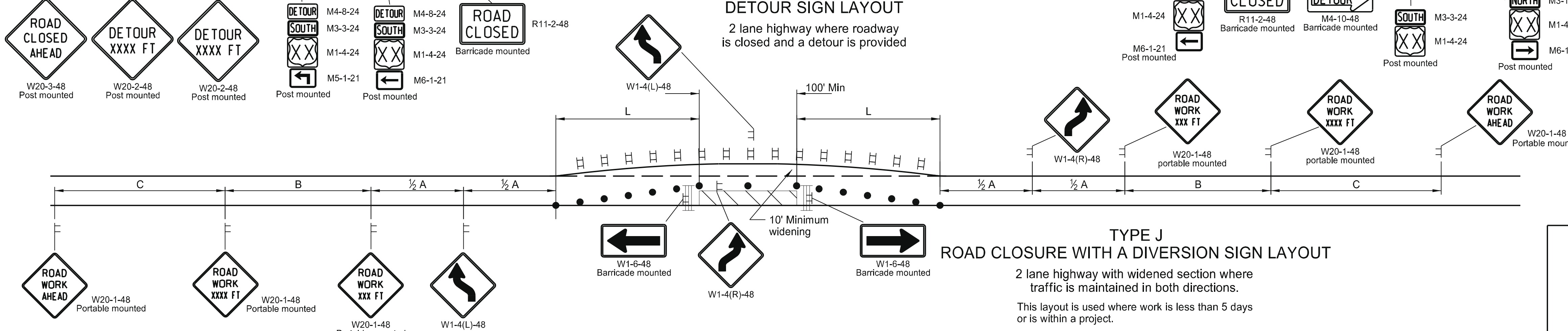
DETOUR AND ROADWAY DIVERSION SIGN LAYOUTS

D-704-21



TYPE I
DETOUR SIGN LAYOUT

2 lane highway where roadway is closed and a detour is provided



TYPE J
ROAD CLOSURE WITH A DIVERSION SIGN LAYOUT

2 lane highway with widened section where traffic is maintained in both directions.

This layout is used where work is less than 5 days or is within a project.

Notes

1. Variables
   S=Numerical value of speed limit or 85th percentile. W=The width of taper.
   L=Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 / 60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
3. Delineator drums and vertical panels used for tapering traffic shall be spaced at dimension "S". Delineator drums, tubular markers and vertical panels used for tangents shall be spaced at 2 times "S".
4. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit shall be placed at ½ B.
5. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
6. Existing speed limit signs within a reduced speed zone shall be covered.
7. Obliterated or covered payment marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
8. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
9. A W24-1-48 sign may be used in place of the double reverse curve signs if the tangent between tapers is less than 600'.

KEY

- Type III barricade
- Sign
- Delineator drum
- Work area
- Vertical panels back to back

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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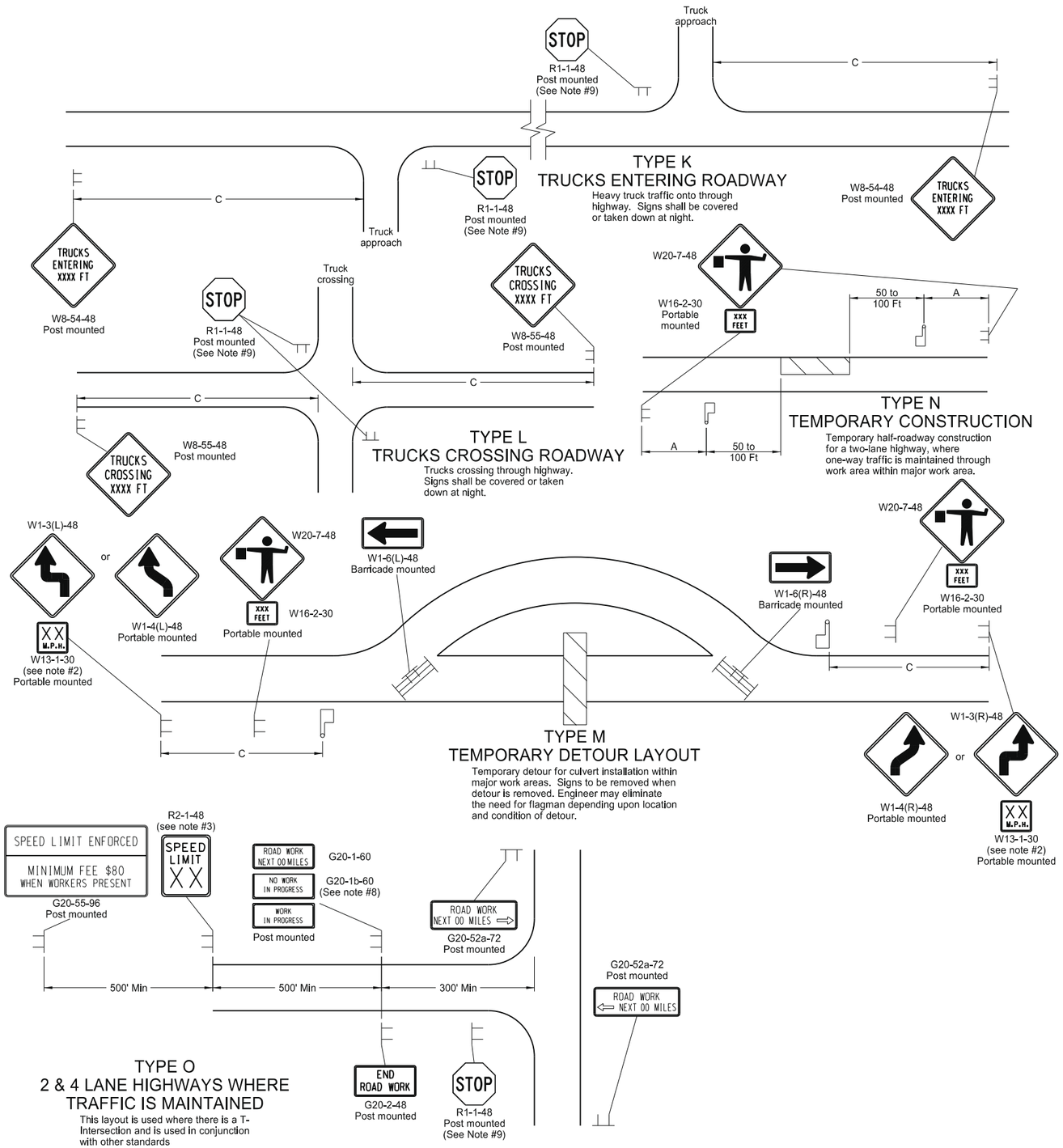
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

KEY

Type III barricade — Work area

Sign — Flagger

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

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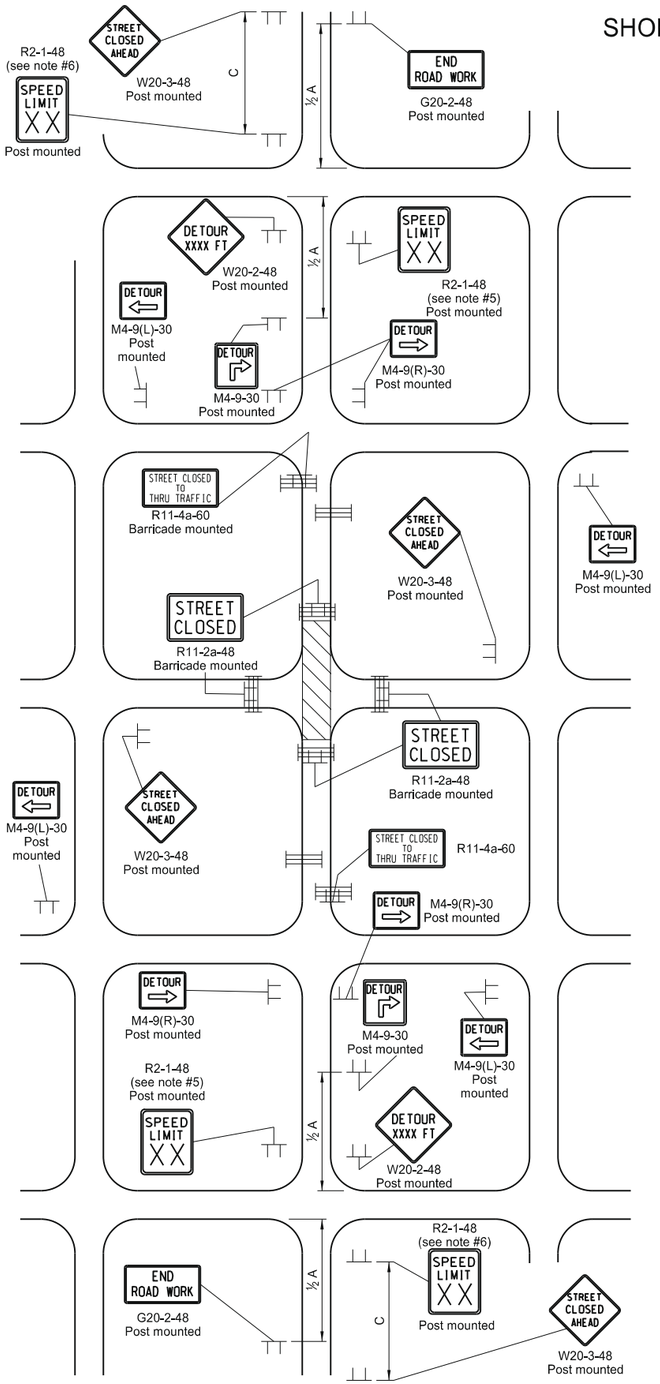
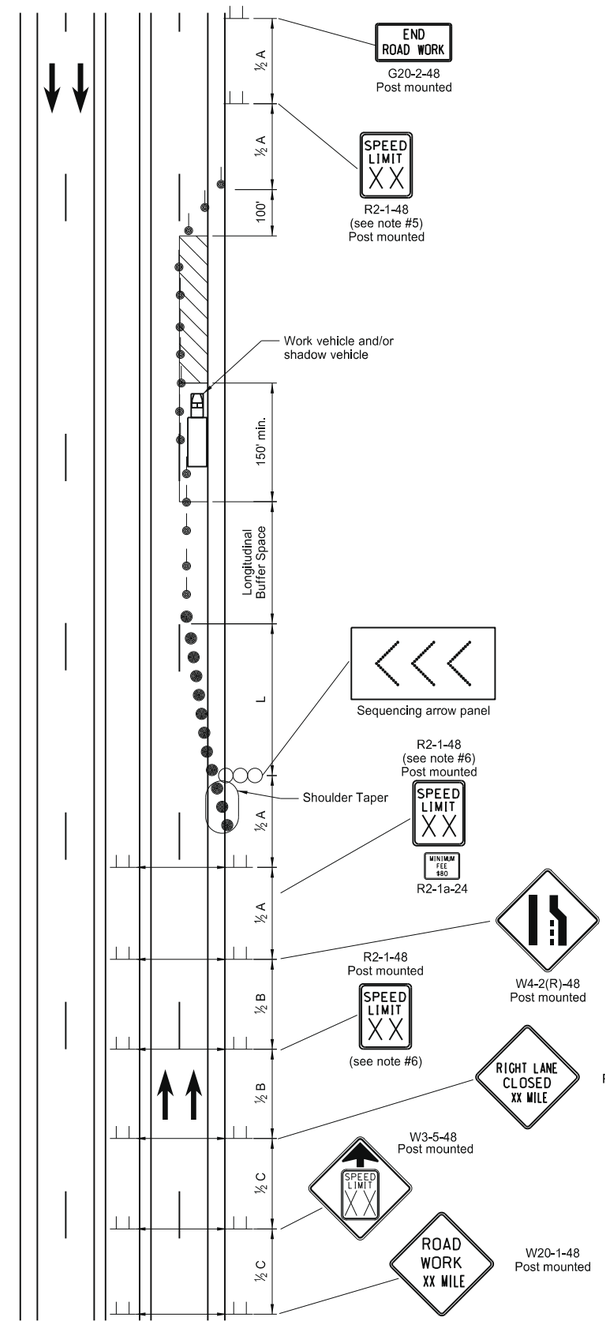
SHORT TERM URBAN DETOUR AND LANE CLOSURE ON A DIVIDED HIGHWAY LAYOUTS

D-704-23



TYPE Q
DETOUR FOR A CLOSED STREET
Where city streets are used for detouring traffic.
Urban projects do not require the G20-55-96 and R2-1a-24 signs.



TYPE P
STATIONARY LANE CLOSURE ON A DIVIDED HIGHWAY
4 lane divided roadway where ½ of roadway is closed.
Short-term (more than 1 hour within a single daylight period.)

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
3. Delineator drums used for tapering traffic shall be spaced at dimension "S".
   Delineator drums or tubular markers used for tangents shall be spaced at 2 times "S".
4. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room the panel should be moved closer to the work area so that it can be placed on the roadway surface.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
7. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
8. Existing speed limit signs within a reduced speed zone shall be covered.
9. Obliterated or covered payment marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
10. Intersection control for Type Q may have to be changed on detour. The Engineer in the field shall determine what control is necessary.
11. Where necessary, safe speed to be determined by the Engineer. When parking is present, signs shall be placed so they are entirely visible above parked vehicles or placed at the edge of the parking area so they are visible to oncoming traffic. These signs may be skid mounted when placed on the roadway surface.
12. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.

Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

	Type III barricade		Work area
	Sign		Sequencing arrow panel
	Delineator Drum		Tubular Markers

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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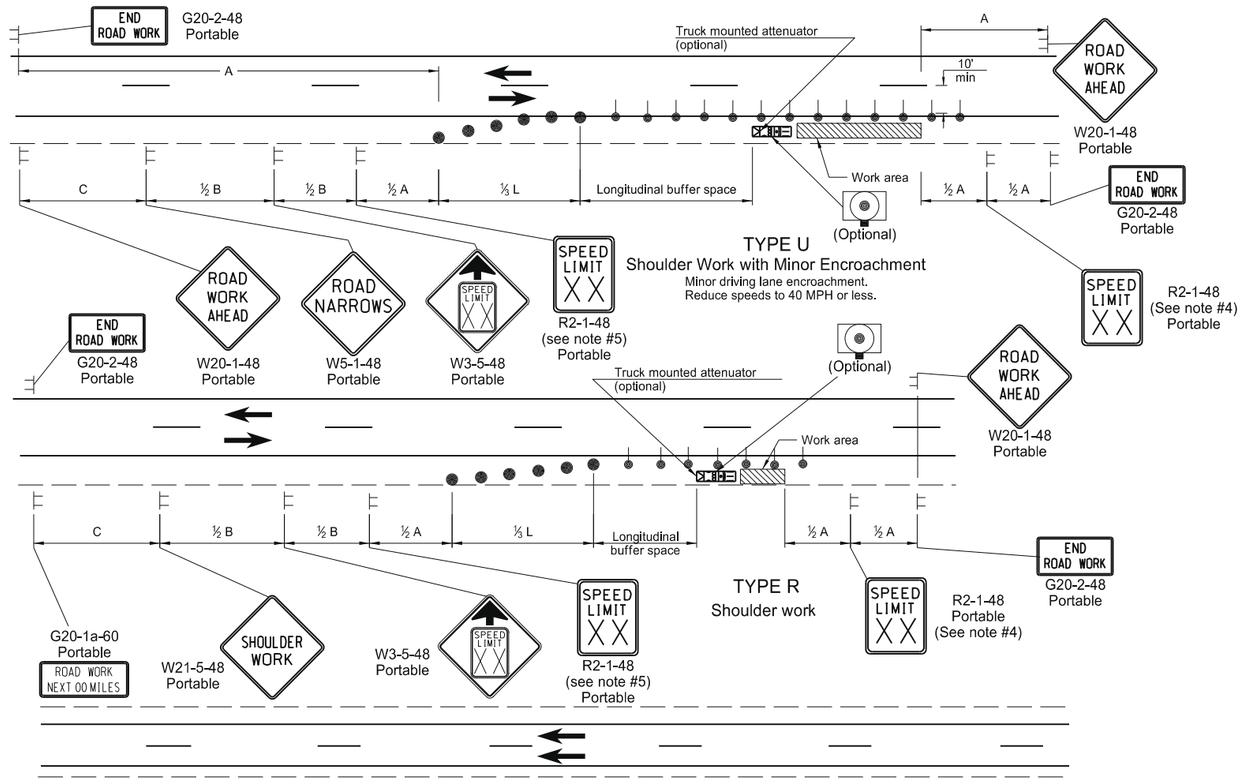
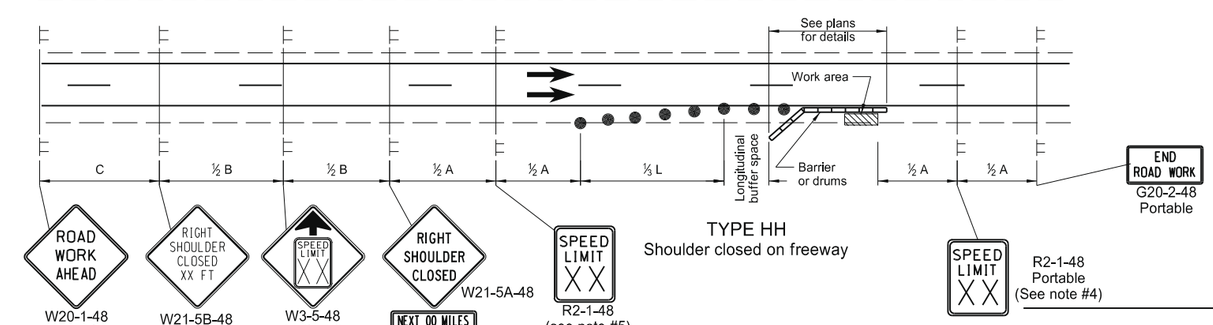
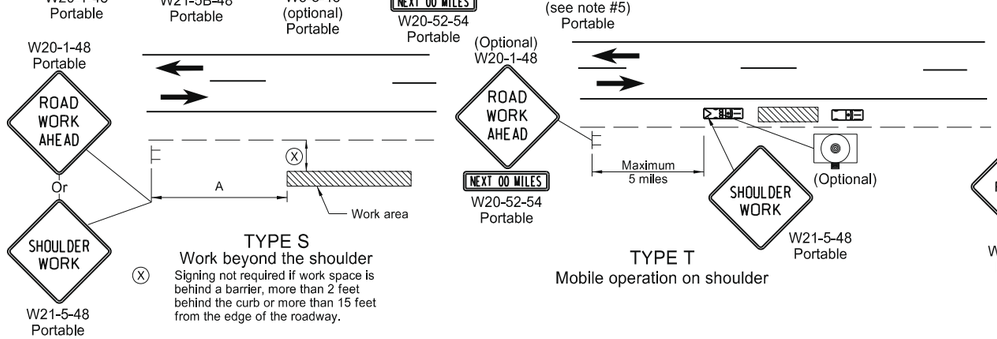
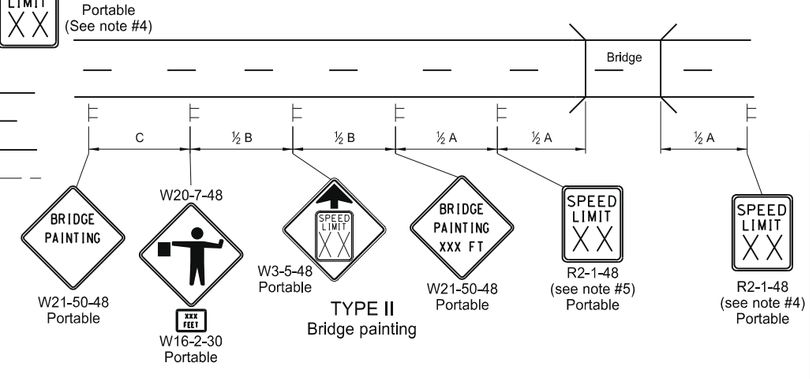
SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24









Notes

1. Variables
   - S = Numerical value of speed limit or 85th percentile.
   - W = The width of the taper.
   - L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Delineator drums used for tapering traffic shall be spaced at dimension "S". Delineator drums or tubular markers used for tangents shall be spaced at 2 times "S".
3. Sequencing Arrow Panels
   - Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   - Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   - Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½B.
6. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.

Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

- Sign
- Work area
- Delineator Drum
- Tubular Marker
- Sequencing Arrow Panel (Caution Mode)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

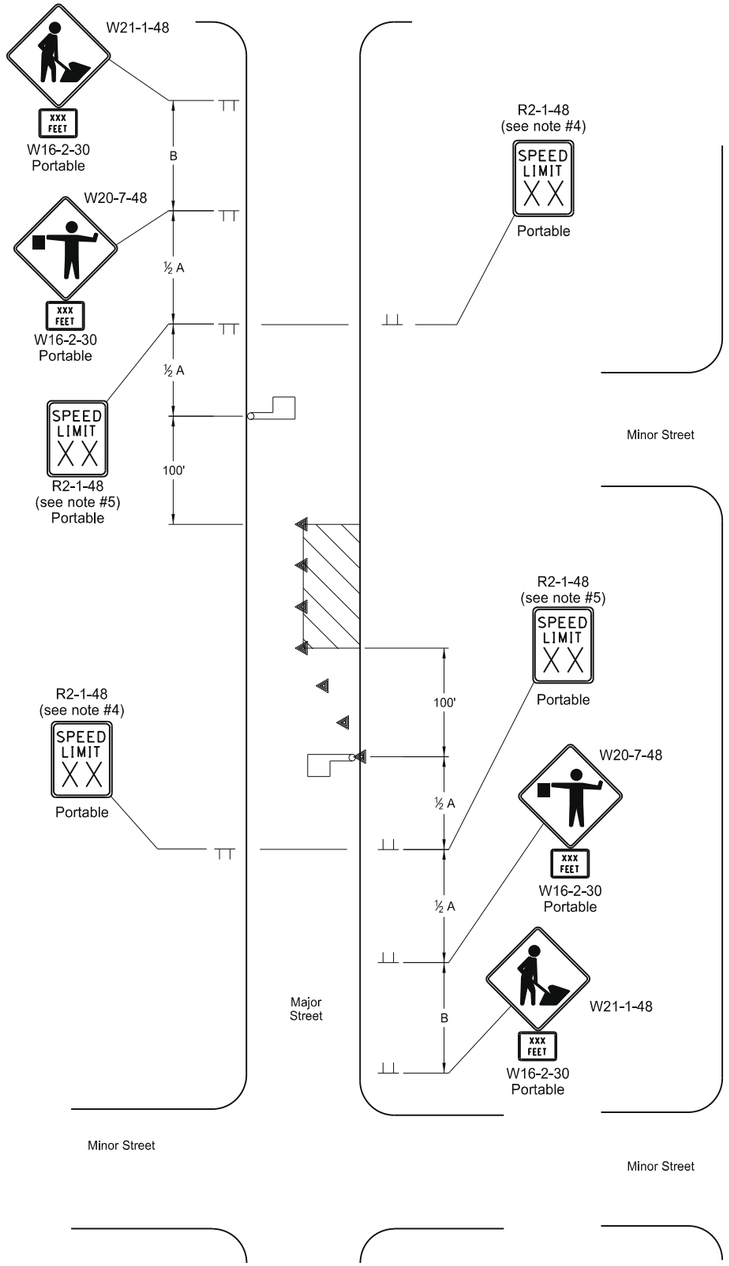
REVISIONS

DATE	CHANGE

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 09/27/13 and the original document is stored at the North Dakota Department of Transportation

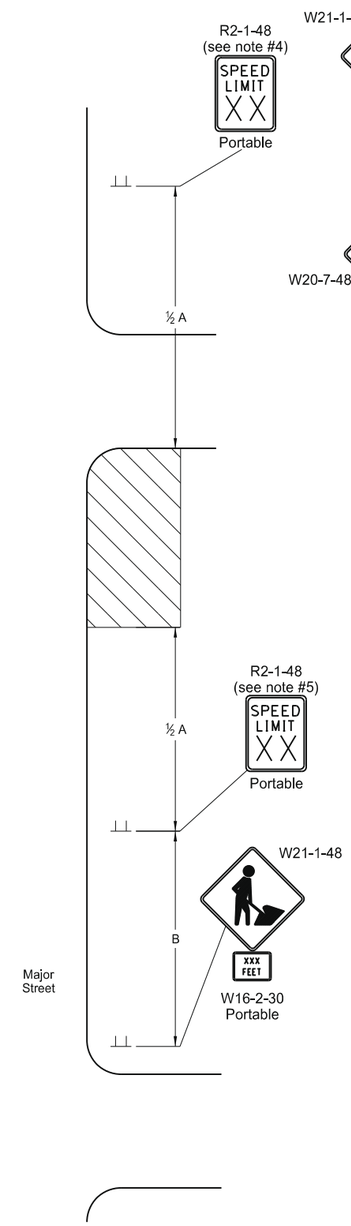
LANE CLOSURES ON URBAN STREETS LAYOUTS

D-704-25



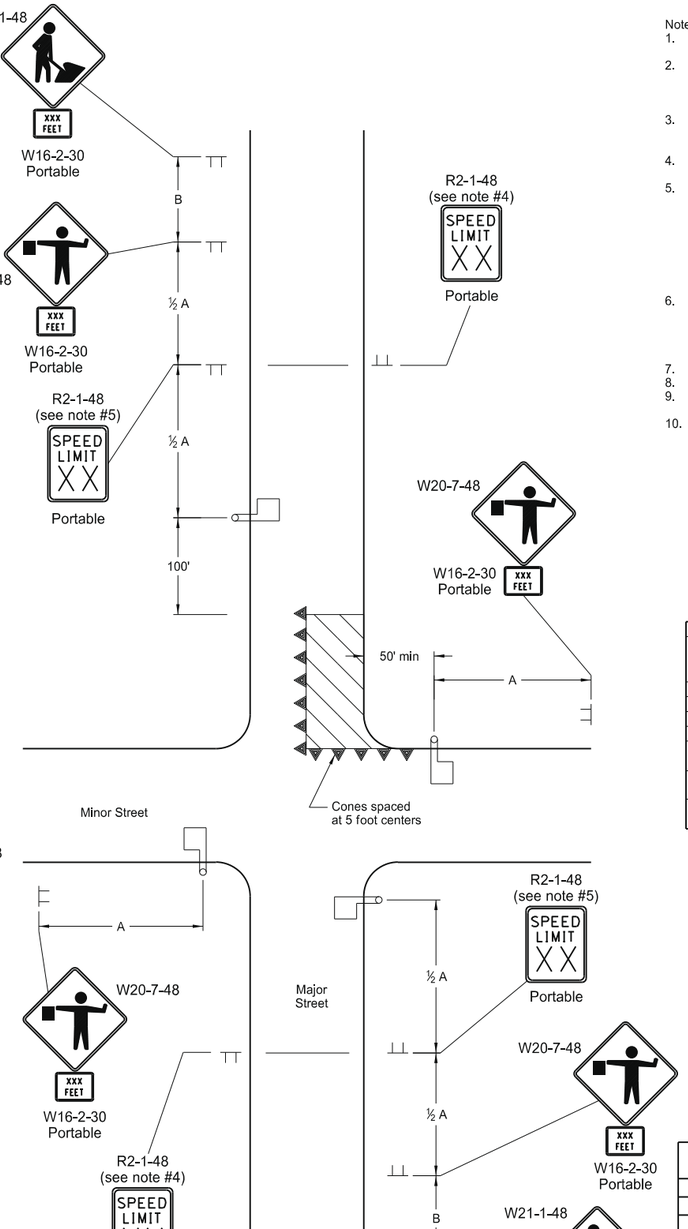
TYPE V
LANE CLOSURE ON URBAN STREET

When portion of roadway is closed to traffic only during daylight hours (mid block location).



TYPE W
WORK BEYOND CURB ON URBAN STREET

When work area is outside of driving lane and no closure is necessary



TYPE X
LANE CLOSURE NEAR INTERSECTION ON URBAN STREET

When portion of roadway is closed to traffic only during daylight hours (end block location).

Notes

1. For Type V: The contractor will be allowed to work only on one side of the roadway at a time so as not to block off any more than one lane of traffic.
2. When parking is present, the signs shall be placed so they are entirely visible above the parked vehicles or placed at the edge of the parking area so they are visible to oncoming traffic. These signs may be skid mounted when placed on the roadway surface.
3. Delineator cones used for tapering traffic shall be placed at 3 equal spaces. Delineator cones for tangents shall be spaced at dimension "S". "S" = the numerical value of speed limit.
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
6. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. Where necessary, safe speed to be determined by the Engineer.
9. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
10. Urban projects do not need the G20-55-96 and R2-1a-24 signs.

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

Sign	Work area
Cones	Flagger

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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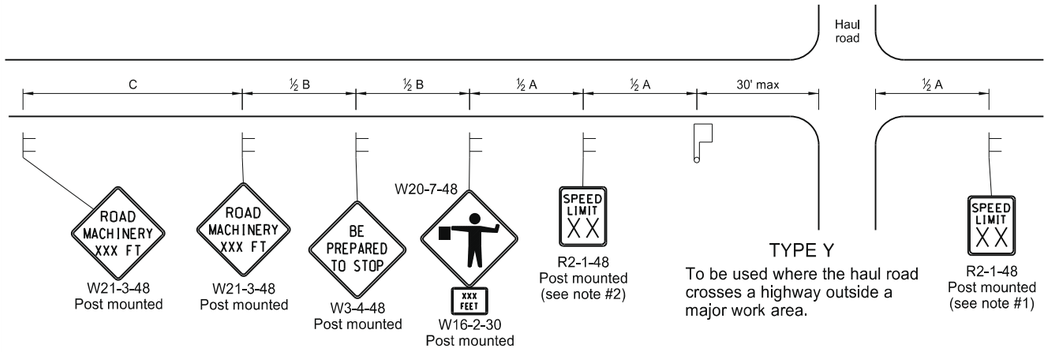
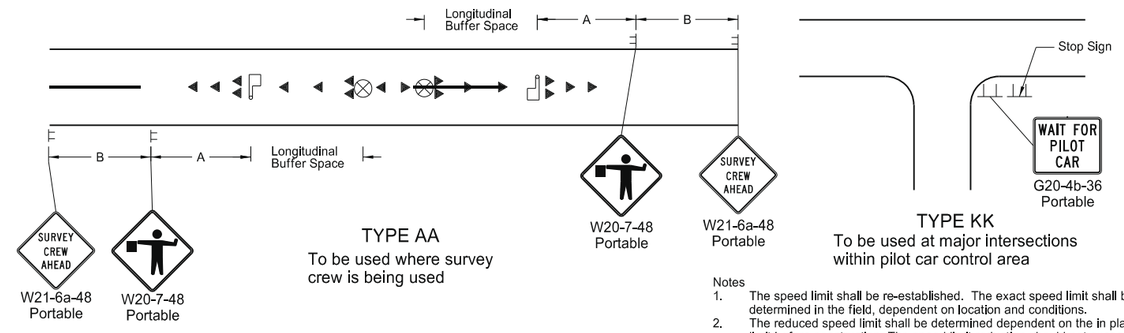
MISCELLANEOUS SIGN LAYOUTS

D-704-26



TYPE Y

To be used where the haul road crosses a highway outside a major work area.



TYPE AA

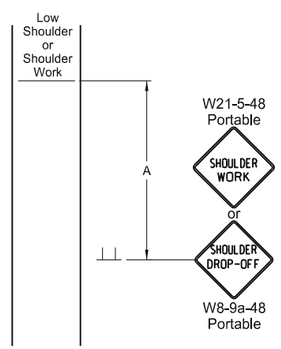
To be used where survey crew is being used

TYPE KK

To be used at major intersections within pilot car control area

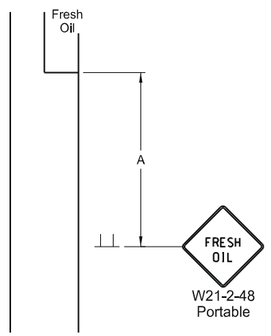
Notes

1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
4. Existing speed limit signs within a reduced speed zone shall be covered.
5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
6. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
7. When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



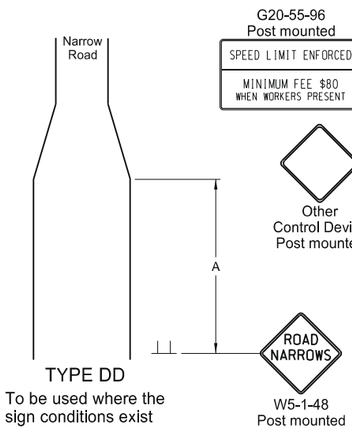
TYPE BB

To be used within a major work area where the sign conditions exist



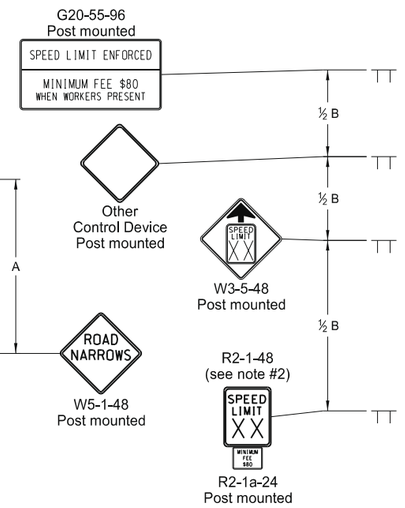
TYPE CC

To be used where the sign conditions exist



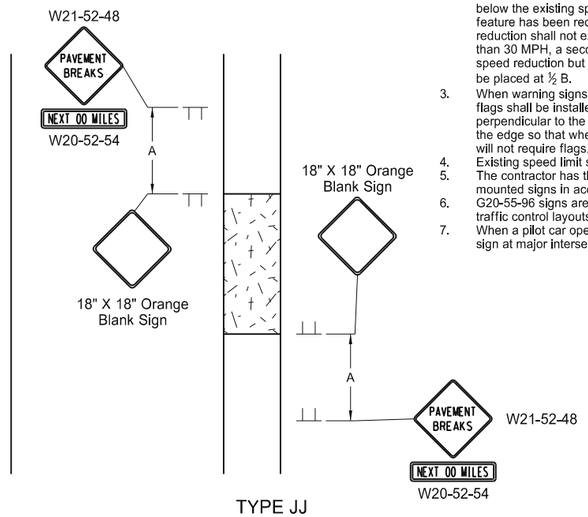
TYPE DD

To be used where the sign conditions exist



TYPE Z

To be used where speed zone is needed

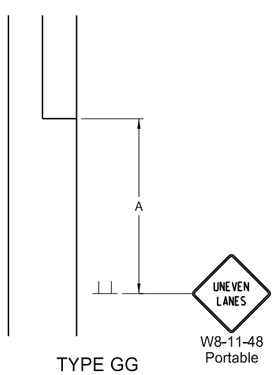


TYPE JJ

To be used where there is a break in the pavement. These signs may be skid mounted or post mounted and shall be installed when conditions exist and removed when not applicable.

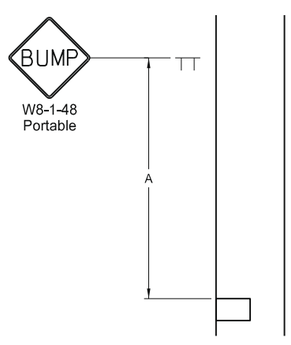
Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.



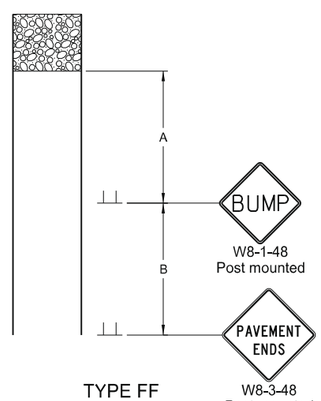
TYPE GG

To be used where a difference of elevation between lanes exist



TYPE EE

To be used where the sign conditions exist



TYPE FF

To be used where the sign conditions exist

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

Sign — Flagger

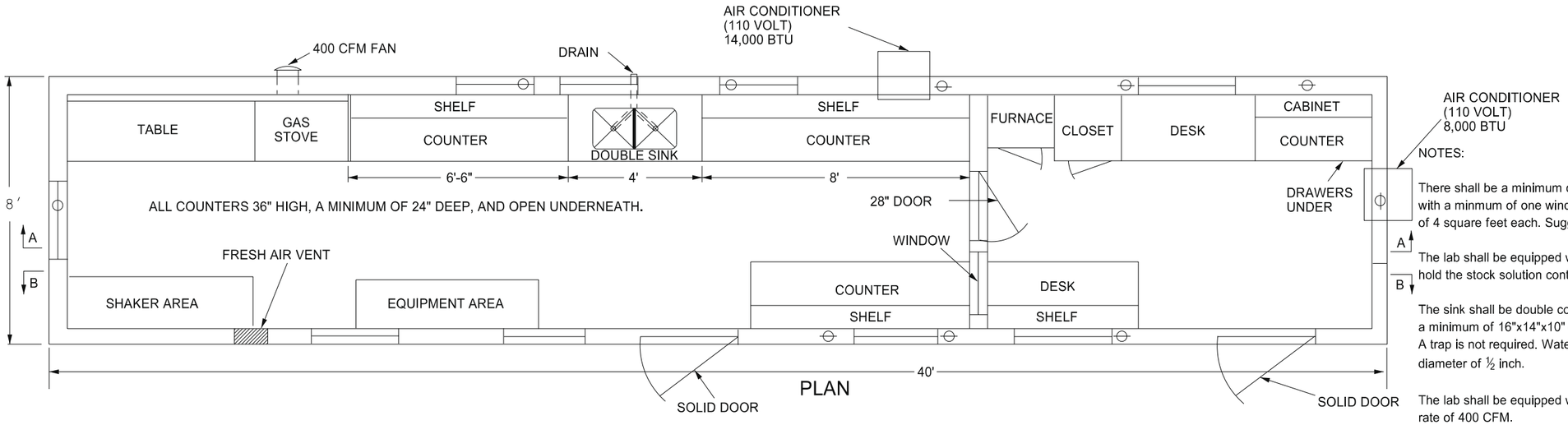
Cones

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

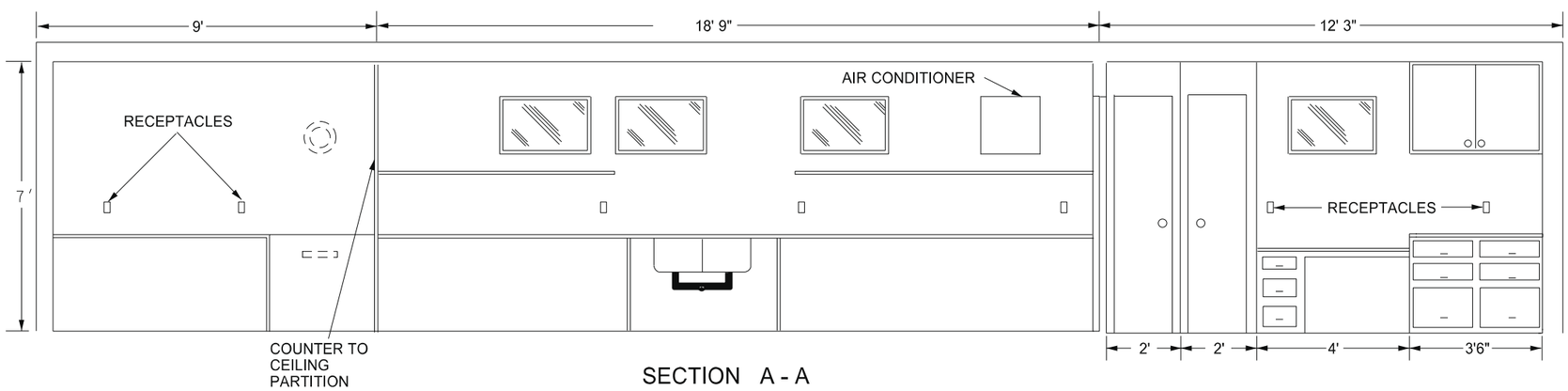
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 09/27/13 and the original document is stored at the North Dakota Department of Transportation

BITUMINOUS LABORATORY

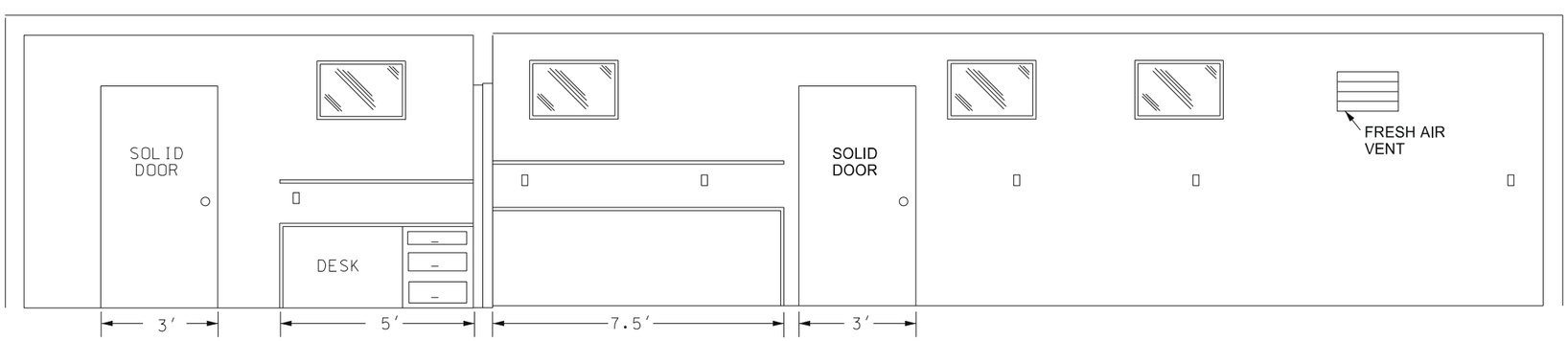
D-706-1



PLAN



SECTION A - A



SECTION B - B

NOTES:

There shall be a minimum of six screened exterior windows on two or more sides, with a minmum of one window in each room. Windows shall have a minimum area of 4 square feet each. Suggested locations are shown on drawing.

The lab shall be equipped with a 1'x1' shelf at 36" above the regular countertop to hold the stock solution container for the Sand Equivalent test.

The sink shall be double compartment stainless steel. Each compartment shall be a minimum of 16"x14"x10" deep. The sink shall be drained to an outside waste line. A trap is not required. Water service lines shall be copper or plastic having a diameter of ½ inch.

The lab shall be equipped with an exhaust fan capable of removing inside air at a rate of 400 CFM.

The fresh air vent shall be hinged to open or close manually.

24" x 48" table shall be provided capable of holding a 200 lb. masonry saw. The table shall have a minimum clearance of 36" overhead.

The water supply tank shall have a capacity of 500 gallons.

Steps and a landing for each set of steps shall be provided for each of two entrance doors. Steps for each area shall be made of, or covered with, a material providing for a non-slip surface. They shall be heavy duty steps that are capable of withstanding heavy loadings and extensive use.

The pressure tank on the pump shall be 20 gallon capacity.

Locks, latches, and hinges for main doors shall be heavy duty type to withstand the intense use in service.

The wall between the office and the work area shall be properly insulated to prevent the transmission of heat and noise.

The floor beneath the marshall area shall be heavily reinforced.

The lab shall be equipped with steel cable tie downs and ground anchors at each corner of the lab.

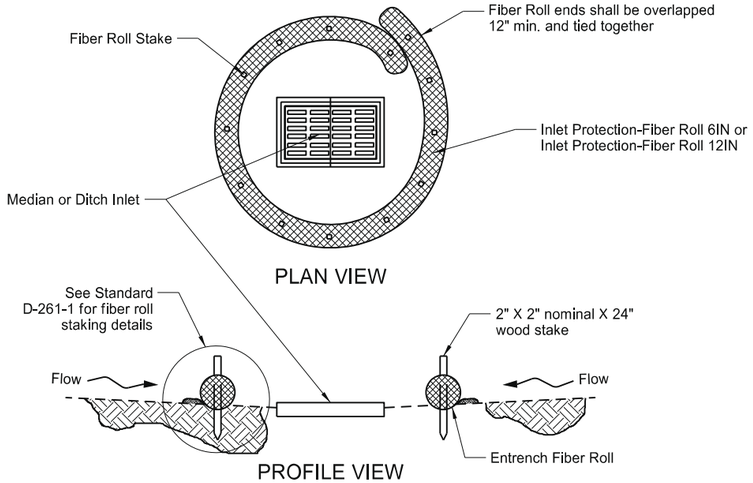
Electrical service entrance shall be wired for 100 amps, and have separate circuits for air conditioners. Convenience outlets shall have a minimum spacing of four feet in counter areas.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.

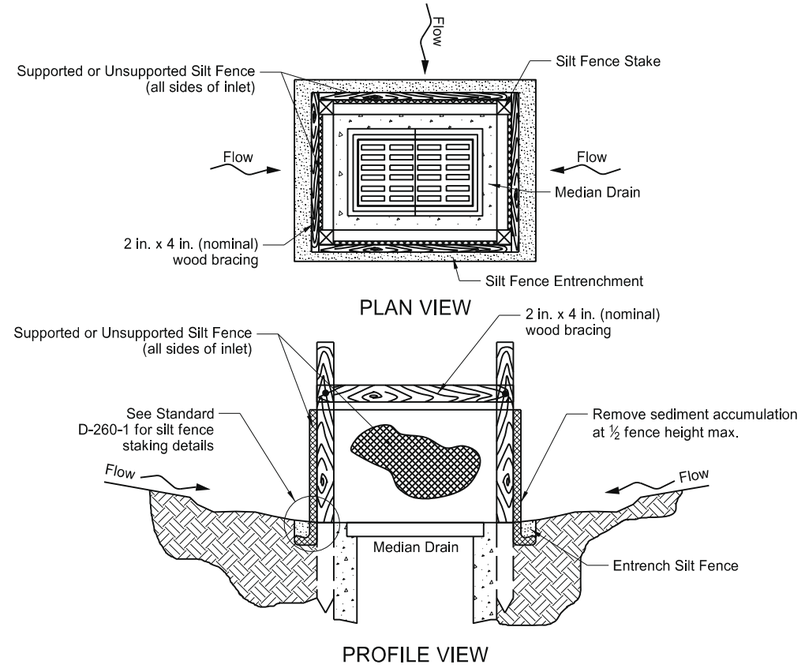
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 07/30/14 and the original document is stored at the North Dakota Department of Transportation

EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION

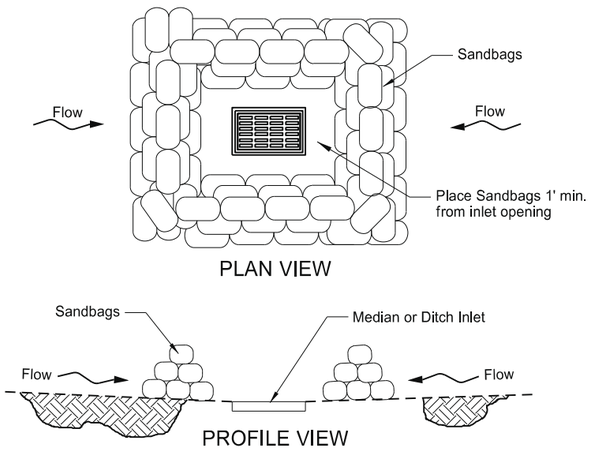
D-708-6



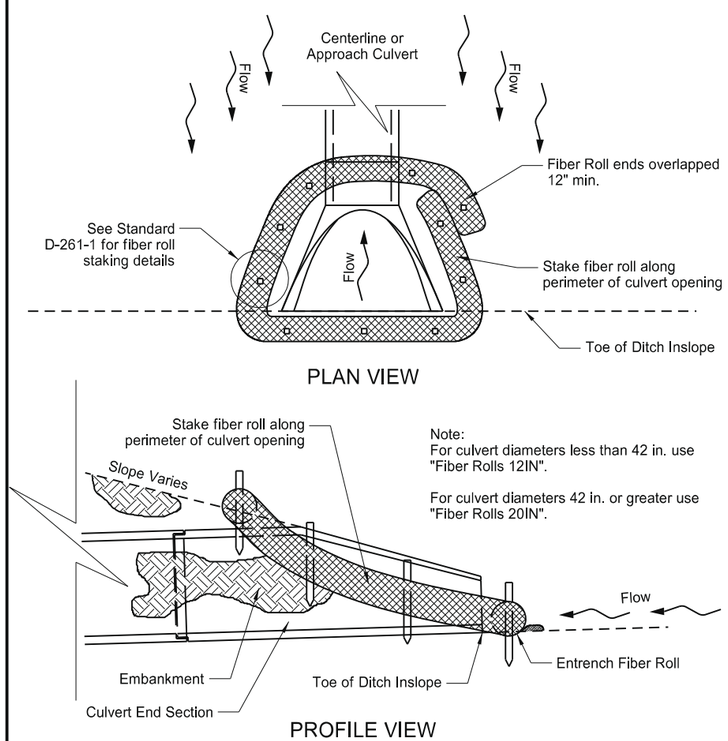
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



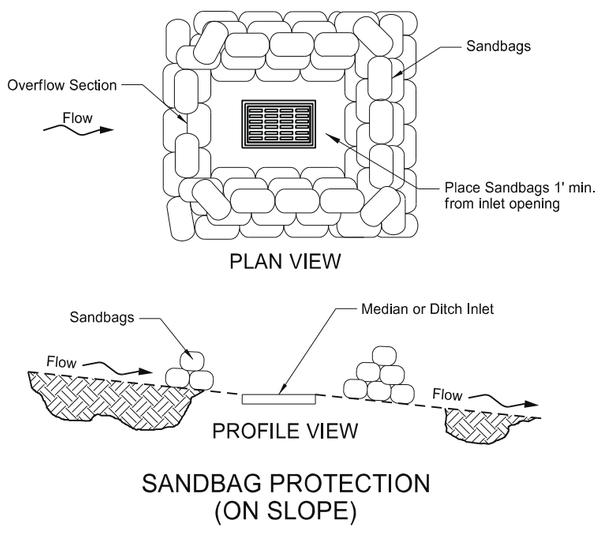
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



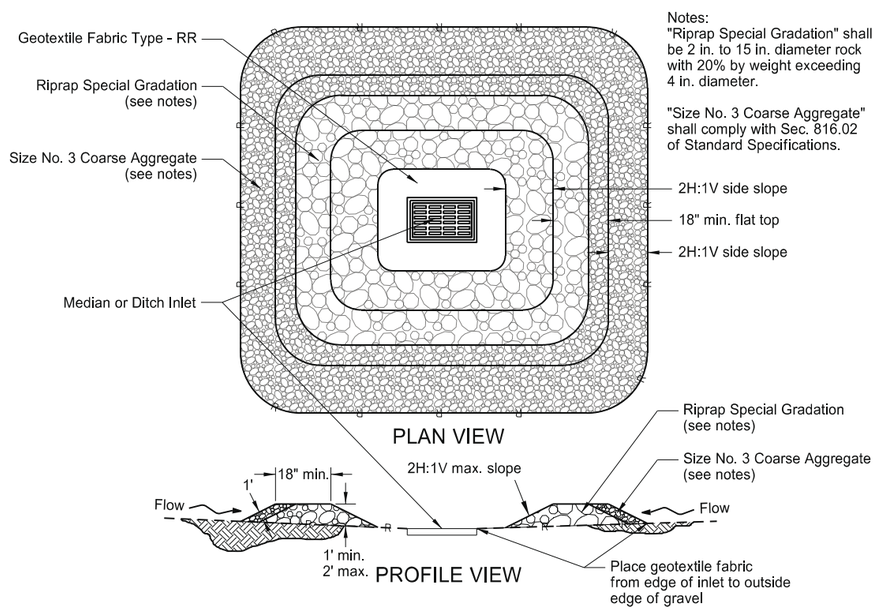
SANDBAG PROTECTION (LOW POINT)



FIBER ROLL PROTECTION (INLET OF CULVERT)



SANDBAG PROTECTION (ON SLOPE)



Notes:
"Riprap Special Gradation" shall be 2 in. to 15 in. diameter rock with 20% by weight exceeding 4 in. diameter.

"Size No. 3 Coarse Aggregate" shall comply with Sec. 816.02 of Standard Specifications.

GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)

NORTH DAKOTA 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.

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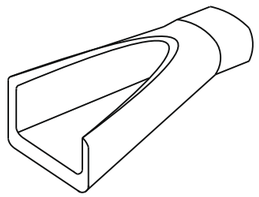
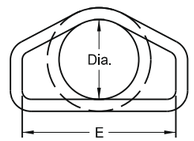
REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)

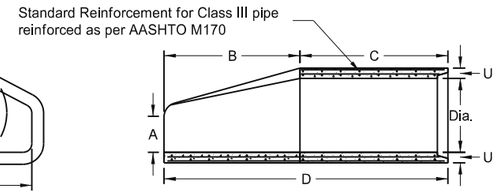
D-714-1



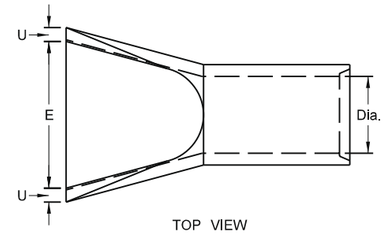
PERSPECTIVE



END VIEW



SIDE VIEW

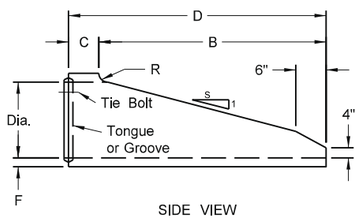


TOP VIEW

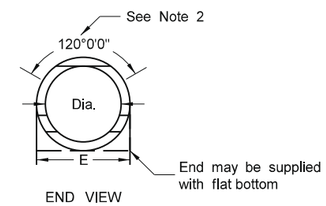
REINFORCED CONCRETE PIPE - FLARED END SECTION
Reinforcement to be equivalent to Class III RCP

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2¼"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2¾"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3¼"
30	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3½"
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4½"
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9¼"	8'-2¼"	7'-6"	5½"
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5½"
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6½"
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	6½"
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	6½"

TRAVERSABLE END SECTION							
DIA	B	C	D	E	F	R	S
15"	4'	9"	4'-9"	1'-7½"	2¼"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	2½"	3"	6
24"	6'	1'	7'	2'-6"	3"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3½"	3½"	4
36"	7'-3"	15"	8'-6"	3'-8"	4"	3"	4



SIDE VIEW



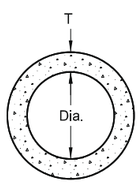
END VIEW

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.

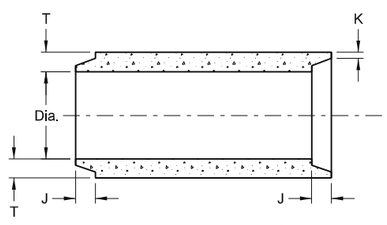
REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION
Reinforcement to be equivalent to Class III RCP

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 End Min.	Minimum Wall Thickness (T)
Dia	Sq. ft.	Lbs.	In.	In.	In.
12	0.79	92	1⅝-2⅜	¾	2
15	1.23	127	1¾-2¾	⅞	2¼
18	1.77	168	1⅞-2⅞	1	2½
21	2.40	214	1⅞-3⅛	1⅛	2¾
24	3.14	265	2⅛-3¾	1⅛	3
27	3.98	322	2¾-4	1¼	3¼
30	4.91	384	3⅛-4¼	1¼	3½
33	5.94	452	3⅛-4¼	1½	3¾
36	7.07	524	3⅛-4¼	1½	4
42	9.62	685	3⅜-4¾	1¾	4½
48	12.57	685	3⅝-4¾	1⅞	5
54	15.90	1070	4⅛-5½	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2⅝	6½
72	28.27	1810	5⅝-6¾	2⅞	7
78	33.18	2098	6¼-7¼	2⅞	7½
84	38.48	2410	5⅝-7¾	3⅜	8
90	44.18	2793	6¾-8½	3⅛	8½
96	50.27	3092	7-8¼	3½	9
102	56.75	3466	7-8¼	3½	9½
108	63.62	3864	7¼-8½	3¾	10

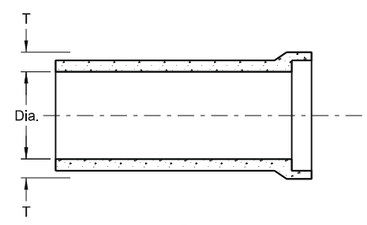


END VIEW

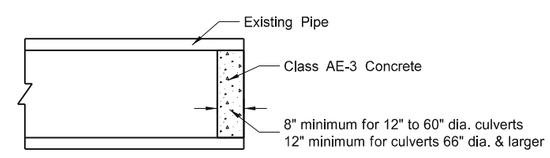
CIRCULAR PIPE



TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT



CONCRETE PIPE PLUG

JOINTS FOR REINFORCED CONCRETE PIPE

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.

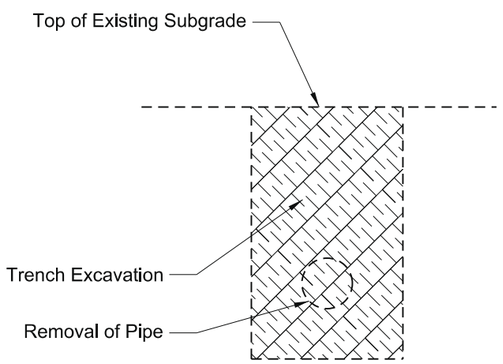
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5

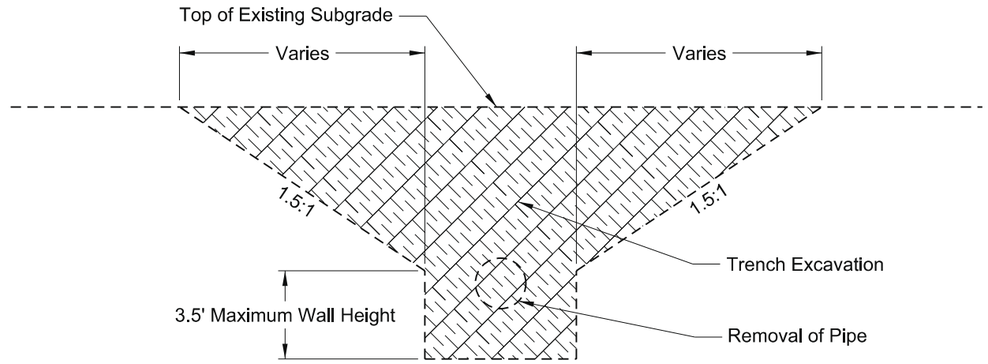
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674, on 01/21/15 and the original document is stored at the North Dakota Department of Transportation

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

D-714-27



EXCAVATION DETAIL A



EXCAVATION DETAIL B

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

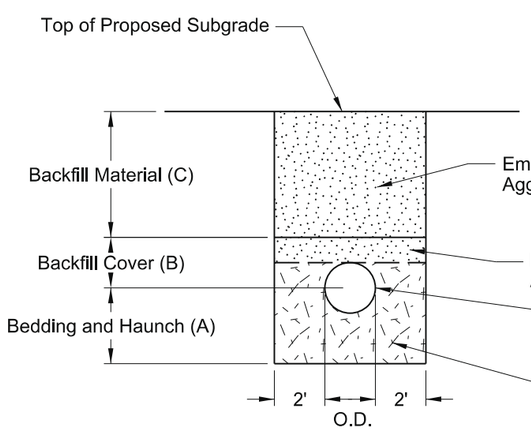
*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate base course Cl 3 or Cl 5
4) Embankment

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

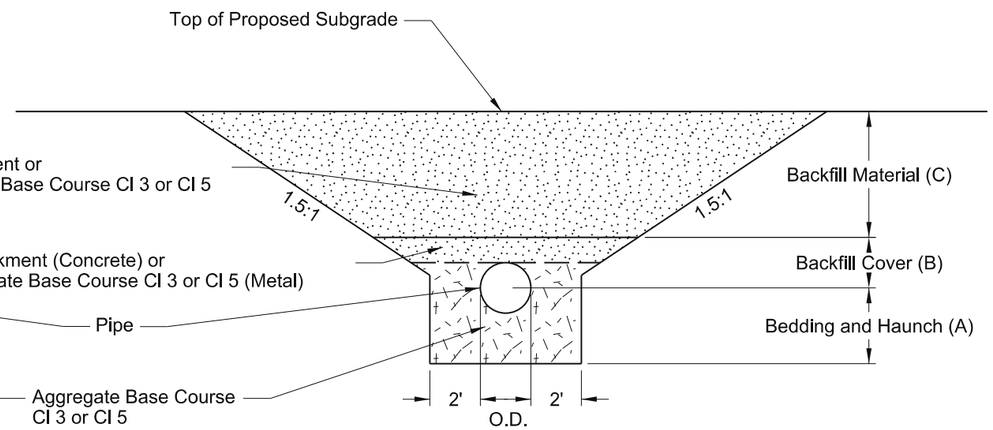
Bedding and Haunch (A)
Pipes NotUnder Roadway = 0.5 O.D. + 4 Inches
Pipes Under the Roadway = 0.5 O.D. + 2 Feet

Backfill Cover (B)
Concete Pipe = 0.5 O.D.
Metal Pipe = 0.5 O.D. + 1 Foot
P/C/HDPE = 0.5 O.D. + 1 Foot

Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggegate Base Course Cl 3 or Cl 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



BACKFILL DETAIL A



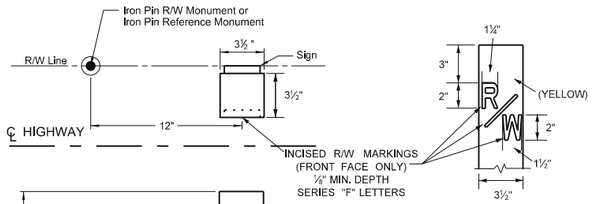
BACKFILL DETAIL B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature

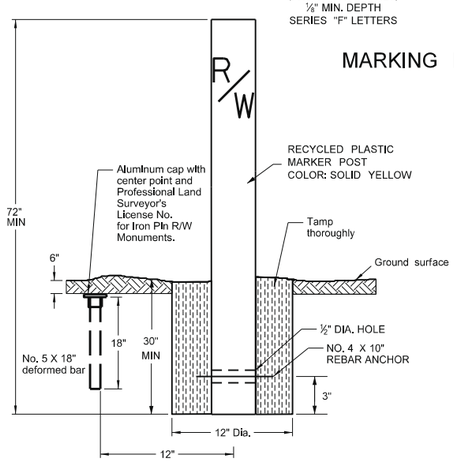
This document was originally issued and sealed by Ron Horner, Registration Number PE- 2087, on 1/22/2015 and the original document is stored at the North Dakota Department of Transportation

STANDARD MONUMENTS AND RIGHT OF WAY MARKERS

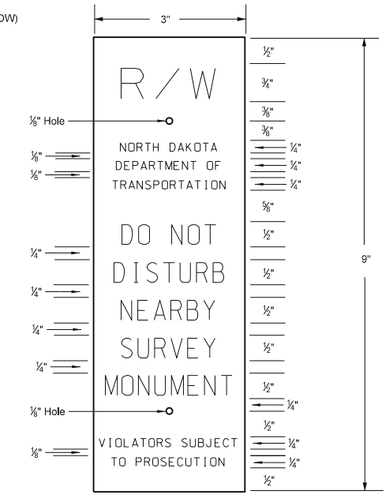
D-720-1



MARKING DETAIL



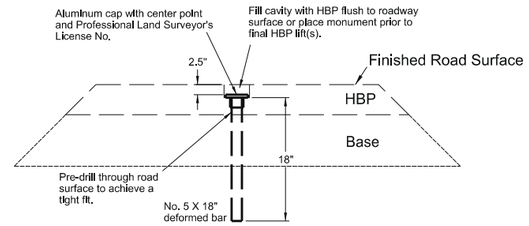
RECYCLED PLASTIC
RIGHT OF WAY MARKER
(WITNESS POST) DETAILS
&
IRON PIN REFERENCE AND R/W
MONUMENT DETAILS



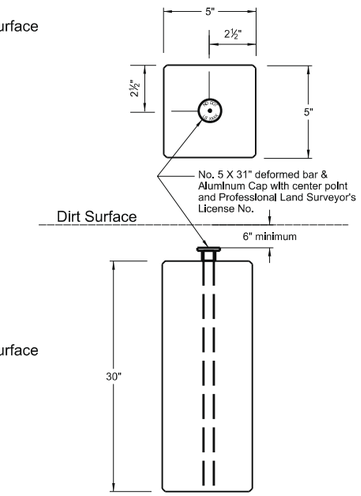
SIGN DETAIL

Black letters on orange high intensity background sheeting meeting ASTM D-4956 Type III or higher on 80 gauge 5052-H38 aluminum. Silk screen graphics. One color print. Sign shall be attached by drilling two holes in the face of the post (side facing the private owner, away from the Department of Transportation right of way). Put inserts into the holes and mount the sign with #4 vandal proof screws. Sign shall be installed 2" from top of post.

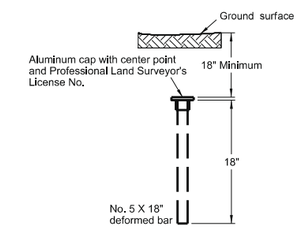
ALIGNMENT MONUMENT DETAILS



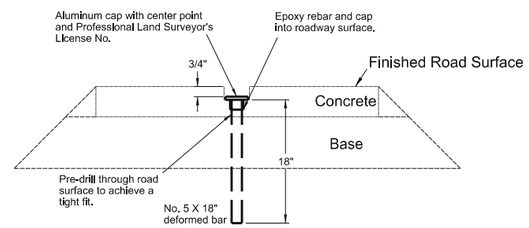
IRON PIN
(Within Finished Roadway Surface)



PRECAST CONCRETE
(Outside Finished Roadway Surface)
(Inside R/W Limits)



IRON PIN
(Outside Finished Roadway Surface)
(Outside R/W Limits)



IRON PIN
(Within Finished Roadway Surface)

NOTES:

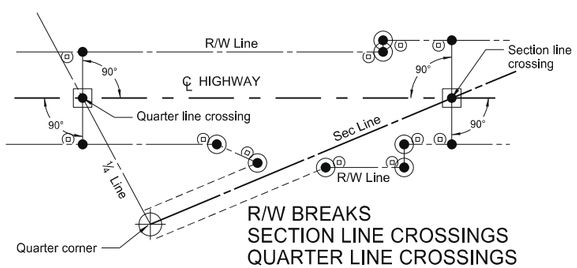
The construction and installation of Alignment Monuments, Iron Pin Reference Monuments, Iron Pin R/W Monuments, and Right of Way Markers (witness posts) shall conform to Section 720 of the Standard Specifications.

ALIGNMENT MONUMENTS:
Iron Pin or Precast Concrete Alignment Monuments with aluminum caps will be placed on the centerline alignment PI's, section corners, quarter corners, section line crossings, quarter line crossings, and at curve points (PC's, PT's, TS's, and ST's) on the centerline.

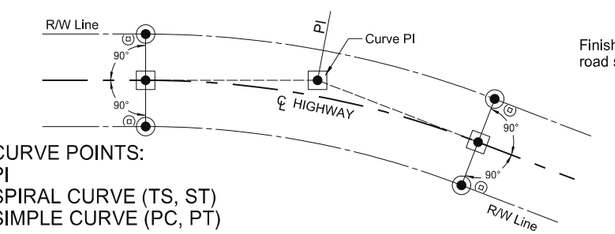
IRON PIN R/W MONUMENT:
Iron pins with aluminum caps (No. 5 X 18") will be placed at breaks on the Right of Way line, and at curve points (PC's, PT's, TS's and ST's) on the Right of Way line.

IRON PIN REFERENCE MONUMENT:
Iron Pins without aluminum caps (No. 5 X 18") will be placed as reference monuments on the Right of Way line at section corners, quarter corners, section line crossings, and quarter line crossings.

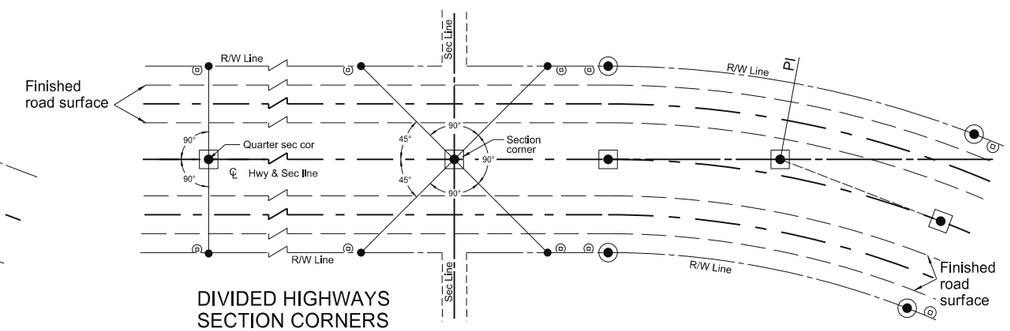
VARIOUS MONUMENT AND MARKER PLACEMENTS



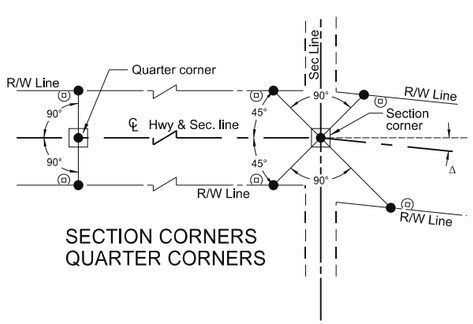
R/W BREAKS
SECTION LINE CROSSINGS
QUARTER LINE CROSSINGS



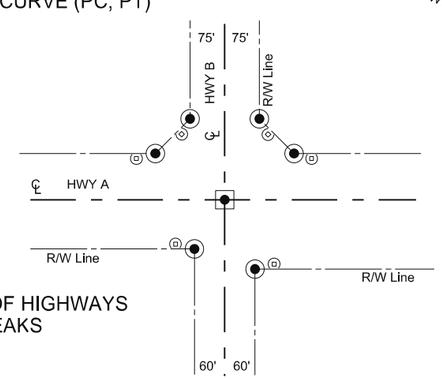
CURVE POINTS:
PI
SPIRAL CURVE (TS, ST)
SIMPLE CURVE (PC, PT)



DIVIDED HIGHWAYS
SECTION CORNERS
QUARTER CORNERS



SECTION CORNERS
QUARTER CORNERS



INTERSECTION OF HIGHWAYS
FLARED R/W BREAKS

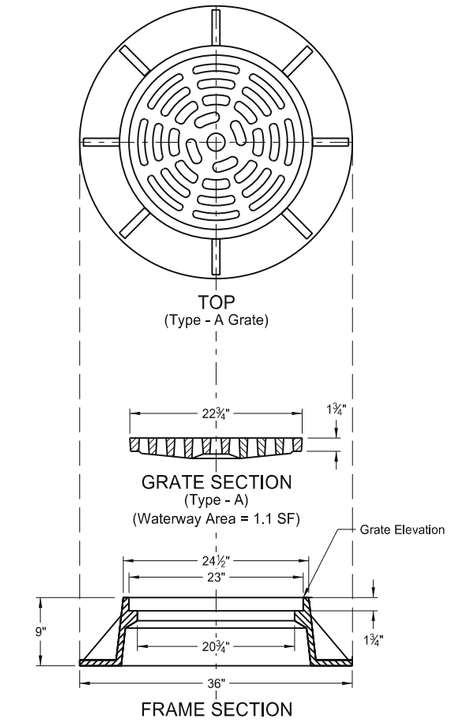
LEGEND
- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Pin R/W Monument

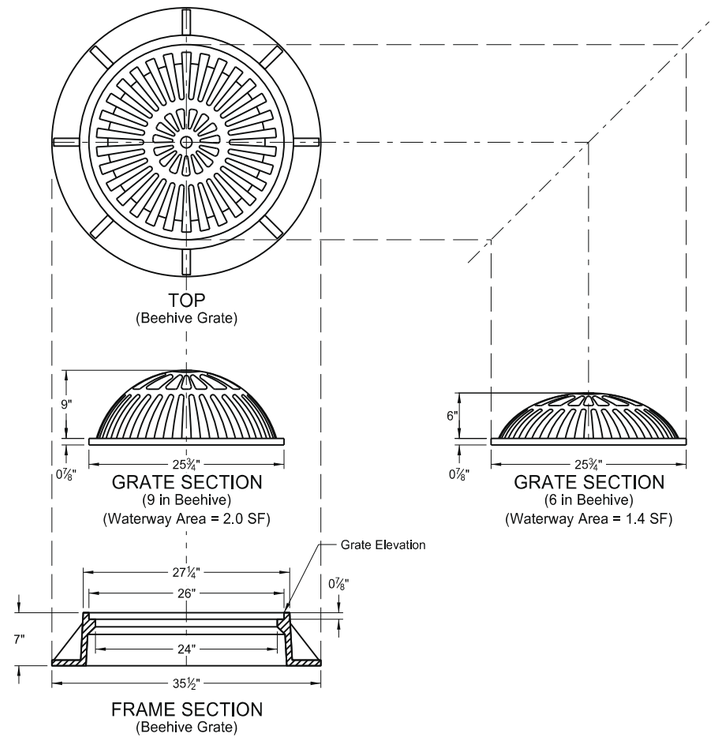
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
11/12/13	Note for SIGN DETAIL modified to meet ASTM D-4956 Type III or higher on 80 gauge 5052-H38

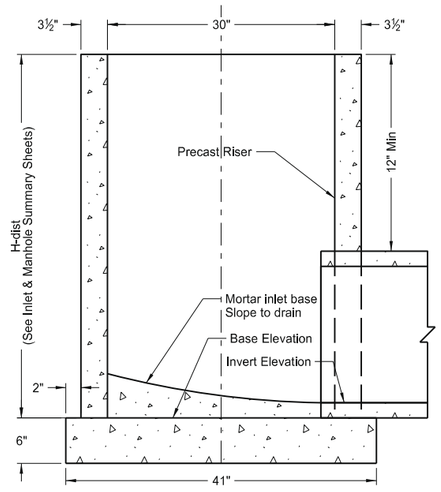
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930 , on 11/12/13 and the original document is stored at the North Dakota Department of Transportation

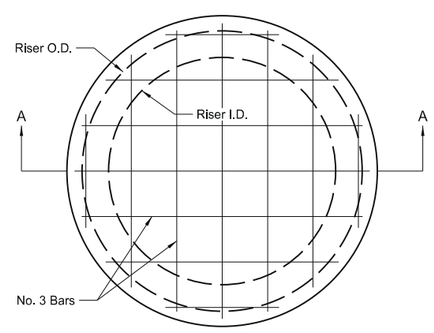
INLET - CATCH BASIN

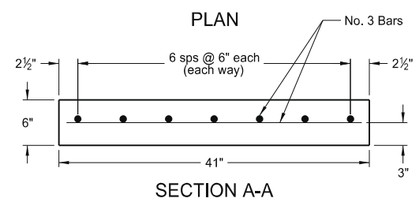
D-722-1A











NOTES:

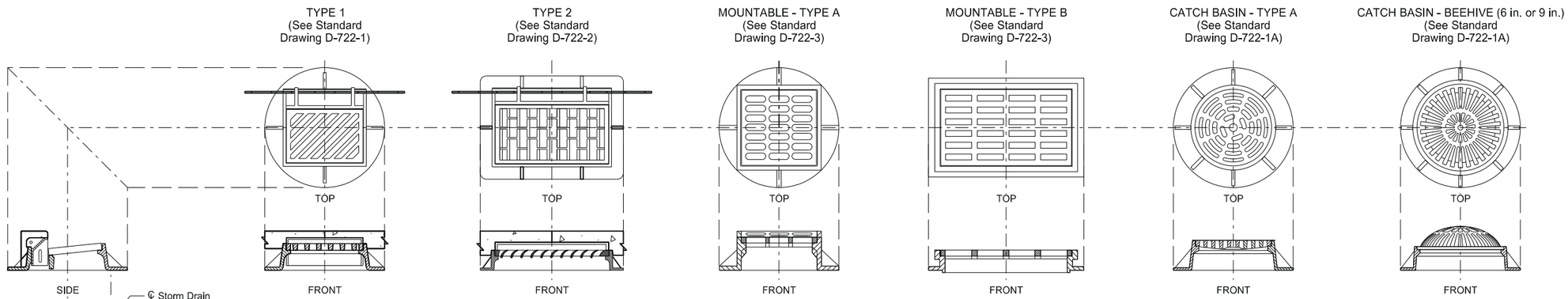
1. Other castings, similar in dimension, may be used if the casting conforms to the riser section and has a grate style as specified in the plans which meets or exceeds the waterway area listed. If modifications to the inlet are required to facilitate similar castings the contractor must receive written approval from the Engineer.
2. Castings shall be manufactured in accordance with AASHTO M306-09. Metal used in the manufacture of castings shall conform to AASHTO M105 Class 35B.
3. The contractor shall have the option of using precast or cast-in-place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with the NDDOT Standard Specifications.
4. Precast concrete risers shall be constructed in accordance with AASHTO M199.
5. On projects with P.C.C. pavement all inlet risers shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after paving. Adjustment may be done with adjusting rings, masonry or cast-in-place concrete. All costs for this adjustment shall be included in the price bid for the inlet.
6. All reinforcing steel shall be Grade 60 steel.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-14-13	
REVISIONS	
DATE	CHANGE
6-24-14	Revised Note 3

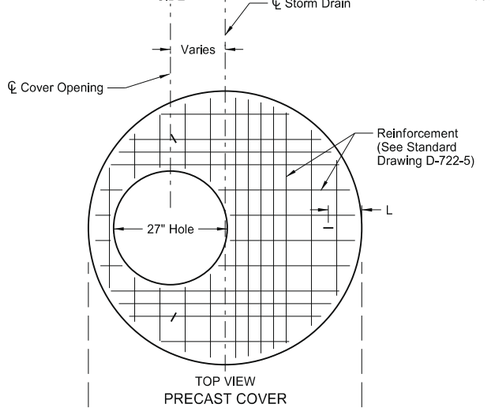
This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 6-24-14 and the original document is stored at the North Dakota Department of Transportation

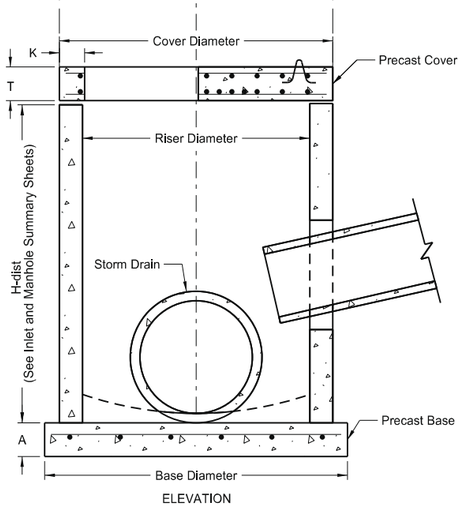
INLET - SPECIAL

D-722-1B



See Note 1.





MANHOLE
(See Standard Drawing D-722-5)

RISER DIAMETER	COVER DIAMETER	BASE DIAMETER
48"	58"	66"
60"	72"	78"
72"	86"	92"

See Note 4.

PAY ITEMS

48 in. Riser
- Inlet Special - Type 1 48 in. . . . . Ea.
- Inlet Special - Type 2 48 in. . . . . Ea.
- Inlet Special Mountable - Type A 48 in. . . . . Ea.
- Inlet Special Mountable - Type B 48 in. . . . . Ea.
- Inlet Special Catch basin 6 in. beehive 48 in. . . . . Ea.
- Inlet Special Catch basin 9 in. beehive 48 in. . . . . Ea.
- Inlet Special Catch basin - Type A 48 in. . . . . Ea.

60 in. Riser
- Inlet Special - Type 1 60 in. . . . . Ea.
- Inlet Special - Type 2 60 in. . . . . Ea.
- Inlet Special Mountable - Type A 60 in. . . . . Ea.
- Inlet Special Mountable - Type B 60 in. . . . . Ea.
- Inlet Special Catch basin 6 in. beehive 60 in. . . . . Ea.
- Inlet Special Catch basin 9 in. beehive 60 in. . . . . Ea.
- Inlet Special Catch basin - Type A 60 in. . . . . Ea.

72 in. Riser
- Inlet Special - Type 1 72 in. . . . . Ea.
- Inlet Special - Type 2 72 in. . . . . Ea.
- Inlet Special Mountable - Type A 72 in. . . . . Ea.
- Inlet Special Mountable - Type B 72 in. . . . . Ea.
- Inlet Special Catch basin 6 in. beehive 72 in. . . . . Ea.
- Inlet Special Catch basin 9 in. beehive 72 in. . . . . Ea.
- Inlet Special Catch basin - Type A 72 in. . . . . Ea.

NOTES:

1. For inlet casting details, see Standard Drawings D-722-1, D-722-21A, D-722-2, and D-722-3. Other castings, similar in dimension, may be used provided the casting meets the requirements set forth in the referenced Standard Drawings. The grate style shall be as specified on the plans and included in the price bid for "Inlet Special - (casting type & riser size)".
2. Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
3. The Class of concrete, aggregate size, and methods of construction for the manhole riser, cover, and base shall be as detailed in Standard Drawing D-722-5.
4. See Standard Drawing D-722-5 for manhole riser, cover, and base details, dimensions, and reinforcement requirements.
5. The distance between the ℄ of the cover opening and the ℄ of the storm drain shall be noted on the Plan & Profile sheets.
6. Manhole steps, if noted on the Plan and Profile sheets, shall be constructed per Standard Drawing D-722-5.
7. On projects with P.C.C pavement, all risers shall be constructed 4 to 5 inches below final elevation and adjusted to final elevation after paving. Adjustments may be made with adjusting rings or cast-in-place concrete. All costs for this adjustment shall be included in the price bid for "Inlet - Special, (casting type & riser size)".

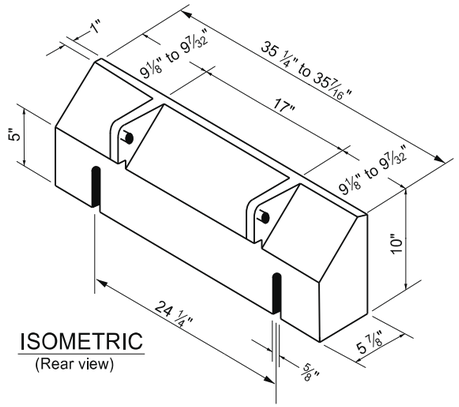
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
03-18-14	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Terrence R. Udland Registration Number PE-2674 , on 03-18-14 and the original document is stored at the North Dakota Department of Transportation

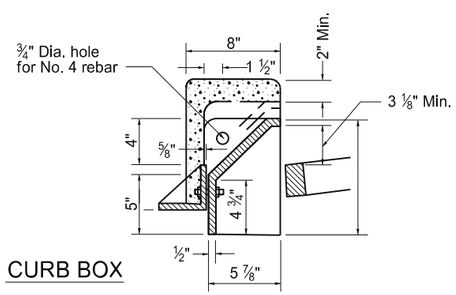
INLET - TYPE 2

D-722-2

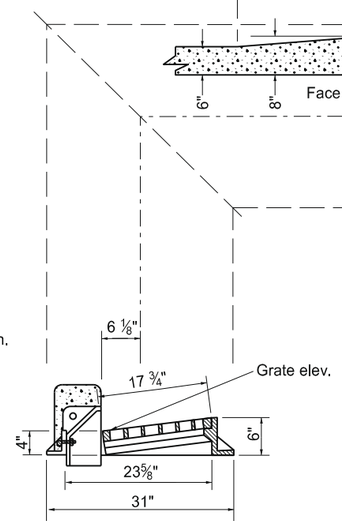
Pay Items
Inlet - Type 2 .....Ea.
Inlet - Type 2, Double.....Ea.



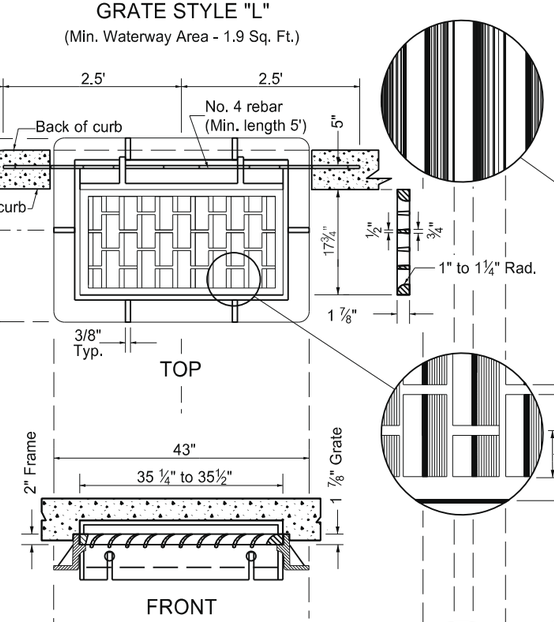
ISOMETRIC
(Rear view)



CURB BOX



SIDE

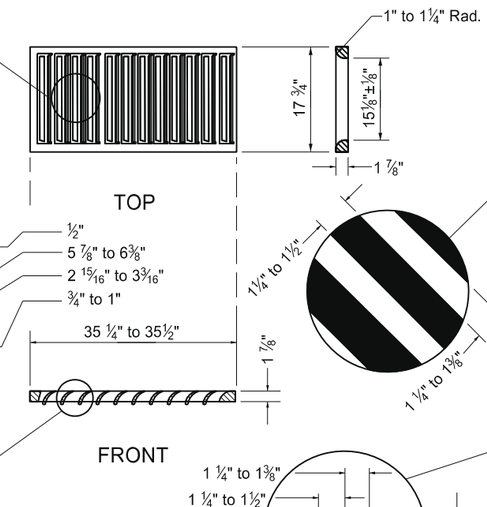


GRATE STYLE "L"
(Min. Waterway Area - 1.9 Sq. Ft.)

TOP

FRONT

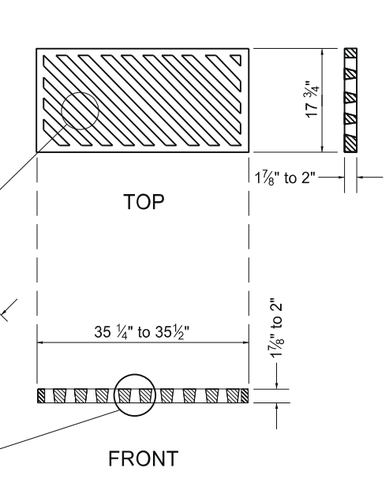
CASTING DETAILS



GRATE STYLE "V"
(Min. Waterway Area - 2.4 Sq. Ft.)

TOP

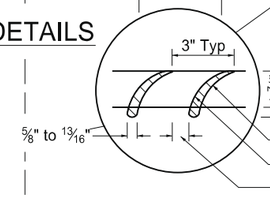
FRONT

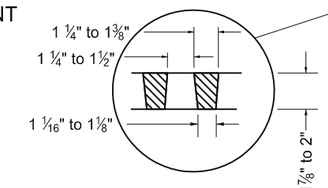


GRATE STYLE "D"
(Min. Waterway area - 1.6 Sq. Ft.)

TOP

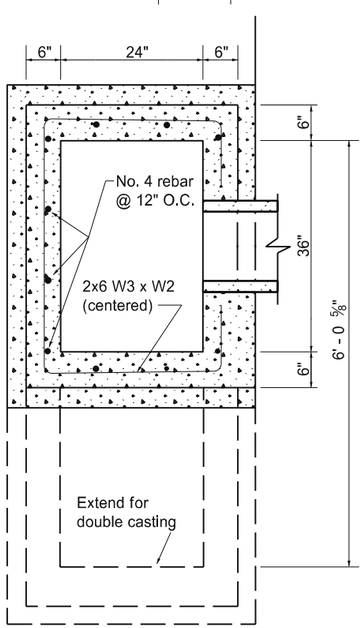
FRONT





Notes:

1. Drainage structure castings shall be manufactured in accordance with AASHTO M306. Metal used in the manufacture of castings shall conform to AASHTO M105 Class 35B.
2. Other castings, similar in dimension, may be used if the casting conforms to the riser section and has the grate style as specified in the plans. If modifications to the inlet riser are required to accomodate similar castings, the contractor must receive written approval from the engineer.
3. Precast risers shall be constructed in accordance with ASTM C858.
4. The contractor shall have the option of using precast or poured in place bases. Cast in place concrete shall be Class AE-3. Construction shall be in accordance with section 722 of the Standard Specifications.
5. On projects with P.C.C. pavement, all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after paving. Adjustment may be done with adjusting rings or cast-in-place concrete. All costs for this adjustment shall be included in the price bid for the inlet.
6. Welded wire reinforcing fabric shall conform to AASHTO M55 Grade 65.
7. The deformed reinforcing steel shall conform to AASHTO M31.



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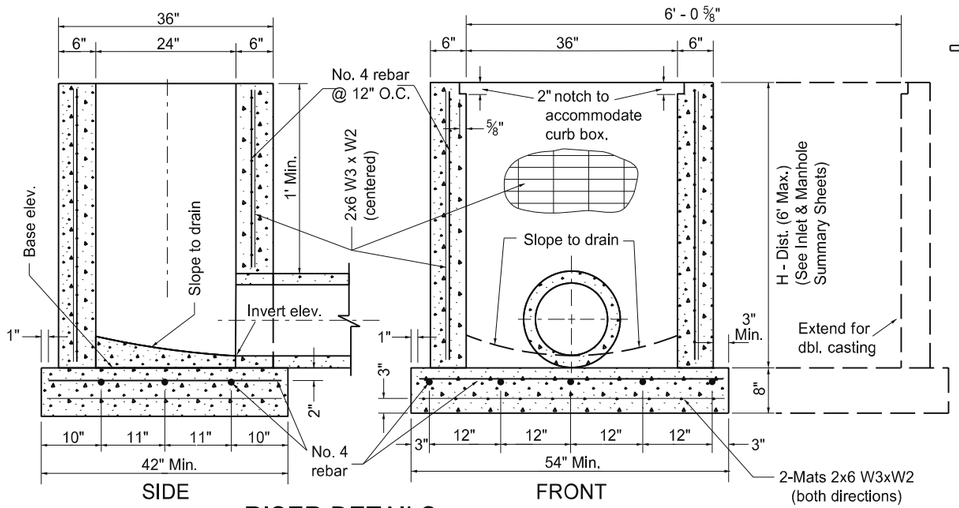
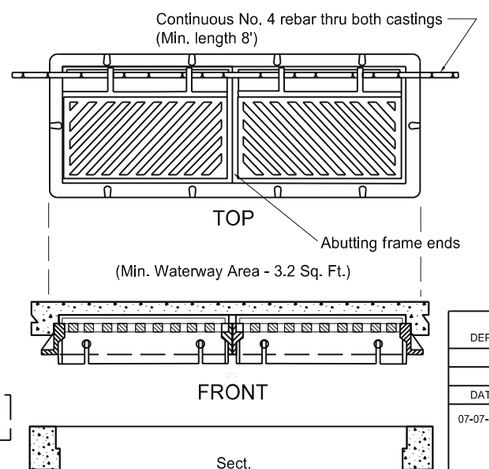


SIDE

FRONT

RISER DETAILS



TOP

FRONT

Sect.

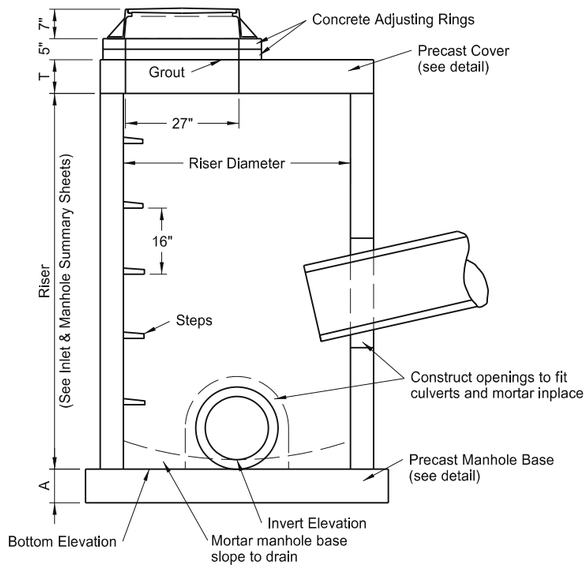
INLET - TYPE 2 - DOUBLE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
07-07-14	Revised Note 4

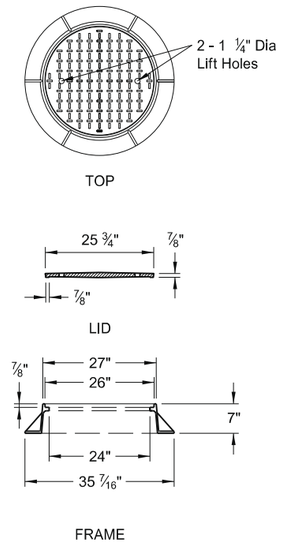
This document was originally issued and sealed by TERRENCE R. UDLAND Registration Number PE- 2674, on 07/07/14 and the original document is stored at the North Dakota Department of Transportation

MANHOLE DETAILS

D-722-5



ELEVATION



MANHOLE CAST IRON RING & COVER

PRECAST MANHOLE COVERS

RISER DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM * BARS	TOP * BARS
48"	58"	1,080 Lb	6"	6"	8"	#4 at 6"	—
54"	65"	1,910 Lb	8"	6"	8"	#4 at 6"	—
60"	72"	2,430 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
66"	79"	3,010 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
72"	86"	3,640 Lb	8"	8"	10"	#4 at 6"	#4 at 11"
84"	100"	5,060 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
96"	114"	6,695 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
108"	128"	12,810 Lb	12"	10"	12"	#5 at 6"	#5 at 11"
120"	142"	15,900 Lb	12"	11"	13"	#5 at 6"	#5 at 11"

* - Reinforcement listed shall be placed in each direction.

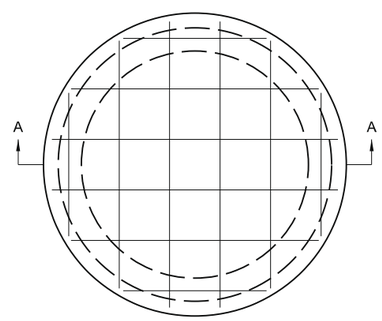
MANHOLE BASES

RISER DIAMETER	BASE DIAMETER	WEIGHT OF SECTION	A	BARS *
48"	66"	1,785 Lb	6"	#4 at 12"
54"	72"	2,830 Lb	8"	#4 at 12"
60"	78"	3,320 Lb	8"	#4 at 12"
66"	86"	4,035 Lb	8"	#4 at 12"
72"	92"	4,620 Lb	8"	#4 at 12"
84"	107"	6,245 Lb	8"	#4 at 12"
96"	120"	7,855 Lb	8"	#4 at 12"
108"	132"	14,255 Lb	12"	#4 at 8"
120"	148"	17,925 Lb	12"	#4 at 8"

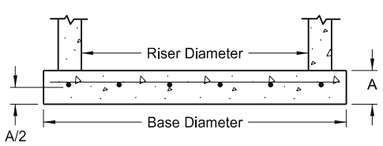
* - Reinforcement listed shall be placed in each direction.

NOTES:

1. The contractor shall have the option of using precast or cast-in-place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with the NDDOT Standard Specifications.
2. Precast concrete manholes, risers and steps shall conform to AASHTO M199.
3. Precast concrete bases and covers shall be reinforced as shown in the table for the corresponding riser diameter.
4. All reinforcing steel shall be Grade 60 steel.
5. Bottoms of manhole risers shall be cut or precast square to fit the manhole base. Grout joint between base and riser with cement mortar.
6. The manhole riser length listed in the plans has been determined assuming the use of the 7" manhole casting plus 2 concrete adjusting rings (5") plus the "T" dimension shown in the Precast Manhole Covers table.
7. Manhole steps shall be corrosion resistant and shall have a minimum vertical load resistance of 800 pounds and a minimum horizontal pull-out resistance of 400 pounds. Configuration of the steps shall be approved by the Engineer.
8. Precast concrete manhole covers shown are designed for an HS-20 wheel load and a maximum fill height of 15'-0". Special design required for heavier wheel loads and/or greater fill heights.
9. Other castings, similar in dimension, may be used if the casting conforms to the manhole cover and has a lid style as specified. If modifications to the manhole cover are required to facilitate similar castings the contractor must receive written approval from the engineer.
10. Castings shall be manufactured in accordance with AASHTO M306-09. Metal used in the manufacture of castings shall conform to AASHTO M105 Class 35B.

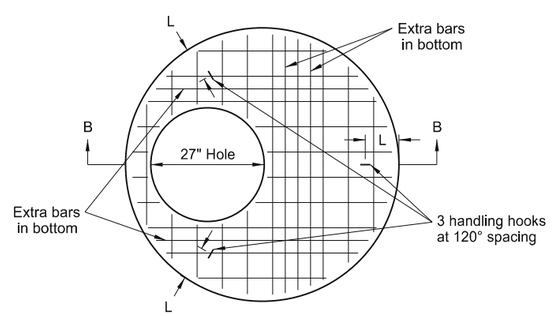


TOP VIEW

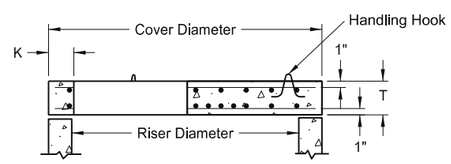


SECTION A-A

PRECAST MANHOLE BASE

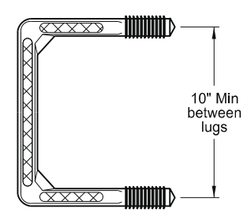


TOP VIEW

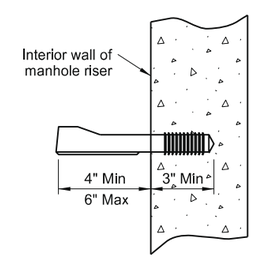


SECTION B-B

PRECAST COVER



TOP VIEW



STEP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-14-2013	
REVISIONS	
DATE	CHANGE
6-24-14	Revised notes 1 & 6, added dimensions to Elev. drawing

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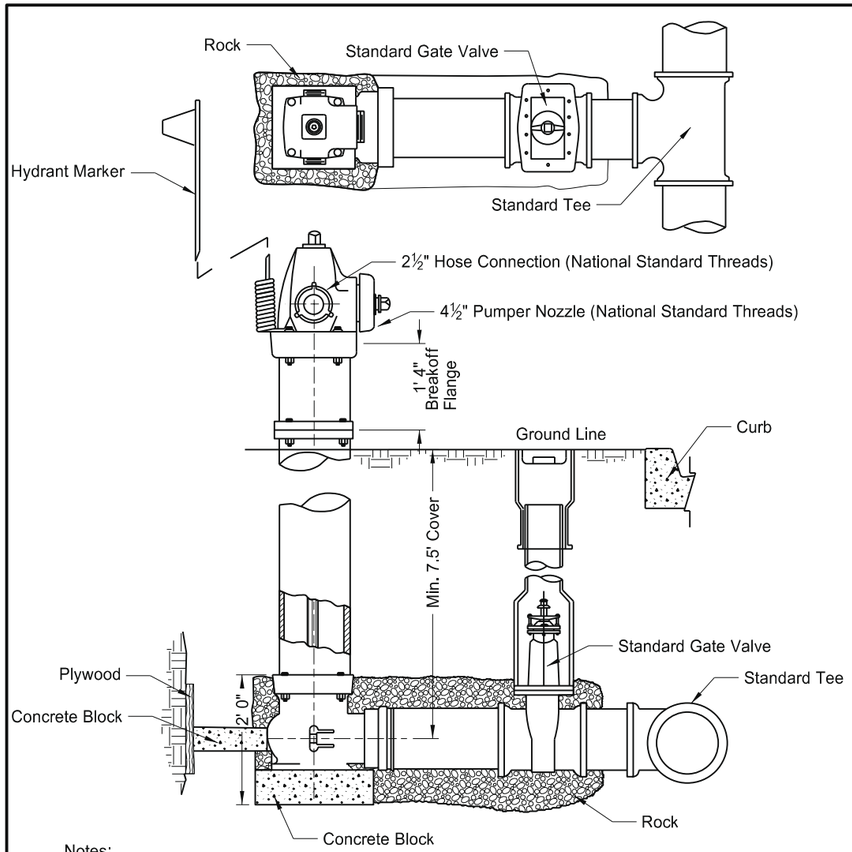
WATERWORKS

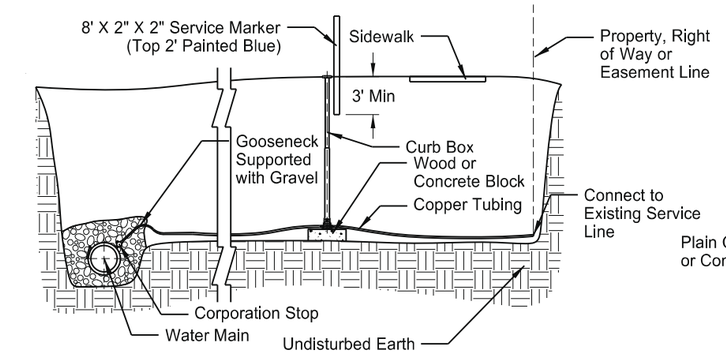
D-724-1

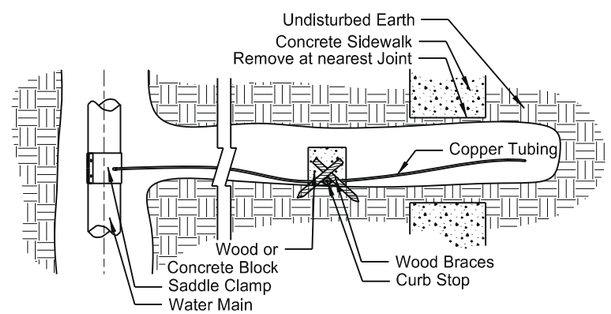


Notes:
1. Operating & Cap Nuts: City Standards

2. Supply and furnish and install hydrant marker. Cost will be included with the unit bid price for the hydrant. The hydrant marker shall be current with city standards or as approved by the engineer in the field.

STANDARD FIRE HYDRANT & CONNECTION

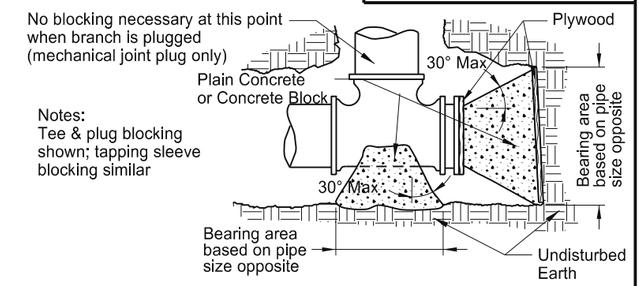




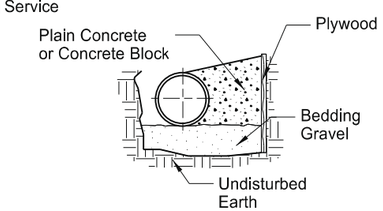
Notes:
1. Service clamp are not required where small size service lines are connected to large cast iron or ductile iron pipe and three threads of the corporation stop make contact with the wall.

2. Trench shall be gravel backfill from water main to back of curb line and under sidewalk areas or standard compaction of earth backfill where specified.

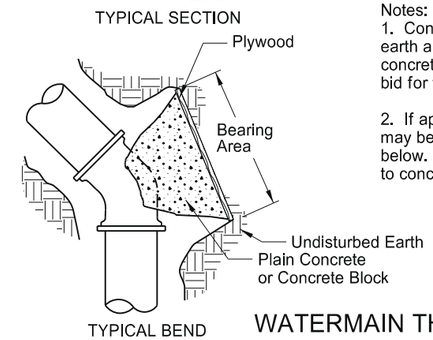
WATER CURB CONNECTION



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



TYPICAL SECTION



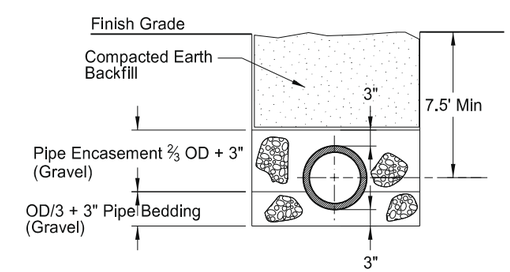
TYPICAL BEND

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

Notes:
1. Concrete blocking to be poured against undisturbed earth and plywood. Keep bells and bolts free of concrete. Concrete in place to be included in price bid for water main.

2. If approved by the engineer, solid concrete blocks may be used for blocking on 8" Dia. pipe and below. 10" Dia. pipe and above will conform to concrete poured in place areas as shown above.

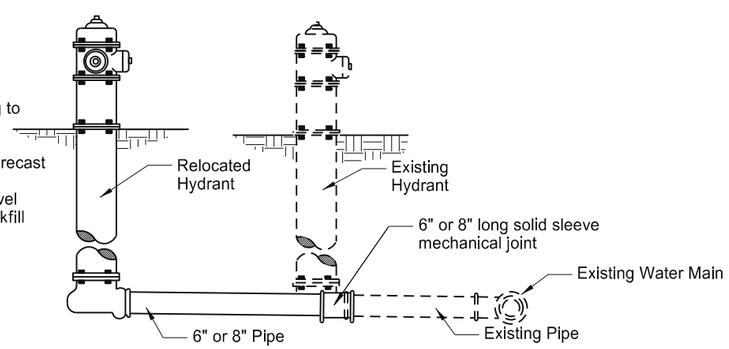
WATERMAIN THRUST BLOCK DETAILS



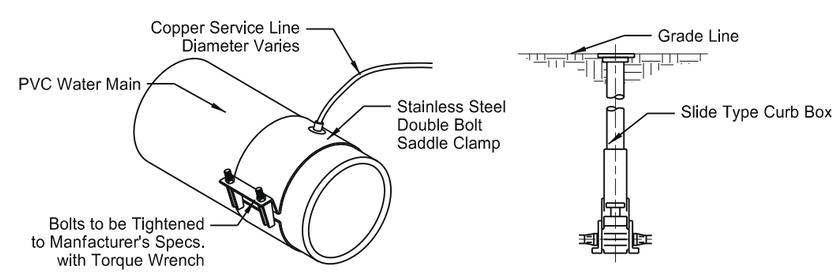
TRENCH BACKFILL

Notes:
1. Concrete thrust blocking to be placed as directed.

2. Hydrant to be set on a precast concrete pad. The hydrant shall be surrounded by gravel according to the trench backfill detail.



LAYOUT FOR RELOCATION OF HYDRANTS



TYPICAL CORPORATION STOP AND CURB STOP

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-22-10	
REVISIONS	
DATE	CHANGE

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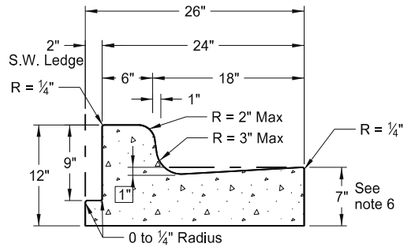
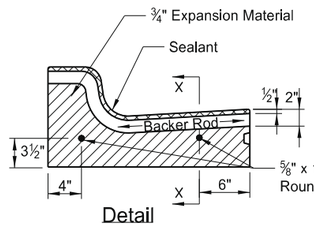
Curb & Gutter and Valley Gutter

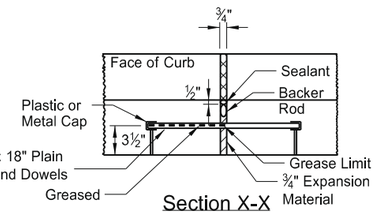
D-748-1



Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median, or Parking Lot.
(Sec. A shown. See Sec B for additional details.)

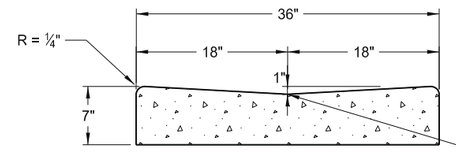


Detail

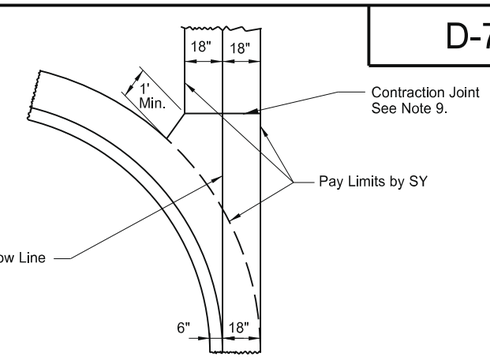


Section X-X

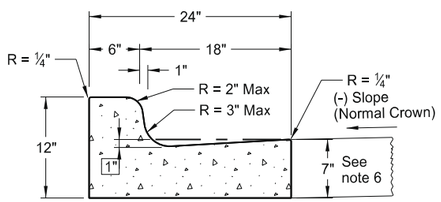
Isolation Joint



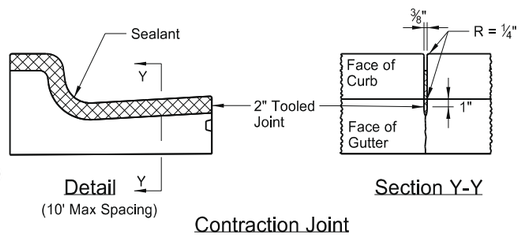
36" Concrete Valley Gutter Detail



36" Concrete Valley Gutter Plan



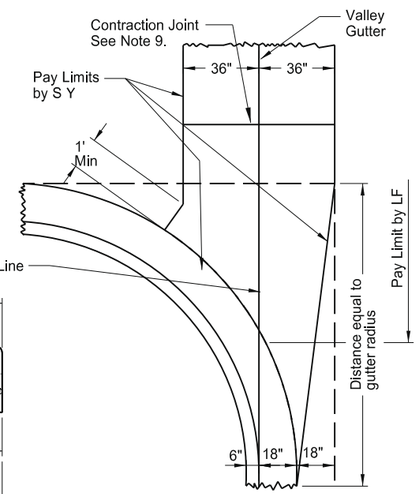
Curb & Gutter Type 1 (Sec. A)



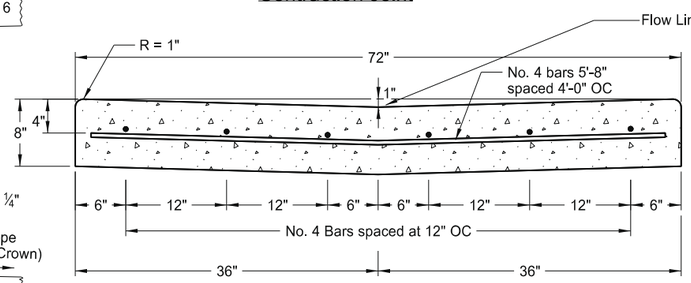
Detail
(10' Max Spacing)

Section Y-Y

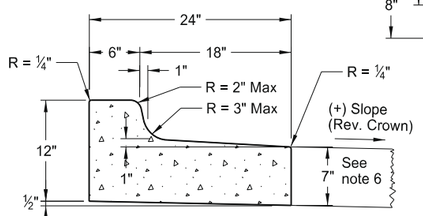
Contraction Joint



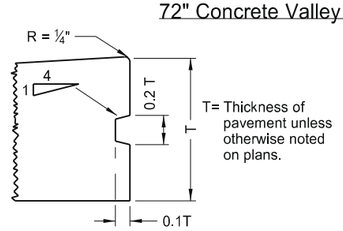
72" Concrete Valley Gutter Plan



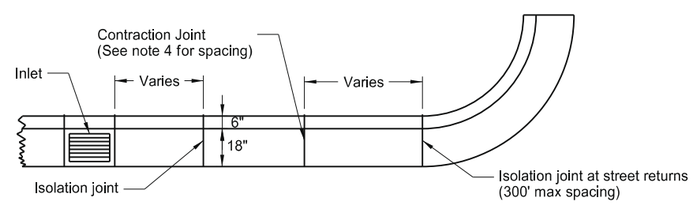
72" Concrete Valley Gutter Detail



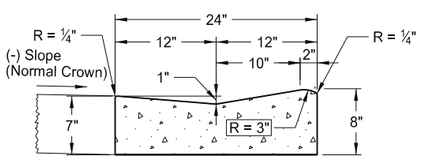
Curb & Gutter Type 1 (Sec. B)



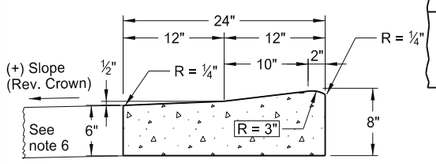
Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)



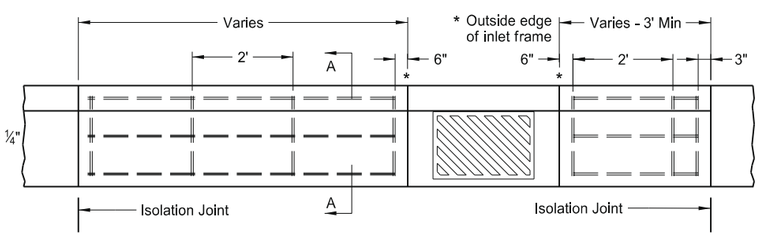
Joint Location Detail



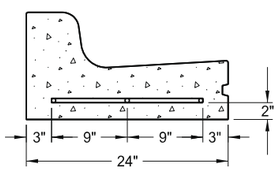
Mountable Curb & Gutter Type 1 (Sec. A)



Mountable Curb & Gutter Type 1 (Sec. B)



Curb & Gutter Reinforcing at Inlets



Section A-A

NOTES:

1. Curb and Gutter Type 1 (Sec. A & B) to be used. Section "A" to be used with (-) pavement slopes and section "B" to be used with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Isolation joint material shall be 3/4" preformed expansion joint filler conforming to the standard specifications. The opening for the backer rod and joint sealant shall be formed by a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint, plastic or metal caps and greased dowels shall be installed in the cold joint for the second pour.
4. Joint Spacing: For hot bituminous pavements the joint spacing for the curb and gutter shall be 10' max. with the panels on each side of the inlets. For concrete pavements the joint spacing for the curb and gutter shall match the pavement joint on PCC Pavements of approximately 15' spacing.
5. Joint sealing: All contraction and isolation joints shall be sealed as shown in the details. The joint sealant for contraction joints shall conform to section 826.02B.The sealant for expansion joints shall be as specified in note 3 above. The sealant shall be tooled and installed in accordance with the manufacturer's recommendations.
6. Depth of Face of Gutter: For hot bituminous pavement the depth of gutter shall be 7" as shown. For PCC pavements, the Contractor has the option to match the depth of gutter to the depth of the adjacent PCC pavement or to construct a 7" depth as shown.
7. When the curb and gutter abuts PCC pavement, it shall be tied to the PCC pavement. The tie bar shall consist of a No. 3 bar, 1'-6" in length spaced 4' center to center.
8. On street returns and other locations where the new curb and gutter ends and does not abut existing curb and gutter, the end two (2) feet of the curb shall be tapered from 6" in height to 0". A 1/2" premolded isolation joint which is full depth and the same shape as the curb and gutter shall be installed just ahead of the taper. An 18" tie bar shall be installed across the joint.
9. Valley Gutter Joints: Contraction joints are required at approx. 10' intervals. The contraction joints shall be ⅛" min. to ⅜" max. in width. The joints shall be formed by sawing or scoring to a minimum depth of 2". The joint sealant shall be a hot poured elastic type joint sealer in accordance with Section 826.02A.2 of the Standard Specifications. The joint and sealant shall be included in the price bid for Valley Gutter.

NOTE: All bars shall be #4 deformed reinforcing bars. Splices will not be permitted. Reinforcing bars at inlet locations will not be paid for separately, but shall be included in the price bid for "Curb and Gutter - Type 1." This includes inlets located on radii. The reinforcement shall be extended to the second joint (rebar placed through the first joint) in cases where the 3' min. panel length cannot be obtained.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
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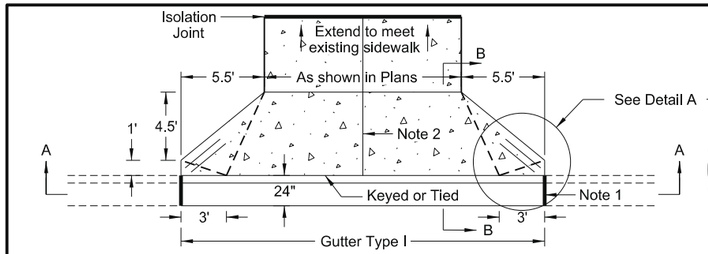
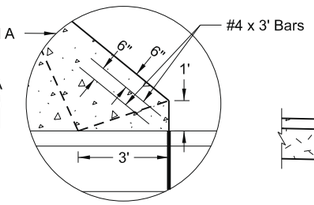
CONCRETE DRIVEWAY - URBAN

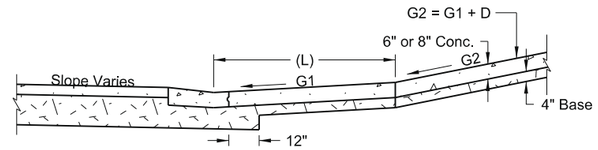
D-750-1



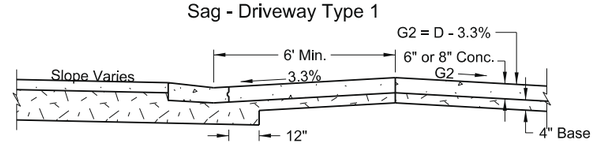
Driveway Type 1



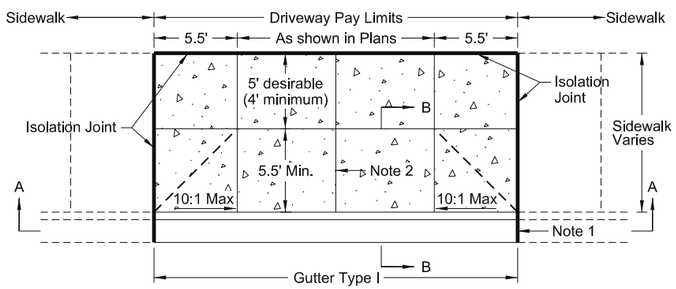
Detail A



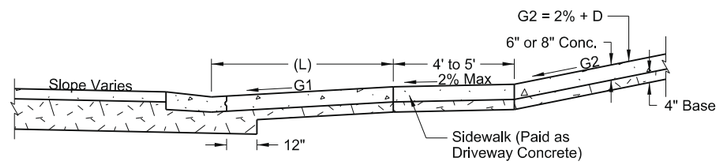
Sag - Driveway Type 1



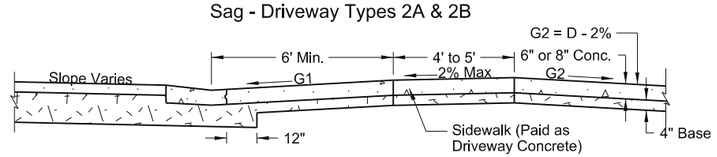
Summit - Driveway Type 1



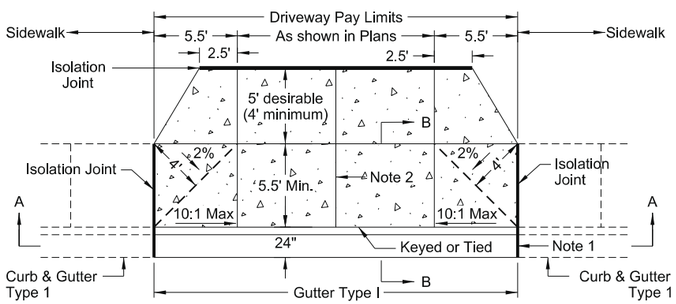
Driveway Type 2A



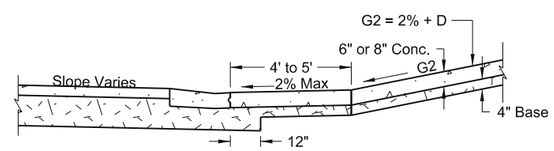
Sag - Driveway Types 2A & 2B



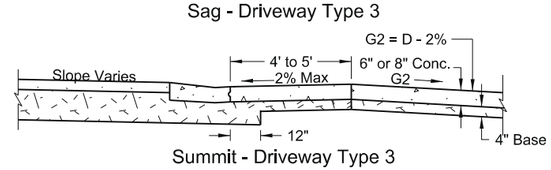
Summit - Driveway Types 2A & 2B



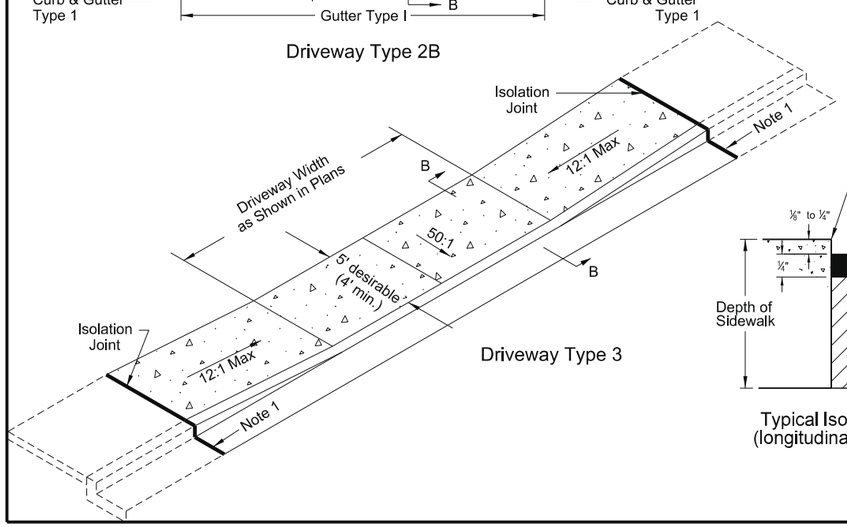
Driveway Type 2B



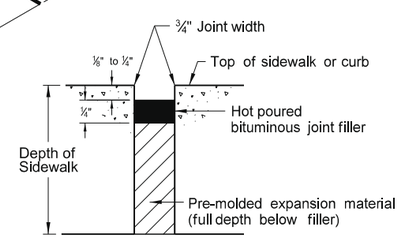
Sag - Driveway Type 3



Summit - Driveway Type 3



Driveway Type 3



Typical Isolation Joint Seal (longitudinal and transverse)

Driveway ADT	Grade G1		Dimension (L) ft.		Grade Changes (D)	
	Desirable	Maximum	Desirable	Maximum	Desirable	Maximum
(0-500)	5%	12% or controlled by vehicle clearance	12	6	6%	15% or controlled by vehicle clearance
(500-1500)	3%	8%	20	20	3%	6%
(> 1500)	2%	5%	40	40	0%	3%

NOTES:

1. See Standard D-748-1 for curb and gutter isolation joint detail. On PCC roadways, the curb and gutter joints should match those of the pavement as much as practical.
2. Joint Spacing: 1 Center contraction joint to be used on all driveways 20' width or less, 2 center contraction joints for driveways > 20' to 30' width, and 3 center contraction joints for driveways greater than 30' width.

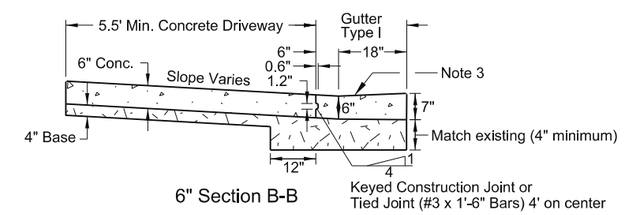
   The contraction joints may be sawed or a grooved joint, and shall be a minimum of 1/3 the depth of the concrete.

   Isolatoin joints should also be used between seperately poured cocretes, or between old and new concrete.

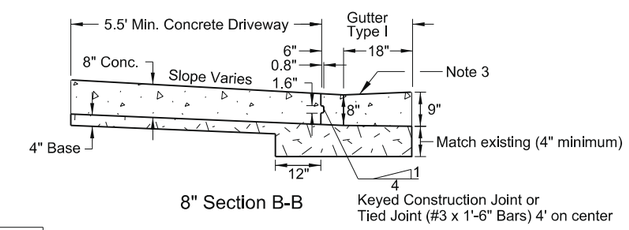
   All joints shall be sealed with hot pour bituminous filler or low modulus silicone. The sealant shall be installed and tooled in accordance with the manufacturer's recommendations.

   All costs for labor, equipment, and material necessary to construct and seal joints shall be included in the price bid for the driveway.
3. Gutter-Type 1 shall be paid for at the unit price bid for "Curb and Gutter-Type 1".
4. 6" Driveway to be used unless otherwise specified.
5. 4" base material shall be placed under the concrete driveway. All labor and materials necessary to place the base material shall be included in the price bid for Salvage Base Course or Aggregate Base Course CL 5.
6. Sidewalk that falls behind a driveway shall be constructed to the same thickness as the driveway and shall be paid for as driveway concrete.

Section A-A



6" Section B-B



8" Section B-B

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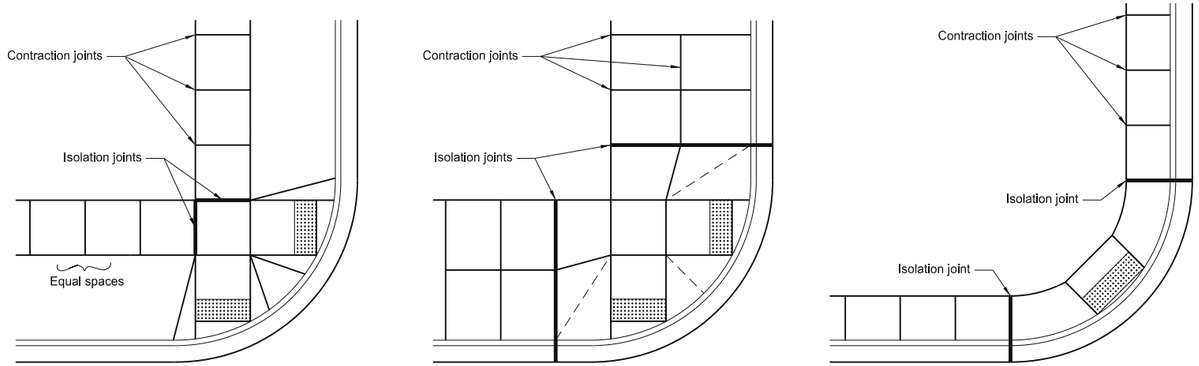
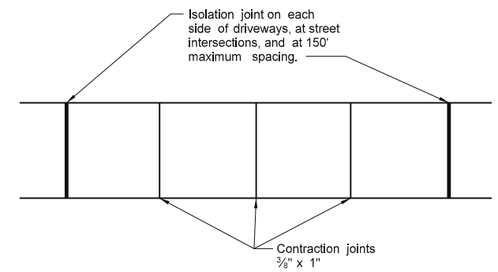
SIDEWALK

D-750-2



Typical Joint Layouts



NOTES:

1. Curb ramp and detectable warning panel layouts are for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Transverse contraction joint spacing shall vary from 4' to 6' to create approximate square panels.

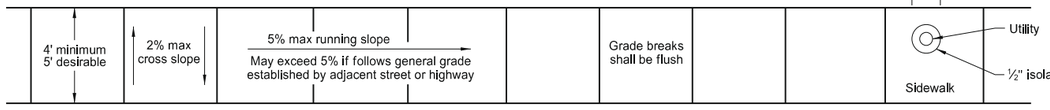
   Longitudinal contraction joints shall be used where the sidewalk width is 8' or greater, and shall be spaced at half the sidewalk width.

   The contraction joints may be sawed or a grooved joint, and shall be a minimum of 1/3 the depth of the concrete.

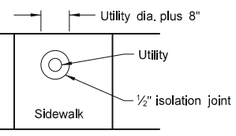
   When the sidewalk is adjacent to the curb & gutter, the sidewalk joint spacing shall be varied to match up with the curb & gutter joints.

   Isolation joints should also be used between seperately poured concretes, or between old and new concrete.

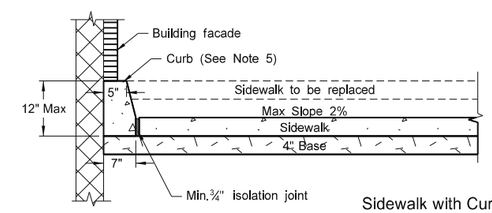
   The cost for all labor, equipment, and material necessary to construct contraction and isolation joints shall be included in the price bid for sidewalk concrete.
3. 4" sidewalk concrete thickness to be used unless otherwise specified in the plans.
4. 4" base material thickness to be used unless otherwise specified in the plans. All labor and materials necessary to place the base material shall be included in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."
5. Landscaping is preferred to modify existing ground slope changes as needed. If not possible, such as adjacent buildings, a vertical curb may be used as shown in the detail below. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.



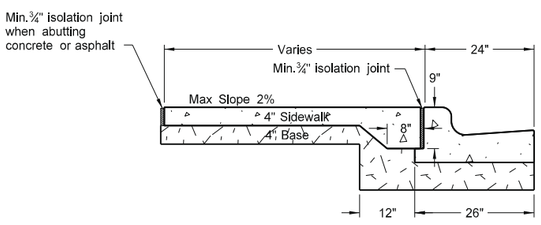
Sidewalk Width and Grade



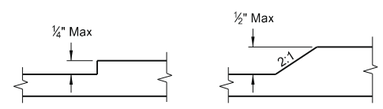
Utility Blockout



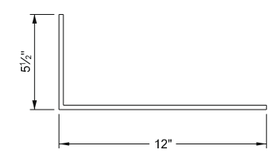
Sidewalk with Curb Detail
(Building face application)



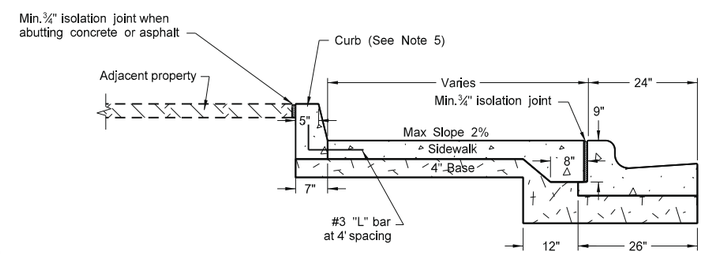
Sidewalk Detail
(Installed adjacent to curb and gutter)



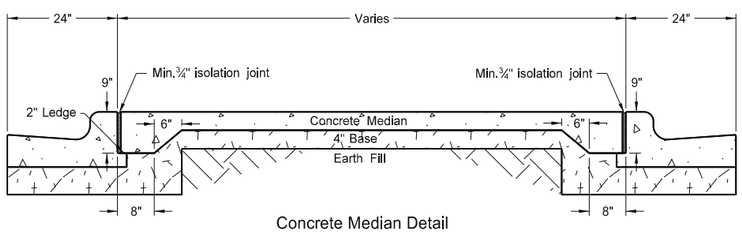
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



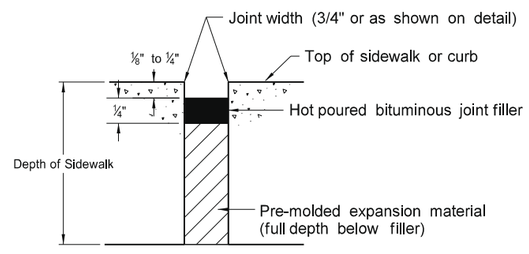
"L"Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



Typical Isolation Joint Seal
(longitudinal and transverse)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
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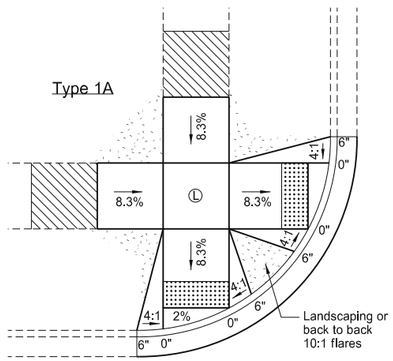
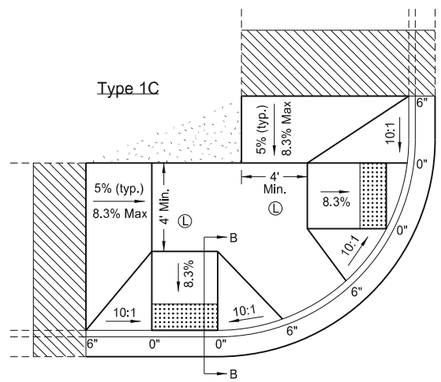
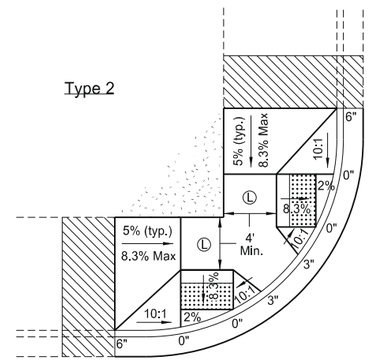
CURB RAMP DETAILS

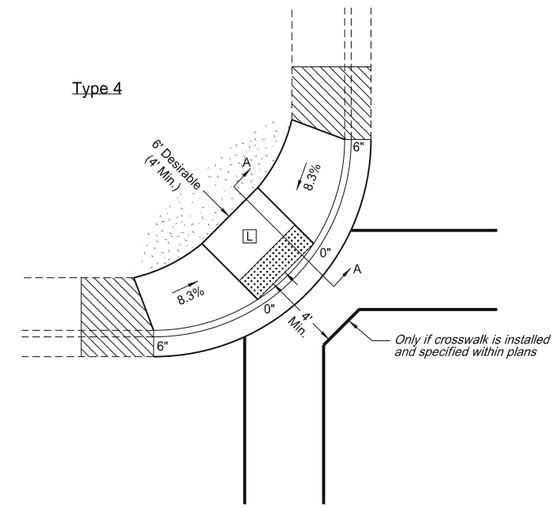
D-750-3

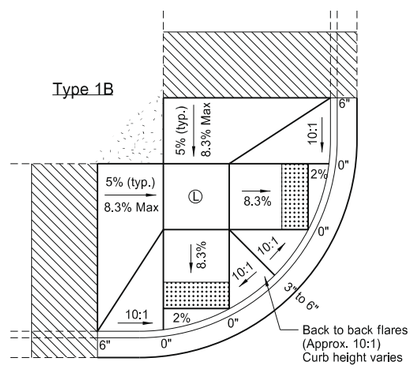
+More Right of Way ⟷ Less Right of Way-

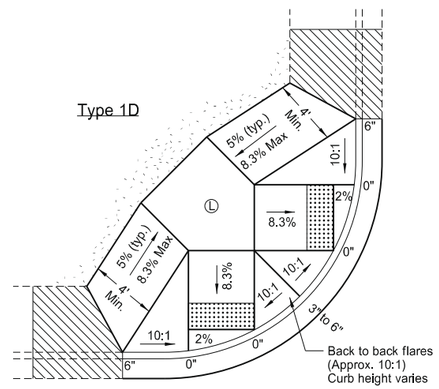


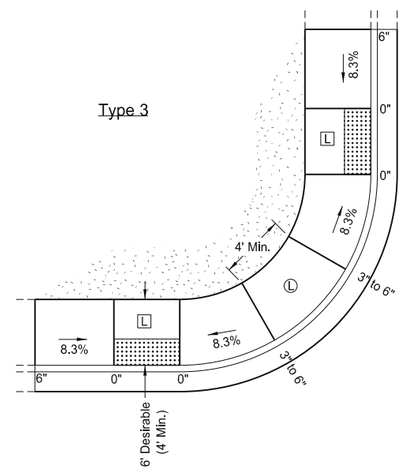




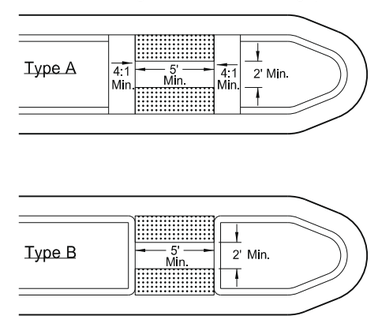








Median Refuge Islands (Cut-Through)



NOTES:

1. Ramp width is defined as the useable portion of the ramp, excluding flares if used.

   Curb ramp width should match the existing sidewalk width. 4' width minimum.

   Ramp width for shared-use paths should match the existing shared use path width.

   Ramp length shall be maximum of 15'.

2. Landings shall be a minimum of 4' x 4' and shall have a max 2% slope in any direction. Landings are desirably 5' x 5' or larger.

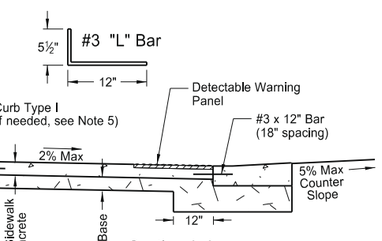
3. Detectable warning panels shall match the ramp width. Radial panels may also be used. The detectable warning panel may be located within the lower landing.

4. The pedestrian access route shall be continuous 4' min. width. Max 2% cross slope applies to all concrete, excluding flares.

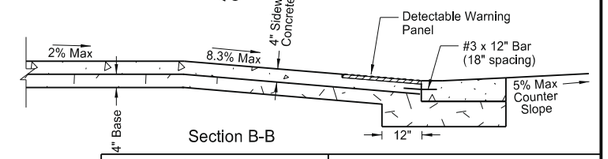
5. Landscaping is preferred to modify existing ground slope changes as needed. If not possible, such as adjacent buildings, a vertical curb may be used as shown in the detail below. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.

LEGEND:

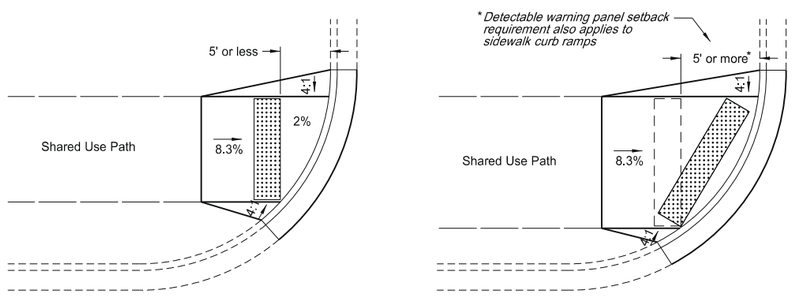
- : Detectable Warning Panel
- : Landscaping
- : Transitional tie-in segment if needed for retrofits. Max grade slope 8.3%.
- Ⓛ : Upper Landing
- L : Lower Landing
- 0", 3", or 6" : Curb Height
- 8.3% : All slopes shown are max grades. Flatter slopes may be used.



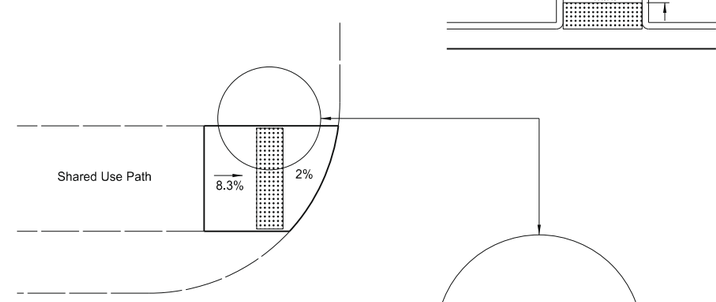
Section A-A



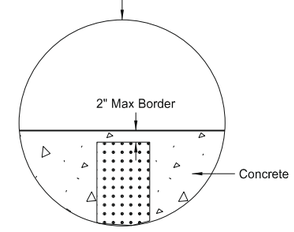
Section B-B

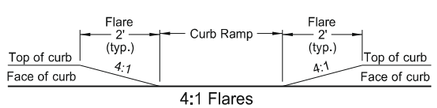


Concrete Apron for Shared Use Paths with Curb and Gutter

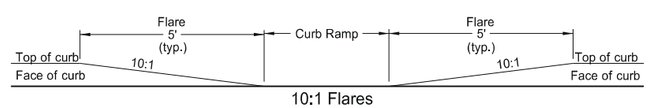


Concrete Apron for Shared Use Paths without Curb and Gutter





4:1 Flares
(To be used when flare is adjacent to landscaping)



10:1 Flares
(To be used when flare is adjacent to sidewalk)

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11-26-13	
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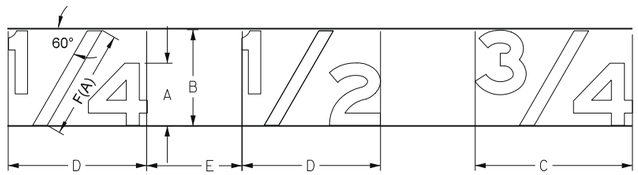
LETTER AND ARROW DETAILS FOR VARIABLE LENGTH SIGNS

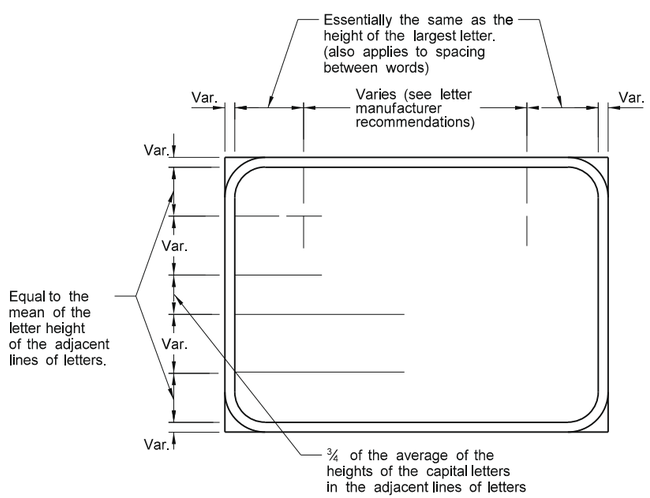
D-754-9



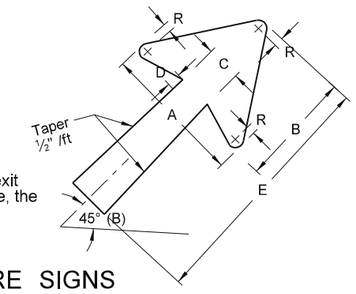
SIZE OF THE FRACTION IS DETERMINED AS FOLLOWS:

SYMBOL	TITLE	RATIO TO HEIGHT OF CAPITAL OR UPPER CASE
A	Letter height	1.0 of capital or upper case
B	Fraction height	1.5 X A
C	Fraction width	2.5 X A
D	Fraction width	2 X A
E	Space to next character	1 to 1.5 X A
F(A)	Length of diagonal	1.75 X A

(A) Diagonal stroke of fraction is to be centered optically.



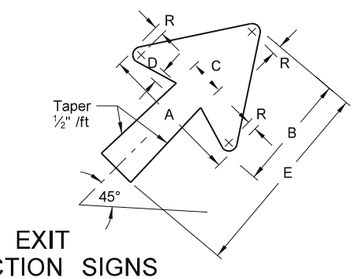
TYPICAL SPACING



(B) When there is no exit number in the sign face, the arrow shall be at 30°

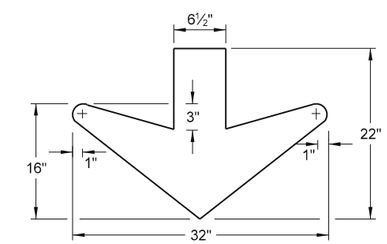
GORE SIGNS

"EXIT" LETTER SIZE (Upper Case)	A	B	C	D	E	R
8"	15⅛"	11 9/16"	3¾"	1 5/16"	25"	13/16"
10" - 13⅓"	18¼"	14"	4½"	1½"	30"	¾"

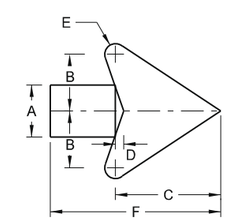


EXIT DIRECTION SIGNS

LETTER SIZE (Upper Case)	A	B	C	D	E	R
8"	15⅛"	11 9/16"	3¾"	1 5/16"	17"	13/16"
10" - 13⅓"	18¼"	14"	4½"	1½"	20"	¾"
16" - 20"	22¼"	17"	5⅜"	1¾"	25"	1"



DOWN ARROW



DISTANCE AND DESTINATION SIGNS

LETTER SIZE (Upper Case)	A	B	C	D	E	F
4"	1¾"	2"	3 9/16"	5/16"	⅜"	6"
6"	2¾"	3"	5 9/16"	7/16"	9/16"	9"
8"	3½"	4"	7⅛"	9/16"	11/16"	12"
12"	5¼"	6"	10⅝"	13/16"	1 1/16"	18"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE
7-8-14	Revised gore sign and added 4" D & D arrow

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 7/8/14 and the original document is stored at the North Dakota Department of Transportation

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.

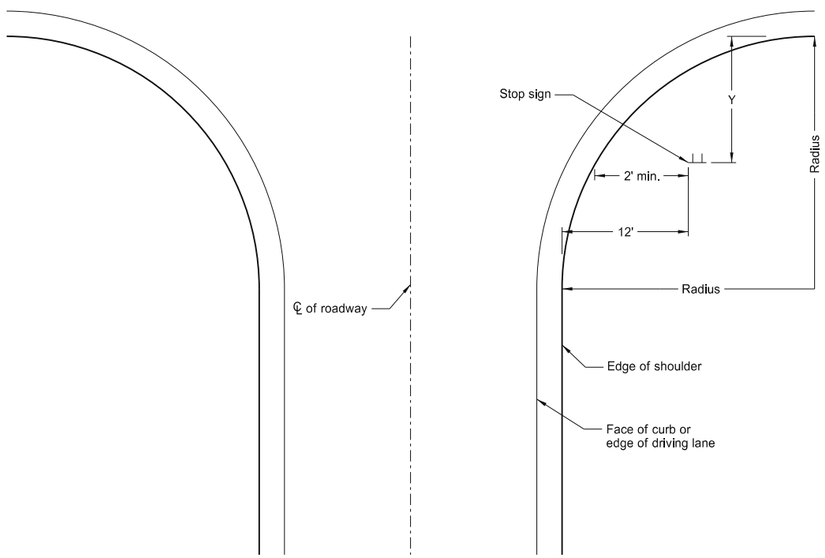
   Signs on expressways shall be installed with a minimum height of 7'.

   Adopt-a-highway signs installed on Freeways shall be at least 7' above the edge of the driving lane.

   The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.

3. Offset signs: Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.

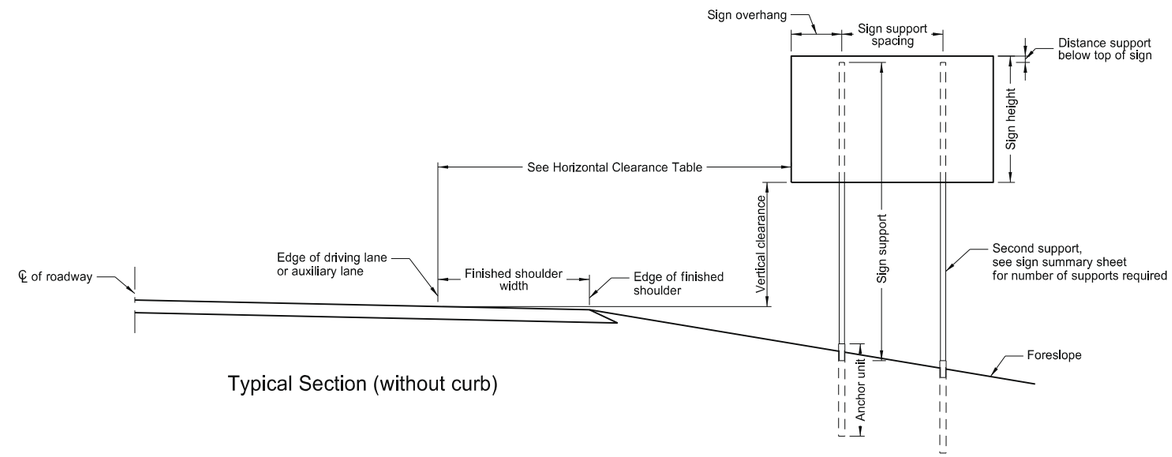
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.



Stop Sign Location
Wide Throat Intersection

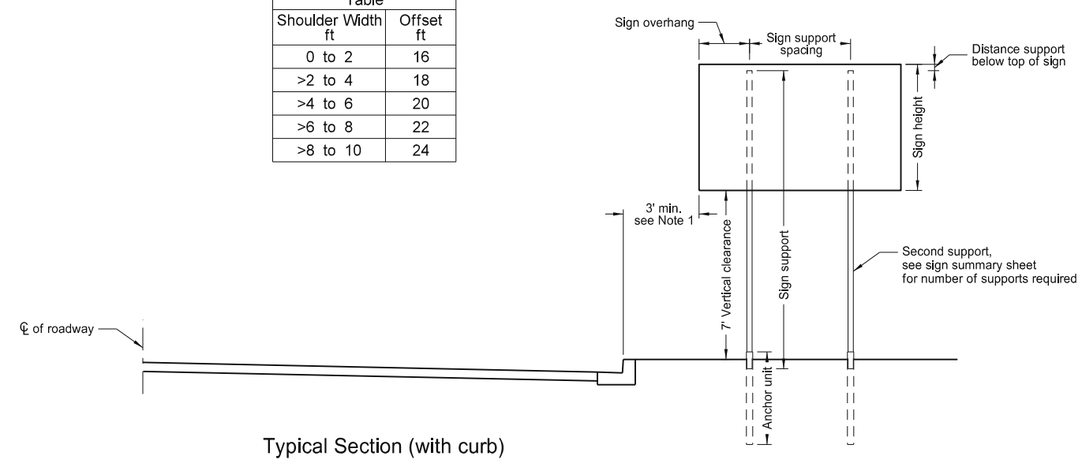
This layout is to be used for the placement of "Stop" signs.

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



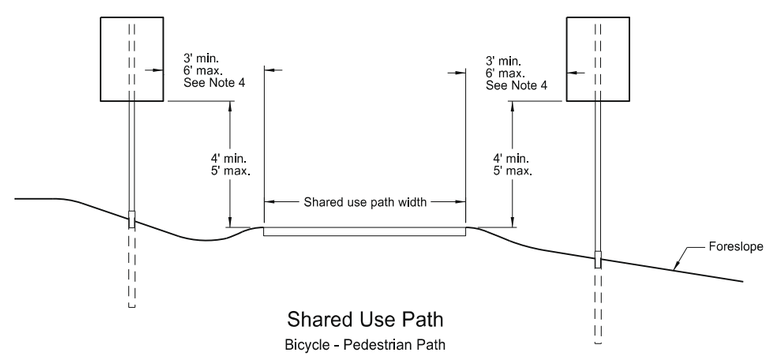
Typical Section (without curb)

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



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

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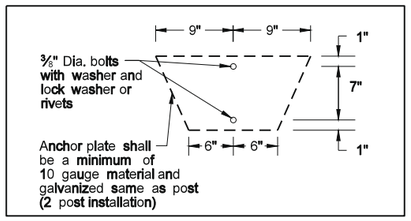
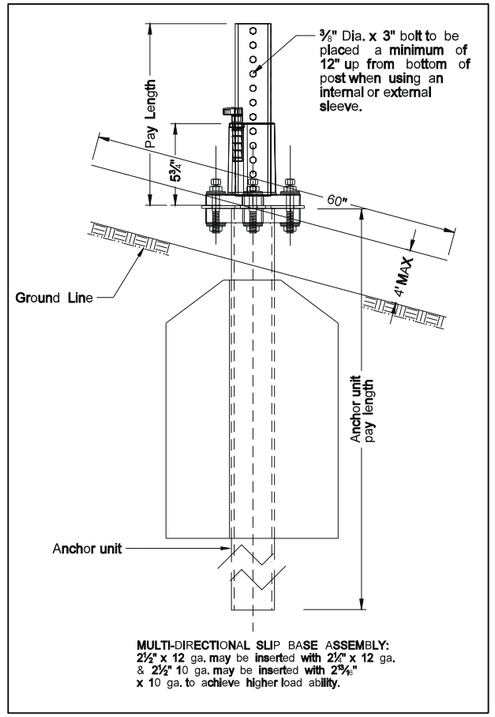
Mounting Details Perforated Tube

D-754-24

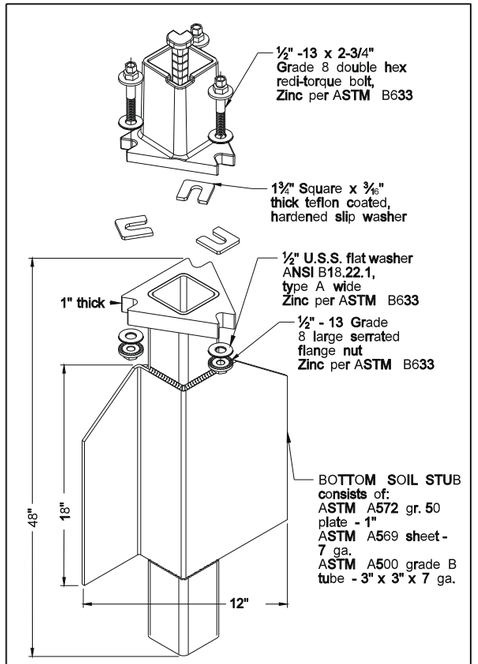
Number of Posts	Telescoping Perforated Tube: Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	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	2 3/16	10	Yes		7

(B) - The 2½", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall 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.

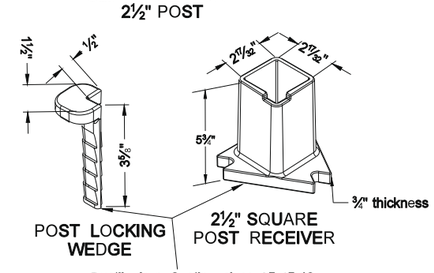




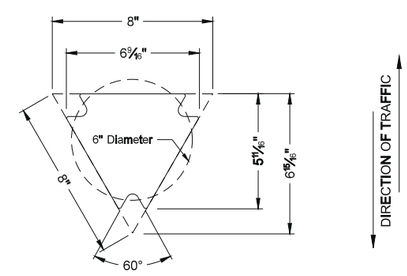
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY: 2½" x 12 ga. may be inserted with 2½" x 12 ga. & 2½" 10 ga. may be inserted with 2 3/16" x 10 ga. to achieve higher load ability.



SLIP BASE FOR 2½" POST



Ductile Iron Casting class 65-45-12. Hot Dip Galvanize ASTM A153



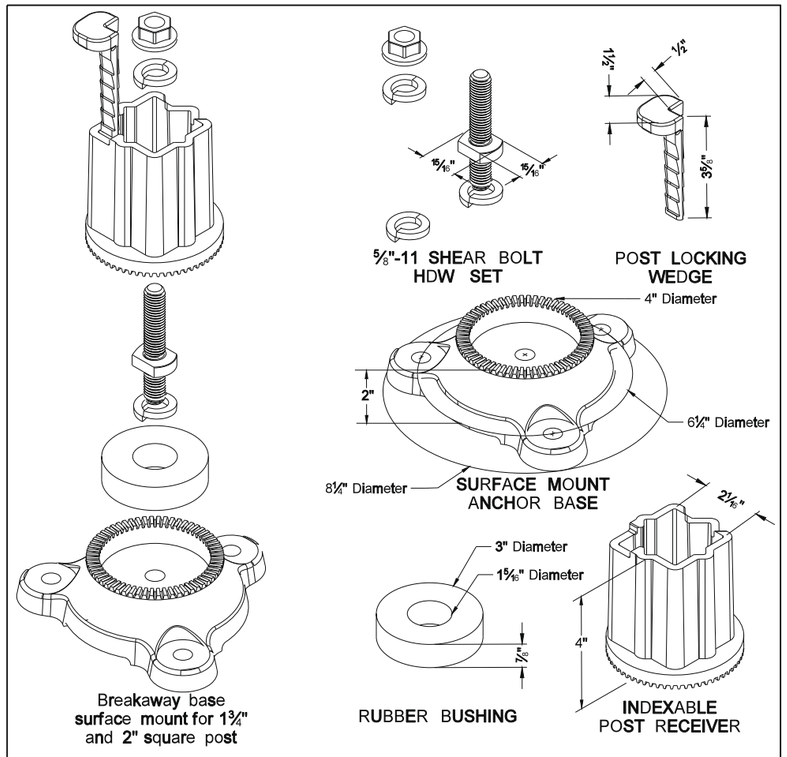
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. Area In.²	Section Modulus In.³
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
2 3/16 x 2 3/16	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

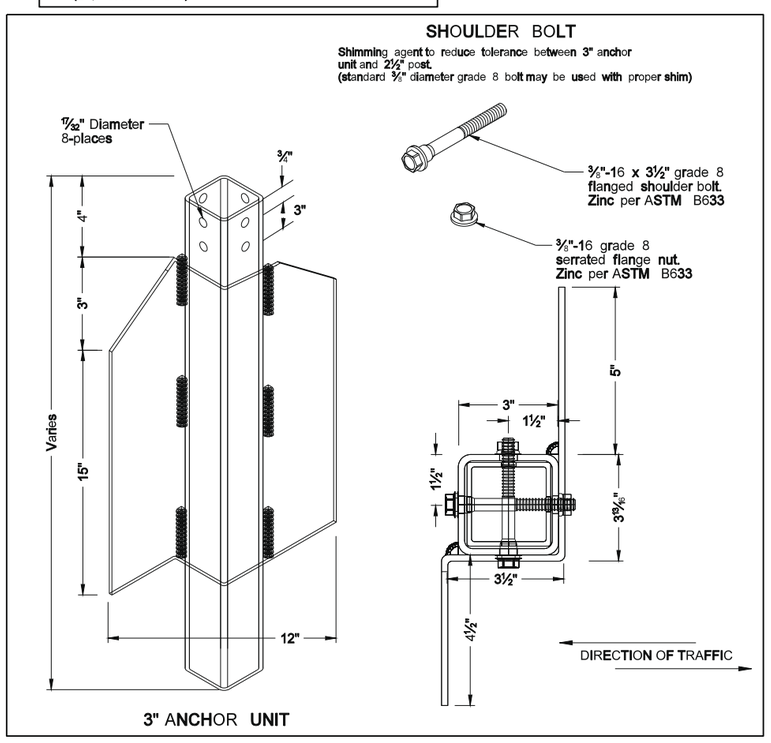
The 2 3/16" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

NOTE:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
2. Anchor material shall be 7 guage H.R.P.O. Commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B. Anchor shall have a yield strength 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/153. All tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless ortherwise noted.
3. When used in concrete sidewalk, anchor shall be the same concept without the wings
4. Four post signs shall have over 8' between the first and fourth posts.
5. Installation procedures as per manufacturers recommendation.
6. Concrete fasteners for surface mount breakaway base shall be a minimum ½" diameter x 4" grade 8.



SURFACE MOUNT ANCHOR BASE



3" ANCHOR UNIT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE

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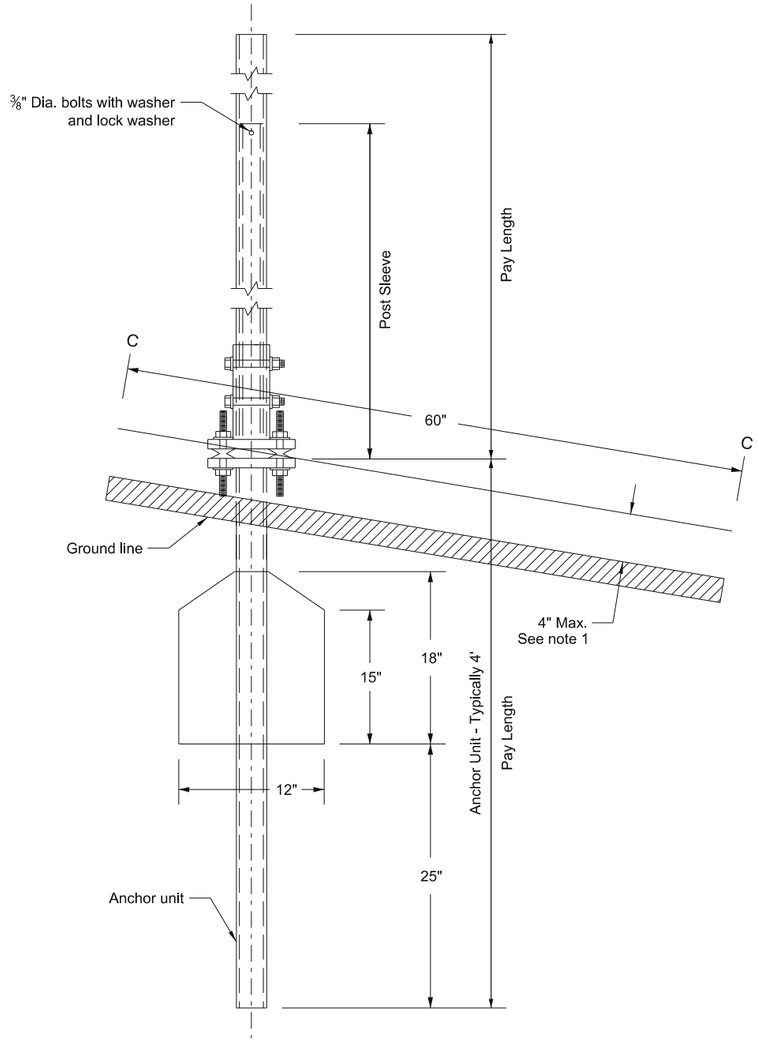
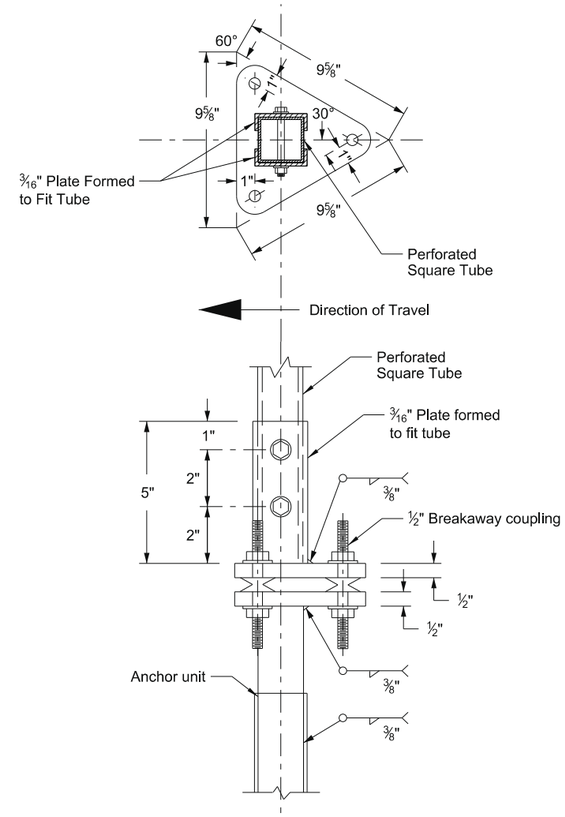
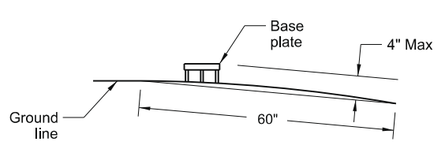
D-754-24A

Breakaway Coupler System for Perforated Tubes





Base Plate with Breakaway Coupler

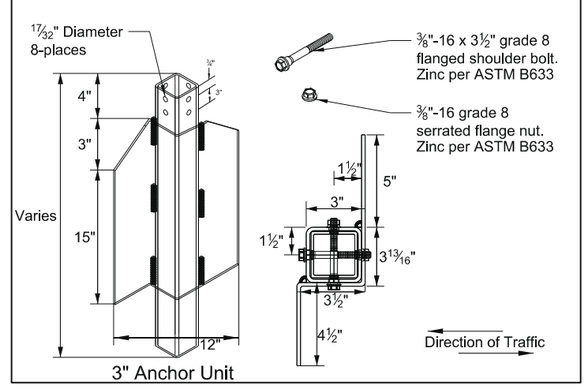


Section C-C

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.

Shoulder Bolt

Shimming agent to reduce tolerance between 3" anchor unit with 2½" post. (standard ⅜" diameter grade 8 bolt may be used with proper shim)



3" Anchor Unit

Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
2. Anchor unit shall be the same size as the post and shall have the same specification as the post.
3. Four post signs shall have over 8' between the first and fourth post.
4. In lieu of the breakaway base system on standard D-754-24 the breakaway coupling system may be used. The breakaway coupler system shall be manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as 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	2 3/16	10	Yes		7

(B) - The 2½" 12 gauge posts do not need breakaway bases when placed in standard soils. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

(C) - 3" anchor unit

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE

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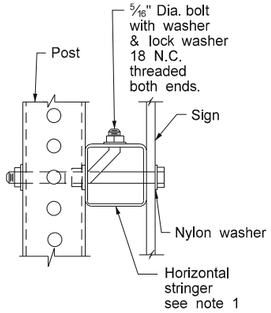
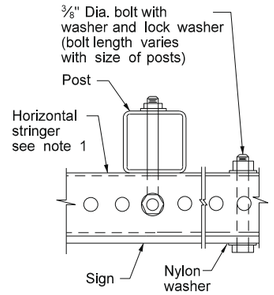
Mounting Details Perforated Tube

D-754-25

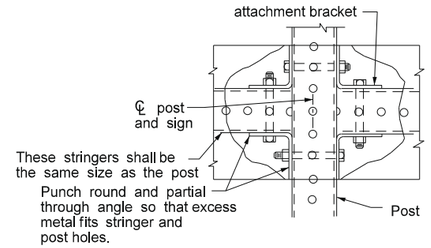


Side View

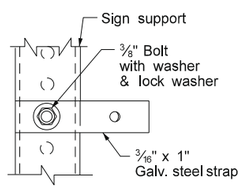


Top View

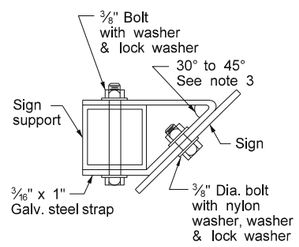
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



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

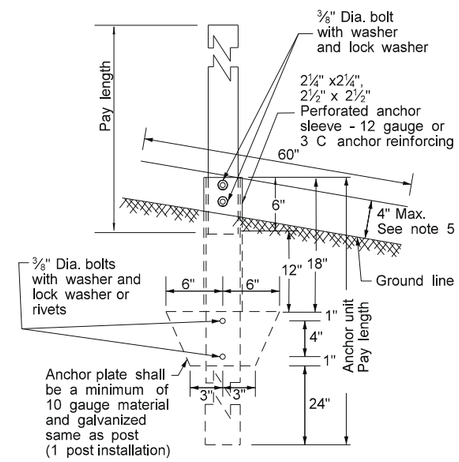


Side View

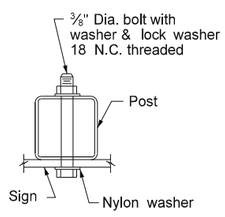


Top View

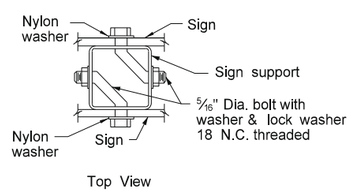
STRAP DETAIL



ANCHOR UNIT AND
POST ASSEMBLY

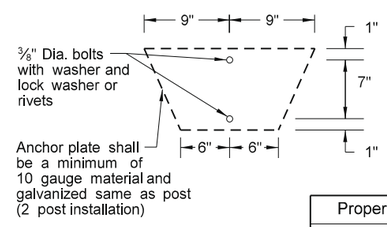


BOLT MOUNTING



Top View

BACK TO BACK
MOUNTING



Note:

1. Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel.
2. Metal washers used on sign face shall have a minimum outside diameter of 15/16" ± 1/16" and 10 gauge thickness.
3. No Parking Signs: All no parking signs with directional arrows shall be placed at a 30 to 45 degree angle with the line of traffic flow. No parking signs required at the above angles may have the support turned to the correct angle. If the no parking sign is placed with another sign that has to be placed at a 90 degree angle with the line of traffic flow, the detailed angle strap should be used to mount the no parking sign. Flat washers and lock washers shall be used with all nylon washers.
4. In lieu of using the bent bolt to attach the post to the stringer, the contractor may choose to punch the sign backing and place the bolt through the sign, the stringer and the post.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.

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 Thick-ness Gauge
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	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	2 3/16	10	Yes		7

(B) - The 2½", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall 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.

Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia $In.^4$	Cross Sect. area $In.^2$	Section Modulus $In.^3$
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
2 3/16 x 2 3/16	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 3/16" size 10 gauge is shown as 2.19" size on the plans.
The 2½" size is shown as 2.51" size on the plans.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

8-6-09

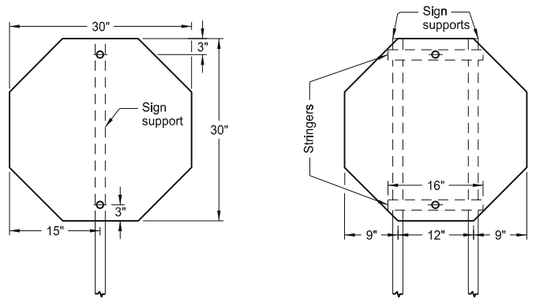
REVISIONS

DATE	CHANGE
7-8-14	Revised Note 3

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 7/8/14 and the original document is stored at the North Dakota Department of Transportation

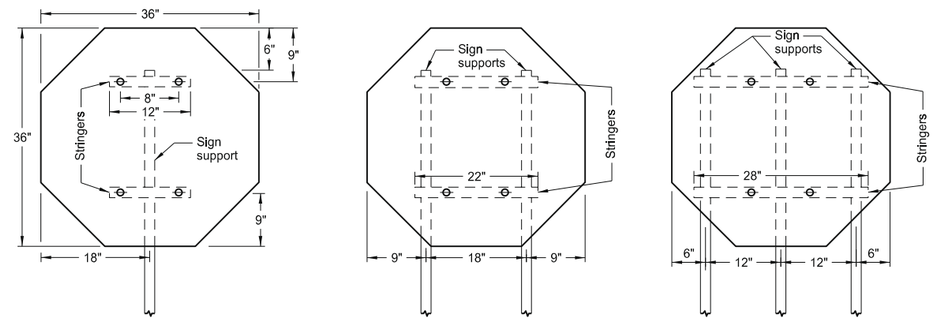
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-26



1 Post 2 Posts

Assembly No. 1



1 Post 2 Posts 3 Posts

Assembly No. 2

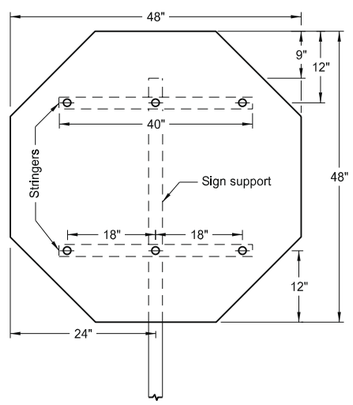
Notes:

1. See Standard D-754-25 for mounting details.

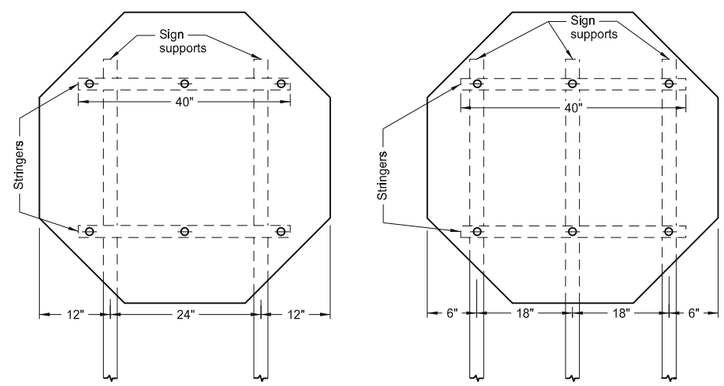
2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

4. All holes shall be punched round for ⅜" bolt.

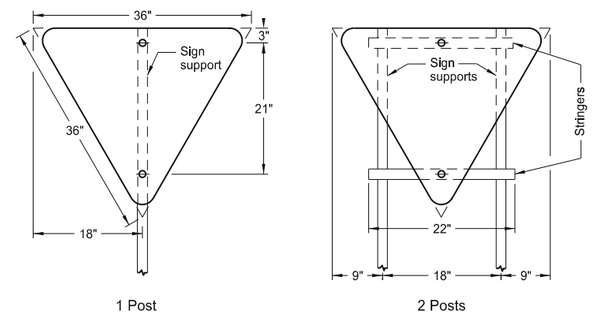


1 Post



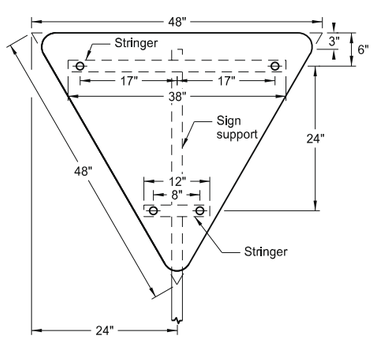
2 Posts 3 Posts

Assembly No. 3

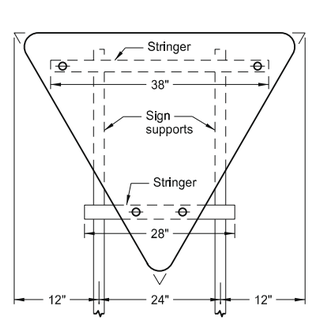


1 Post 2 Posts

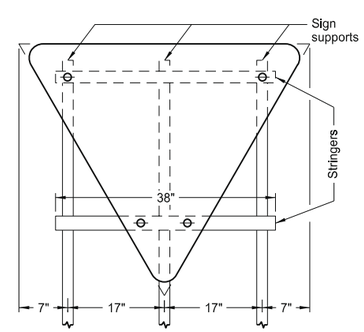
Assembly No. 4



1 Post



2 Posts



3 Posts

Assembly No. 5

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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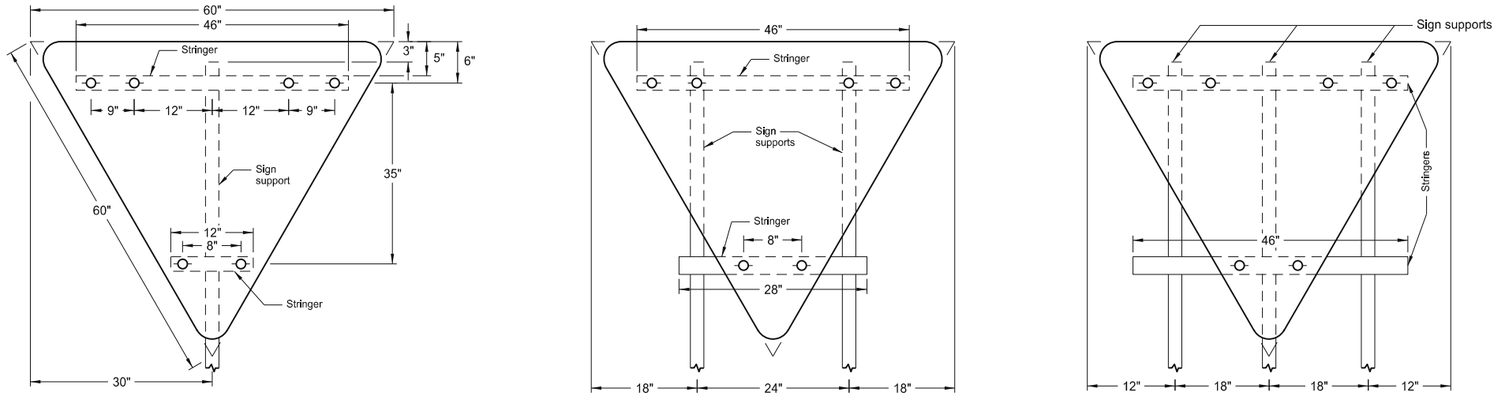
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-27



Assembly No. 6

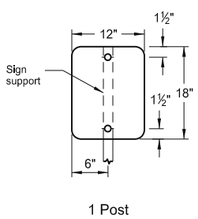
Notes:

1. See Standard D-754-25 for mounting details.

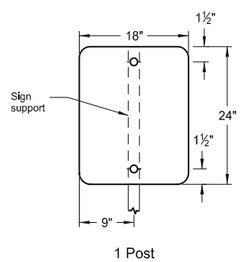
2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

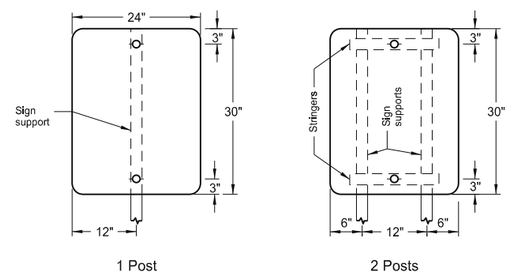
4. All holes shall be punched round for ⅜" bolt.



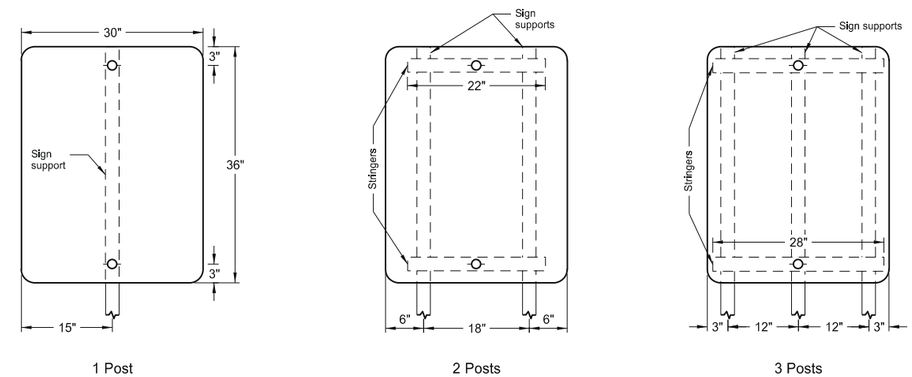
Assembly No. 7



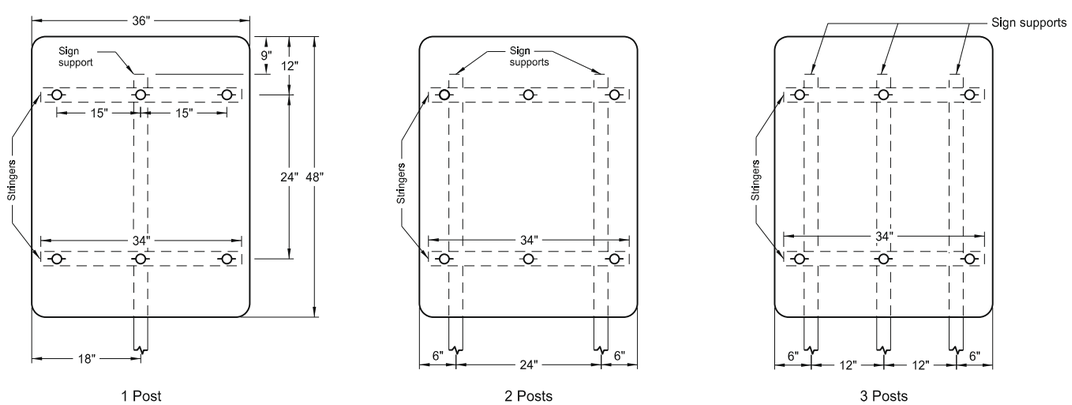
Assembly No. 8



Assembly No. 9



Assembly No. 10



Assembly No. 11

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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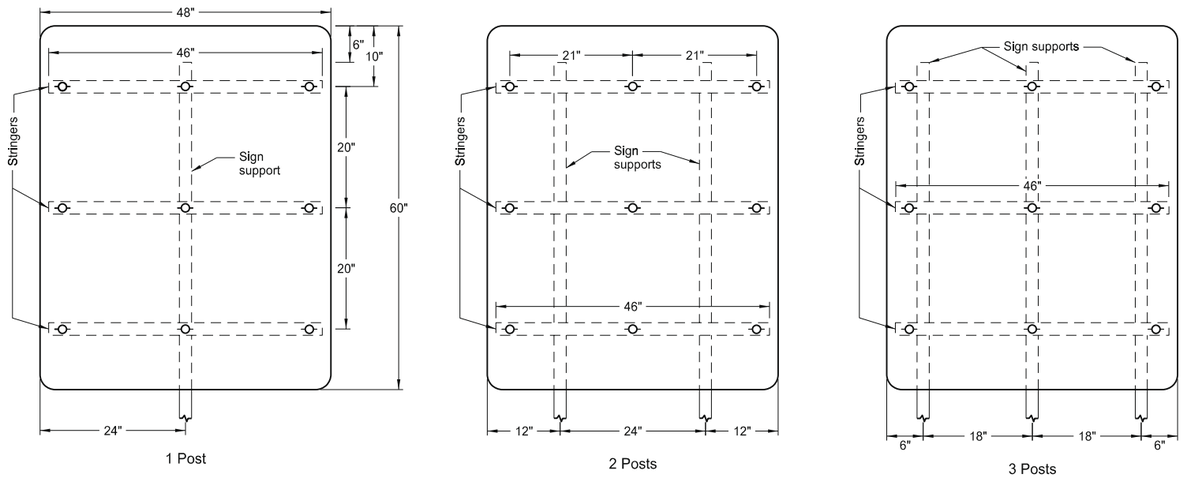
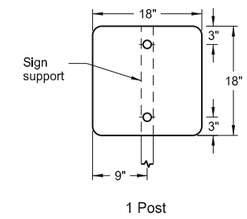
D-754-28

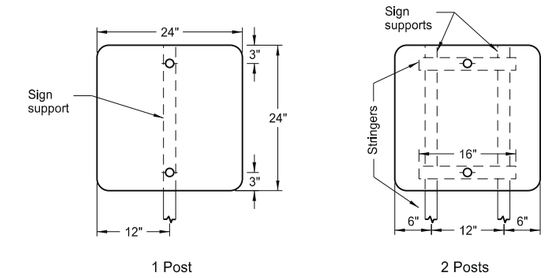
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



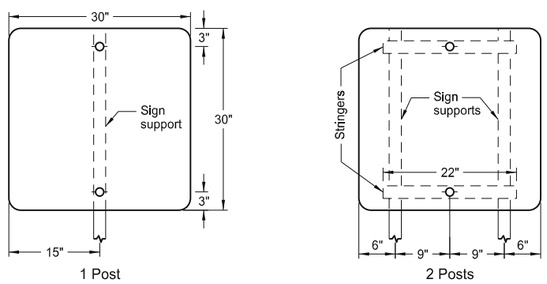
Assembly No. 12



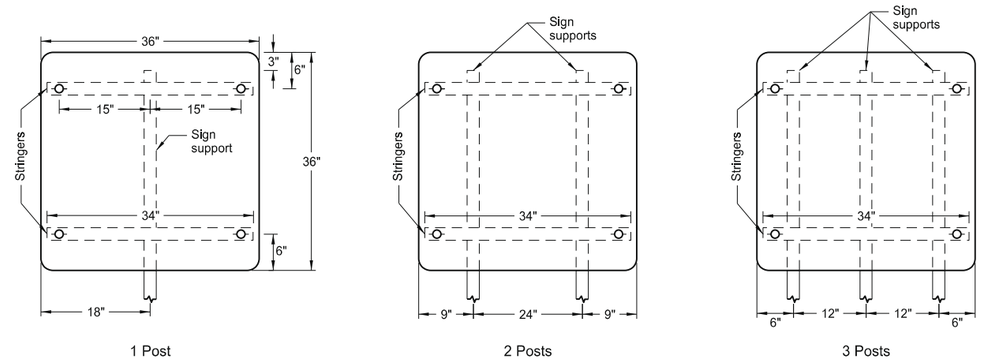
Assembly No. 13



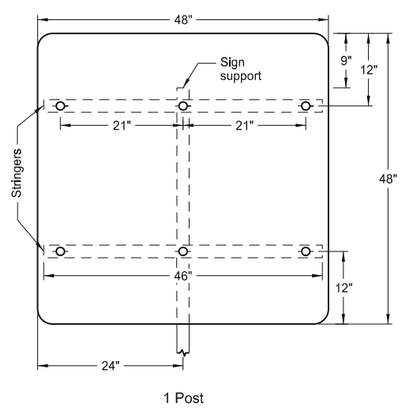
Assembly No. 14

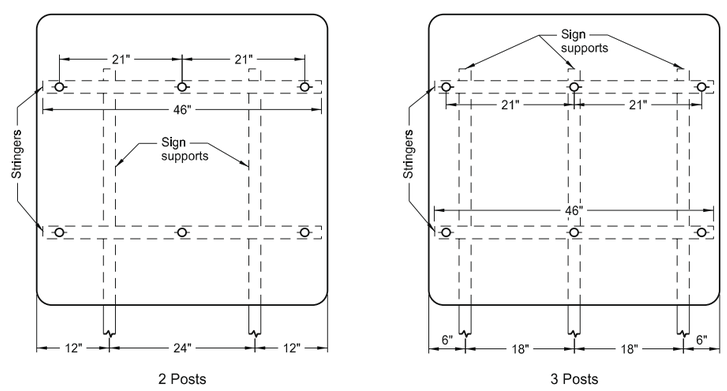


Assembly No. 15



Assembly No. 16





Assembly No. 17

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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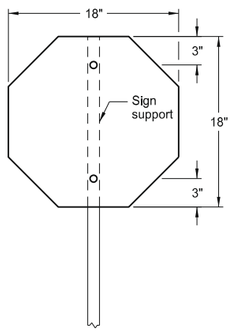
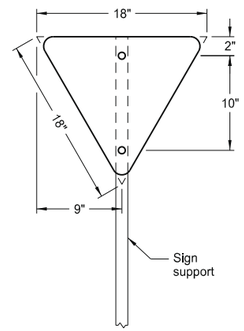
D-754-46

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



1 Post
Assembly No. 100



1 Post
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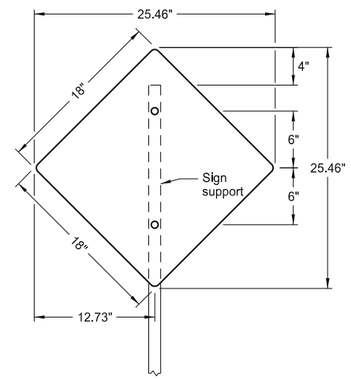
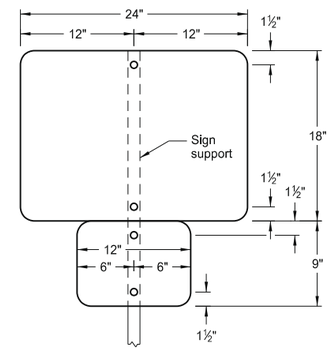


1 Post
Assembly No. 102



1 Post
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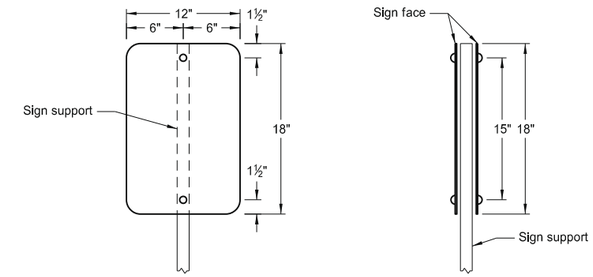
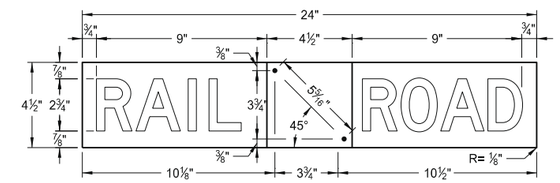
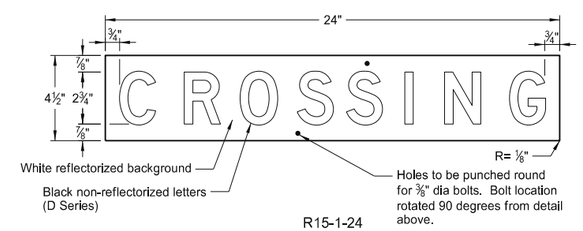


1 Post
back to back
Assembly No. 104

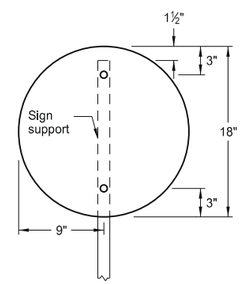


R15-1-24



R15-1-24

Railroad Crossing Sign Details



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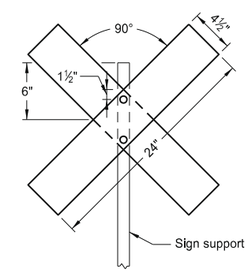

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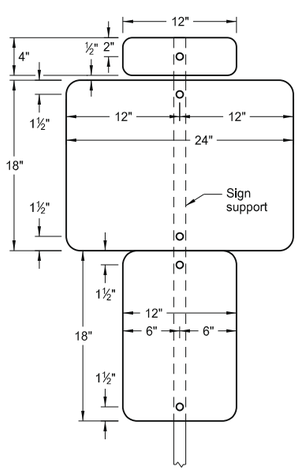
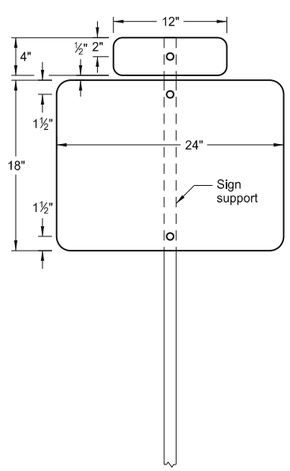
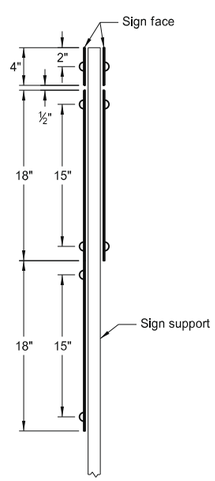
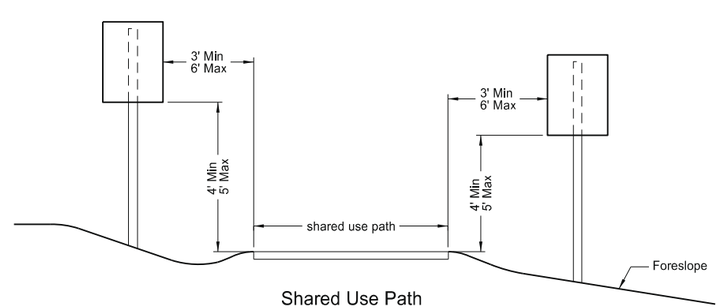




1 Post
back to back
Assembly No. 105





Shared Use Path
Bicycle - Pedestrian Path

Notes:

1. The minimum sign backing material thickness shall be 0.100 inch.

2. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE

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911 SIGN SUPPORT INFORMATION AND SIGN DETAILS

D-754-86

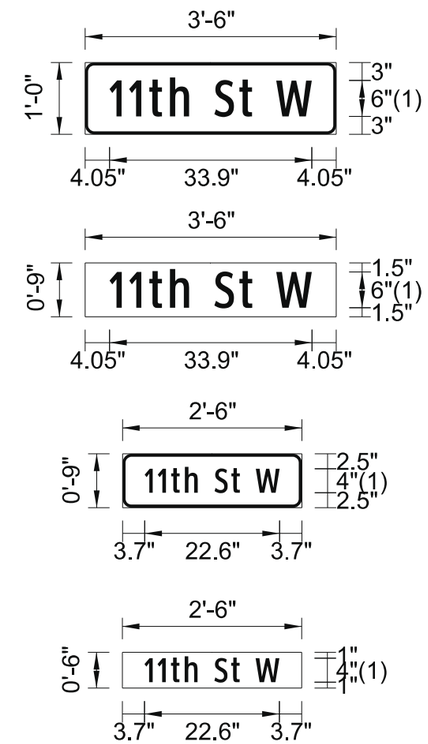
THE POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS
(60 INCH VERTICAL CLEARANCE)

ASSEMBLY NUMBER	STREET NAME SIGN SIZE	TOTAL SIGN AREA	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A)			SLEEVE SIZE	ANCHOR			BREAK - AWAY
						1st	2nd	3rd		NUMBER	LENGTH	SIZE	
	Inches	SF	LF			LF	LF	LF			LF		
SA 1	24"x12"	8.00	20.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x12"	10.00	16.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x12"	12.00	13.8	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x12"	14.00	14.7	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x12"	16.00	12.9	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x12"	18.00	15.2	1	2.25x2.25 12 ga					1	4.0	2.5x2.5 12ga	
	60"x12"	20.00	13.7	1	2.25x2.25 12 ga					1	4.0	2.5x2.5 12ga	
	24"x9"	6.00	24.1	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x9"	7.50	21.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x9"	9.00	17.7	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x9"	10.50	15.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x9"	12.00	13.5	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x9"	13.50	14.8	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	60"x9"	15.00	13.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	24"x6"	4.00	35.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x6"	5.00	28.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x6"	6.00	23.6	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x6"	7.00	22.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x6"	8.00	19.6	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x6"	9.00	17.5	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	60"x6"	10.00	15.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
SA 2	24"x12"	13.2	14.6	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x12"	15.2	16.3	1	2.5.2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x12"	17.2	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x12"	19.2	14.7	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x12"	21.2	15.3	1	2.25x2.25 12 ga	4.5			2x2 12 ga	1	4.0	3x3 7 ga	1
	54"x12"	23.2	20.6	1	2.5x2.5 10 ga	1.5			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	60"x12"	25.2	16.7	1	2.5x2.5 12 ga	3.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x9"	11.2	15.2	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x9"	12.7	14.5	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x9"	14.2	16.5	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x9"	15.7	15.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x9"	17.2	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x9"	18.7	15.1	1	2.25x2.25 12 ga	4.2			2x2 12ga	1	4.0	3x3 7 ga	1
	60"x9"	20.2	14.6	1	2.25x2.25 12 ga	4.6			2x2 12 ga	1	4.0	3x3 7 ga	1
	24"x6"	9.2	16.0	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x6"	10.2	15.5	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x6"	11.2	15.0	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	42"x6"	12.2	13.7	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	48"x6"	13.2	15.9	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x6"	14.2	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	60"x6"	15.2	14.9	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
SA 3	24"x12"	13.9	16.1	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x12"	15.9	15.3	1	2.5.2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x12"	17.9	15.9	1	2.25x2.25 12 ga	4.4			2x2 12 ga	1	4.0	3x3 7 ga	1
	42"x12"	19.9	15.2	1	2.25x2.25 12 ga	4.8			2x2 12 ga	1	4.0	3x3 7 ga	1
	48"x12"	21.9	15.1	1	2.5x2.5 12 ga	5.1			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x12"	23.9	20.6	1	2.5x2.5 10 ga	1.9			2.19X2.19 10ga	1	4.0	3x3 7 ga	1
	60"x12"	25.9	16.0	1	2.5x2.5 12 ga	4.7			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x9"	11.9	16.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x9"	13.4	16.1	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x9"	14.9	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x9"	16.4	14.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x9"	17.9	15.6	1	2.25x2.25 12 ga	4.3			2x2 12 ga	1	4.0	3x3 7 ga	1
	54"x9"	19.4	14.9	1	2.5x2.5 12 ga	4.8			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x9"	20.9	20.6	1	2.5x2.5 10 ga	1.6			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	24"x6"	9.9	14.7	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x6"	10.9	14.3	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x6"	11.9	16.5	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x6"	12.9	16.0	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x6"	13.9	14.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x6"	14.9	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	60"x6"	15.9	15.3	1	2.25x2.25 12 ga	4.2			2x2 12 ga	1	4.0	3x3 7 ga	1

THE POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS
(60 INCH VERTICAL CLEARANCE)

ASSEMBLY NUMBER	STREET NAME SIGN SIZE	TOTAL SIGN AREA	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A)			SLEEVE SIZE	ANCHOR			BREAK - AWAY
						1st	2nd	3rd		NUMBER	LENGTH	SIZE	
	Inches	SF	LF			LF	LF	LF			LF		
SA 4	24"x12"	15.5	15.1	1	2.25x2.25 12 ga	4.7			2x2 12 ga	1	4.0	3x3 7 ga	1
	30"x12"	17.5	15.1	1	2.5x2.5 12 ga	4.9			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	36"x12"	19.5	17.5	1	2.5x2.5 12 ga	3.6			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	42"x12"	21.5	16.8	1	2.5x2.5 12 ga	4.1			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	48"x12"	23.5	16.2	1	2.5x2.5 12 ga	4.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x12"	25.5	15.6	1	2.5x2.5 12 ga	4.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x12"	27.5	16.7	1	2.5x2.5 10 ga	4.2			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	24"x9"	13.5	14.3	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x9"	15.0	15.1	1	2.25x2.25 12 ga	4.4			2x2 12 ga	1	4.0	3x3 7 ga	1
	36"x9"	16.5	14.6	1	2.25x2.25 12 ga	4.7			2x2 12 ga	1	4.0	3x3 7 ga	1
	42"x9"	18.0	14.7	1	2.5x2.5 12 ga	4.9			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	48"x9"	19.5	17.2	1	2.5x2.5 12 ga	3.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x9"	21.0	15.8	1	2.5x2.5 12 ga	4.3			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x9"	22.5	15.4	1	2.5x2.5 12 ga	4.6			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x6"	11.5	14.7	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x6"	12.5	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x6"	13.5	14.0	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x6"	14.5	15.0	1	2.25x2.25 12 ga	4.2			2x2 12 ga	1	4.0	3x3 7 ga	1
	48"x6"	15.5	14.5	1	2.5x2.5 12 ga	4.6			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	54"x6"	16.5	14.1	1	2.5x2.5 12 ga	4.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x6"	17.5	16.8	1	2.5x2.5 12 ga	3.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
SA 5	24"x12"	21.3	17.2	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	30"x12"	23.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	36"x12"	25.3	16.3	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	42"x12"	27.3	17.3	2	2.25x2.25 12 ga	4.2	4.6		2x2 12ga	2	4.0	3x3 7 ga	2
	48"x12"	29.3	16.9	2	2.25x2.25 12 ga	4.5	5.0		2x2 12 ga	2	4.0	3x3 7 ga	2
	54"x12"	31.3	16.5	2	2.25x2.25 12 ga	4.7	5.3		2x2 12 ga	2	4.0	3x3 7 ga	2
	60"x12"	33.3	17.5	3	2.5x2.5 12 ga					3	4.0	3x3 7 ga	3
	24"x9"	19.3	15.6	1	2.5x2.5 10 ga	4.9			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	30"x9"	20.8	17.0	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	36"x9"	22.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	42"x9"	23.8	16.3	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	48"x9"	25.3	16.0	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	54"x9"	26.8	17.2	2	2.25x2.25 12 ga	3.9	4.5		2x2 12 ga	2	4.0	3x3 7 ga	2
	60"x9"	28.3	16.8	2	2.25x2.25 12 ga	4.2	4.8		2x2 12 ga	2	4.0	3x3 7 ga	2
	24"x6"	17.3	15.8	1	2.5x2.5 10 ga	4.4			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	30"x6"	18.3	15.5	1	2.5x2.5 10 ga	4.5			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	36"x6"	19.3	15.3	1	2.5x2.5 10 ga	4.7			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	42"x6"	20.3	15.1	1	2.5x2.5 10 ga	4.9			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	48"x6"	21.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	54"x6"	22.3	16.4	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	60"x6"	23.3	16.8	2	2.25x2.25 12 ga	3.8	4.4		2x2 12 ga	2	4.0	3x3 7 ga	2

(A) The sleeve length shown is for the maximum post length. The required sleeve length is the "sleeve length" minus the difference between the "maximum post length" and the post length required in the field.



Sign Details

(1) Clearview Type 2-W Font
Radius 1-1/2"
Border 1/2"

Notes:
The sign legend shall be 6 inch in height except on low-volume roads and urban streets with speeds of 25 mph or less. On low volume roads and urban streets, the legend shall be at least 4 inch in height. Low-volume roads shall be a facility outside of developed areas of cities, towns, and communities, and shall have a traffic volume of less than 400 ADT. On divided multi-lane roadways, the 911 signs shall not be placed on top of the stop sign.

When installing signs on existing supports, check the support and sleeve size to determine if they meet the table requirements. The maximum post length is measured from the ground to the top of the street name sign. If the calculated support length is greater than the maximum post length shown, the support size must be recalculated.

See Standard Drawing D-754-87 for sign punching, stringer and support location details.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-3-13

REVISIONS

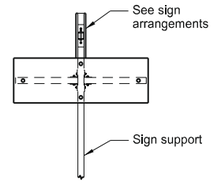
DATE	CHANGE
7-18-14	Revised street name sign layouts

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 7/18/14 and the original document is stored at the North Dakota Department of Transportation

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

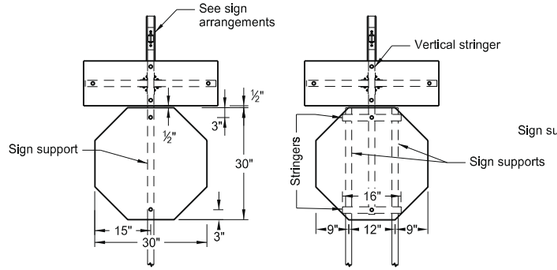
D-754-87

A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



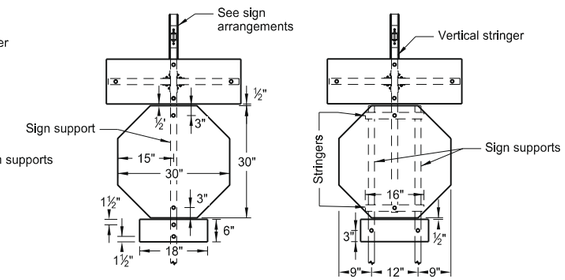
1 Post

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



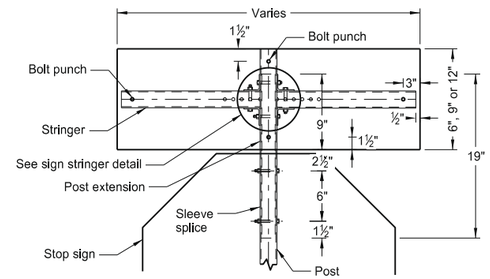
1 Post 2 Posts

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



1 Post 2 Posts

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

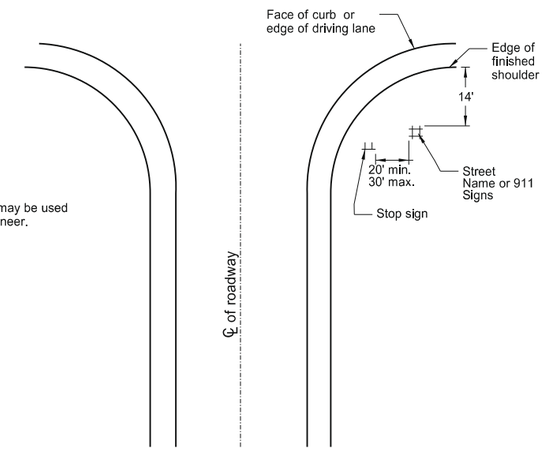


Front View

Sleeve Splice Detail

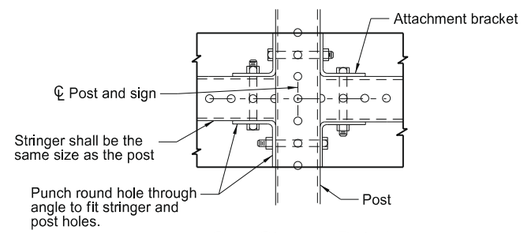
Note: The splice method may be used upon approval of the engineer.

Note: See Standard Drawing D-754-86 for 911 support information and sign layout details.

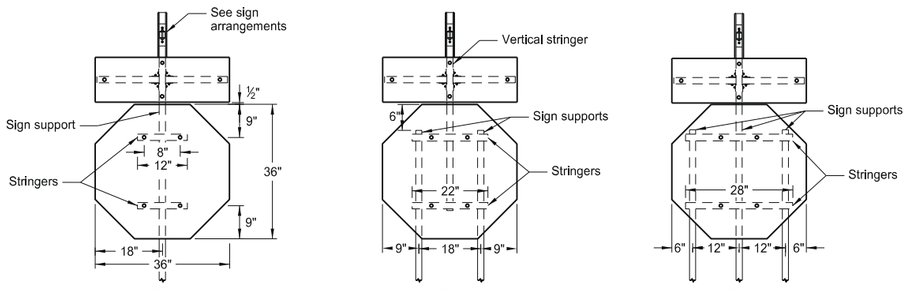


Intersection Layout

Note: This layout is to be used for street name signs or 911 signs that are used with Special Assembly 1 .

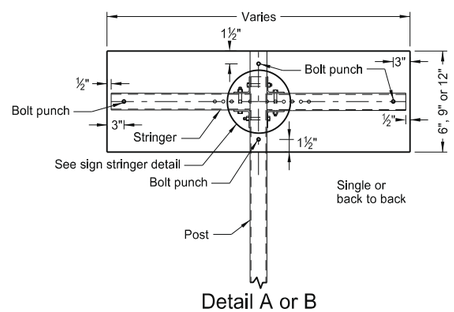


Sign Stringer Detail

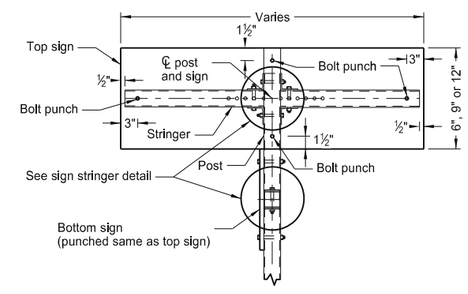


1 Post 2 Posts 3 Posts

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

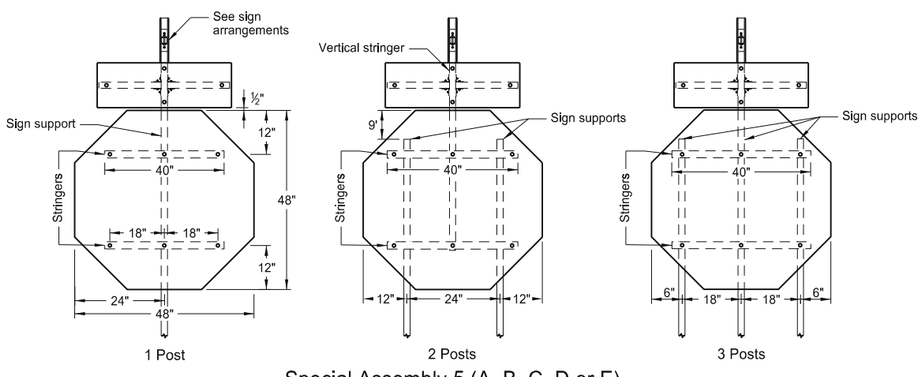


Detail A or B



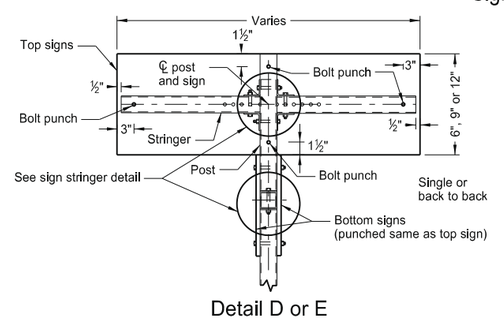
Detail C

Sign Arrangements



1 Post 2 Posts 3 Posts

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



Detail D or E

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

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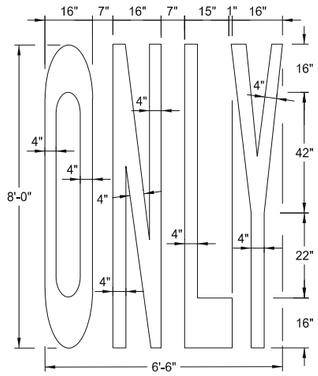
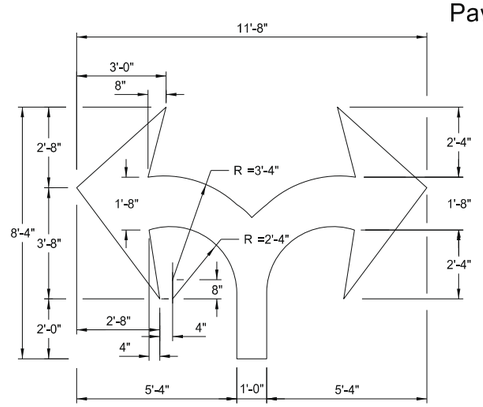
Pavement Marking Message Details

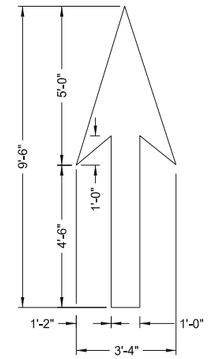
D-762-1



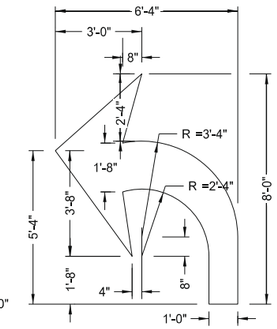
22 S. F.



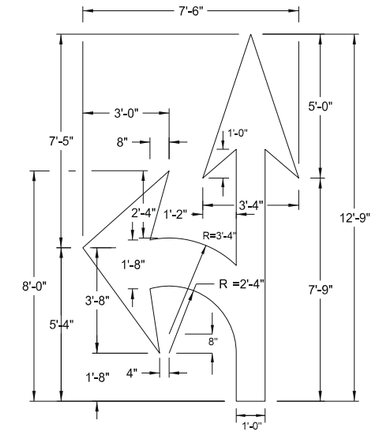
29 S. F.



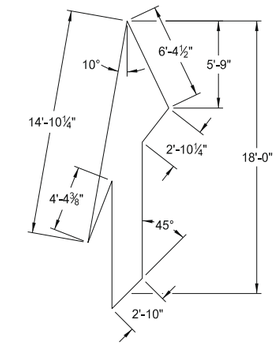
12 S. F.



16 S. F.

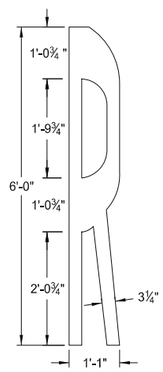


27 S. F.

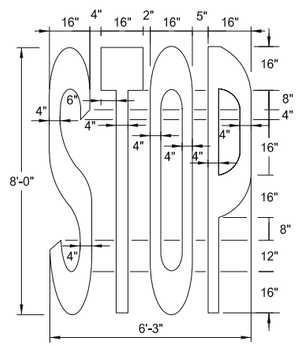


41 S. F.

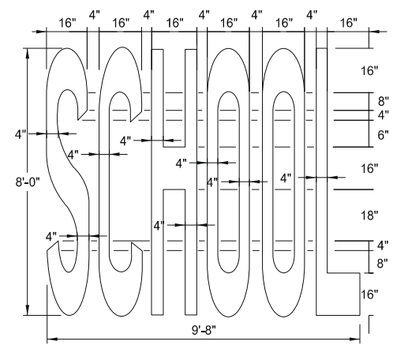
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



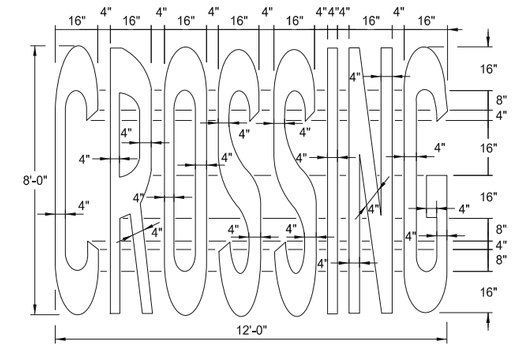
4 S. F.



22 S. F.



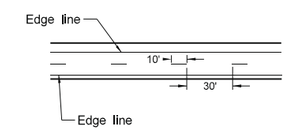
34.5 S. F.



46 S. F.

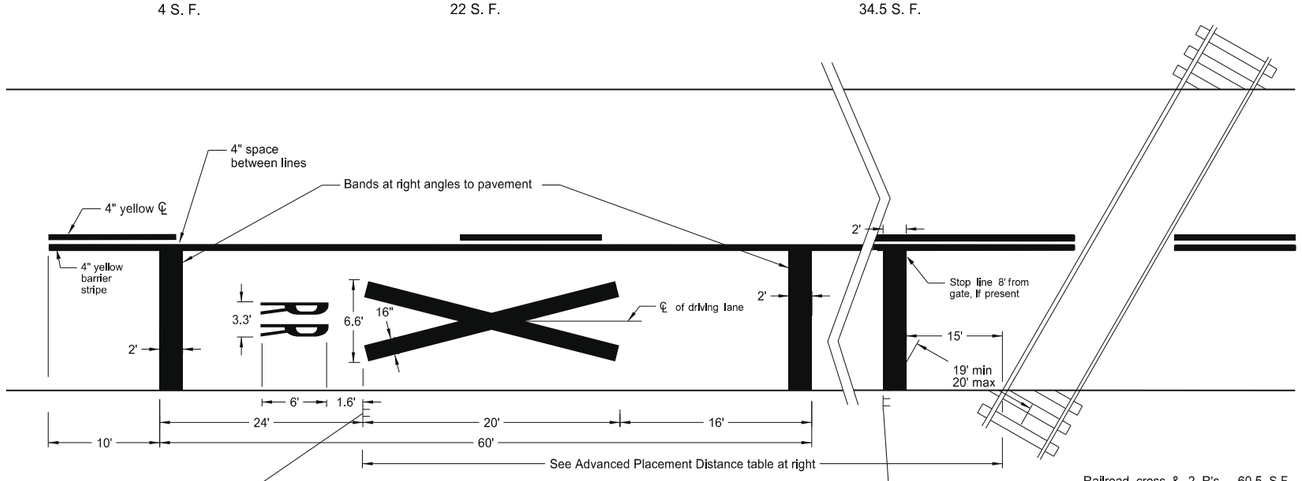
Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



Centerline Pavement Marking Skip Spacing Detail

Advance Placement Distance for Railroad Warning Signs	
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

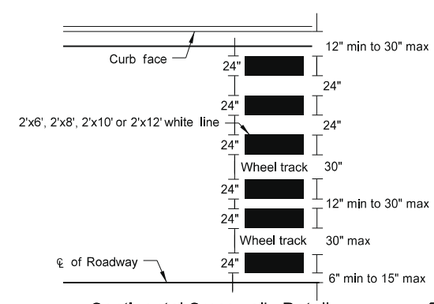


Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

See Standard Drawing D-754-81

Notes:
A three lane roadway should be marked with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, the transverse bands should extend across all approach lanes, and individual R X R symbols should be used in each approach lane.

See plans for correct message. All pavement markings shall be white unless noted otherwise.



Continental Crosswalk Detail

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE

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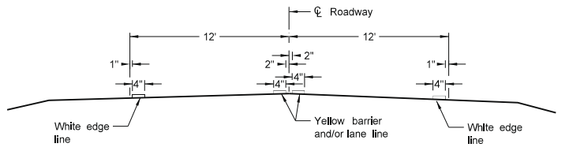
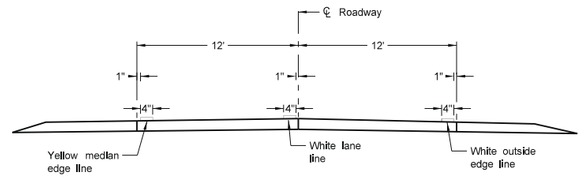
PAVEMENT MARKING

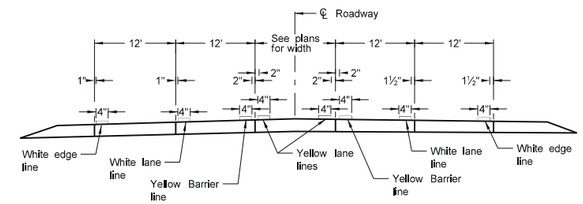
D-762-4



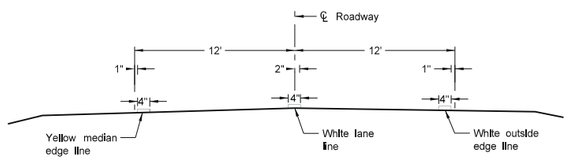
Two Lane Two Way
RURAL ROADWAY



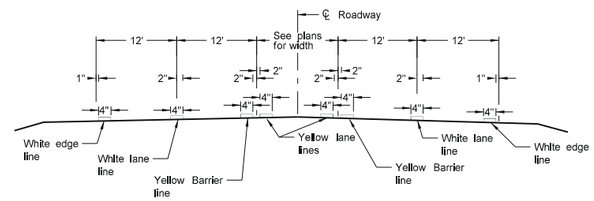
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



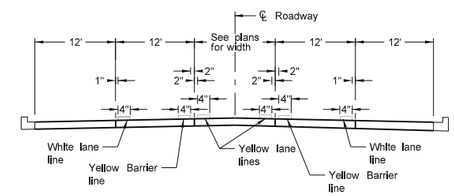
RURAL FIVE LANE ROADWAY
Concrete Section



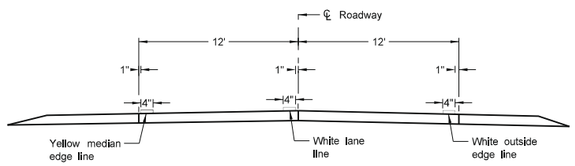
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



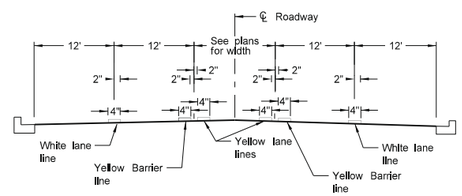
RURAL FIVE LANE ROADWAY
Asphalt Section



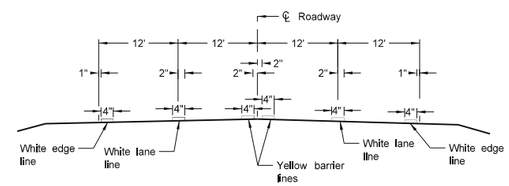
URBAN FIVE LANE SECTION
Concrete Section



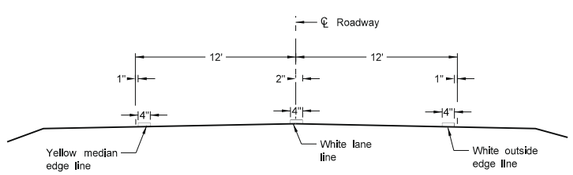
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



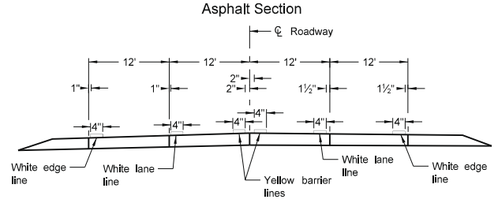
URBAN FIVE LANE SECTION
Asphalt Section



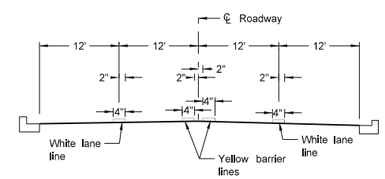
RURAL FOUR LANE ROADWAY
Asphalt Section



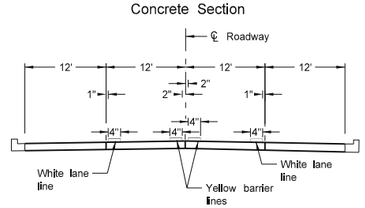
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



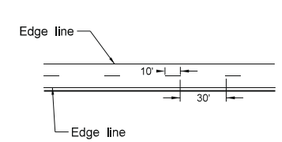
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

1. Edge lines shall be continued through private drives and field drives and broken for intersections.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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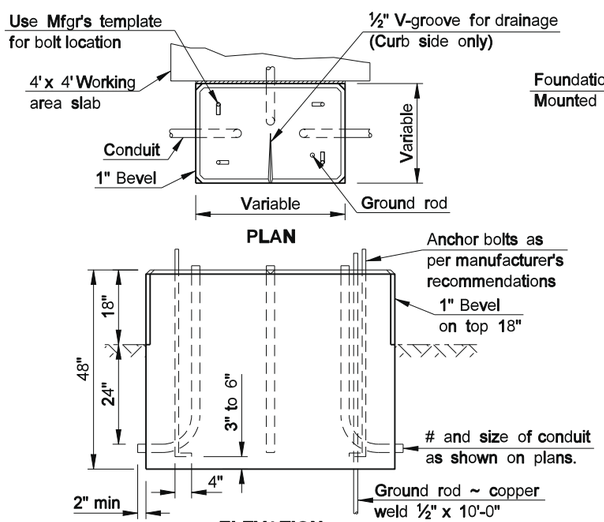
CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

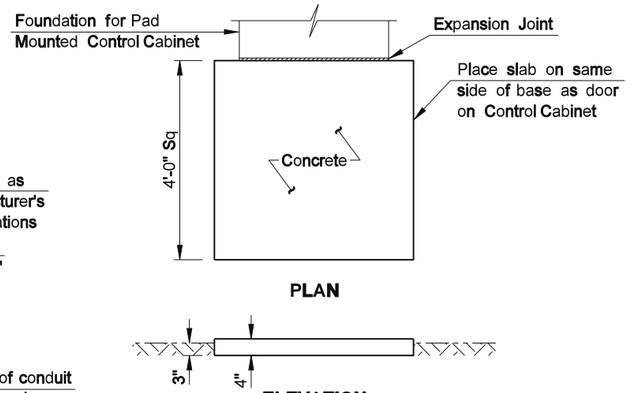
D-770-1



ELEVATION

CONTROLLER CABINET FOUNDATION PAD MOUNT

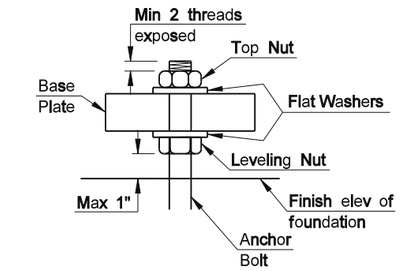
The Controller Cabinet Foundation shall be bid as Concrete Foundation - Traffic Signals.



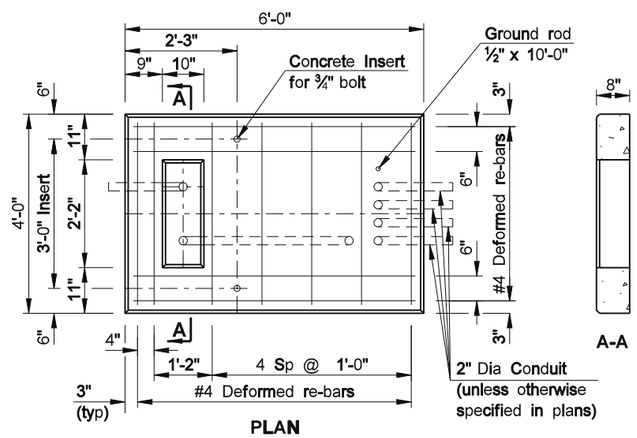
ELEVATION

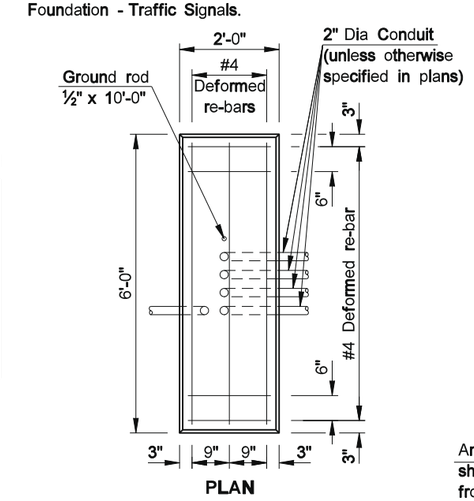
WORKING AREA SLAB

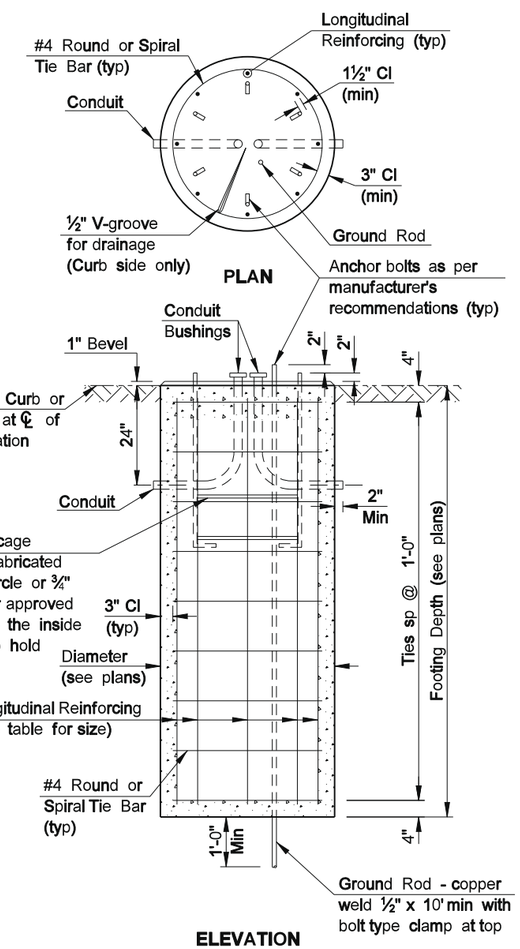
The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



ANCHOR BOLT DETAIL

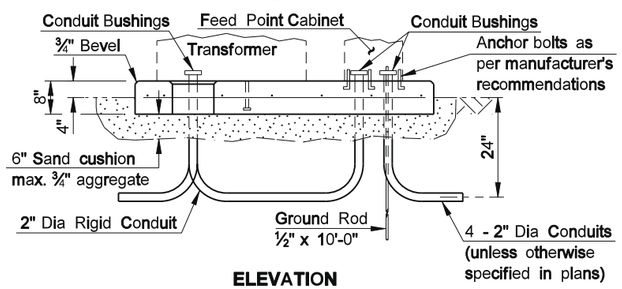






ELEVATION

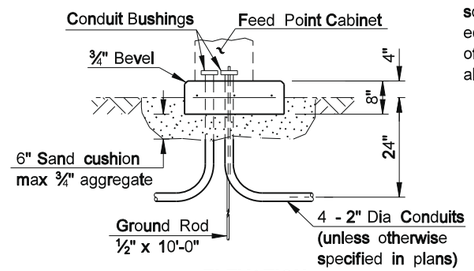
LIGHT & SIGNAL STANDARD FOUNDATION



ELEVATION

TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNT

The Transformer & Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type A.



ELEVATION

FEED POINT CABINET FOUNDATION PAD MOUNT

The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type B.

NOTES:

LIGHT & SIGNAL STANDARD FOUNDATIONS: See plans for conduit size, number of bends and correct position for each foundation. When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown. See plans for correct size & location of foundations. The grade and exact location shall be established by the Engineer in the field. All reinforcing shall be Grade 60. Tie bars shall have a minimum of a 12" lap. Reinforcing may be omitted for Type I, II, V, VI & VII signal standard foundations if the anchor bolts extend to within 3" to 6" above the bottom of the foundation. A minimum of 6 anchor bolts shall be used for cantilevered structures.

CONTROLLER CABINET FOUNDATION PAD MOUNT FOUNDATION: See plans for the number of 90° bends per foundation and correct positioning. The foundation for Pad Mounted Controller Cabinet shall be of sufficient size so that there is a minimum of 3" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The contractor shall ensure a water-tight seal between the controler cabinet and the foundation by caulking, except for V-groove.

WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-15-10	
REVISIONS	
DATE	CHANGE

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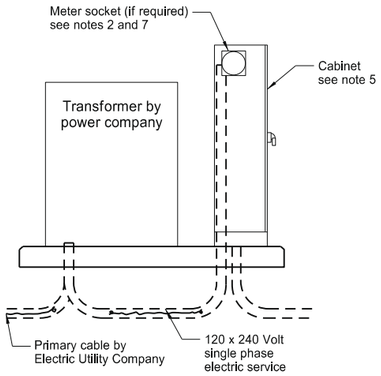
FEED POINTS
(ROADWAY LIGHTING)

D-770-2



Elevation

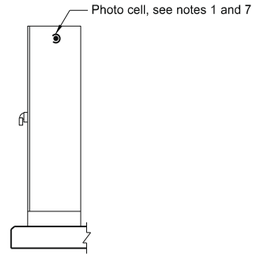
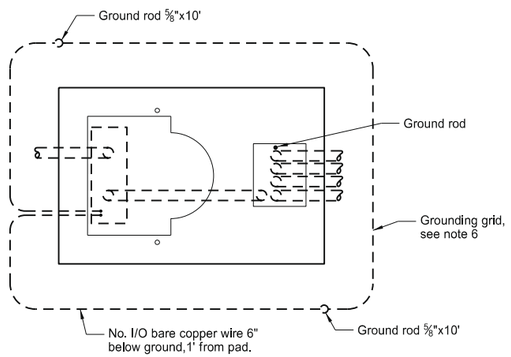
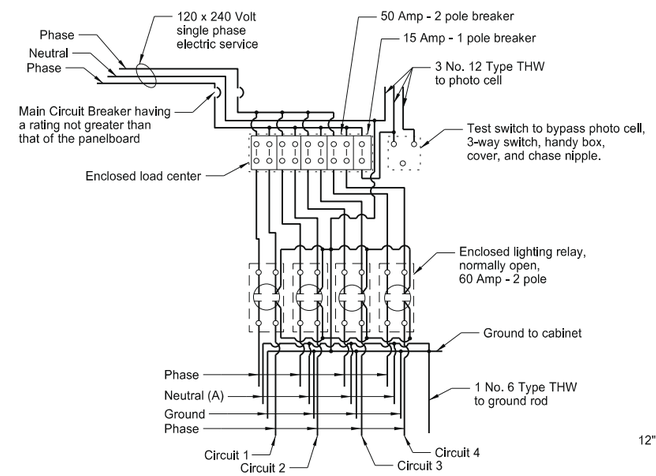


Photo Cell
Mounting Detail



Plan

Transformer and Feed Point Cabinet Pad Mounted



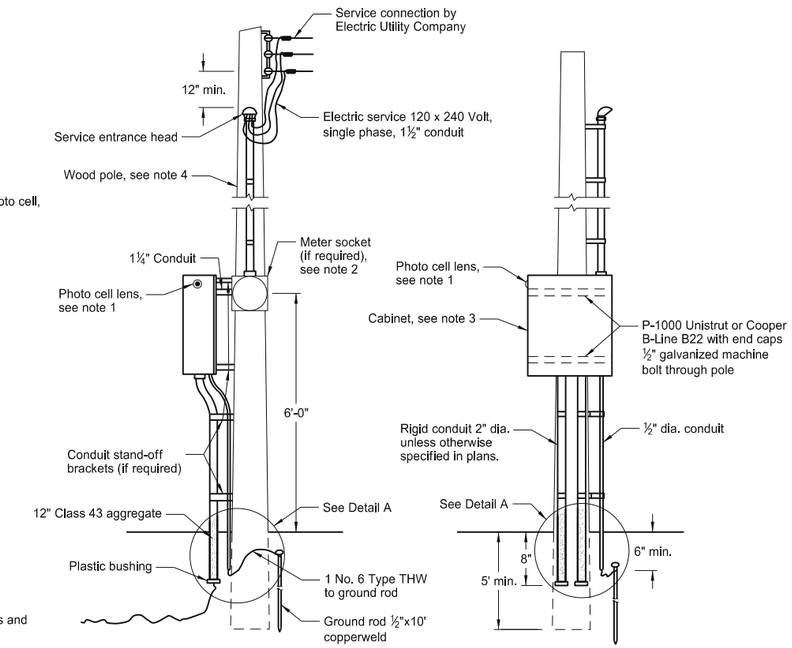
Feed Point Type IV

Type I feed point is similar to Type IV except only one electrical circuit, one 50 Amp - 2 pole breakers and one lighting relay, normally open, shall be installed.

Type II feed point is similar to Type IV except only two electrical circuit, two 50 Amp - 2 pole breakers and two lighting relays, normally open, shall be installed.

Type III feed point is similar to Type IV except only three electrical circuits, three 50 Amp - 2 pole breakers and three lighting relays, normally open, shall be installed.

(A) Install when festoon circuit is required.

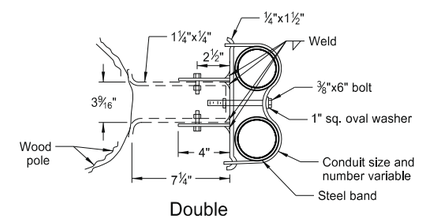


Feed Point Pole Mounted

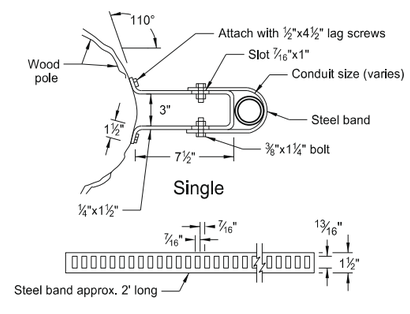
Notes:

1. Photo Cell: The electrical contractor shall furnish and install the photoelectric cell. The photo lens shall face north.
2. Meter Socket: The contractor shall install the meter socket and trim if the meter is required by local Utility Company. Meter to be furnished and installed by Utility Company.
3. Pole Mounted Cabinet: Cabinet shall have lock drip shield, factory installed steel backing, stainless steel hardware, and side hinge door. Cabinet shall be shop coated with one coat of primer and have two coats of exterior gray enamel.

   Type I and II feed point shall be 30" high x 24" wide x 8" deep, Type III and IV feed point shall be 30" high x 42" wide x 10" deep or 36" high x 36" wide x 10" deep.
4. Wood Pole: Minimum 20' Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
5. Pad Mounted Cabinet: Cabinet shall be 56" high x 26" wide x 14" deep. Minimum 12 gauge steel or aluminum with provisions for padlock. Cabinet shall be weatherproof. A steel cabinet shall have one coat of primer and two coats of exterior dark green enamel.
6. Grounding Grid: The grounding grid shall have a ground resistance not to exceed 25 ohms. This shall be obtained by one or more ⅝"x10' copperweld ground rods in parallel or series at two corners. Minimum distance between ground unit assemblies shall be 6'0".
7. Meter Location: The meter (if required) shall not be mounted on the same side of the cabinet as the photo cell.

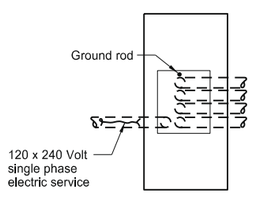


Double

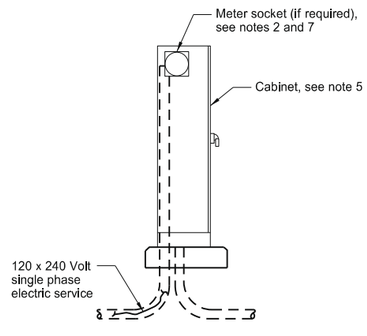


Conduit Standoff Bracket

The conduit standoff brackets may be omitted if not required by the local utility company.

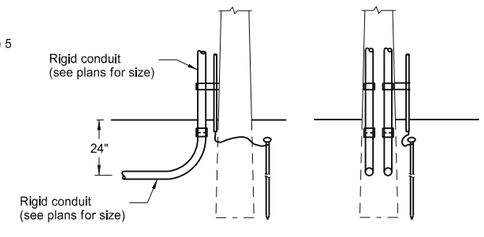


Plan



Elevation

Feed Point Cabinet Pad Mounted



Detail A

Use this detail if there is a continuous run of conduit from the feed point to the first light standard.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 3

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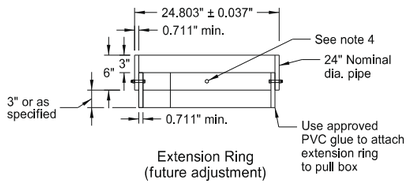
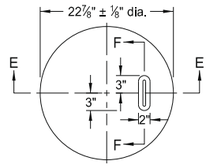
PULL BOX DETAILS

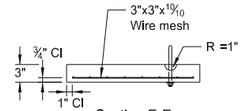
D-770-3



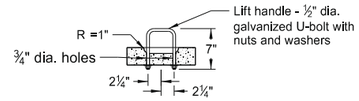
Extension Ring
(future adjustment)



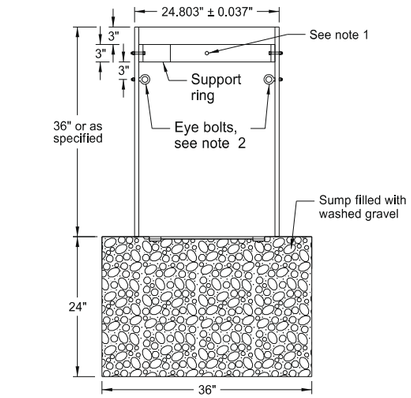
Concrete Cover



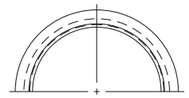
Section E-E



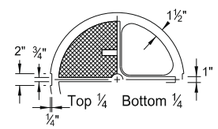
Section F-F

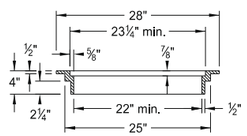


Elevation

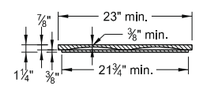


Half Top View



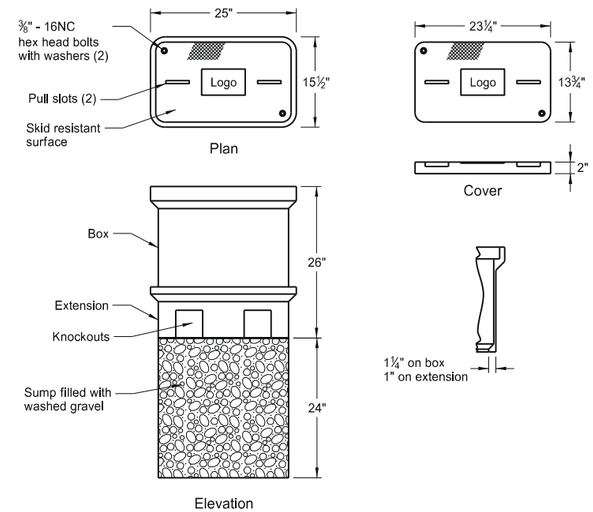


Section Frame



Section Cover

Cast Iron Frame and Cover



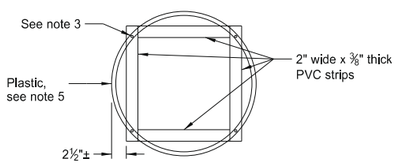
Polymer Concrete Pull Box

Note: Polymer concrete reinforced by a heavy weave fiberglass

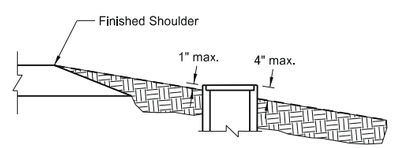
Notes:

1. Place top of pull box flush with surfaced area and approximatley one inch above earth or sodded areas on level surfaces.
2. Pull box shall have at least one knockout per side.
3. Polymer Concrete pull box shall be Tier 22 as per ANSI / SCTE 77.

PVC Pull Box



Bottom View



Typical Pull Box in Rural Section

PVC Pull Box Notes:

1. Attach split 24" nominal diameter PVC cover support ring with four ⅜" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
2. Two type 2 shoulder eye bolts, ⅜" dia. x 1¼" shank length with hex nuts 180 degrees apart (for lifting pull box and supporting electric cable).
3. Four ¼" x 1¼" long galvanized lag screws. Screw assembly together.
4. Attach split 24" nominal diameter PVC cover support extension ring with four ⅜" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
5. Bolt assembly together.
6. Conduit holes located in barrel section shall be sized no more than 1" larger than size of conduit being used.
7. After pull box and conduit installation all inside walls and cover shall be made water tight to the satisfaction of the Engineer.
8. PVC pipe to meet requirements of ASTM F679T-1 or equal.
9. Hex head bolts and nuts shall be austenitic stainless steel. Other fasteners to be galvanized as per AASHTO M-232.
10. Concrete cover shall be coated on top and sides with an approved epoxy coating. The epoxy protective coating shall be light gray, clear, or neutral in color and shall be applied as recommended by the manufacturer. The surfaces of the concrete to which the epoxy protective coating is applied, shall be cleaned by wire brush and shall be dry before application.
11. Cast Iron Cover castings shall be gray iron as per AASHTO M 105, Class 35B.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-8-13

REVISIONS

DATE	CHANGE
7-8-14	Added Note 3

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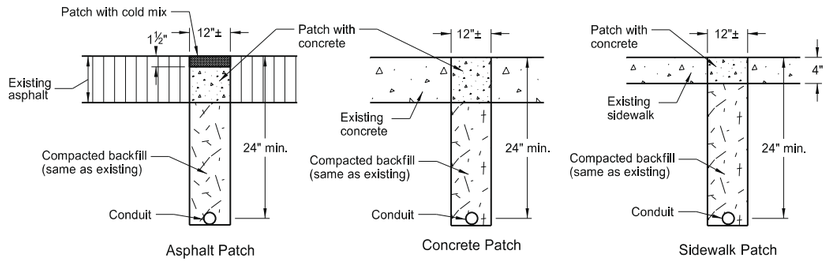
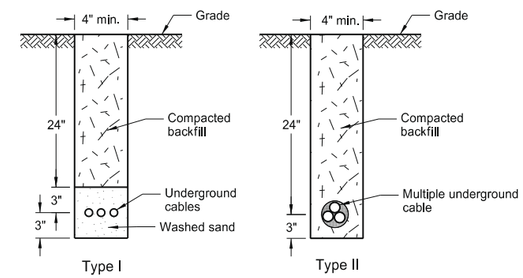
LIGHTING AND SIGNAL DETAILS

D-770-4



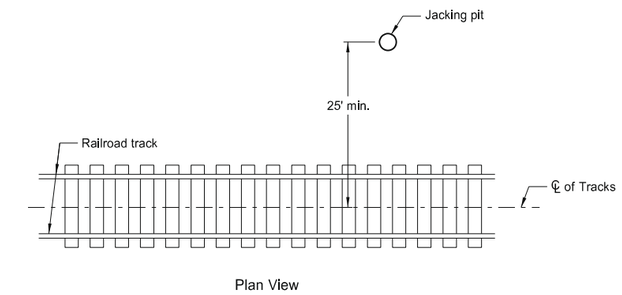
Surface Patch Details

Note: All trenches shall be saw cut. The replacement concrete shall be P.C.C. pavement and the coarse aggregate gradation, maximum size and method of curing shall be as approved by the Engineer. Immediately prior to pouring replacement concrete, all surfaces shall be painted with an approved epoxy compound.

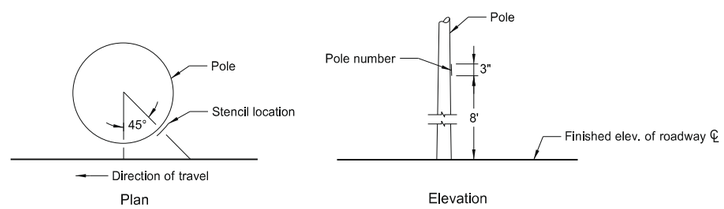


Cable Trench

Note: The entire area which is disturbed by the trenching shall be sodded or as directed by the Engineer.

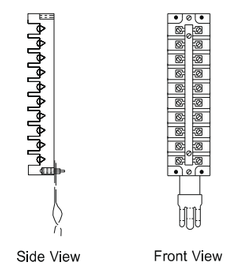


Conduit Placement under Railroad Tracks

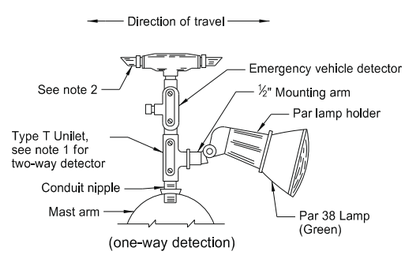


Light Standard Numbering

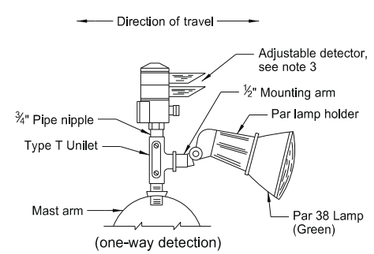
Note: On the roadway side of each light standard, the Contractor shall stencil on the pole number using black paint or an adhesive coated plastic such as Scotchcal by 3M or as approved by the Engineer. See layout sheets for pole numbers.



Terminal Block Detail

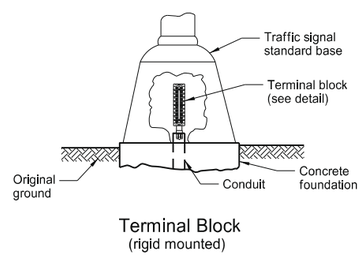


Emergency Vehicle Detector Detail

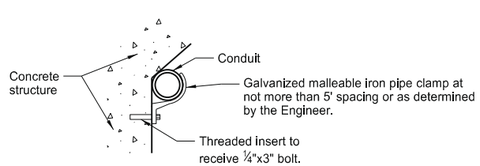


Alternate Emergency Vehicle Detector Detail (adjustable)

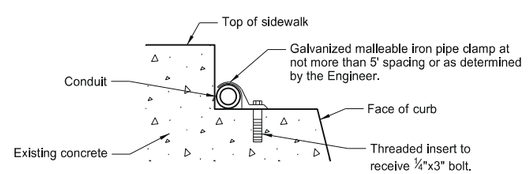
Notes:
1. Two-way Detector shall have Type X Unilet with two Par lamp holders and lamps. (one in each direction).
2. One-way Detector shall have the unused end plugged with metal pipe plug.
3. Two-way Detector shall have the detector lens rotated to face the direction of travel, and shall have Type X Unilet with two Par lamp holders and lamps (one in each direction).



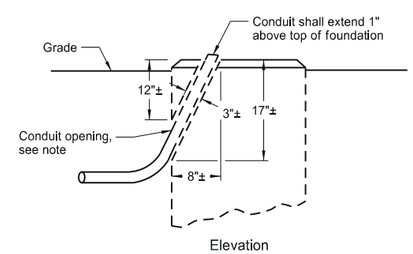
Terminal Block
(rigid mounted)



Bridge Mounted Conduit Hanger



Curb Mounted Conduit



Revise Concrete Foundation

Note: Jackhammer or drill to remove material and provide a location for conduit. Make opening no larger than necessary. Place conduit, fill with concrete and finish foundation to original appearance.

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10-8-13	
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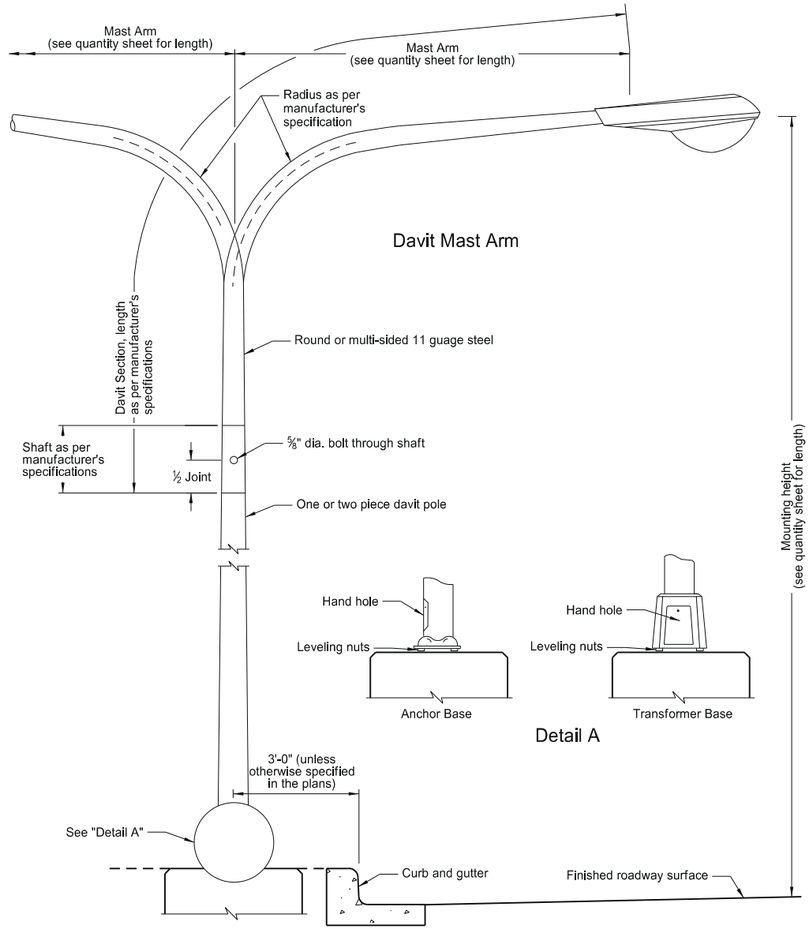
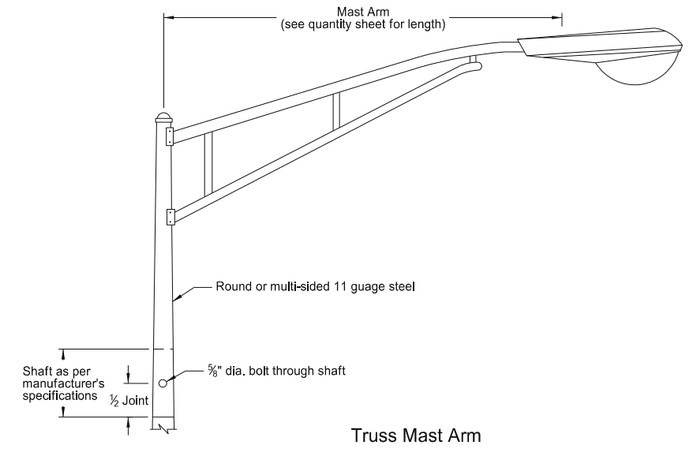
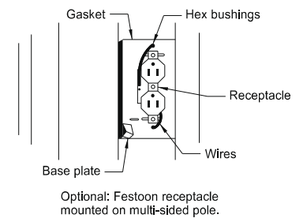
LIGHT STANDARD DETAILS

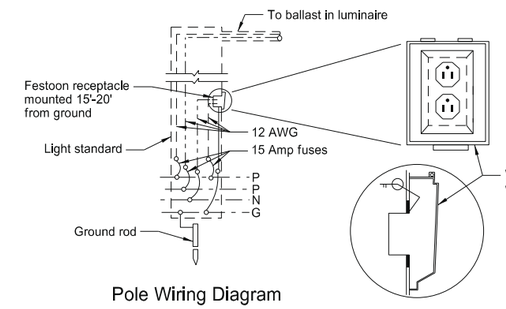
D-770-5



Light Standard Details



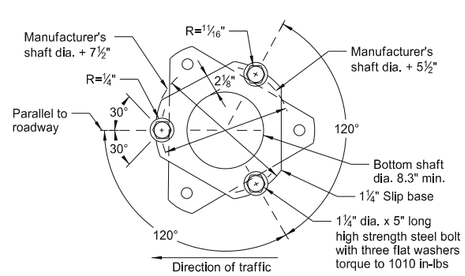




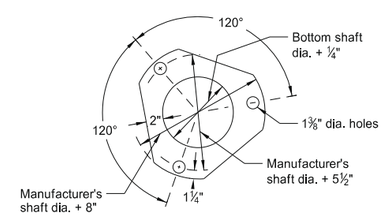
Pole Wiring Diagram

Receptacle Mounting Detail (B)

(B) Receptacle shall be mounted on the side of the pole that faces the street side. Festoon Receptacle shall be installed only when specified in the plans.



Top View



Plan View

Keeper Plate Detail (A)

(A) ASTM A446 Grade "A" 28 gauge keeper plate on top of middle flat washer. The Keeper plate shall be galvanized after fabrication.

Notes:

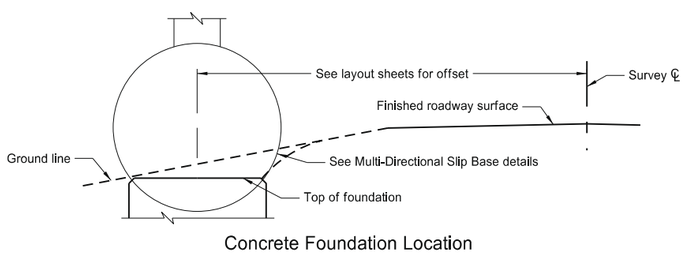
Light Standard Locations: The offset distance shall have a minimum offset from the curb face of 3 feet. Light standards that are placed in urban areas and where speeds are less than 30 mph, may be placed at 3 feet. Where speeds are 30 mph or more, light standards shall be placed at least 16 feet from the driving lane.

Steel Standards: Marred or scratched areas shall be touched up after erection.

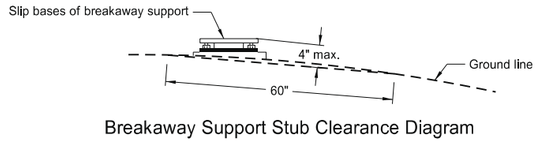
Luminaire: Shall be internal ballast-constant wattage 120x240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, and operating system.

Fusing: Fusing in base, see specifications.

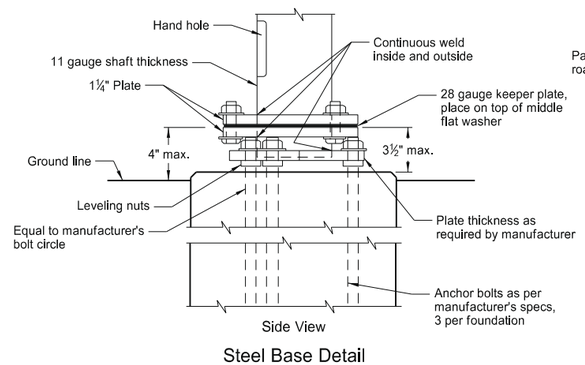
Slip Base Bolt Torque Procedure:
1. Tighten all bolts the maximum possible with 12" to 15" wrench to bed washers and to clean bolt threads, then loosen.
2. Retighten bolts with a systematic order to prescribed torque.
3. Loosen each bolt and retighten to prescribed torque in the same order as initial retightening.
4. Burr threads of junction with nut using center punch to prevent nut loosening.



Concrete Foundation Location

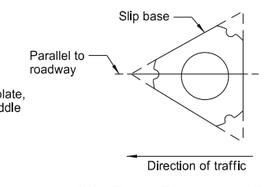


Breakaway Support Stub Clearance Diagram

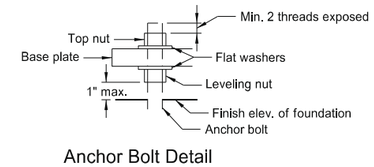


Side View

Steel Base Detail



Slip Base Placement Detail



Anchor Bolt Detail

Multi-Directional Slip Base

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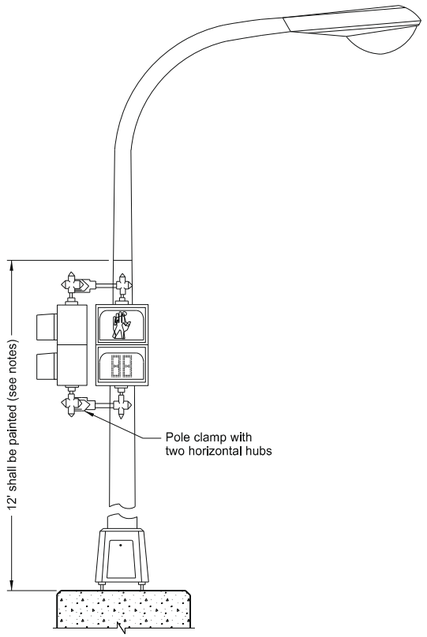
TRAFFIC SIGNAL HEAD MOUNTING

D-772-4



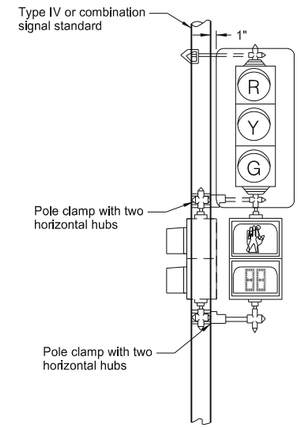
Light Standard Mounted
Pedestrian Signal Head (A)

Pedestrian countdown timer

(A) See plans for the appropriate orientation and type of pedestrian signal head to use.

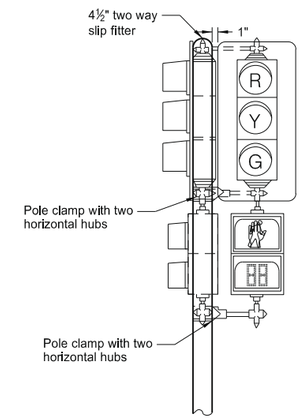
Type II

Pedestal Mounted - Pedestrian (A)



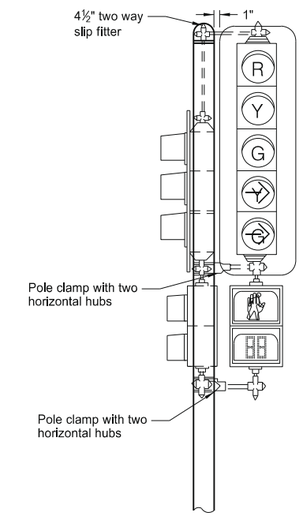
Type IV

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



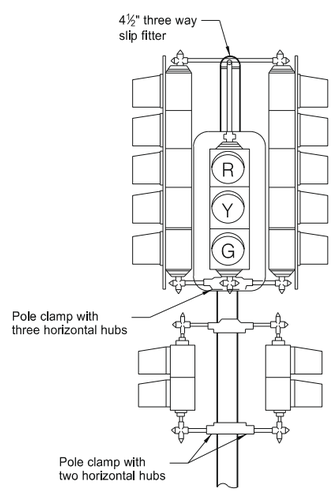
Type V

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



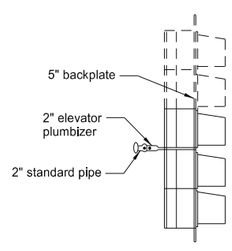
Type VI

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



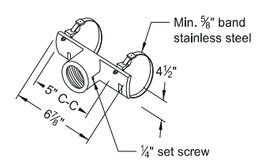
Type VII

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)

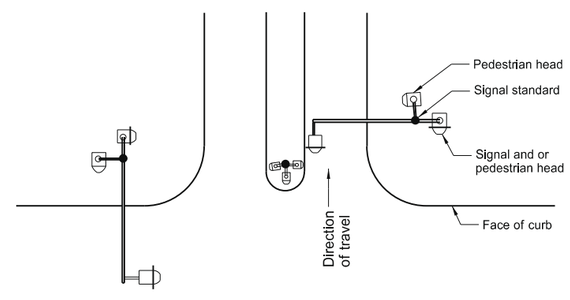


Side View

Mid-Span Mounted and
Mast Arm Rigid Mounted
Signal Heads

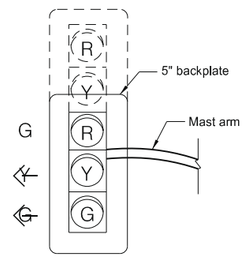


Mast Arm Signal
Head Bracket

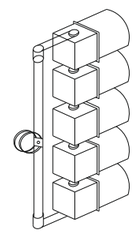


Plan Layout
(typical)

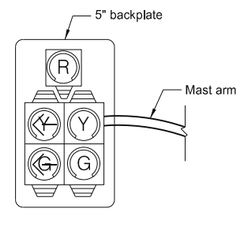
Note: Signal heads shall not protrude over the face of the curb.



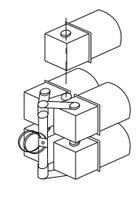
Front View



Isometric View



Front View



Isometric View

End Mounted and Mast Arm Rigid Mounted
Signal Heads

Notes:

Reinforcing Plates: Polycarbonate signal heads shall have reinforcing plates installed where the mounting hardware attaches to the signal head. Where a plumbizer is used reinforcing plates shall be placed on each side of the plumbizer.

Clearance: Clearance from the ground line or sidewalk to the bottom of post or pedestal mounted vehicular signal heads shall be 10 ft. minimum, from pedestrian signal heads shall be 8 ft. minimum.

Signal Heads: See traffic signal layout for correct mounting position, numbers, size, and arrangement of lenses.

Pole Clamps: A pole plate with suitable banding material, as approved by the Engineer, may be substituted for the pole clamps. Where traffic signal heads and pedestrian signal heads are mounted one above the other, one pole clamp assembly may be used.

Paint: Signal housing shall be painted yellow. Backplates shall be painted dull black. Pole clamps and signal head mounting hardware shall be painted the same color as the signal standard shaft.

When pedestrian heads are light standard mounted, the lower 12 ft. shall be painted the same color as the other traffic signal standards.

Mounting Details: All signal heads shown are viewed from direction of travel.

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7-8-14	Added reinforcing plate note

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