DESIGN DATA				
Traffic	Average Daily			
Current 2012	Pass: 13,976	Trucks: 1605	Total: 15,581	
Forecast 2032	Pass: 20,824	Trucks: 2391	Total: 23,215	
Clear Zone Distance:		Design Speed: 40		
Minimum Sight Dist. for Stopping:		Bridges:		
Limited Access Control				
Pavement Design Life (years)				
Design Accumulated One-way ESALs:				

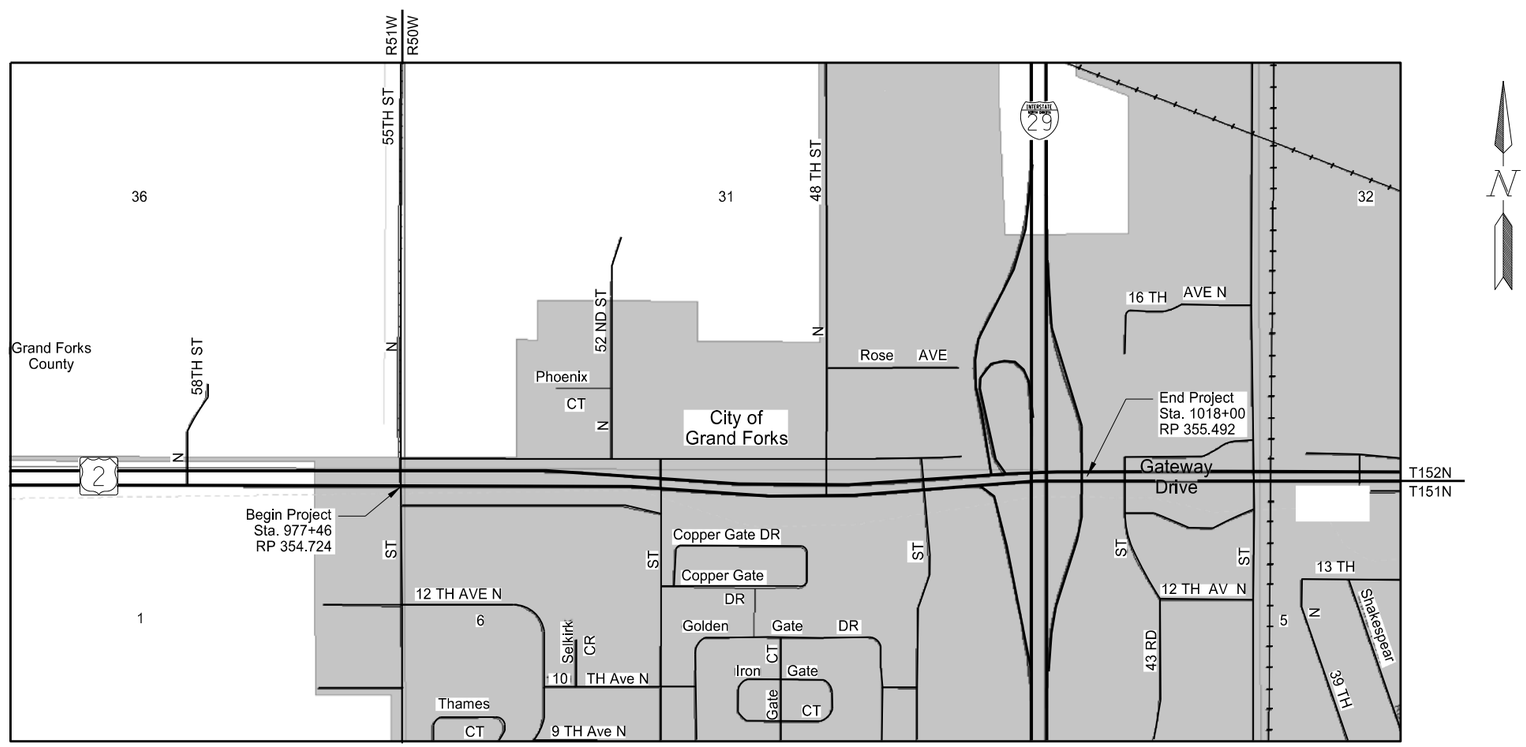
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20103	1	1

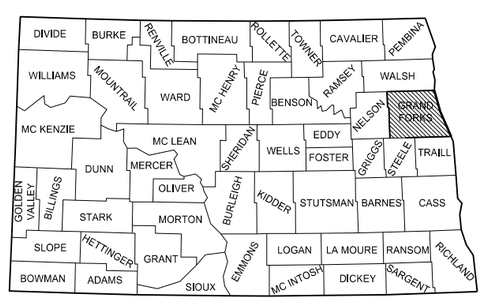
JOB # 33
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

S-NHU-6-002(111)354
FHWA Limited Involvement
Grand Forks County
Gateway Drive - 55th Street to I-29
CPR, Grinding, Dowel Bar Retrofit, Video Detection, Grinding, ADA & Incidentals

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
S-NHU-6-002(111)354	0.768	0.768





STATE COUNTY MAP

DESIGNERS

Jason Leonard /s/

Chad Eklund /s/

APPROVED DATE 08/23/13

Edward Pavlish
GRAND FORKS DISTRICT
ND DEPARTMENT OF TRANSPORTATION

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

APPROVED DATE 08/23/13

Christopher K Beggs
GRAND FORKS DISTRICT

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TABLE OF CONTENTS

Section No.	Sheet No.	Description
1	1	Title Sheet
2	1	Table of Contents
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20	1-9	General Details
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75	1	Erosion Control
80	1-20	Repair Locations
90	1-2	ADA Curb Ramps
100	1-33	Work Zone Traffic Control
120	1-5	Pavement Marking
150	1-11	Signals

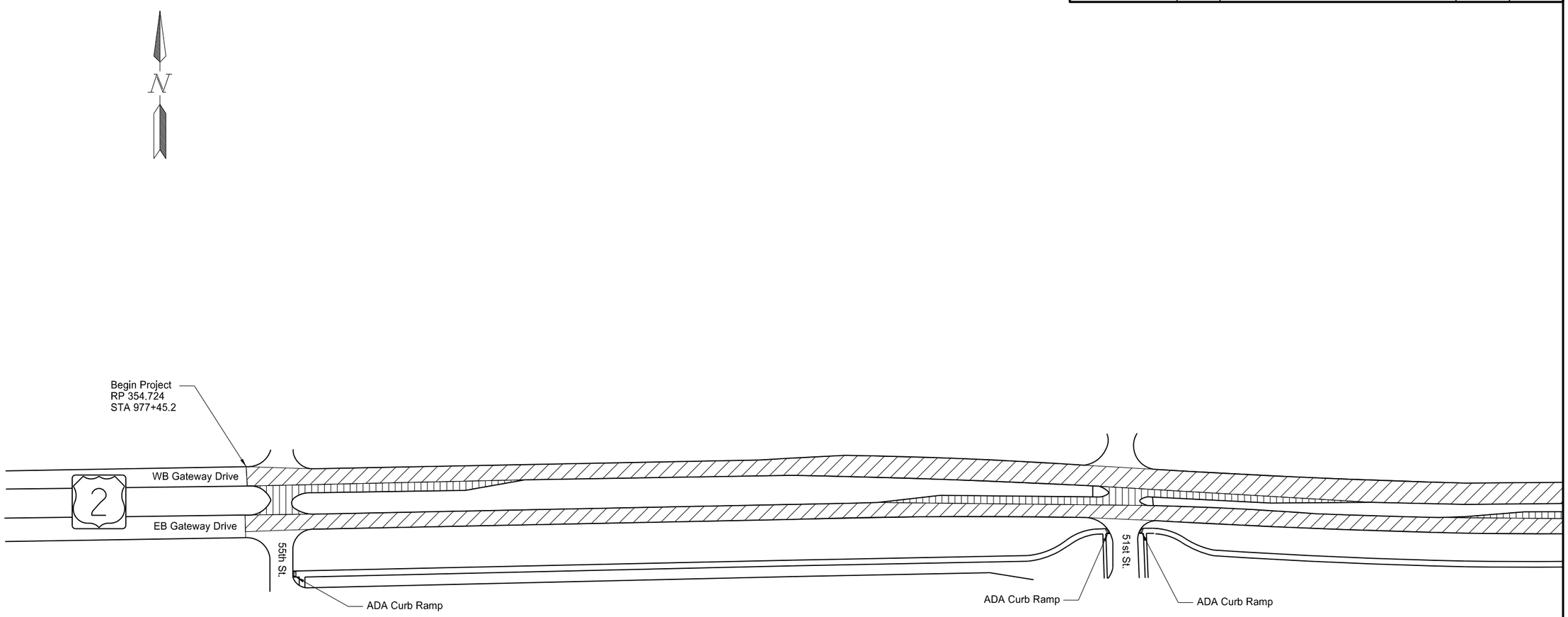
LIST OF SPECIAL PROVISIONS (SP)

SP #	Description

LIST OF STANDARD DRAWINGS

Standard No.	Description
D-20-1, 2, 3	NDDOT Abbreviations
D-20-10	NDDOT Utility Company Abbreviations
D-20-20, 21	Line Styles
D-20-30, 31, 32	Symbols
D-550-2	Longitudinal Joint Details
D-550-3	Transverse Contraction Joint Details
D-704-7	Breakaway Systems for Construction Zone Signs Perforated Tube
D-704-8	Breakaway Systems for Construction Zone Signs
D-704-9, 10, 11	Construction Sign Details
D-704-13	Barricade Details and Channelizing Devices
D-704-14	Construction Sign and Barricade Assembly Details
D-704-15, 20	Construction Sign and Barricade Location Details
D-704-34	Sign Layout for One Lane Closure
D-704-35	Sign Layout for One Lane Closure – Interstate System
D-704-50	Portable Sign Support Assembly
D-748-1	Valley Gutter and Curb & Gutter
D-750-2	Sidewalk and Curb Ramps
D-750-3	Curb Ramp Detail
D-762-1	Pavement Marking Message Detail
D-762-4	Pavement Marking

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	4	1



Concrete Pavement Repair, Dowel Bar Retrofit, Grinding

Concrete Pavement Repair

ADA Curb Ramps

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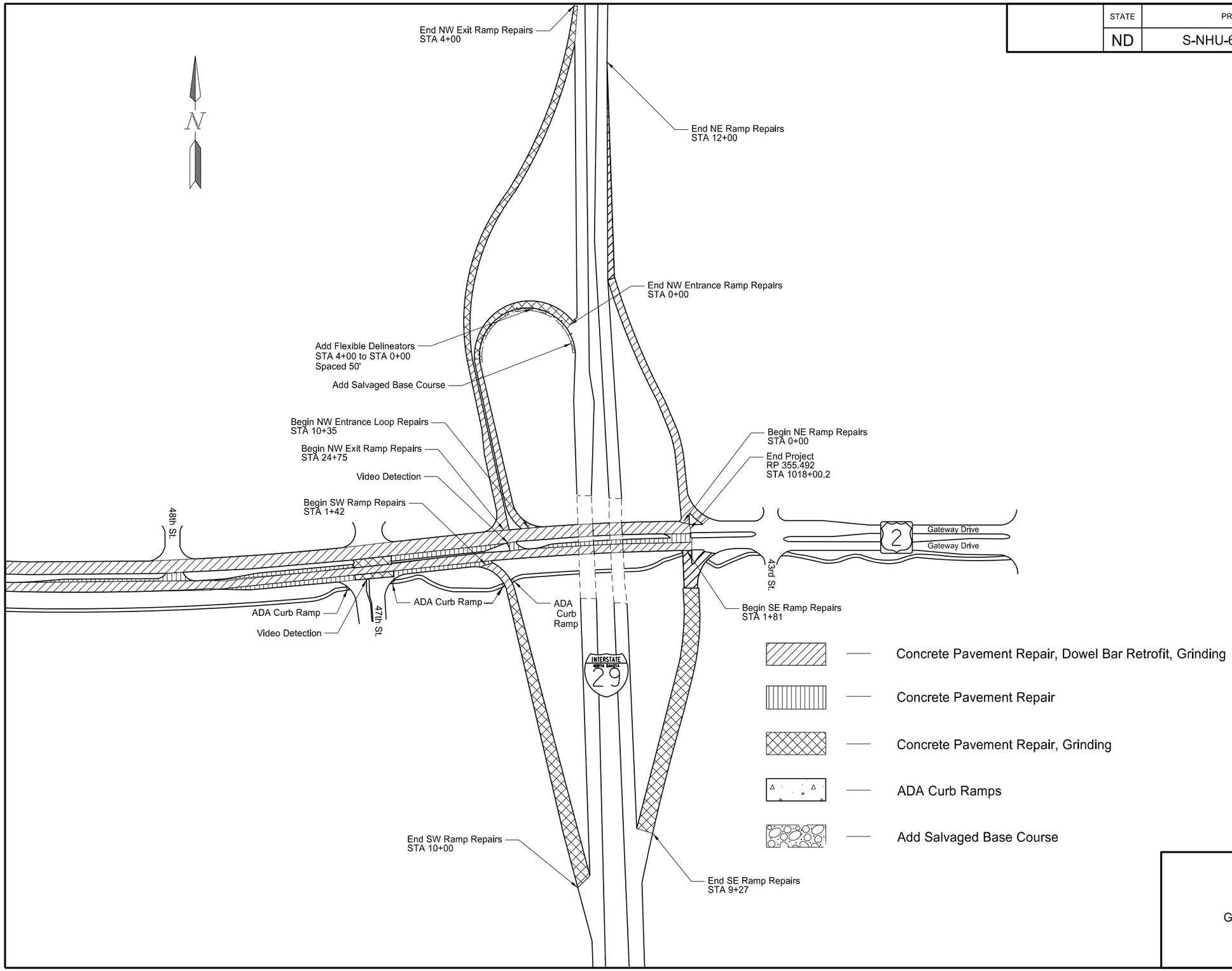
Scope of Work

Gateway Drive

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	4	2



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Scope Of Work

Gateway Drive and I-29 Ramps

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	6	1

NOTES

GENERAL NOTES

100-P01 WORK SCHEDULE: The contractor will not be allowed to work on the I-29 ramps or Highway 2 until all work on I-29 ramps or Highway 2 has been completed. It is the contractors option as to which will be completed first. Work will not be allowed to be completed simultaneously. Intersection work of the I-29 ramps and Highway 2 will be completed with the highway 2 phases. A detailed schedule shall be approved prior to beginning work, between the Engineer, utility companies, and the Contractor and subcontractors, if any. In order to minimize interference with traffic operations, Concrete Pavement Repair, Dowel Bar Retrofit, and grinding work through the intersection of N 47th Street shall begin no earlier than 9:00 PM and must cease prior to 6:00 AM. A noise variance from the City of Grand Forks must be granted for work between the hours of 10:00 PM and 6:30 AM.

100-P02 NOISE RESTRICTION: Contractor shall be required to comply with the City of Grand Forks noise ordinance, except where variance is specifically granted by the Grand Forks Health Department. The contractor will contact the Grand Forks Health Department to determine the amount of notice they will need to consider the variance request. Should work be done outside this variance, the contractor shall make a written request 7 days in advance to the engineer stating the nature of the work, the additional hours required and the number of days needed to complete the work. This request must be approved by the Grand Forks Health Department prior to beginning work.

100-P03 EMERGENCY PERSONNEL: The Contractor shall provide the City of Grand Forks and the Engineer with the name, address and telephone number of personnel who have access to equipment and are authorized to make emergency repairs to the Contractor's work.

100-P04 PUBLIC NOTIFICATION: The contractor shall provide written notices in person to each property and business owner a minimum of 7 days in advance of scheduled work that would affect access to their property. The contractor shall provide 5 business days of advance written notice to the Engineer of scheduled street, ramp, loop, and shared path use closures and detour routes. The Contractor shall notify the City Public Works Department a minimum of 5 business days in advance of street closures.

105-P01 WEEKLY PLANNING/REPORTING MEETING:

A. Purpose of Weekly Meeting.
   1. The contractor shall organize weekly meetings to coordinate efforts between subcontractors, utilities, local authorities, and others.

B. Contractor's Project Manager/Superintendent: Planning and Reporting.
   1. The contractor will be responsible for sending a knowledgeable representative to conduct a weekly Reporting/Planning meeting. It will be the contractor's responsibility to prepare minutes for each meeting and to make the appropriate distribution of the minutes. The minutes shall be approved by the Engineer prior to distribution.
   2. The contractor will be required to provide a written schedule of the next week's work and a tentative schedule of the following week.
   3. Reporting/Planning meeting will include discussion of problems encountered during the current week; information of interest to local authorities, subcontractors, utilities, and next week's prospective schedule.
   4. The contractor shall organize the weekly meeting contacting interested agencies. These agencies may include, but are not limited to, the following:
      a. North Dakota Department of Transportation
      b. FHWA
      c. Police, Sheriff, or Highway Patrol Departments
      d. Fire Department
      e. Ambulance service
      f. Telephone Co.
      g. Power Co.
      h. Cable T.V.
      i. Gas Co.
      j. Subcontractors
      k. Chamber of Commerce
      l. Local Government Agencies

105-P02 PAVEMENT SWEEPING: The contractor shall sweep pavement after completion of each traffic control phase, and after PCC grinding. For this sweeping, the contractor shall furnish and utilize a vacuum-type sweeper. All costs connected with this work shall be included in the price bid for Dowel Bar Retrofit - Type B.

202-P01 SAW CONCRETE: Where the new pavement will abut existing pavement, a full-depth vertical saw cut shall be made along the entire length of the joint. The material to be removed shall then be removed without disturbing the material that is designated to remain. The sawed edge shall be reasonably free of frays or spalls. The new pavement shall be placed so as to match the existing pavement and so as to provide a satisfactory surface profile. Any intermediate saw cuts performed to aid in the removal of pavements shall not be paid for separately. The sawing of concrete pavement shall be paid for as "Saw Concrete".

550-P01 FINAL SURFACE FINISH: Standard Spec. 550.04 J.6 only applies to areas that will not receive PCC Pavement Grinding.

570-P01 CONCRETE SAWING: The bid item "Saw Concrete" shall include all equipment, materials, and labor necessary to saw existing concrete. Sawing shall create a clean, vertical, full-depth cut along the entire length of the joint to facilitate material removed.

570-P02 CONCRETE PAVEMENT REPAIR: An additional 20% has been added to the quantities for "11 IN Conc Pvmt Repair-Full Depth-Doweled", "10 IN Conc Pvmt Repair-Full Depth-Doweled", "Saw Concrete", "Dowel Bars", "Doweled Contraction Join Assembly", "Spall Repair-Partial Depth" and "Curb and Gutter – Type I" to be used as directed by the Engineer.

570-P03 TRANSVERSE AND LONGITUDINAL JOINT SEALING: All costs for labor, materials, and equipment to form, clean, and seal smooth doweled transverse joints and longitudinal joints in the repair areas as per standard drawing 550-2 and 550-3 shall be included in the unit price bid for Full Depth Repair Items.

570-P04 PCC PAVEMENT GRINDING: All slurry or residue from the pavement grinding operation shall be contained, become property of the contractor, and disposed of properly. This slurry or residue shall not be placed along the ditch inslope, along the curb and gutter, or in the storm sewer.

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NOTES

570-P05 GRINDING TRANSITIONS**:** Grinding of mainline pavement shall transition as required from the mainline edge to provide drainage and an acceptable ride surface as per standard specification 570.04 E. Slight grinding of the curb and gutter and turning lanes may be required to maintain proper cross slope and positive drainage. An additional grinding pass may be required at intersections to achieve an acceptable ride surface as per standard specification 570.04 E.

570-P06 CONTRACTOR MIX DESIGNS: The Contractor shall submit a concrete mix design for each class of concrete required for this project. The mix design shall be submitted a minimum of 7 working days prior to concrete placement.

The mix designs shall include the following:

a. A list of all ingredients
b. The source of all materials
c. Gradation of the aggregates
d. The absorption of the aggregates
e. The SSD bulk specific gravity of the aggregates
f. The specific gravity of the pozzolon
g. Results of 7 day compressive strength tests
h. Water/Cement Ratio
i. Mixture Proportions:
    1 Water - lb/CY
    2 Cement - lb/CY
    3 Fly ash - lb/CY
    4 Coarse Aggregate - lb/CY
    5 Intermediate Aggregate - lb/CY
    6 Fine Aggregate - lb/CY
    7 Air content %
    8 Air-entraining admixture - fl oz.
    9 Water-reducing admixture – fl oz.

704-P01 TRAFFIC CONTROL: Traffic control shall be in accordance with the layouts in Section 100 of these plans. The layouts for construction signing for various lane closures show the required devices for each phase.

Type 1 Barricades shall be placed in front of each open area or as directed by the engineer. The barricades shall not encroach onto the traffic lane. The quantities provide for 30 Type 1 Barricade locations per lane closure.

A lane closure cannot be set up without active work taking place in the closure. The Engineer will determine if a lane closure is warranted.

704-P02 TRAFFIC CONTROL PHASING: The traffic control details, as indicated on the plans, have been developed on the basis that the Concrete Pavement Repair and Dowel Bar Retrofit portions of this project will be constructed in multiple phases to provide access to local businesses along the project and accommodate the traveling public. Access to businesses must be maintained at all times during construction. Construction of adjacent phases will not be allowed until required work is complete on prior phases. These plans have been developed based on 2 phases for mainline and 4 phases for each intersection.

Phase 1: Consists of right lane closures for both the east and west bound traffic on Highway 2. Work during this phase shall be completed within the right lane closure. During phase 1, phases 1 & 2 for the Intersection traffic control shall be utilized to complete the Intersection work. For the I-29/Highway 2 on/off ramps the right portion of the ramp will be closed for work to be performed.

Phase 2: Consists of left lane closures for both the east and west bound traffic on Highway 2. Work during this phase shall be completed within the left lane closure. During phase 2, phases 3 & 4 for the Intersection traffic control shall be utilized to complete the Intersection work. For the I-29/Highway 2 on/off ramps the left portion of the ramp will be closed for work to be performed.

For both phases, the overpass of I-29 will have a right lane closure to provide a buffer space for construction operations.

704-P03 MAINTENANCE & PROTECTION OF TRAFFIC FOR CONCRETE PAVEMENT REPAIRS: The layouts for construction signing for various lane closures show the required devices for each situation. In full depth removal areas vertical panels shall be spaced at 10 feet on centerline roadway until the concrete has been replaced. A minimum of two vertical panels shall be used at each full depth removal area. This does not allow the contractor to leave the full depth repairs open for a longer period of time, work must be completed in an acceptable time frame as directed by the Engineer.

Type I Barricades shall be placed in front of each open area or as directed by the Engineer. The barricades shall not encroach onto the traffic lane.

704-P04 TRAFFIC CONTROL SUPERVISOR: Section 704.03U of the North Dakota Standard Specifications shall be used on this project.

748-P01 CURB & GUTTER – TYPE I: Tie bars will be drilled approximately one half the length of the bar and epoxied into place where existing concrete pavement abuts new curb & gutter. The tie bars shall be #3 -18 inches in length with 3' center to center spacing. All costs to be included in the price bid for "CURB & GUTTER – TYPE I."

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

750-P01 SIDEWALK CONCRETE: Sidewalk concrete is for the installation of ADA ramps at the locations shown on the plans. The ramps shall be constructed as per Standard Drawing D750-2 & D750-3. All sidewalk replacement areas shall have a No. 3 deformed reinforced bar placed 24" on center both longitudinally and transversely. The bar shall be six (6) inches shorter than the width of the slab and placed accurately at one-half the depth of the slab. Plastic chairs will be used. At sidewalk replacement areas, the Contractor shall excavate material to accommodate the proposed aggregate base, strip and salvage the existing topsoil, perform minor reshaping to match the proposed sidewalk or driveway elevation, dispose of excess excavation, replace the topsoil and seed. The cost of labor, equipment and materials to perform the following work shall be included in the price bid for "Sidewalk Concrete."

762-P01 PAVEMENT MARKING: Permanent pavement marking shall be applied within 14 days following all PCC pavement grinding.

762-P02 PAVEMENT MARKING GROOVED: Prior to applying pavement markings, the Contractor shall clean the roadway surfaces by sandblasting, shotblasting, grinding, or waterblasting, to remove all surface treatments, or existing pavement markings. The item "Pavement Marking Groove" shall be constructed according to NDDOT specification 762.04 B6 with the following modification: Groove depth 50 mils ± 5 mils.

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NOTES

SECTION 150

772-P01 REMOVE PULL BOX: The area of the removed pull boxes shall be backfilled with earth and compacted. The disturbed areas shall be seeded. The removed pull boxes shall be disposed of outside the right of way at the contractor's expense. The cost to remove the pull boxes, backfill, compact, and seed shall be included in the price bid for "Revise Traffic Signal System".

772-P02 VIDEO DETECTION SYSTEM AND SPARE EQUIPMENT: The video detection system shall be Autoscope Encore manufactured by Econolite.

A video monitor shall be included in the controller cabinet for viewing the video detection.

The contractor shall provide one spare video detection camera, one video detection processor, and one camera interface panel for each video detection system.

The cost of the Video Detection System, video monitor, and spare equipment shall be included in the price bid for the item "Revise Traffic Signal System".

This document was originally issued and sealed by Blaine D. Johanneson, Registration Number PE-5038, on 08/27/13 and the original document is stored at the North Dakota Department of Transportation.

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
202	0112	REMOVAL OF CONCRETE	SY	96	96
202	0119	SAW CONCRETE	LF	106	106
202	0130	REMOVAL OF CURB & GUTTER	LF	330	330
302	0100	SALVAGED BASE COURSE	TON	304	304
570	0095	SAW CONCRETE	LF	1,975	1,975
570	0210	PCC PAVEMENT GRINDING	SY	42,641	42,641
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	187	187
570	0424	DOWEL BARS	EA	1,294	1,294
570	0431	DOWEL BAR RETROFIT-TYPE B	EA	9,639	9,639
570	0709	11IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	235	235
570	0710	10IN CONC PVMT REPAIR-FULL DEPTH-DOWELED	SY	354	354
570	0966	RANDOM PCC CRACK CLEANING & SEALING	LF	221	221
570	1512	SPALL REPAIR-PARTIAL DEPTH	SF	3,373	3,373
570	1600	EPOXY COATED DEFORMED BARS	EA	226	226
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	720	720
704	1000	TRAFFIC CONTROL SIGNS	UNIT	4,223	4,223
704	1050	TYPE I BARRICADE	EA	30	30
704	1052	TYPE III BARRICADE	EA	25	25
704	1060	DELINEATOR DRUMS	EA	150	150
704	1067	TUBULAR MARKERS	EA	200	200
704	1072	FLEXIBLE DELINEATORS	EA	9	9
704	1081	VERTICAL PANELS-BACK TO BACK	EA	50	50
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2
704	4011	PORTABLE CHANGEABLE MESSAGE SIGN	EA	1	1
708	1540	INLET PROTECTION-SPECIAL	EA	40	40
722	6160	ADJUST INLET	EA	1	1
748	0140	CURB & GUTTER-TYPE I	LF	330	330
750	0100	SIDEWALK CONCRETE	SY	107	107
750	2115	DETECTABLE WARNING PANELS	SF	144	144
762	0100	PAVEMENT MARKING GROOVE	LF	13,345	13,345
762	0103	PVMT MK PAINTED-MESSAGE	SF	576	576

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
762	1104	PVMT MK PAINTED 4IN LINE	LF	9,043	9,043
762	1106	PVMT MK PAINTED 6IN LINE	LF	364	364
762	1108	PVMT MK PAINTED 8IN LINE	LF	1,118	1,118
762	1124	PVMT MK PAINTED 24IN LINE	LF	380	380
762	1305	PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	2,720	2,720
762	1309	PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	LF	2,979	2,979
772	2904	REVISE TRAFFIC SIGNAL SYSTEM	EA	2	2

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	10	1

Scope of Work: Concrete Pavement Repair, Dowel Bar Retrofit, Video Detection, Grinding, ADA and Incidentals
Current ADT: 15,581 ESALS: 1198

302 Salvaged Base Course

- 75 tons has been provided for the inside shoulder of the NW Loop from Sta 4+00 to 0+00
- An additional 200 tons has been provided to fill in low areas on the existing aggregates along the concrete on the I-29 on & off ramps

570 Dowel Bar Retrofit – Type B

- No dowel bars will be placed in the turn lanes
- Bars will be placed in the 4-12' lanes with the addition of the 12' third driving lane from Sta 989+05 WB to Sta 1010+48 WB and Sta 1011+48 WB to Sta 1020+57 WB
- Refer to Section 80 sheets for locations of dowel bar retrofit in ramp area

570 PCC Pavement Grinding

- 4-12' lanes with the addition of the 12' third driving lane from Sta 989+05 WB to Sta 1010+48 WB and Sta 1011+48 WB to Sta 1020+57 WB
- 1' feather pass into gutter line and turn lanes
- Grinding will not take place on turn lanes
- Full width grinding through N 47th Street Intersection: Sta 1010+48 to Sta 1011+48, 102' wide
- Refer to Section 80 sheets for grinding areas on ramps

704 Flagging

Mainline Repairs
- CPR Repairs: 10 Days x 12 Hrs = 120 Hrs
- Dowel Bar Retrofit: 12 Days x 12 Hrs = 144 Hrs
- Grinding: 10 Days x 12 Hrs = 120 Hrs

Ramp Repairs
- CPR Repairs: 12 Days x 12 Hrs = 144 Hrs
- Dowel Bar Retrofit: 8 Days x 12 Hrs = 96 Hrs
- Grinding: 4 Days x 12 Hrs = 48 Hrs

Mainline Intersection Work
- 4 Days x 12 Hrs = 48 Hrs

Total Flagging Hrs = **720 Hrs**

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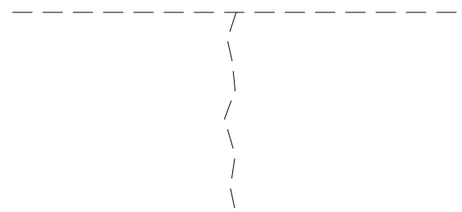
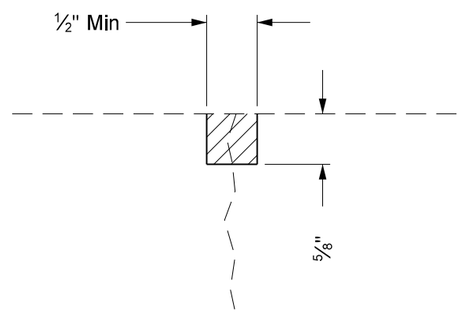
Basis of Estimate

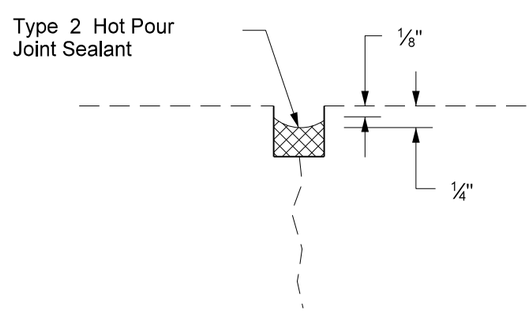
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20	1



Existing Random Crack



Random Crack Sawing



Random Crack Sealing

Note: See Standard Drawing D-550-2 and D-550-3 for Transverse and Longitudinal Joint Details.

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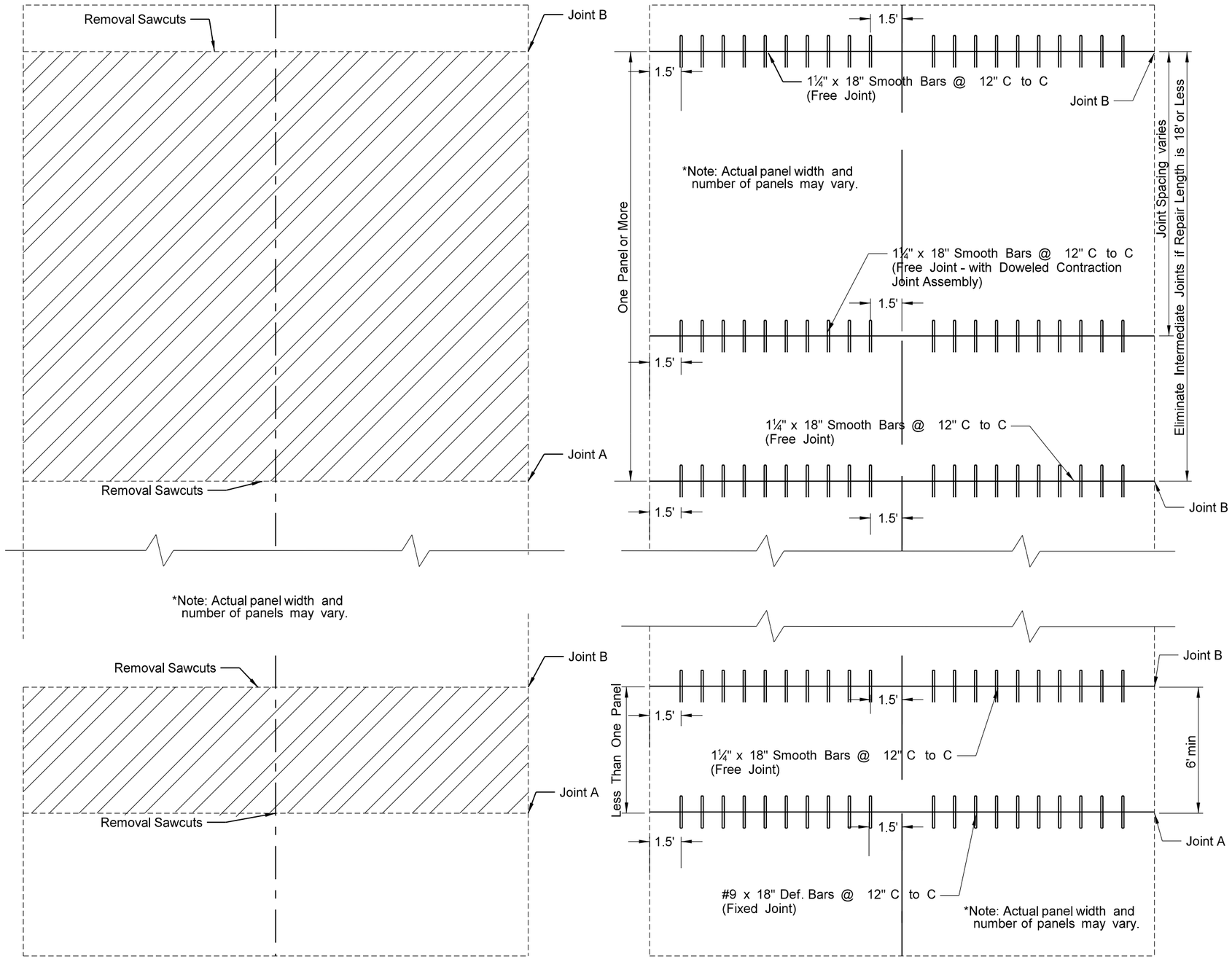
Joint and Random Crack Cleaning and Sealing

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20	2



PCC Removal

Notes:

1. Joint A (Fixed Joint) shall be the new joint with the shortest distance to the next transverse joint or working random crack. The saw cut will be made at 90° to the centerline. The deformed bars shall be placed perpendicular to the face of the saw cut.
2. Joint B (Free Joint) shall be the new joint with the greatest distance to the next transverse joint or working random crack. The smooth bars shall be installed within the tolerances shown on the "Dowel Bar Placement- Full Depth Repair" detail sheet.
3. When the distance to the next transverse joint or working random crack is equal for both new joints, the free joint (joint B) shall be placed on the approach side of the repair.
4. If greater than one panel in length, a Doweled Contraction Joint Assembly shall be installed at transverse contraction joints.
5. In repair areas which are not the entire roadway width, joints shall be placed to match the existing pavement wherever possible.
6. The joints at the beginning and end of a full depth repair section can be either a Joint B or Joint A depending on the existing joint.

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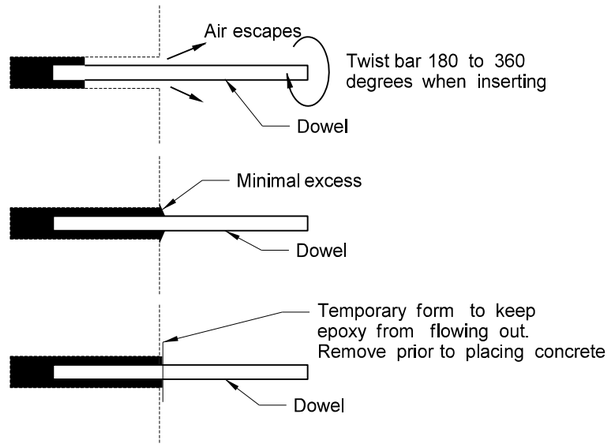
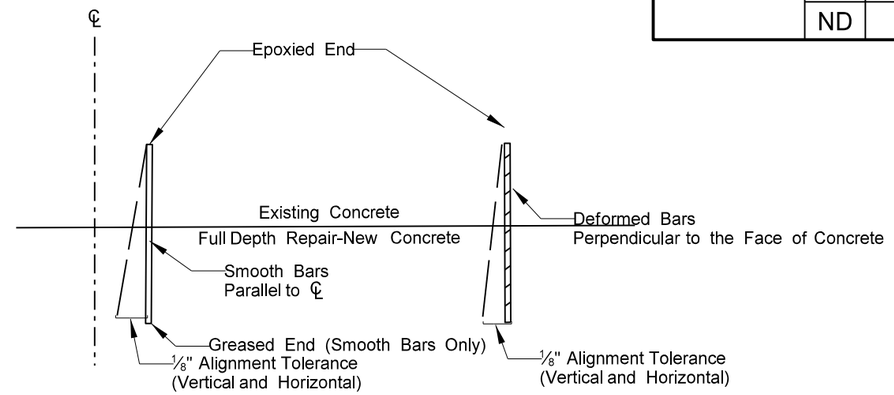
Removal of Concrete & Dowel Bar

Placement - Full Depth Repair
Straight Joint

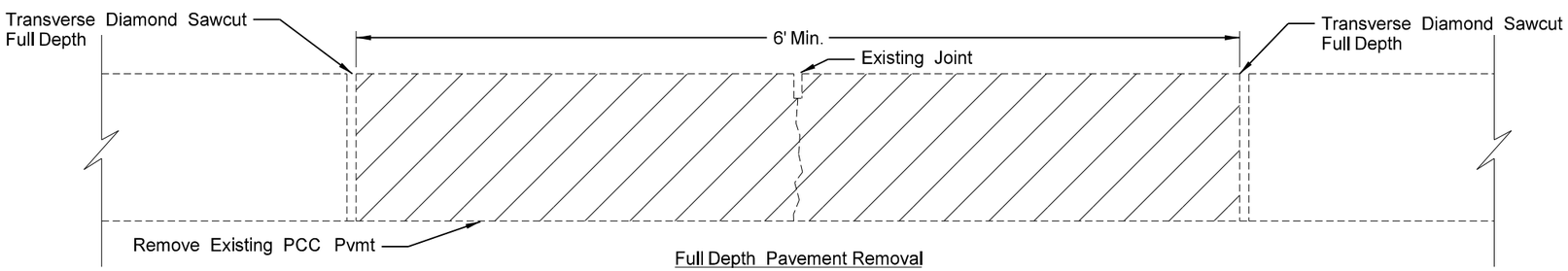
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20	3



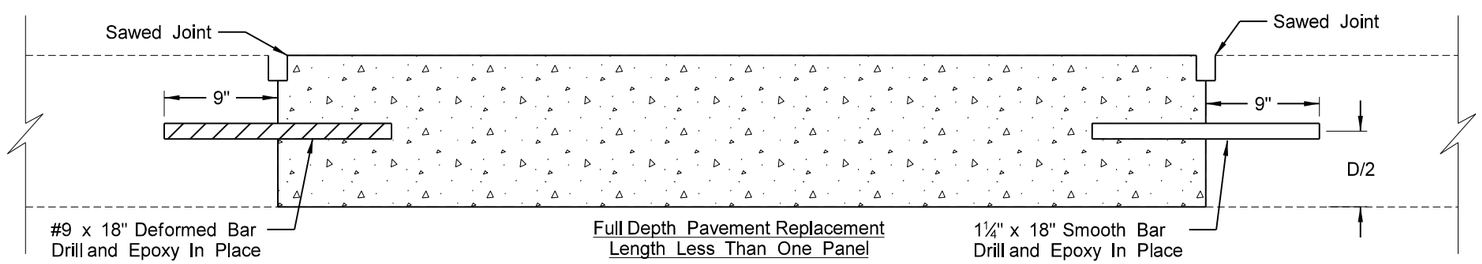
Dowel & Epoxy Installation
(Smooth or Deformed Bars)



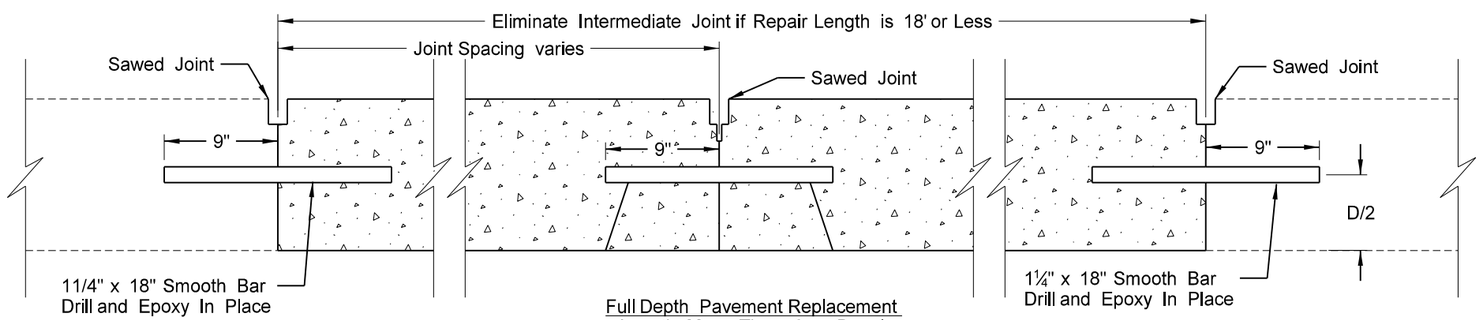
Dowel Alignment Tolerance



Full Depth Pavement Removal



Full Depth Pavement Replacement
Length Less Than One Panel



Full Depth Pavement Replacement
Length More Than One Panel

Notes:

1. Variables:
   D= Depth of Pavement
2. Removal and replacement also applies to full depth repairs at cracks.
3. Place smooth dowel bars in repair joint which is farthest away from the next transverse joint or working random crack. If distance is equal for both repair joints, place smooth dowels on approach side of patch.

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Concrete Pavement Repair - Full Depth

Non - Reinforced PCC Pavement

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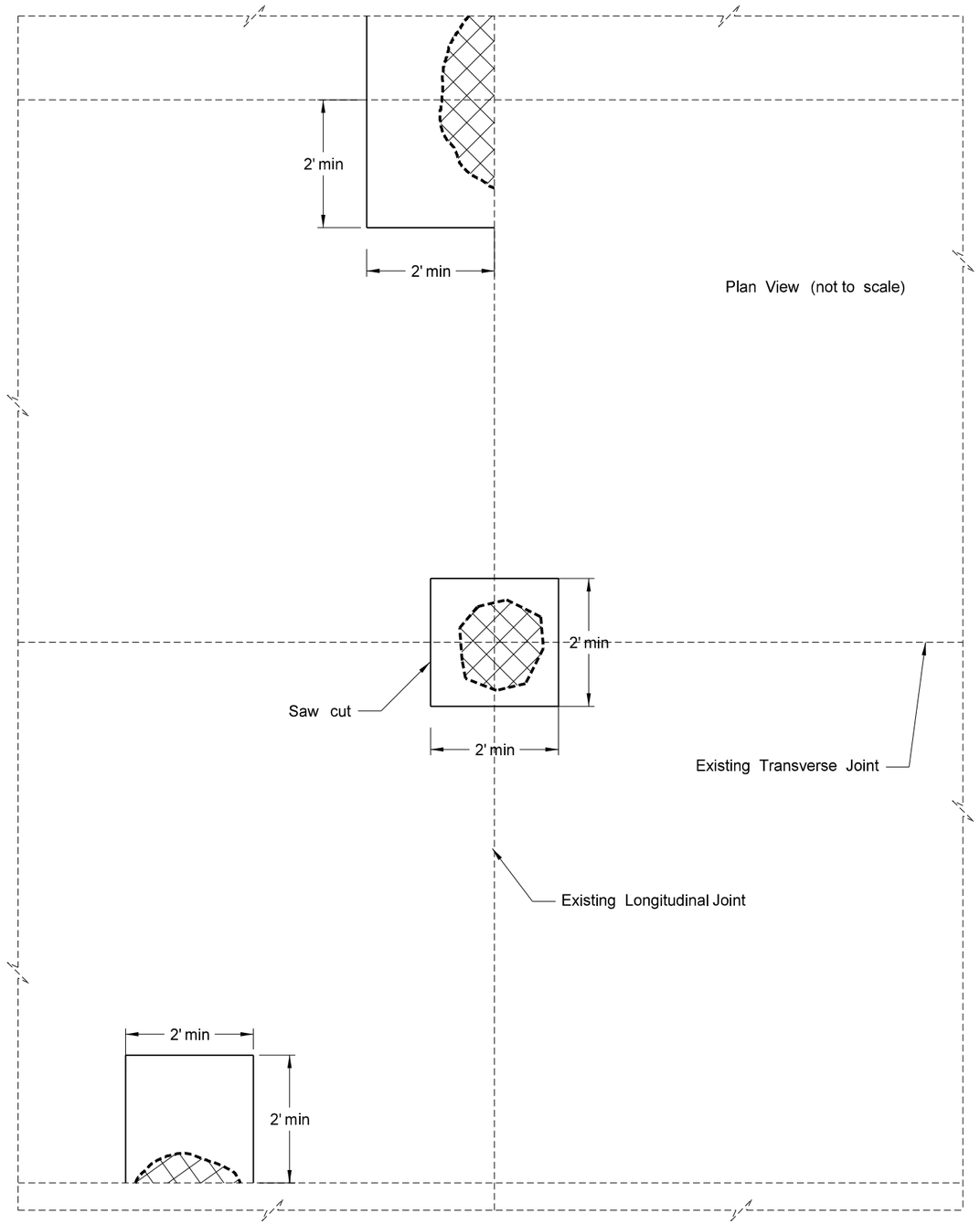
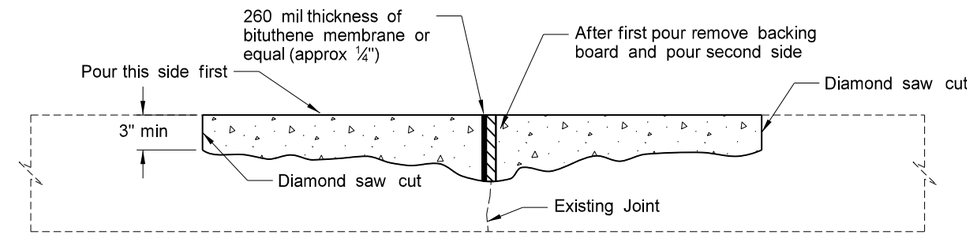
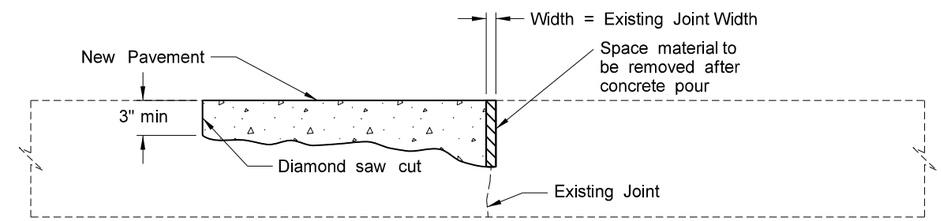
ND	S-NHU-6-002(111)354	20	4



Spall Repair



Cross Section - Repair Area on Both Sides of the Joint



Cross Section - Repair Area on One Side of the Joint

Notes:

1. Existing concrete shall be removed with a chipping hammer or other methods as approved by the engineer. A milling machine may be used, as approved by the engineer, but sawing and chipping will still be required to finish the removal.

2. Grout shall be applied to the sides, excluding joint faces, and bottom of the repair area.

3. A spacer material, as approved by the engineer, shall be placed on the joint face to maintain the joint during repair. The material shall have the capability of maintaining a width equal to that of the existing joint, and being easily removed after the pour. In the case of repair on both sides of the transverse joint each side shall be poured separately.

4. In the case of repair on both sides of the joint, if deemed necessary by the engineer, a bituthene waterproofing membrane will be placed on the face of the newly poured joint in lieu of the spacer material prior to the concrete pour. The material shall be a minimum of 260 Mil (approximately ¼") thick or equal to the width of the existing joint, whichever is larger. The material shall be cut to fit over the entire face of the existing joint. The material shall be placed to provide for expansion and to prevent water from entering the existing joint through the sides or bottom. The material shall be hand pressed into place to conform to the face of the existing joint. In the case of repair on both sides of the joint a backer board material, as approved by the engineer shall be placed over the bituthene material on the side facing the second pour prior to the 2nd pour. The backer board shall be removed after the repair is completed.

   In the case of repair on one side of the joint, if deemed necessary by the engineer, a bituthene waterproofing membrane will be placed on the face of the existing joint in lieu of the spacer material and prior to the concrete pour.

5. All joints shall be sealed according to NDDOT specifications.

6. All costs for cleaning and sealing joints and any bituthene installment shall be covered under the bid item " Spall Repair - Partial Depth."

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Spall

Concrete Removal Area

Spall Repair Detail

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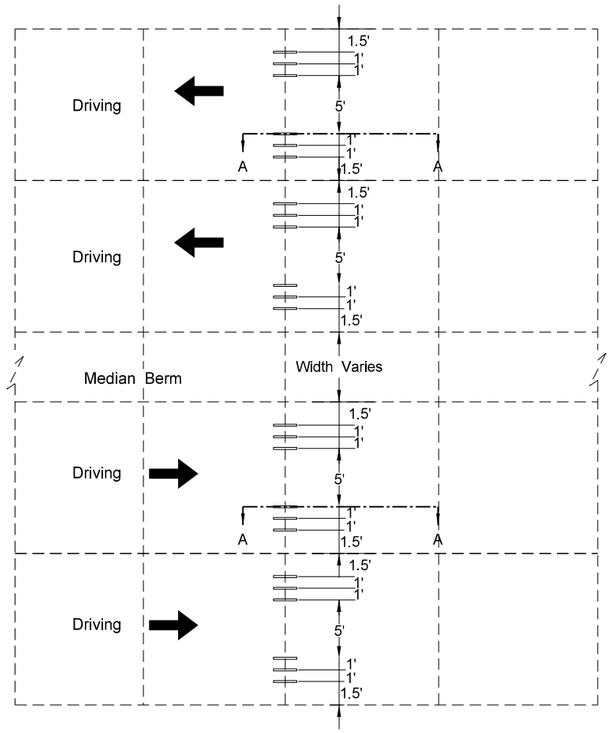
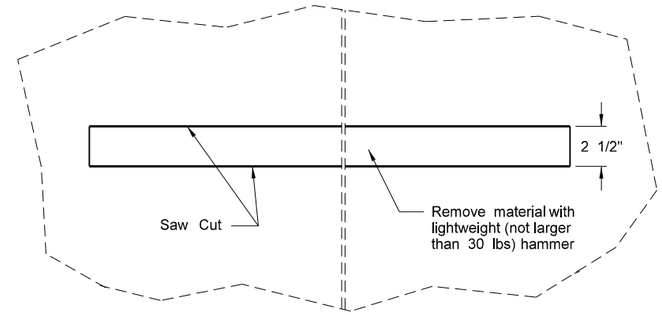
ND	S-NHU-6-002(111)354	20	5

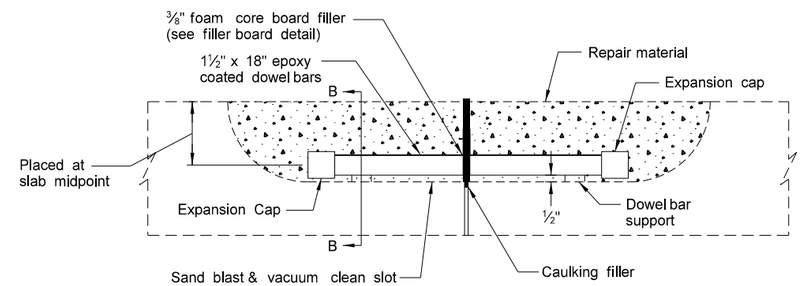


Retrofit Dowel Bar Spacing*

*Refer to Section 80 drawings for placement of Dowel Bar Retrofit in ramp areas.



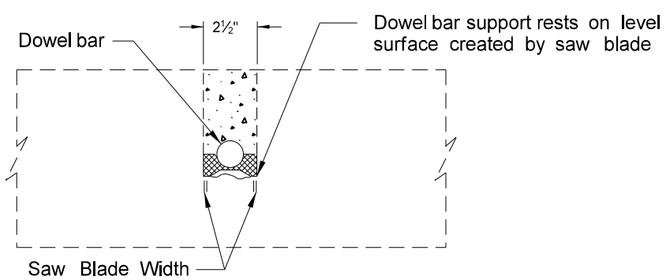
Plan View Dowel Bar Retrofit Slot Material Removal



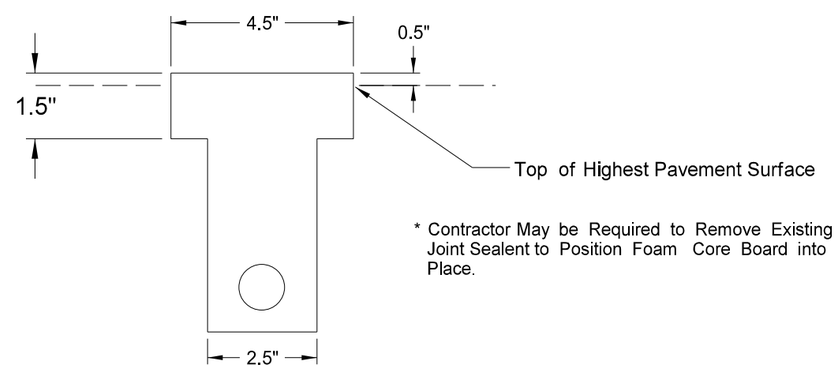
Section A-A

Dowel Bar Installation Detail

NOTE: Repair material shall be placed above the existing PCC pavement (a maximum of ¼".)



Section B-B



* Contractor May be Required to Remove Existing Joint Sealent to Position Foam Core Board into Place.

Filler Board Detail

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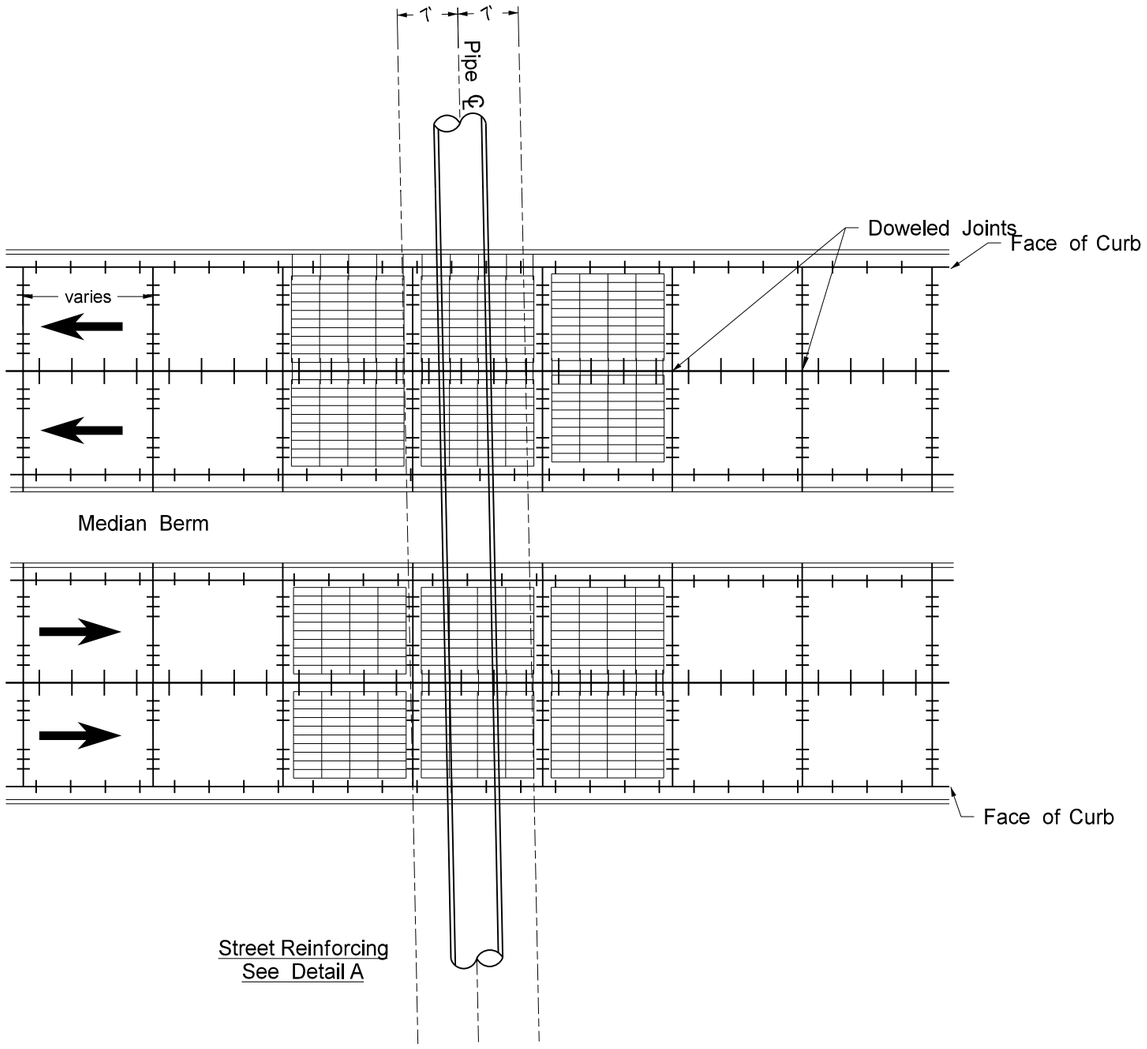
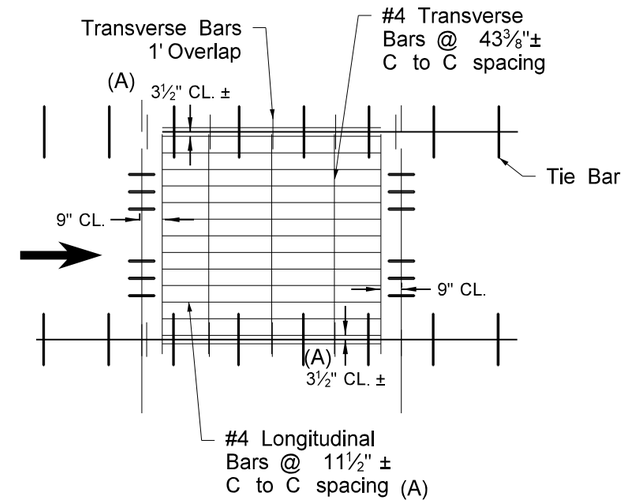
Retrofit Dowel Bar Installation Detail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20	6





Detail A
Reinforcing Layout

NOTES:

1. Place reinforcing steel above dowel bars, above longitudinal centerline tie bars, and under shoulder tie bars.
2. A 1 foot minimum overlap of transverse reinforcing steel across the longitudinal tied joints shall be provided.
3. Transverse reinforcing steel shall be gapped across keyed joints a minimum of 6 inches (3 inches on each side of joint).
4. The complete panel shall be reinforced if any part of the panel lies within 7 feet of the pipe centerline or box culvert.
5. All costs to furnish and install the reinforcing steel as shown shall be included in the price bid for concrete pavement items.

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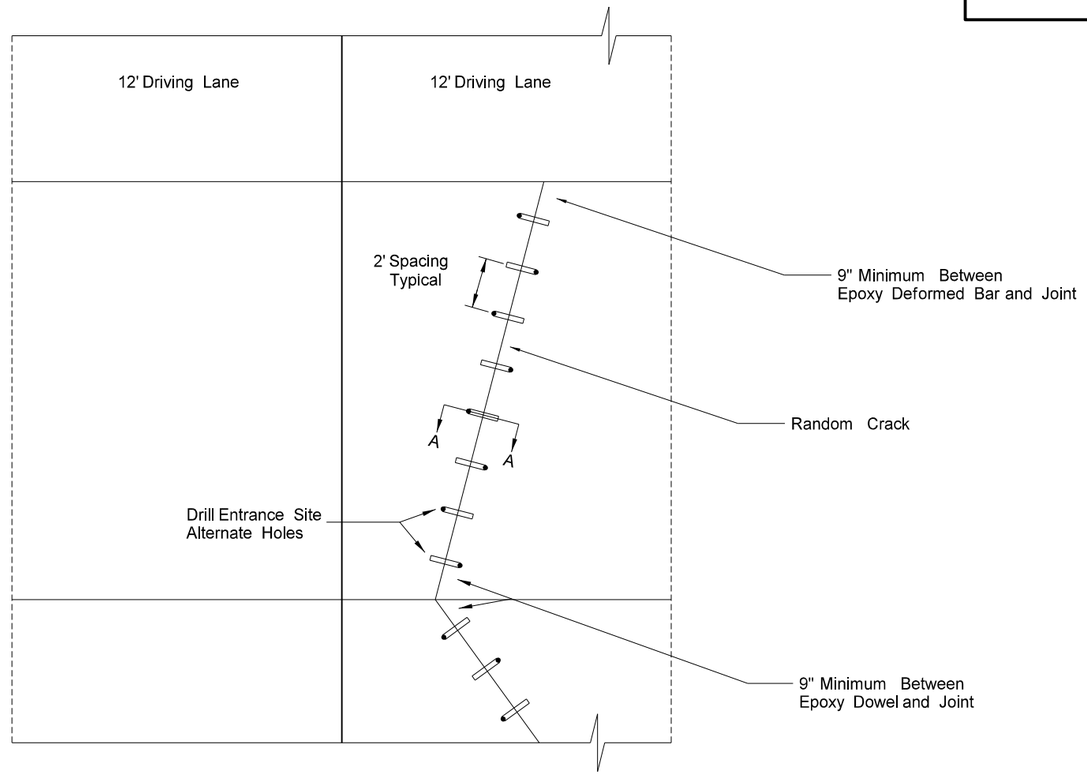
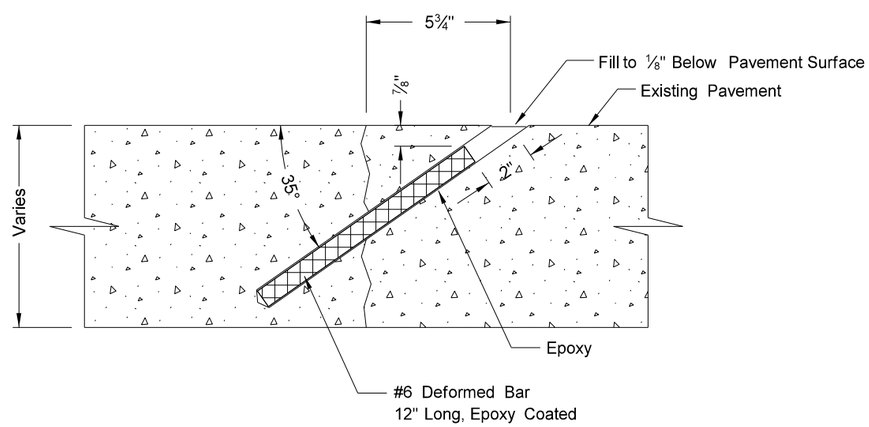
Pavement Reinforcing Detail

At Pipe Locations

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20	7





SECTION A-A

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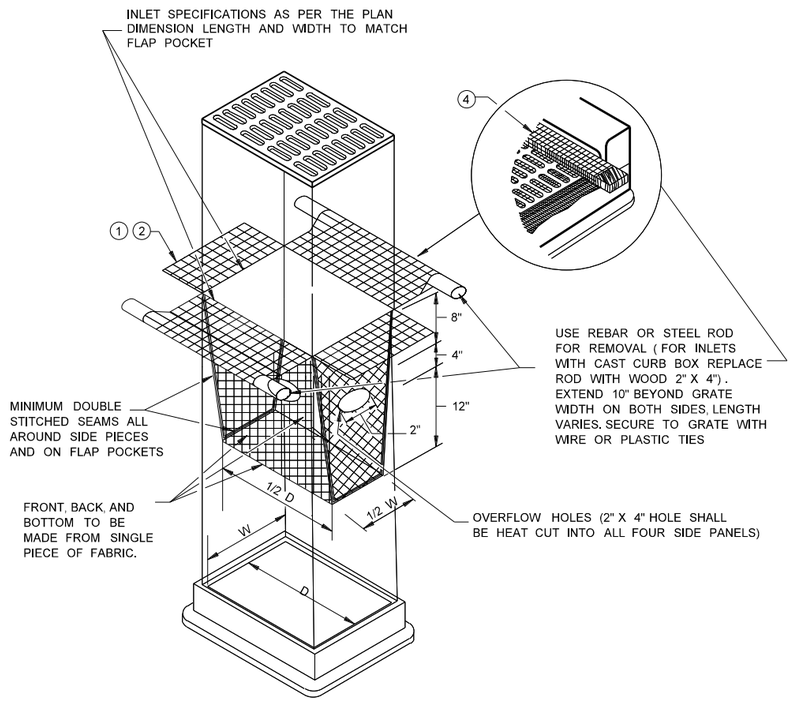
Stitching Detail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20	8



FILTER BAG INSERT (3)
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)

NOTES:

(1) ALL GEOTEXTILE USED FOR INLET PROTECTION SHALL MEET THE REQUIREMENTS OF D1.

(2) FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED SHALL EXTEND A MINIMUM OF 10 INCHES AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

(3) INSTALLATION NOTES:
DO NOT INSTALL FILTER BAG INSERT IN INLETS SHALLOWER THAN 30 INCHES, MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. THE INSTALLED 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.

(4) FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2 INCH X 4 INCH OR USE A ROCK SOCK OR SAND BAGS IN PLACE OF THE FLAP POCKETS.

EROSION PROTECTION AT INLETS

INLET PROTECTION - SPECIAL

INLET BASKET INSERT 40 EACH

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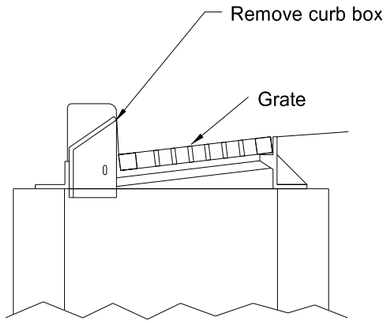
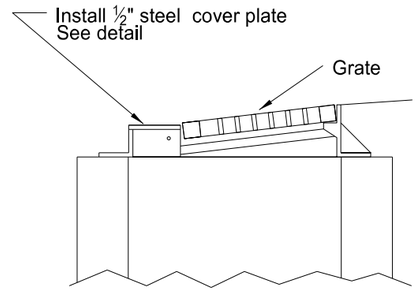
Sediment Protection Detail (BMP's)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	20	9



Section showing inlet



Section showing modified inlet

NOTES:

Contractor shall verify in the field the length of need for steel plate.

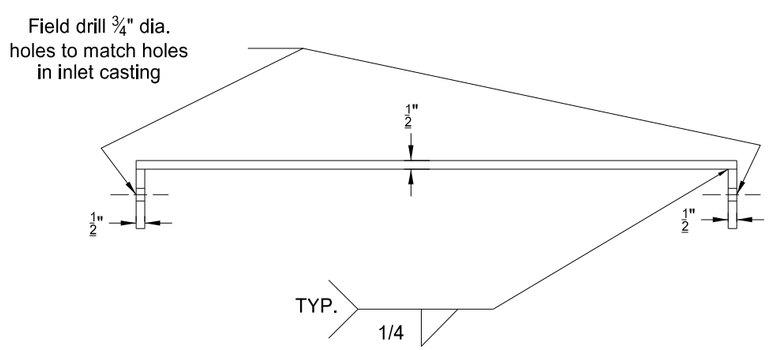
Install cover plate using two $1\frac{1}{16}$" dia. x $2\frac{1}{2}$" bolts with lockwashers, washers, and nuts.

Steel used for the cover plates shall conform to AASHTO M 183.

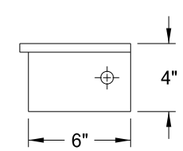
Fabrication and installation of the cover plates shall be included in the price bid for the item "Adjust Inlet".

Work to be performed for ADA location # 5
Station 1011+81 Rt
47th Street

Top view



Front view



Side view

Cover Plate Details

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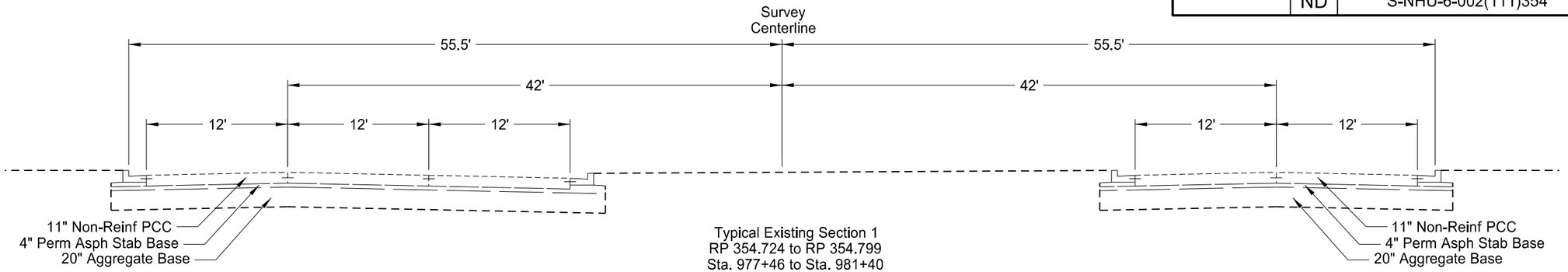
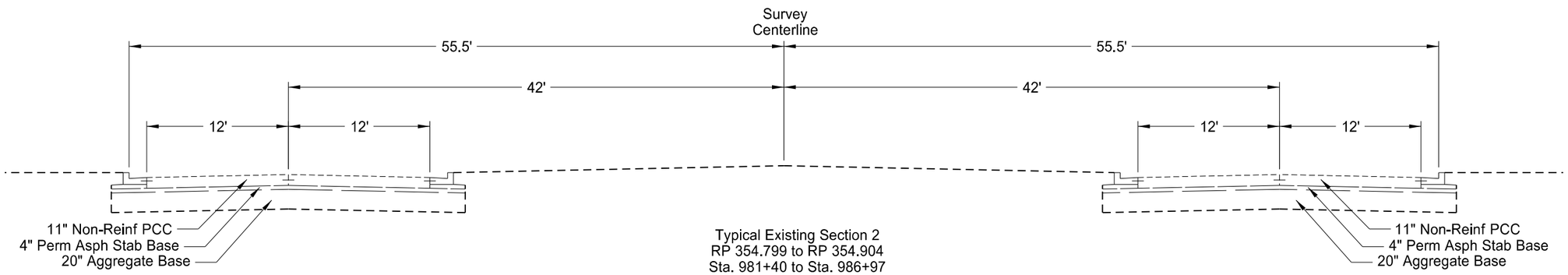
Cover Plate Details

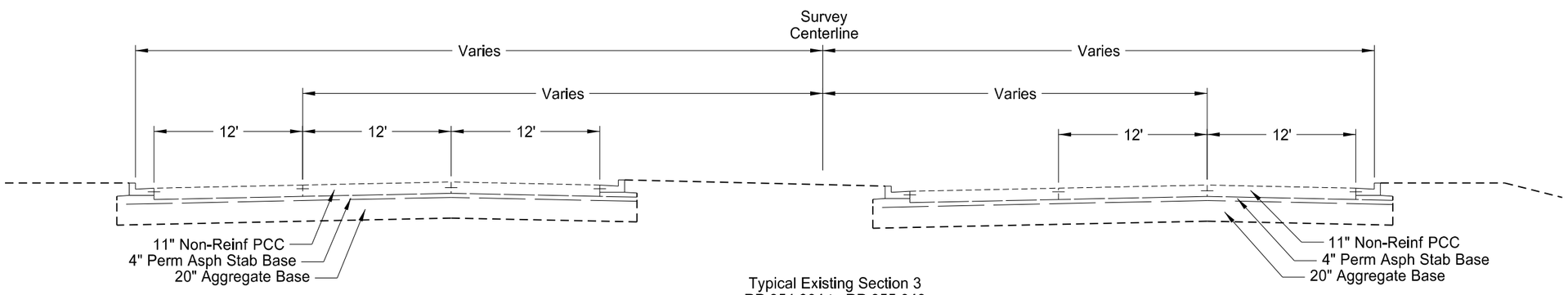
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	30	1



Typical Existing Section 1
RP 354.724 to RP 354.799
Sta. 977+46 to Sta. 981+40



Typical Existing Section 2
RP 354.799 to RP 354.904
Sta. 981+40 to Sta. 986+97



Typical Existing Section 3
RP 354.904 to RP 355.043
Sta. 986+97 to Sta. 994+29

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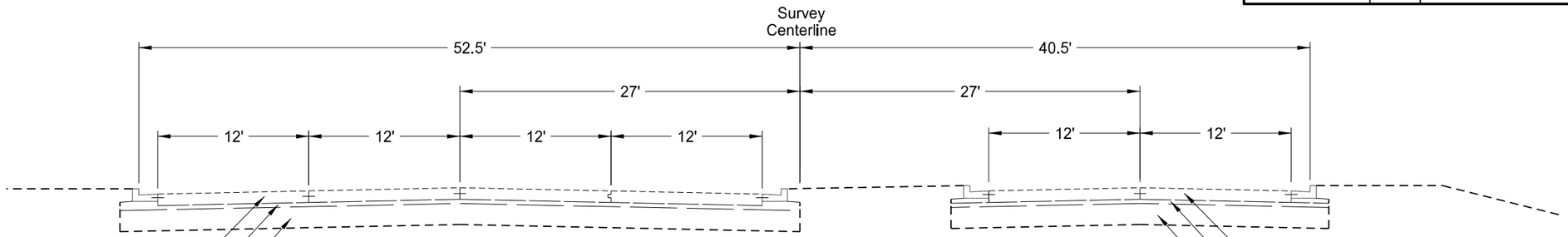
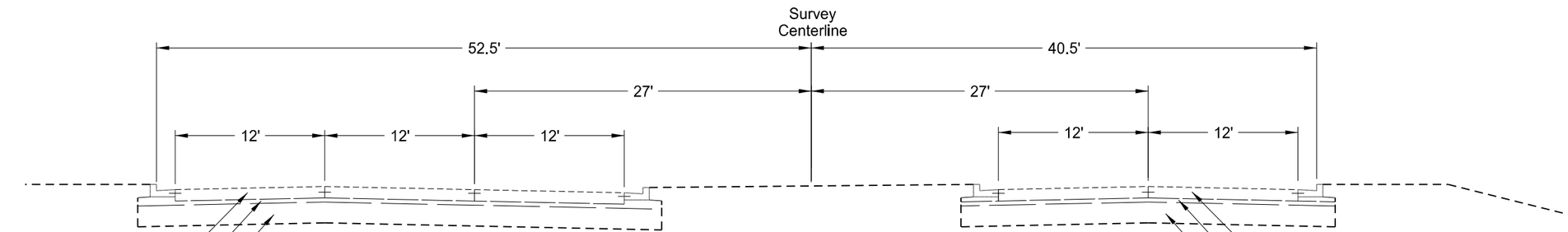
Typical Existing Sections

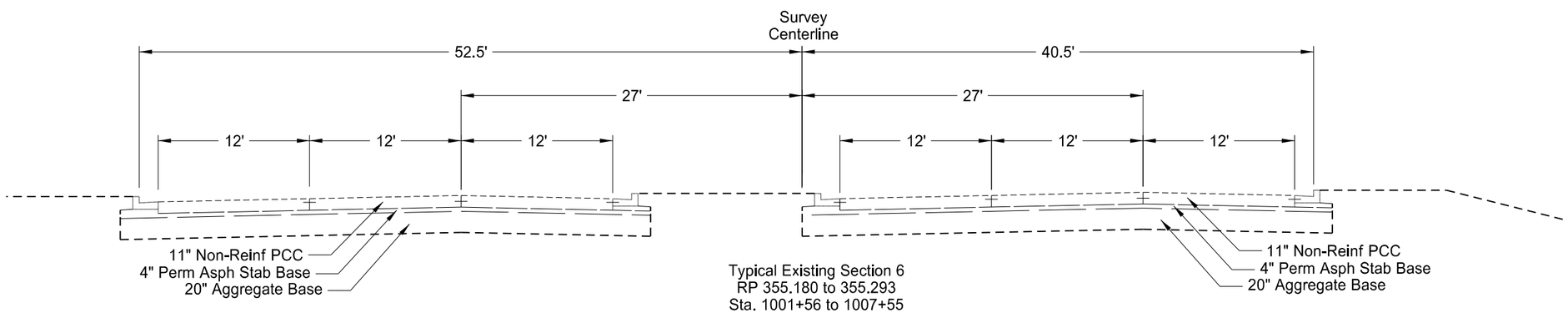
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	30	2



Typical Existing Section 4
RP 355.043 to 355.129
Sta. 994+29 to Sta. 998+84



Typical Existing Section 5
RP 355.129 to 355.180
Sta. 998+84 to Sta. 1001+56



Typical Existing Section 6
RP 355.180 to 355.293
Sta. 1001+56 to 1007+55
RP 355.404 to RP 355.479
Sta. 1013+00 to Sta. 1018+00

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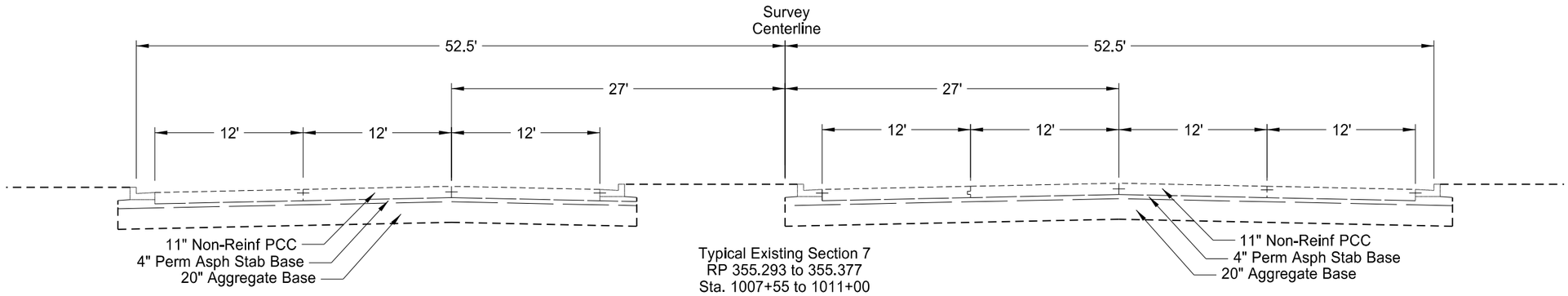
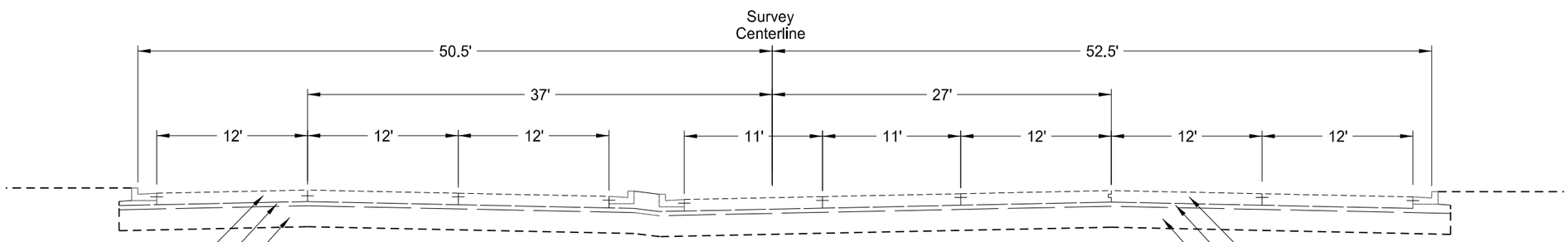
Typical Existing Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	30	3



Typical Existing Section 7
RP 355.293 to 355.377
Sta. 1007+55 to 1011+00



Typical Existing Section 8
RP 355.377 to RP 355.404
Sta. 1011+00 to Sta. 1013+00

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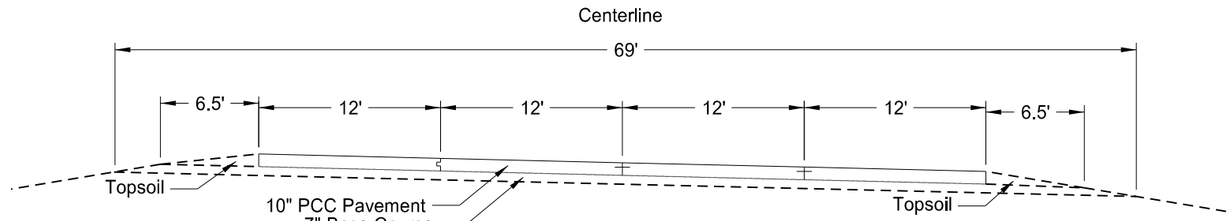
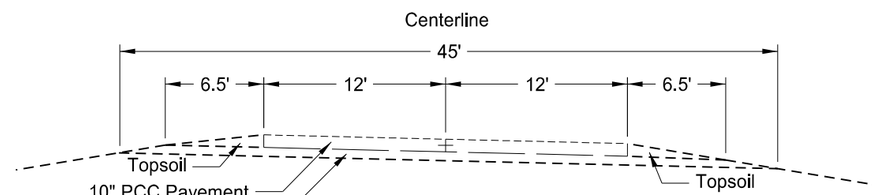
Typical Existing Sections

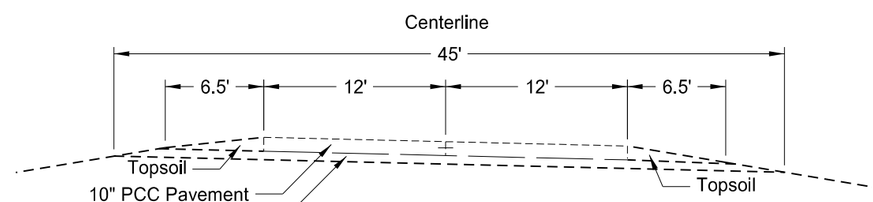
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	30	4



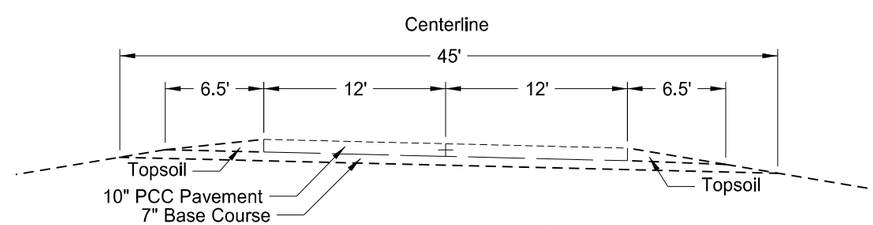
Typical Existing Section 9
South East Ramp
Sta. 1+81 to Sta. 9+00



Typical Existing Section 10
South East Ramp
Sta. 9+00 to Sta. 9+27



Typical Existing Section 11
South West Ramp
Sta. 1+42 to Sta. 10+00



Typical Existing Section 12
North West Ramp
Exit Ramp Sta. 10+35 to 18+74

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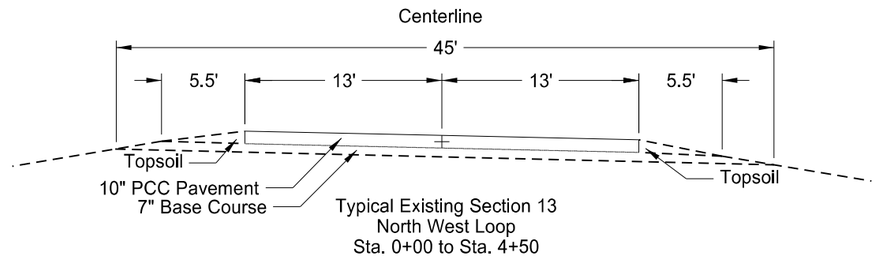
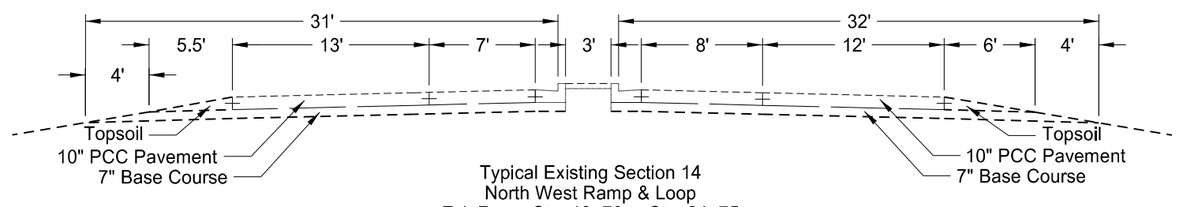
Typical Existing Sections

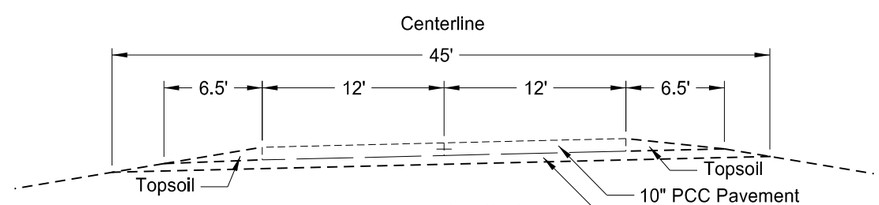
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	30	5



Typical Existing Section 13
North West Loop
Sta. 0+00 to Sta. 4+50



Typical Existing Section 14
North West Ramp & Loop
Exit Ramp Sta. 18+76 to Sta. 24+75
Entrance Loop Sta. 4+50 to Sta. 10+35



Typical Existing Section 15
North East Ramp
Sta. 0+00 to Sta. 12+00

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Typical Existing Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	75	1

Inlet Location	Type of Inlet Protection	Quantity
977+95 0’ Offset	Inlet Baskets	1 EA
981+17 52’ LT	Inlet Baskets	1 EA
981+17 16’ LT	Inlet Baskets	1 EA
981+17 30’ RT	Inlet Baskets	1 EA
981+17 54’ RT	Inlet Baskets	1 EA
987+04 50’ LT	Inlet Baskets	1 EA
987+04 26’ LT	Inlet Baskets	1 EA
987+04 30’ RT	Inlet Baskets	1 EA
987+04 54’ RT	Inlet Baskets	1 EA
993+95 71’ LT	Inlet Baskets	1 EA
993+95 8’ LT	Inlet Baskets	1 EA
993+95 3’ RT	Inlet Baskets	1 EA
993+95 53’ RT	Inlet Baskets	1 EA
997+00 50’ LT	Inlet Baskets	1 EA
997+00 3’ LT	Inlet Baskets	1 EA
997+00 13’ RT	Inlet Baskets	1 EA
997+00 37’ RT	Inlet Baskets	1 EA
1004+15 50’ LT	Inlet Baskets	1 EA
1004+15 10’ LT	Inlet Baskets	1 EA
1004+15 6’ RT	Inlet Baskets	1 EA

Inlet Locaiton	Type of Inlet Protection	Quantity
1004+15 44’ RT	Inlet Baskets	1 EA
1005+10 58’ LT	Inlet Baskets	1 EA
1005+15 10’ RT	Inlet Baskets	1 EA
1010+26 12’ LT	Inlet Baskets	1 EA
1010+26 4’ RT	Inlet Baskets	1 EA
1010+26 75’ RT	Inlet Baskets	1 EA
1010+46 73’ LT	Inlet Baskets	1 EA
1011+57 8’ RT	Inlet Baskets	1 EA
1011+57 16’ RT	Inlet Baskets	1 EA
1014+52 62’ RT	Inlet Baskets	1 EA
1014+78 40’ RT	Inlet Baskets	1 EA
1014+85 118’ LT	Inlet Baskets	1 EA
1015+22 0’ Offset	Inlet Baskets	1 EA
1015+53 15’ LT	Inlet Baskets	1 EA
1015+85 65’ LT	Inlet Baskets	1 EA
1016+55 5’ RT	Inlet Baskets	1 EA
1020+10 10’ LT	Inlet Baskets	1 EA
1020+17 4’ RT	Inlet Baskets	1 EA
1020+38 50’ LT	Inlet Baskets	1 EA
1020+38 39’ RT	Inlet Baskets	1 EA

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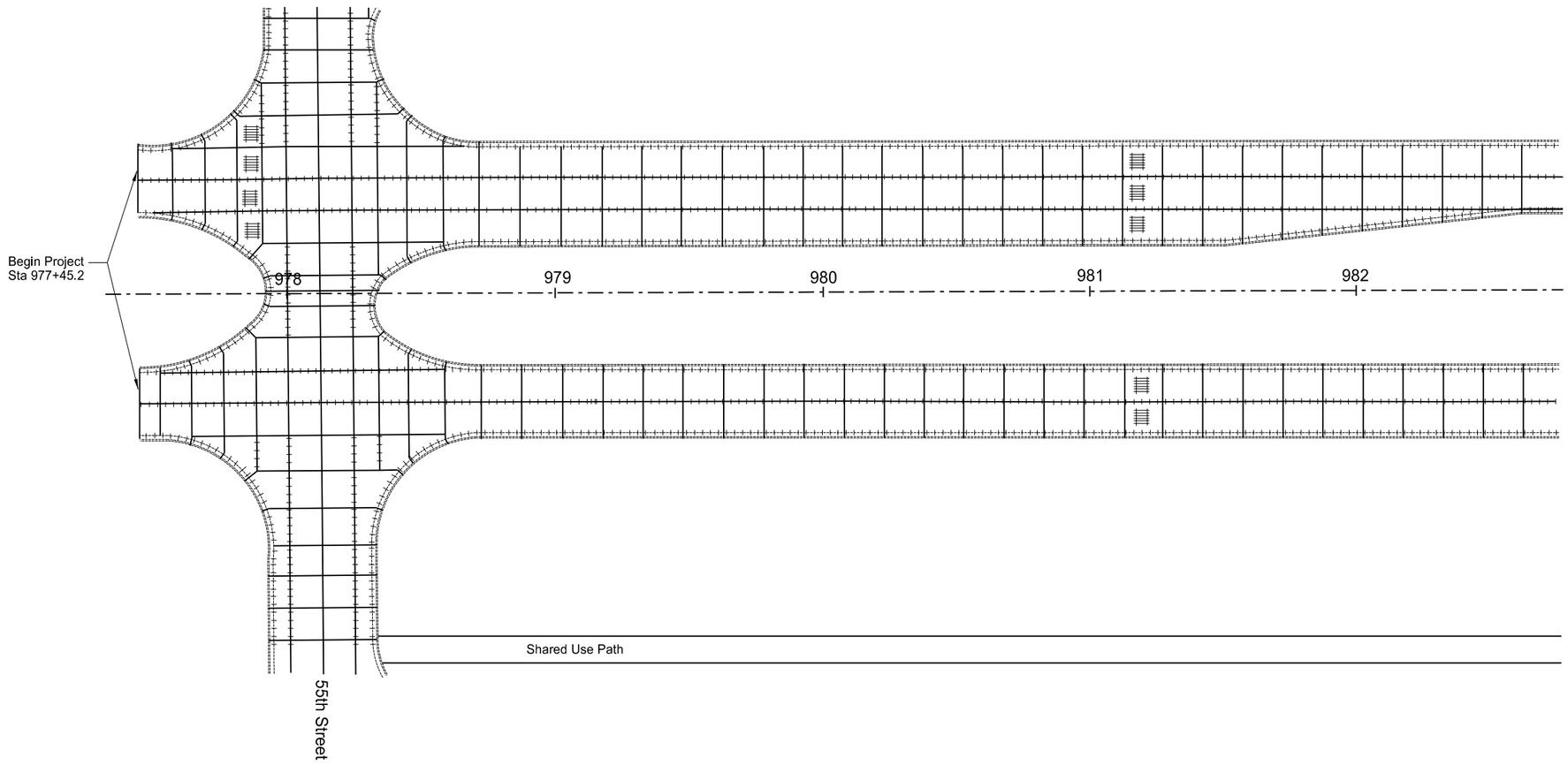
Inlet Protection Locations

Gateway Drive

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	1



Spall Repair Locations (WB)

STA	L		W		SF
978+73 CL	2	x	2	=	4
978+78 CL	2	x	2	=	4
981+65 Lt	2	x	2	=	4

Full Depth Doweled Repair Locations (WB)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)
981+65 Rt	16	x	12	=	21.4	56	20

Curb and Gutter (WB)

STA	LF	
977+50	42	
977+50 Med.	25	

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
977+45	to	982+75	530	48	2827

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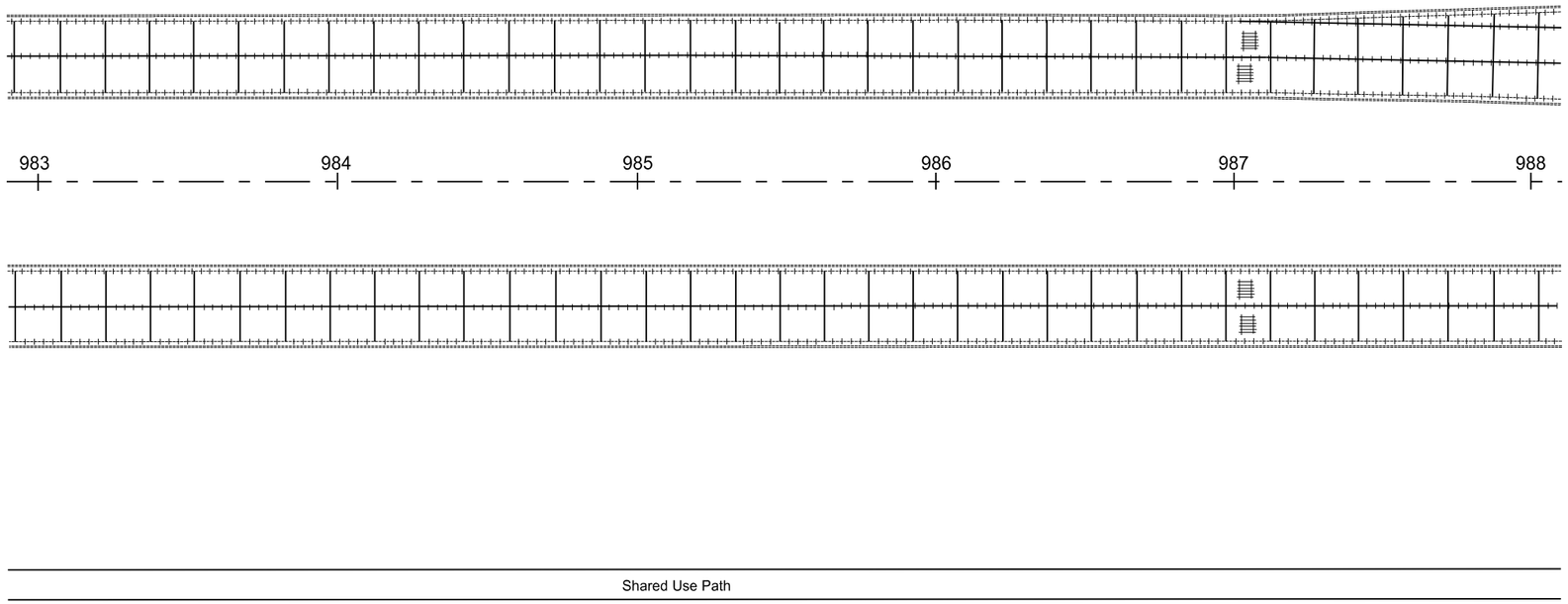
Repair Locations

977+45 to 982+75

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	2



Spall Repair Locations (EB)					
STA	L		W		SF
984+32 Rt.	2	x	2	=	4
986+38 Rt.	3	x	2	=	6
986+78 Rt.	2	x	2	=	4

Grinding Locations					
Sta.		Sta.	Length (FT)	Width (FT)	SY
982+75	to	988+00	525	48	2800

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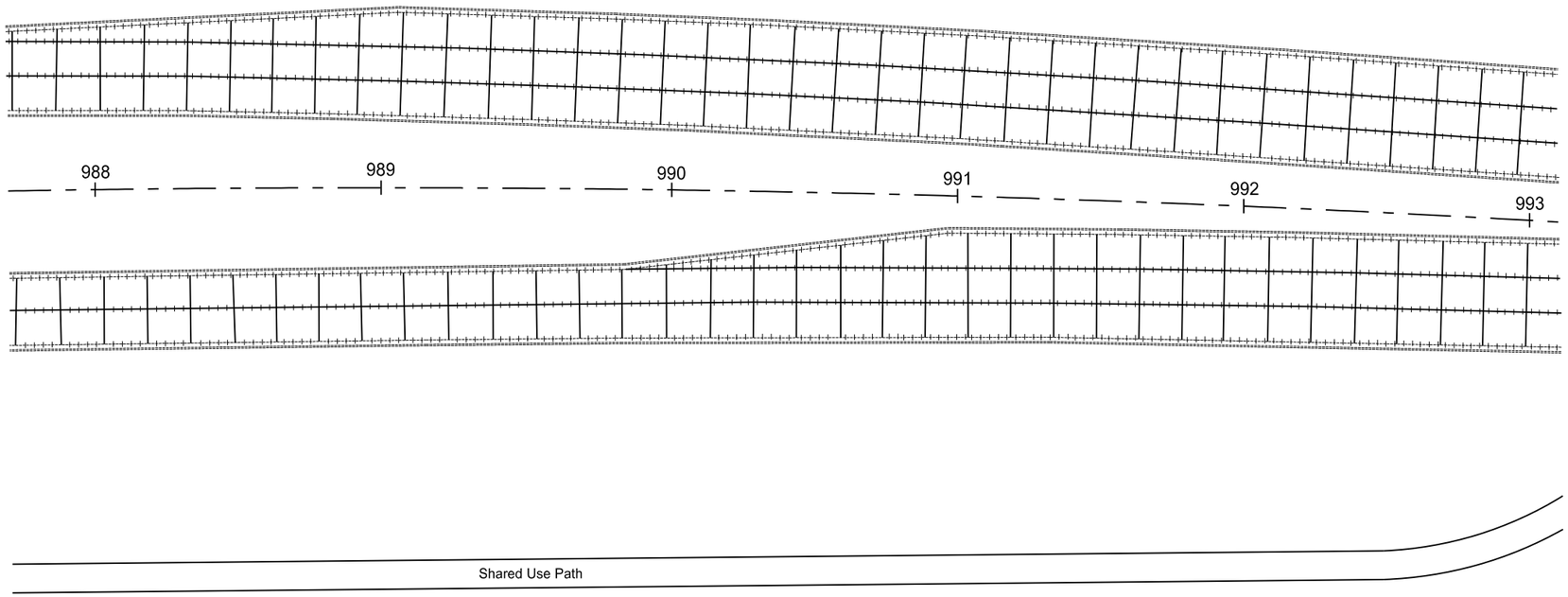
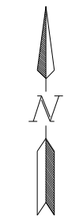
Repair Locations

982+75 to 988+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	3





Spall Repair Locations (WB)

STA	L		W		SF
990+13 Lt.	2	x	2	=	4
991+16 Rt.	2	x	2	=	4

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
988+00	to	989+00	100	48	534
989+00	to	993+00	400	60	2667

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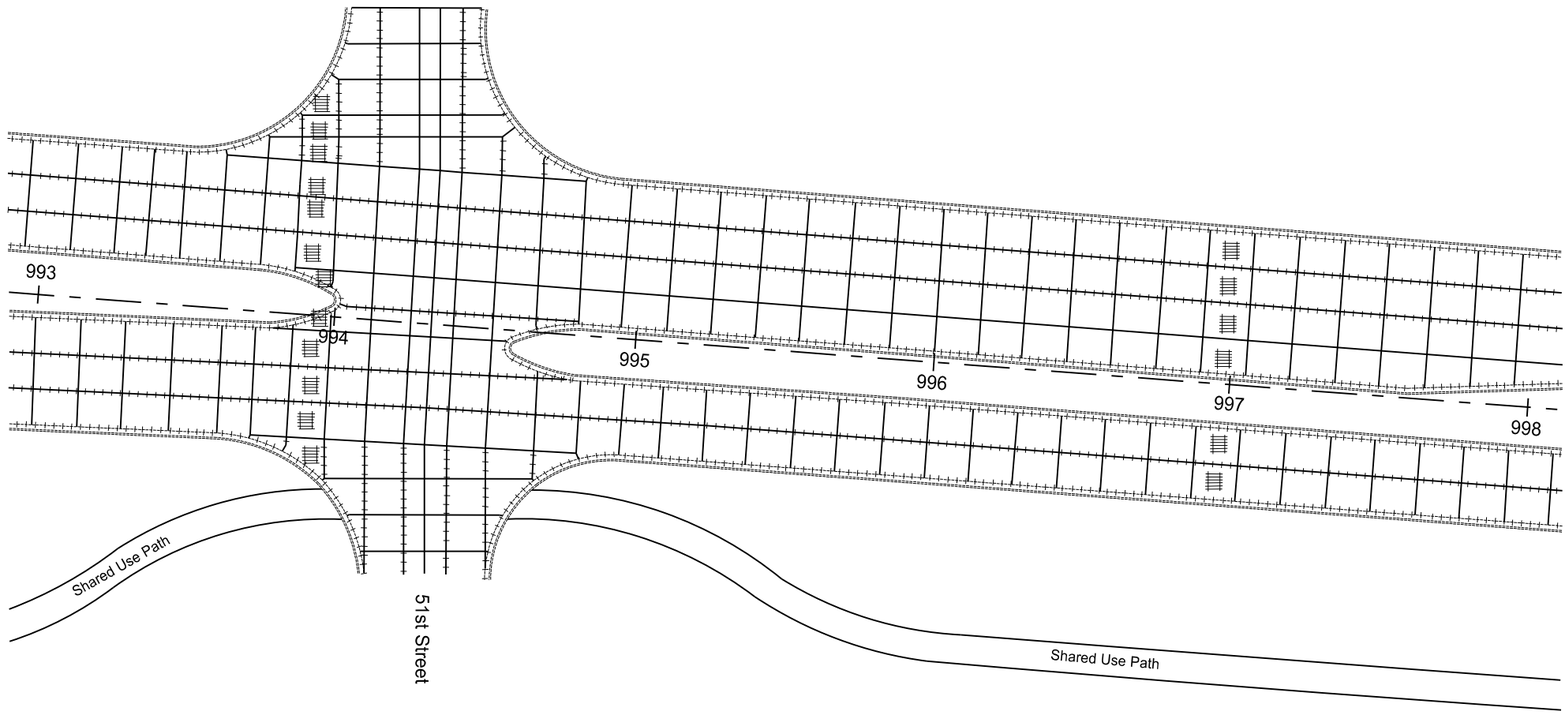
Repair Locations

988+00 to 993+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	4



Spall Repair Locations (WB)

STA	L		W		SF
995+60 Lt.	3	x	2	=	6
995+84 Lt.	6	x	2	=	12
996+63 Rt.	2	x	2	=	4
996+63 Lt.	3	x	2	=	6
996+78 Lt.	3	x	2	=	6
996+86 Lt.	3	x	3	=	6
996+93 Lt.	4	x	2	=	8
997+21 Rt.	2	x	2	=	4

Spall Repair Locations (EB)

STA	L		W		SF
993+61 Lt.	2	x	2	=	4
994+76 Lt.	4	x	2	=	8
996+84 Rt.	4	x	2	=	8

Curb and Gutter (WB)

STA	LF	
994+00	6	
994+10	10	

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
993+00	to	998+00	500	60	3334

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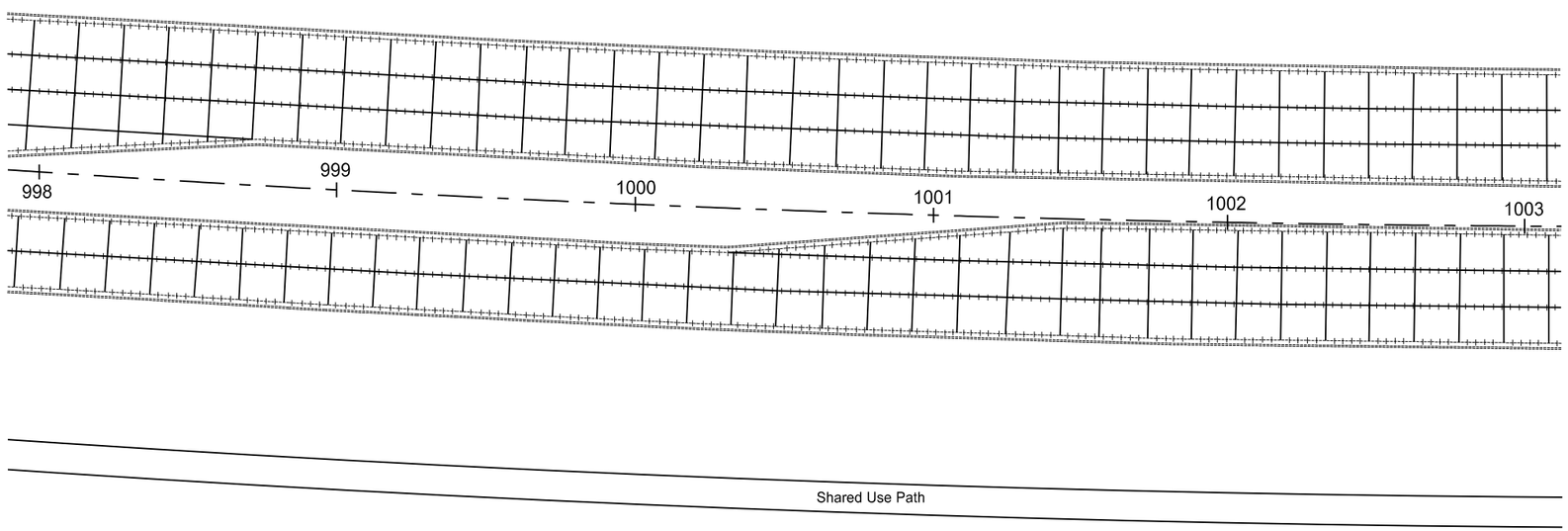
Repair Locations

993+00 to 998+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	5



Spall Repair Locations (WB)

STA	L		W		SF
998+94 Lt.	2	x	2	=	4

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
998+00	to	1003+00	500	60	3334

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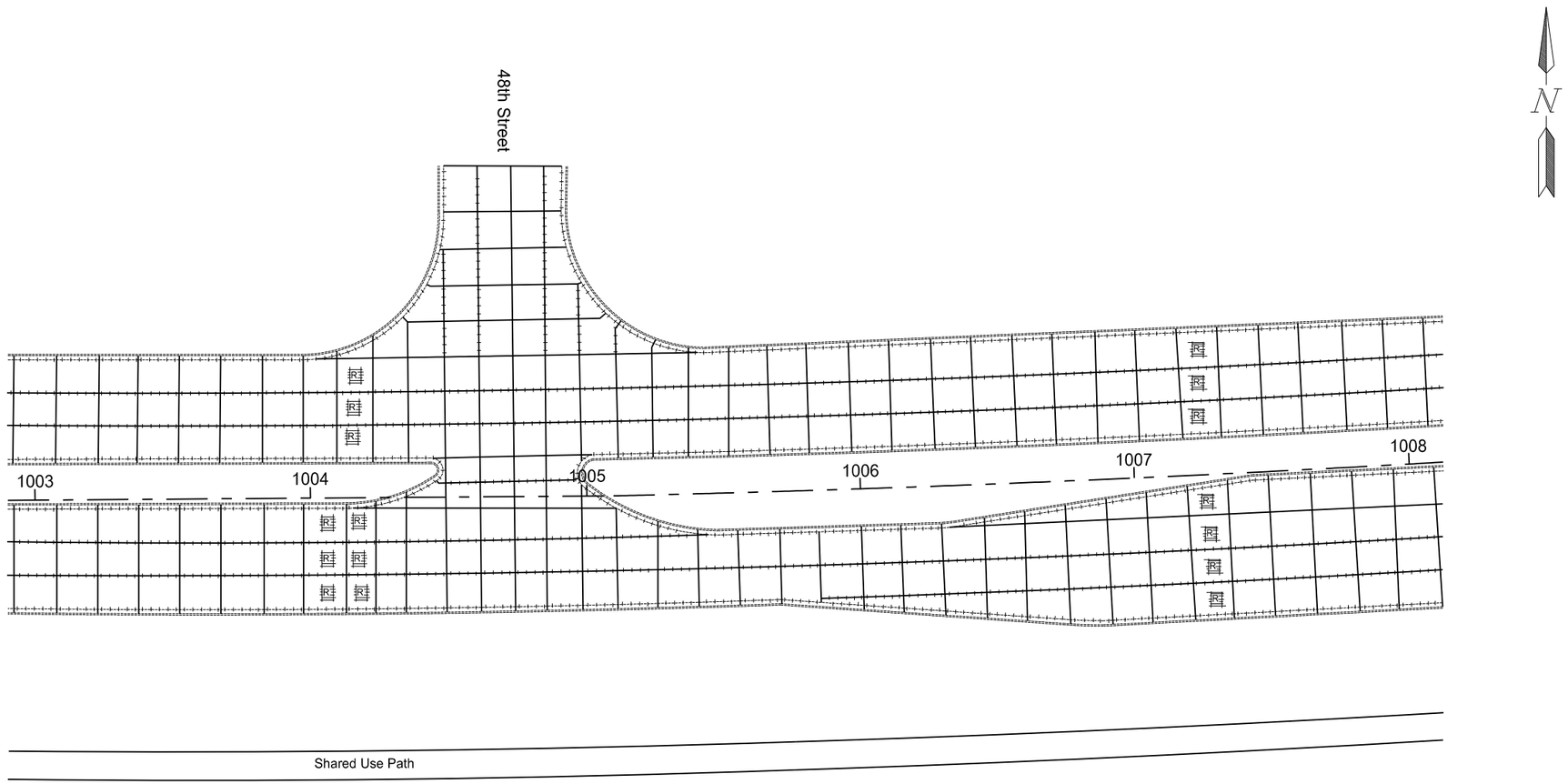
Repair Locations

998+00 to 1003+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	6



Spall Repair Locations (WB)

STA	L		W		SF
1007+44 Rt.	4	x	2	=	8
1007+44 Lt.	2	x	2	=	4
1007+65 Rt.	2	x	2	=	4

Full Depth Doweled Repair Locations (WB)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)
1005+54 Rt.	15	x	12	=	20.0	54	20
1005+54 Lt.	15	x	12	=	20.0	54	20
1007+44 Rt.	10	x	12	=	13.4	44	20
1007+44 Rt.	10	x	12	=	13.4	44	20

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
1003+00	to	1008+00	500	60	3334

Curb and Gutter (EB)

STA	LF
1004+14	3
1005+02	3
1005+10 Median	3
1005+32 Median	18

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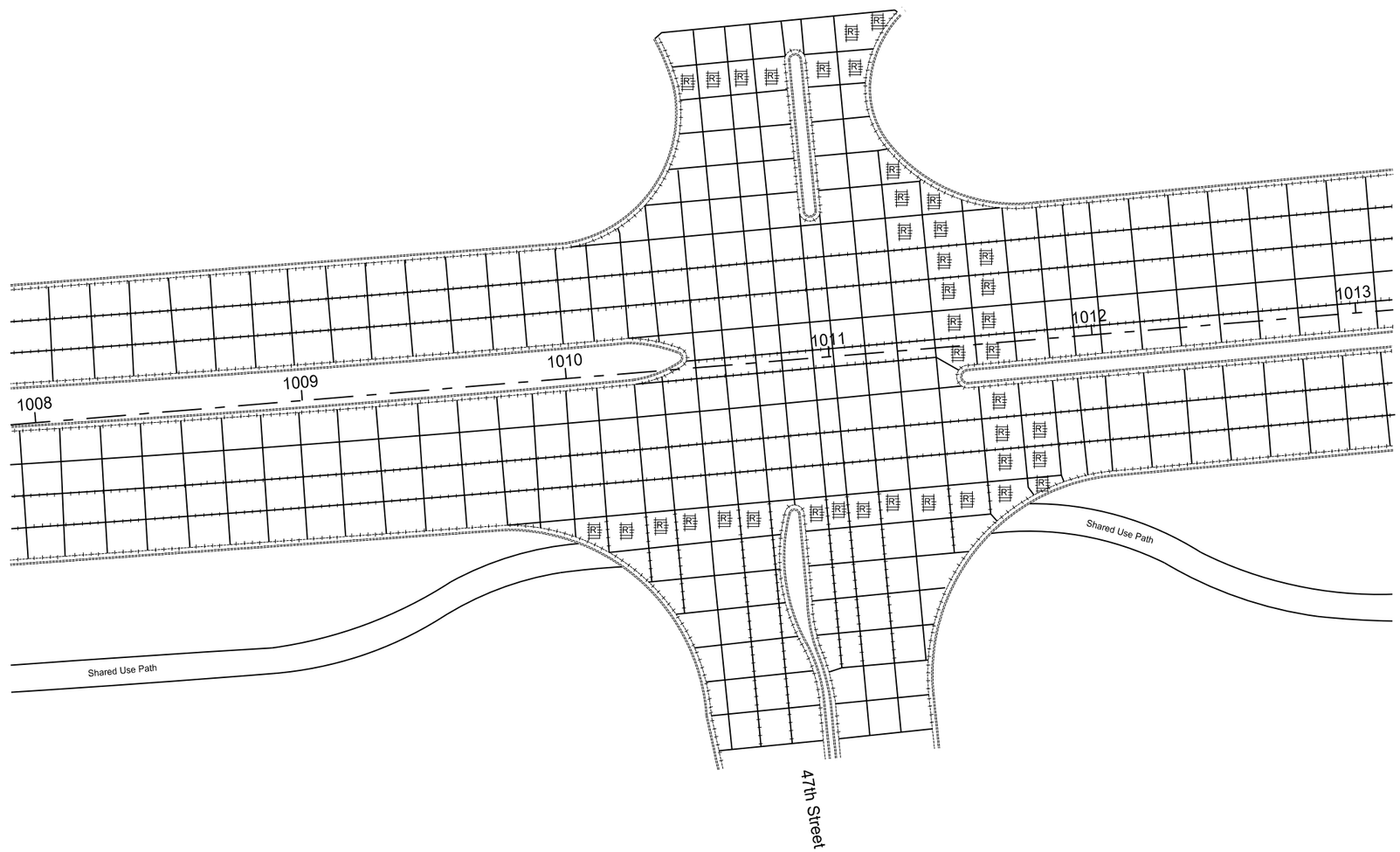
Repair Locations

1003+00 to 1008+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	7



Spall Repair Locations (WB)

STA	L		W		SF
1008+04 Rt.	2	x	2	=	4
1010+67 CL	2	x	2	=	4
1010+67 Rt.	2	x	2	=	4
1010+70 CL	2	x	2	=	4
1010+86 CL	2	x	2	=	4
1010+95 CL	2	x	2	=	4
1011+65 CL	2	x	2	=	4
1012+86 CL	2	x	2	=	4
1012+86 Lt.	2	x	2	=	4

Full Depth Doweled Repair Locations (WB)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)
1012+38 Center	15	x	12	=	20.0	54	20

Curb and Gutter (WB)

STA	LF
1011+02	10

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
1008+00	to	1010+48	248	60	1654
1010+48	to	1011+48	100	102	1134
1011+48	to	1013+00	152	60	1014

Curb and Gutter (EB)

STA	LF
1010+20 Median	4
1010+80 Rt. Median	22
1012+33 Median	15

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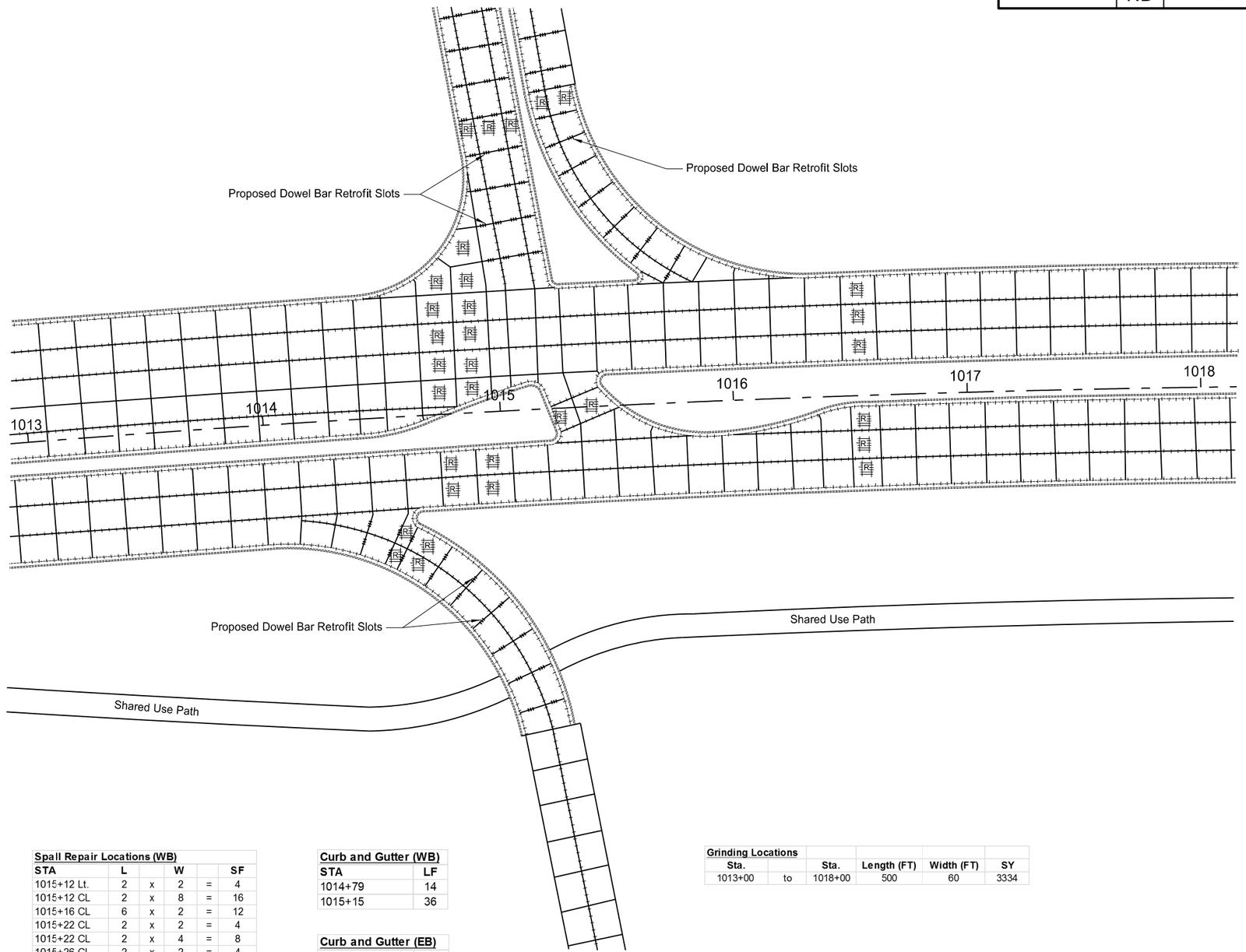
Repair Locations

1008+00 to 1013+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	8



Spall Repair Locations (WB)					
STA	L		W		SF
1015+12 Lt.	2	x	2	=	4
1015+12 CL	2	x	8	=	16
1015+16 CL	6	x	2	=	12
1015+22 CL	2	x	2	=	4
1015+22 CL	2	x	4	=	8
1015+26 CL	2	x	2	=	4
1015+36 CL	2	x	4	=	8
1015+36 Rt.	2	x	2	=	4
1015+75 Rt.	2	x	2	=	4
1016+26 CL	2	x	2	=	4
1016+71 CL	2	x	2	=	4

Curb and Gutter (WB)	
STA	LF
1014+79	14
1015+15	36

Curb and Gutter (EB)	
STA	LF
1014+65	10

Grinding Locations					
Sta.		Sta.	Length (FT)	Width (FT)	SY
1013+00	to	1018+00	500	60	3334

* Note: All Ramps are 10" PCC PVMT

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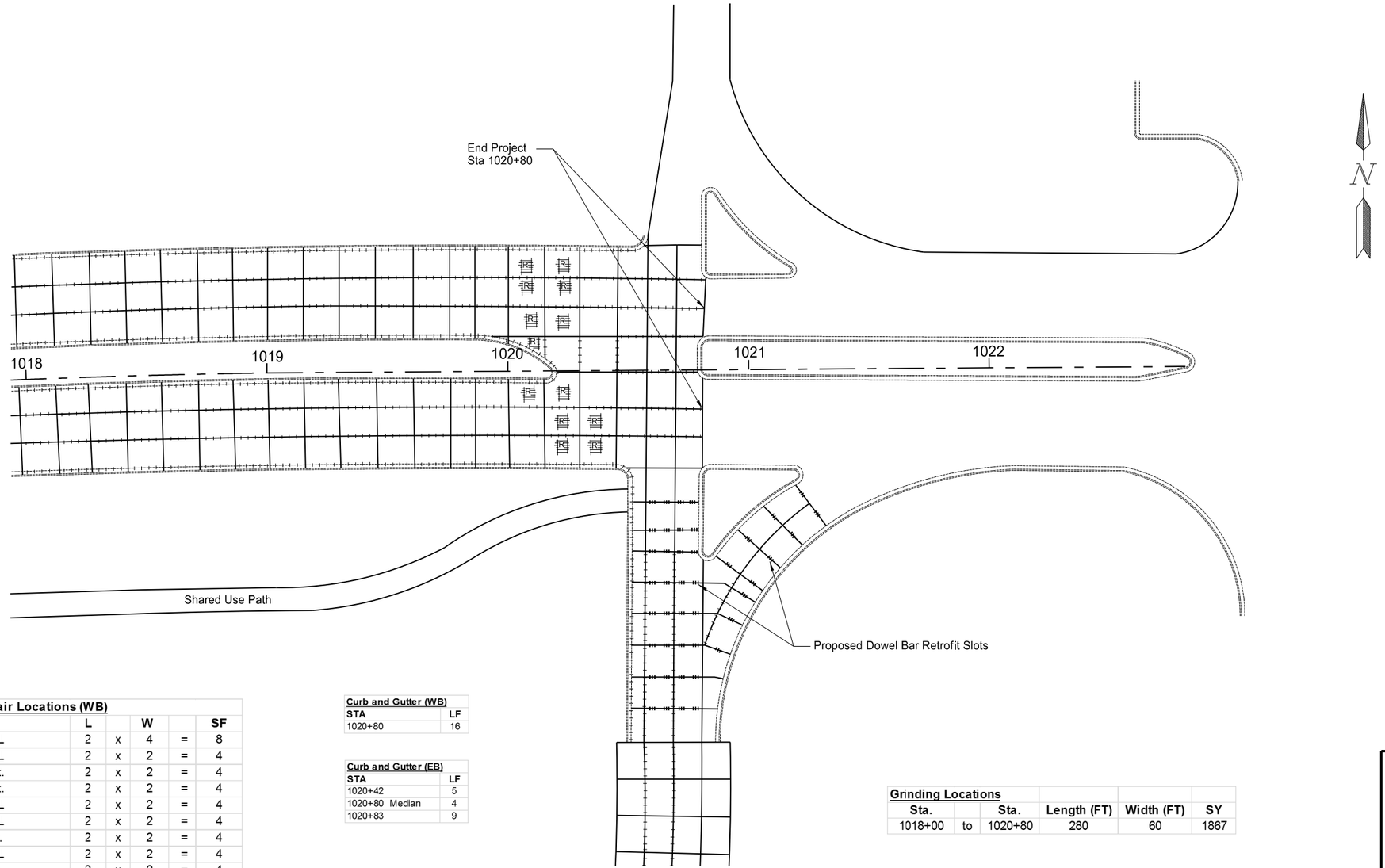
Repair Locations

1013+00 to 1018+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	9



Spall Repair Locations (WB)

STA	L		W		SF
1018+17 CL	2	x	4	=	8
1018+80 CL	2	x	2	=	4
1019+04 Rt.	2	x	2	=	4
1019+38 Rt.	2	x	2	=	4
1019+38 CL	2	x	2	=	4
1019+45 CL	2	x	2	=	4
1019+72 Lt.	2	x	2	=	4
1019+72 CL	2	x	2	=	4
1019+72 Lt.	2	x	2	=	4
1019+85 Lt.	2	x	4	=	8
1019+85 CL	2	x	2	=	4
1020+00	4	x	4	=	16
1020+10	9	x	3	=	27
1020+36 Intersection	2	x	2	=	4
1020+68 Intersection	2	x	2	=	4

Curb and Gutter (WB)

STA	LF
1020+80	16

Curb and Gutter (EB)

STA	LF
1020+42	5
1020+80 Median	4
1020+83	9

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
1018+00	to	1020+80	280	60	1867

Full Depth Doweled Repair Locations (WB)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)
1020+00	6	x	12	=	8.0	36	30
1020+16 Intersection	6	x	12	=	8.0	36	30
1020+16 Intersection	6	x	12	=	8.0	36	30
1020+16 Intersection	6	x	12	=	8.0	36	30
1020+31 Intersection	6	x	24	=	16.0	60	40
1020+36 Intersection	6	x	12	=	8.0	36	30
1020+36 Intersection	6	x	12	=	8.0	36	30
1020+46 Intersection	6	x	12	=	8.0	36	30
1020+46 Intersection	6	x	12	=	8.0	36	30
1020+46 Intersection	6	x	12	=	8.0	36	30

* Note: All Caps are 10" PCC PVMT

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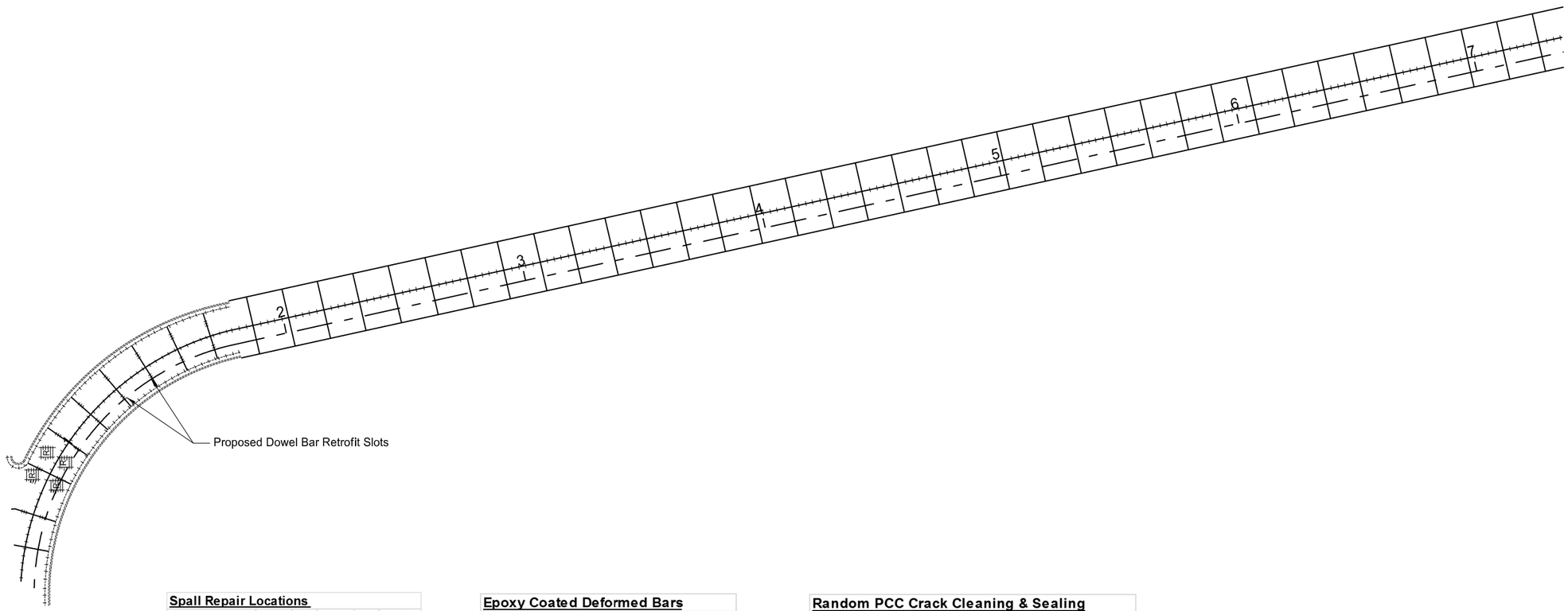
Repair Locations

1018+00 to 1020+80

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	10



Spall Repair Locations

STA	L		W		SF
0+02	2	x	2	=	4
1+17	2	x	2	=	4
6+11	2	x	2	=	4

Epoxy Coated Deformed Bars

STA	EA
0+43 to 0+55	24
0+43 to 0+55	24

Random PCC Crack Cleaning & Sealing

STA	LF
0+43 to 0+55	12
0+43 to 0+55	12

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
0+70	to	7+00	630	12	840

Dowel Bar Retrofit

EA
54

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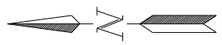
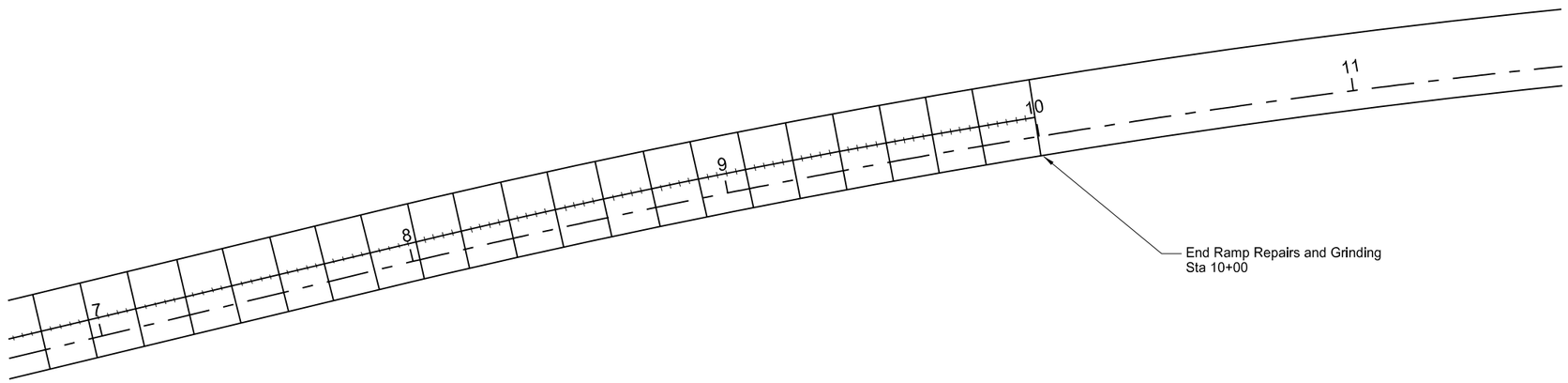
SW Ramp

0+00 to 7+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	11





Grinding Locations					
Sta.		Sta.	Length (FT)	Width (FT)	SY
7+00	to	10+00	300	12	400

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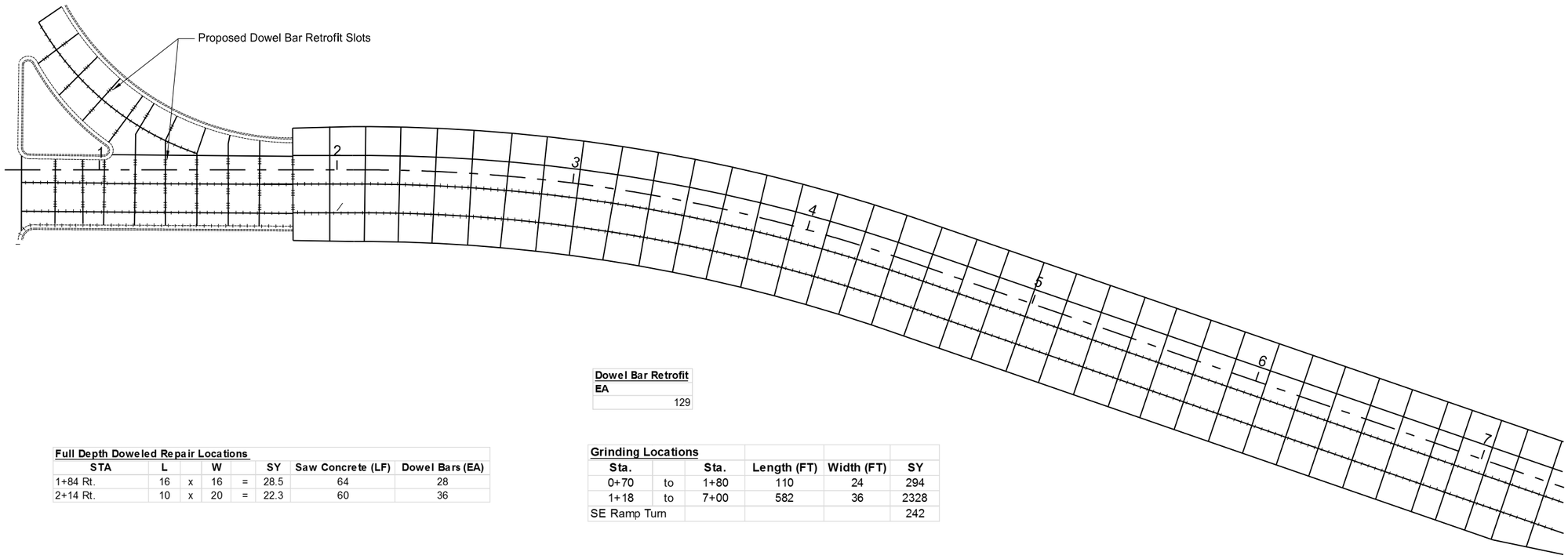
SW Ramp

7+00 to 10+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	12



Dowel Bar Retrofit
EA
129

Full Depth Doweled Repair Locations

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)
1+84 Rt.	16	x	16	=	28.5	64	28
2+14 Rt.	10	x	20	=	22.3	60	36

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
0+70	to	1+80	110	24	294
1+18	to	7+00	582	36	2328
SE Ramp Turn					242

Spall Repair Locations

STA	L		W		SF
0+85 CL	2	x	4	=	8
1+00 CL	2	x	6	=	12
1+15 CL	2	x	32	=	64
1+27 CL	2	x	32	=	64
1+42 CL	2	x	32	=	64
1+57 CL	2	x	32	=	64
1+88 Rt.	6	x	2	=	12
1+99 Rt.	2	x	2	=	4
2+29 Rt.	2	x	20	=	40
2+44 Rt.	2	x	20	=	40
2+58 Rt.	2	x	20	=	40
2+74 Rt.	2	x	20	=	40
2+89 Rt.	2	x	25	=	50
3+05 Rt.	2	x	14	=	28
3+23 CL	2	x	20	=	40
3+37 CL	2	x	20	=	40
3+52 CL	2	x	20	=	40

Spall Repair Locations

STA	L		W		SF
3+77 CL	2	x	25	=	50
3+88 CL	2	x	25	=	50
3+96 CL	2	x	6	=	12
3+96 Rt.	2	x	3	=	6
4+13 Lt.	2	x	2	=	4
4+13 CL	2	x	4	=	8
4+13 Rt.	2	x	3	=	6
4+28 Lt.	2	x	2	=	4
4+28 CL	2	x	2	=	4
4+28 Rt.	2	x	2	=	4
4+59 Lt.	2	x	2	=	4
4+59 CL	2	x	2	=	4
4+59 Rt.	2	x	3	=	6
4+74 Lt.	2	x	2	=	4
4+74 Rt.	3	x	16	=	48
4+89 CL	2	x	8	=	16
4+89 Rt.	2	x	3	=	6

Spall Repair Locations

STA	L		W		SF
5+04 Rt.	2	x	16	=	32
5+20 Lt.	2	x	2	=	4
5+20 CL	2	x	4	=	8
5+20 Rt.	2	x	4	=	8
5+34 Rt.	2	x	18	=	36
5+49 CL	2	x	6	=	12
5+49 Rt.	2	x	3	=	6
5+64 Lt.	2	x	2	=	4
5+64 Rt.	2	x	16	=	32
5+79 Rt.	2	x	20	=	40
5+94 Rt.	2	x	20	=	40
6+09 Rt.	2	x	14	=	28
6+25 CL	2	x	2	=	4
6+25 Rt.	2	x	2	=	4
6+40 Lt.	2	x	2	=	4
6+40 Rt.	2	x	14	=	4
6+54 Lt.	2	x	2	=	28

Spall Repair Locations

STA	L		W		SF
6+54 Rt.	2	x	16	=	32
6+71 Lt.	2	x	2	=	4
6+71 Rt.	2	x	20	=	40
6+86 CL	2	x	6	=	12
6+86 Rt.	2	x	4	=	8

Spall Repair Locations (SE Turn - Mainline Stationing)

STA	L		W		SF
1020+78 CL	2	x	4	=	8
1020+88 CL	2	x	8	=	16
1020+98 CL	2	x	26	=	52
1021+10 CL	2	x	2	=	4
1021+14 CL	2	x	15	=	30
1021+27 CL	2	x	2	=	4
1021+33 CL	2	x	8	=	16
1021+52 CL	2	x	8	=	16
1021+81 CL	2	x	2	=	4

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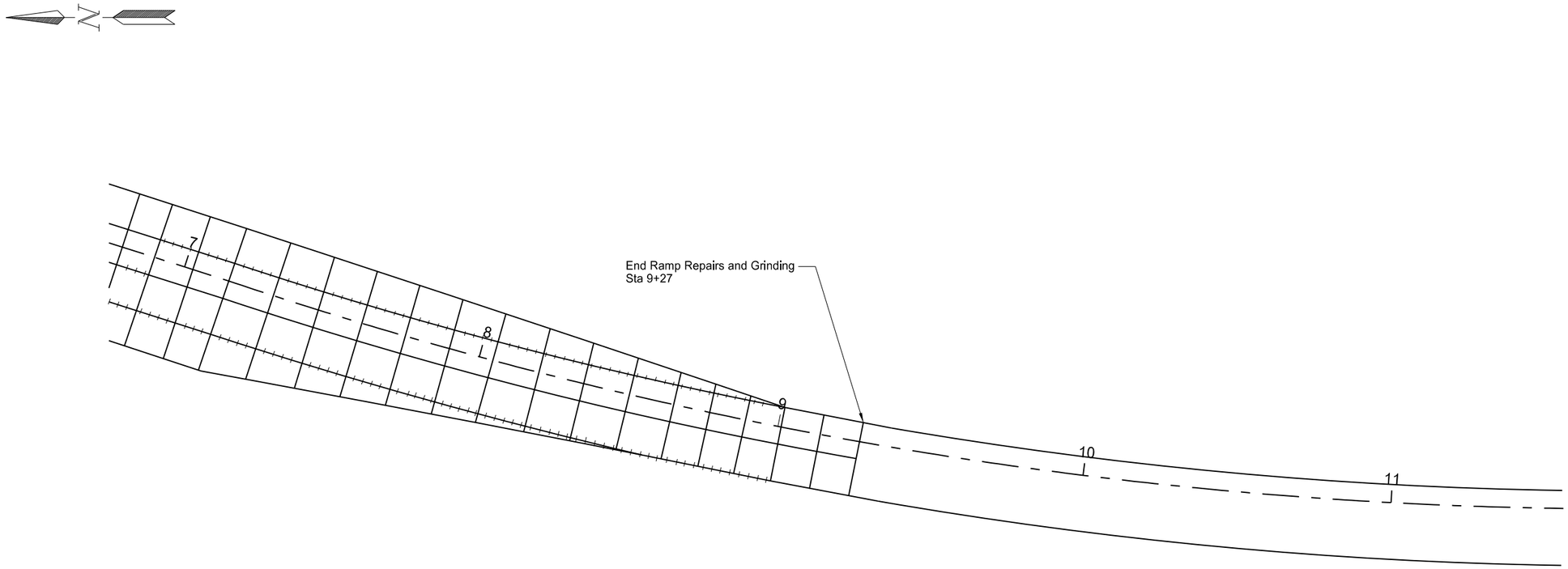
SE Ramp

0+70 to 7+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(11)354	80	13



Spall Repair Locations

STA	L		W		SF
7+17 CL	2	x	25	=	50
7+47 Lt.	2	x	2	=	4
7+47 Rt.	2	x	2	=	4
7+92 CL	2	x	2	=	4
8+21 CL	3	x	30	=	90

Grinding Locations

Sta.		Sta.	Length (FT)	Width (FT)	SY
7+00	to	7+15	15	36	60
7+15	to	9+27	212	24	566

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SE Ramp

7+00 to 9+27

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	14

Spall Repair Locations (Entrance Ramp)

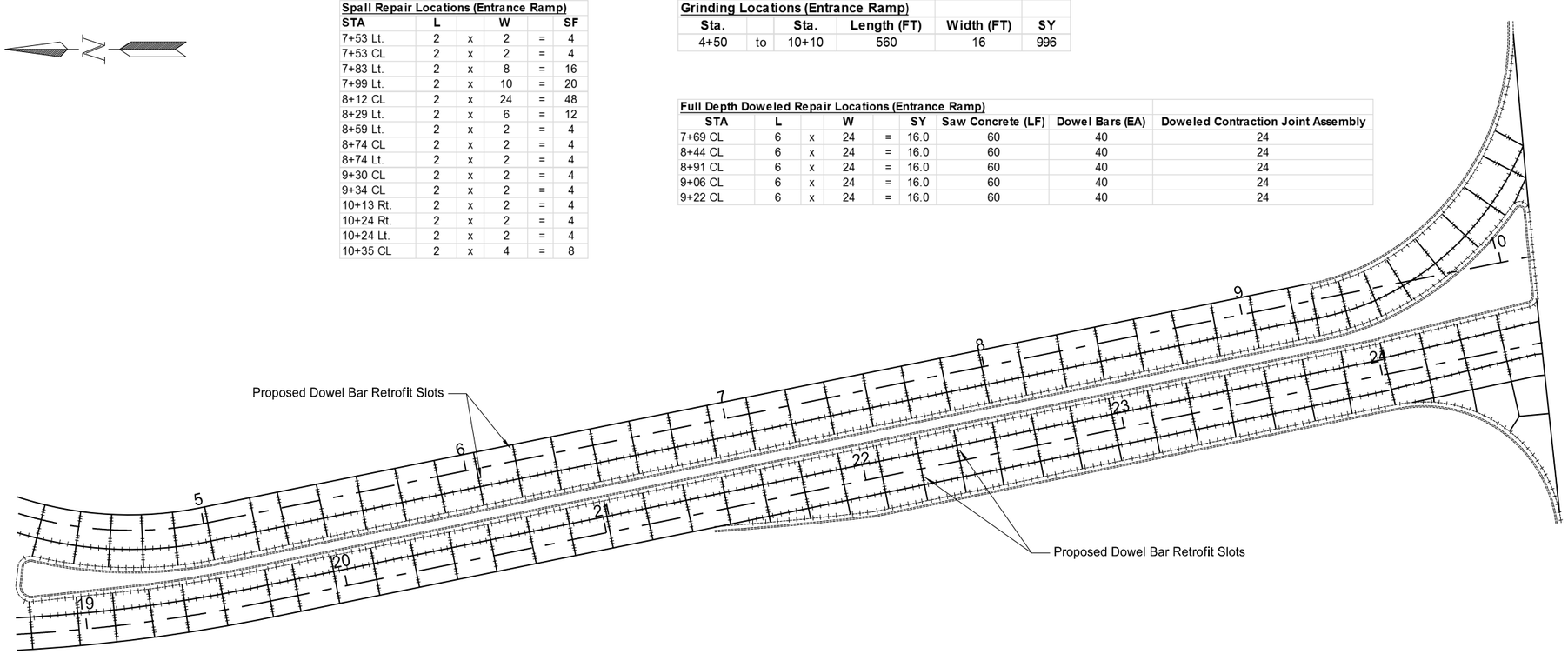
STA	L		W		SF
7+53 Lt.	2	x	2	=	4
7+53 CL	2	x	2	=	4
7+83 Lt.	2	x	8	=	16
7+99 Lt.	2	x	10	=	20
8+12 CL	2	x	24	=	48
8+29 Lt.	2	x	6	=	12
8+59 Lt.	2	x	2	=	4
8+74 CL	2	x	2	=	4
8+74 Lt.	2	x	2	=	4
9+30 CL	2	x	2	=	4
9+34 CL	2	x	2	=	4
10+13 Rt.	2	x	2	=	4
10+24 Rt.	2	x	2	=	4
10+24 Lt.	2	x	2	=	4
10+35 CL	2	x	4	=	8

Grinding Locations (Entrance Ramp)

Sta.		Sta.	Length (FT)	Width (FT)	SY
4+50	to	10+10	560	16	996

Full Depth Doweled Repair Locations (Entrance Ramp)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)	Doweled Contraction Joint Assembly
7+69 CL	6	x	24	=	16.0	60	40	24
8+44 CL	6	x	24	=	16.0	60	40	24
8+91 CL	6	x	24	=	16.0	60	40	24
9+06 CL	6	x	24	=	16.0	60	40	24
9+22 CL	6	x	24	=	16.0	60	40	24



Spall Repair Locations (Exit Ramp)

STA	L		W		SF
19+12 Rt.	2	x	2	=	4
22+10 Rt.	2	x	2	=	4
22+14 CL	2	x	2	=	4
22+14 Rt.	2	x	2	=	4
22+29 Lt.	2	x	2	=	4
22+29 Rt.	2	x	2	=	4
22+44 CL	2	x	8	=	16
22+59 CL	2	x	26	=	52
22+74 CL	2	x	30	=	60
22+89 Lt.	2	x	2	=	4
22+89 Rt.	2	x	2	=	4
23+35 Lt.	2	x	2	=	4
23+35 Rt.	2	x	2	=	4
23+90 Lt.	2	x	2	=	4
23+90 RT.	2	x	2	=	4

Spall Repair Locations (Exit Ramp)

STA	L		W		SF
24+02 Lt.	2	x	2	=	4
24+02 Rt.	2	x	2	=	4
24+05 Lt.	2	x	2	=	4
24+05 Rt.	2	x	2	=	4
24+15 Lt.	2	x	2	=	4
24+15 Rt.	2	x	2	=	4
24+20 Lt.	2	x	2	=	4
24+20 Rt.	2	x	2	=	4
24+24 Rt.	2	x	6	=	12
24+44 CL	2	x	30	=	60
24+57 CL	2	x	30	=	60
24+65 Rt.	6	x	2	=	12

Grinding Locations (Exit Ramp)

Sta.		Sta.	Length (FT)	Width (FT)	SY
19+00	to	22+00	300	16	534
22+00	to	24+65	265	24	707

Dowel Bar Retrofit

EA
717

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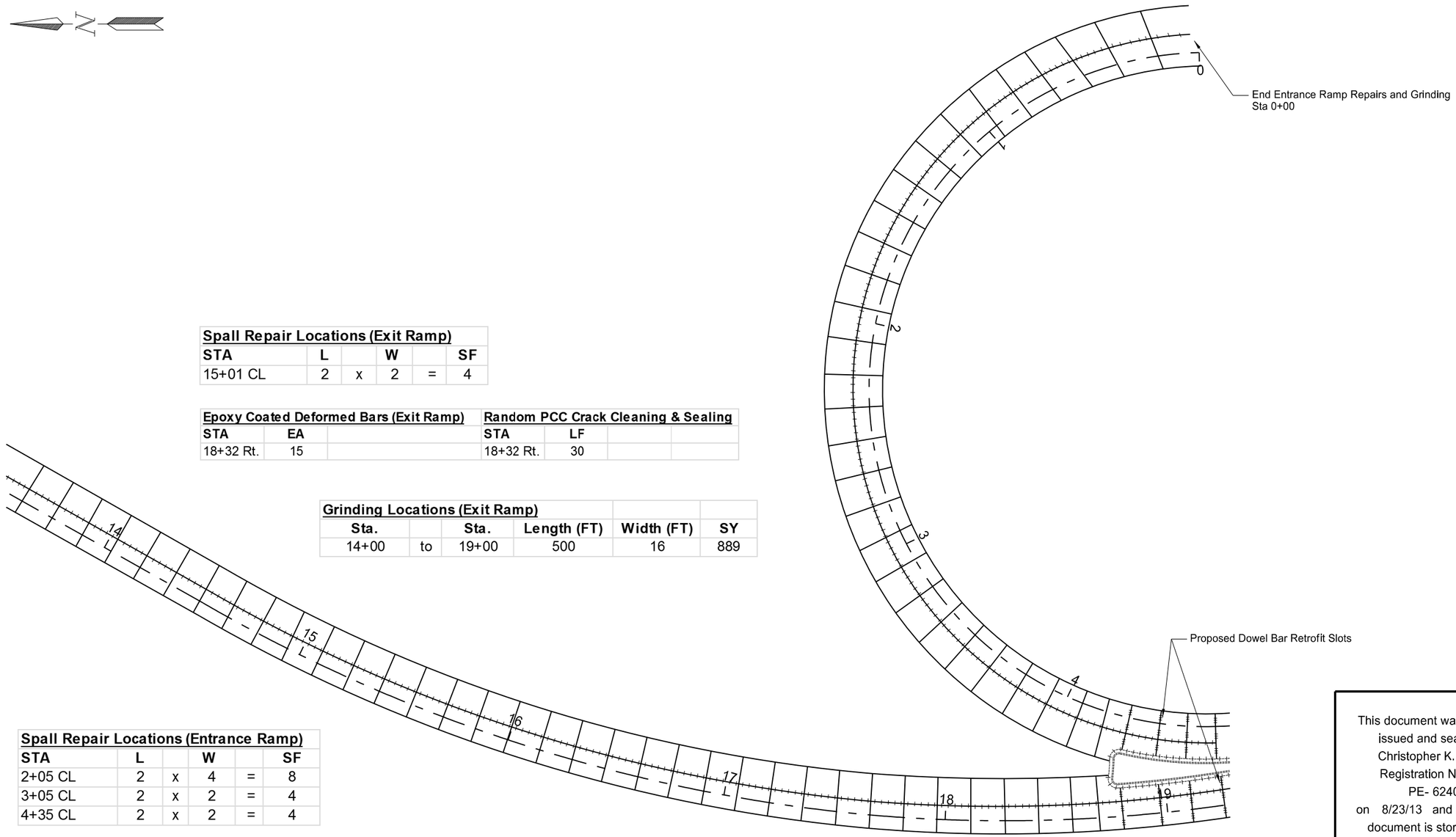
NW Ramps

Entrance Ramp 4+50 to 10+35
Exit Ramp 19+00 to 24+65

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	15



Spall Repair Locations (Exit Ramp)					
STA	L		W		SF
15+01 CL	2	x	2	=	4

Epoxy Coated Deformed Bars (Exit Ramp)		
STA	EA	
18+32 Rt.	15	

Random PCC Crack Cleaning & Sealing			
STA	LF		
18+32 Rt.	30		

Grinding Locations (Exit Ramp)					
Sta.		Sta.	Length (FT)	Width (FT)	SY
14+00	to	19+00	500	16	889

Spall Repair Locations (Entrance Ramp)					
STA	L		W		SF
2+05 CL	2	x	4	=	8
3+05 CL	2	x	2	=	4
4+35 CL	2	x	2	=	4

Grinding Locations (Entrance Ramp)					
Sta.		Sta.	Length (FT)	Width (FT)	SY
0+00	to	4+50	450	16	800

Dowel Bar Retrofit
EA
72

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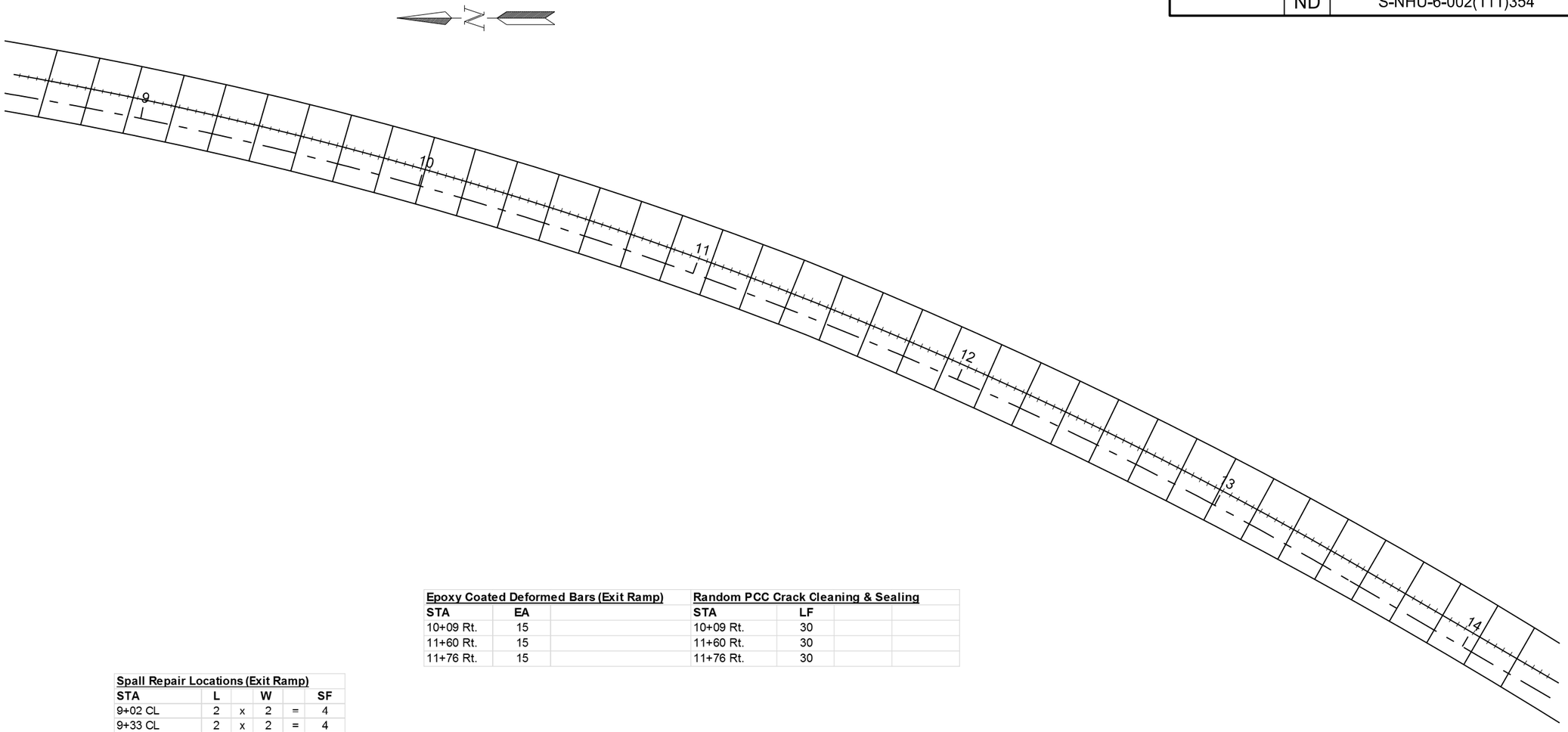
NW Ramps

Entrance Ramp 0+00 to 4+50
Exit Ramp 14+00 to 19+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	16



Epoxy Coated Deformed Bars (Exit Ramp)

STA	EA
10+09 Rt.	15
11+60 Rt.	15
11+76 Rt.	15

Random PCC Crack Cleaning & Sealing

STA	LF
10+09 Rt.	30
11+60 Rt.	30
11+76 Rt.	30

Spall Repair Locations (Exit Ramp)

STA	L		W		SF
9+02 CL	2	x	2	=	4
9+33 CL	2	x	2	=	4
10+09 CL	2	x	2	=	4
10+25 CL	2	x	2	=	4
10+39 CL	2	x	2	=	4
10+84 CL	2	x	2	=	4
12+06 CL	2	x	2	=	4

Grinding Locations (Exit Ramp)

Sta.		Sta.	Length (FT)	Width (FT)	SY
9+00	to	14+00	500	16	889

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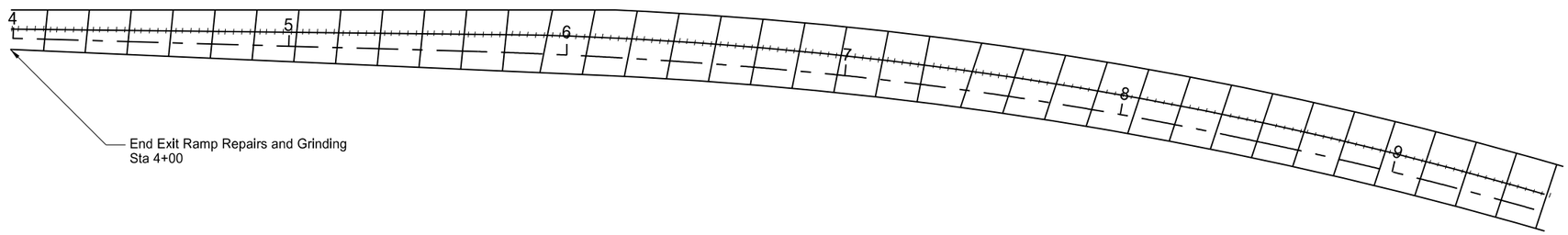
NW Ramp

Exit Ramp 9+00 to 14+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	17



Spall Repair Locations (Exit Ramp)					
STA	L		W		SF
4+38 CL	3	x	4	=	12
5+43 CL	2	x	2	=	4
6+32 CL	2	x	2	=	4
7+69 CL	2	x	2	=	4
8+73 CL	2	x	2	=	4
8+88 CL	2	x	2	=	4

Epoxy Coated Deformed Bars (Exit Ramp)		
STA	EA	
7+38 Lt.	30	
7+38 Rt.	20	
8+29 Lt.	30	

Random PCC Crack Cleaning & Sealing			
STA	LF		
7+38 Lt.	15		
7+38 Rt.	10		
8+29 Lt.	15		

Grinding Locations (Exit Ramp)					
Sta.		Sta.	Length (FT)	Width (FT)	SY
4+00	to	9+00	500	16	889

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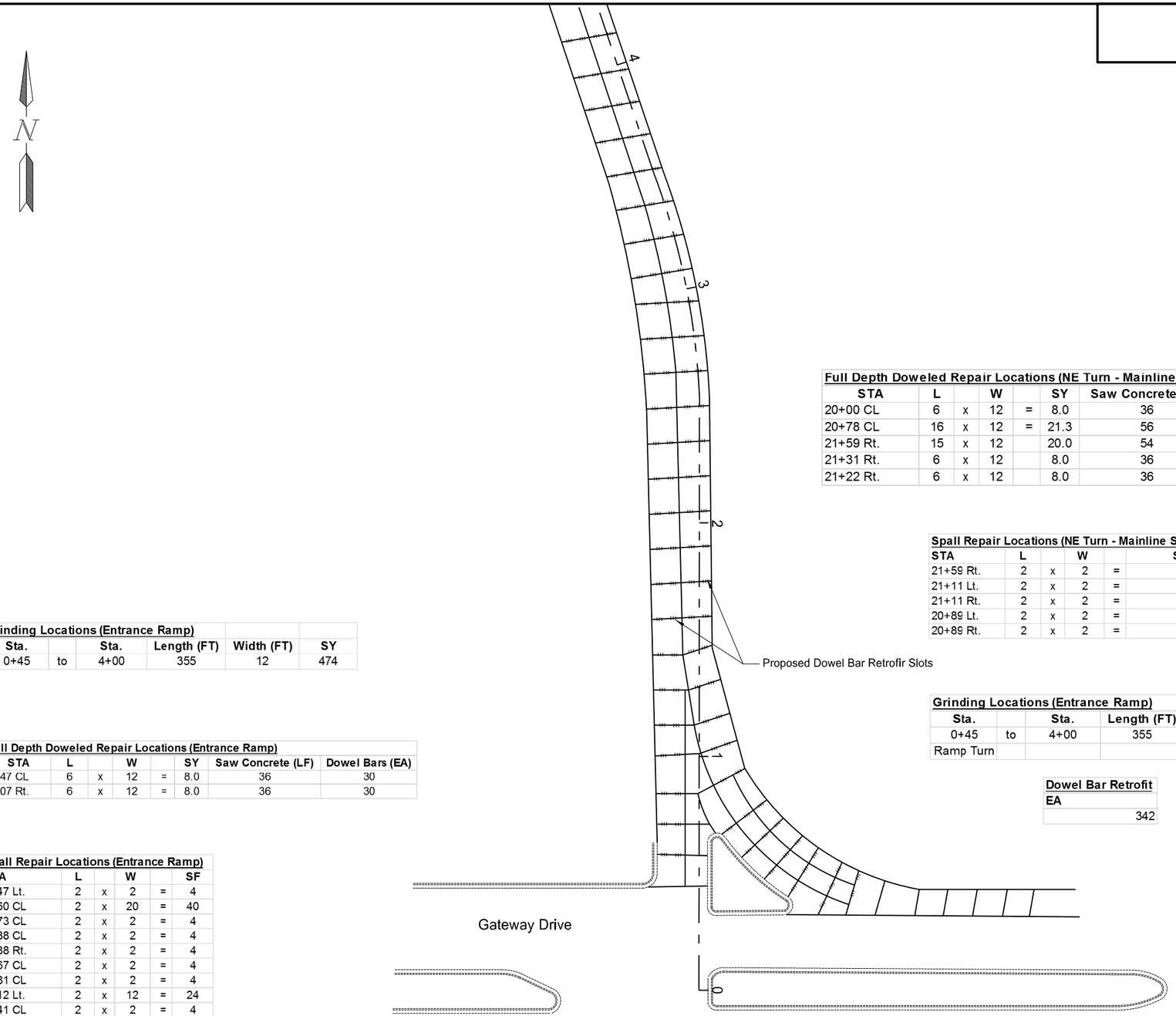
NW Ramp

Exit Ramp 4+00 to 9+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	18



Full Depth Doweled Repair Locations (NE Turn - Mainline Stationing)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)	Doweled Contraction Joint Assembly (LF)
20+00 CL	6	x	12	=	8.0	36	30	
20+78 CL	16	x	12	=	21.3	56	30	12
21+59 Rt.	15	x	12		20.0	54	30	
21+31 Rt.	6	x	12		8.0	36	30	
21+22 Rt.	6	x	12		8.0	36	30	

Spall Repair Locations (NE Turn - Mainline Stationing)

STA	L		W		SF
21+59 Rt.	2	x	2	=	4
21+11 Lt.	2	x	2	=	4
21+11 Rt.	2	x	2	=	4
20+89 Lt.	2	x	2	=	4
20+89 Rt.	2	x	2	=	4

Curb And Gutter (NE Turn)

STA	LF
20+78	10
21+11	10

Grinding Locations (Entrance Ramp)

Sta.		Sta.	Length (FT)	Width (FT)	SY
0+45	to	4+00	355	12	474

Grinding Locations (Entrance Ramp)

Sta.		Sta.	Length (FT)	Width (FT)	SY
0+45	to	4+00	355	16	632
Ramp Turn					287

Dowel Bar Retrofit

EA
342

Full Depth Doweled Repair Locations (Entrance Ramp)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)
0+47 CL	6	x	12	=	8.0	36	30
1+07 Rt.	6	x	12	=	8.0	36	30

Spall Repair Locations (Entrance Ramp)

STA	L		W		SF
0+47 Lt.	2	x	2	=	4
0+60 CL	2	x	20	=	40
0+73 CL	2	x	2	=	4
0+88 CL	2	x	2	=	4
0+88 Rt.	2	x	2	=	4
1+67 CL	2	x	2	=	4
1+81 CL	2	x	2	=	4
2+12 Lt.	2	x	12	=	24
2+41 CL	2	x	2	=	4
3+01 Rt.	2	x	2	=	4
3+47 CL	2	x	2	=	4

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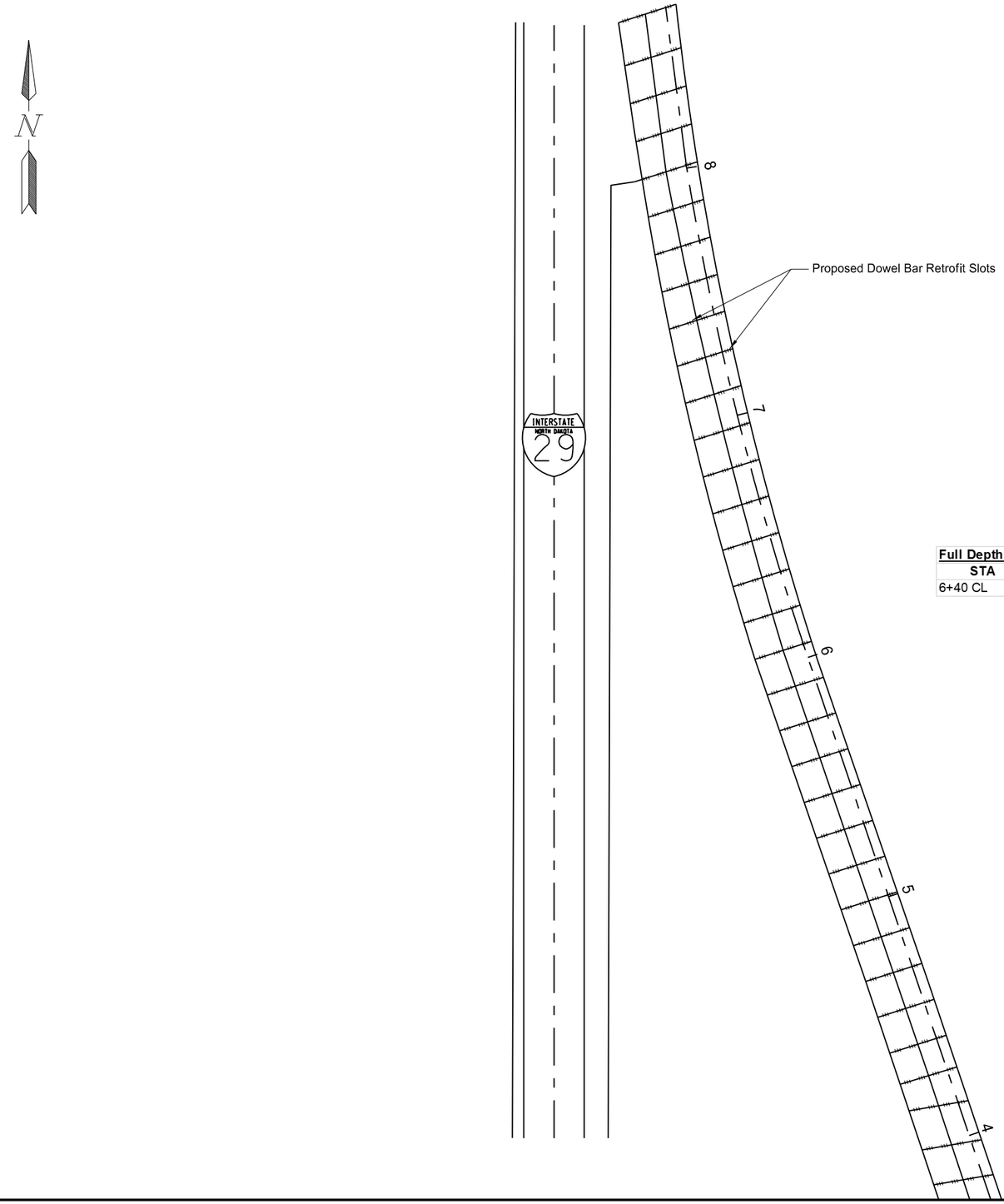
NE Ramp

0+00 to 4+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	19



Grinding Locations (Entrance Ramp)

Sta.		Sta.	Length (FT)	Width (FT)	SY
4+00	to	8+50	400	16	712

Full Depth Doweled Repair Locations (Entrance Ramp)

STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)	Doweled Contraction Joint Assembly (LF)
6+40 CL	28	x	24	=	74.7	104	44	24

Spall Repair Locations (Entrance Ramp)

STA	L		W		SF
4+37 Rt.	2	x	2	=	4
4+37 CL	2	x	2	=	4
4+79 CL	2	x	2	=	4
5+24 CL	2	x	2	=	4
5+34 CL	2	x	2	=	4
5+52 CL	2	x	2	=	4
6+04 CL	2	x	8	=	16
6+12 CL	2	x	2	=	4
6+84 Rt.	2	x	2	=	4
6+84 CL	2	x	2	=	4
7+26 CL	4	x	4	=	16
7+57 Rt.	2	x	2	=	4
7+85 CL	2	x	2	=	4
8+48 CL	2	x	2	=	4

Dowel Bar Retrofit

EA
396

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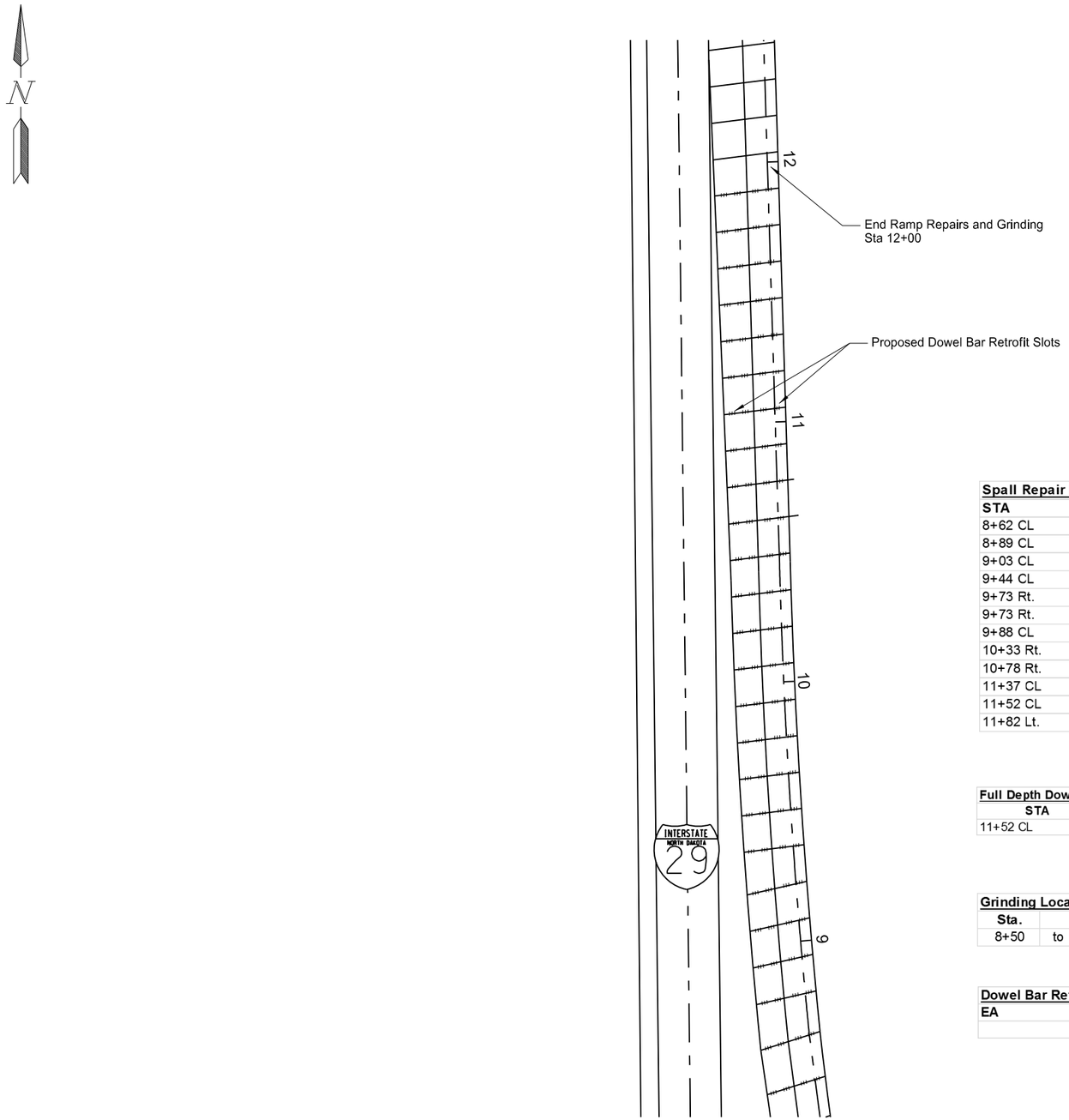
NE Ramp

4+00 to 8+50

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	80	20



Spall Repair Locations (Entrance Ramp)					
STA	L		W		SF
8+62 CL	2	x	2	=	4
8+89 CL	2	x	2	=	4
9+03 CL	2	x	2	=	4
9+44 CL	2	x	4	=	8
9+73 Rt.	2	x	2	=	4
9+73 Rt.	2	x	2	=	4
9+88 CL	2	x	4	=	8
10+33 Rt.	2	x	10	=	20
10+78 Rt.	2	x	4	=	8
11+37 CL	3	x	12	=	36
11+52 CL	2	x	2	=	4
11+82 Lt.	2	x	2	=	4

Full Depth Doweled Repair Locations (Entrance Ramp)							
STA	L		W		SY	Saw Concrete (LF)	Dowel Bars (EA)
11+52 CL	6	x	12	=	8.0	36	30

Grinding Locations (Entrance Ramp)					
Sta.		Sta.	Length (FT)	Width (FT)	SY
8+50	to	12+00	350	12	467

Dowel Bar Retrofit
EA
300

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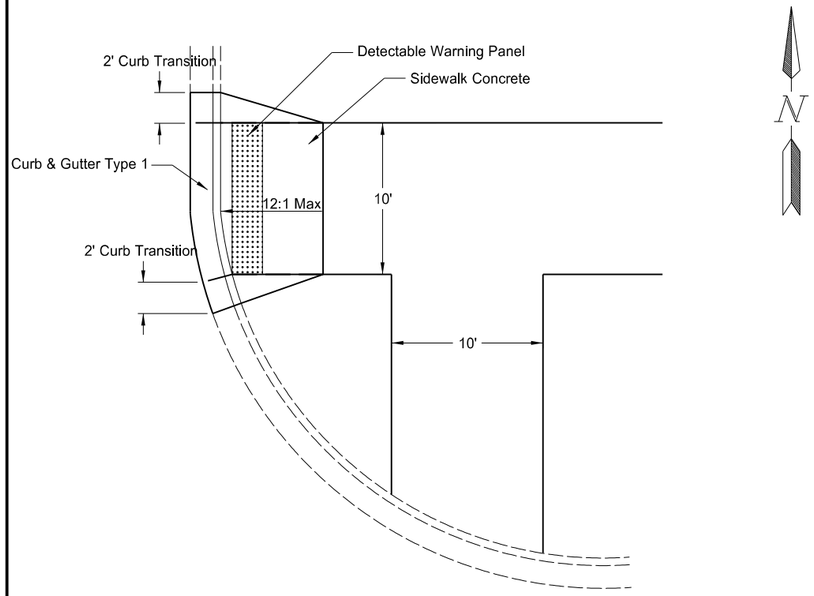
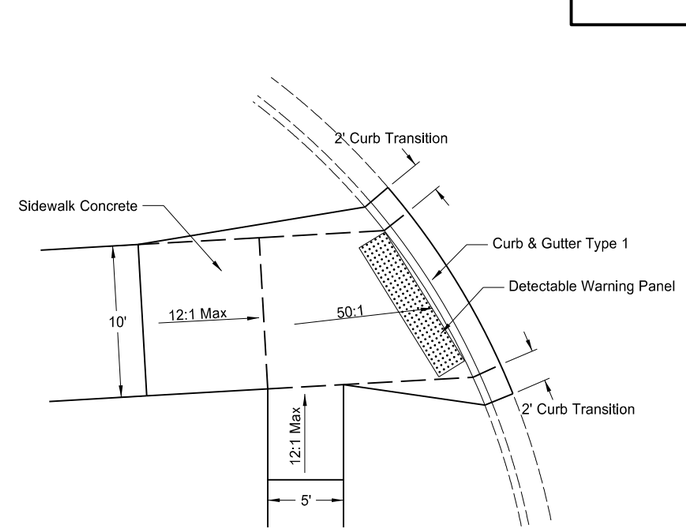
NE Ramp

8+50 to 12+00

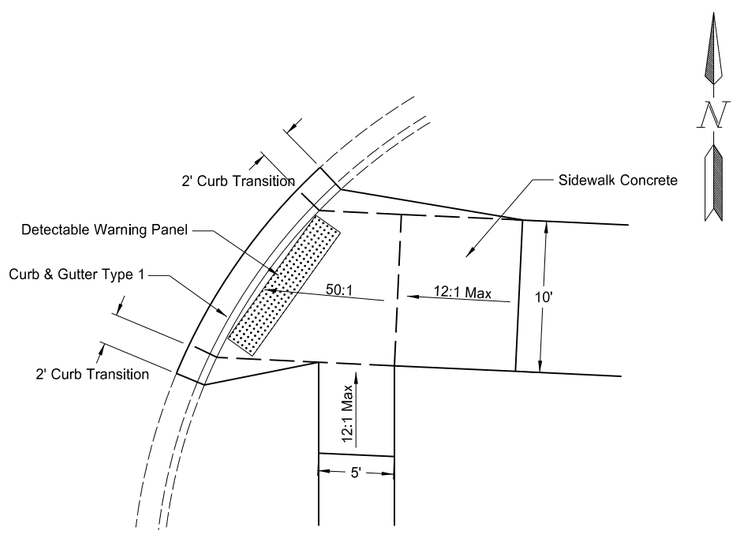
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	90	1



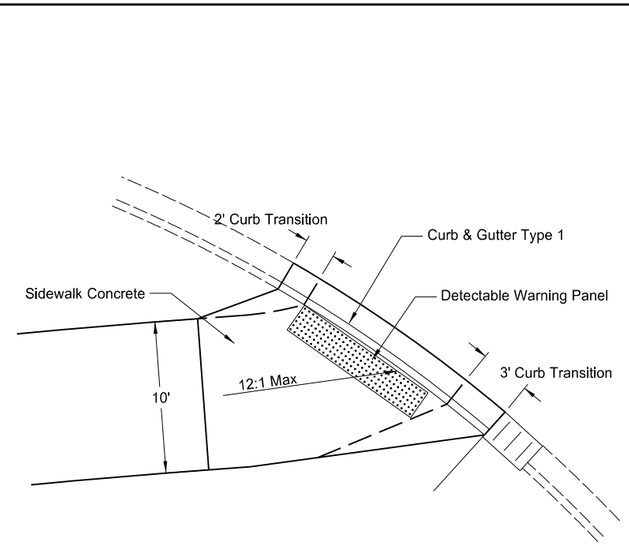
Location 1 Sta 978+34 133' RT
55th Street



Location 2 Sta 994+00 62' RT
51st Street



Location 3 Sta 994+60 58' RT
55th Street



Location 4 Sta 1010+07 66' RT
47th Street

SPEC CODE	BID ITEM		QUANTITY	UNIT
202	112	REMOVAL OF CONCRETE		
		Location 1	7.4	SY
		Location 2	24.7	SY
		Location 3	22.3	SY
		Location 4	13.4	SY
202	119	SAW CONCRETE		
		Location 1	14	LF
		Location 2	19	LF
		Location 3	19	LF
		Location 4	12	LF
202	130	REMOVAL OF CURB & GUTTER		
		Location 1	15	LF
		Location 2	16	LF
		Location 3	16	LF
		Location 4	17	LF
302	100	SALVAGED BASE COURSE		
		Location 1	2.5	TON
		Location 2	6.5	TON
		Location 3	5.9	TON
		Location 4	4.0	TON
748	140	CURB & GUTTER - TYPE 1		
		Location 1	15	LF
		Location 2	16	LF
		Location 3	16	LF
		Location 4	17	LF
750	100	SIDEWALK CONCRETE		
		Location 1	8.8	SY
		Location 2	25.1	SY
		Location 3	24.9	SY
		Location 4	15.1	SY
750	2115	DETECTABLE WARNING PANEL		
		Location 1	20	SF
		Location 2	20	SF
		Location 3	20	SF
		Location 4	20	SF

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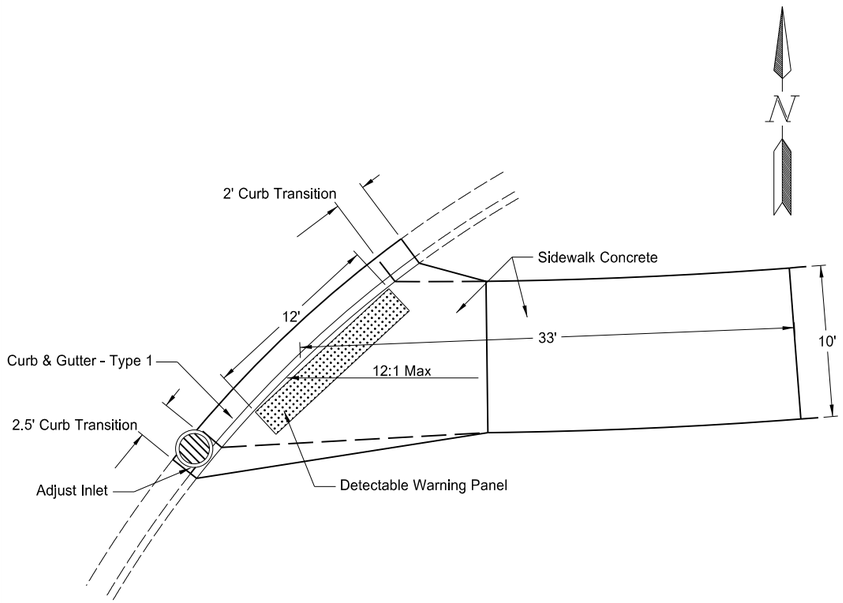
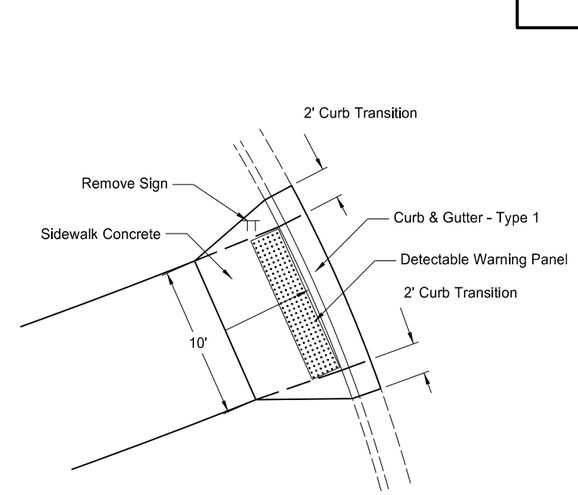
ADA Ramp Detail

Gateway Drive

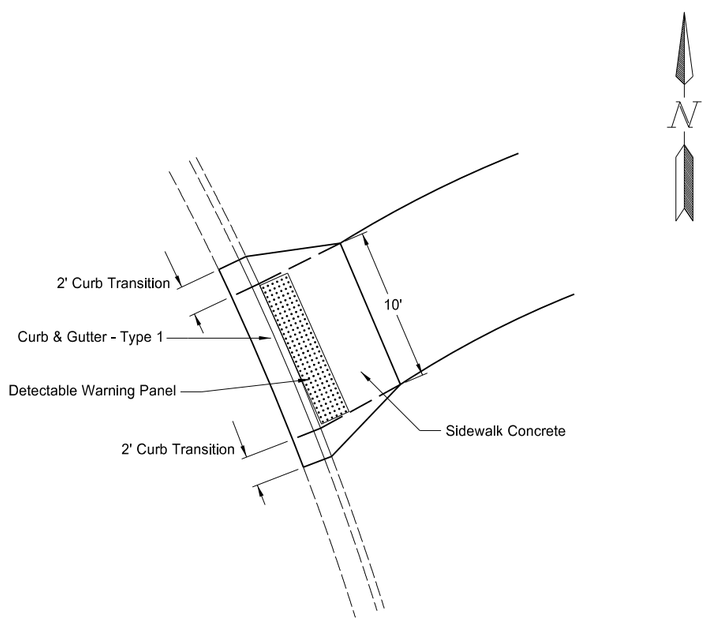
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	90	2



Location 5 Sta 1011+61 66' RT
47th Street



Location 6 Sta 1015+00 116' RT
I-29 Entrance Ramp



Location 7 Sta 1015+20 106' RT
I-29 Entrance Ramp

SPEC CODE		BID ITEM	QUANTITY	UNIT
202	112	REMOVAL OF CONCRETE		
		Location 5	37.0	SY
		Location 6	6.9	SY
		Location 7	6.9	SY
202	119	SAW CONCRETE		
		Location 5	14	LF
		Location 6	14	LF
		Location 7	14	LF
202	130	REMOVAL OF CURB & GUTTER		
		Location 5	21	LF
		Location 6	15	LF
		Location 7	14	LF
302	100	SALVAGED BASE COURSE		
		Location 5	4.5	TON
		Location 6	2.4	TON
		Location 7	2.4	TON
722	6160	ADJUST INLET		
		Location 5	1	EA
748	140	CURB & GUTTER - TYPE 1		
		Location 5	21	LF
		Location 6	15	LF
		Location 7	14	LF
750	100	SIDEWALK CONCRETE		
		Location 5	39.9	SY
		Location 6	8.3	SY
		Location 7	8.3	SY
750	2115	DETECTABLE WARNING PANEL		
		Location 5	24	SF
		Location 6	20	SF
		Location 7	20	SF

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ADA Ramp Detail

Gateway Drive

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	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**	**8**	**19**	**152**
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**	**5**	**37**	**185**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**6**	**30**	**180**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**8**	**59**	**472**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**8**	**5**	**40**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**16**	**39**	**624**
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**	**8**	**39**	**312**
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		28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**8**	**35**	**280**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**35**	**140**
W4-2-48	**48"x48"**	**RIGHT or LEFT LANE TRANSITION SYMBOL**	**8**	**35**	**280**
W5-1-48	**48"x48"**	**ROAD NARROWS**	**2**	**35**	**70**
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT.		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	**48"x60"**	**RAMP ARROW**	**2**	**39**	**78**
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**16**	**35**	**560**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	**48"x48"**	**RIGHT or LEFT LANE CLOSED AHEAD or __ FT.**	**8**	**35**	**280**
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**8**	**35**	**280**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

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

SPECIAL SIGNS

R3-2-30	**30"x30"**	**No_Left_Turn**	**2**	**17**	**34**
R3-5R-48	**48"x60"**	**Right Turn Only**	**2**	**28**	**56**
W5-4-48	**48"x48"**	**Ramp Narrows**	**4**	**35**	**140**
w13-4P	**30"x24"**	**On Ramp**	**4**	**15**	**60**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**4223**

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/

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**720**
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	
704-1060	**DELINEATOR DRUMS**	**EACH**	**150**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**200**
704-1070	DELINEATOR	EACH	
704-1072	**FLEXIBLE DELINEATORS**	**EACH**	**9**
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**	**2**
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
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	

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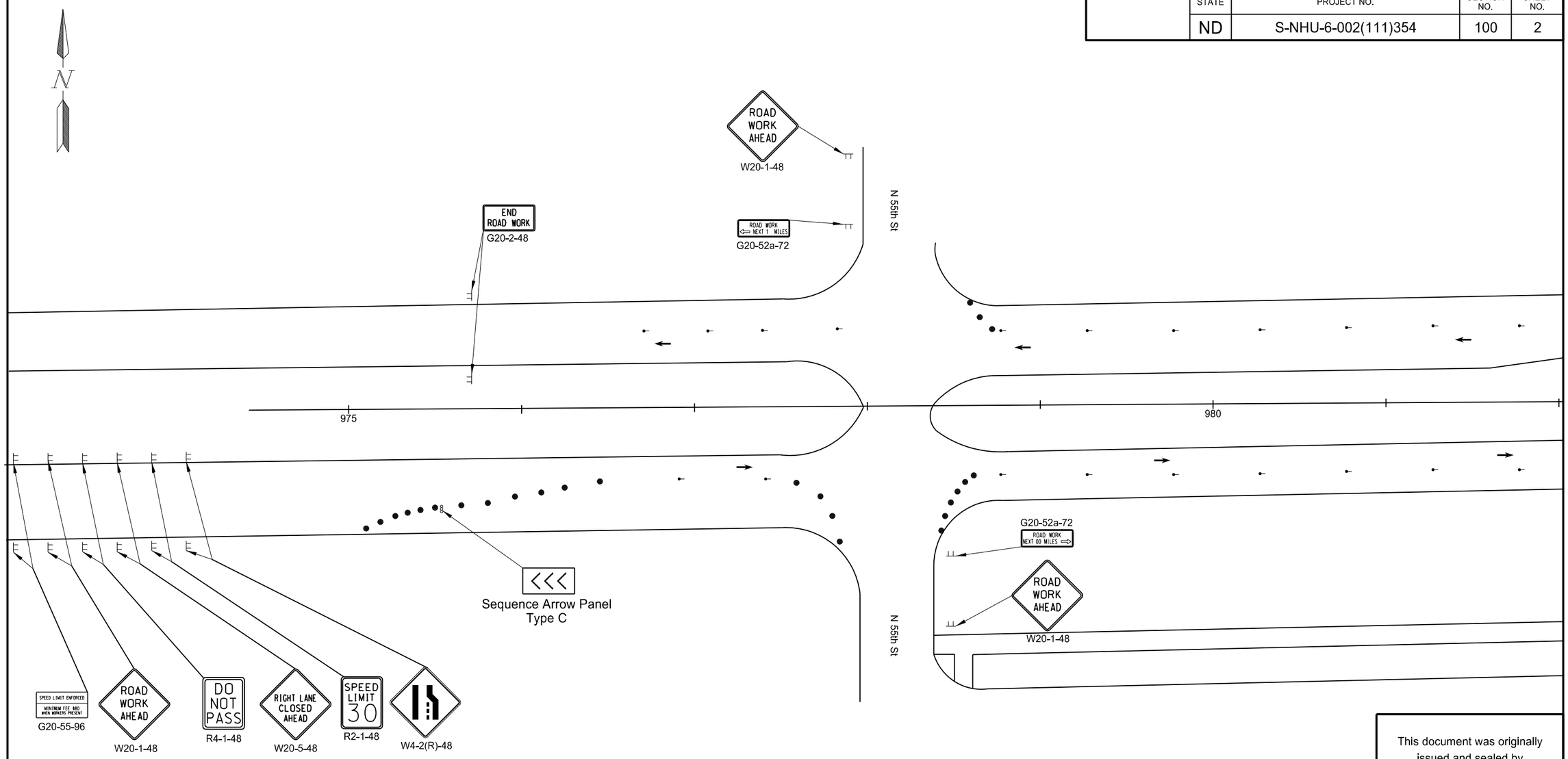
Traffic Control Devices List

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	2



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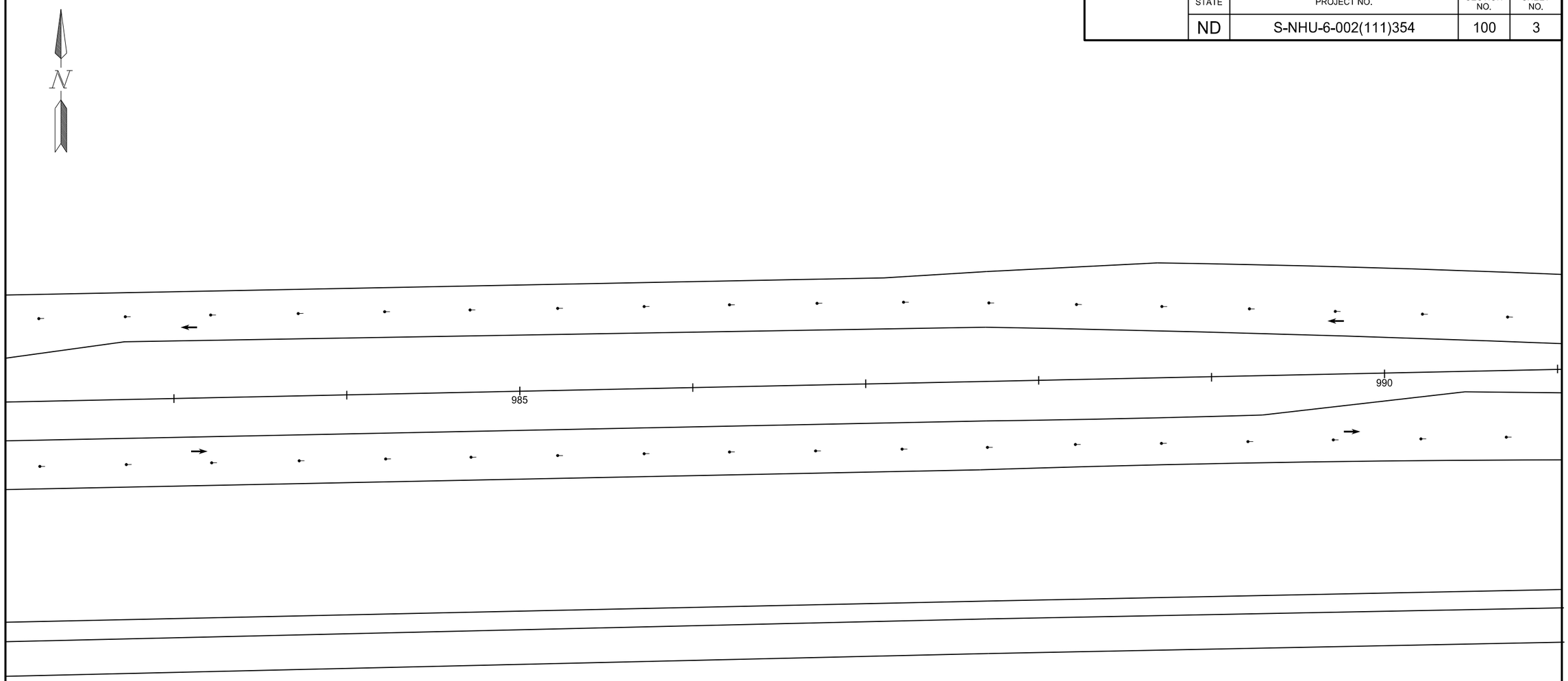
Traffic Control Layout
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	3



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Traffic Control Layout
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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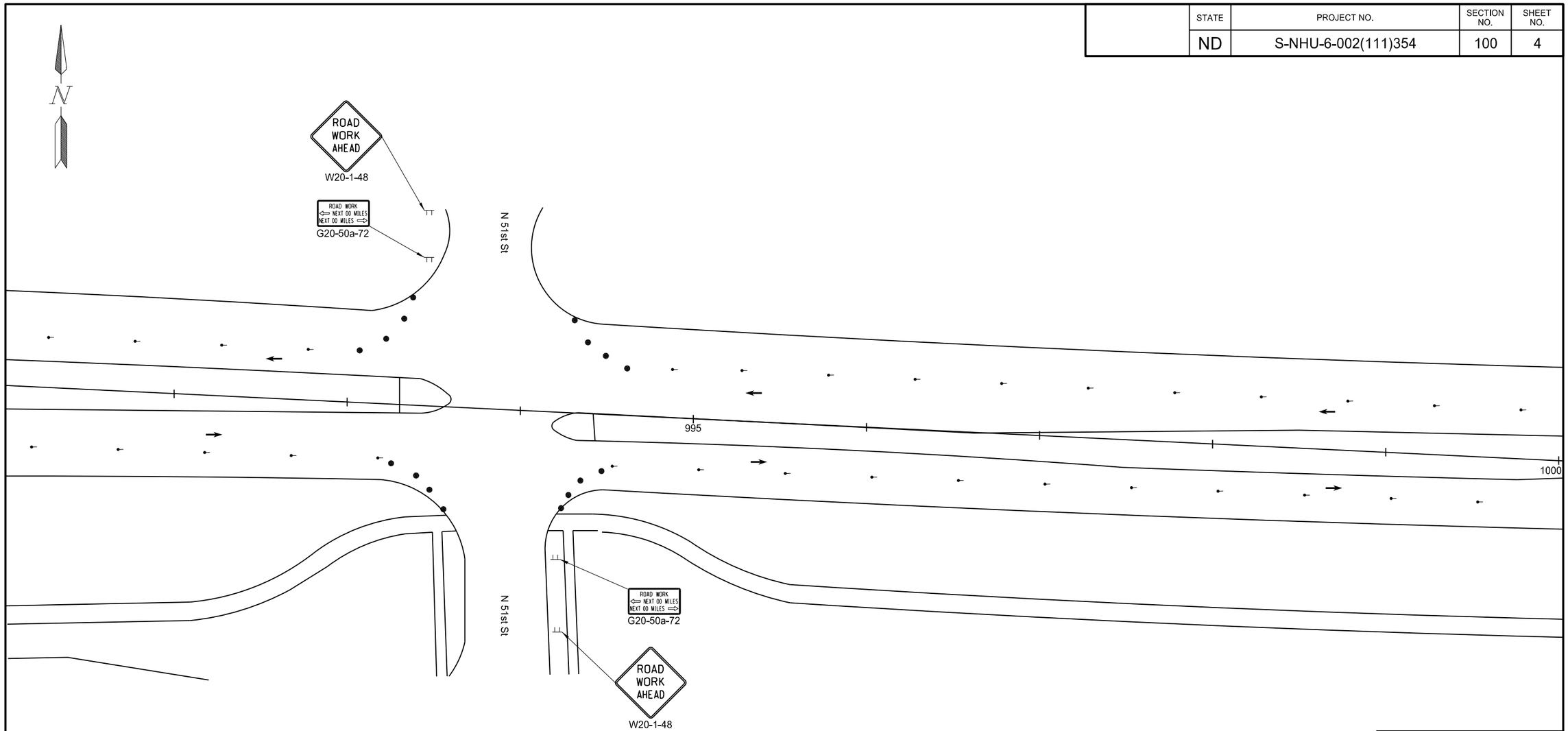

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Traffic Control Layout
Phase 1

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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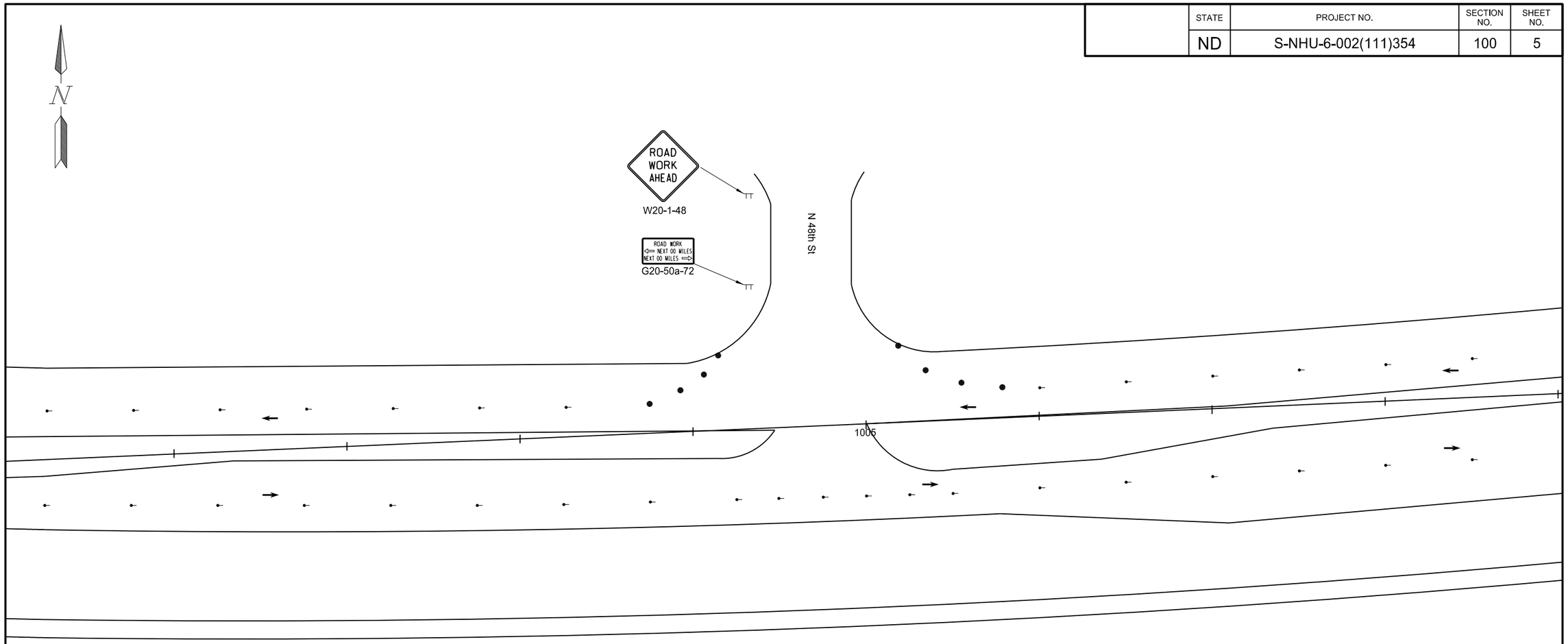

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Traffic Control Layout
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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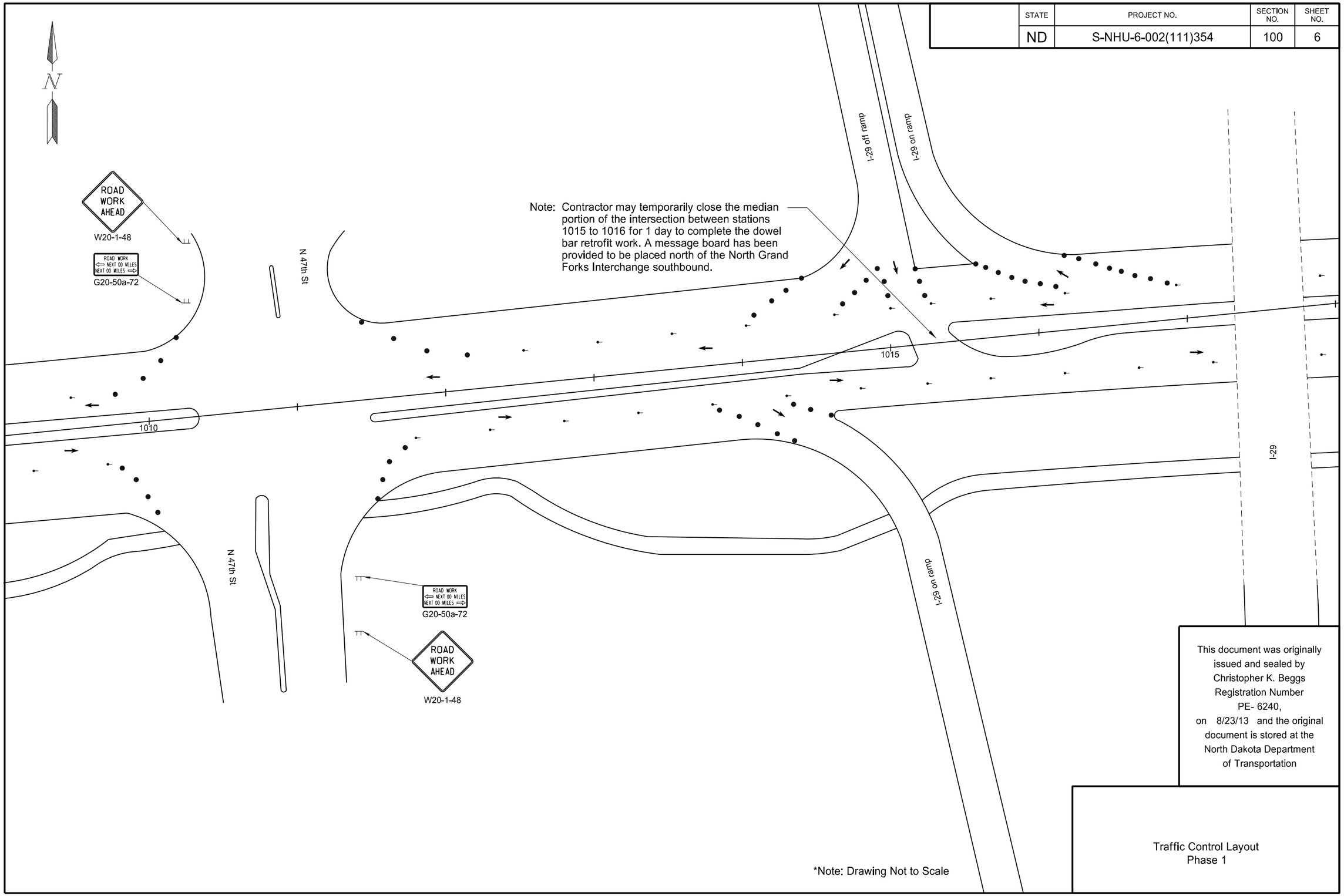

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Traffic Control Layout
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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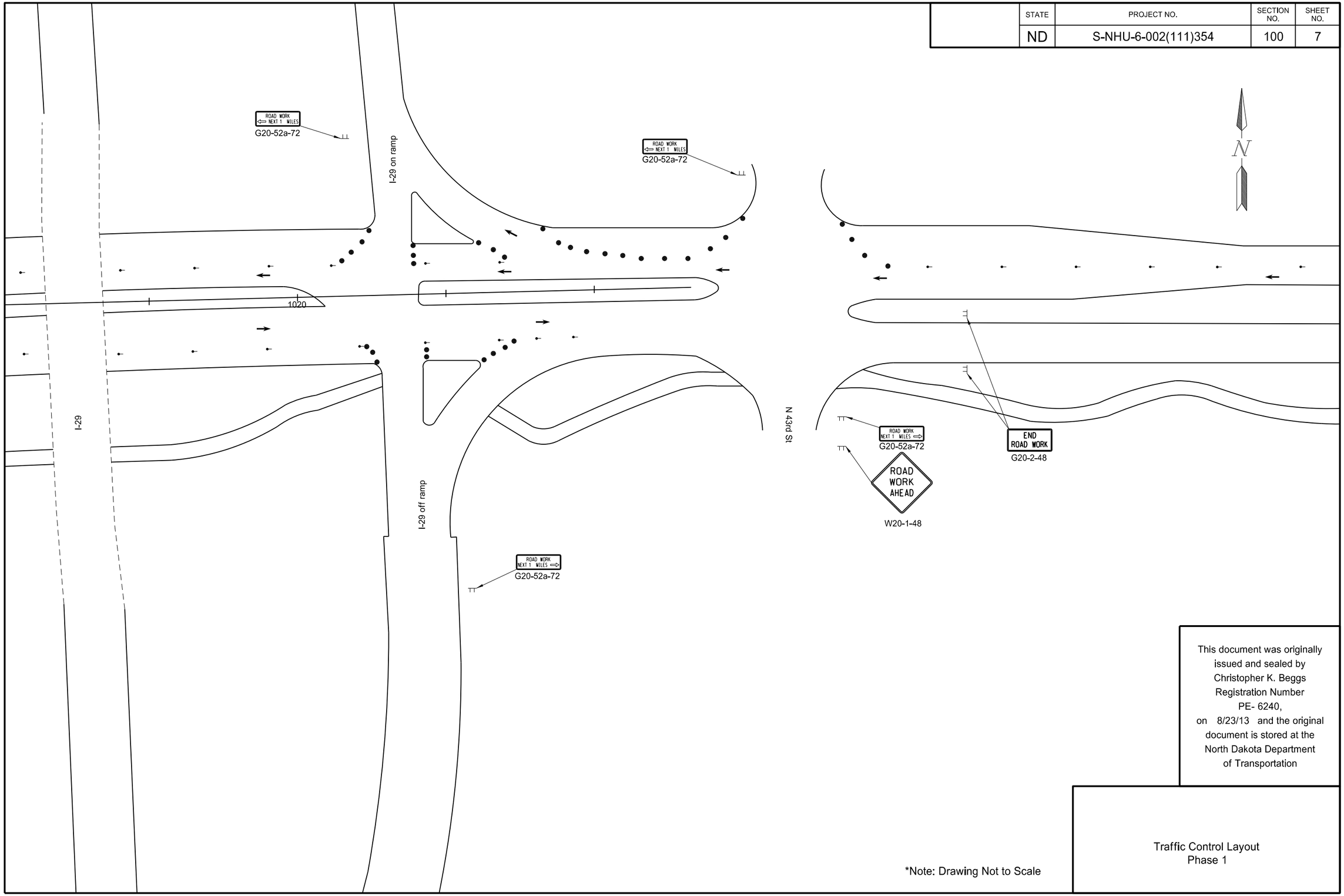

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Traffic Control Layout
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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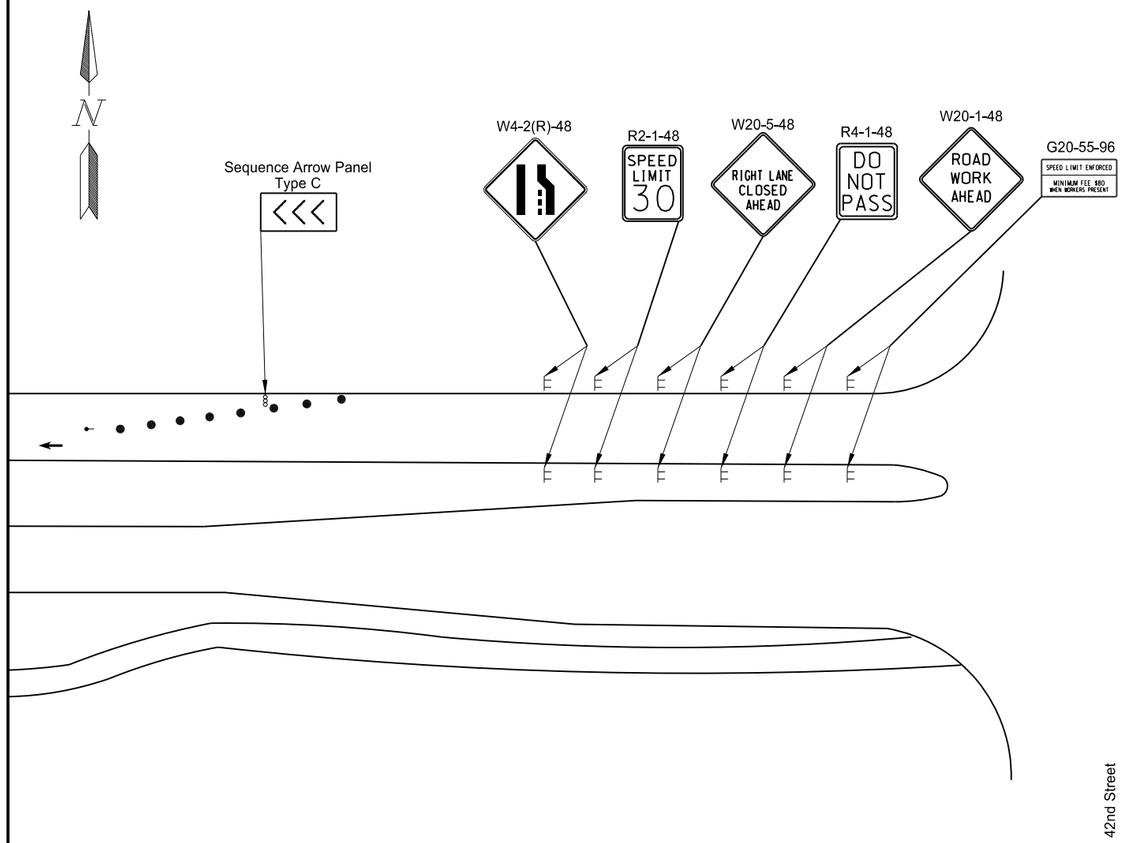

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Traffic Control Layout
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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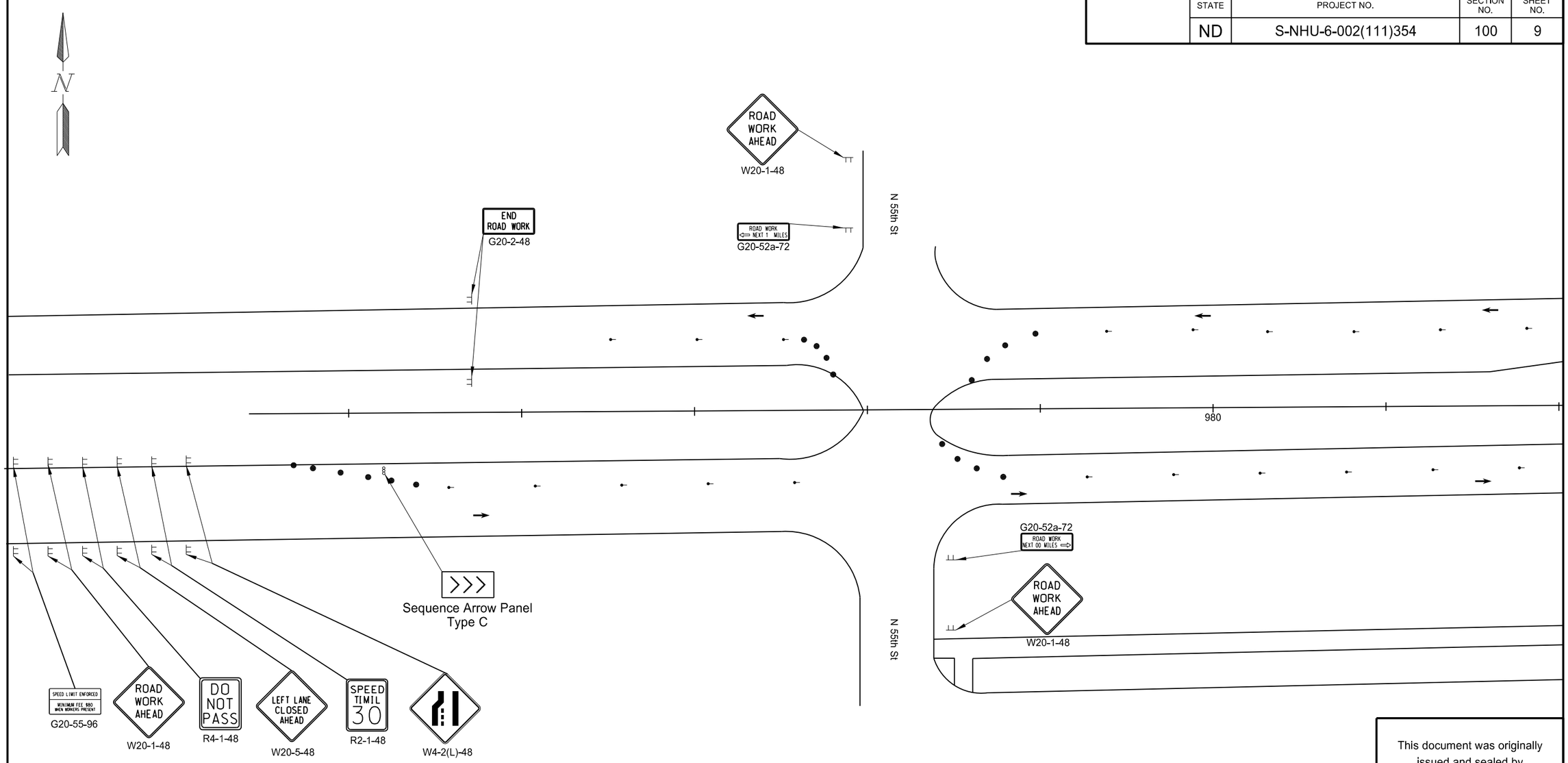

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Traffic Control Layout
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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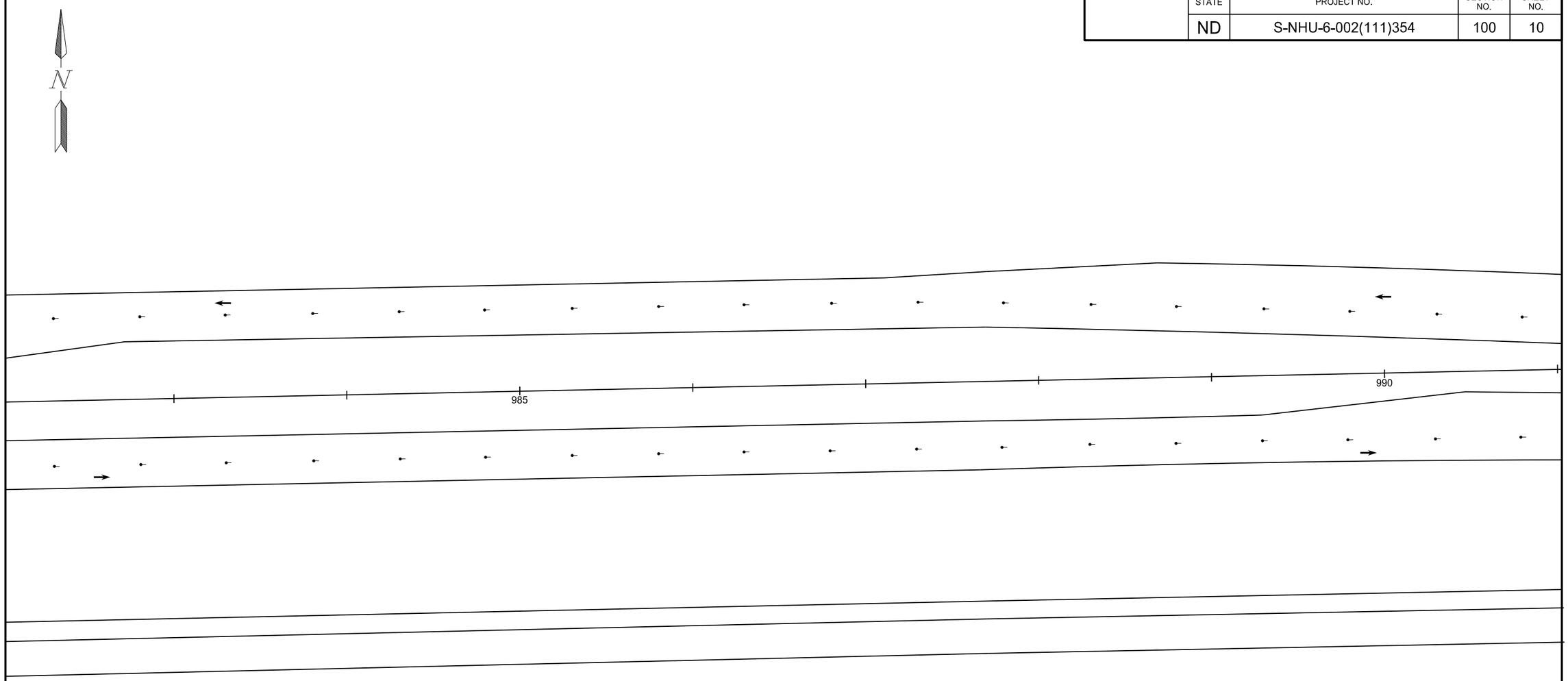

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Traffic Control Layout
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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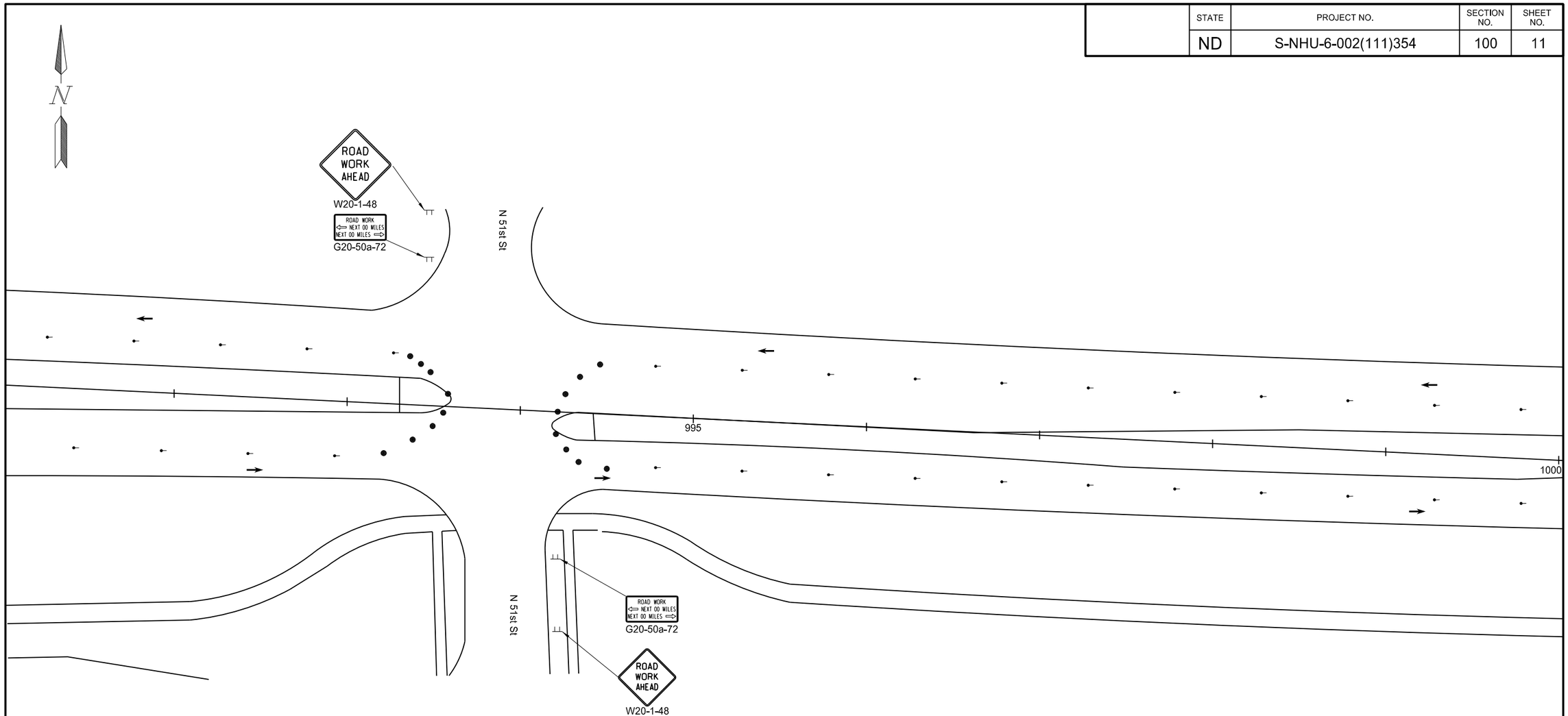

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Traffic Control Layout
Phase 2

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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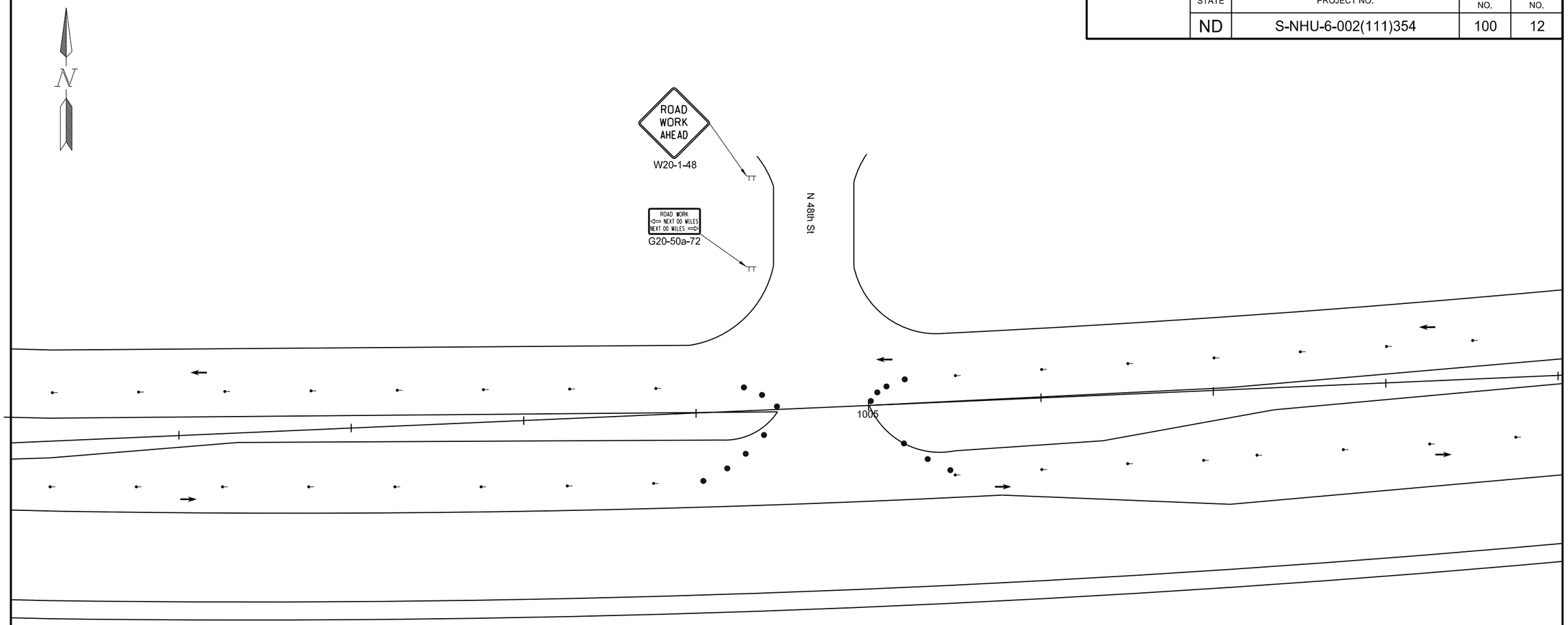

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Phase 2

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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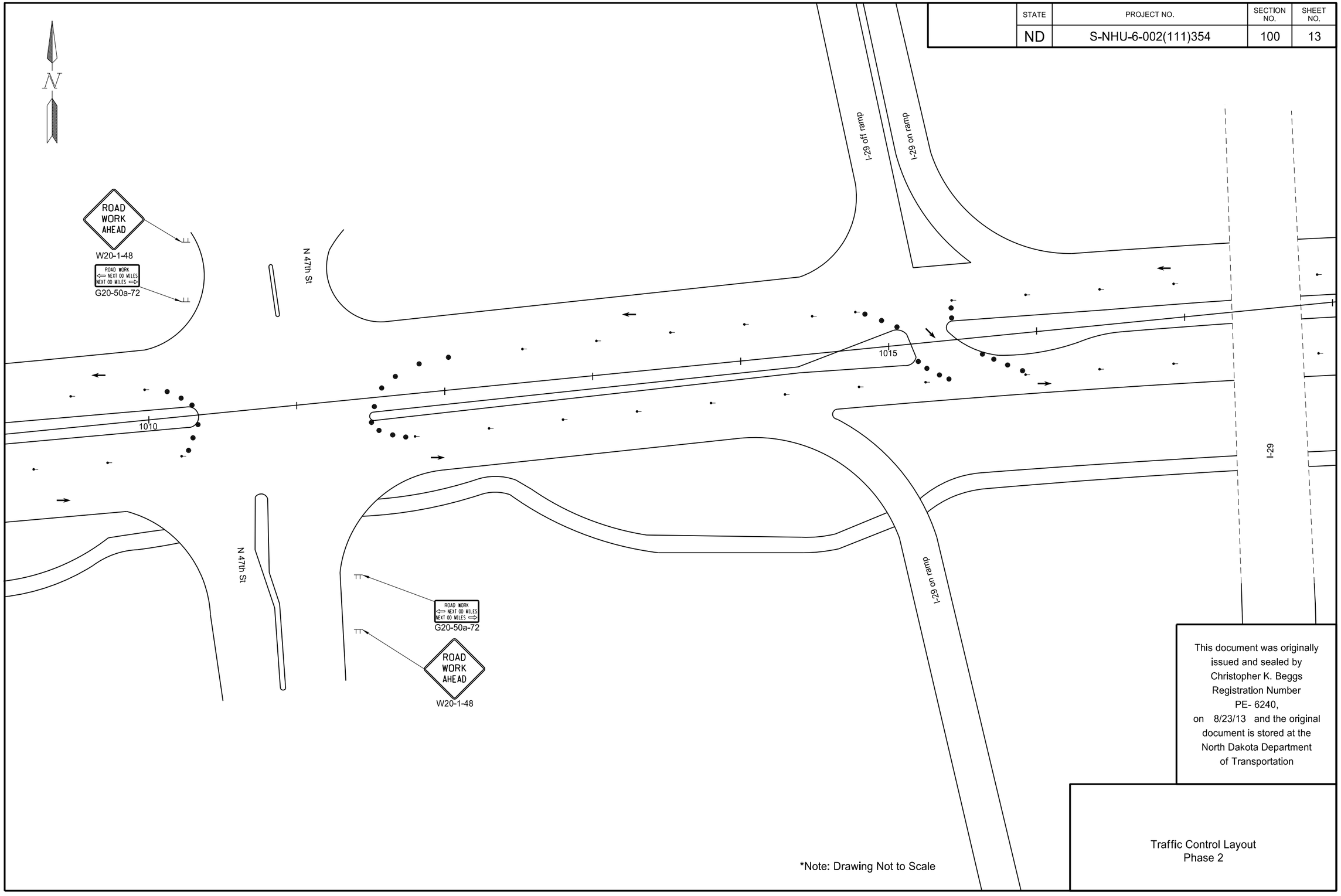

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Traffic Control Layout
Phase 2

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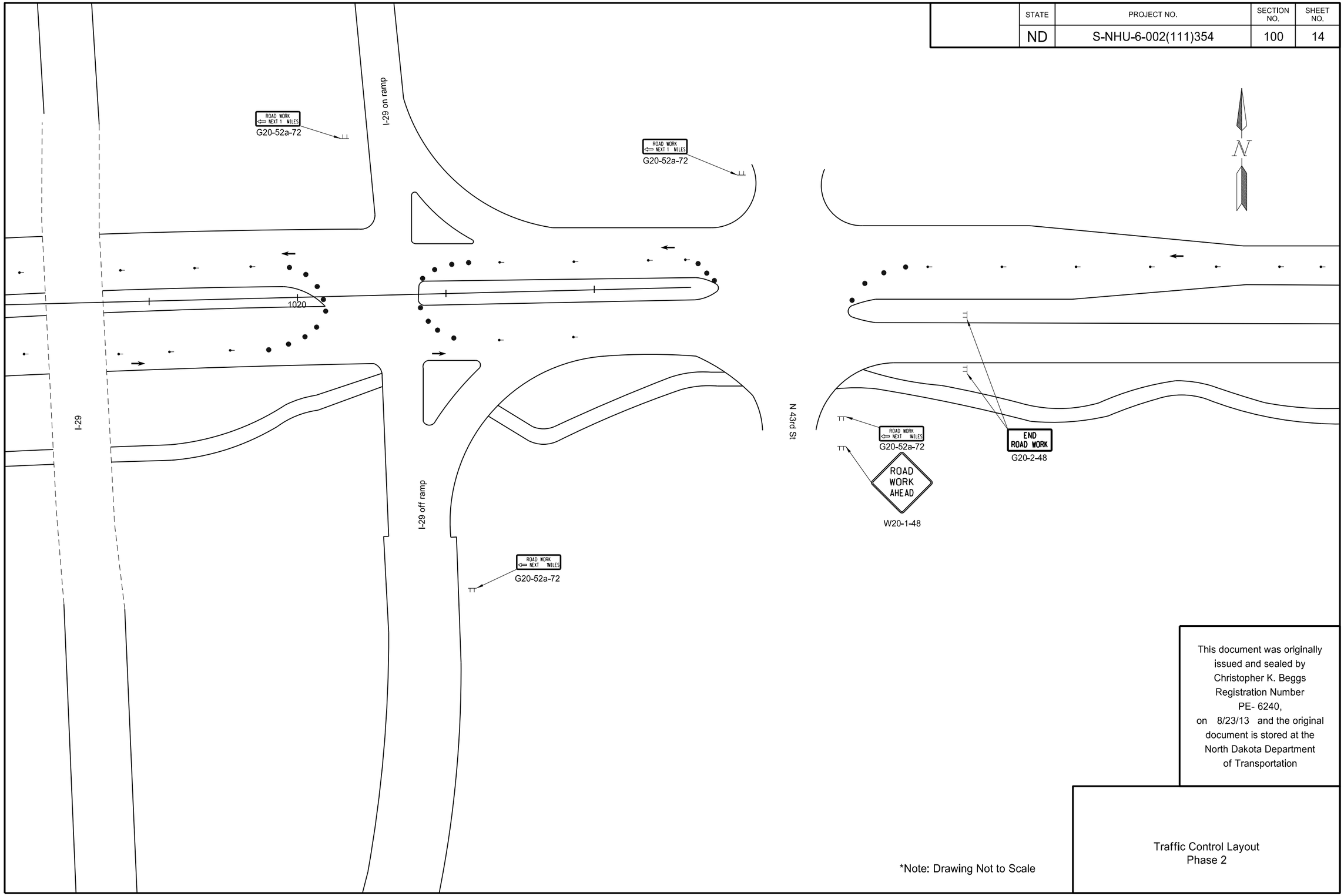

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Traffic Control Layout
Phase 2

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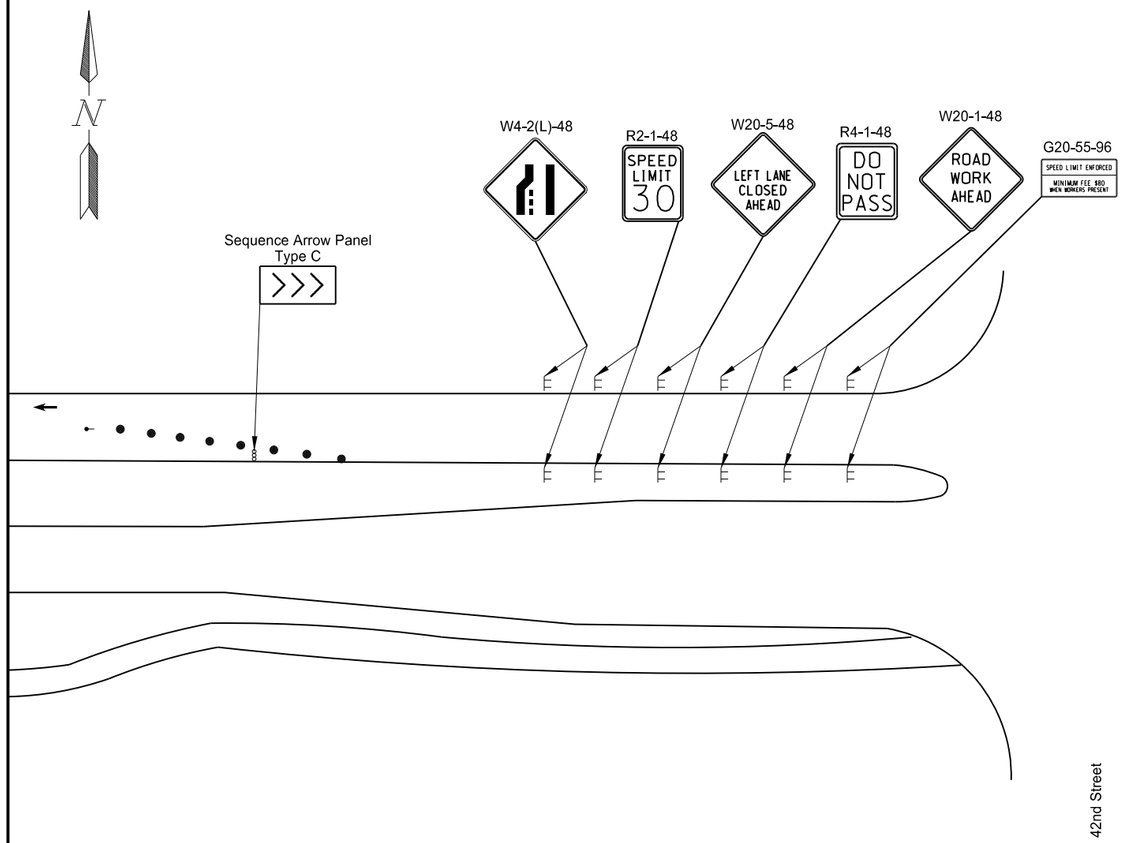

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Traffic Control Layout
Phase 2

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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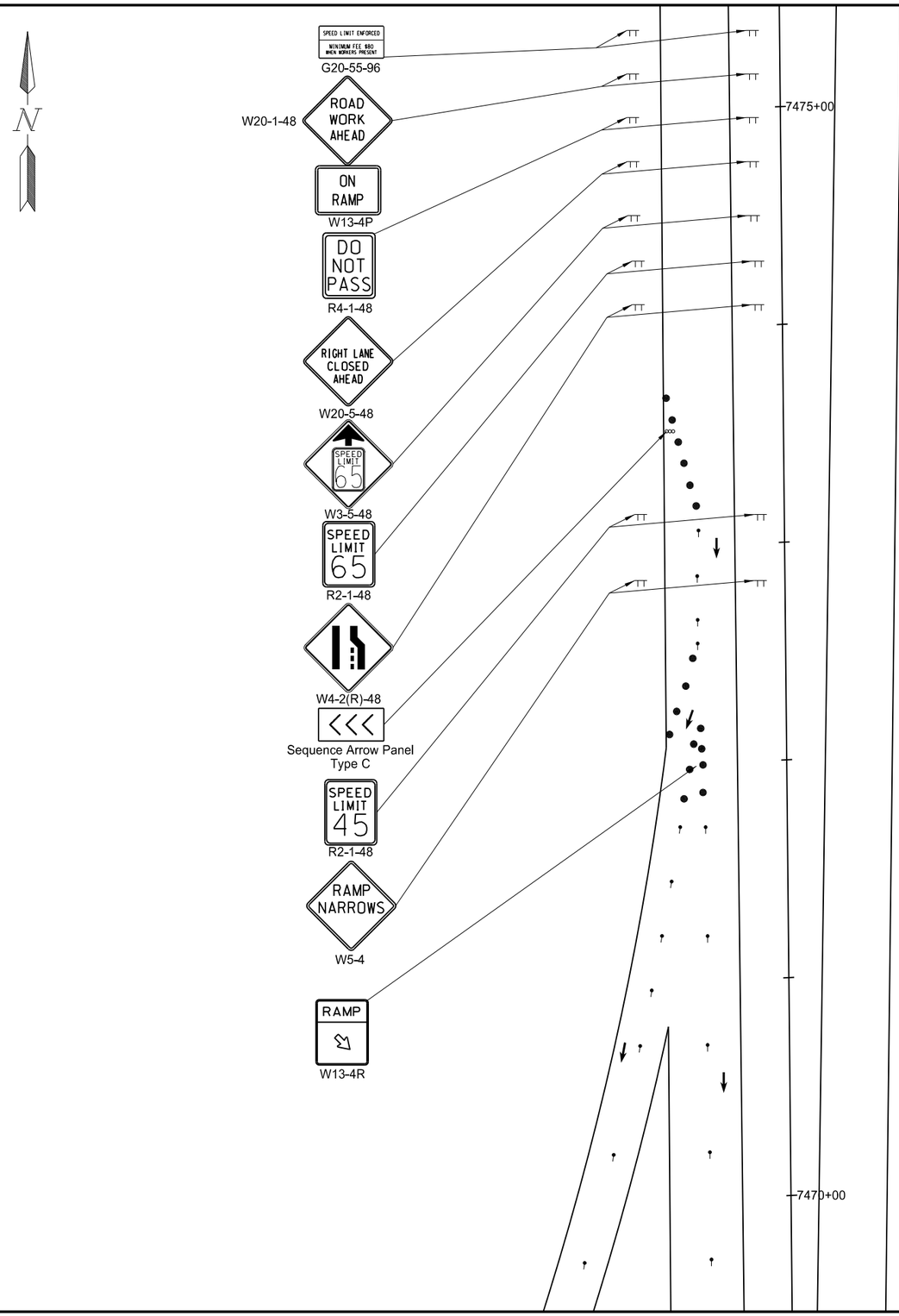

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Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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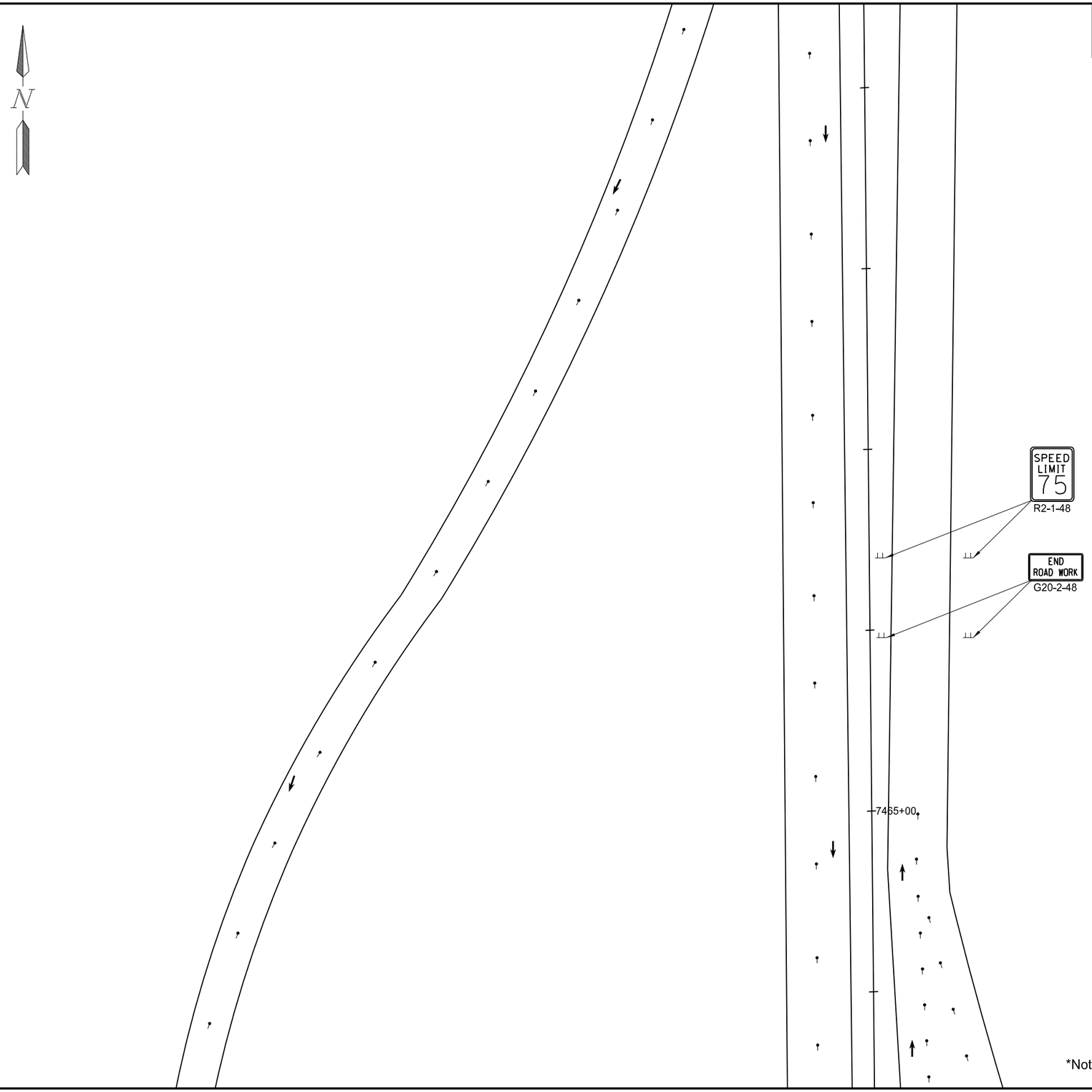

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Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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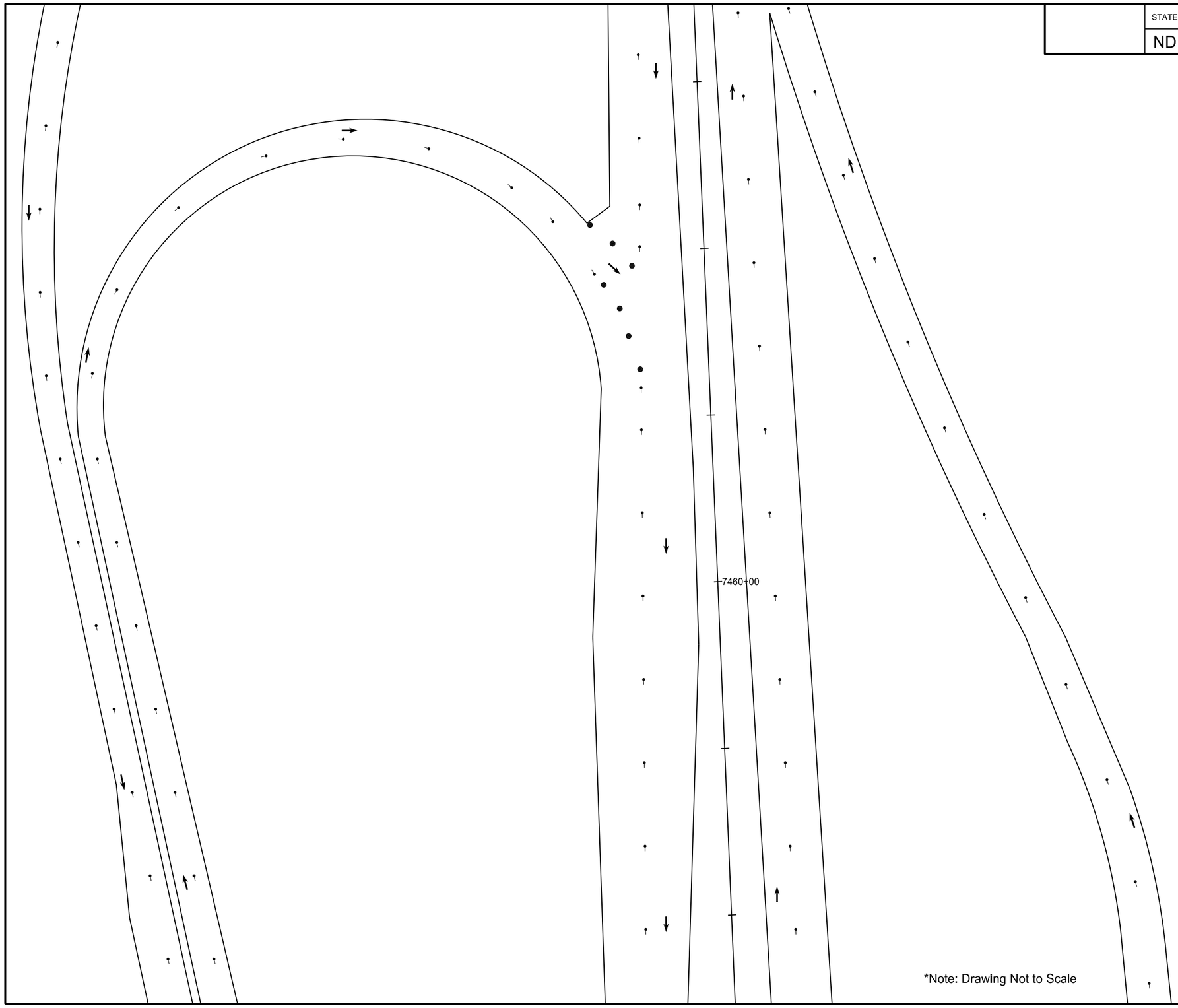

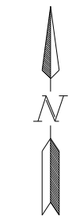

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Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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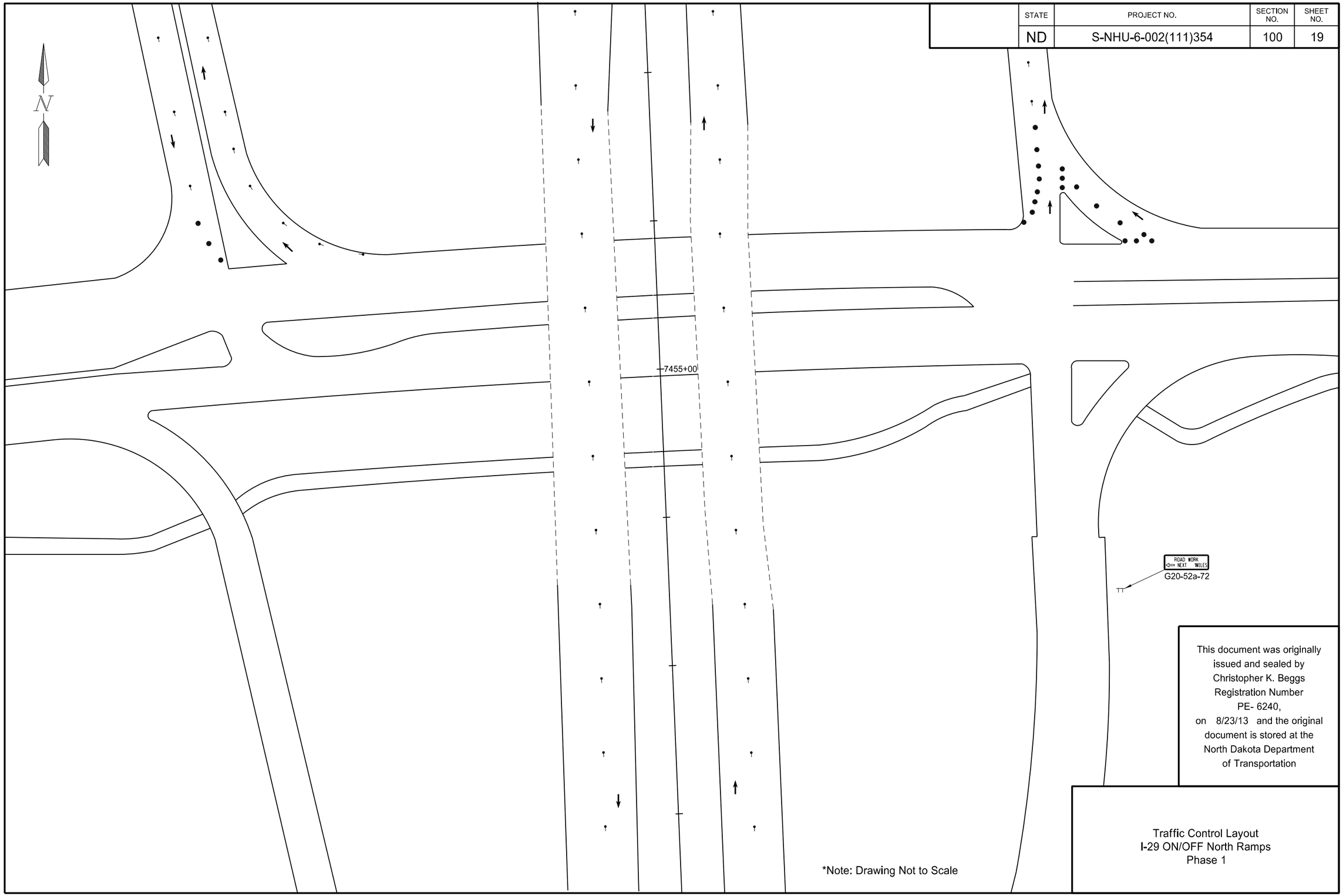

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Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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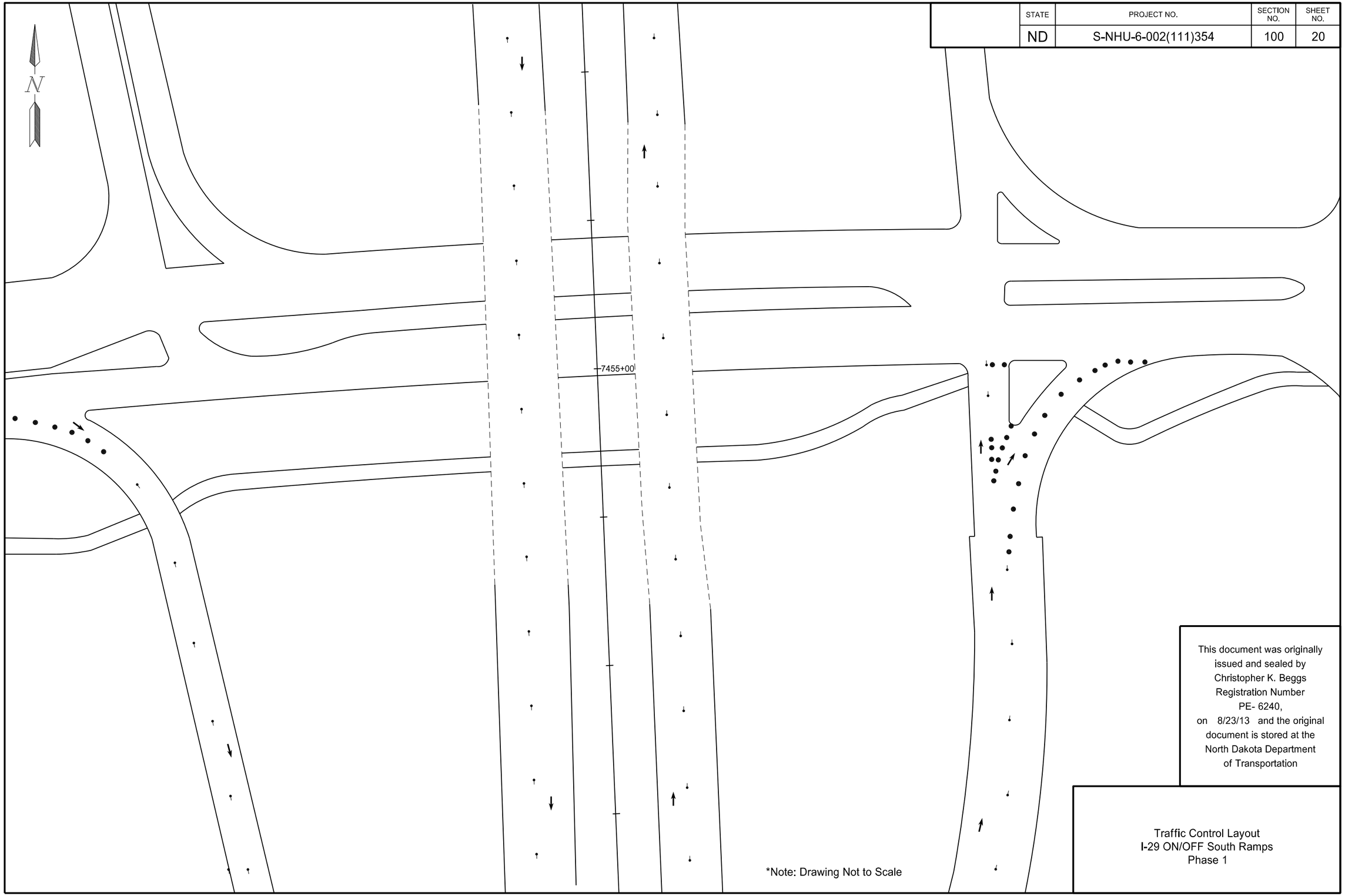

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Traffic Control Layout
I-29 ON/OFF South Ramps
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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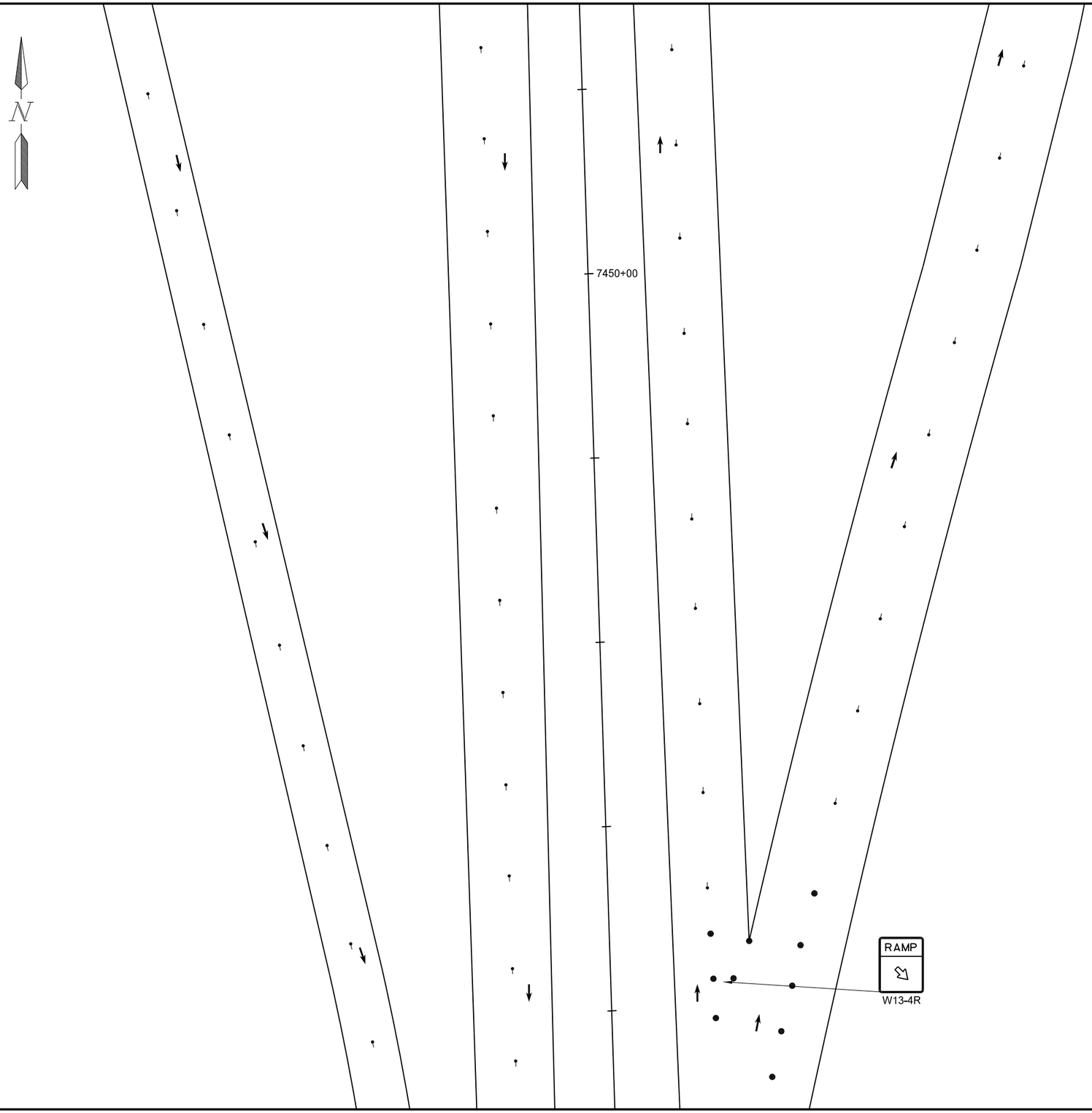

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Traffic Control Layout
I-29 ON/OFF South Ramps
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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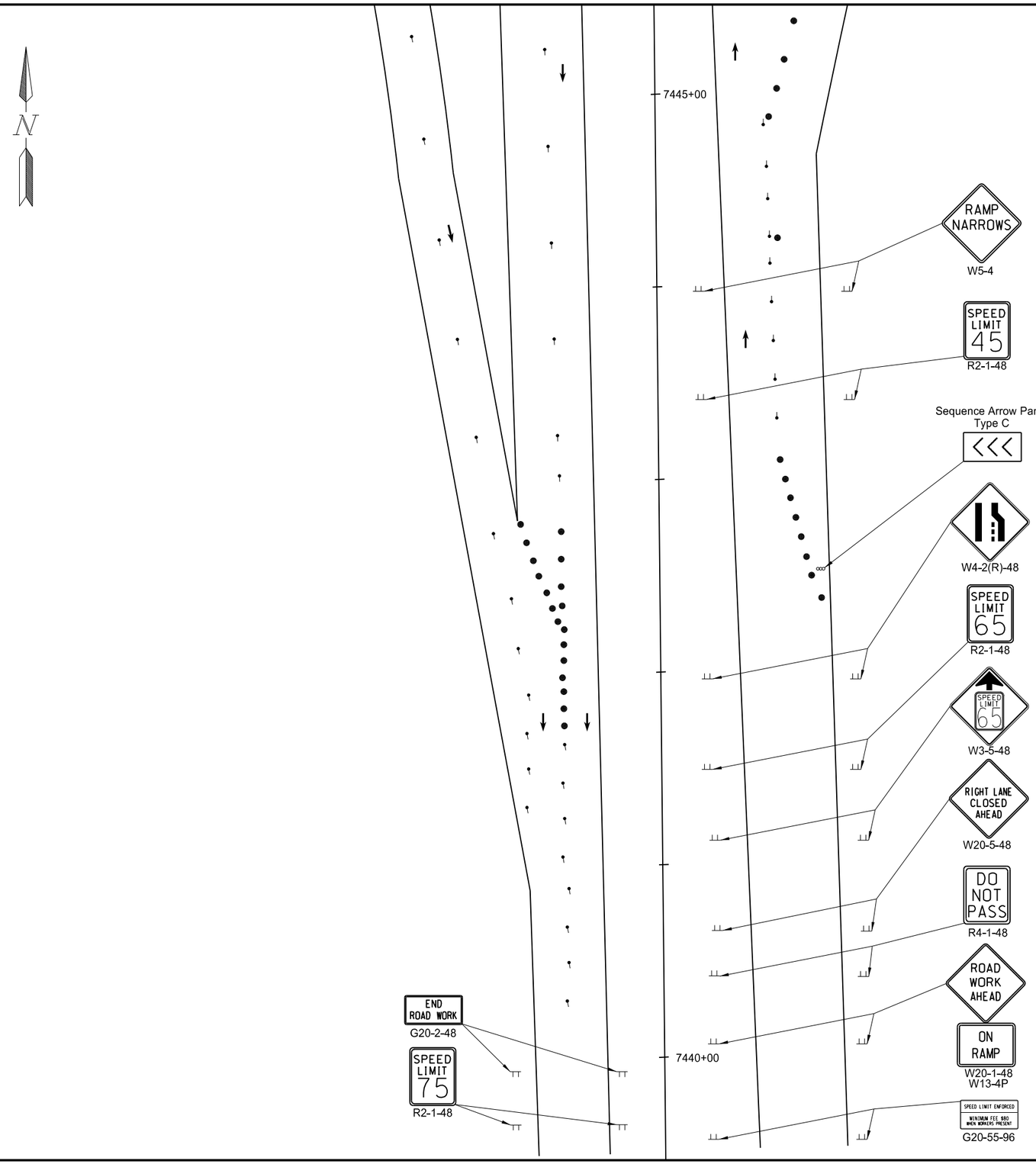

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Traffic Control Layout
I-29 ON/OFF South Ramps
Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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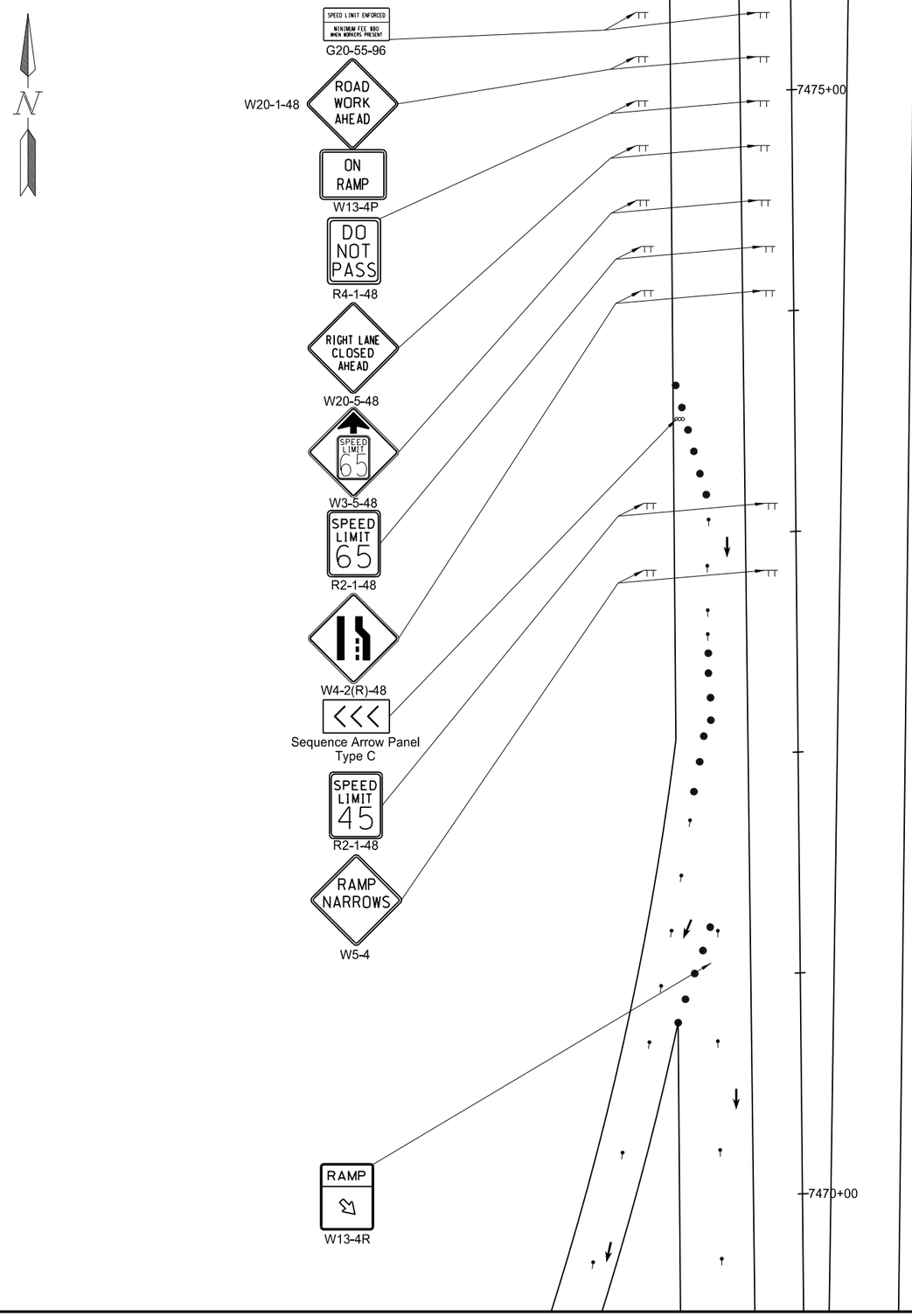

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Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 2

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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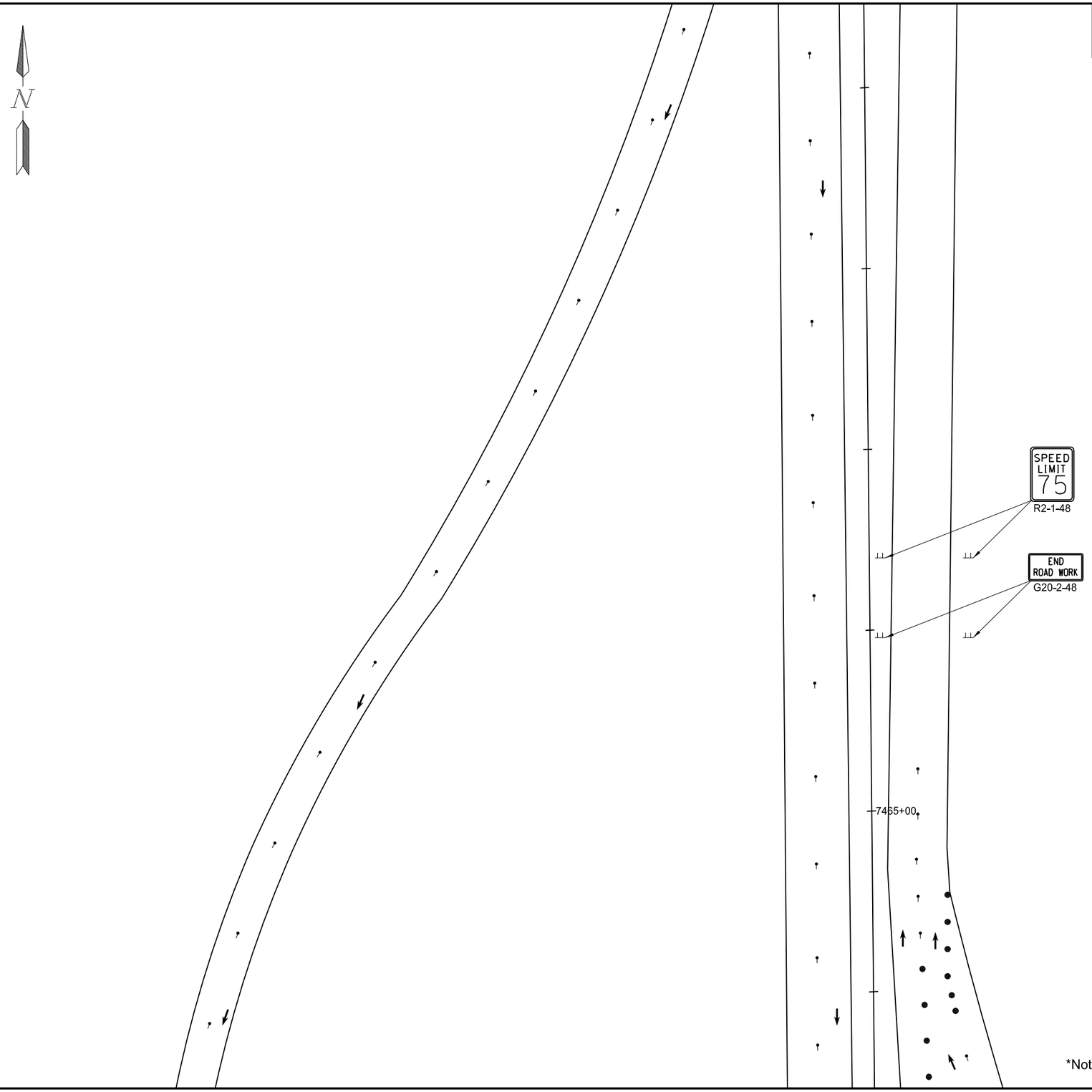

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Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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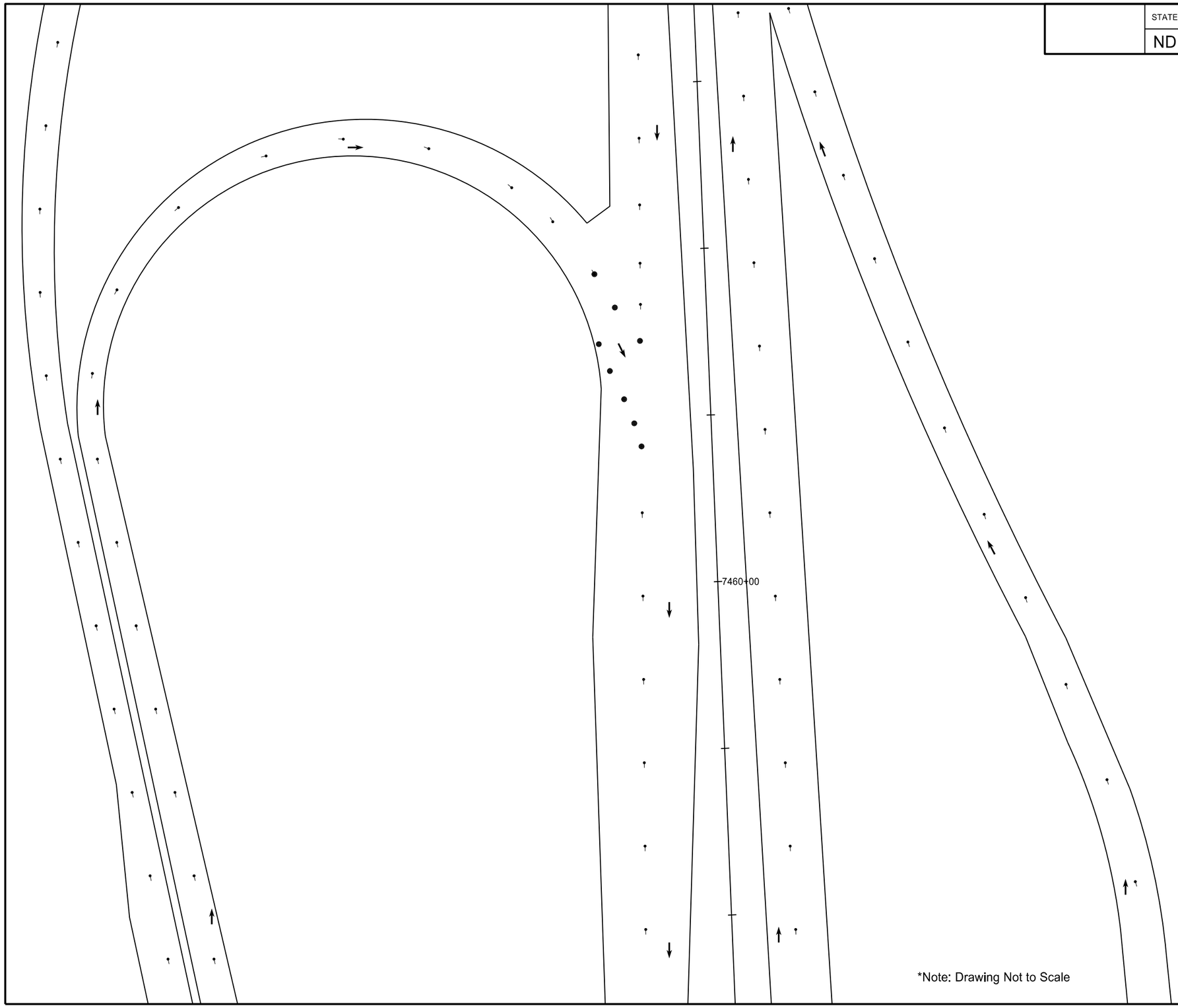

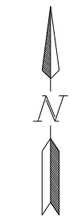

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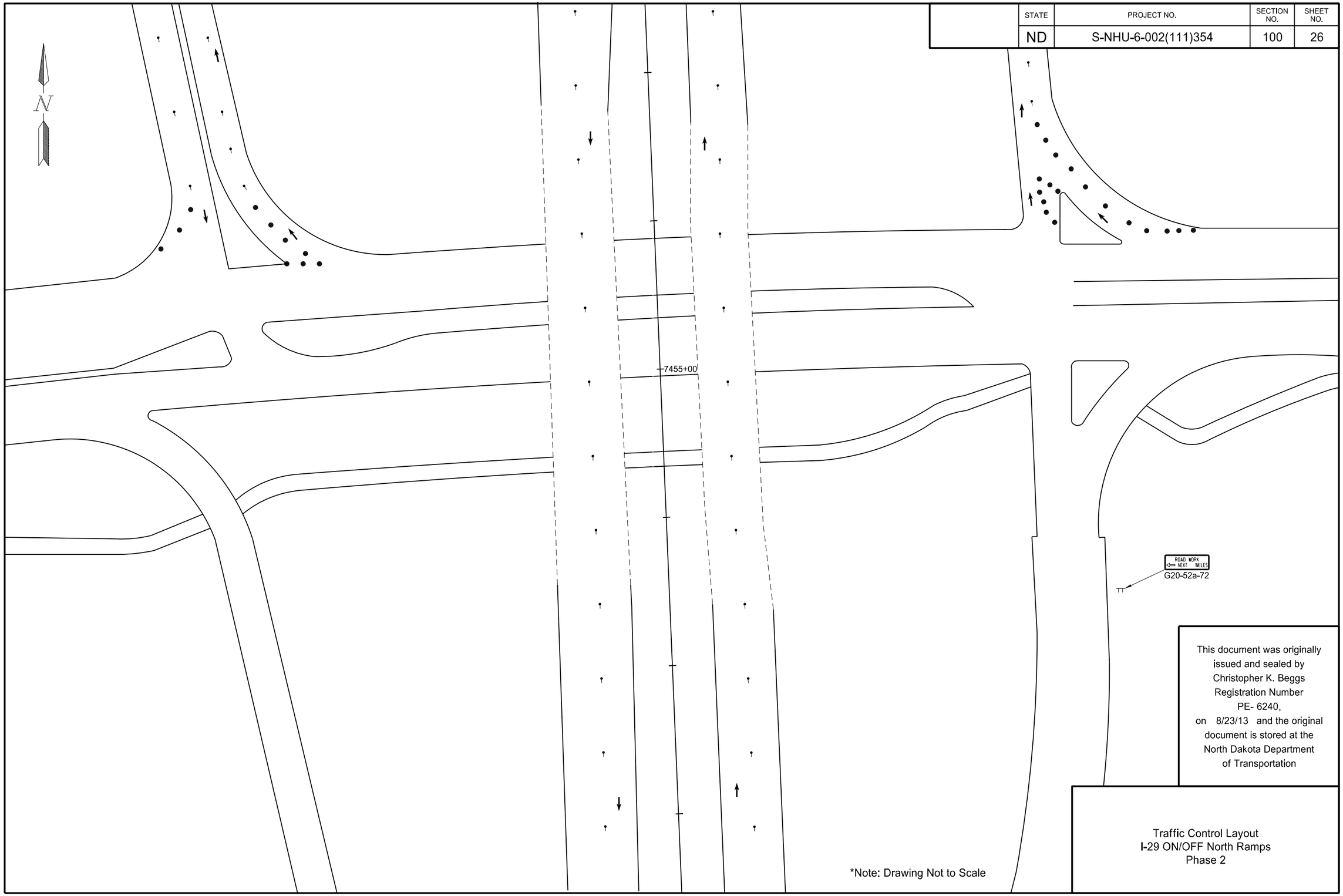
Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	26



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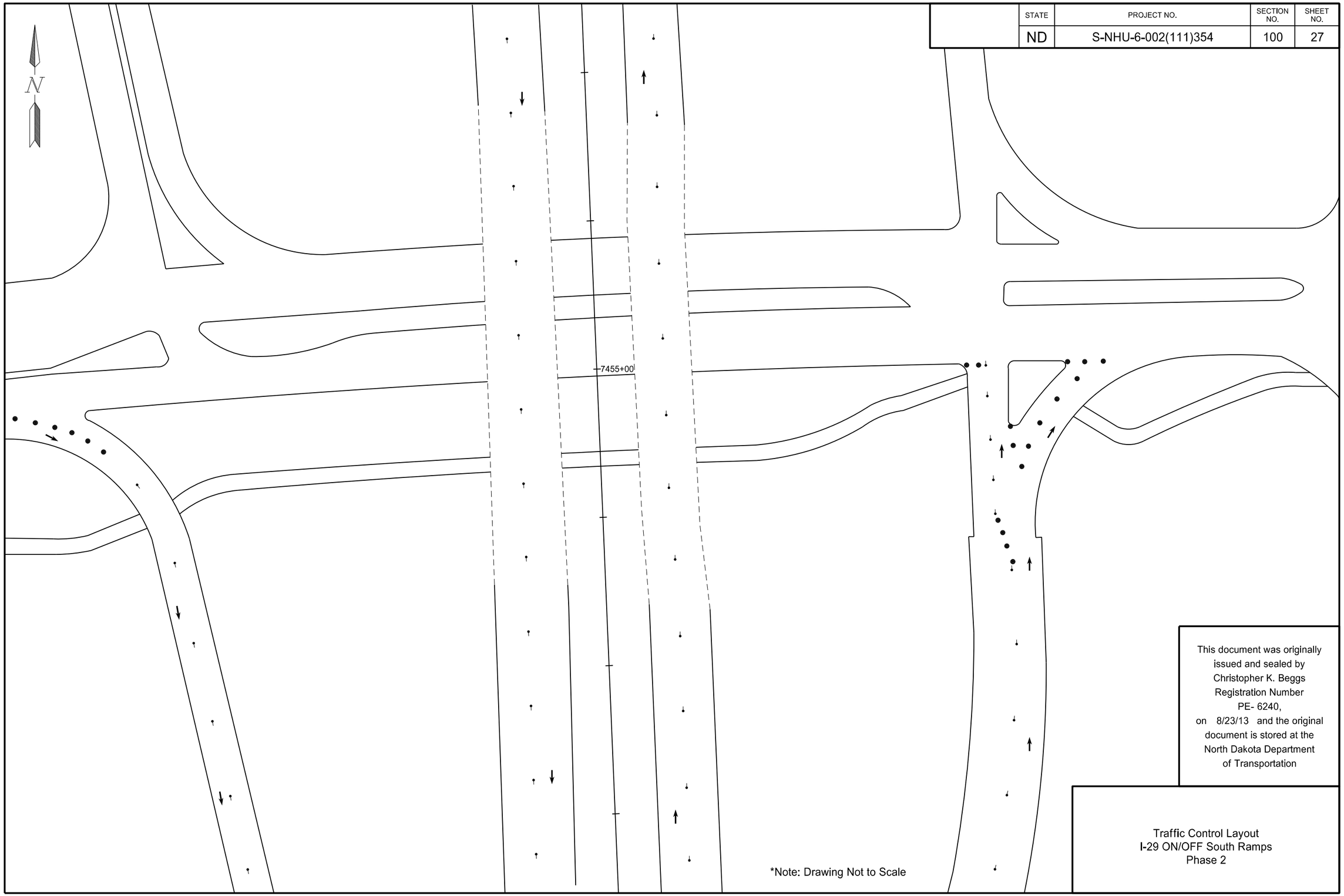
*Note: Drawing Not to Scale

Traffic Control Layout
I-29 ON/OFF North Ramps
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	27



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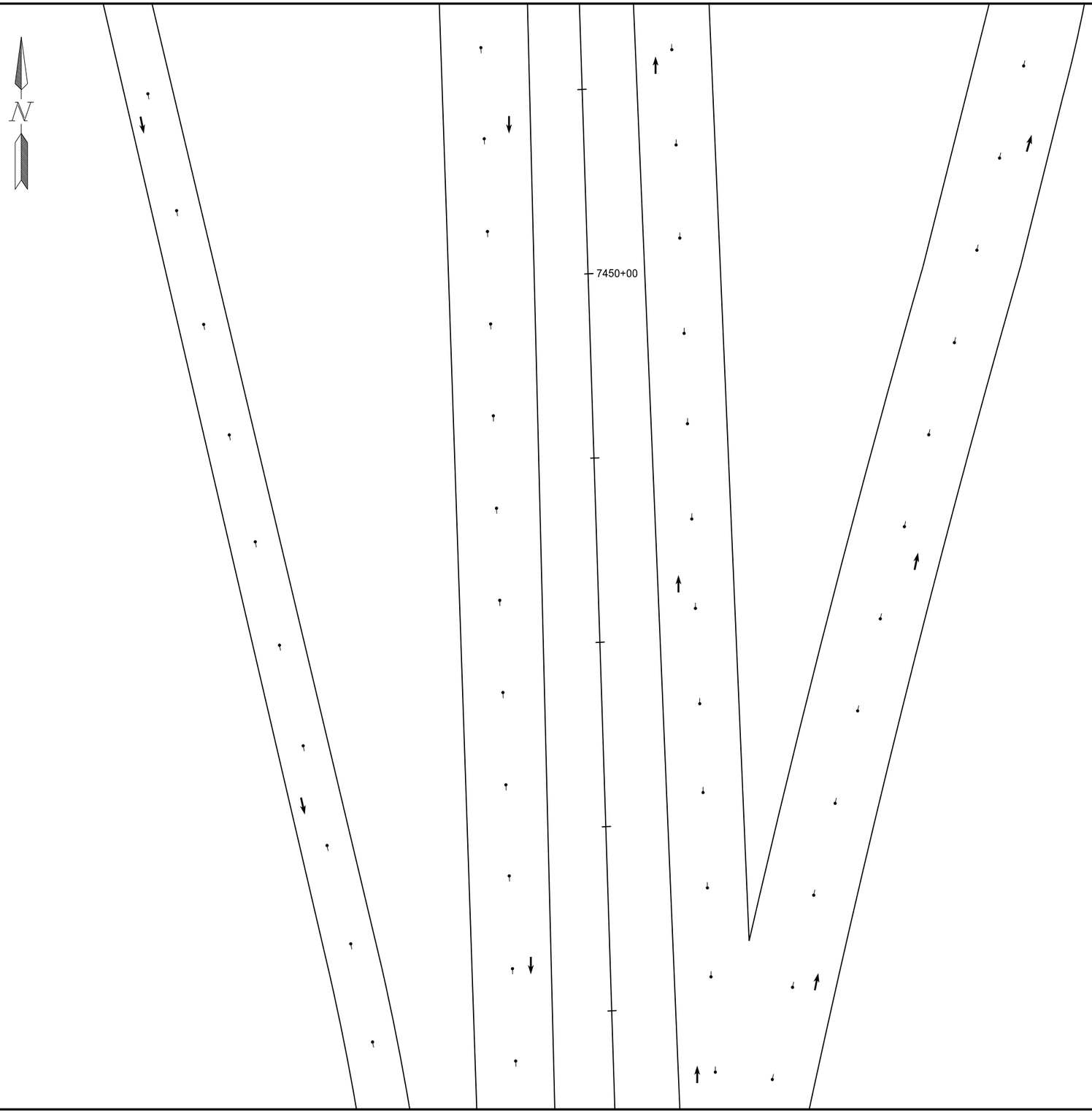
Traffic Control Layout
I-29 ON/OFF South Ramps
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	28



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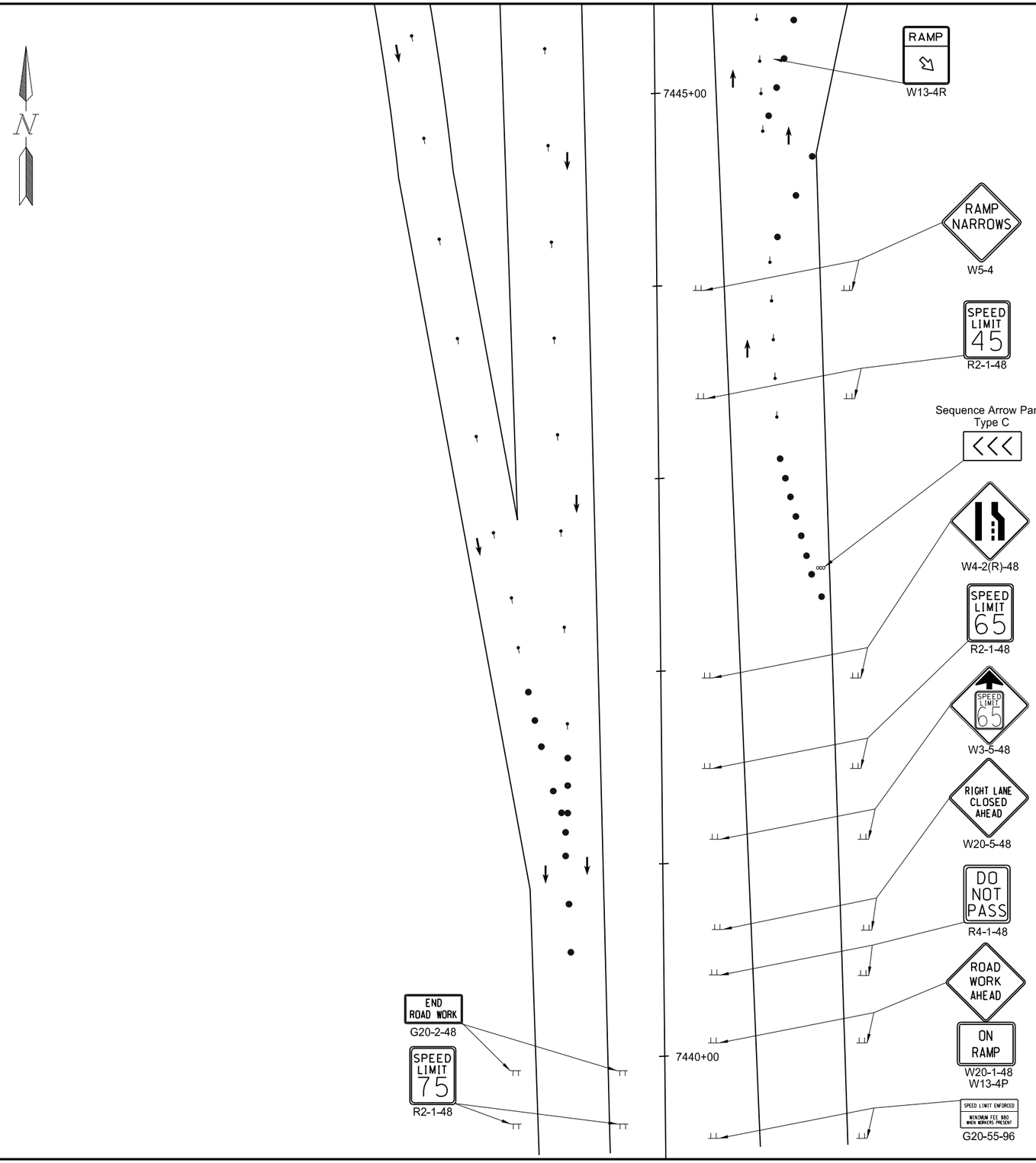
Traffic Control Layout
I-29 ON/OFF South Ramps
Phase 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	29



*Note: Drawing Not to Scale

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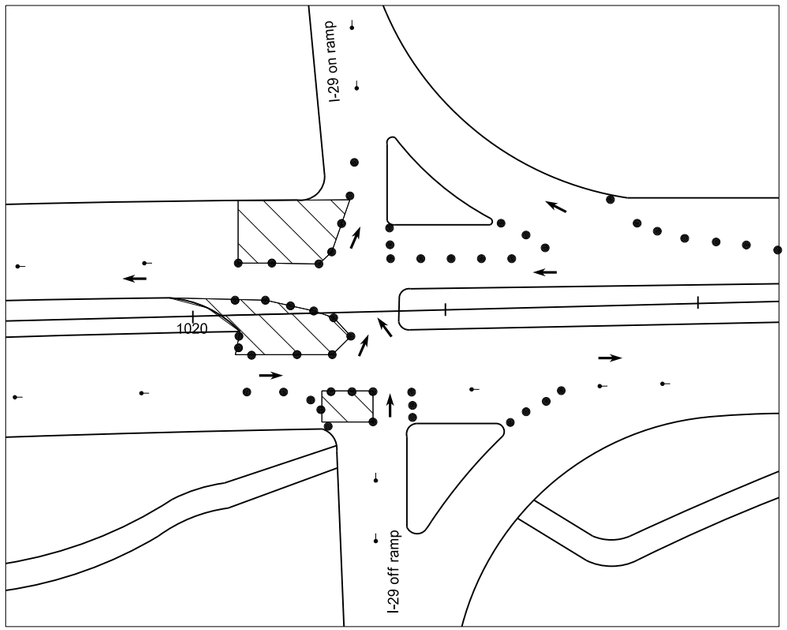
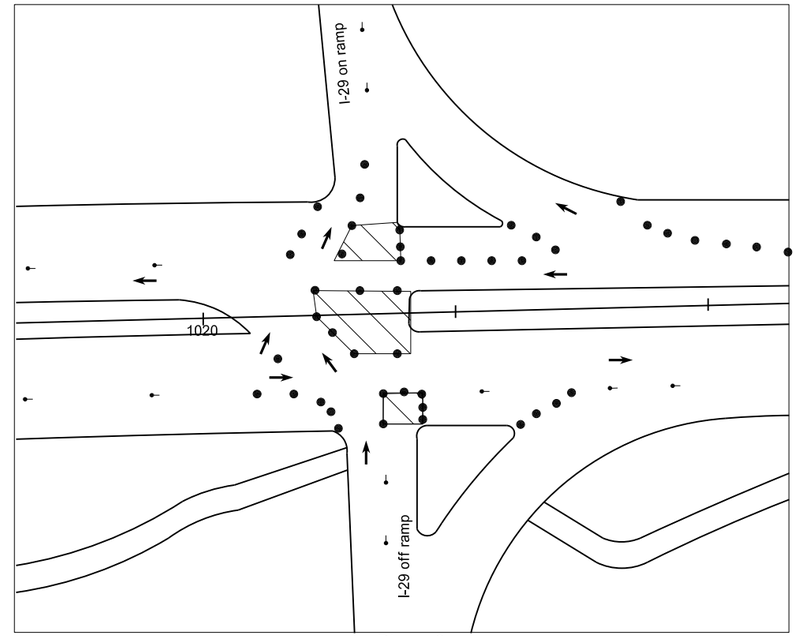
Traffic Control Layout
I-29 ON/OFF South Ramps
Phase 2

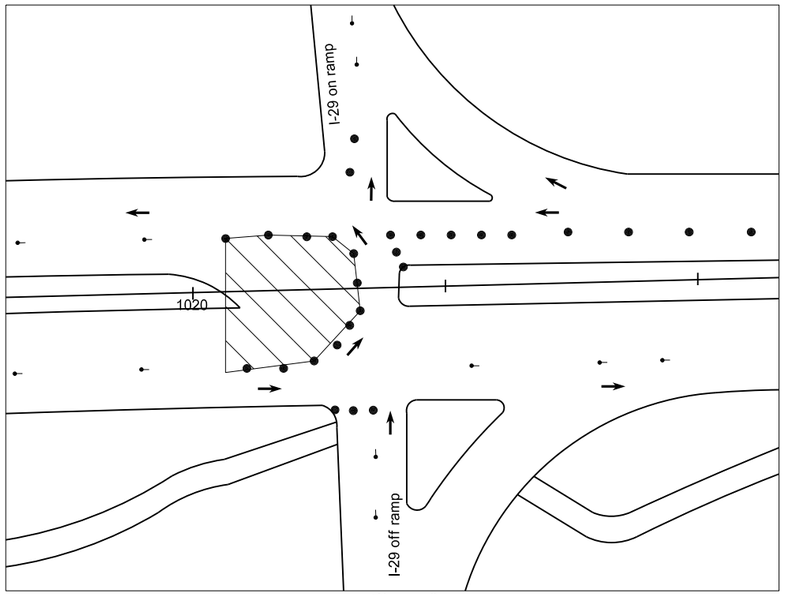
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	30



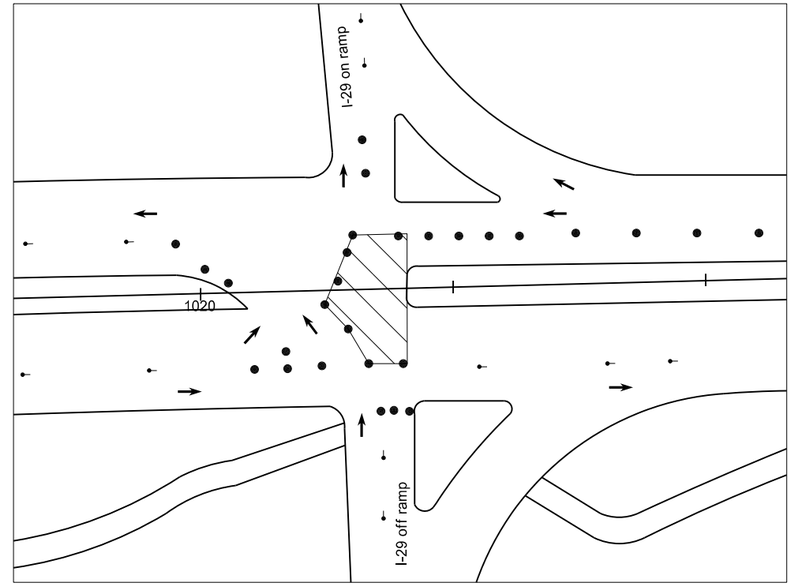
Phase 1



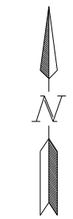
Phase 2



Phase 3



Phase 4



Construction Work Area

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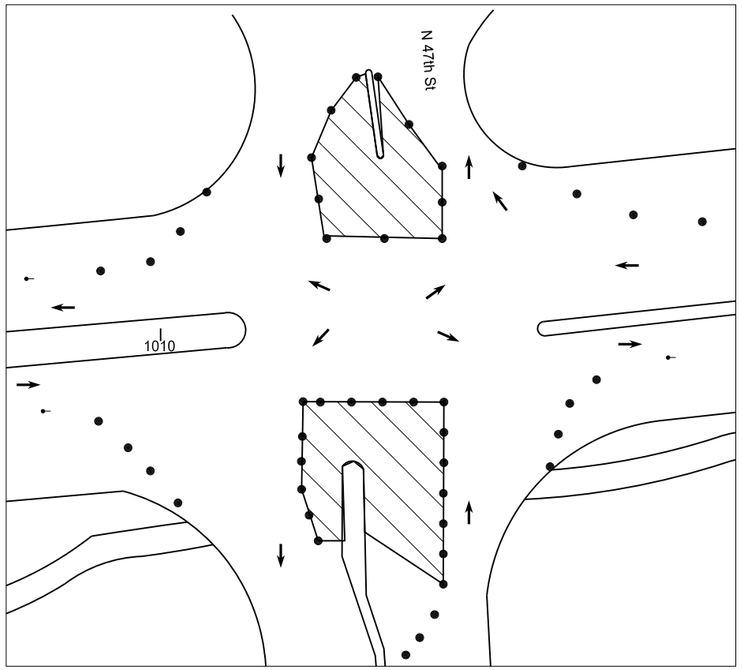
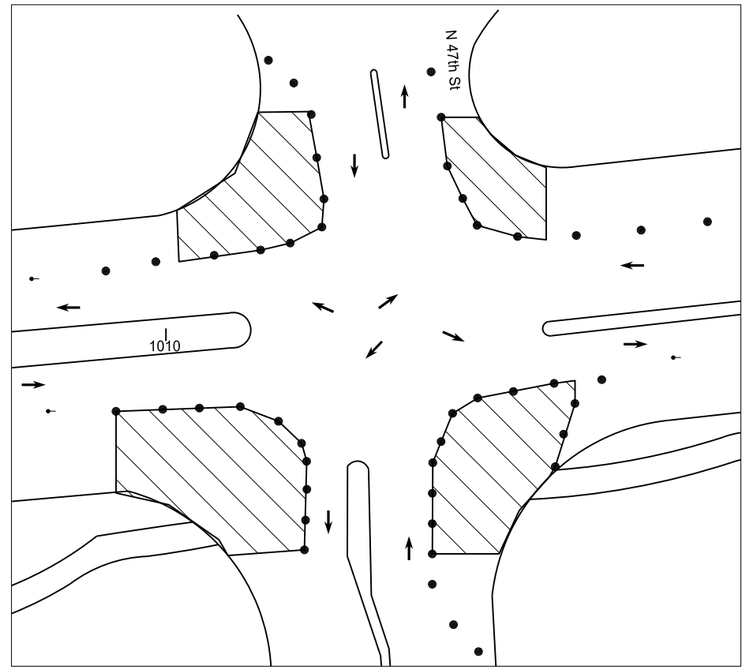
Intersection Traffic Control Layout
I-29 Off Ramp

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	31



Phase 1



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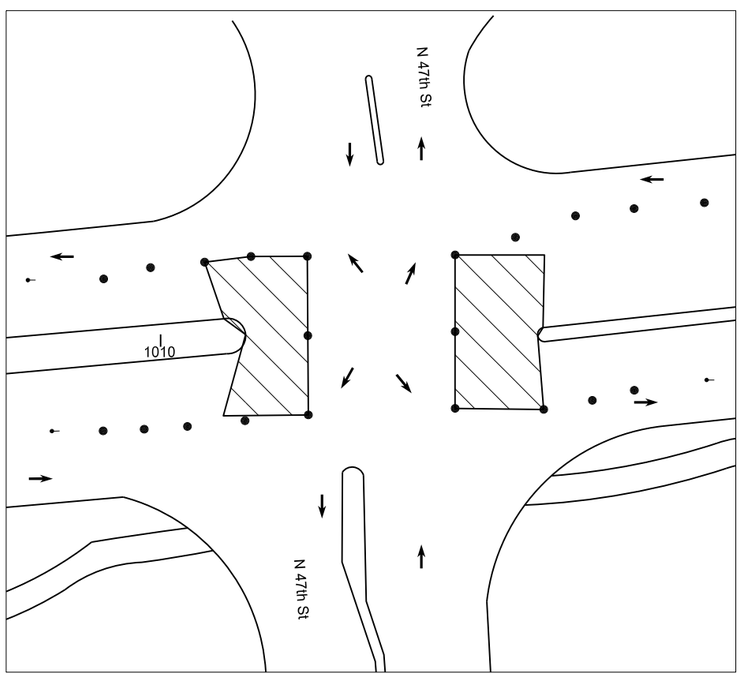
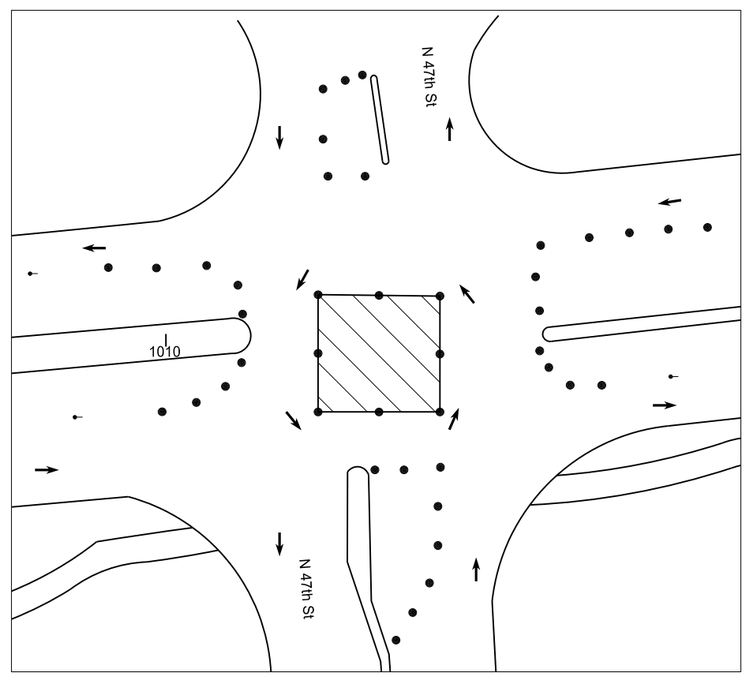


Phase 3



Phase 4

Construction Work Area

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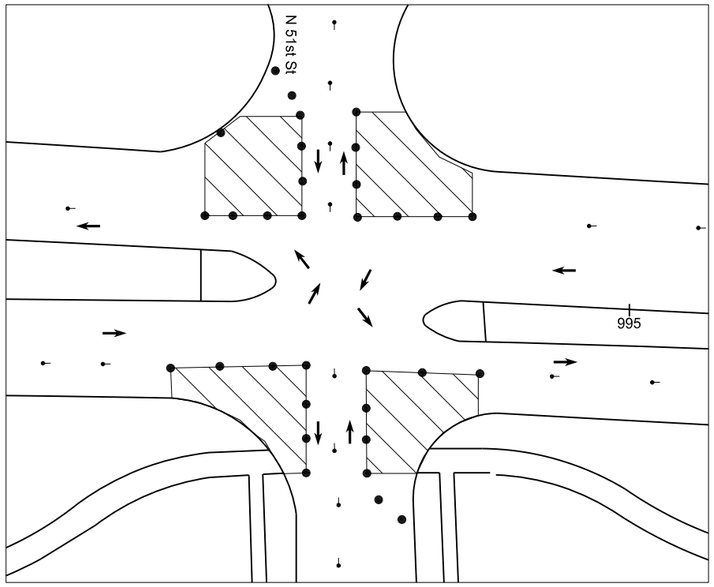
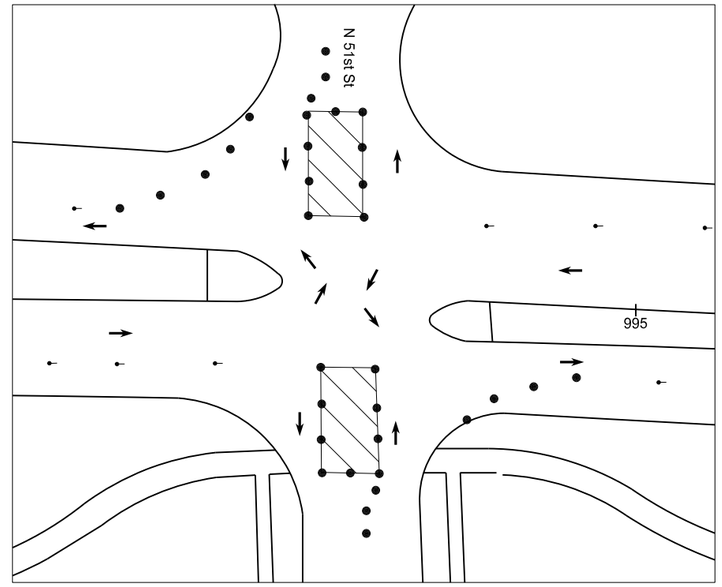
Intersection Traffic Control Layout
N 47th Street

*Note: Drawing Not to Scale

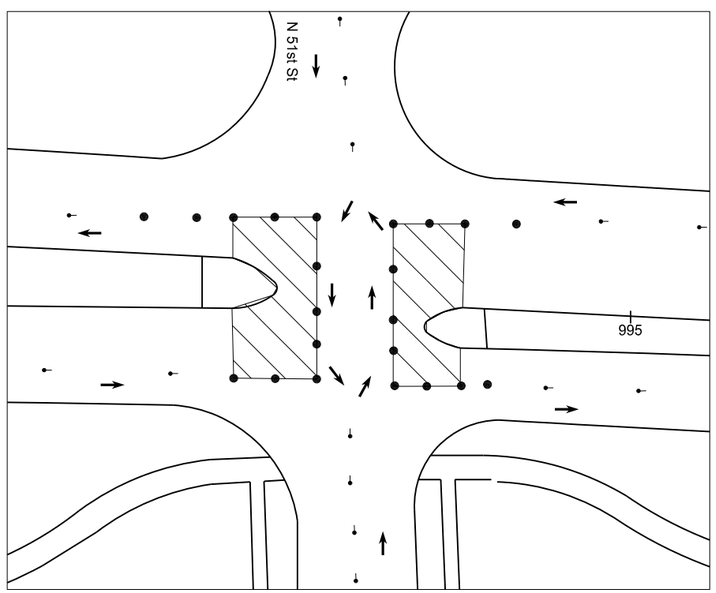
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	32



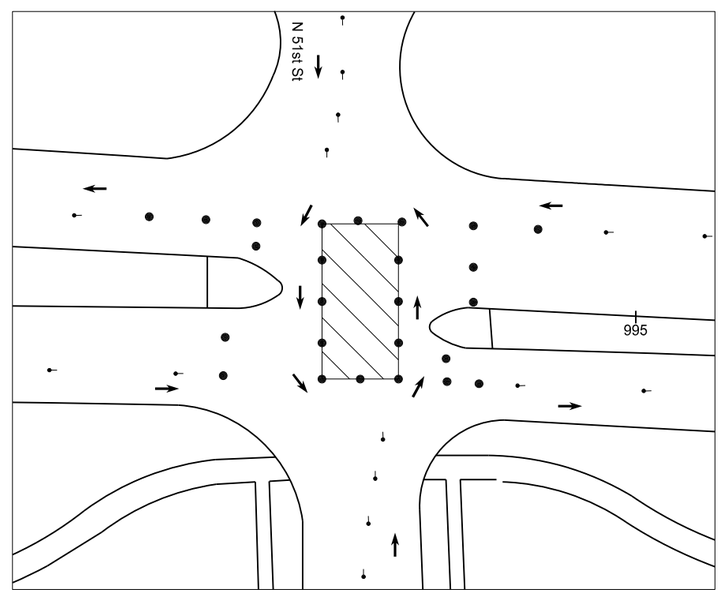
Phase 1



Phase 2



Phase 3



Phase 4

Construction Work Area

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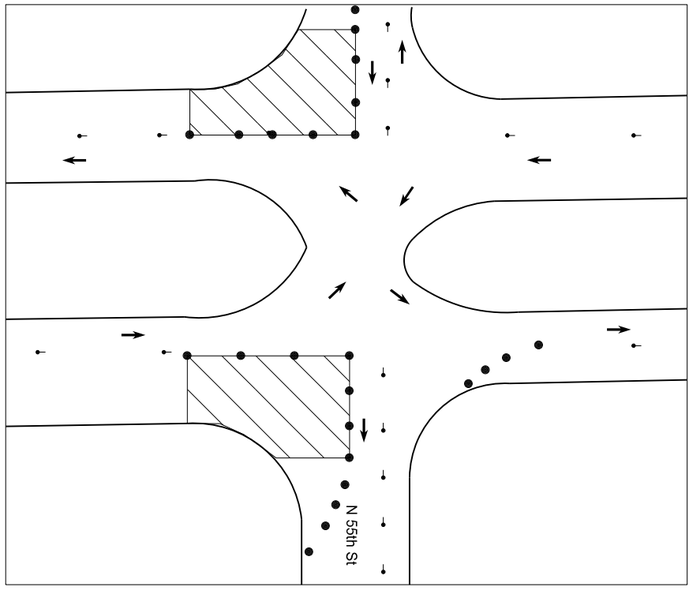
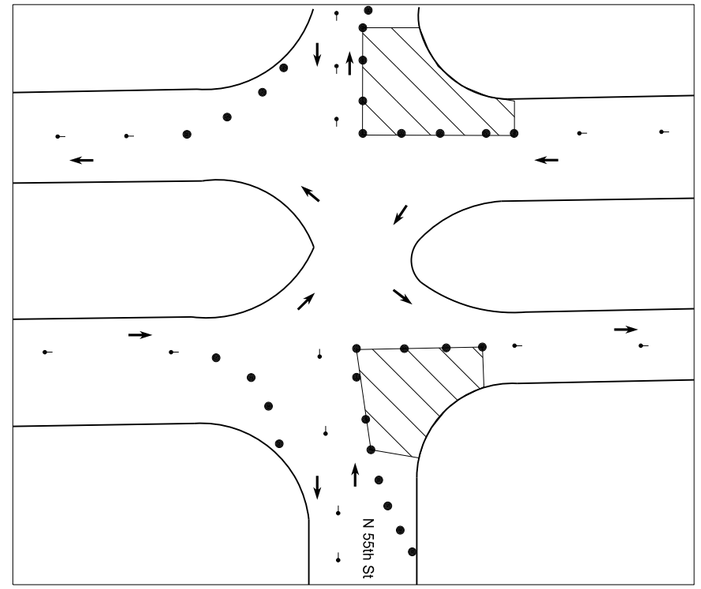
Intersection Traffic Control Layout
N 51st Street

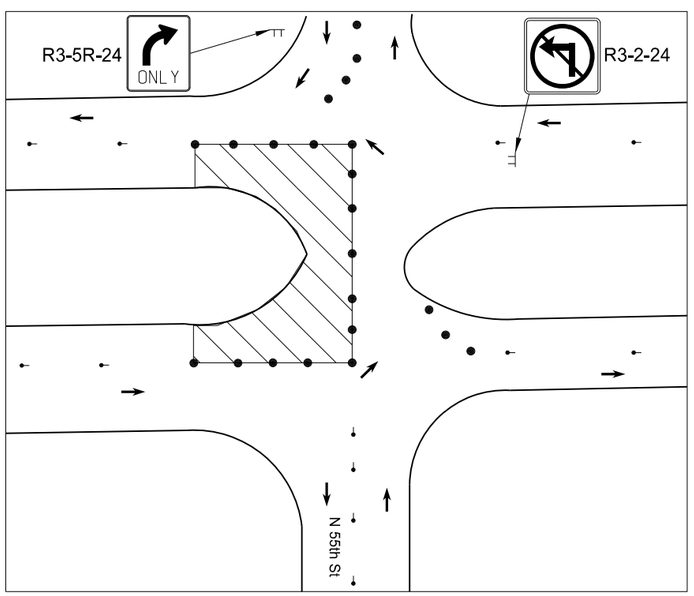
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	100	33



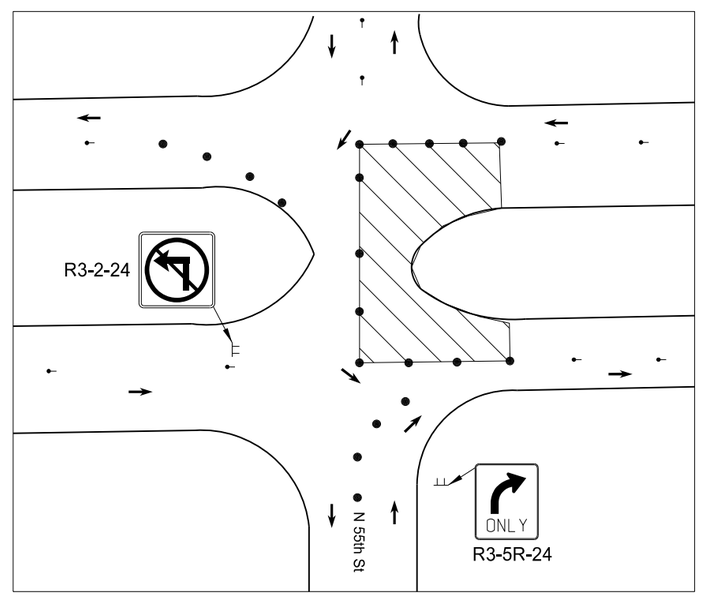
Phase 1



Phase 2



Phase 3



Phase 4

Construction Work Area

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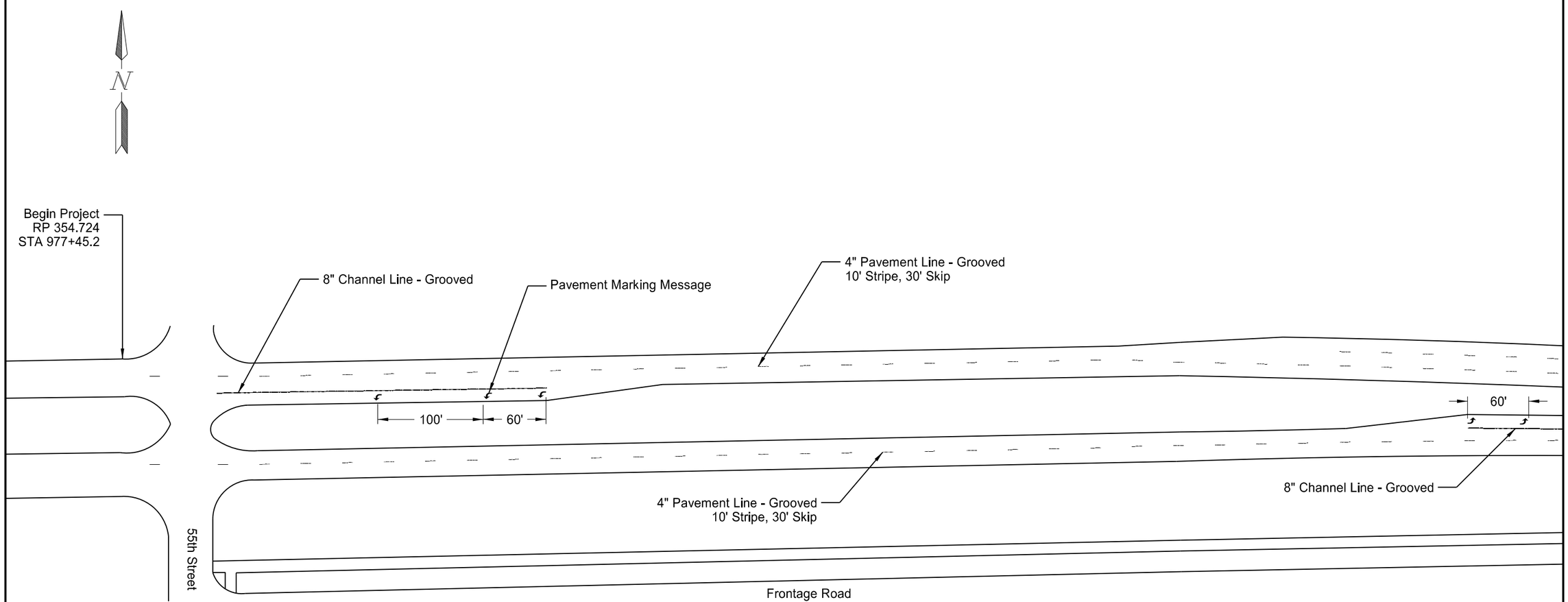
Intersection Traffic Control Layout
N 55th Street

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	120	1



PVMT MK Painted - Message

5 Arrow	80 SF

Preformed Patterned PVMT MK 4" Line - Grooved

White Center Line	740 LF

Preformed Patterned PVMT MK 8" Line - Grooved

55th Street Left Turn Lane	320 LF
51st Street Left Turn Lane	90 LF

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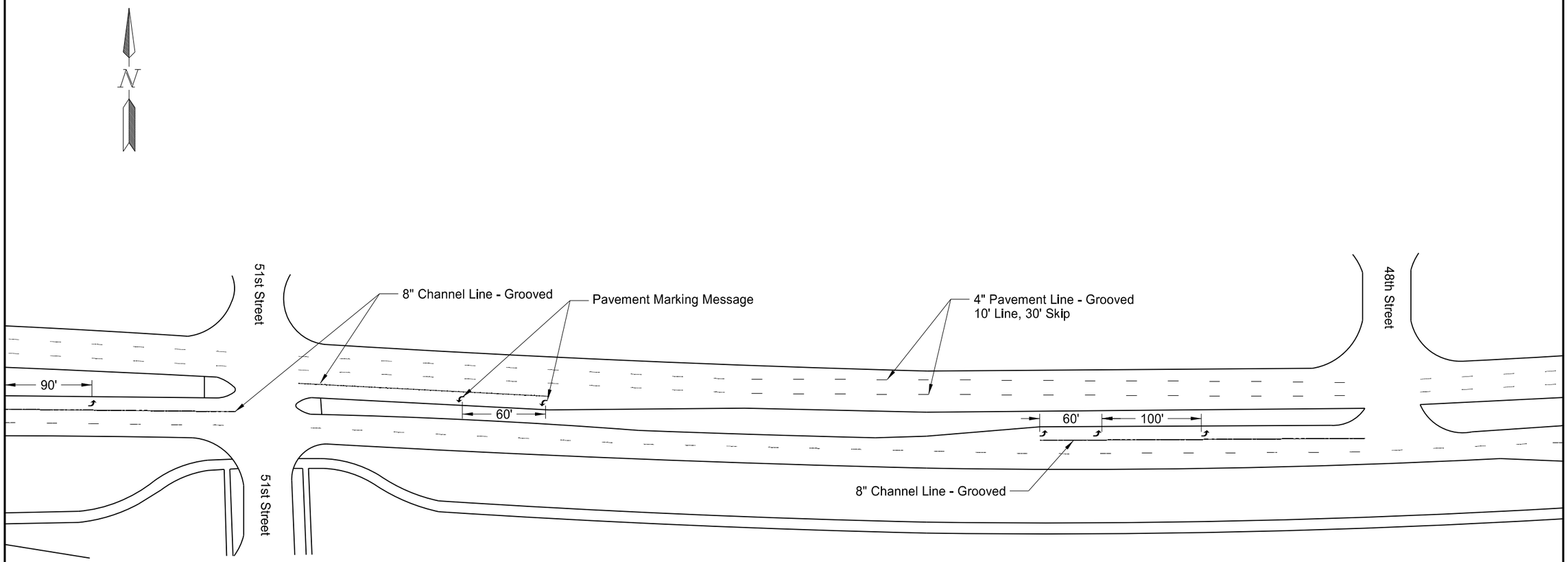
Pavement Marking

Gateway Drive

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	120	2



PVMT MK Painted - Message

6 Arrow	96 SF

Preformed Patterned PVMT MK 4" Line - Grooved

White Center Line	1090 LF

Preformed Patterned PVMT MK 8" Line - Grooved

51st Street Left Turn Lane EB	220 LF
51st Street Left Turn Lane WB	245 LF
48th Street Left Turn Lane WB	315 LF

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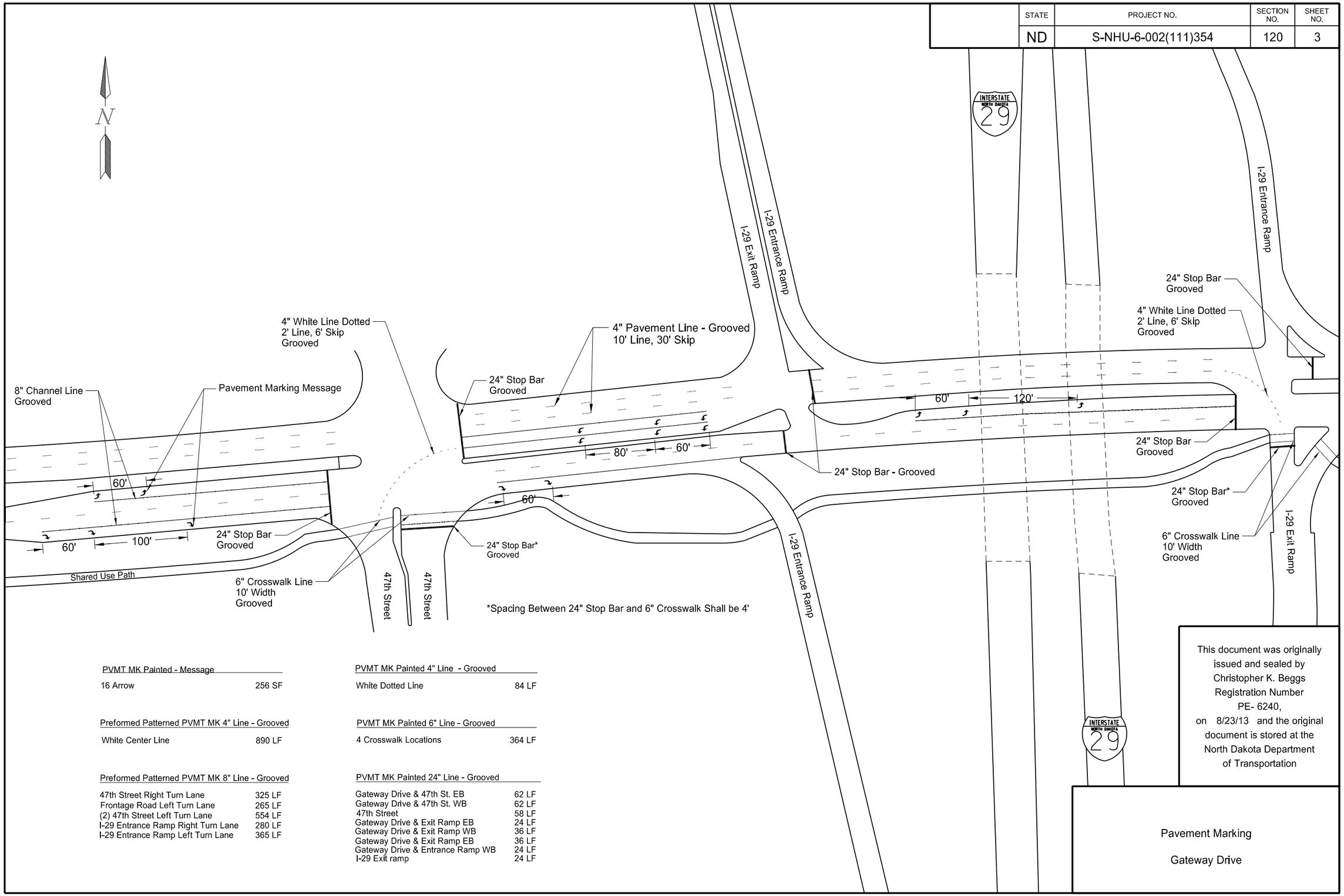
Pavement Marking

Gateway Drive

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	120	3



PVMT MK Painted - Message

16 Arrow	256 SF

Preformed Patterned PVMT MK 4" Line - Grooved

White Center Line	890 LF

Preformed Patterned PVMT MK 8" Line - Grooved

47th Street Right Turn Lane	325 LF
Frontage Road Left Turn Lane	265 LF
(2) 47th Street Left Turn Lane	554 LF
I-29 Entrance Ramp Right Turn Lane	280 LF
I-29 Entrance Ramp Left Turn Lane	365 LF

PVMT MK Painted 4" Line - Grooved

White Dotted Line	84 LF

PVMT MK Painted 6" Line - Grooved

4 Crosswalk Locations	364 LF

PVMT MK Painted 24" Line - Grooved

Gateway Drive & 47th St. EB	62 LF
Gateway Drive & 47th St. WB	62 LF
47th Street	58 LF
Gateway Drive & Exit Ramp EB	24 LF
Gateway Drive & Exit Ramp WB	36 LF
Gateway Drive & Exit Ramp EB	36 LF
Gateway Drive & Entrance Ramp WB	24 LF
I-29 Exit ramp	24 LF

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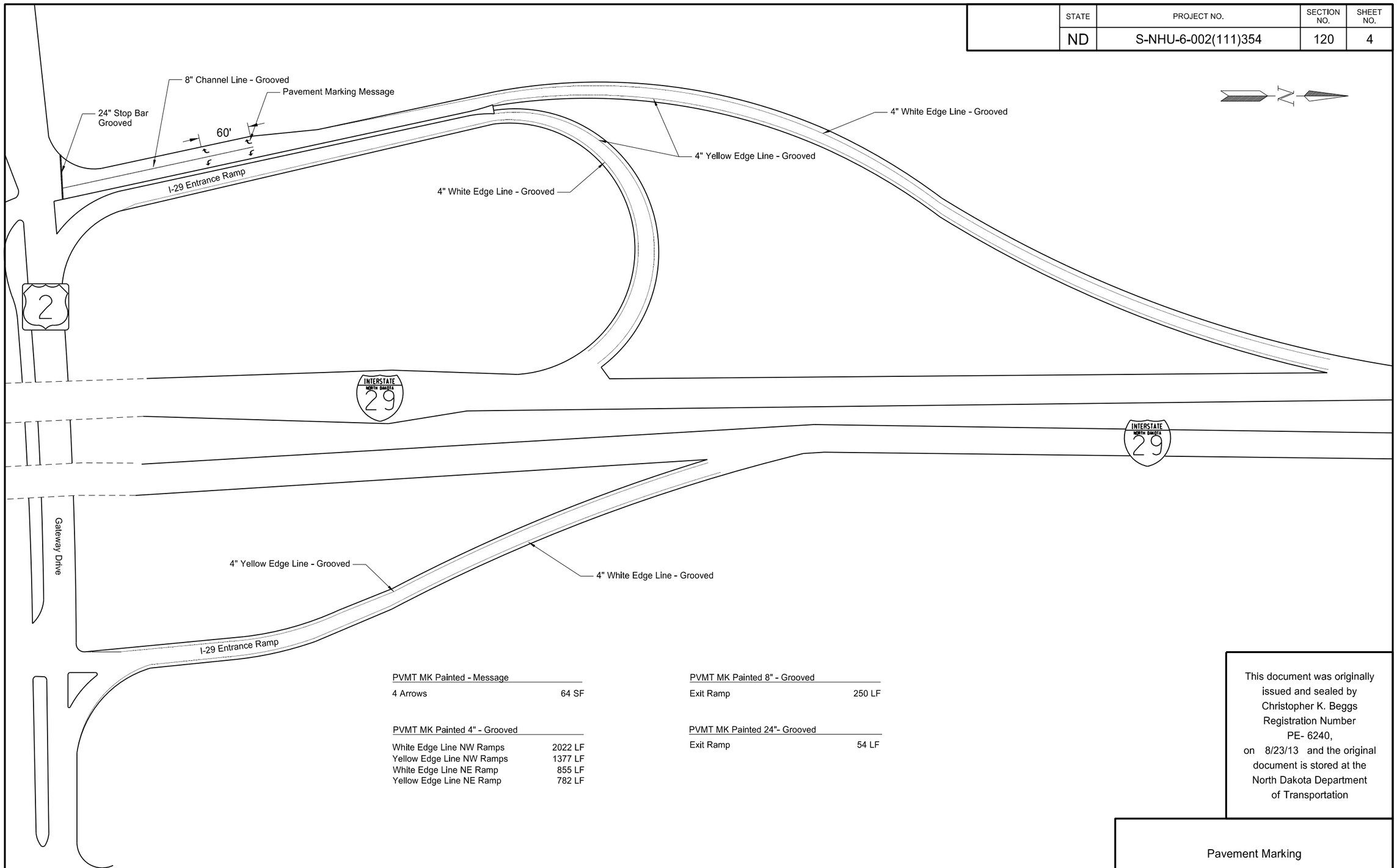
Pavement Marking

Gateway Drive

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	120	4



PVMT MK Painted - Message	
4 Arrows	64 SF

PVMT MK Painted 8" - Grooved	
Exit Ramp	250 LF

PVMT MK Painted 4" - Grooved	
White Edge Line NW Ramps	2022 LF
Yellow Edge Line NW Ramps	1377 LF
White Edge Line NE Ramp	855 LF
Yellow Edge Line NE Ramp	782 LF

PVMT MK Painted 24"- Grooved	
Exit Ramp	54 LF

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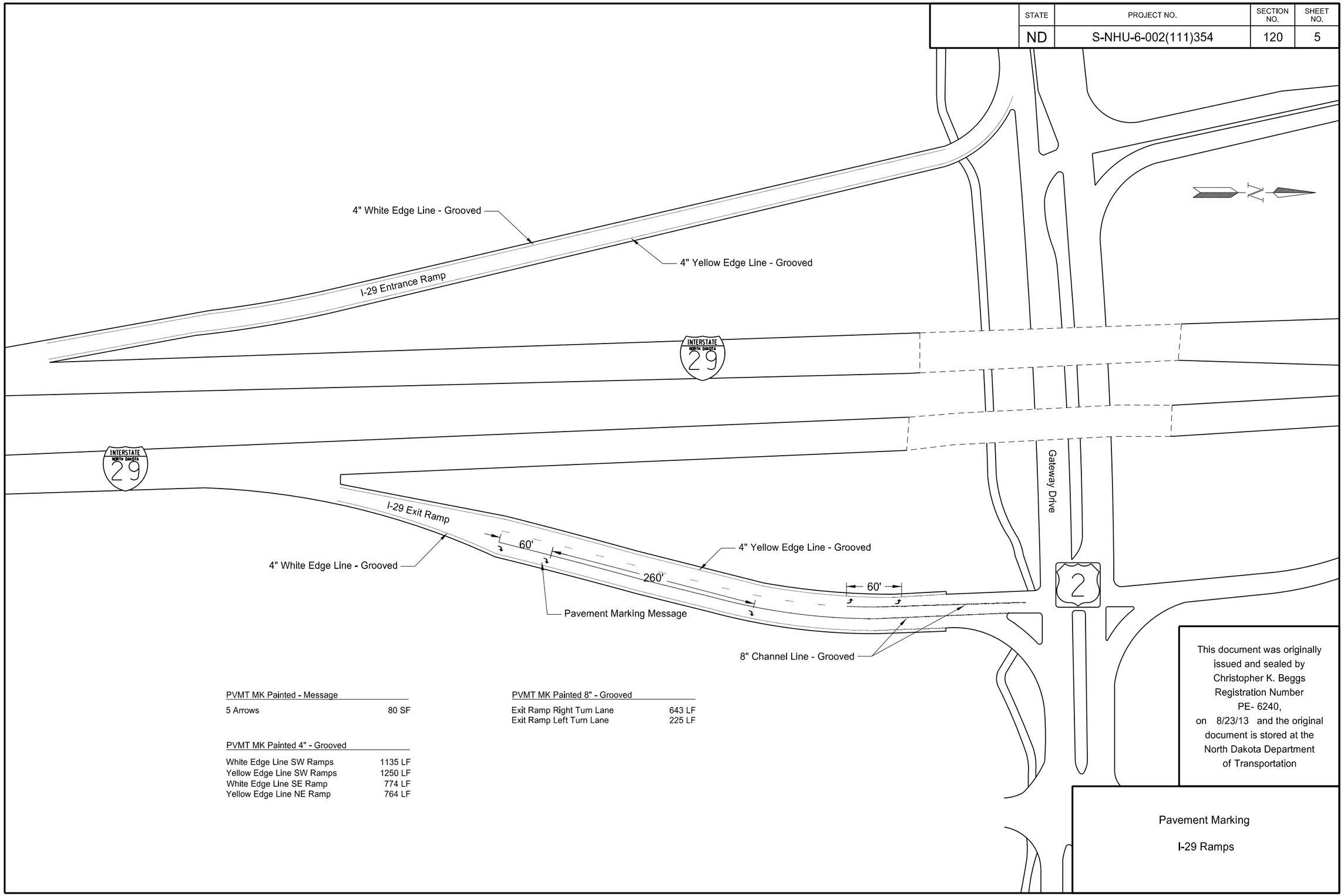
Pavement Marking

I-29 Ramps

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	120	5



PVMT MK Painted - Message

5 Arrows	80 SF

PVMT MK Painted 8" - Grooved

Exit Ramp Right Turn Lane	643 LF
Exit Ramp Left Turn Lane	225 LF

PVMT MK Painted 4" - Grooved

White Edge Line SW Ramps	1135 LF
Yellow Edge Line SW Ramps	1250 LF
White Edge Line SE Ramp	774 LF
Yellow Edge Line NE Ramp	764 LF

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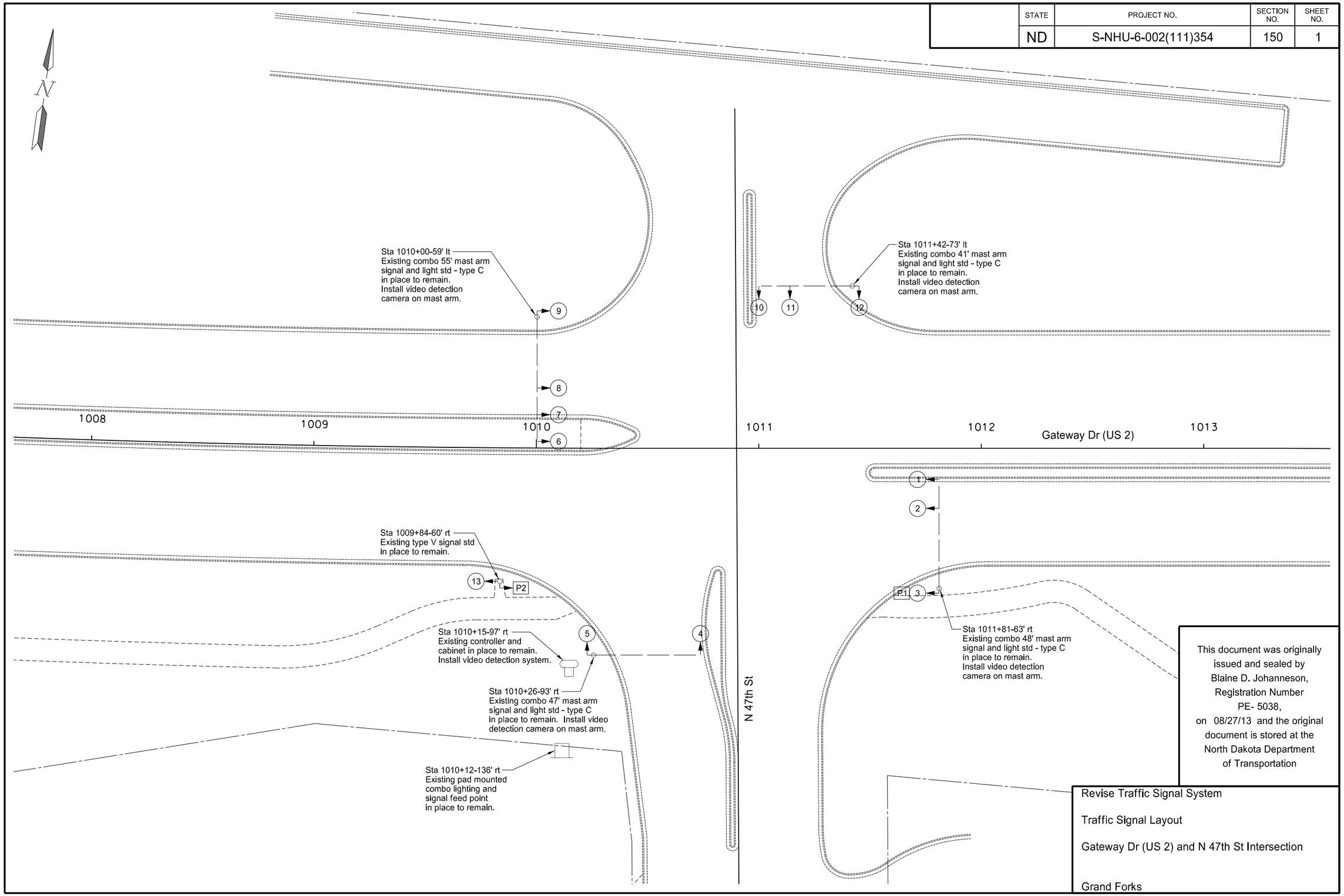
Pavement Marking

I-29 Ramps

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	1



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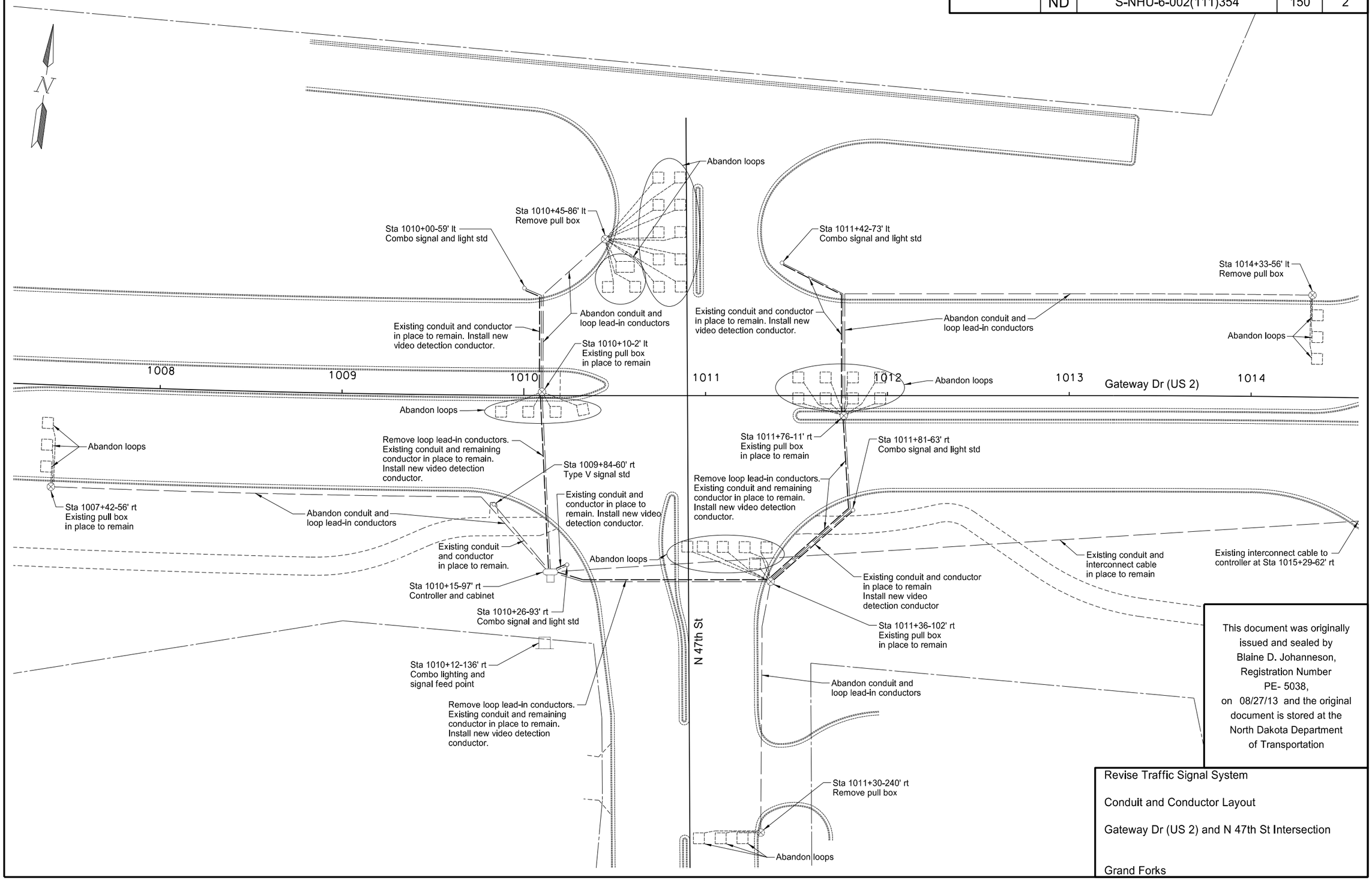
Revise Traffic Signal System

Traffic Signal Layout

Gateway Dr (US 2) and N 47th St Intersection

Grand Forks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	2



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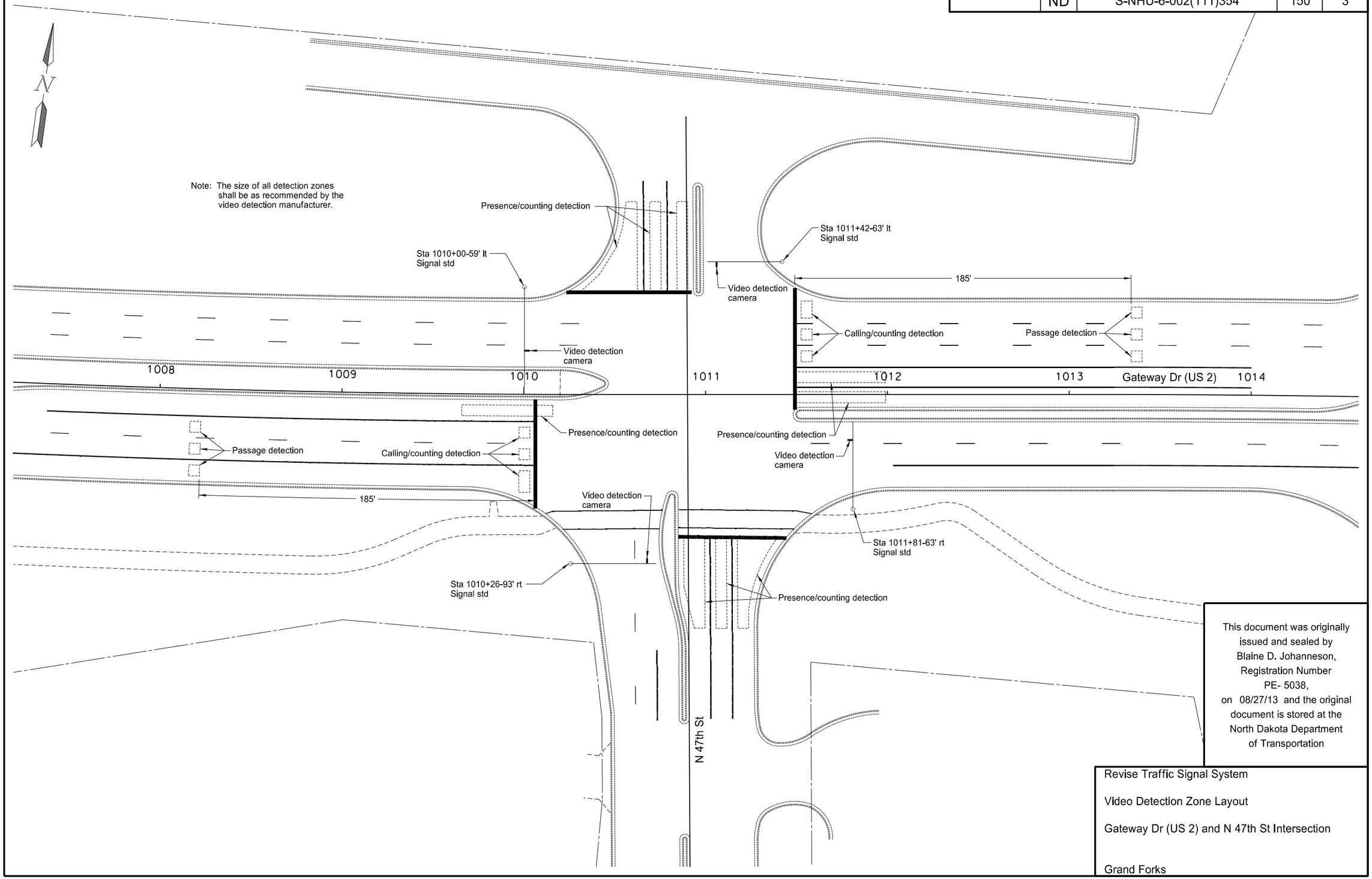
Revise Traffic Signal System

Conduit and Conductor Layout

Gateway Dr (US 2) and N 47th St Intersection

Grand Forks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	3



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Revise Traffic Signal System

Video Detection Zone Layout

Gateway Dr (US 2) and N 47th St Intersection

Grand Forks

8/27/2013 12:57:40 PM bjohanne R:\project\60002354.111\traffic\150SL_003_LSGNL_DETECTON_47TH.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	4

STATION	CONDUIT RUNS		CABLE RUNS	
	LF	DIA	LF	Type
1010+00-59' lt to 1010+10-56' lt to 1010+10-2' lt	10 54	2.5" (F) 2.5" (F)	132	Existing Cable 3 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) No. 16 AWG 3 (E)
1010+10-2' lt to 1010+15-97' rt	98	2.5" (F)	108	Existing Cable 3 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) No. 16 AWG 3 (E)
1010+26-93' rt to 1010+15-97' rt	10	2" (F)	95	Existing Cable 2 (12-12) No. 16 AWG 3 (E)
1011+42-73' lt to 1011+76-56' lt to 1011+76-11' rt	37 67	2" (F) 2" (F)	173	Existing Cable 4 (12-12) No. 16 AWG 3 (E)
1011+76-11' rt to 1011+81-62' rt to 1011+36-102' rt	52 60	2" (F) 2" (F)	112	Existing Cable 4 (12-12) No. 16 AWG 3 (E)
1011+81-63' rt to 1011+36-102' rt	59	2" (F)	130	Existing Cable 1 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) Existing No. 12 AWG 2 (D) No. 16 AWG 3 (E)
1011+36-102' rt to 1010+15-97' rt	121	3.5" (F)	262	Existing Cable 1 (12-12) Existing Cable 4 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) Existing No. 12 AWG 2 (D) (2) No. 16 AWG 3 (E)

(B) Existing Emergency Vehicle Detector Cable

(C) Existing Emergency Vehicle Indicator Light Conductor

(D) Existing Pedestrian Pushbutton Conductor

(E) New Video Detection Power Cable - (As Required by Manufacturer)

(F) Existing Conduit

	QUANTITIES (A)					
	No. 16 AWG 3 Conductor Cable	Video Detection System	Remove Pull Box	Remove Loop Lead-In Conductor		Revise Traffic Signal System
	LF	EA	EA	LS		EA
TOTAL	1012	1	3	1		1

(A) These items shall not be bid separately but shall be included in the item "Revise Traffic Signal System".

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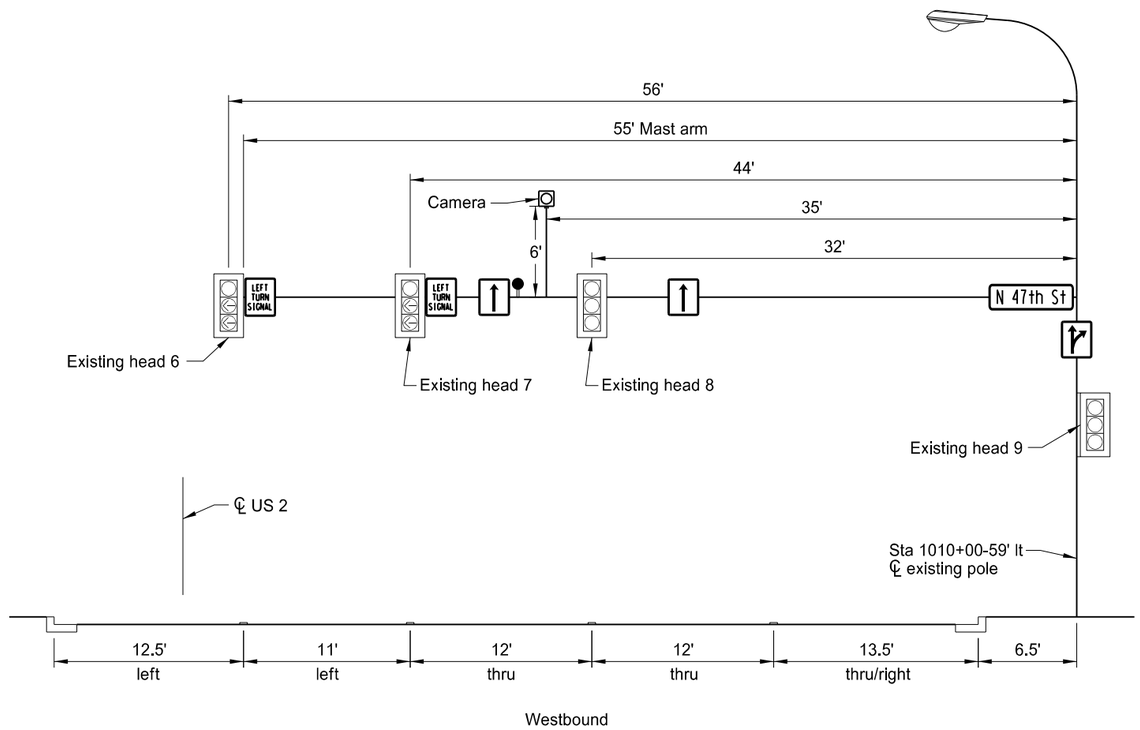
Revise Traffic Signal System

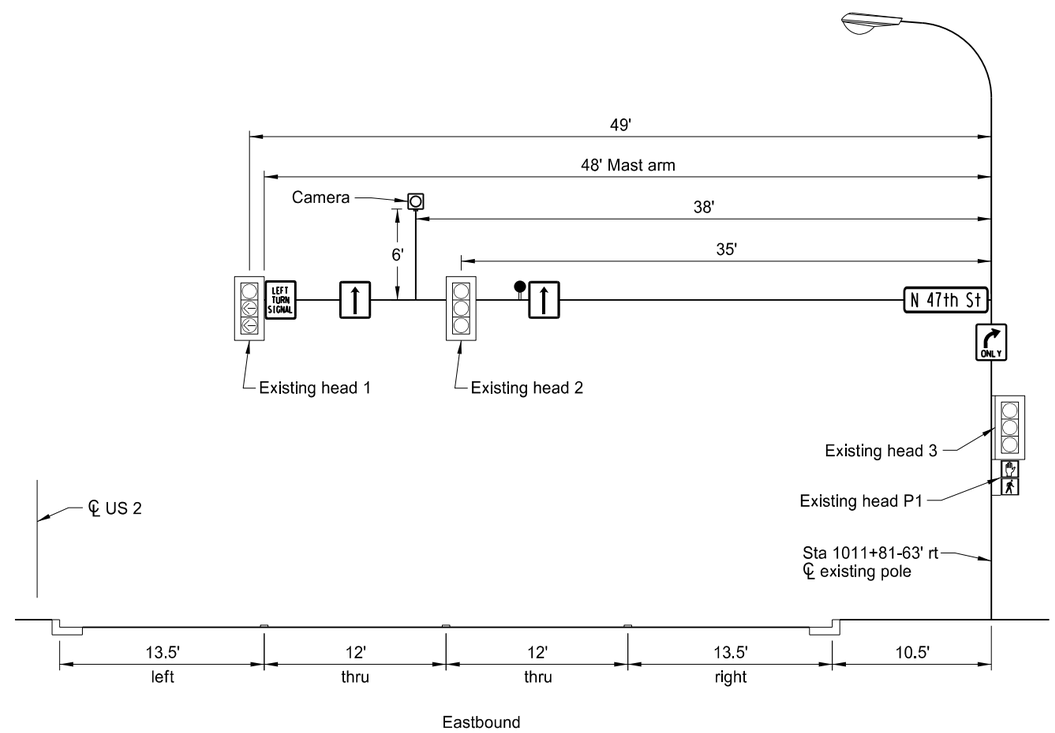
Traffic Signal Cable Runs and Quantities

Gateway Dr (US 2) and N 47th St Intersection

Grand Forks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	5





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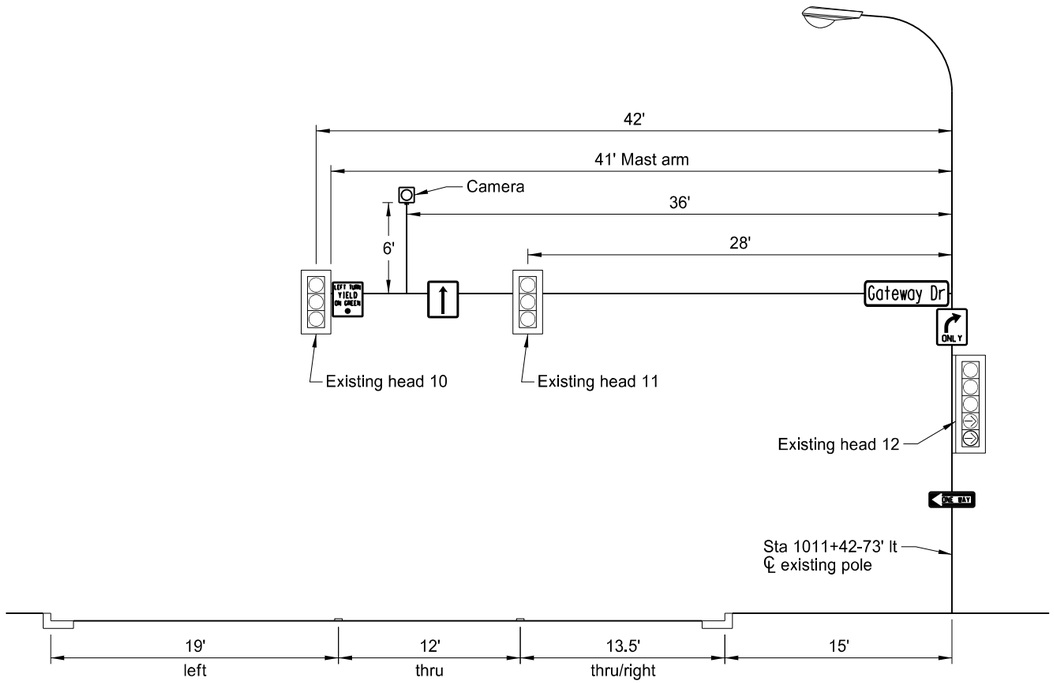
Revise Traffic Signal System

Video Camera Locations

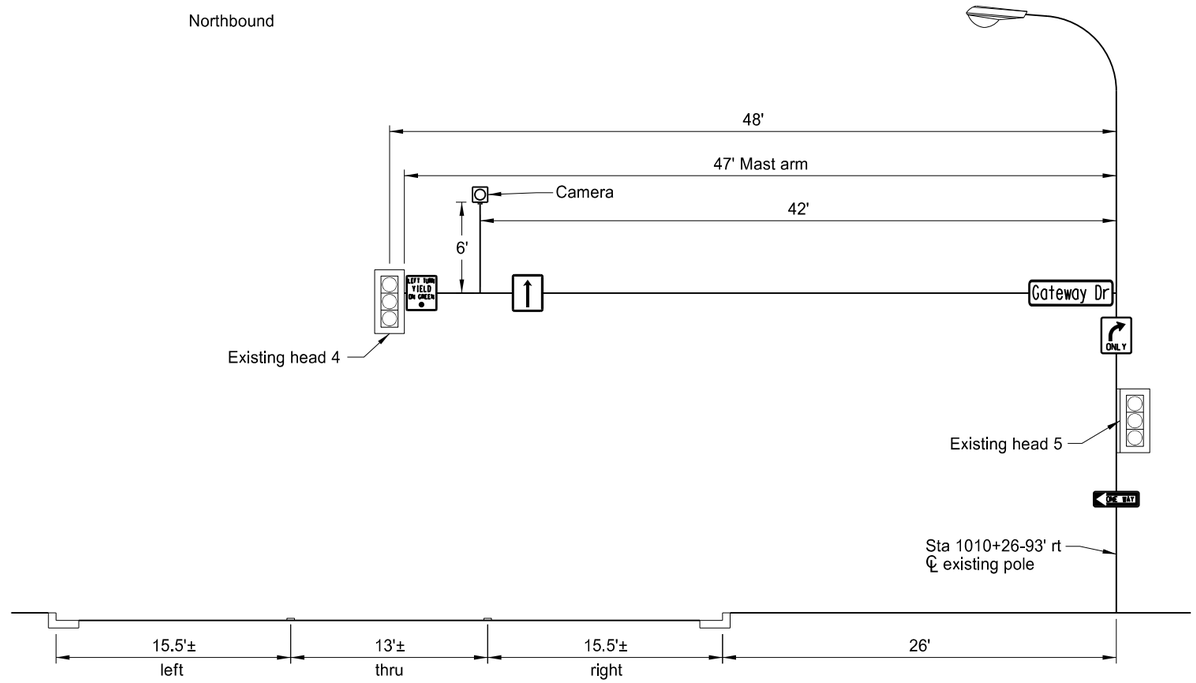
Gateway Dr (US 2) and N 47th St Intersection

Grand Forks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	6



Northbound



Southbound

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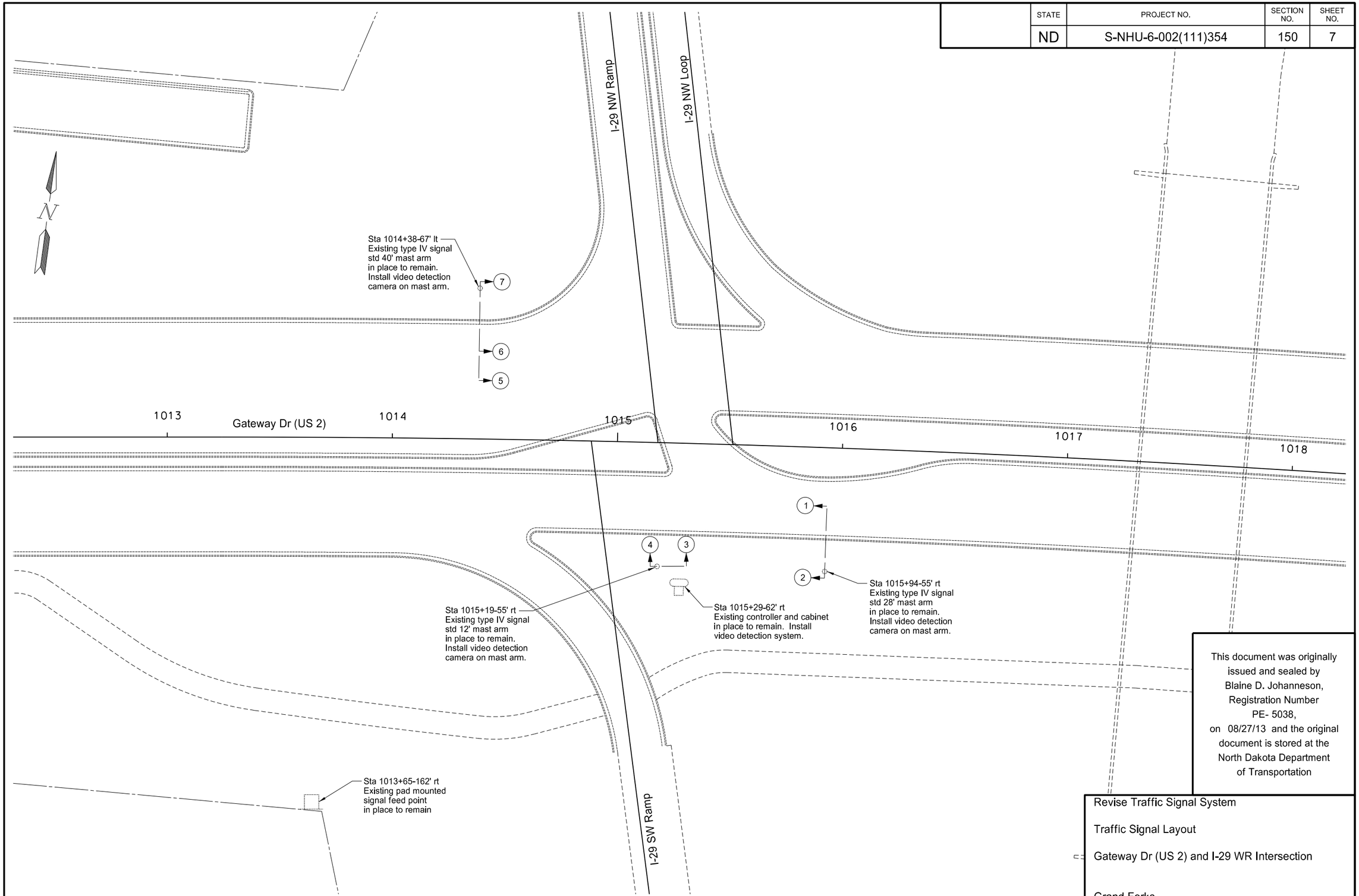
Revise Traffic Signal System

Video Camera Locations

Gateway Dr (US 2) and N 47th St Intersection

Grand Forks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	7



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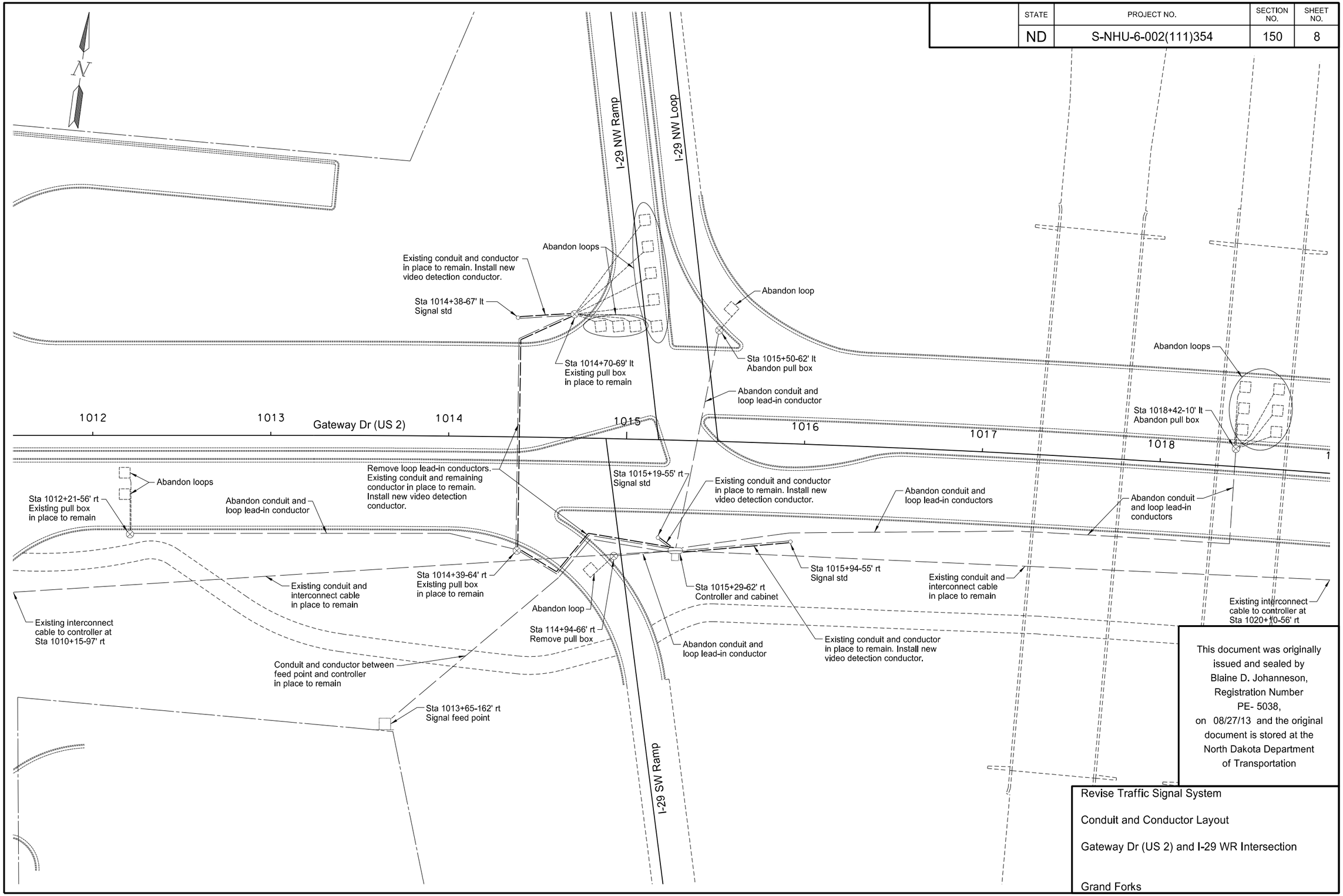
Revise Traffic Signal System

Traffic Signal Layout

Gateway Dr (US 2) and I-29 WR Intersection

Grand Forks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	8



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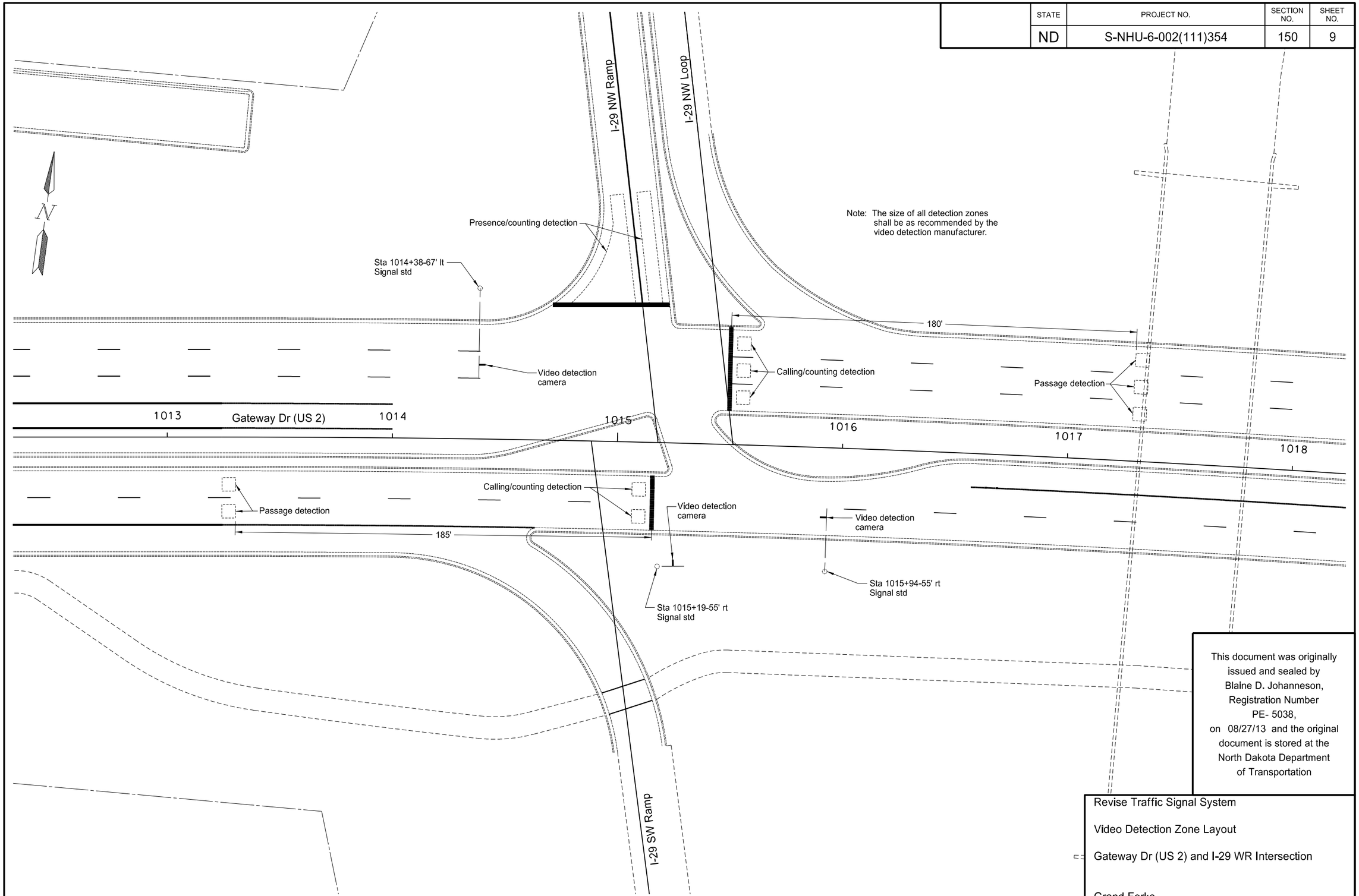
Revise Traffic Signal System

Conduit and Conductor Layout

Gateway Dr (US 2) and I-29 WR Intersection

Grand Forks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	9



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Revise Traffic Signal System

Video Detection Zone Layout

Gateway Dr (US 2) and I-29 WR Intersection

Grand Forks

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	10

STATION	CONDUIT RUNS		CABLE RUNS	
	LF	DIA	LF	Type
1014+38-67' lt to 1014+70-69' lt	31	2" (E)	82	Existing Cable 3 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) No. 16 AWG 3 (D)
1014+70-69' lt to 1014+39-56' lt to 1014+39-64' rt	34 120	2.5" (E) 2.5" (E)	154	Existing Cable 3 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) No. 16 AWG 3 (D)
1014+39-64' rt to 1014+62-76' rt to 1014+80-55' rt to 1015+29-62' rt	26 28 49	3" (E) 3" (E) 3" (E)	113	Existing Cable 3 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) No. 16 AWG 3 (D)
1015+19-55' rt to 1015+29-62' rt	11	2" (E)	71	Existing Cable 2 (12-12) No. 16 AWG 3 (D)
1015+94-55' rt to 1015+29-62' rt	65	2" (E)	125	Existing Cable 1 (12-12) Existing EVD Cable (B) Existing No. 12 AWG 2 (C) No. 16 AWG 3 (D)

(B) Existing Emergency Vehicle Detector Cable

(C) Existing Emergency Vehicle Indicator Light Conductor

(D) New Video Detection Power Cable - (As Required by Manufacturer)

(E) Existing Conduit

	QUANTITIES (A)					
	No. 16 AWG 3 Conductor Cable	Video Detection System	Remove Pull Box	Remove Loop Lead-In Conductor		Revise Traffic Signal System
	LF	EA	EA	LS		EA
TOTAL	545	1	1	1		1

(A) These items shall not be bid separately but shall be included in the item "Revise Traffic Signal System".

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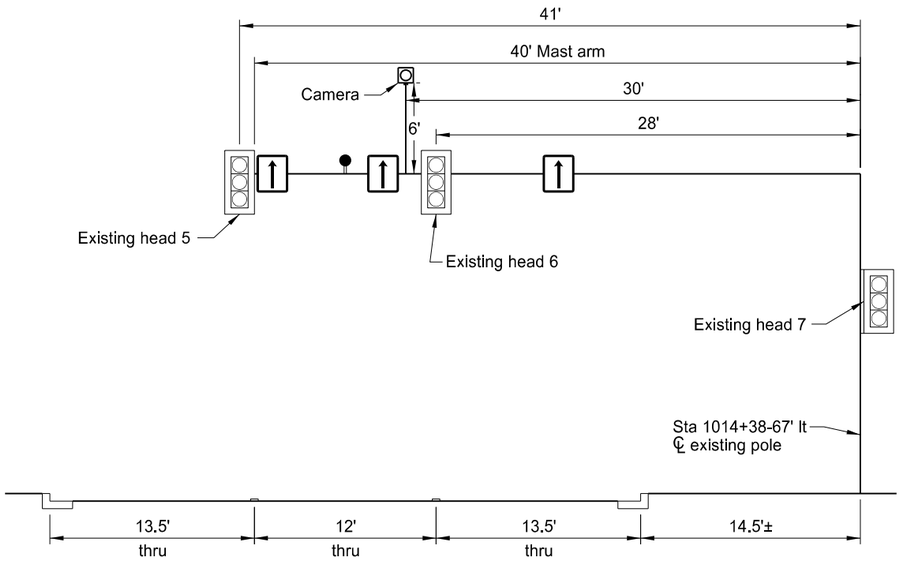
Revise Traffic Signal System

Traffic Signal Cable Runs and Quantities

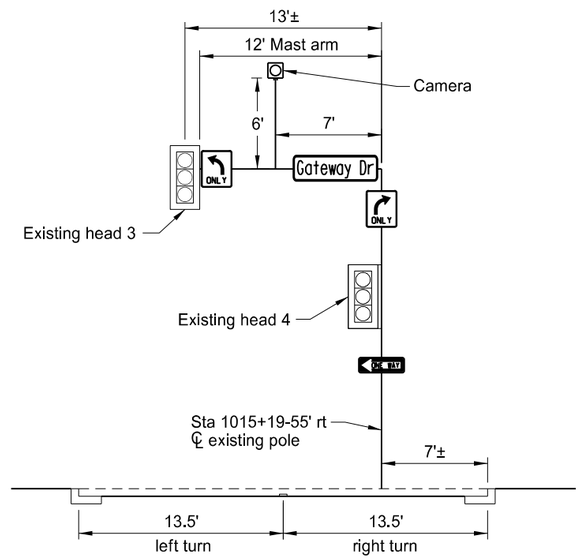
Gateway Dr (US 2) and I-29 WR Intersection

Grand Forks

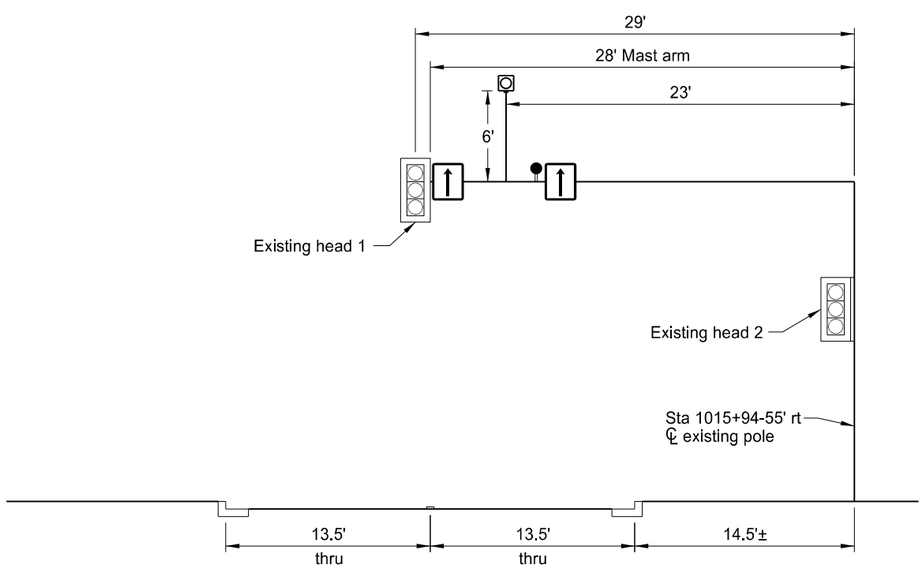
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	S-NHU-6-002(111)354	150	11



Westbound



Southbound



Eastbound

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Revise Traffic Signal System

Video Camera Locations

Gateway Dr (US 2) and I-29 WR Intersection

Grand Forks

NDDOT ABBREVIATIONS

D-20-1

Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
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
BLM	Bureau of Land Management
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
Cl or ℄	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
FHWA	Federal Highway Administration
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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
06-15-10	
REVISIONS	
DATE	CHANGE
04-20-11	Added Items
03-15-13	Added Items

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NDDOT ABBREVIATIONS

D-20-2

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
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
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
NDDOT	North Dakota Department of Transportation
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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

06-15-10

REVISIONS

DATE	CHANGE
04-20-11	Added Items
03-15-13	Added Items

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NDDOT ABBREVIATIONS

D-20-3

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
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
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
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
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
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

06-15-10

REVISIONS

DATE	CHANGE
04-20-11	Added Items
03-15-13	Added Items

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NDDOT UTILITY COMPANY ABBREVIATIONS

D-20-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
All PI	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users Association
AMOCO PI	Amoco Pipeline Company
AMRDA HESS	Amerada Hess Corporation
AT&T	AT&T Corporation
B PAW	Bear Paw Energy Incorporated
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
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 PWR ELEC	Central Power Electric Cooperative
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
FALK MNG	Falkirk Mining Company
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
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 WRD	McKenzie County Water Resource District
MCKNZ ELEC	McKenzie Electric Cooperative
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
MRE LBTY TEL	Moore & Liberty Telephone
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MUNICIPAL	City Of '.....'
MUNICIPAL	City Water And Sewer
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
OTTR TL PWR	Otter Tail Power Company
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
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
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
STUT RWU	Stutsman Rural Water Users
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
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
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

6-15-10

REVISIONS

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04-20-11	Added Items
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Line Styles

D-20-20

- 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

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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

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Symbols

D-20-30

- 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

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Symbols

D-20-31

- 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
- Existing Monument Found
- Existing Monument set
- Existing RW Property Monument Found
- Existing RW PropertyMonument set
- 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

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Symbols

D-20-32

- 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
- Concrete Monument to Be Set
- RW Property Monument to Be Set
- 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

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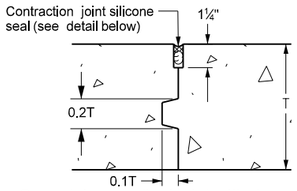
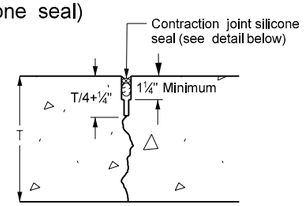
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS (silicone seal)

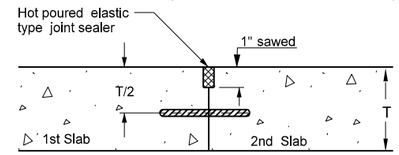


Sawed longitudinal joint with keyway



Sawed longitudinal joint without keyway

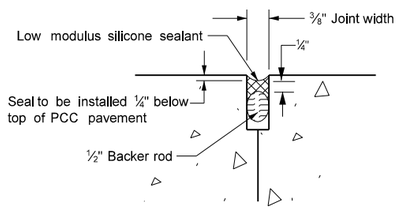
TIED JOINTS (hot poured elastic seal)



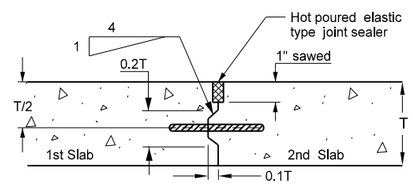
Longitudinal construction joint (tied butt joint)

Notes:

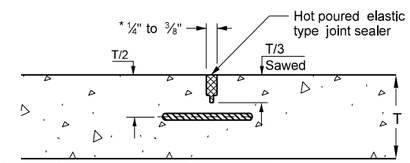
1. The hot poured elastic type joint sealer shall be in accordance with Section 826.02A.2 of the Standard Specifications.
2. The longitudinal joint and seal shall be included in the price bid for the P.C.C. pavement.
3. Tie bars shall not be placed within 18 inches of a transverse skewed joint.
4. Where tie bars are installed bent and later straightened, Grade 40 steel shall be used.
5. Tie bar spacing can be increased up to 10% to facilitate construction.
6. Tie Bars shall be at a 48 inch maximum spacing.
7. A "Warp" joint is a sawed joint or a construction joint with a keyway.
8. A "Butt joint" is a construction joint with no keyway.



Contraction joint silicone seal



Longitudinal construction joint (tied keyed joint)



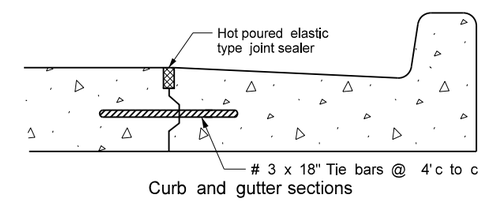
* Width requirement for top 1" only, bottom portion of saw cut may be narrower

Sawed longitudinal joint

TIEBAR SPACINGS (In)

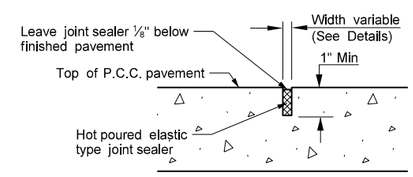
BAR SIZE / GRADE STEEL / BAR LENGTH / DIST TO FREE EDGE (FT) / JOINT TYPE / PVMT THICKNESS		# 3 BAR										# 4 BAR											
		GRADE 40				GRADE 60						GRADE 40					GRADE 60						
		24"				30"						24"					36"						
		4	6	8	10	4	6	8	10	12	14	8	10	12	14	16	8	10	12	14	16	22	24
6"	WARP		48	39			48	48				48					48						
	BUTT		37	27			48	42				48					48						
8"	WARP	48	39	29	24	48	48	44	35	29	25	48	42	35	30	26	48	48	48	45	39	28	26
	BUTT	42	27			48	42	31	25			37	29	24			48	44	37	32	27		
8½"	WARP	48	37	28		48	48	42	33	28	24	48	39	33	28	24	48	48	48	42	37	27	24
	BUTT	39	26			44	39	29				35	27				48	42	35	29	26		
9"	WARP	48	35	26		48	48	39	31	26		47	37	31	26		48	48	47	40	35	25	
	BUTT	37	24			48	37	27				33	26				48	40	33	28	25		
9½"	WARP	48	33	25		48	48	37	30	25		44	35	29	25		48	48	44	38	33	24	
	BUTT	35				48	35	26				31	25				47	37	31	27			
10"	WARP	47	31			48	47	35	28			42	34	28	24		48	48	42	36	31		
	BUTT	33				48	33	25				29	24				45	36	29	25			
10½"	WARP	45	30			48	45	34	27			40	32	26			48	48	40	34	30		
	BUTT	32				48	32	24				28					42	34	28	24			
11"	WARP	43	28			48	43	32	26			38	31	25			48	46	38	33	28		
	BUTT	30				46	30					27					40	32	27				
11½"	WARP	41	27			48	41	31	24			36	29	24			48	44	36	31	27		
	BUTT	29				44	29					25					39	31	25				
12"	WARP	39	26			48	39	29				35	28				48	42	35	30	26		
	BUTT	27				42	27					25					37	30	25				
12½"	WARP	38	25			48	38	28				33	27				48	40	33	29	25		
	BUTT	27				40	27										35	28					
13"	WARP	36	24			48	36	27				32	26				48	39	32	27	24		
	BUTT	25				38	25										34	27					
13½"	WARP	35				48	35	26				31	25				47	37	31	26			
	BUTT	25				37	25										33	26					
14"	WARP	34				48	34	25				30	24				45	36	30	25			
	BUTT	24				35	24										32	25					
14½"	WARP	32				48	32	24				29					43	35	29	25			
	BUTT					34											30	25					
15"	WARP	31				47	31					28					42	33	28	24			
	BUTT					33											29						

BAR SIZE / GRADE STEEL / BAR LENGTH / DIST TO FREE EDGE (FT) / JOINT TYPE / PVMT THICKNESS		# 5 BAR												# 6 BAR											
		GRADE 40						GRADE 60						GRADE 40						GRADE 60					
		30"						42"						36"						48"					
		10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	19	22	24	10	12	14	16	19	22	24
6"	WARP																										
	BUTT																										
8"	WARP	48	48	47	41	30	27	48	48	48	48	45	41	48	48	48	48	48	43	39	48	48	48	48	48	48	48
	BUTT	46	39	33	29			48	48	48	43	32	29	48	48	48	48	35	30	27	48	48	48	48	45	41	
8½"	WARP	48	48	44	38	28	25	48	48	48	48	42	38	48	48	48	48	47	40	37	48	48	48	48	48	48	48
	BUTT	44	36	31	27			48	48	47	41	30	27	48	48	45	39	33	28	26	48	48	48	48	42	39	
9"	WARP	48	48	42	36	26	24	48	48	48	48	40	36	48	48	48	48	44	38	35	48	48	48	48	48	48	48
	BUTT	41	34	29	25			48	48	44	39	28	25	48	48	42	37	31	26	24	48	48	48	48	47	40	37
9½"	WARP	48	46	39	34	25		48	48	48	48	38	34	48	48	48	48	42	36	33	48	48	48	48	48	48	48
	BUTT	39	32	27	25			48	48	42	37	27	24	48	47	40	35	29	25		48	48	48	48	44	38	35
10"	WARP	48	44	37	33	24		48	48	48	48	36	33	48	48	48	48	40	34	31	48	48	48	48	48	48	47
	BUTT	37	31	26	24			48	46	40	35	25		48	45	38	33	28	24		48	48	48	48	42	36	33
10½"	WARP	48	42	36	31			48	48	48	47	34	31	48	48	48	45	38	33	30	48	48	48	48	48	48	45
	BUTT	35	29	25				48	44	38	33	24		48	42	36	32	27			48	48	48	48	40	34	31
11"	WARP	48	40	34	30			48	48	48	45	32	30	48	48	48	43	36	31	28	48	48	48	48	48	47	43
	BUTT	34	28	24				48	42	36	32			48	40	35	30	25			48	48	48	46	38	33	30
11½"	WARP	46	38	32	28			48	48	48	43	31	28	48	48	47	41	34	30	27	48	48	48	48	48	45	41
	BUTT	32	27					48	40	35	30			46	39	33	29	24			48	48	48	44	37	31	29
12"	WARP	44	36	31	28			48	48	47	41	30	27	48	48	45	40	33	28	26	48	48	48	48	48	43	39
	BUTT	31	25					46	39	33	29			45	37	32	28				48	48	48	42	35	30	27
12½"	WARP	42	35	30	26			48	48	45	39	28	26	48	48	43	38	32	27	25	48	48	48	48	48	41	38
	BUTT	29	25					44	37	32	27			42	35	30	27				48	48	45	40	34	29	26
13"	WARP	40	33	29	25			48	48	43	38	27	25	48	48	41	36	30	26	24	48	48	48	48	46	40	36
	BUTT	28						42	35	30	27			41	34	29	25				48	48	44	38	32	28	25
13½"	WARP	39	32	28	24			48	48	42	36	26	24	48	47	40	35	29	25		48	48	48	48	44	38	35
	BUTT	27						41	34	29	25			39	33	28	25				48	48	42	37	31	27	24
14"	WARP	37	31	27				48	47	40	35	25		48	45	38	34	28	24		48	48	48	48	43	37	34
	BUTT	26						39	33	28	25			38	32	27	24				48	47	40	35	30	26	
14½"	WARP	36	30	26				48	45	39	34	24		48	43	37	32	27			48	48	48	48	41	35	32
	BUTT	25						38	32	27	24			36	30	26					48	46	39	34	29	25	
15"	WARP	35	29	25				48	44	37	33	24		48	42	36	31	26			48	48	48	47	40	34	31
	BUTT	25						37	31	26				35	29	25					48	44	38	33	28	24	



Curb and gutter sections

JOINT SEALER DETAILS



Typical section

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-15-2010

REVISIONS

DATE	CHANGE
10/23/2012	Expanded Tie Bar Table

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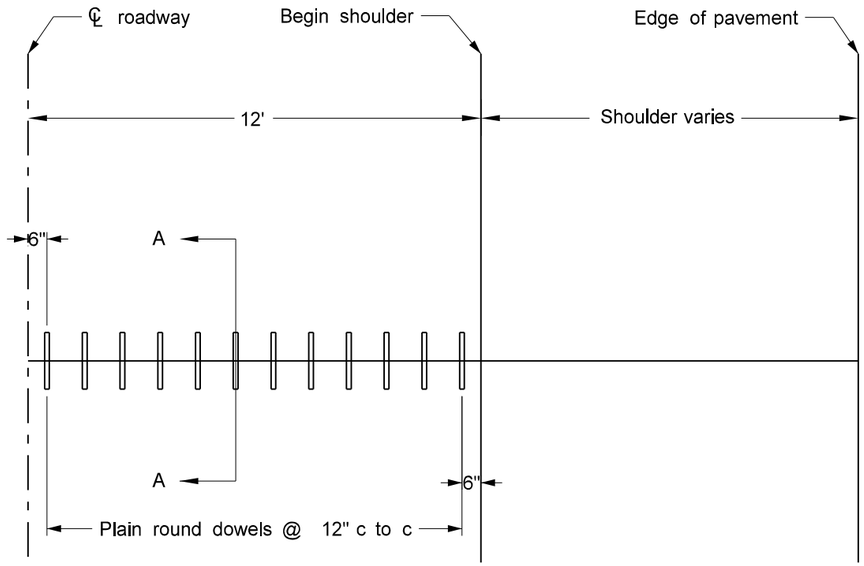
TRANSVERSE CONTRACTION JOINT DETAILS

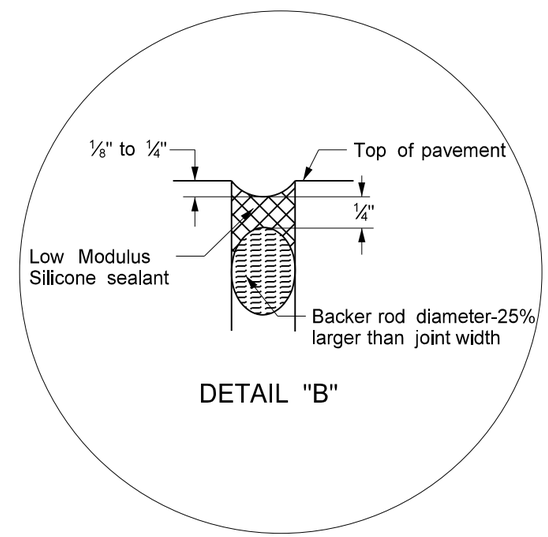
D-550-3



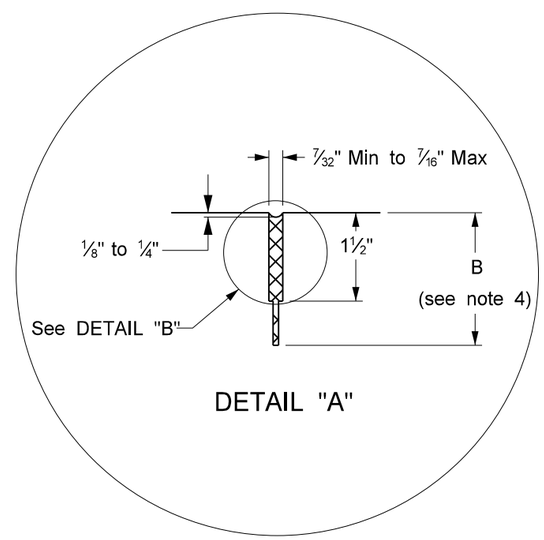
CONTRACTION JOINT DOWEL ASSEMBLY
(1/2 roadway shown)

Notes

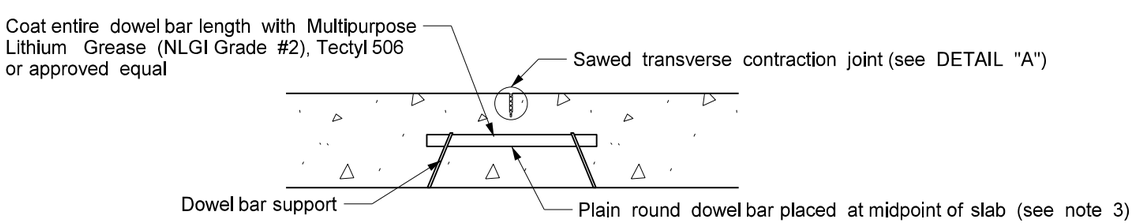
1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. Dowels
   Pavement 10" or less: 1¼" X 18" plain round
   Pavement greater than 10": 1½" X 18" plain round
4. B = T/4 + ¼" for AE or YE non-dowelled concrete pavement
   or T/3 for high early or dowelled concrete pavement



DETAIL "B"



DETAIL "A"



SECTION A-A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE

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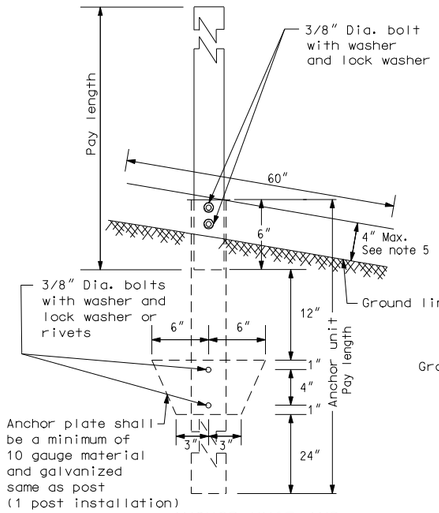
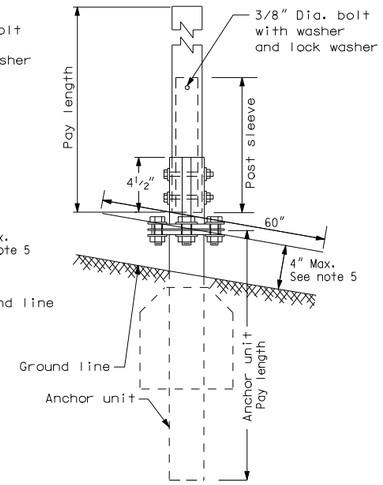
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

PERFORATED TUBE

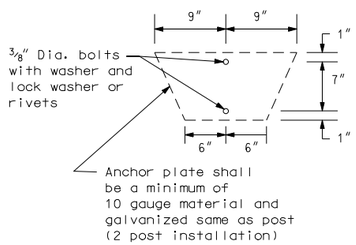
D-704-7

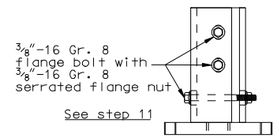


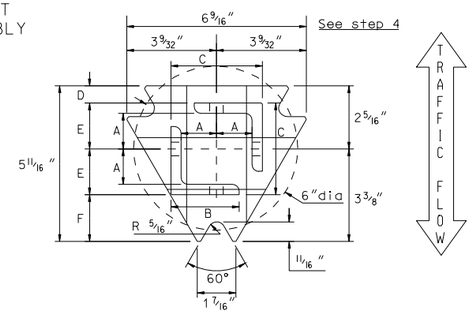
ANCHOR UNIT AND POST ASSEMBLY



SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY





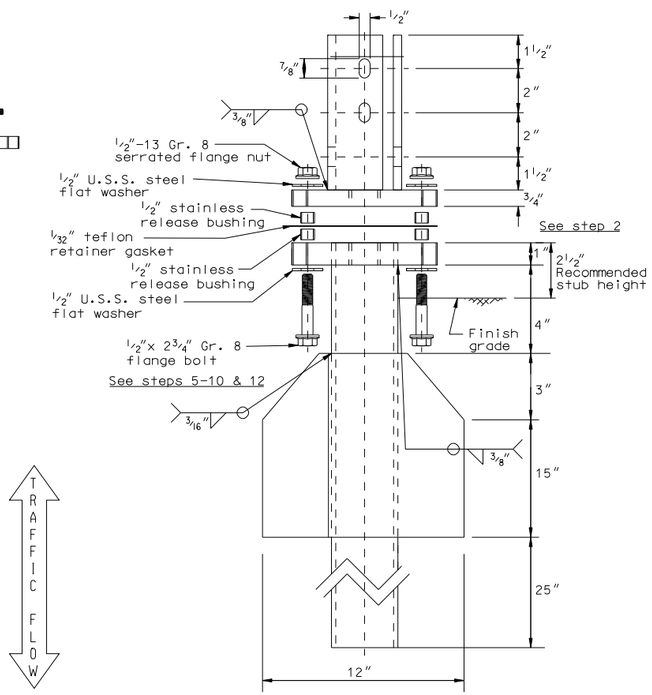


TOP POST RECEIVER

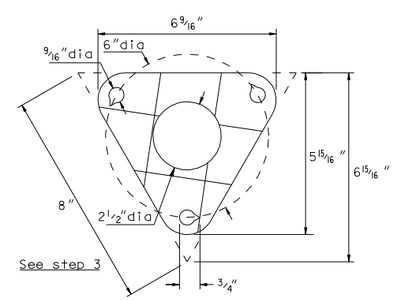
Materials: Plate - ASTM A572 grade 50
Angle receiver - 2 1/2"x 2 1/2"x 3/8" ASTM A36 structural angle

TOP POST RECEIVER DATA TABLE						
Square Post Sizes	A	B	C	D	E	F
2 3/16" x 10 Ga. Square Post	1 9/64"	2 1/2"	3 1/32"	25/32"	1 33/64"	1 7/8"
2 1/2" x 10 Ga. Square Post	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

2 3/16" x 10 gauge may be inserted into 2 1/2" x 10 gauge for additional wind load.

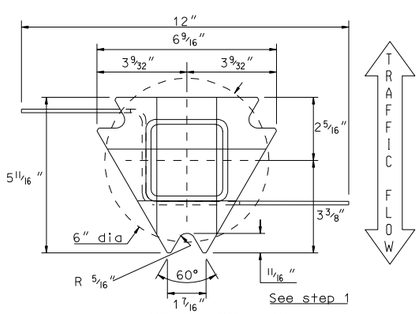


MULTI-DIRECTIONAL SLIP BASE ASSEMBLY



BOLT RETAINER FOR BASE CONNECTION

Materials: 1/32" reprocessed Teflon



BOTTOM SOIL STUB

Materials: Tube - 3"x 3"x 7 gauge ASTM A500 Gr B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A 569
Plate - ASTM A572 grade 50

Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
2. The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size 10 gauge is shown as 2.51" size on the plans.
3. Anchor for 2", 2 1/4", and 2 1/2" posts.
4. Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3"x 3"x 7 gauge ASTM A500 Grade B. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/A153. All tolerances on anchor unit and slip base bottom assembly are ± 0.005 unless otherwise noted.
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.
6. When used in concrete sidewalk, anchor shall be the same except without the wings.
7. Four post signs shall have over 8' between the first and fourth posts.

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.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			B	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	10			Yes	
2	2 1/4	12	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

B - The 2 1/2", 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.

MULTI-DIRECTIONAL SLIP BASE ASSEMBLY	
STEP	INSTALLATION PROCEDURE
1.	Install bottom soil anchor stub plumb and squared up with road, with point of plate facing oncoming traffic.
2.	Depth of imbedment to leave 2 1/2" from grade to top of anchor plate.
3.	Place teflon bolt retainer gasket on top of bottom plate (make sure that notches in holes are pointing counter clockwise).
4.	Place top post receiver on to retainer gasket, properly indexed so that angle receivers are squared up with road.
5.	Slide 1 each 1/2" flat washer on to 1 each inverted 1/2"-13 gr. 8 flange bolt, followed by 1 each stainless steel release bushing.
6.	Insert above bolt with washer and bushing up through notched points of top and bottom plates, passing through hole in gasket.
7.	Slide second bushing down on to above bolt until it rests on top of gasket followed by second washer.
8.	Complete by threading 1/2"-13 gr. 8 serrated flange nut snugly down against top of washer.
9.	Repeat steps 5,6,7 & 8 at the two remaining notched triangle points.
10.	Insert sign post into angle receivers on top half until post(s) bottom out. *NOTE: Where higher wind load is desired, insert the next size smaller square post inside bottom of main upright post (Minimum of 48", not to exceed beyond bottom edge of sign).
11.	Secure posts into receivers using 3 each 3/8"-16 gr. 8 flange bolts and 3 each 3/8"-16 serrated flange nuts in receiver slots (top 2 bolts should be parallel to highway) do not tighten nuts until all bolts are in place.
12.	After all sub-assembly hardware is tightened, then torque the three 1/2"-13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque. *NOTE: On multi-leg installations, be sure that all anchors are squared and lined up with each other.

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}
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785
4 x 4	0.250	1/4	6.600	3.040	1.940	1.050

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-02	
REVISIONS	
DATE	CHANGE
12-01-04	PE stamp added

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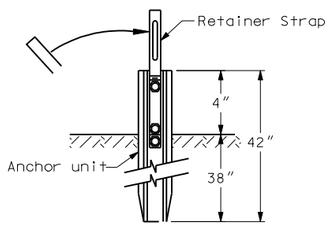
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

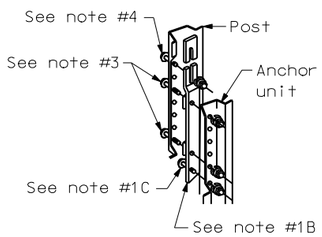
FLANGED CHANNEL



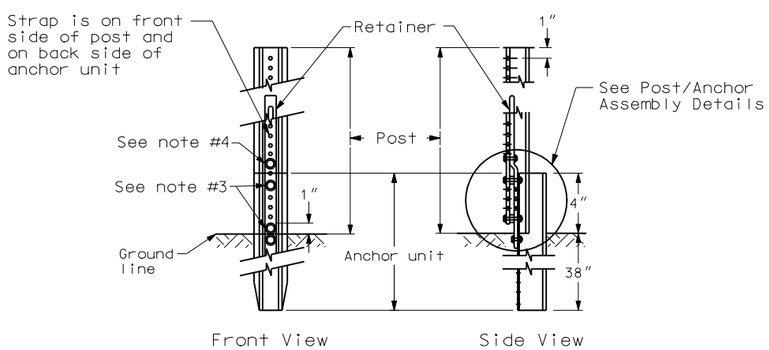
Anchor Unit & Strap Assembly Detail

STEPS OF INSTALLATION

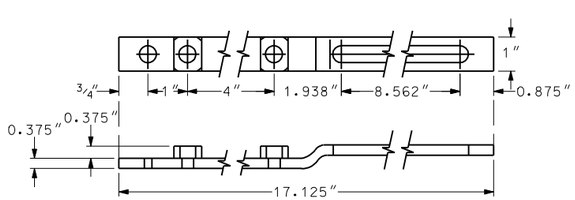
1. A) Drive anchor unit to within 12″ of ground level.
   B) Proper assembly established by lining up the top ¾″ slot of retainer spacer strap with top hole of anchor unit.
   C) Assemble strap to back of anchor unit using ⅜″-16 UNC x 2.0″ long bolt, lock washer and nut.
   D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4″ dimension.
   B) Rotate strap to vertical position.
3. A) Place ⅜″-16 UNC x 2″ bolt, lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit (this coincides with the bottom ¾″ slot in the strap).
   B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening ⅜″-16 UNC x 2″ long retainer bolt (this fastens sign post to retainer spacer strap).
5. The base post, strap & 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.



Post/Anchor Assembly Details



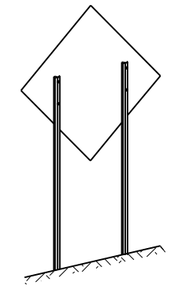
Sign Post Assembly Detail



Retainer/Spacer Strap Detail

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN. 3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"	.150	3.00	.372	.918	.403
1.750 x 3.500"	.175	4.00	.500	1.190	.560

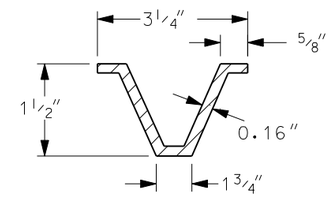
3 LB/FT U POSTS



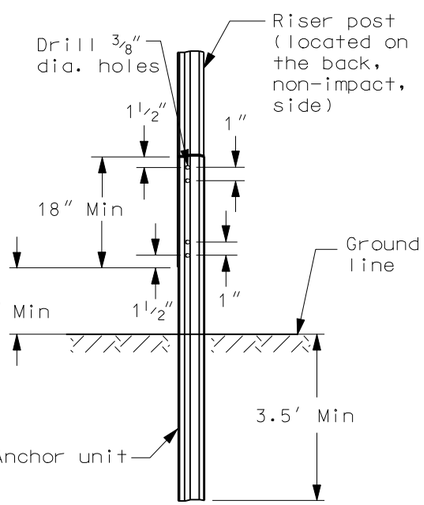
Typical Installation

Notes

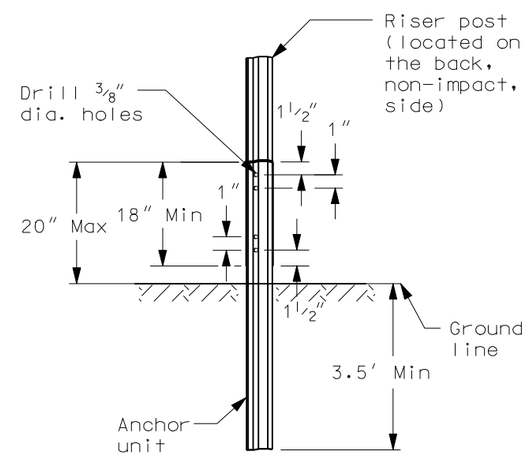
1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7′ long and embedded at least 3.5′.
3. A splice shall overlap a minimum of 18″.
4. Use 4 bolts ⅝″ diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4″ above ground and embedded at least 3.5′.



U-Post Detail (3 lb/ft)



U-Channel Splice Option 2



U-Channel Splice Option 1

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-28-93	
REVISIONS	
DATE	CHANGE
03-07-01	Revised U-post details
11-21-02	Deleted perforated tube
05-08-03	Revised U-Channel splice
12-01-04	PE stamp added
06-29-05	Revised flanged channel note

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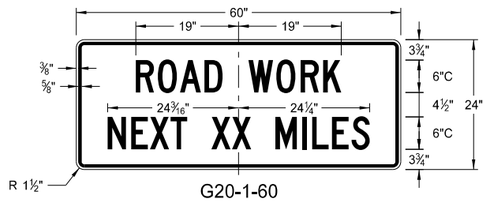
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



G20-1-60
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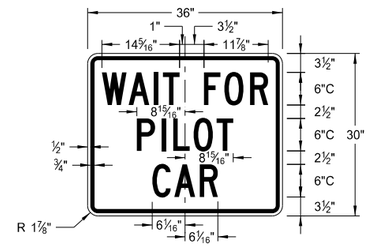
Background: orange



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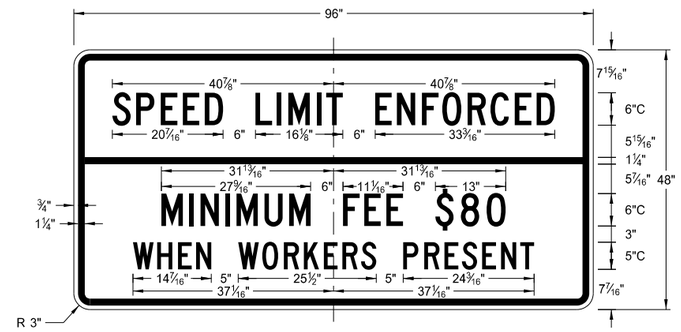

G20-55-96
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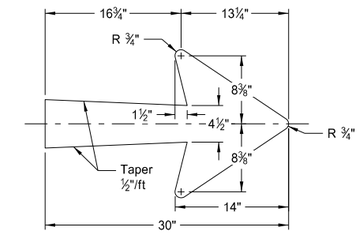
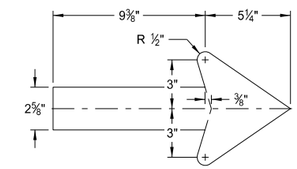
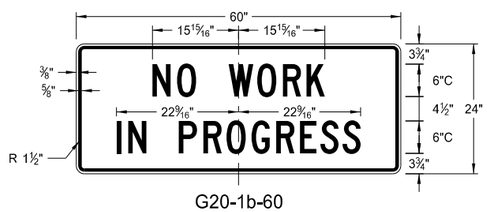


E5-1-48



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



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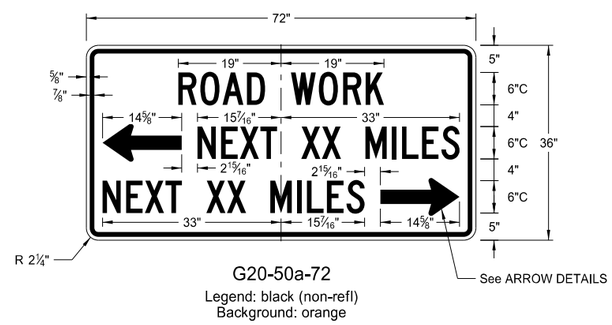

G20-50a-72
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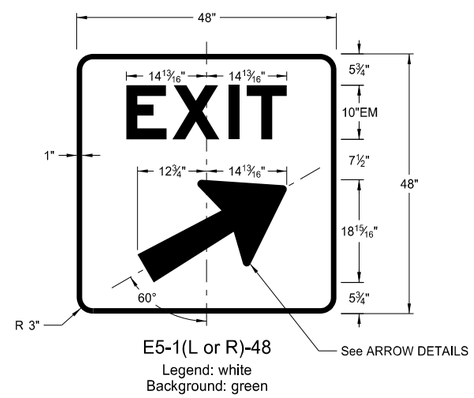
Background: orange



E5-1(L or R)-48
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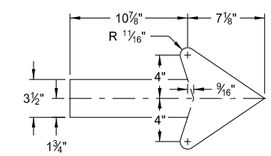
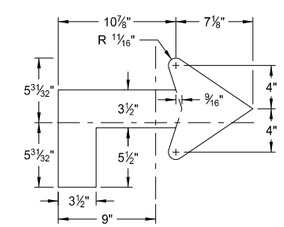
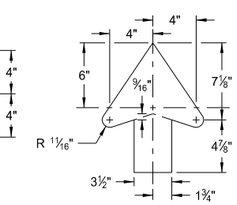


M4-9(L or R)-30
Right or Left

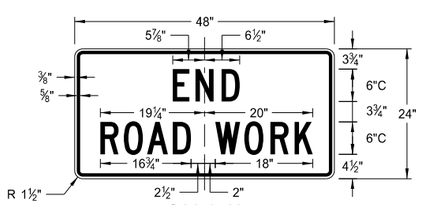


M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS



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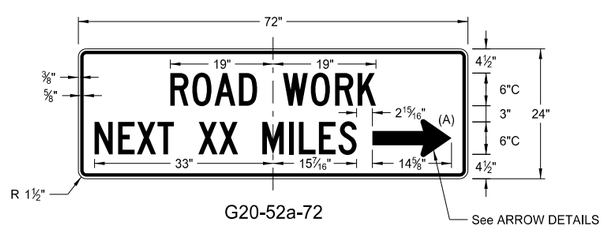
Background: orange



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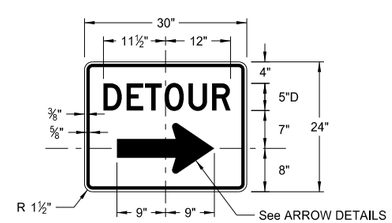
Background: orange



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

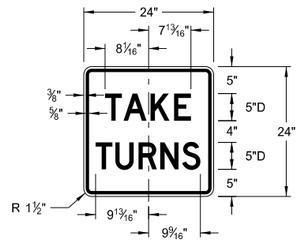
NOTES:

(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

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

CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50-24
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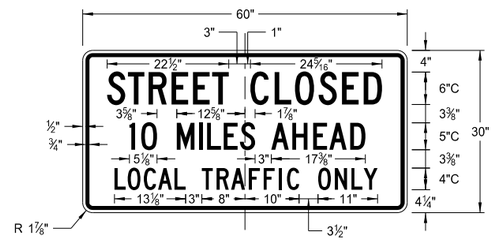

R11-3c-60
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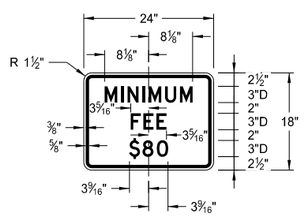

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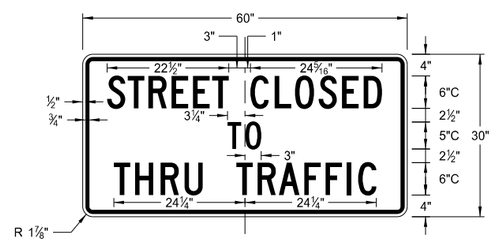

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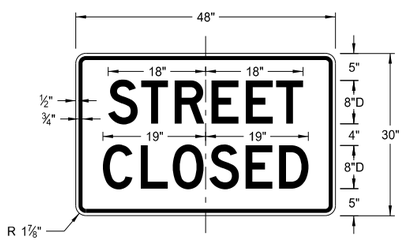

R11-2a-48
Legend: black (non-refl)
Background: white

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

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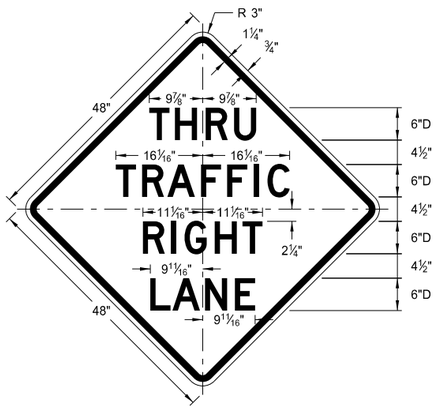
D-704-11

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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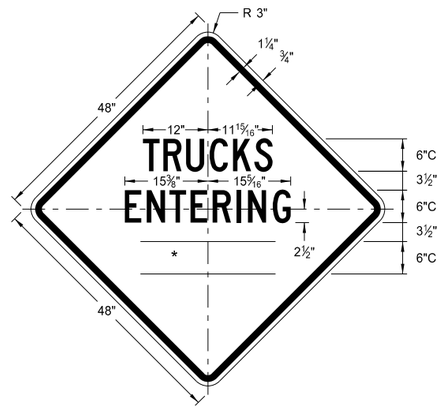

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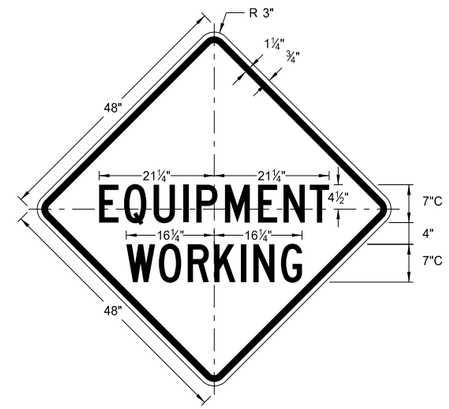

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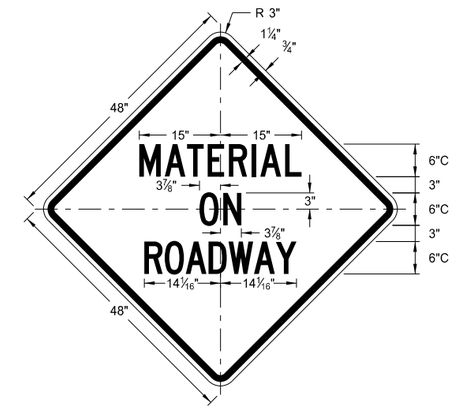
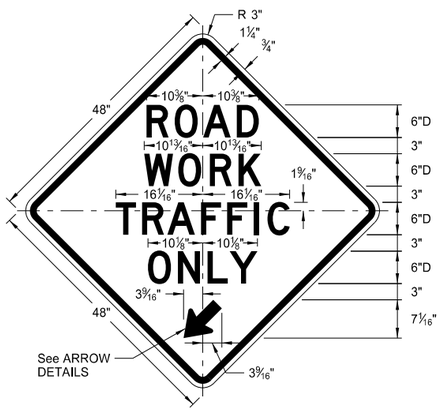


W21-51-48
Legend: black (non-refl)
Background: orange

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



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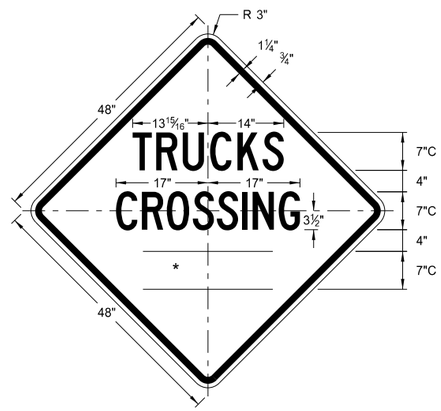

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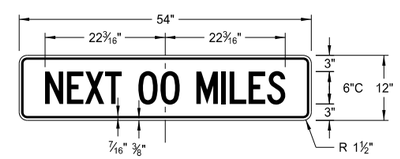

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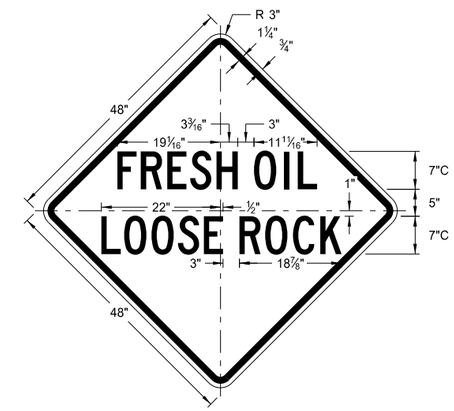

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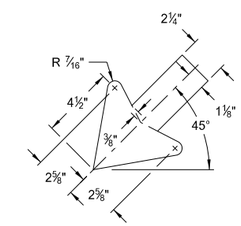
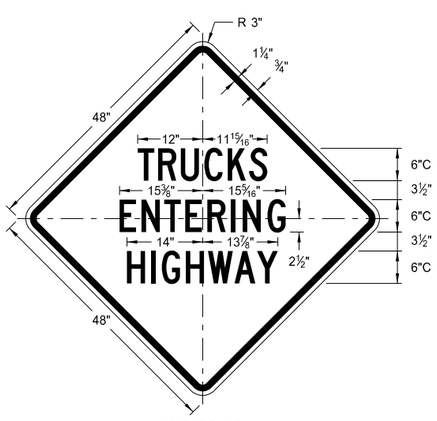


W5-9-48

ARROW DETAILS



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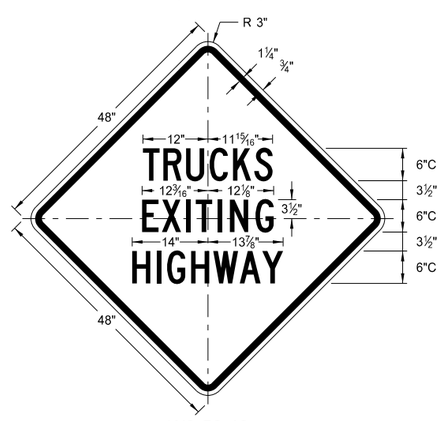

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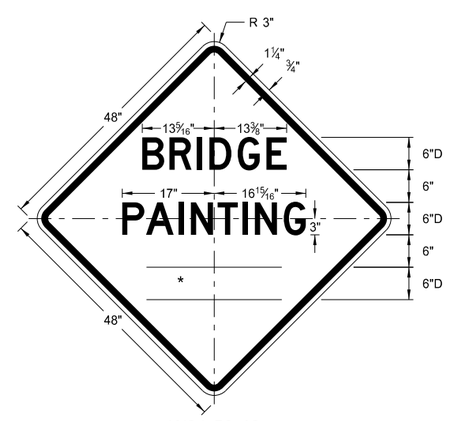

W21-50-48
Legend: black (non-refl)
Background: orange

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

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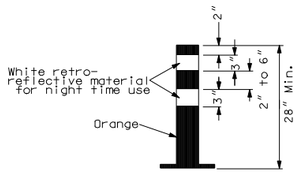
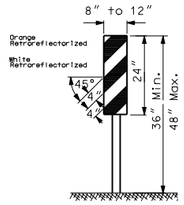
BARRICADE DETAILS AND CHANNELIZING DEVICES

D-704-13



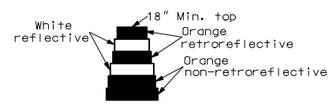
TUBULAR MARKER



VERTICAL PANEL

(Retroreflective sheeting shall be placed on both sides)

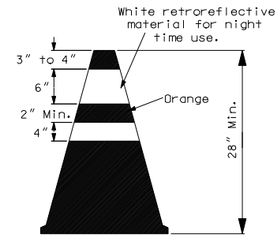
NOTE: Vertical panels used on the expressways or other high speed roadways shall be 12" by 24"



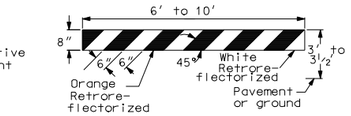
DELINEATOR DRUM

36" Min. height

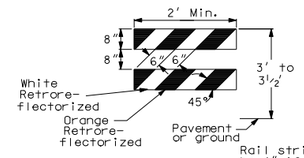
The markings on drums shall be orange and white stripes 4 to 6 inches wide. There shall be at least two orange and two white stripes. Where drums have ribs or indentations, there shall be no retroreflectorized sheeting in this area. This space shall be no more than 2 inches wide. The drum surface shall be prepared as recommended by the sheeting manufacturer before retro reflective sheeting is applied



CONE

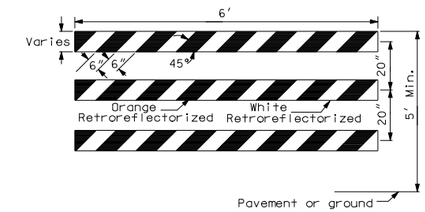


TYPE I BARRICADE



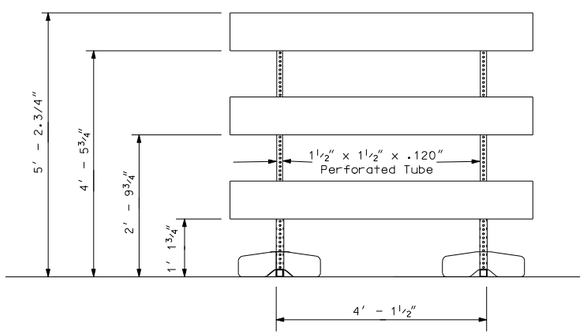
Rail stripe width shall be 4" if barricade length is less than 36".

TYPE II BARRICADE

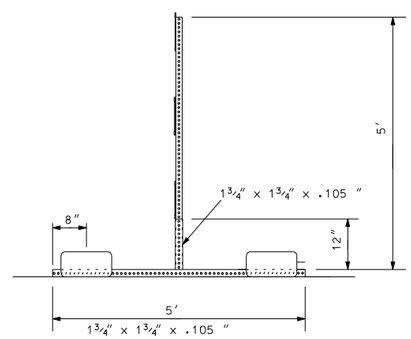


TYPE III BARRICADE

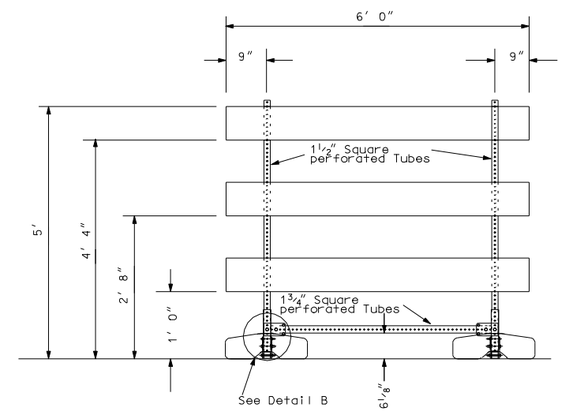
BARRICADES:
Number of retroreflectorized rail faces:
Type I - 2 (One each direction)
Type II - 4 (Two each direction)
Type III- 6 (Three in each direction)

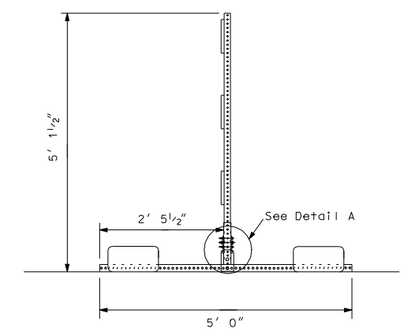


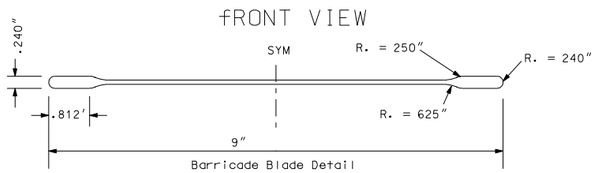
FRONT VIEW



END VIEW







Barricade Blade Detail

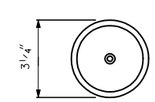
Ballast = 45lb sandbag at the end of each leg.

Barricade blade fastened to vertical supports with 2" corner bolts.

Vertical potion of leg is welded to horizontal portion on all four sides.

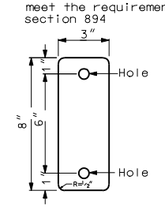
Masts slide inside vertical portion of legs. No bolts or fastenings devices used.

BARRICADE ASSEMBLY DETAIL
(Use when aluminum blade as detailed above)



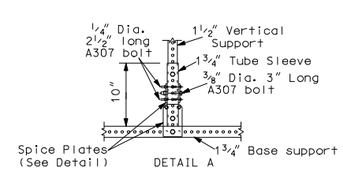
ACRYLIC PLASTIC REFLECTOR

Delineator reflector shall meet the requirements of section 894

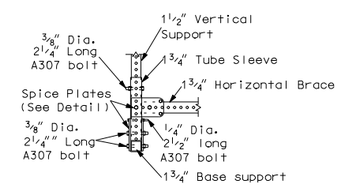


DELINEATOR REFLECTOR

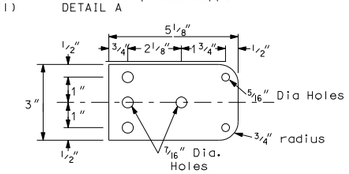
3"x8"- 18 Gauge galvanized steel sheet or 0.080" aluminum plate with white retroreflective sheeting (Type 3A or 3B) as specified in section 894 of the Standard Specifications.



DETAIL A



DETAIL B



SPLICE PLATE

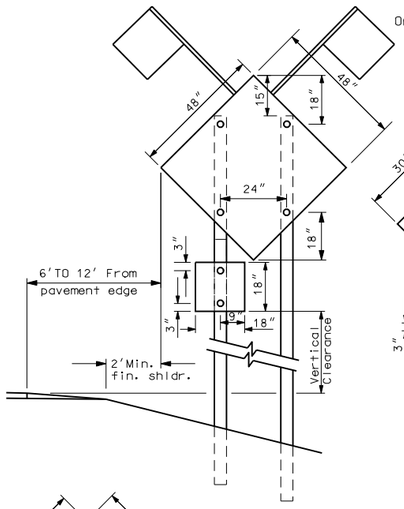
BARRICADE ASSEMBLY DETAIL
(Use when Plastic I-Beam w/ 1½" Hollow Core Flanges or 1" x 8" x72" wood boards.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-03-87	Type sheeting
10-01-87	Delineator drum note
06-08-88	Barricade type III
06-01-92	General revision
06-10-93	General revision
09-23-93	Vertical panel
06-09-95	Reflective sheeting
03-01-02	Barricade type III assembly details
04-01-02	Type III barricade
12-01-04	PE stamp added
06-29-05	Revised Type II barricade stripe

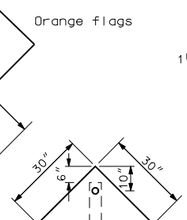
This document was originally issued and sealed by MARK S GAYDOS Registration Number PE-4518, on 06/29/05 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS

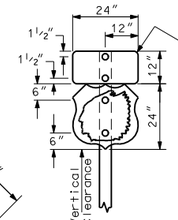
D-704-14



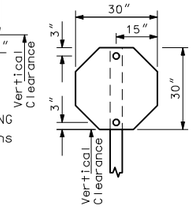
POST MOUNTING 48"x48" Signs



POST MOUNTING 30"x30" Signs

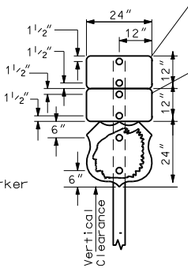


POST MOUNTING Assemblies with one cardinal direction sign & one route marker

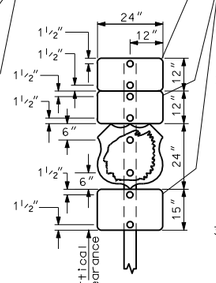


POST MOUNTING Sign R1-1-30

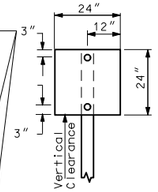
See note 7



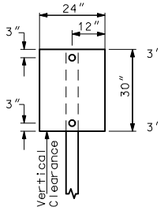
POST MOUNTING Assemblies with one cardinal direction sign, one detour sign & one route marker



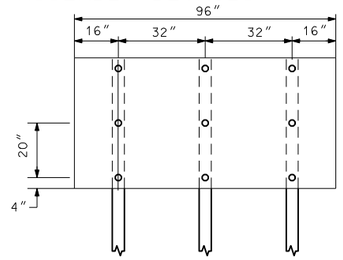
POST MOUNTING Assemblies with one cardinal direction sign, one detour sign, one route marker & one directional arrow.



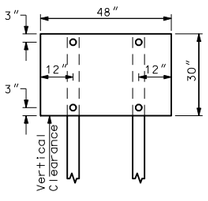
POST MOUNTING 24"x24" Signs



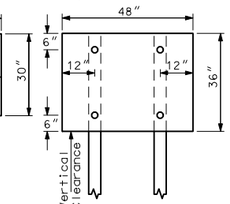
POST MOUNTING 24"x30" Signs



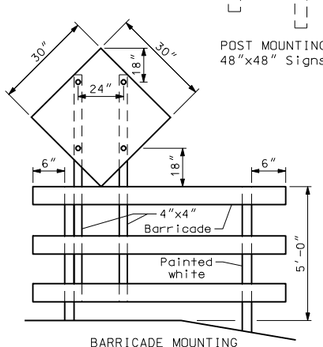
POST MOUNTING 48"x96" Signs



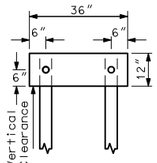
POST MOUNTING 48"x30" Signs



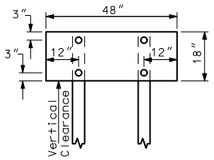
POST MOUNTING 48"x36" Signs



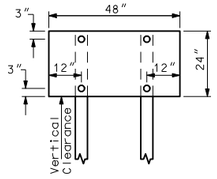
BARRICADE MOUNTING 48"x48" Signs



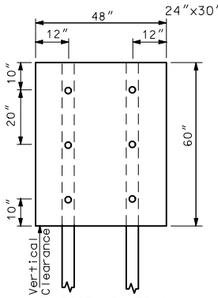
POST MOUNTING 36"x12" Signs



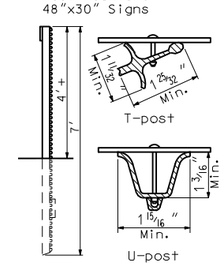
POST MOUNTING 48"x18" Signs



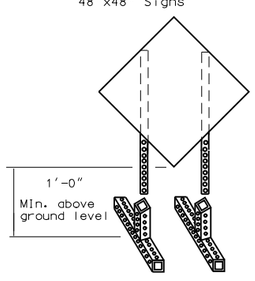
POST MOUNTING 48"x24" Signs



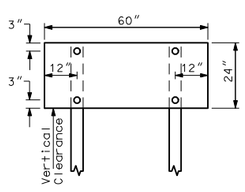
POST MOUNTING 48"x60" Signs



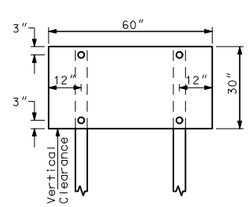
DELINEATOR ATTACHMENT AND POST MOUNTING DETAILS



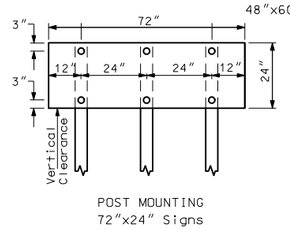
PORTABLE SIGN MOUNTING



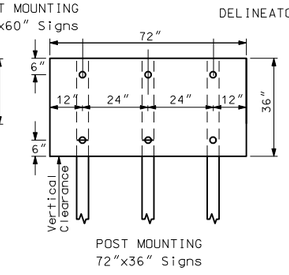
POST MOUNTING 60"x24" Signs



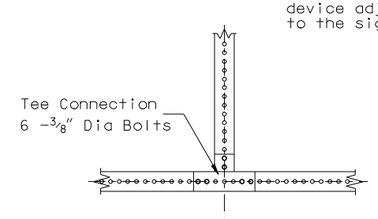
POST MOUNTING 60"x30" Signs



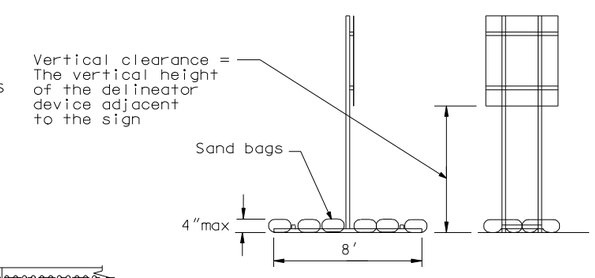
POST MOUNTING 72"x24" Signs



POST MOUNTING 72"x36" Signs

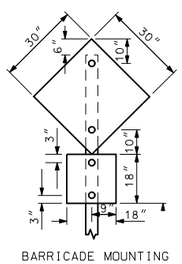


Post to Ground Support Connection

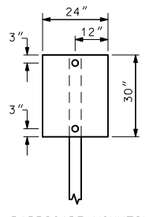


Post sizes shall be 2¼" perforated tube

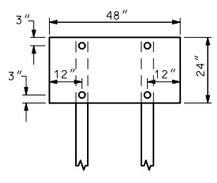
SKID MOUNTED SIGNS



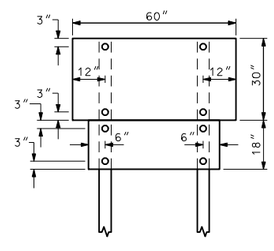
BARRICADE MOUNTING 30"x30" Signs



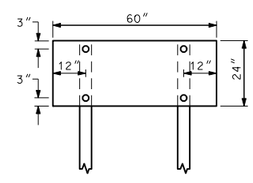
BARRICADE MOUNTING 24"x30" Signs



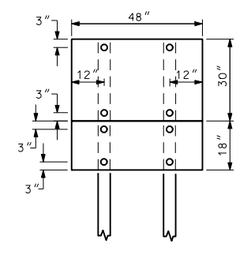
BARRICADE MOUNTING 48"x24" Signs



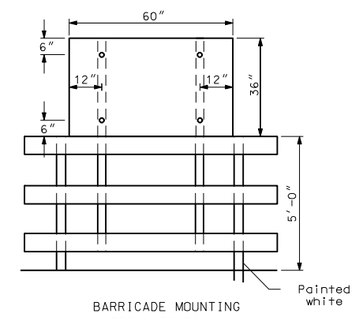
BARRICADE MOUNTING 60"x30" & 48"x18" Signs



BARRICADE MOUNTING 60"x24" Signs



BARRICADE MOUNTING 48"x30" & 48"x18" Signs



BARRICADE MOUNTING G20-1-60 Signs

NOTES:

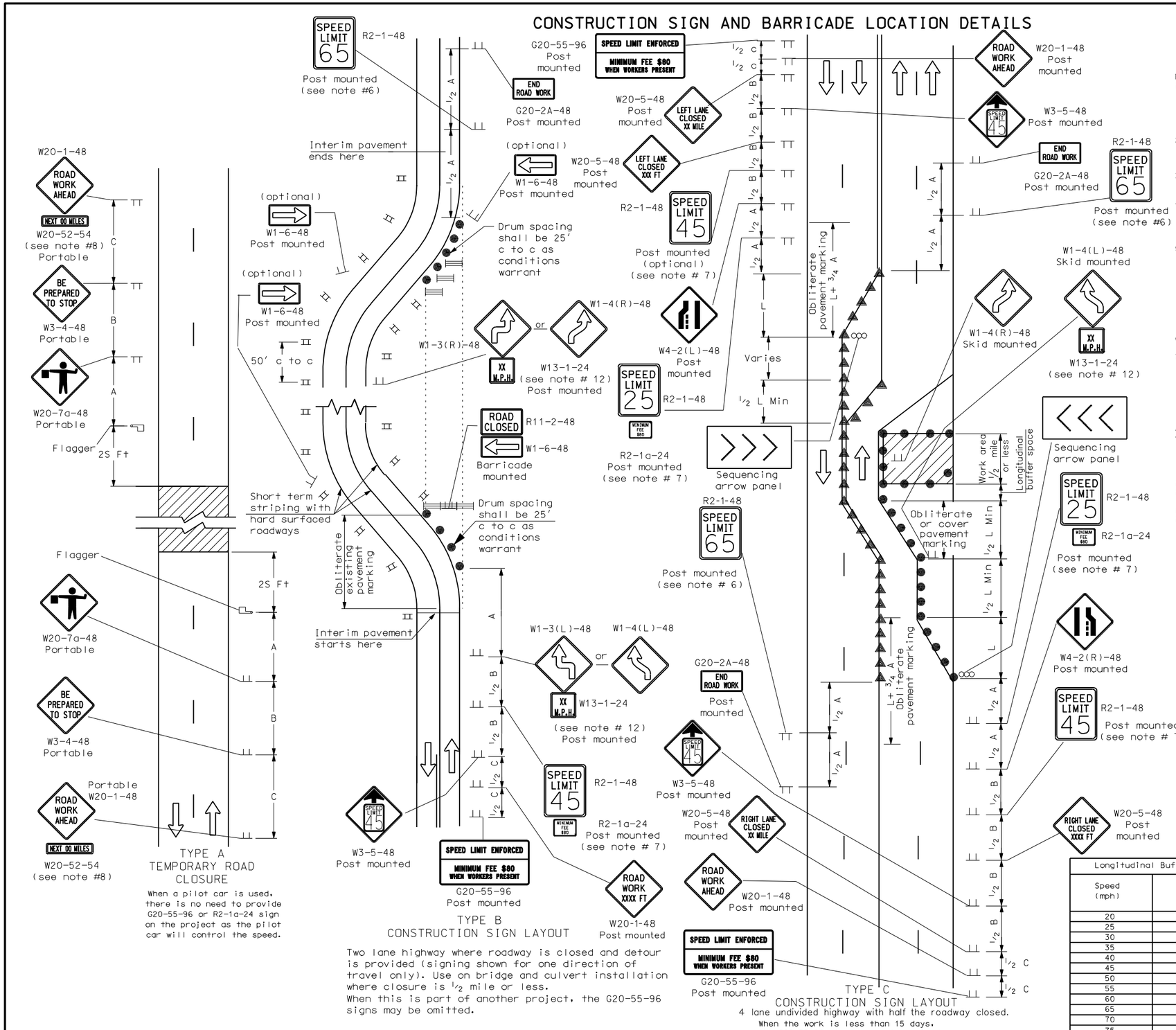
1. Barricade and Sign Supports: Wooden supports shall be painted white. Steel supports shall be galvanized or painted.
2. Barricade Mounting Signs: The bottom of the sign shall be flush with the top of the top rail. Wood sign posts shall be 4"x4" min. SFS or equivalent steel posts. All barricades and barricade mounted signs shall be assembled with 3/8" bolts.
3. Sign Supports: Sign supports shall be 4"x4" min. SFS or equivalent steel post. The anchor for steel supports shall have a stub height of 4" or less. Wood posts more than 4"x4" shall be breakaway. Sign supports shall be imbedded to a sufficient depth so that signs will remain plumb throughout duration of project. It is suggested that wood posts have a min. depth of embedment of 5' and steel posts be embedded a min. 3'-6".
   Material: All signs shall be 0.100" aluminum, 12 gauge steel, ½" plywood or other approved material.
   Holes: All holes to be punched round for 3/8" bolts.
4. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate without a border and this plate installed and removed as required.
5. Advance Warning Flashing or Sequencing Arrow Panels: The minimum mounting height shall be 7 feet above the roadway to the bottom of the panel, except on vehicle mounted panels which shall be as high as practicable.
6. Delineator Posts: Typical fence post sections are shown in Attachment Details. Other types of metal fence posts may be substituted upon approval of the engineer. These substituted posts shall have reflectors attached similar to the ones shown.
7. Route Marker Auxiliary Signs: The route marker auxiliary signs such as the cardinal direction and directional arrows shall have background colors the same as the route marker they are used with (Interstate route markers, blue background, US and State route markers, white background, Interstate Business loop and spur, green background, and County route markers, blue background).
8. Vertical Clearance: Post mounted signs placed in rural areas shall have a vertical clearance of at least 5 feet measured from the bottom of the sign to the near edge of the driving lane. In business, commercial and residential districts where parking and/or pedestrian movement is likely to occur or where other obstructions to view, the distance between the bottom of the sign to the near edge of the driving lane shall be at least 7 feet. The height to the bottom of secondary signs mounted below another sign may be 1 foot less than the appropriate height specified. Large signs having an area exceeding 50 square feet that are installed on multiple breakaway posts shall be mounted a minimum of 7 feet above the ground.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-01-88	Sign assembly
05-01-92	Sign assembly
03-30-93	Sign supports note
03-04-96	Sign height
08-15-96	Note 8
07-10-97	Note revision
07-31-98	Note & portable sign
10-01-99	Skid mounted sign
02-07-03	Vertical clearance note
11-30-04	Third post added to some signs
12-01-04	PE stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-15



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. Barricade shown to be placed on roadway shall be on a moveable assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Sign shown to be 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. Existing striping shall be removed as required. Delineators will only be used when foreslope is 1V:4H or better and roadway alignment is visible to approaching vehicles. Vertical panels shall be used where roadways has steep slopes and alignment is not visible to approaching vehicles. Delineators and vertical panels shall be installed back to back.
5. 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 and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph and 5000 ADT).
6. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
7. 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.
8. Use when work area is 1 mile or longer.
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. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
12. Where necessary, safe speed to be determined by the Engineer.
13. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.

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 I barricade
- Type II barricade
- Type III barricade
- Sign
- Delineator drum
- Cones
- Work area
- Flagger
- Sequencing arrow panel
- Type A delineator or 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

10-1-86

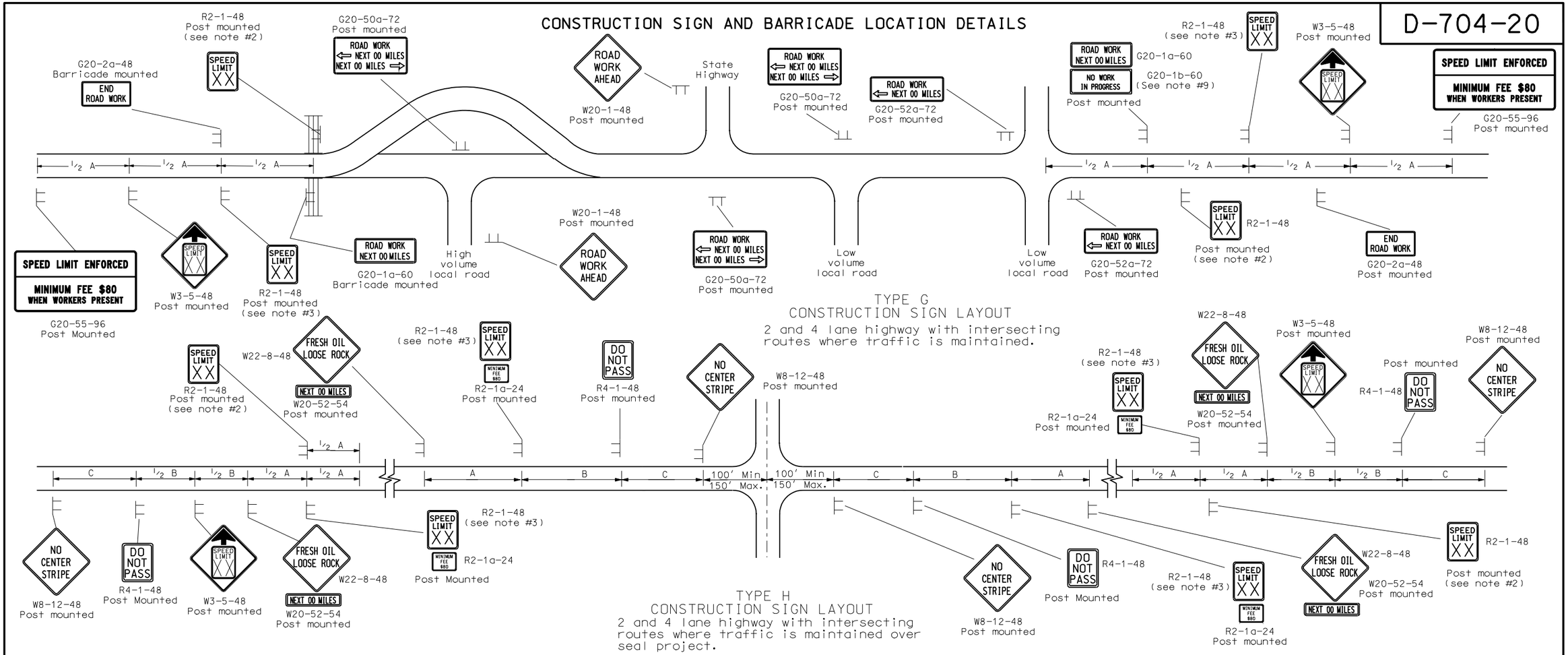
REVISIONS

DATE	CHANGE
01-05-01	Revised note 3
07-19-02	Reversed End Road Work & Speed Signs
07-25-03	Revised R2-1, R2-1a and W20-1
04-01-04	Change Fee Sign, Warning & Buffer Spacing
12-18-03	Relocated reverse curve
12-01-04	PE stamp added
06-29-05	Revised W4-2, Replaced R2-5a with W3-5, Rev. Adv. Warning Table, Rev. Note 7.
07-05-05	Changed W20-7b to W3-4

This document was originally issued and sealed by Mark S Gaydos Registration Number PE-4518, on 07/05/05 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-20



TYPE G
CONSTRUCTION SIGN LAYOUT

2 and 4 lane highway with intersecting routes where traffic is maintained.

TYPE H
CONSTRUCTION SIGN LAYOUT

2 and 4 lane highway with intersecting routes where traffic is maintained over seal project.

1. Barricade shown to be placed on roadway shall be on a moveable assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Sign shown to be placed on the roadway shall be placed on skid mounted assemblies.
2. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
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. Sign no. R2-1-48, R2-1a-24, R4-1-48, W22-8-48, W20-52-54, and W8-12-48 shall be placed just after all important intersections and every five miles in either direction. Sign no W8-12-48 shall be placed when traffic volumes are 750 ADT or less. No short term markings are placed when this condition exists.
7. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.
8. Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
9. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
10. The layouts show the signs needed before work begins. The requirements at the actual work areas will require the use of other standards. If the speed limit is reduced in the work areas, the speed limit signs shall have the R2-1a-24 sign placed below.

KEY

- Type I barricade
- Type II barricade
- Type III barricade
- Sign
- Delineator drum
- Cones
- Work area
- Flagger
- Sequencing arrow panel
- Type A delineator or 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

10-1-86

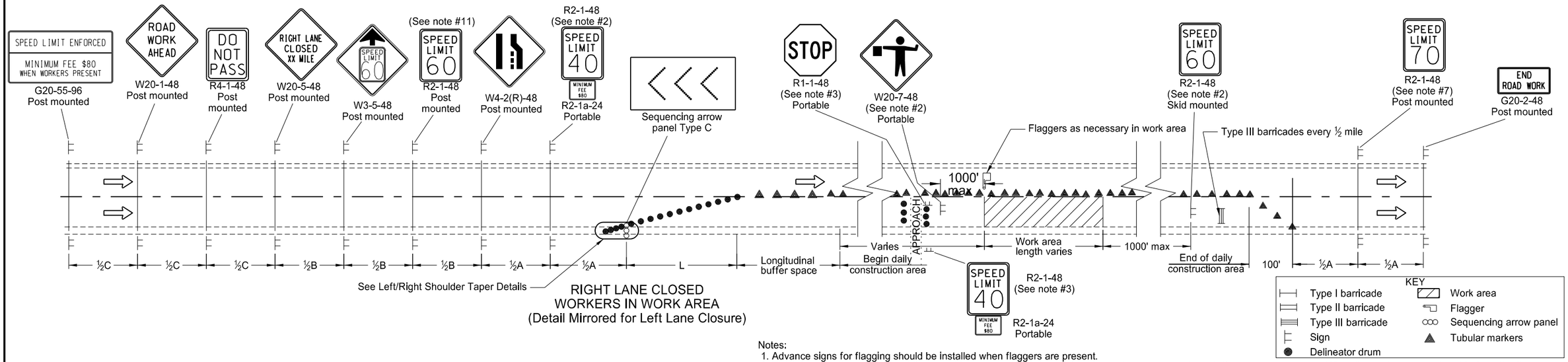
REVISIONS

DATE	CHANGE
08-15-96	Revise flag note
10-01-99	General revisions
10-18-01	Added note 8 & 9
07-19-02	Rev. end road work & speed limit sign
07-25-03	Rev. R2-1a & W20-1
04-01-04	Rev. fee sign & warning sign spacing Rev note 3, add note 10
12-01-04	PE Stamp added
06-29-05	Added W3-5 to Type H and Type G. Rev. Adv. Warning Table. Rev. Note 3
04-05-06	Corrected sign W3-5

This document was originally issued and sealed by MARK S. GAYDOS, Registration Number PE-4518, on 04/05/06 and the original document is stored at the North Dakota Department of Transportation

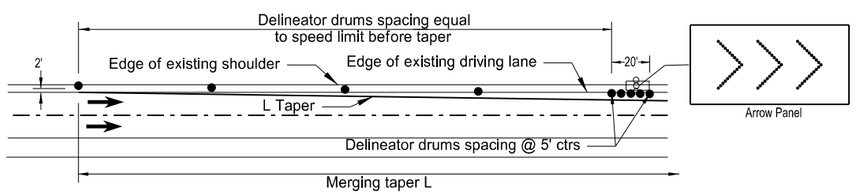
SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34

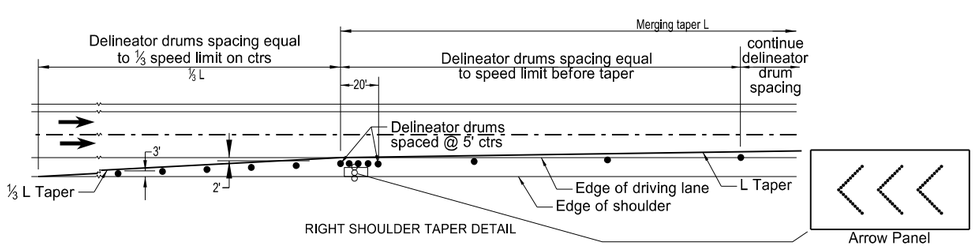


Notes:

1. Advance signs for flagging should be installed when flaggers are present.
2. The advanced flagger sign and the speed limit signs shall be moved as the work area moves through the construction zone. When the work area is not visible from the flagger, the flagger station shall be placed so the work area is visible. The 40 mph speed limit sign shall be spaced at ½A in advance of the flagger sign. The 60 mph speed limit sign shall also be moved. Upon completion of the work day or when workers are not present, the 40 mph speed limit and the Minimum Fee $80 signs shall be covered or removed. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, the approach shall be controlled by installing a 40 mph speed limit sign. If this approach is on the side of the lane closure, the existing stop sign shall be covered and a new portable stop sign shall be installed. When the main line 40 mph speed zone is moved past the approach, the approach speed limit sign shall be removed.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Delineator drums, used for tapering traffic shall be spaced at the dimension "S". Tubular markers used for tangents shall be spaced at 2 times dimension "S".
6. Sequencing arrow 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).
7. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
8. Existing speed limit signs within a reduced speed zone shall be covered.
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. 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.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
12. Sign G20-55-96 is not required if this standard is part of other traffic control layouts or the work is less than 15 days.



LEFT SHOULDER TAPER DETAIL



RIGHT SHOULDER TAPER DETAIL

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.

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

9-26-2012

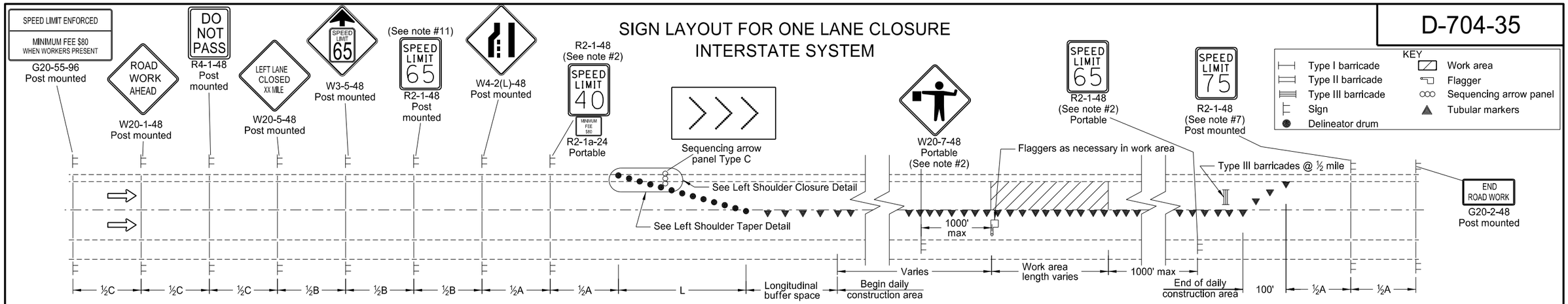
REVISIONS

DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 9/26/2012 and the original document is stored at the North Dakota Department of Transportation

SIGN LAYOUT FOR ONE LANE CLOSURE INTERSTATE SYSTEM

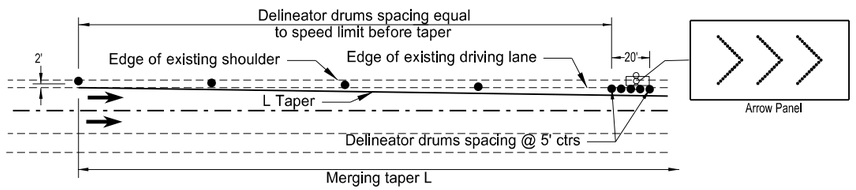
D-704-35



KEY

- Type I barricade
- Type II barricade
- Type III barricade
- Sign
- Delineator drum
- Work area
- Flagger
- Sequencing arrow panel
- Tubular markers

LEFT LANE CLOSED WORKERS IN WORK AREA



LEFT SHOULDER TAPER DETAIL

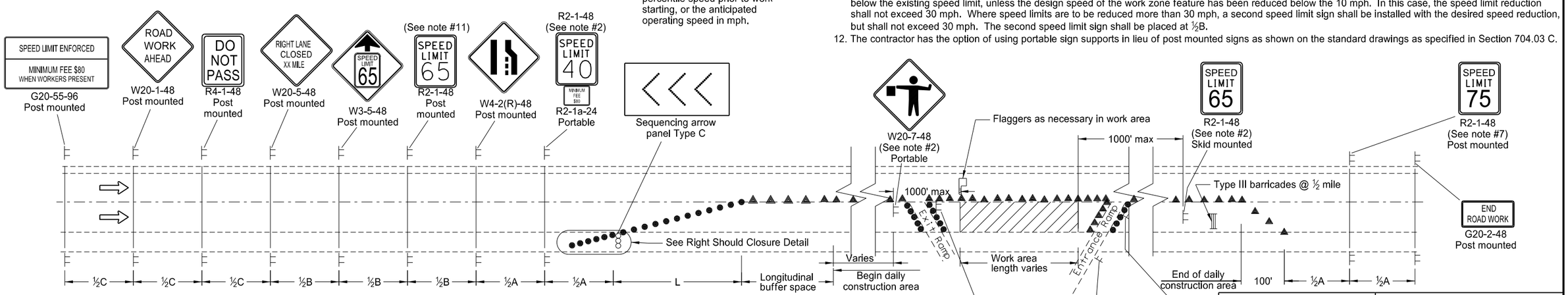
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance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

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

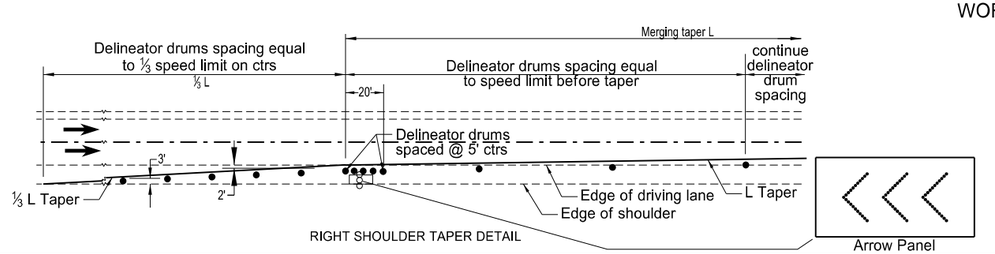
*Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

Notes:

1. Advance signs for flagging shall be installed when flaggers are flagging.
2. The advanced flagger sign and the speed limit signs shall be moved as the work area moves through the construction zone. When the work area is not visible from the flagger, the flagger station shall be placed so the work area is visible. The 65 mph speed limit and the 40 mph speed limit sign shall be spaced at ½A in advance of the flagger sign. The 65 mph speed limit sign shall also be moved. Upon completion of the work day or when workers are not present, the 65 mph speed limit, 40 mph speed limit, and the Minimum Fee $80 signs shall be covered or removed.
3. RAMPS: When the work area encompasses an entrance ramp, the ramp shall be controlled by installing a 40 mph speed limit sign and covering any existing yield sign. Install new yield sign as necessary. When the main line 40 mph speed zone is moved past the ramp, the ramp speed limit sign shall be removed.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater,
   or WxSxS/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Delineator drums, used for tapering traffic shall be spaced at the dimension "S". Tubular markers used for tangents shall be spaced at 2 times dimension "S".
6. Sequencing arrow 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 C shall be used on roadways with high traffic speeds and volumes (over 40 mph or 5000 ADT or greater).
7. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
8. Existing speed limit signs within a reduced speed zone shall be covered.
9. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
10. 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.
11. 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.
12. The contractor has the option of using portable sign supports in lieu of post mounted signs as shown on the standard drawings as specified in Section 704.03 C.



RIGHT LANE CLOSED WORKERS IN WORK AREA



RIGHT SHOULDER TAPER DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-7-2012

REVISIONS	
DATE	CHANGE

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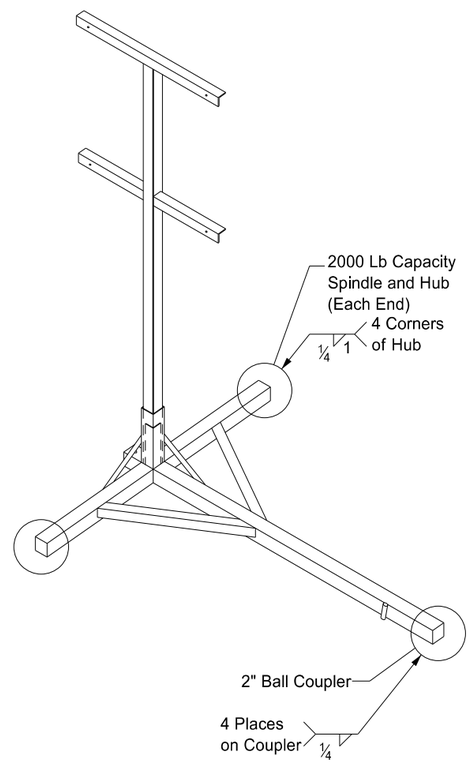
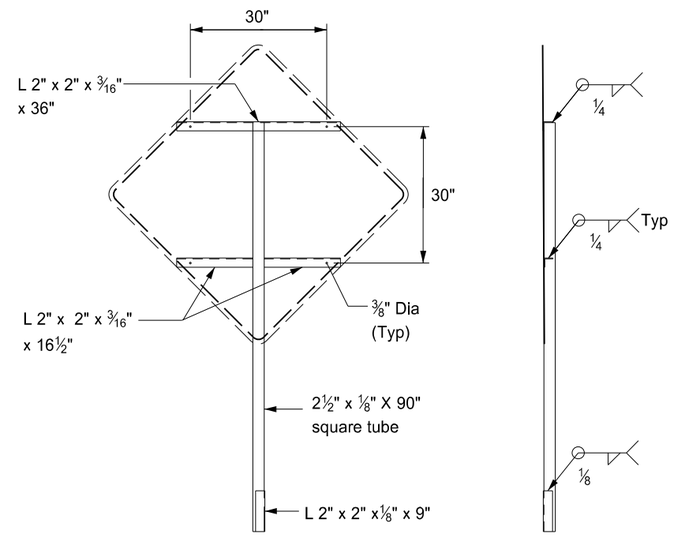
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

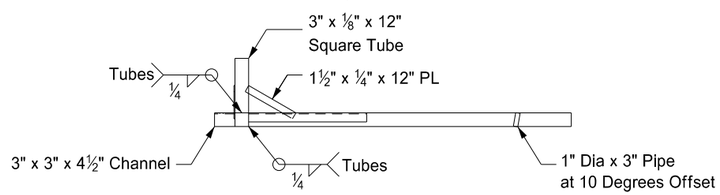




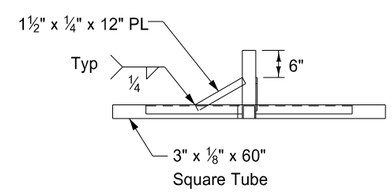
FRONT

RIGHT

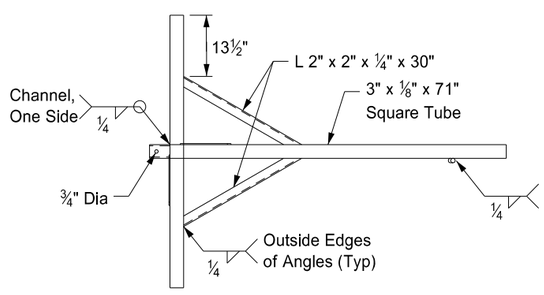
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

Notes:

1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

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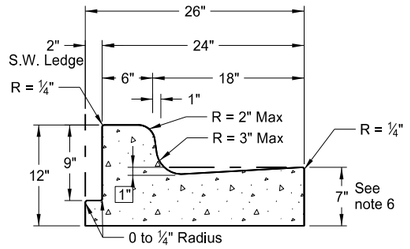
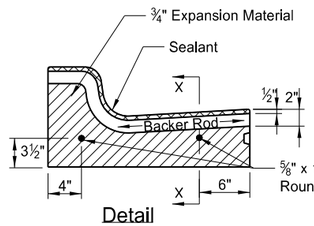
Curb & Gutter and Valley Gutter

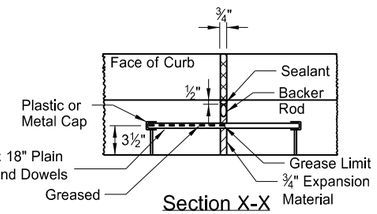
D-748-1



Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median, or Parking Lot.
(Sec. A shown. See Sec B for additional details.)

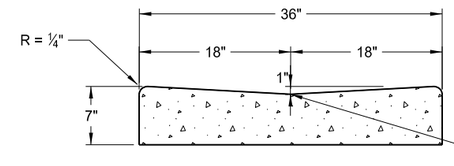


Detail

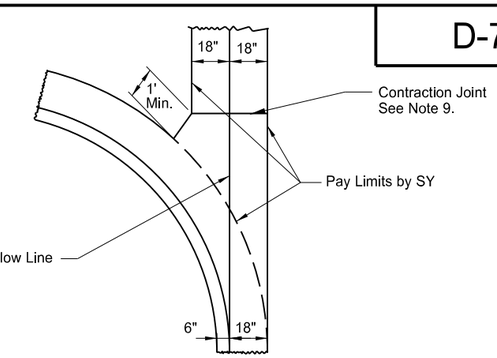


Section X-X

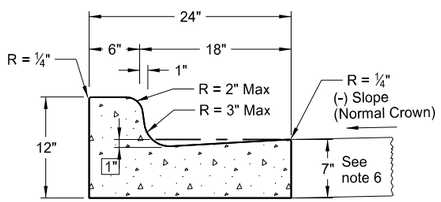
Isolation Joint



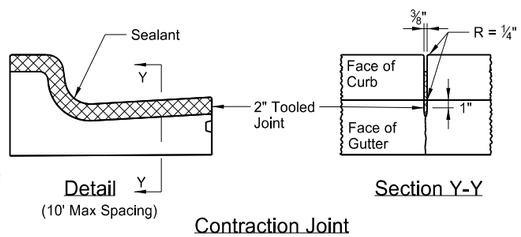
36" Concrete Valley Gutter Detail



36" Concrete Valley Gutter Plan



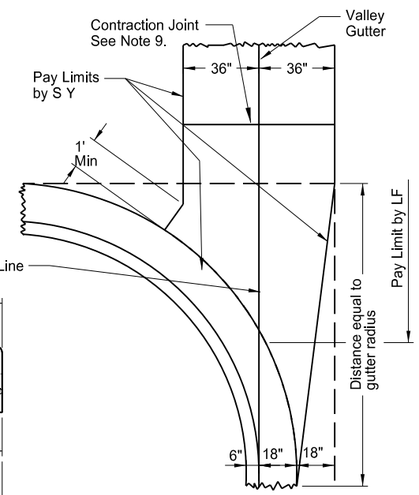
Curb & Gutter Type 1 (Sec. A)



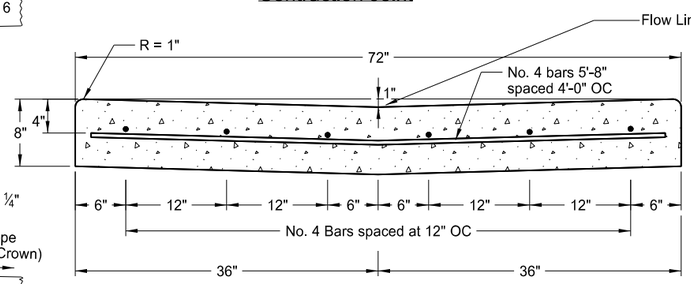
Detail
(10' Max Spacing)

Section Y-Y

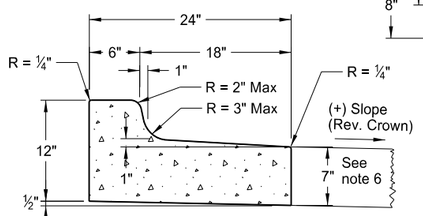
Contraction Joint



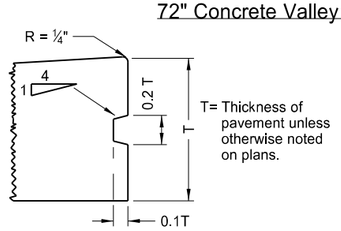
72" Concrete Valley Gutter Plan



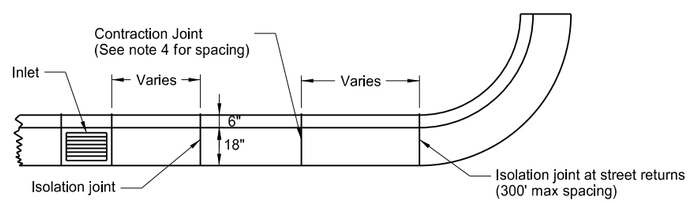
72" Concrete Valley Gutter Detail



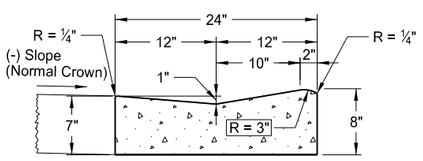
Curb & Gutter Type 1 (Sec. B)



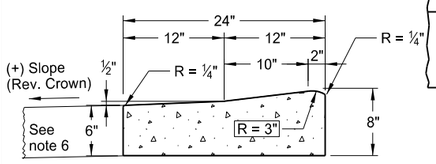
Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)



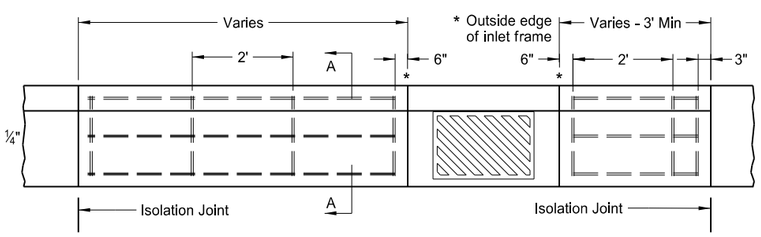
Joint Location Detail



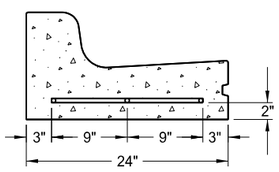
Mountable Curb & Gutter Type 1 (Sec. A)



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	
REVISIONS	
DATE	CHANGE

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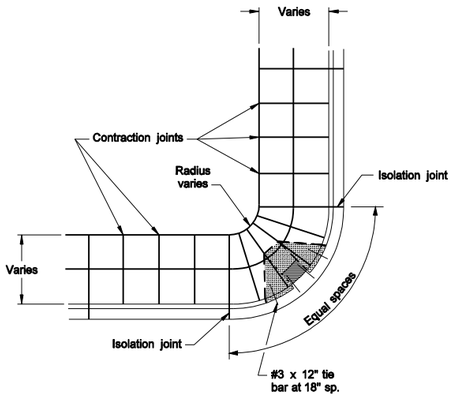
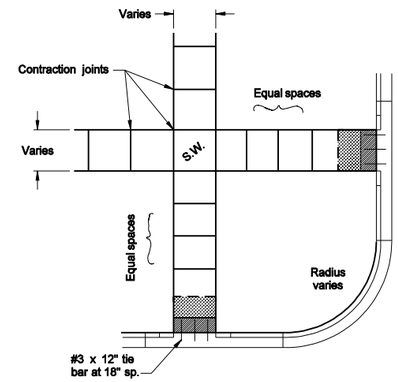
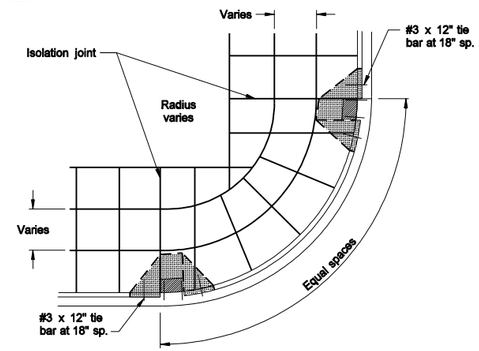
SIDEWALK

D-750-2



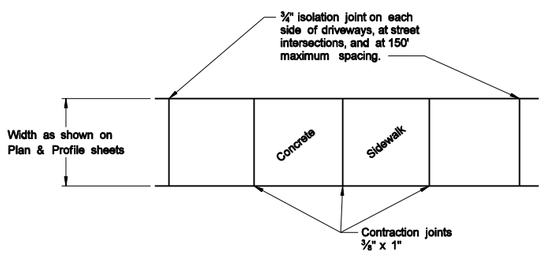




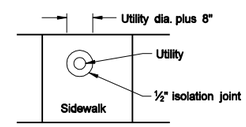
TYPICAL JOINT LAYOUTS

Notes:

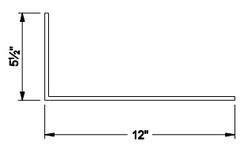
1. Method of payment: The curb ramp will not be paid for separately, but shall be included in the quantities & paid for at the unit price for concrete sidewalk and curb & gutter.
2. The cost for all labor, equipment, and material (pre-molded expansion material & hot bituminous joint filler) necessary to construct contraction and isolation joints shall be included in the price bid for sidewalk.
3. 4" base material shall be placed under the concrete sidewalk. 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.
4. Details showing curb ramps and detectable warning panels on this drawing are for joint and reinforcing layout purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
5. As shown in the plans or as directed by the engineer, a curb shall be constructed where the existing sidewalk is to be lowered, or abuts a building or adjacent property. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.
6. Transverse sidewalk joint spacing shall vary from 4'-6' to create approximate square panels. When the sidewalk is adjacent to the curb & gutter, the sidewalk joint spacing shall be varied so that the sidewalk joints match up with the curb & gutter joints.
7. Longitudinal joints shall be used where the sidewalk width is 8' or greater, and shall be spaced at half the sidewalk width.



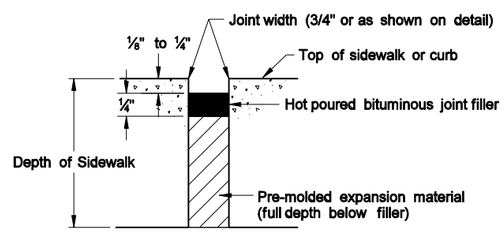
CONCRETE SIDEWALK DETAILS



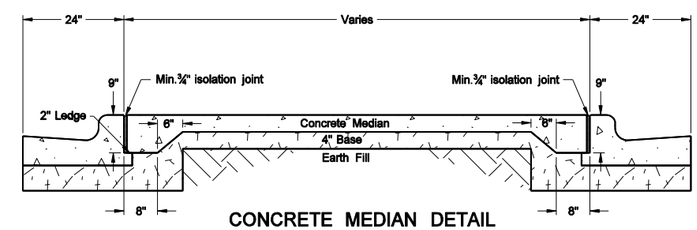
UTILITY BLOCKOUT



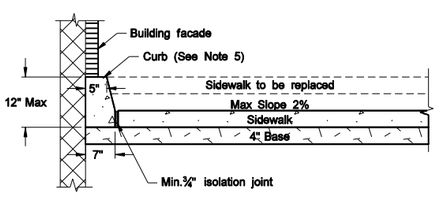
"L"BAR DETAIL
#3 BAR



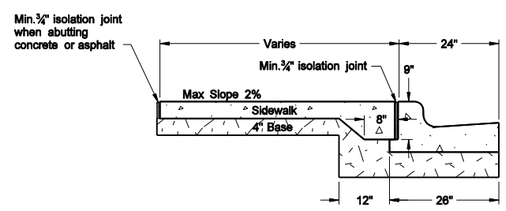
TYPICAL ISOLATION JOINT SEAL
(longitudinal and transverse)



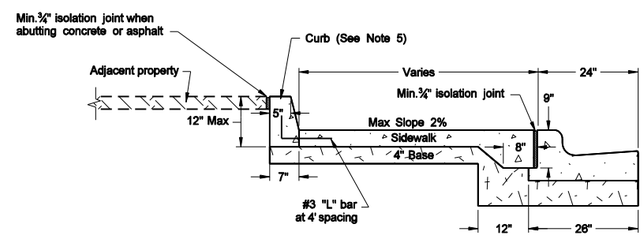
CONCRETE MEDIAN DETAIL



SIDEWALK WITH CURB DETAIL
(Building face application)



SIDEWALK DETAIL
(Installed adjacent to curb and gutter)



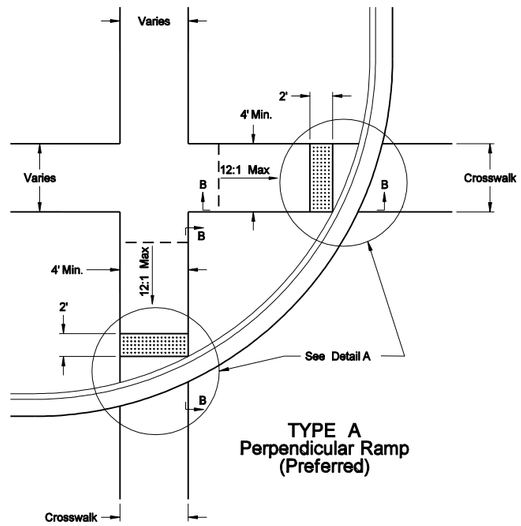
SIDEWALK WITH CURB DETAIL
(Adjacent property application)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
09-01-92	Remove Detectable Warning
09-23-92	Revised Expansion Joint
12-05-93	Isolation Joint
02-16-94	General Revisions
07-18-01	Revised joints
03-11-02	Revised Section A-A
10-23-03	Added detectable warning
01-15-04	Added Maximum Slopes
01-24-04	Rev notes - Added base
12-01-04	PE Stamp added
09-12-07	Major Revisions
11-02-07	Thickened sidewalk abutting curb & gutter,added concrete median detail

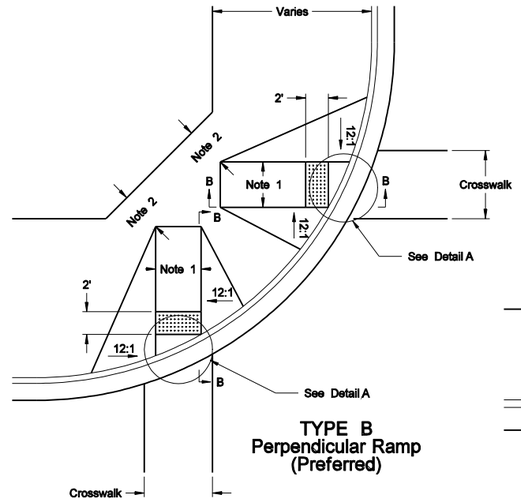
This document was originally issued and sealed by Mark S Gaydos, Registration Number PE- 4518 , on 11/02/07 and the original document is stored at the North Dakota Department of Transportation

CURB RAMP DETAILS

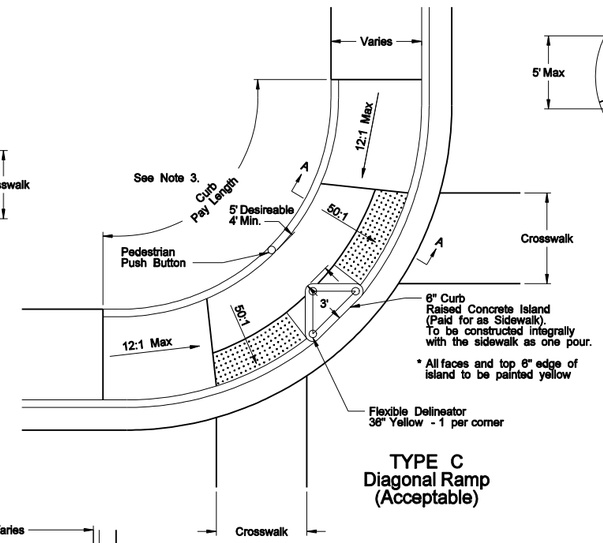
D-750-3



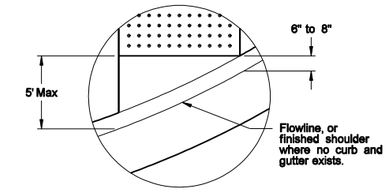
TYPE A
Perpendicular Ramp
(Preferred)



TYPE B
Perpendicular Ramp
(Preferred)



TYPE C
Diagonal Ramp
(Acceptable)



Detail A

Notes:

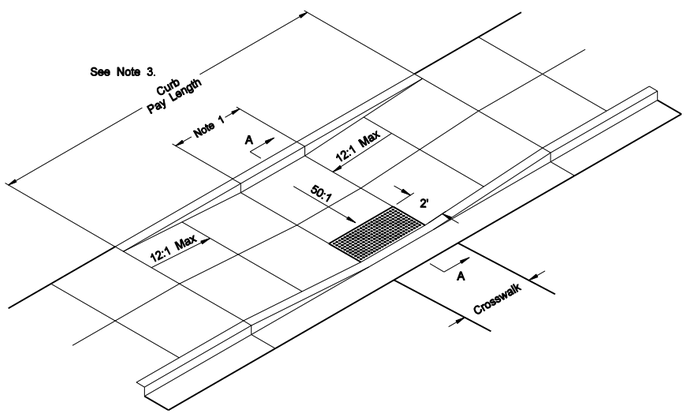
1. For sidewalk installations, a 5' ramp width should be used. Where site conditions do not allow a 5' ramp width, a 4' ramp width may be used. Detectable warning panels shall be installed to match the ramp width (Ramp width is defined as the useable portion of ramp,excluding flared aprons if used).

   Where ramps are installed for shared-use paths, the ramp width and detectable warning panel width shall be equal to the width of the shared-use path.

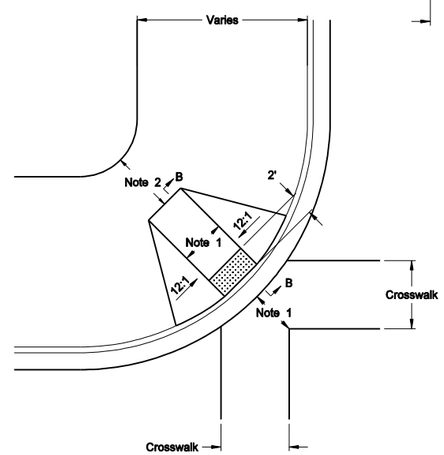
2. 5' is desireable but 4' is the minimum allowable distance. If the 4' minimum distance cannot be provided, Ramp Type C shall be used.

3. The curb shown in the details for Type C and D curb ramps shall be measured by the lineal foot, and paid for at the unit price bid for the item "Curb - Type I."

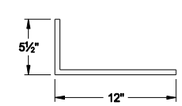
Detectable Warning Panel(s)



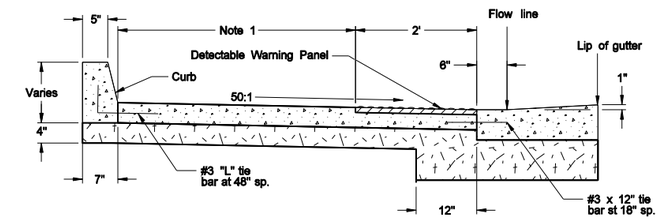
TYPE D
Perpendicular Ramp
(Acceptable)



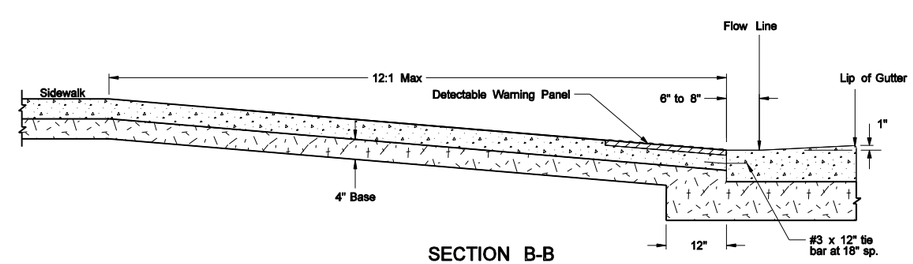
TYPE E
Diagonal Ramp
(Where Necessary)



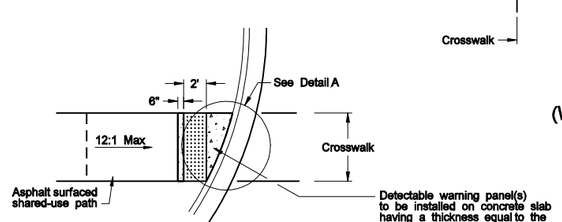
"L" Bar Detail
#3 Bar



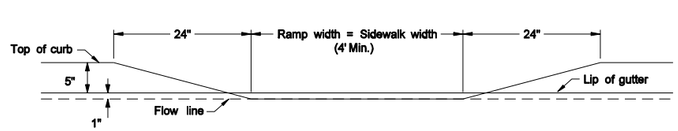
SECTION A-A



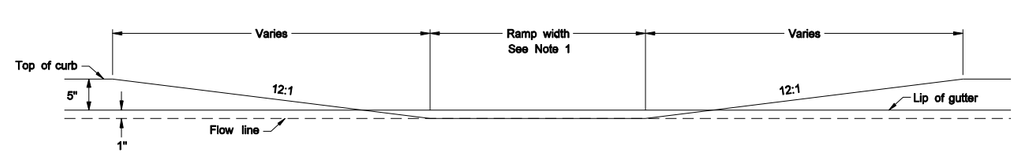
SECTION B-B



Concrete Pad Detail For
Asphalt Surfaced Shared-Use Path



DEPRESSED CURB FOR PEDESTRIAN CROSSING
(TYPE A RAMP)



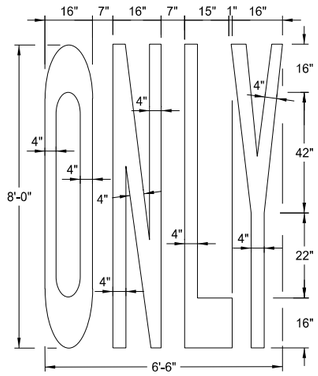
DEPRESSED CURB FOR PEDESTRIAN CROSSING
(TYPE B & E RAMPS)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
09-13-07	
REVISIONS	
DATE	CHANGE
09-20-07	Revised detail A
10-26-07	Revised Section B-B, detail C, misc. labeling, Notes, and added concrete pad detail.
12-18-07	Revised Note 1.

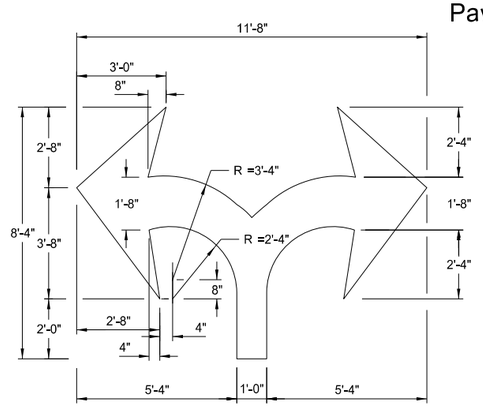
This document was originally issued and sealed by Mark S Gaydos, Registration Number PE- 4518 , on 12/18/07 and the original document is stored at the North Dakota Department of Transportation

Pavement Marking Message Details

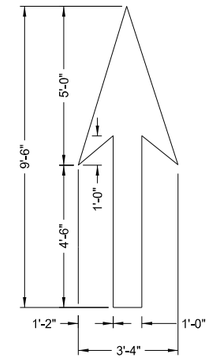
D-762-1



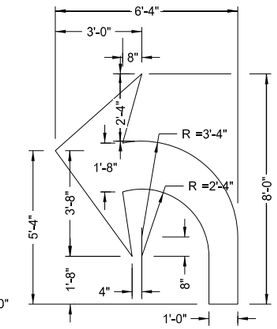
22 S. F.



29 S. F.



12 S. F.



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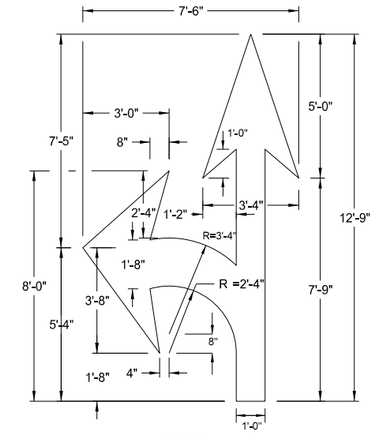
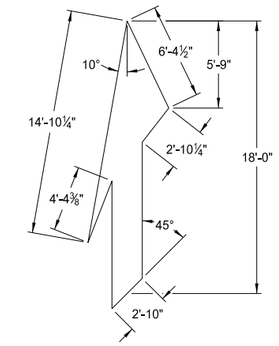
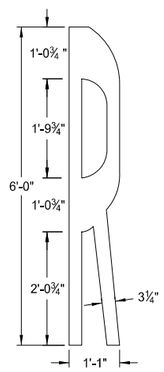


27 S. F.

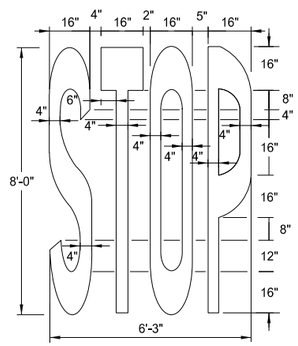


41 S. F.

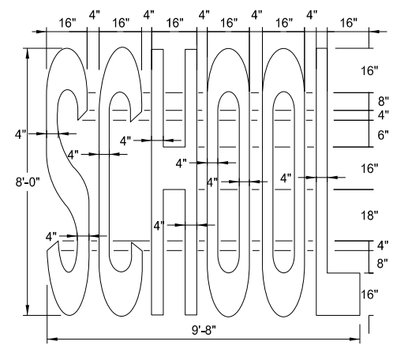
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



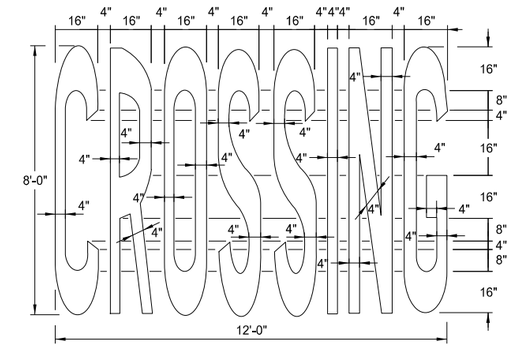
4 S. F.



22 S. F.



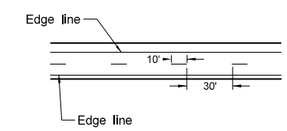
34.5 S. F.



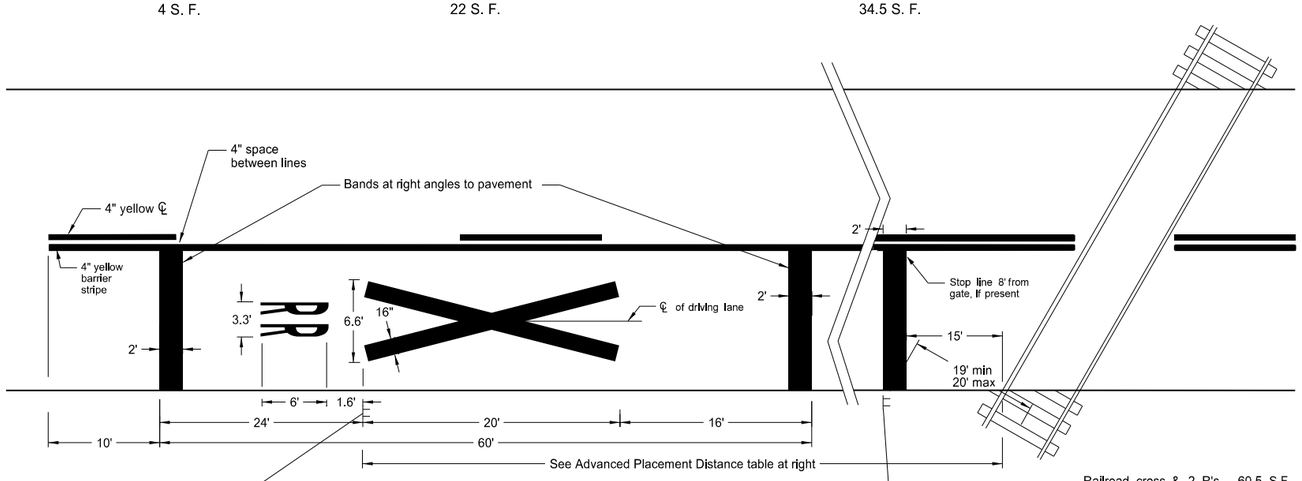
46 S. F.

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



Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

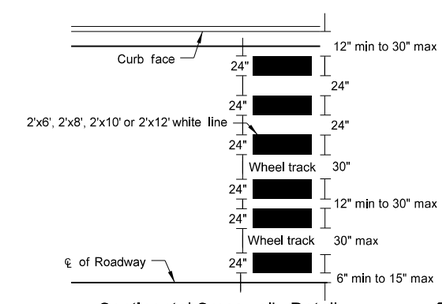
W10-1

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.

R15-1



Continental Crosswalk 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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

REVISIONS

DATE	CHANGE

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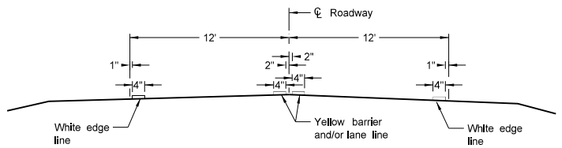
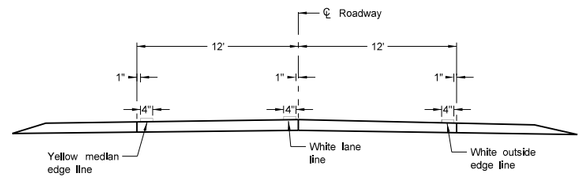
PAVEMENT MARKING

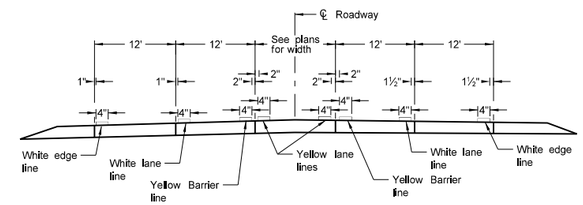
D-762-4



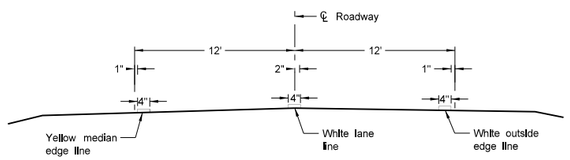
Two Lane Two Way
RURAL ROADWAY



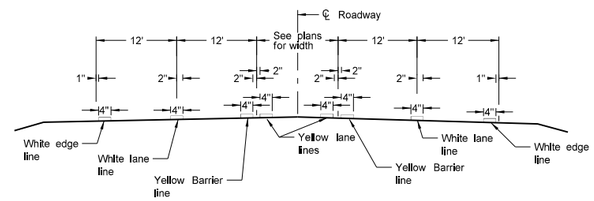
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



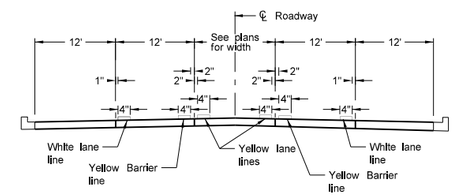
RURAL FIVE LANE ROADWAY
Concrete Section



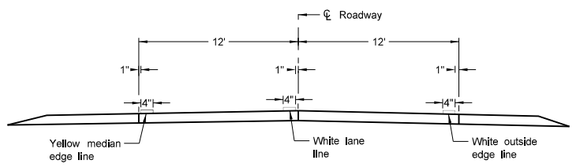
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



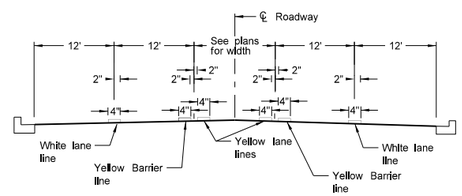
RURAL FIVE LANE ROADWAY
Asphalt Section



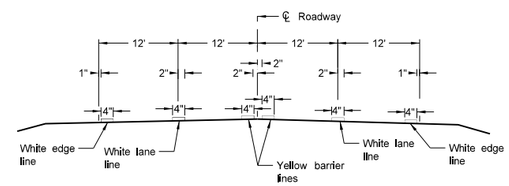
URBAN FIVE LANE SECTION
Concrete Section



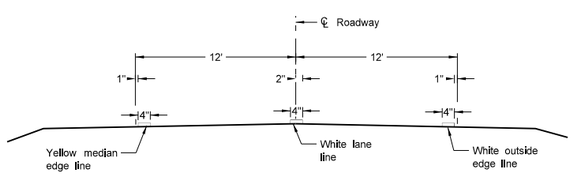
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



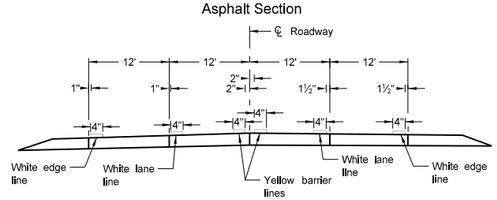
URBAN FIVE LANE SECTION
Asphalt Section



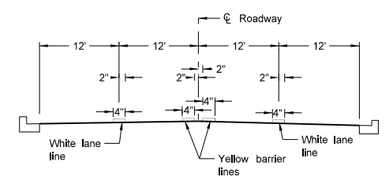
RURAL FOUR LANE ROADWAY
Asphalt Section



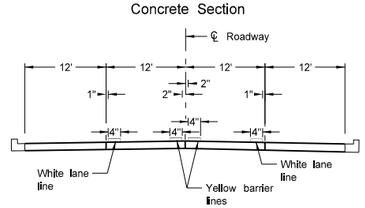
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



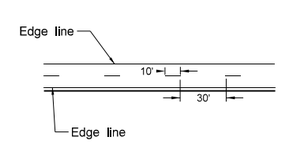
RURAL FOUR LANE ROADWAY
Concrete Section



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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