

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED			TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.					
			1	2	3			
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)					6	
D9-2-30	24"x30"	HOSPITAL	9	7	2	9	15	135
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	3	4	3	4	19	76
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)					18	
G20-10-108	108"x48"	CONTRACTOR SIGN					64	
G20-50a-72	72"x36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS					37	
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW					30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	2	2	2	2	59	118
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		7	7	49
M3-2-24	24"x12"	EAST (Mounted on route marker post)		4	1	4	7	28
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)	1	8	1	8	7	56
M3-4-24	24"x12"	WEST (Mounted on route marker post)	2			2	7	14
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)	6	4		6	7	42
M4-8a-24	24"x12"	END DETOUR	2	3		3	12	36
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT	5	12		12	15	180
M4-9a-30	30"x24"	BIKE/PEDESTRIAN DETOUR	25	25	25	25	6	150
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT	1			1	23	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)	6	5	1	6	7	42
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)	6	8	3	8	7	56
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)	2	1		2	7	14
R1-1-48	48"x48"	STOP	1	4		4	32	128
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back	4	4	2	4	5	20
R1-2-60	60"x60"	YIELD					29	
R2-1-30	24"x30"	SPEED LIMIT ___	10	10	10	10	15	150
R2-1-48	48"x60"	SPEED LIMIT ___					39	
R2-1a-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	9	9	9	9	10	90
R3-2-36	36"x36"	NO LEFT TURN	4	4	2	4	27	108
R3-5bP-30	30"x12"	LEFT LANE	1	1	1	1	12	12
R3-5eP-30	30"x12"	CENTER LANE					12	12
R3-5fP-30	30"x12"	RIGHT LANE	1	1	1	1	12	12
R3-5R-30	30"x36"	RIGHT ONLY	1	2	3	3	18	54
R3-6L-30	30"x36"	OPTIONAL MOVEMENT (1 LANE)		1		1	18	18
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT	2	5		5	35	175
R4-1-48	48"x60"	DO NOT PASS					39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL					39	
R5-1-30	30"x30"	DO NOT ENTER		1		1	17	17
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	
R9-9-24	24"x12"	SIDEWALK CLOSED	17	18	17	18	3	54
R9-11-24	24"x18"	SIDEWALK CLOSED AHEAD, CROSS HERE	1	1	1	1	4	4
R10-6-24	24"x36"	STOP HERE ON RED					16	
R10-11b-30	36"x36"	NO TURN ON RED	8	8	6	8	17	136
R11-2-48	48"x30"	ROAD CLOSED	2	7		7	28	196
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	1	1		1	31	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	2	3	3	3	35	105
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW					35	
W1-6-48	48"x24"	LARGE ARROW	1	3		3	26	78
W3-1-48	48"x48"	STOP AHEAD SYMBOL					35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL					35	
W3-4-48	48"x48"	BE PREPARED TO STOP					35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	2	2	2	2	35	70
W4-1R-48	48"x48"	MERGE	1	1	1	1	35	35
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL	1	1	1	1	35	35
W5-1-48	48"x48"	ROAD NARROWS					35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE	1	1		1	35	35
W5-8-48	48"x48"	THRU TRAFFIC LEFT LANE	1	1		1	35	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	5	5		5	35	175
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	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED			TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.					
			1	2	3			
W13-1-24	24"x24"	___ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)					11	
W13-4-48	48"x60"	RAMP ARROW					39	
W14-3-48	48"x36"	NO PASSING ZONE					23	
W16-9p-24	24"x12"	AHEAD	1	1	1	1	3	3
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE	4	4	4	4	35	140
W20-2-48	48"x48"	DETOUR AHEAD or ___ FT	1	1		1	35	35
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or ___ FT.	1	2		2	35	70
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or ___ FT.	1	1	1	1	35	35
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.					35	
W20-7a-48	48"x48"	FLAGGING SYMBOL	4	4	2	4	35	140
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	
W21-5-48	48"x48"	SHOULDER WORK					35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED					35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ___ FT.					35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD					35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or ___ FT.					35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY					35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK					35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)					11	

SPECIAL SIGNS								
CONSIGN	SIGN SIZE	DESCRIPTION	1	2	3	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
CONSIGN 1	36"x24"	COLUMBIA ROAD	3	14	2	14	16	224
CONSIGN 2	54"x36"	STREET OPEN TO ALL BUSINESSES ON 13TH AVE S		4		4	32	128
CONSIGN 3	30"x24"	KNIGHT DRIVE	1			1	15	15
CONSIGN 4	60"x36"	WB 14TH AVE S CLOSED FOLLOW DETOUR	2			2	34	68
CONSIGN 5	36"x24"	14TH AVENUE S	3	4	2	4	16	64
CONSIGN 6	60"x36"	WB 13TH AVE S CLOSED FOLLOW DETOUR	2			2	34	68
CONSIGN 7	36"x24"	9TH AVENUE S					16	
CONSIGN 8	60"x48"	ROAD CONSTRUCTION COLUMBIA ROAD 11TH AVE S TO KNIGHT DRIVE	7	7	7	7	39	273
CONSIGN 9	36"x24"	11TH AVENUE S		1		1	16	16
CONSIGN 10	60"x36"	EB 14TH AVE S CLOSED FOLLOW DETOUR		2		2	34	68
CNSIN 11/12	42"x24"	PERKINS MED PARK MALL MEDICAP PHARMACY	2	2	2	2	18	36
CNSIN 13/14	30"x9"	HUGOS	2	2	2	2	12	24
CNSIN 15/16	30"x24"	US BANK CARIBOU COFFEE	2	2	2	2	15	30
CONSIGN 17	48"x48"	THRU TRAFFIC MERGE	1	1	1	1	35	35

SPEC & CODE				TOTAL UNITS
704-1000	TRAFFIC CONTROL SIGNS			4276

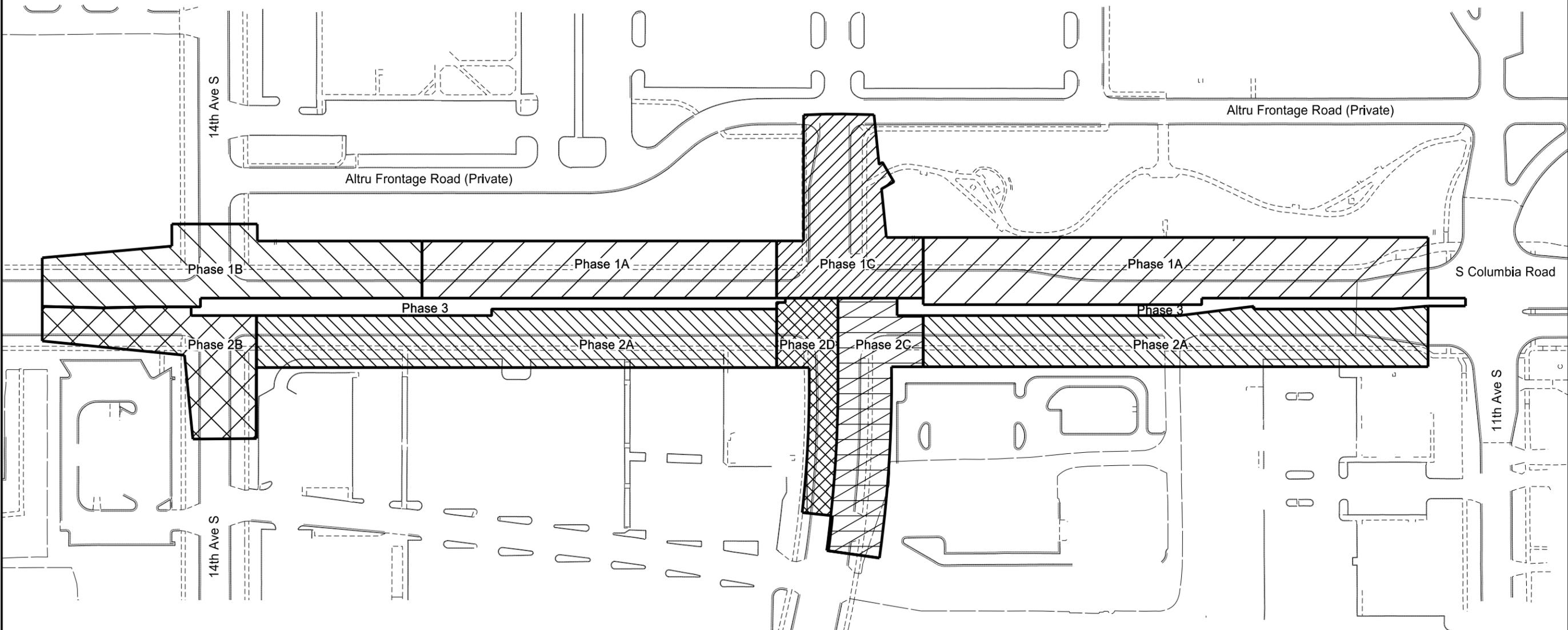
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO.			TOTAL QUANTITY
			1	2	3	
			704-0100	FLAGGING	MHR	
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH				
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH				
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH				
704-1050	TYPE I BARRICADES	EACH				
704-1051	TYPE II BARRICADES	EACH				
704-1052	TYPE III BARRICADES	EACH	44	67	36	67
704-1060	DELINEATOR DRUMS	EACH	178	298	204	298
704-1065	TRAFFIC CONES	EACH				
704-1067	TUBULAR MARKERS	EACH	66	71	33	71
704-1070	DELINEATOR	EACH				
704-1072	FLEXIBLE DELINEATORS	EACH				
704-1081	VERTICAL PANELS - BACK TO BACK	EACH				
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH				
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH				
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	2	2	1	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				
704-4011	PORTABLE CHANGEABLE MESSAGE SIGN	EACH	2	2	2	2
752-0911	TEMPORARY SAFETY FENCE	LF		500		500
762-0200	RAISED PAVEMENT MARKERS	EACH				
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	159	87		246
762-0425	SHORT TERM 16IN LINE - TYPE R	LF	24	64		88
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF				
762-0440	SHORT TERM MESSAGE - TYPE R	SF	33			33
762-1500	OBLITERATION OF PVMT MK	SF				
772-2110	FLASHING BEACON - POST MOUNTED	EACH				
772-2810	TEMPORARY TRAFFIC SIGNALS	EACH	2	2		2

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

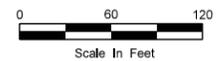
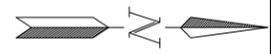
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Traffic Control Devices List  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	2



Legend	
	Phase 1A
	Phase 1B
	Phase 1C
	Phase 2A
	Phase 2B
	Phase 2C
	Phase 2D
	Phase 3

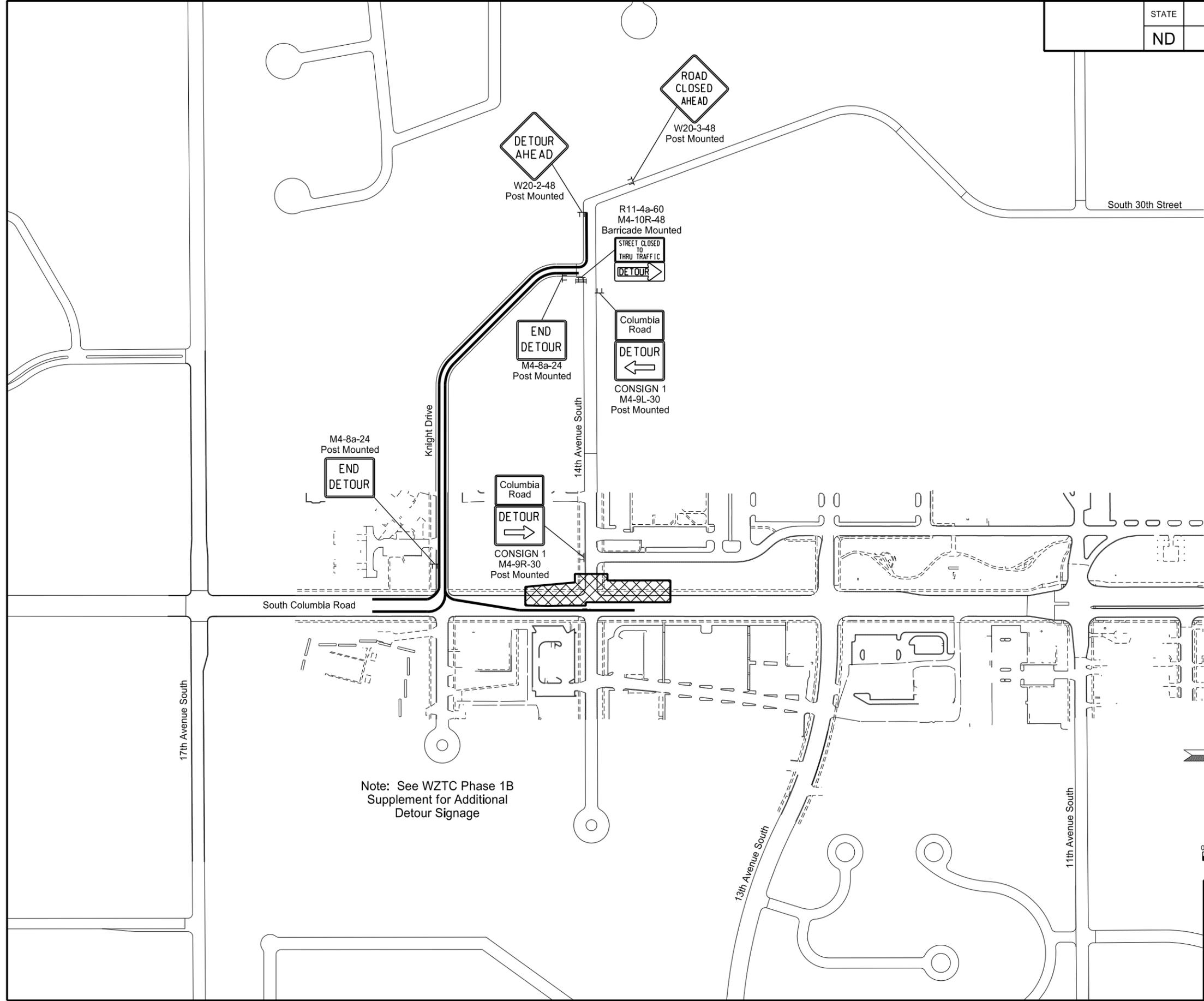


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Work Zone Traffic Control  
Construction Phasing

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

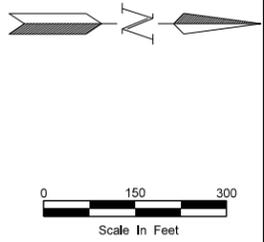
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	3



Legend

- ⊞ Sign
- ▤ Type III Barricade
- Delineator Drum (20' Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- ⋄ Tubular Marker (40' Spacing unless noted)
- ⊞ Existing Traffic Signal
- ⊞ Temporary Traffic Signal
- ▨ Work Area
- Detour Route

Note: See WZTC Phase 1B Supplement for Additional Detour Signage

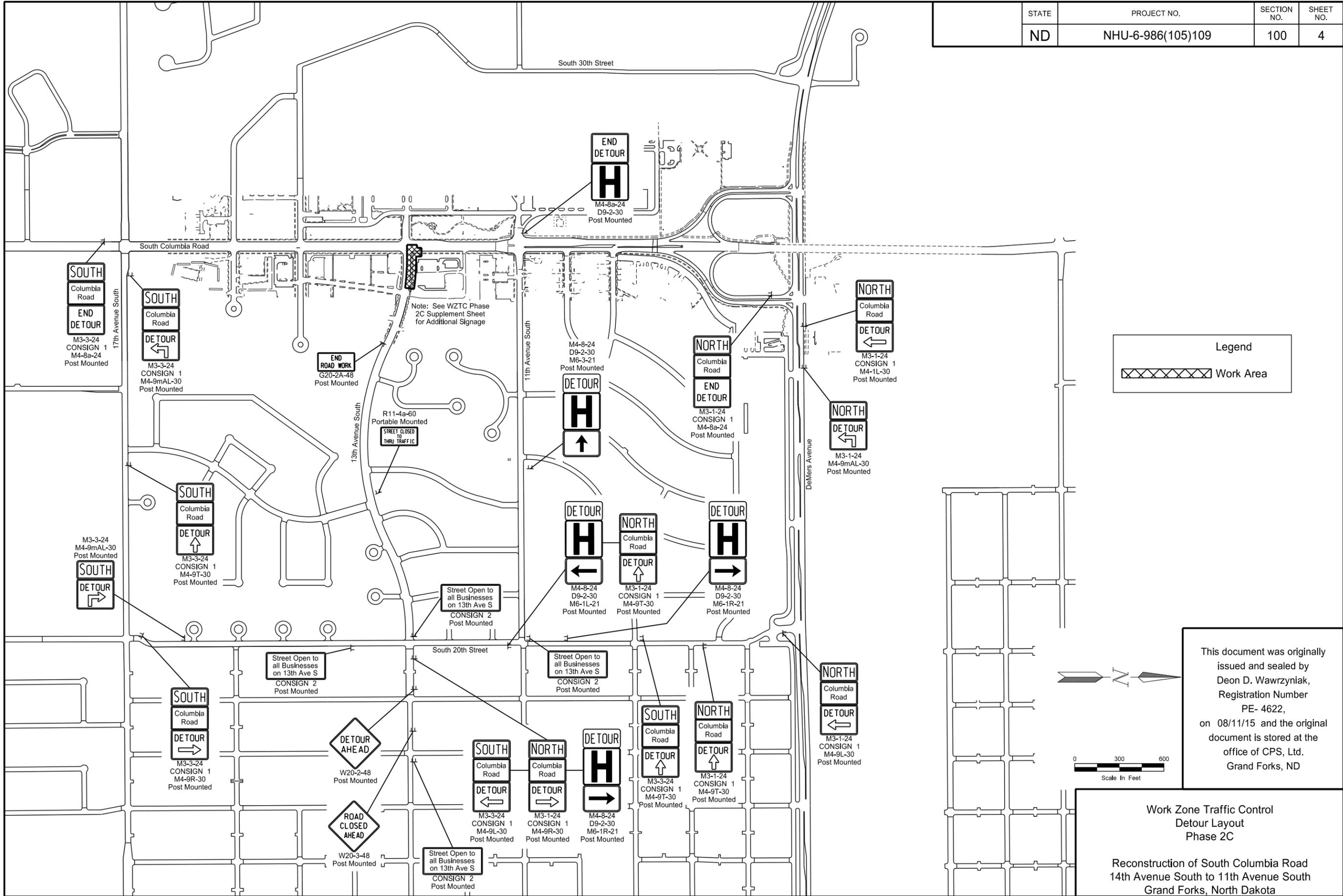


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**Work Zone Traffic Control  
Detour Layout  
Phase 1B**

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	4



**Legend**

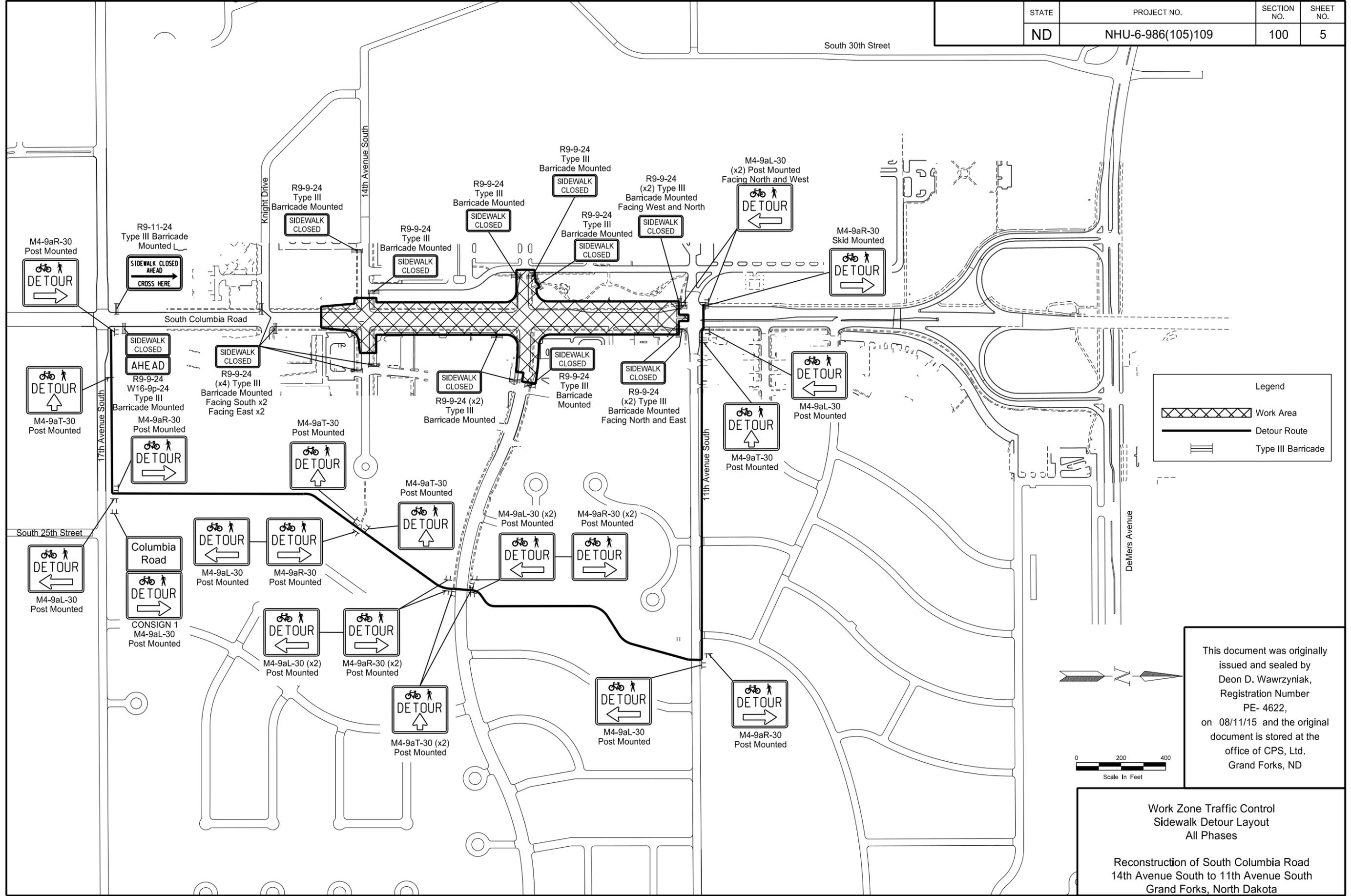
Work Area



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 Grand Forks, ND

**Work Zone Traffic Control  
 Detour Layout  
 Phase 2C**

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota



**Legend**

- Work Area
- Detour Route
- Type III Barricade

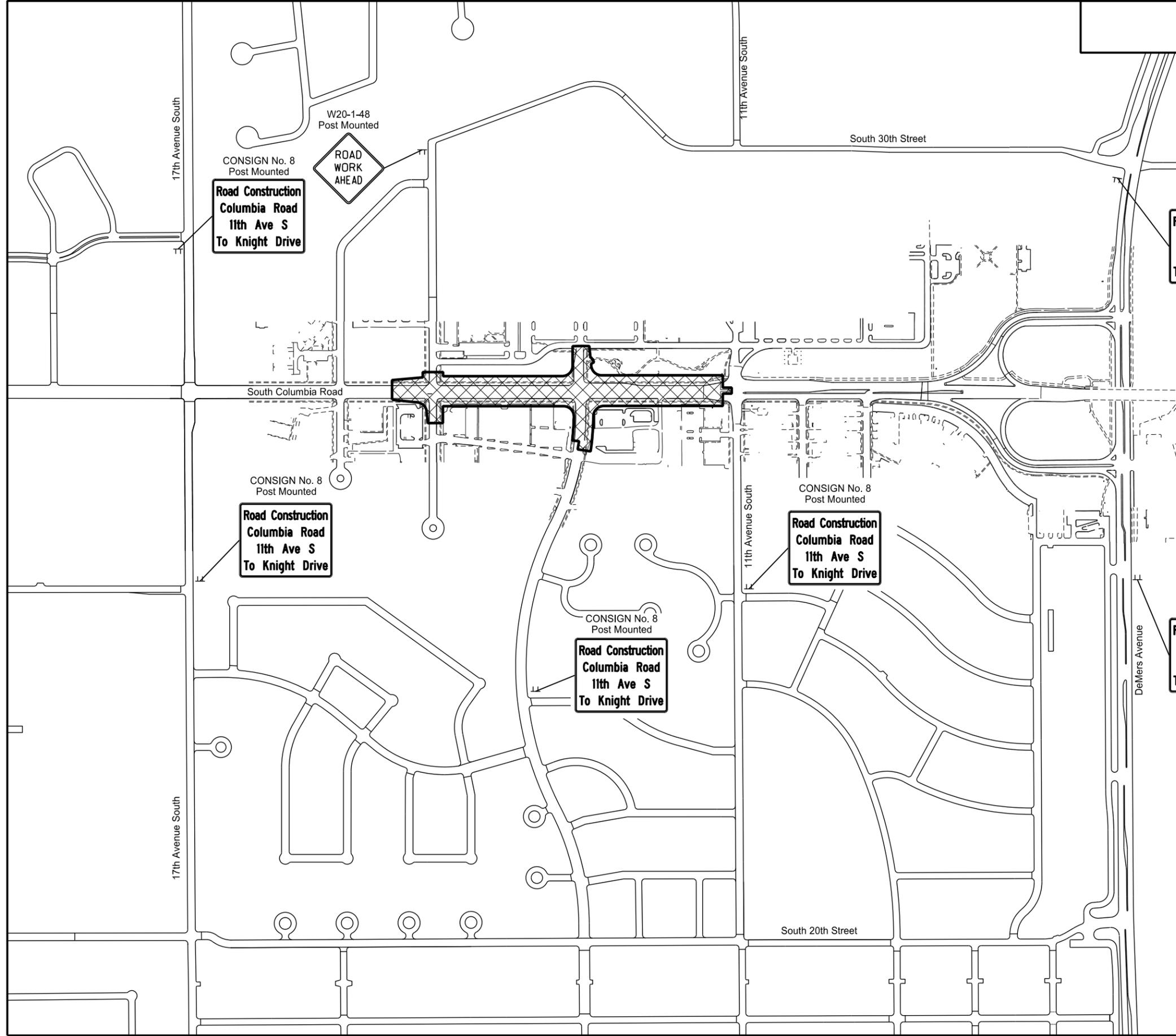
Scale In Feet

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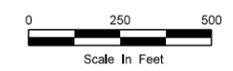
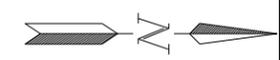
**Work Zone Traffic Control  
Sidewalk Detour Layout  
All Phases**

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	6



Legend

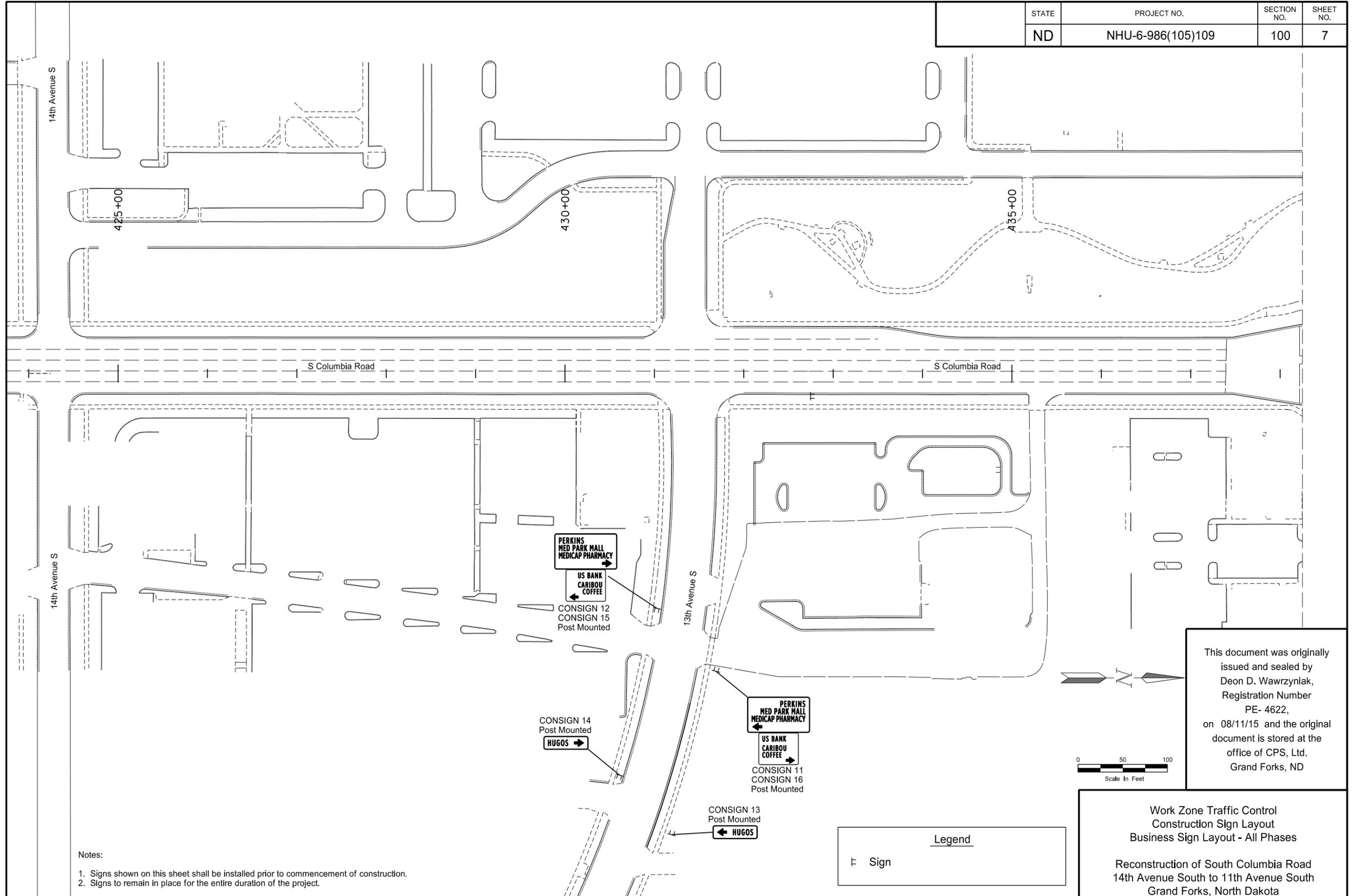


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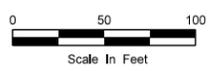
Work Zone Traffic Control  
Off-Site Signage Layout  
All Phases

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	7



Notes:  
1. Signs shown on this sheet shall be installed prior to commencement of construction.  
2. Signs to remain in place for the entire duration of the project.



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Work Zone Traffic Control  
Construction Sign Layout  
Business Sign Layout - All Phases  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	8

20th Avenue S

400+00

19th Avenue S

405+00

410+00

17th Avenue S

S Columbia Road

Message  
Changeable Message Board  
Portable Mounted

280'

SPEED LIMIT ENFORCED  
MINIMUM FEE \$80  
WHEN WORKERS PRESENT  
G20-55-96  
Post Mounted

ROAD WORK AHEAD  
W20-1-48  
Post Mounted

ONE LANE ROAD AHEAD  
W20-4-48  
Post Mounted

SPEED LIMIT 30  
W3-5-48  
Post Mounted

SPEED LIMIT 30  
MINIMUM FEE \$80  
R2-1-30  
R2-1a-24  
Post Mounted

140'

140'

140'

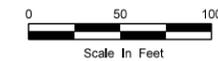
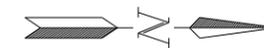
140'

140'

75'

**Legend**

- ⊢ Sign
- II Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊘ Sequencing Arrow Panel
- ← Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- ⊠ Temporary Traffic Signal
- Traffic Direction

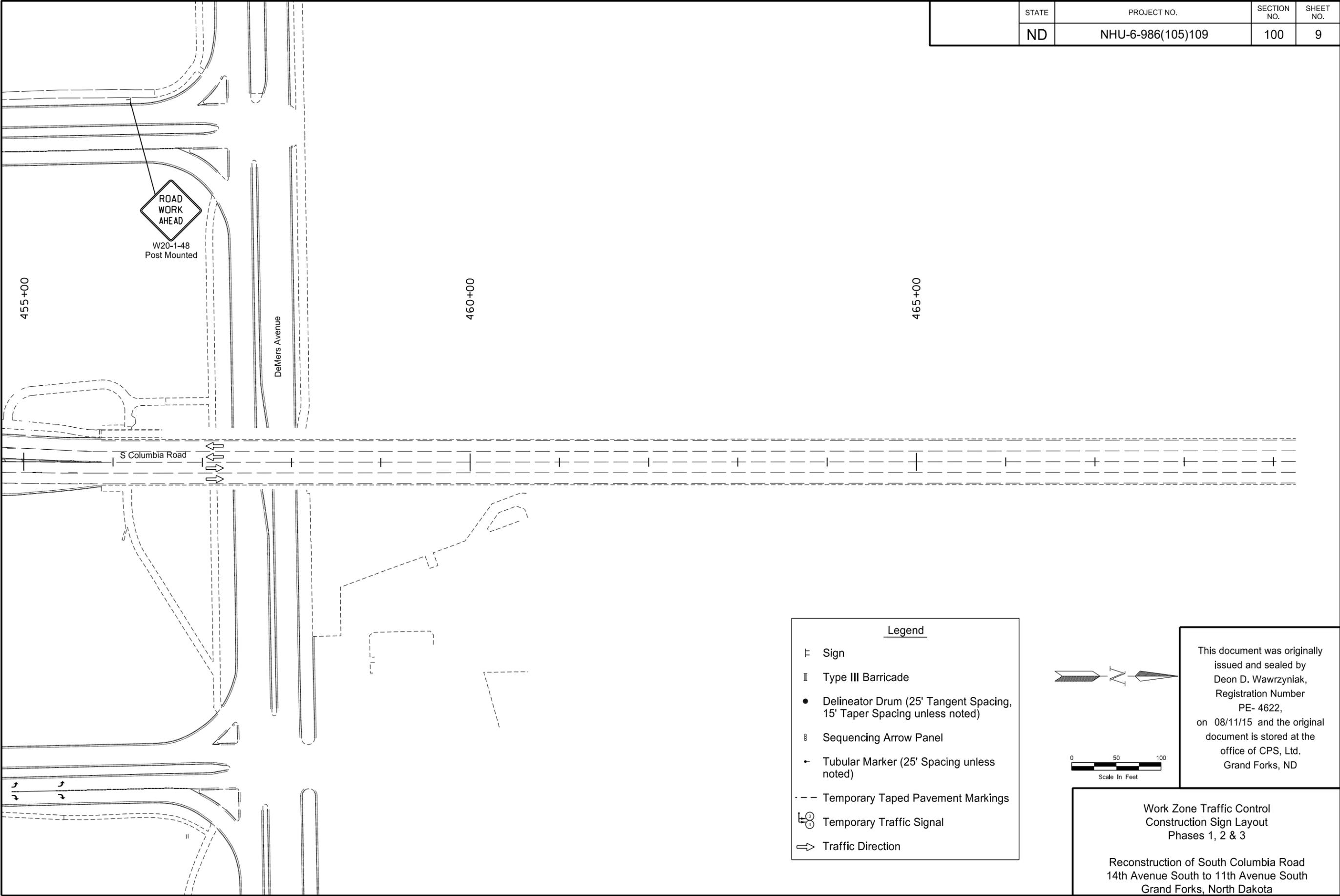


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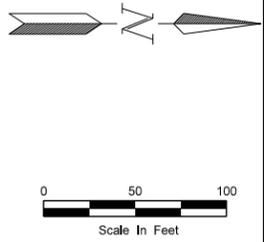
Work Zone Traffic Control  
Construction Sign Layout  
Phases 1, 2 & 3

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(105)109	100	9



Legend	
⊢	Sign
II	Type III Barricade
●	Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
⋈	Sequencing Arrow Panel
←	Tubular Marker (25' Spacing unless noted)
- - -	Temporary Taped Pavement Markings
⊞	Temporary Traffic Signal
→	Traffic Direction

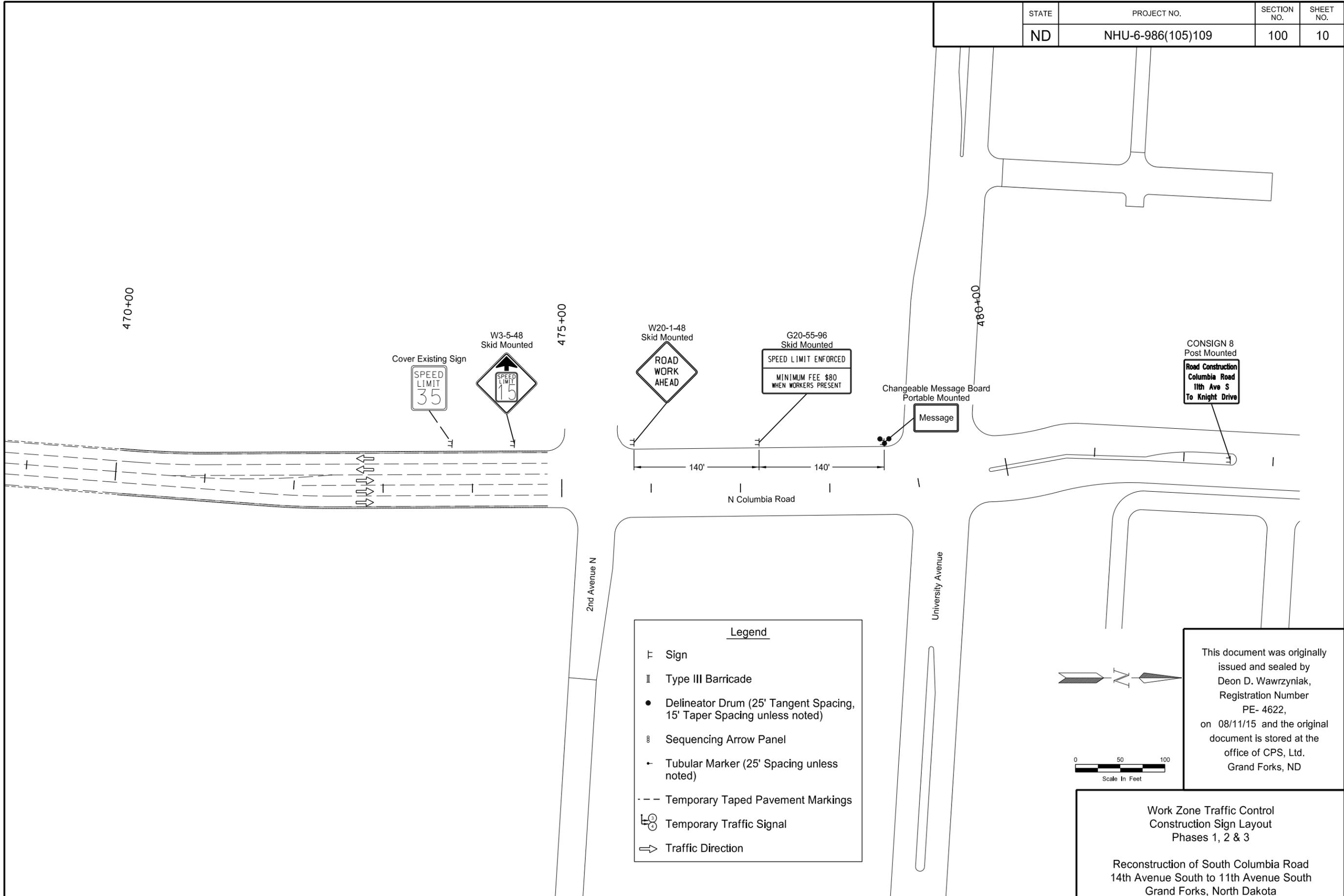


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Work Zone Traffic Control  
Construction Sign Layout  
Phases 1, 2 & 3

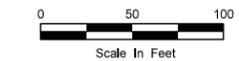
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	10



Legend	
⊢	Sign
	Type III Barricade
●	Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
⊞	Sequencing Arrow Panel
•	Tubular Marker (25' Spacing unless noted)
- - -	Temporary Taped Pavement Markings
⊞	Temporary Traffic Signal
➔	Traffic Direction

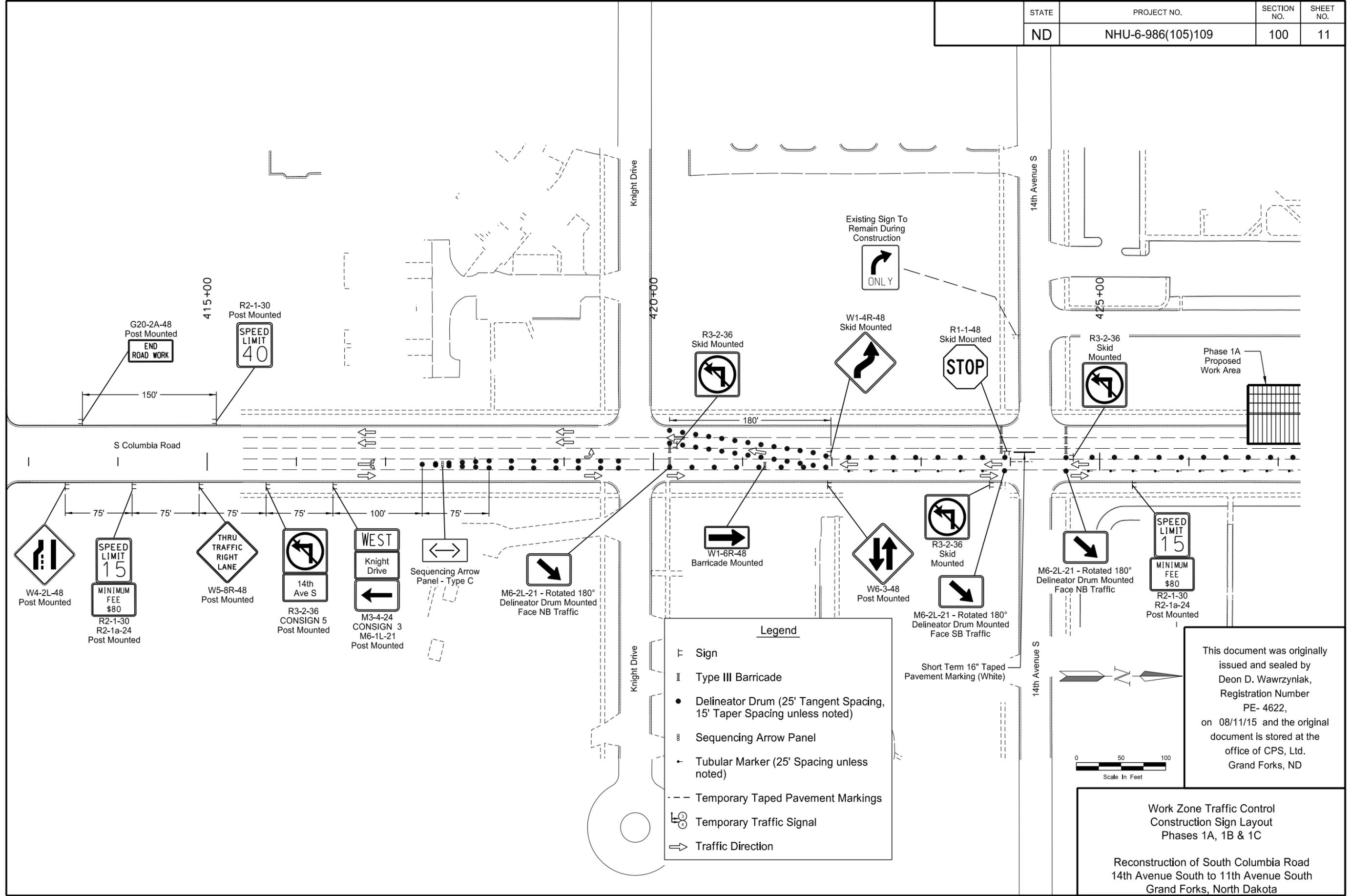
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Work Zone Traffic Control  
Construction Sign Layout  
Phases 1, 2 & 3

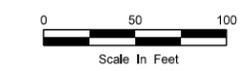
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	11



**Legend**

- ⊞ Sign
- ⊞ Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- ⊞ Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- ⊞ Temporary Traffic Signal
- ➔ Traffic Direction

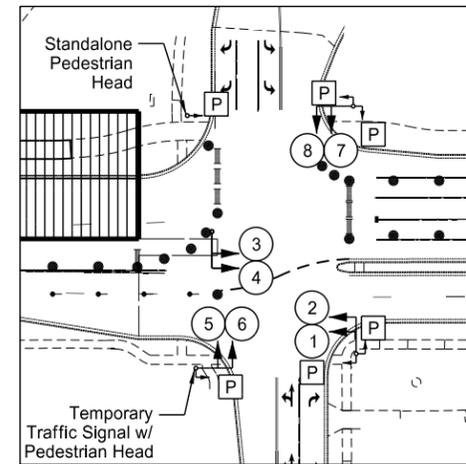


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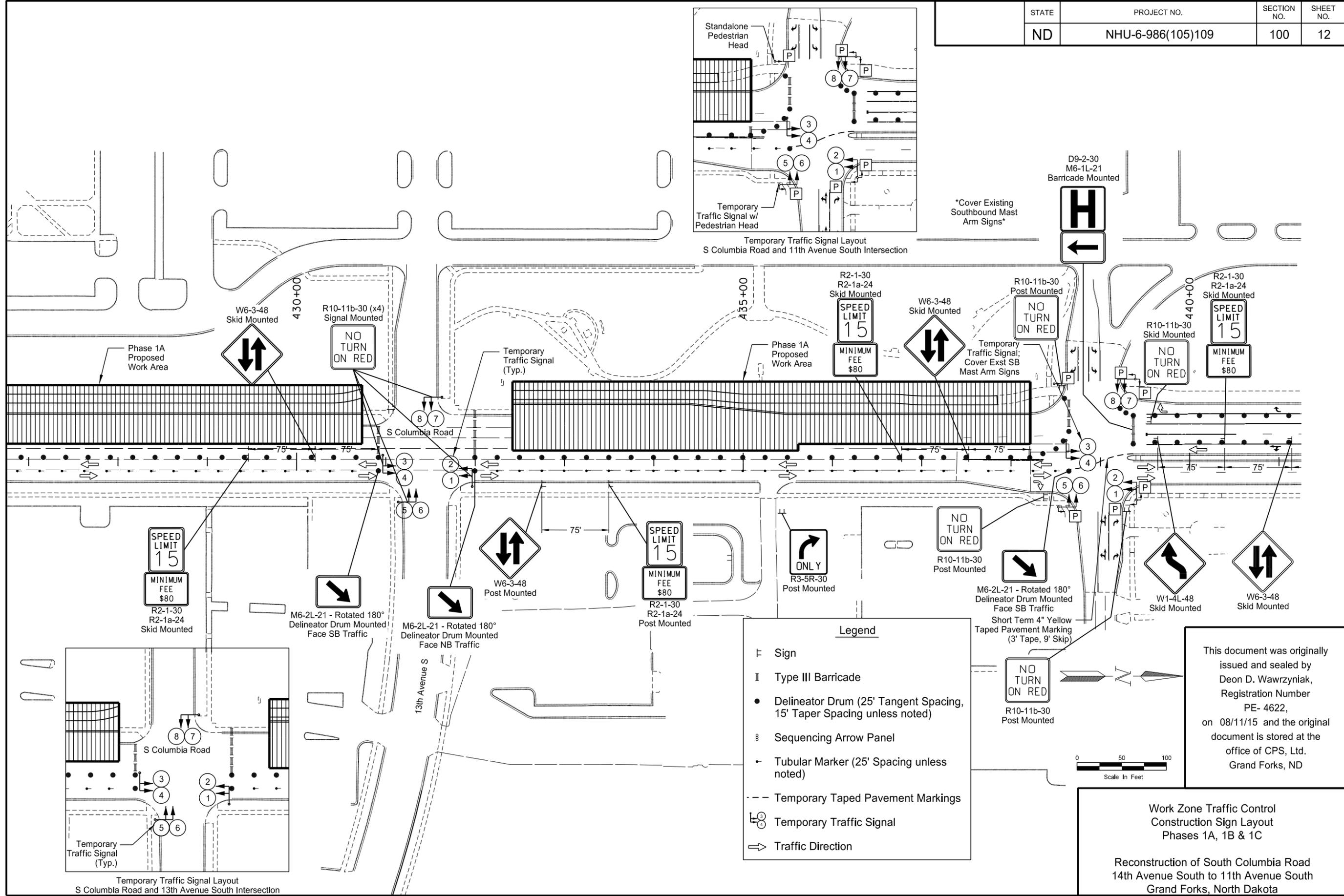
Work Zone Traffic Control  
Construction Sign Layout  
Phases 1A, 1B & 1C

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

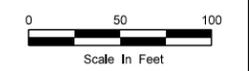
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	12



Temporary Traffic Signal Layout  
S Columbia Road and 11th Avenue South Intersection



- Legend**
- F Sign
  - I Type III Barricade
  - Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
  - ⊞ Sequencing Arrow Panel
  - Tubular Marker (25' Spacing unless noted)
  - - - Temporary Taped Pavement Markings
  - ⊞ Temporary Traffic Signal
  - Traffic Direction

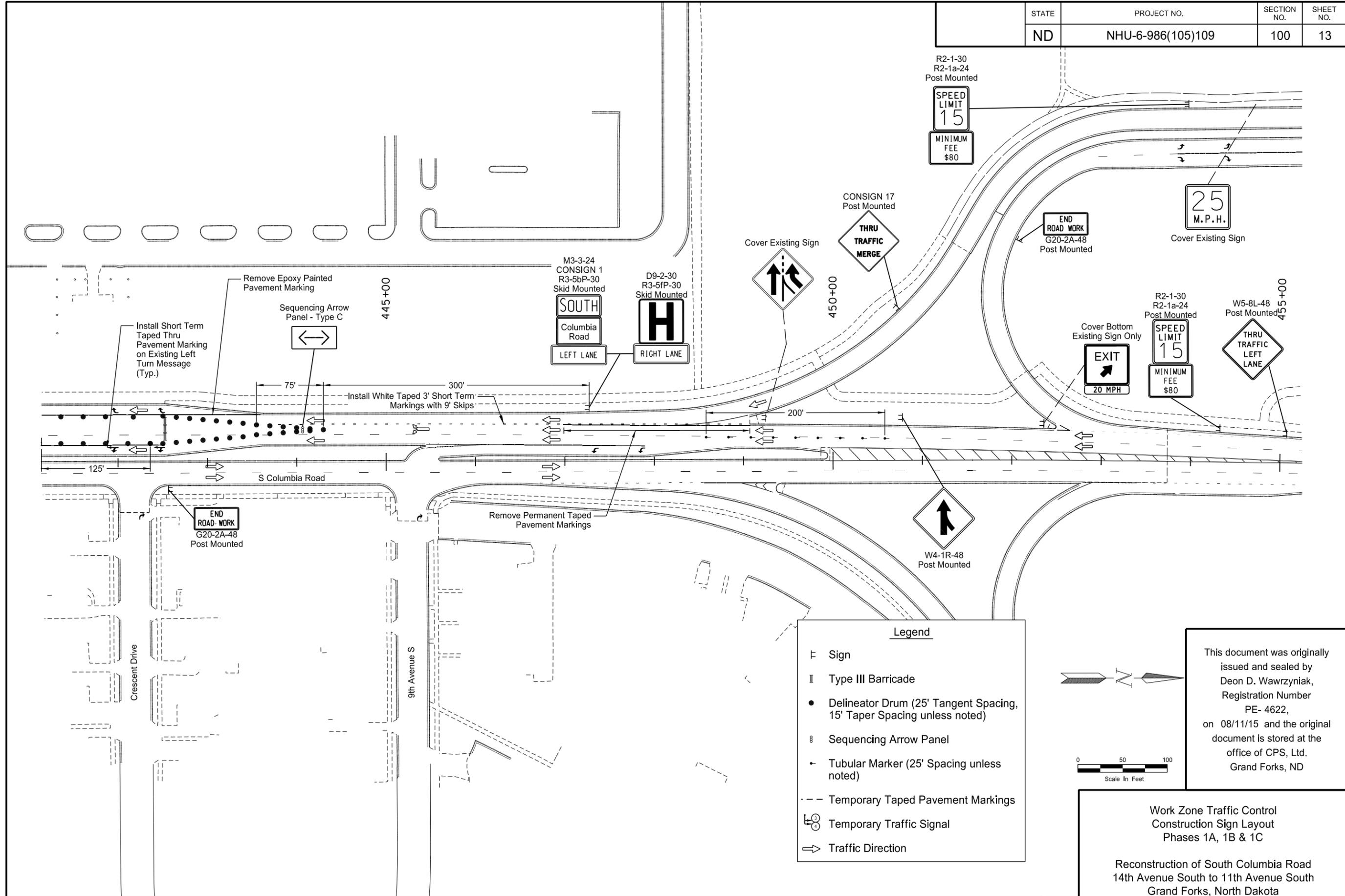


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Work Zone Traffic Control  
Construction Sign Layout  
Phases 1A, 1B & 1C

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

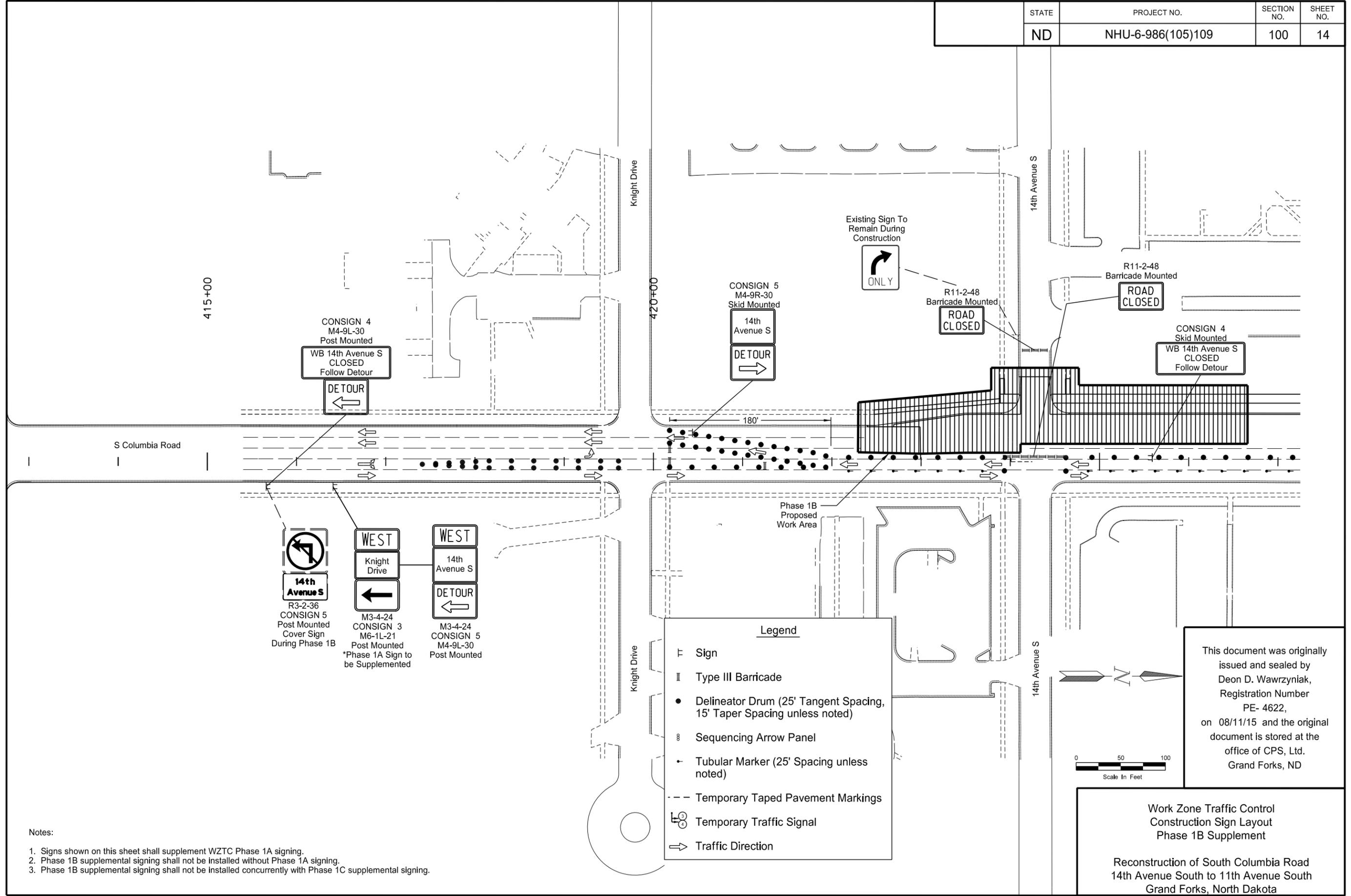
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	13



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Work Zone Traffic Control Construction Sign Layout Phases 1A, 1B & 1C  
 Reconstruction of South Columbia Road 14th Avenue South to 11th Avenue South Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	14



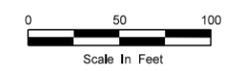
**14th Avenue S**  
R3-2-36  
CONSIGN 5  
Post Mounted  
Cover Sign  
During Phase 1B

**WEST**  
Knight Drive  
M3-4-24  
CONSIGN 3  
M6-1L-21  
Post Mounted  
\*Phase 1A Sign to be Supplemented

**WEST**  
14th Avenue S  
M3-4-24  
CONSIGN 5  
M4-9L-30  
Post Mounted

**Legend**

- ☐ Sign
- ▬ Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- ⬮ Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- 🚦 Temporary Traffic Signal
- ➡ Traffic Direction

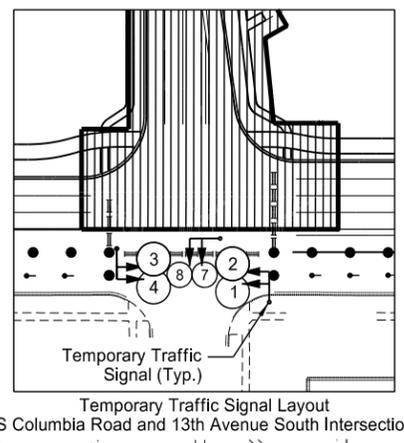
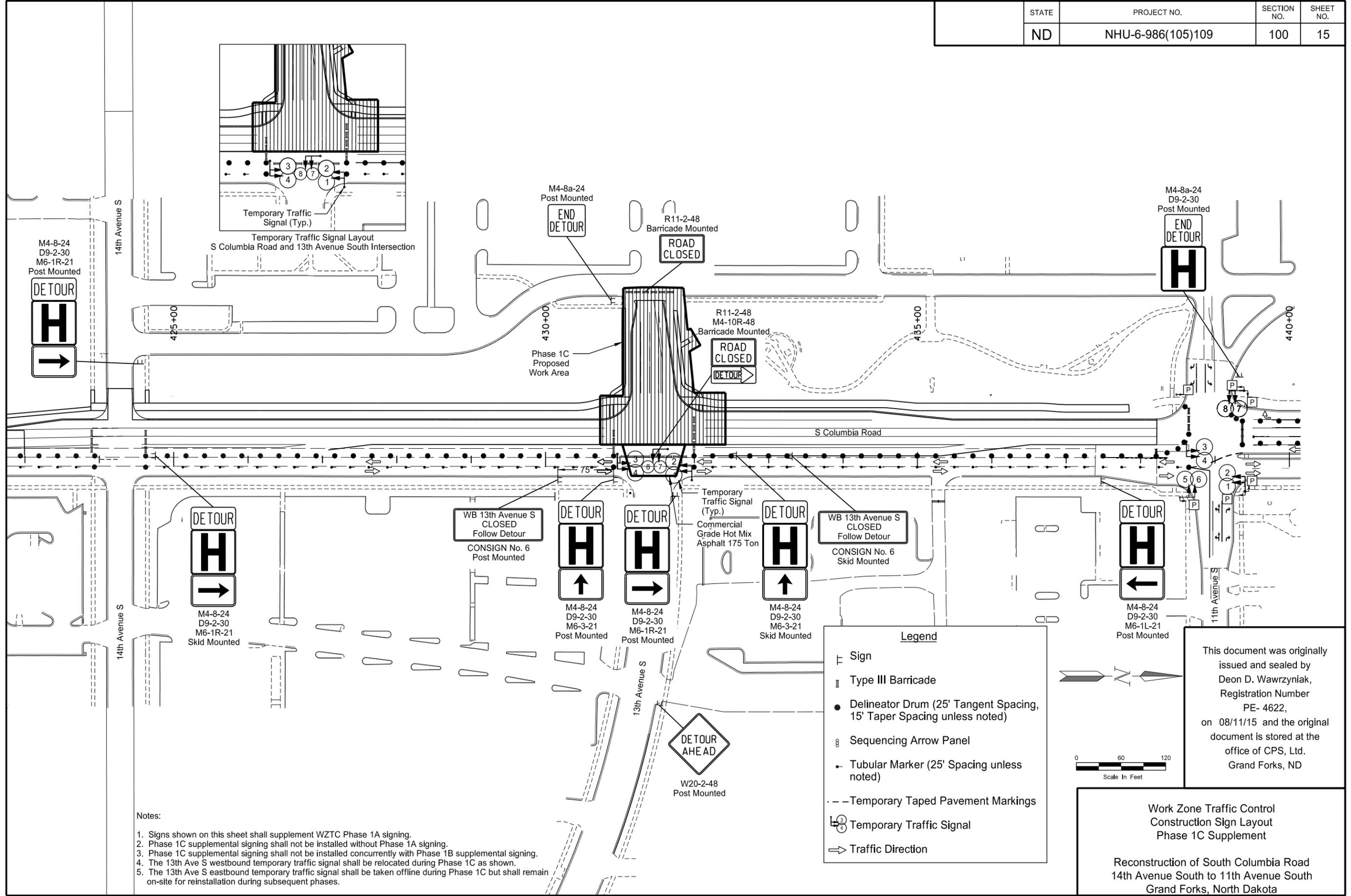


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Work Zone Traffic Control  
Construction Sign Layout  
Phase 1B Supplement

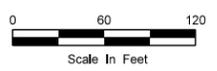
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

- Notes:
1. Signs shown on this sheet shall supplement WZTC Phase 1A signing.
  2. Phase 1B supplemental signing shall not be installed without Phase 1A signing.
  3. Phase 1B supplemental signing shall not be installed concurrently with Phase 1C supplemental signing.



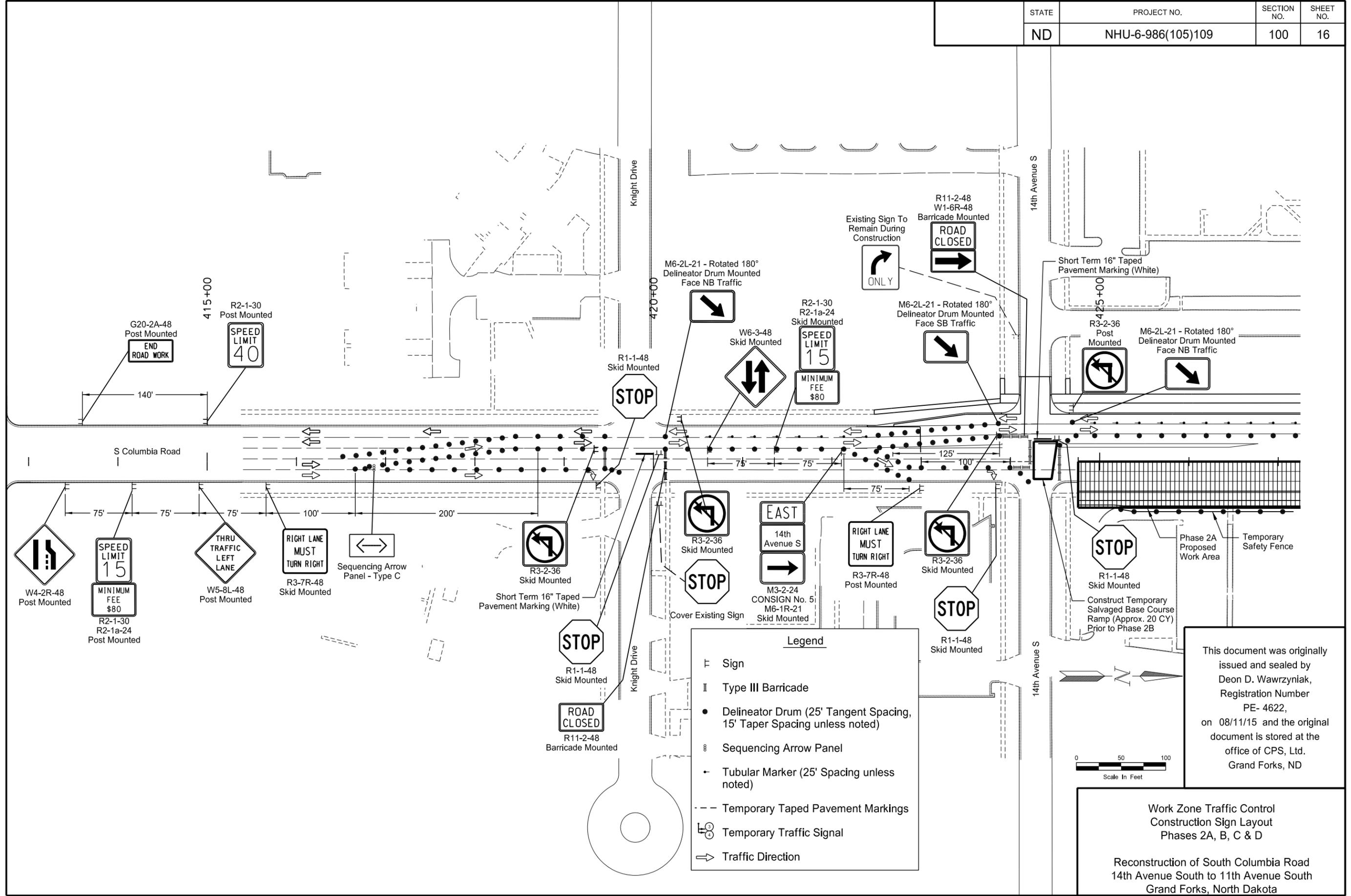
- Notes:
1. Signs shown on this sheet shall supplement WZTC Phase 1A signing.
  2. Phase 1C supplemental signing shall not be installed without Phase 1A signing.
  3. Phase 1C supplemental signing shall not be installed concurrently with Phase 1B supplemental signing.
  4. The 13th Ave S westbound temporary traffic signal shall be relocated during Phase 1C as shown.
  5. The 13th Ave S eastbound temporary traffic signal shall be taken offline during Phase 1C but shall remain on-site for reinstallation during subsequent phases.

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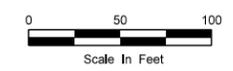
Work Zone Traffic Control Construction Sign Layout Phase 1C Supplement

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota



**Legend**

- Sign
- Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- ⊞ Temporary Traffic Signal
- ⇒ Traffic Direction



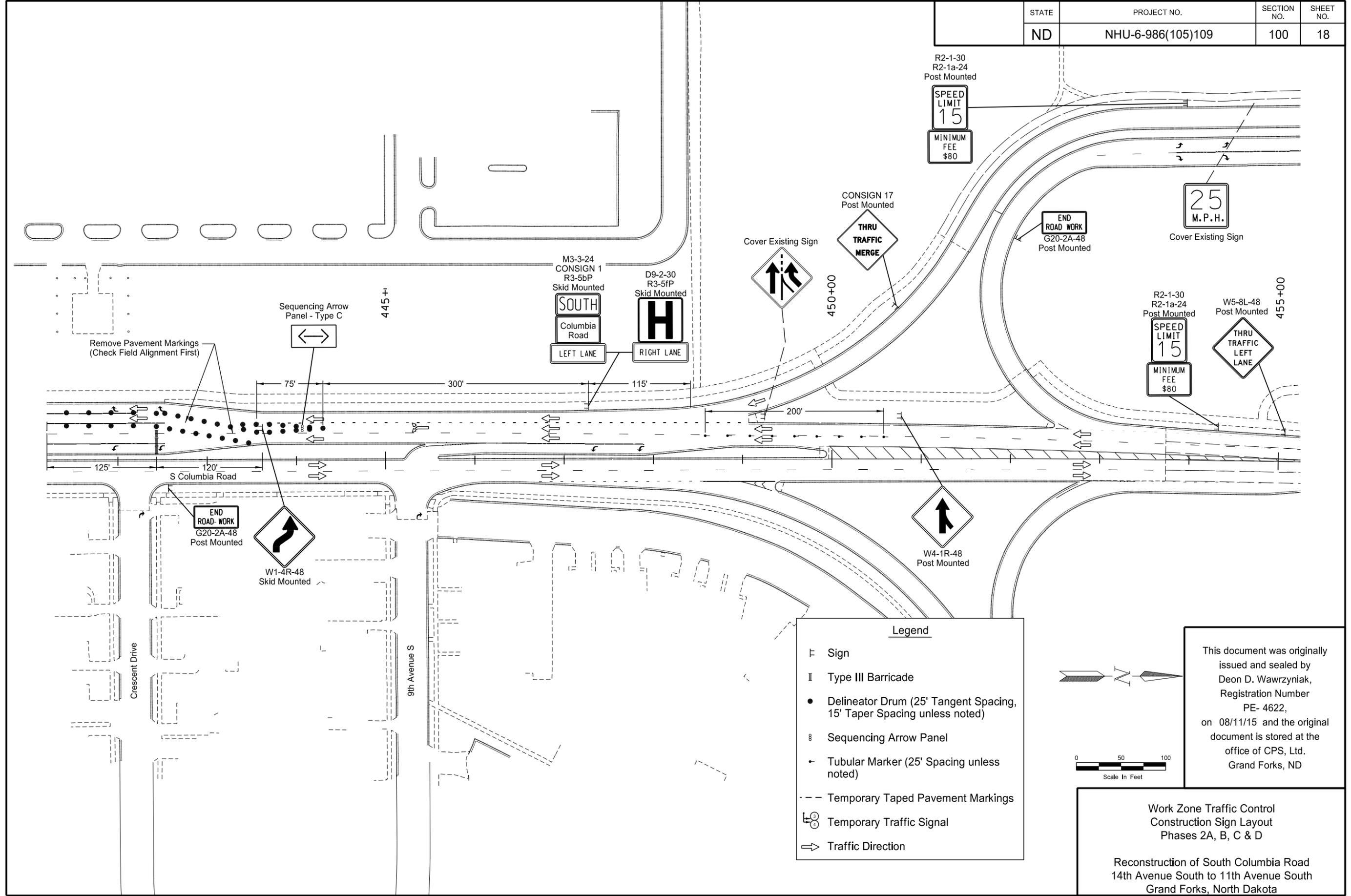
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**Work Zone Traffic Control Construction Sign Layout Phases 2A, B, C & D**

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

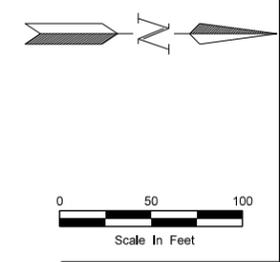


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	18



**Legend**

- ⊞ Sign
- || Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- ⬆ Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- ⊞ Temporary Traffic Signal
- ➔ Traffic Direction

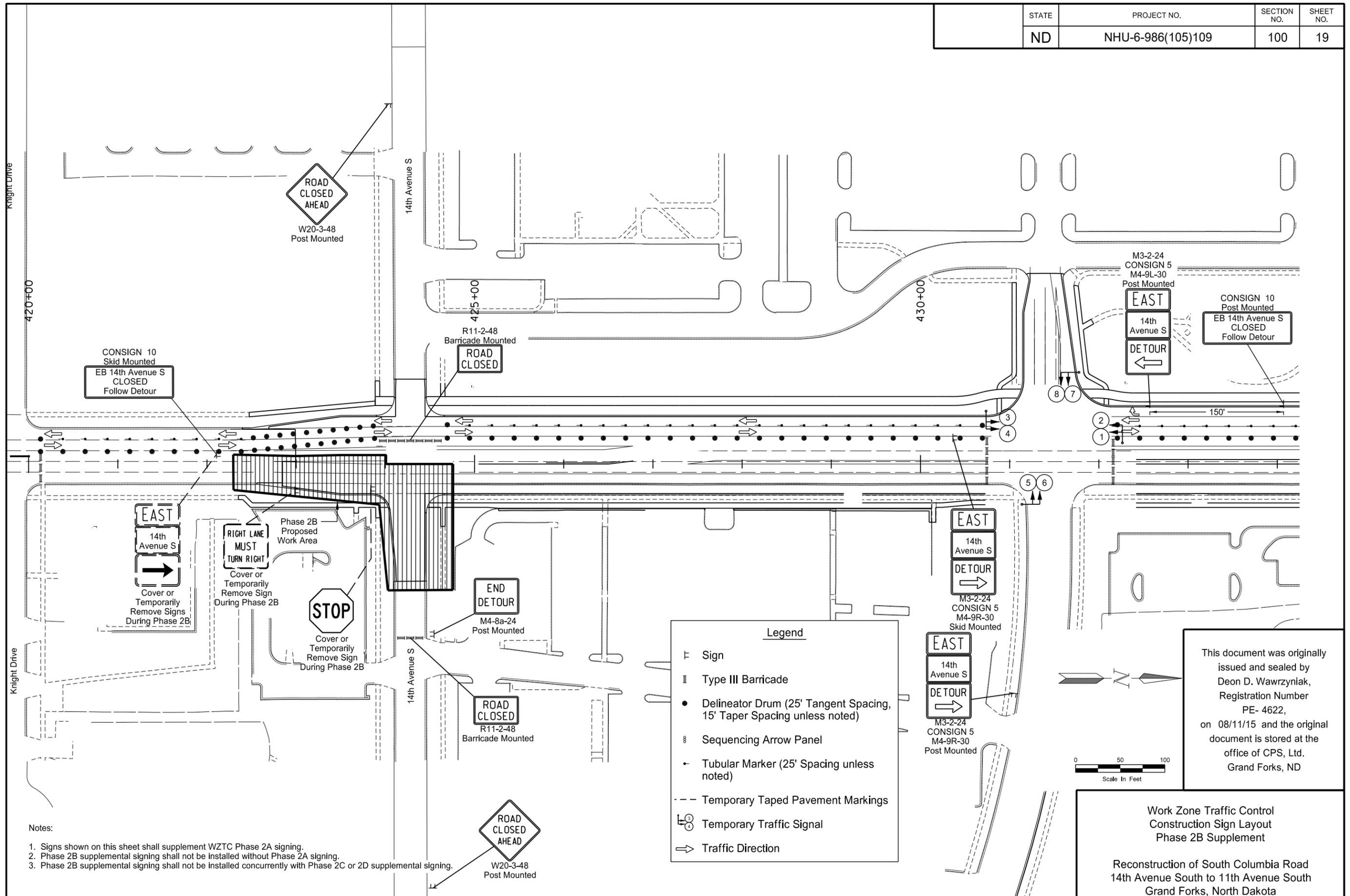


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Work Zone Traffic Control  
Construction Sign Layout  
Phases 2A, B, C & D

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	19

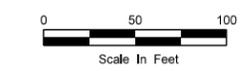


Notes:

1. Signs shown on this sheet shall supplement WZTC Phase 2A signing.
2. Phase 2B supplemental signing shall not be installed without Phase 2A signing.
3. Phase 2B supplemental signing shall not be installed concurrently with Phase 2C or 2D supplemental signing.

**Legend**

- F Sign
- I Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- 8 Sequencing Arrow Panel
- ↳ Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- Ⓜ Temporary Traffic Signal
- Traffic Direction

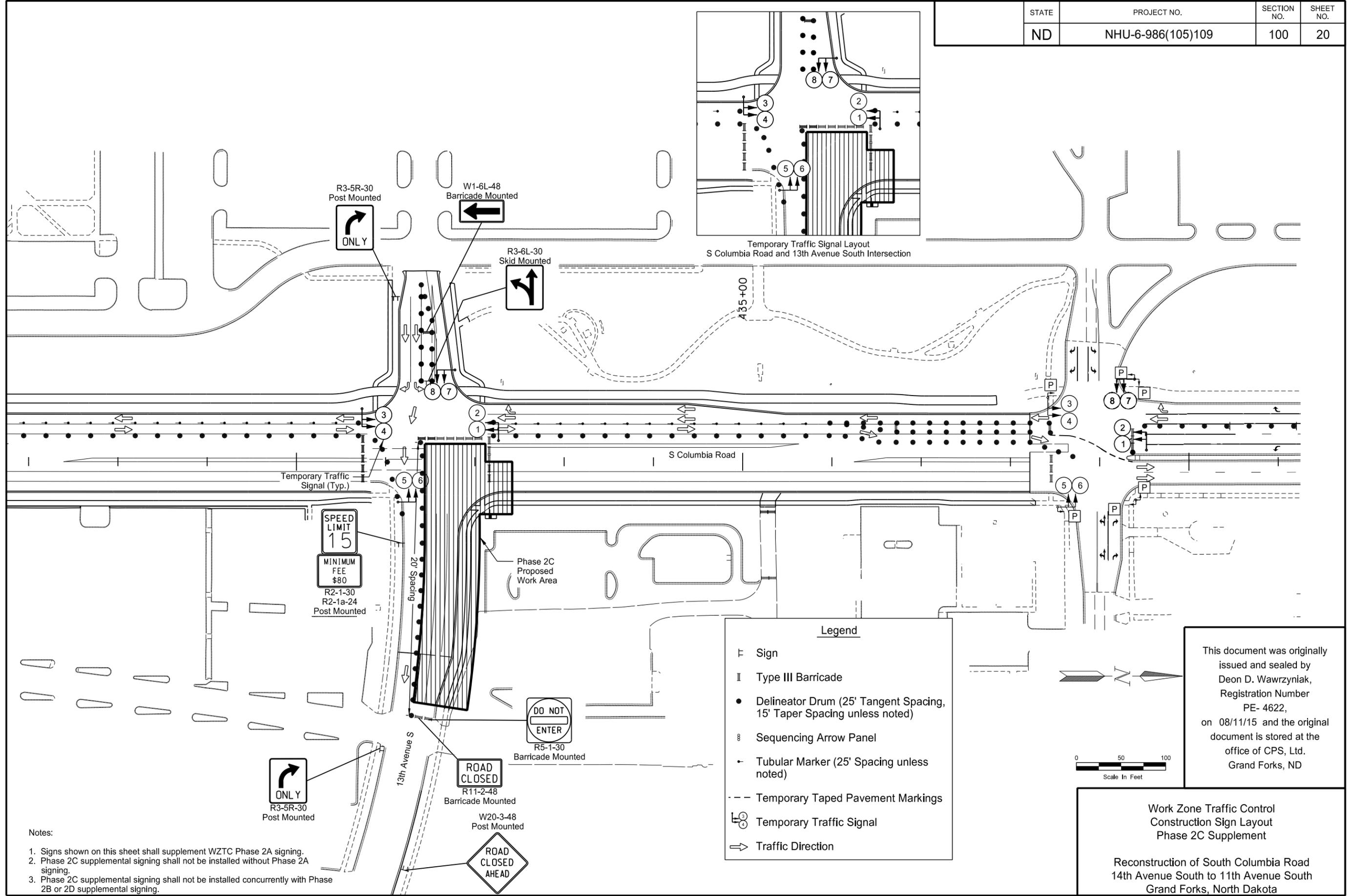
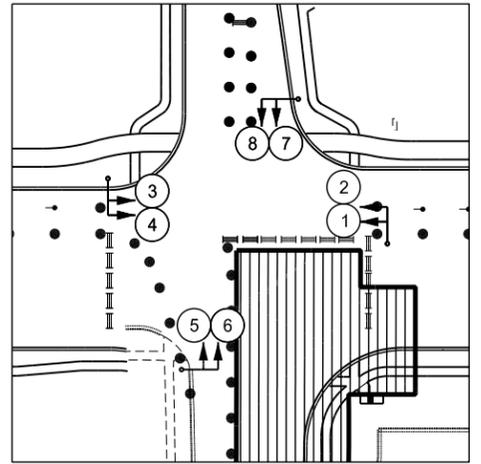


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Work Zone Traffic Control  
Construction Sign Layout  
Phase 2B Supplement

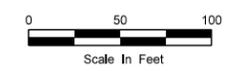
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	20



**Legend**

- ⊞ Sign
- ▬ Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- ⊞ Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- ⊞ Temporary Traffic Signal
- Traffic Direction



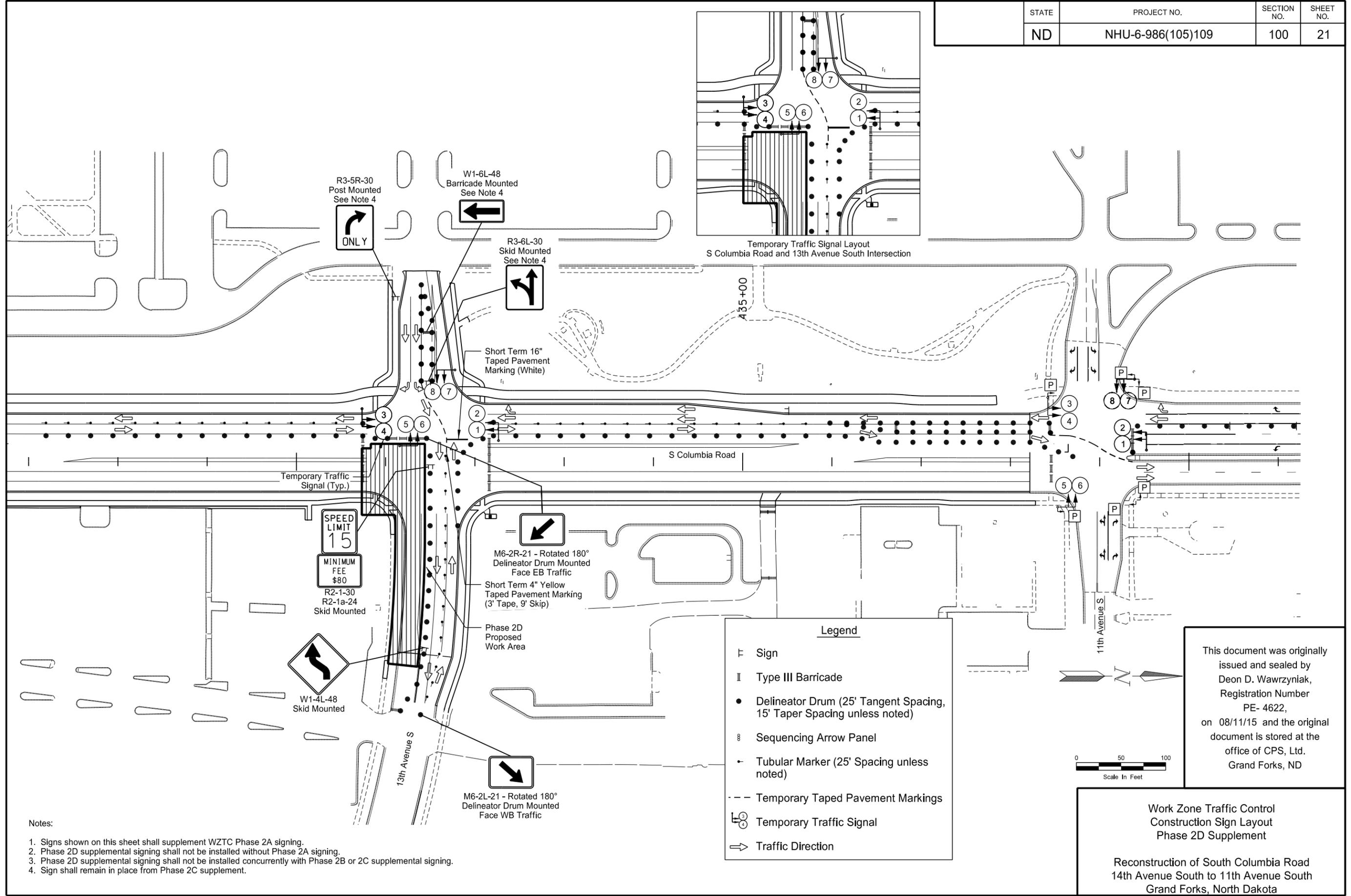
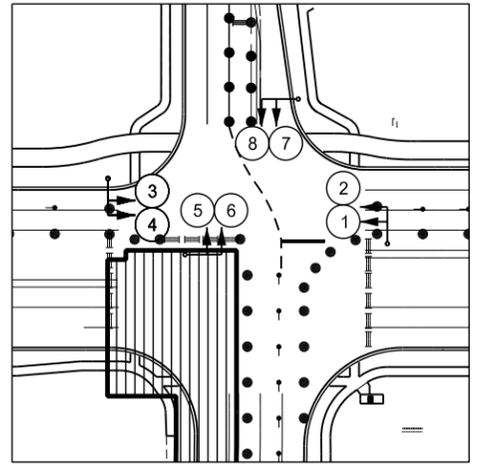
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Work Zone Traffic Control Construction Sign Layout Phase 2C Supplement

Reconstruction of South Columbia Road 14th Avenue South to 11th Avenue South Grand Forks, North Dakota

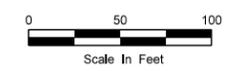
- Notes:
1. Signs shown on this sheet shall supplement WZTC Phase 2A signing.
  2. Phase 2C supplemental signing shall not be installed without Phase 2A signing.
  3. Phase 2C supplemental signing shall not be installed concurrently with Phase 2B or 2D supplemental signing.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	21



**Legend**

- ☐ Sign
- ▬ Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- ⬮ Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- Ⓢ Temporary Traffic Signal
- ➔ Traffic Direction



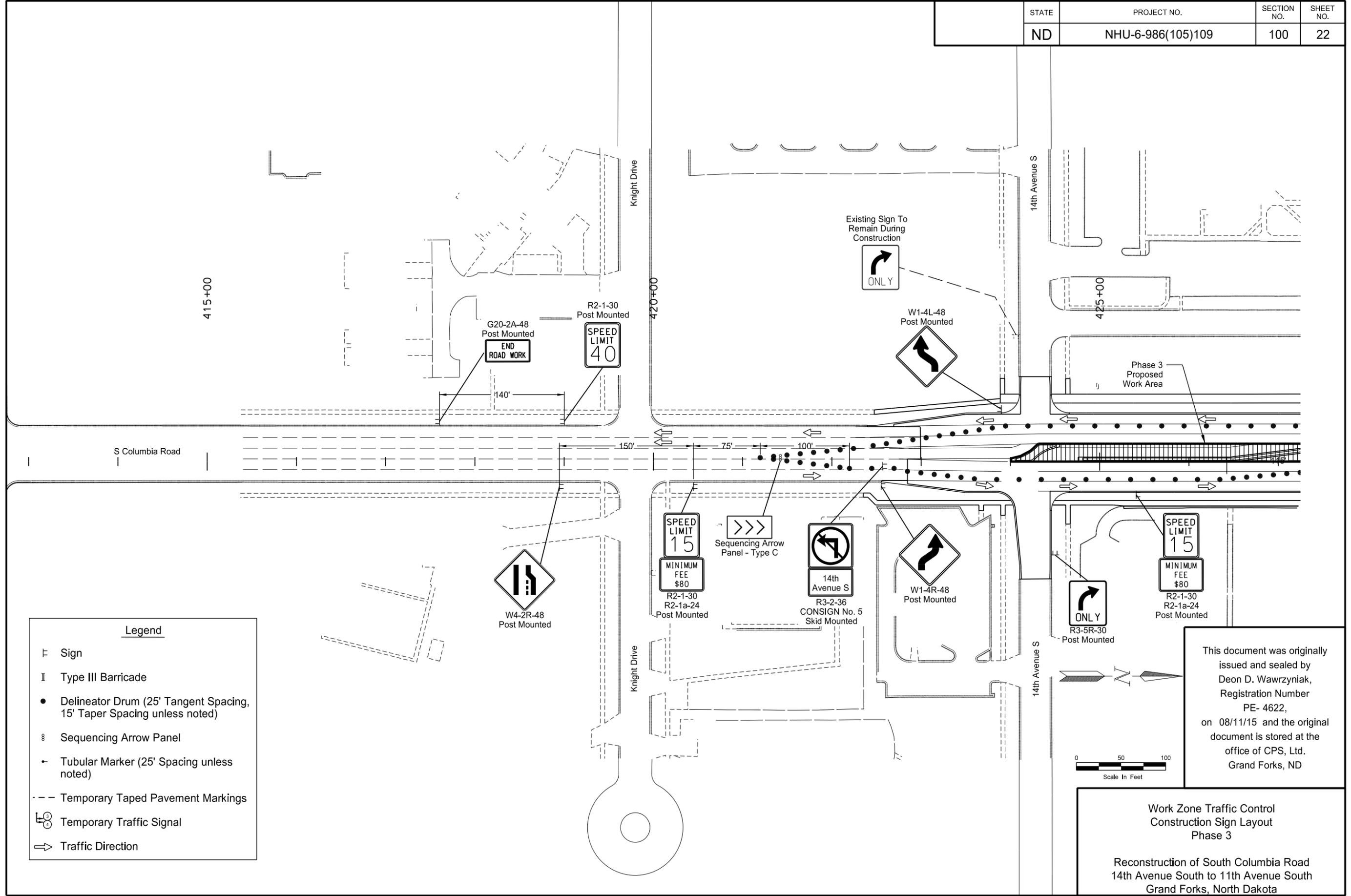
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**Work Zone Traffic Control Construction Sign Layout Phase 2D Supplement**

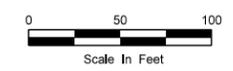
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

- Notes:
1. Signs shown on this sheet shall supplement WZTC Phase 2A signing.
  2. Phase 2D supplemental signing shall not be installed without Phase 2A signing.
  3. Phase 2D supplemental signing shall not be installed concurrently with Phase 2B or 2C supplemental signing.
  4. Sign shall remain in place from Phase 2C supplement.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	22



Legend	
⌄	Sign
	Type III Barricade
●	Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
⋈	Sequencing Arrow Panel
⬆	Tubular Marker (25' Spacing unless noted)
- - -	Temporary Taped Pavement Markings
⓪	Temporary Traffic Signal
➔	Traffic Direction

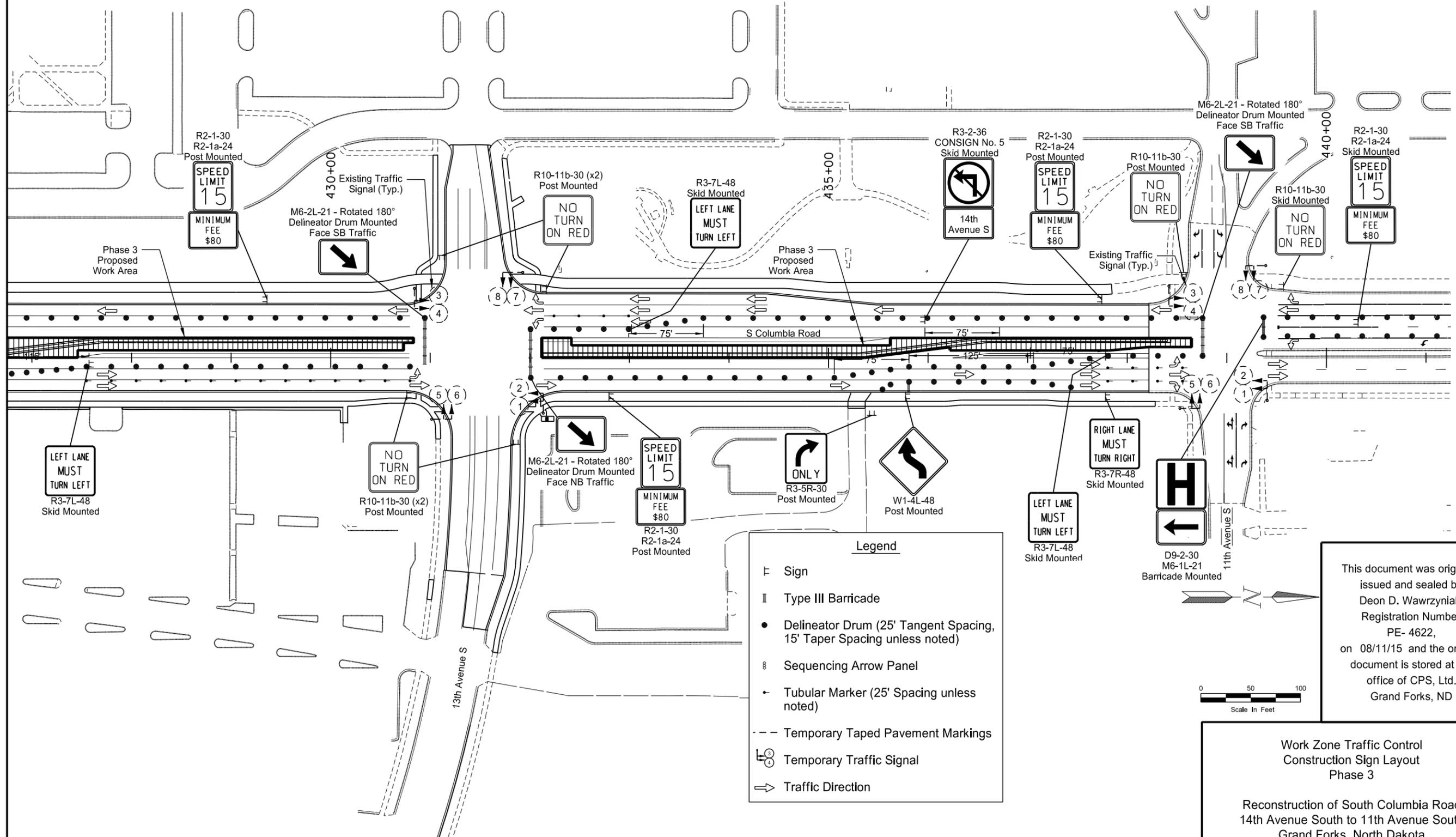


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Work Zone Traffic Control  
Construction Sign Layout  
Phase 3

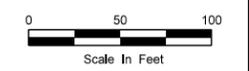
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	23



**Legend**

- F Sign
- I Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- 8 Sequencing Arrow Panel
- Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- Ⓜ Temporary Traffic Signal
- Traffic Direction

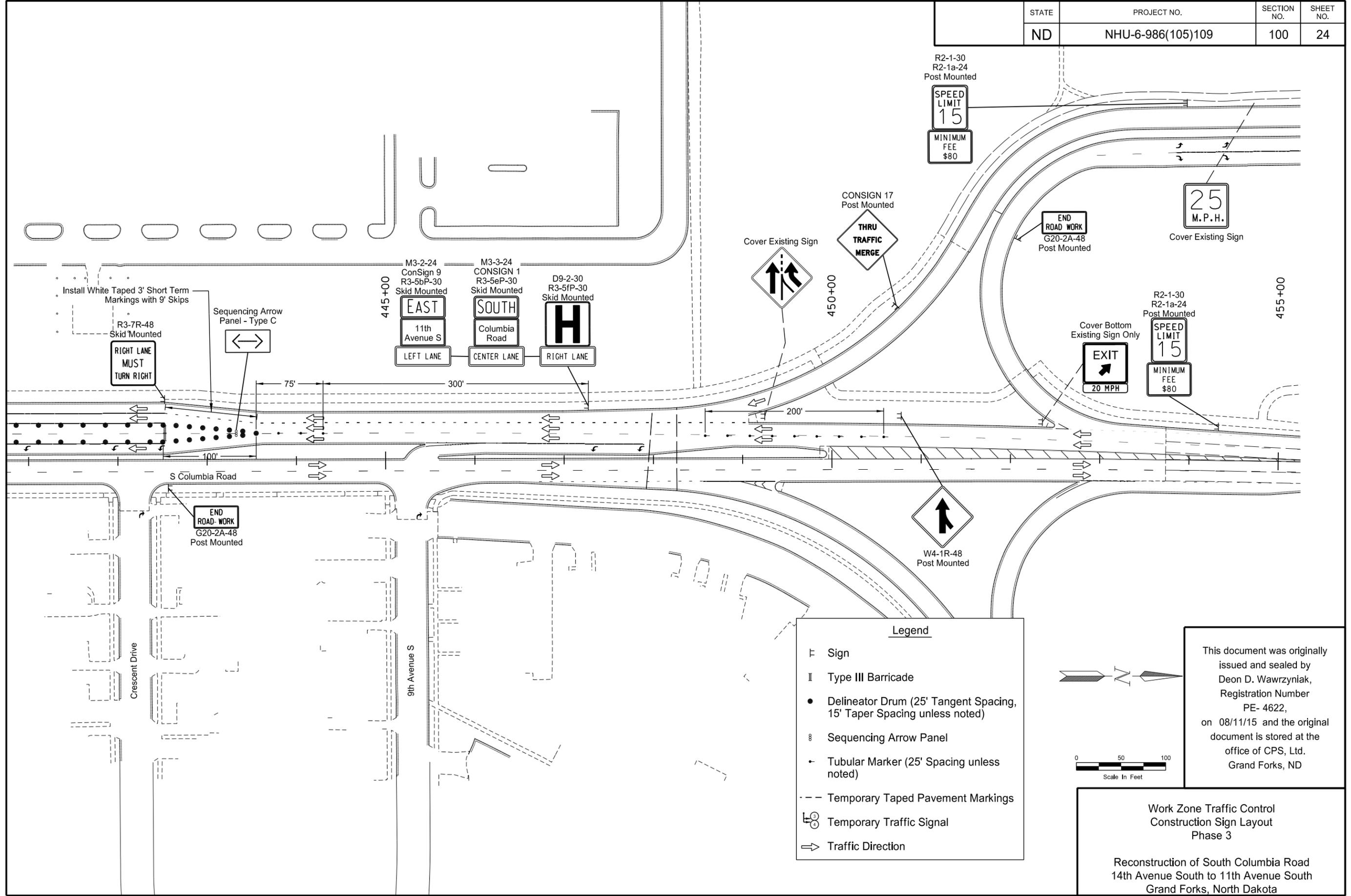


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**Work Zone Traffic Control Construction Sign Layout Phase 3**

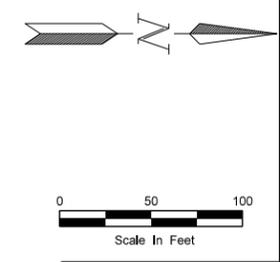
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	100	24



**Legend**

- ☐ Sign
- ▬ Type III Barricade
- Delineator Drum (25' Tangent Spacing, 15' Taper Spacing unless noted)
- ⊞ Sequencing Arrow Panel
- ⬮ Tubular Marker (25' Spacing unless noted)
- - - Temporary Taped Pavement Markings
- ⓪ Temporary Traffic Signal
- ➔ Traffic Direction



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Work Zone Traffic Control  
Construction Sign Layout  
Phase 3

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota











Area: 7.0 Sq. Ft.

SIGN NUMBER	ConSign
WIDTH x HIGHT.	3'-6" x 2'-0"
BORDER WIDTH	0.5"
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Blue
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	ROT	X	Y	WID	HT
NDDOT ARDD	90	3.5	1.6	4.8	6.4

BORDER  
R=1.5"  
TH=0.5"  
IN=0.0"

M,U,T,C,D.; 2009 Edition

Dimensions are in inches,tenths  
Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIESSIZE			
P	E	R	K	I	N	S							16.6	ClearviewHwy-1-W 4			
22.4	25	27.4	30.1	32.8	34.4	37.2											
M	E	D		P	A	R	K		M	A	L	L	30	ClearviewHwy-1-W 4			
9	12.1	14.3	16.2	18.2	20.5	23.4	26	27.9	29.8	32.7	35.6	37.7					
M	E	D	I	C	A	P		P	H	A	R	M	A	C	Y	36	ClearviewHwy-1-W 4
3	5.9	7.8	10.3	11.4	13.7	16.4	18.2	19.6	21.9	24.2	26.9	29.3	32	34.7	36.9		

Area: 7.0 Sq. Ft.  
1:15

SIGN NUMBER	ConSign
WIDTH x HIGHT.	3'-6" x 2'-0"
BORDER WIDTH	0.5"
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Blue
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

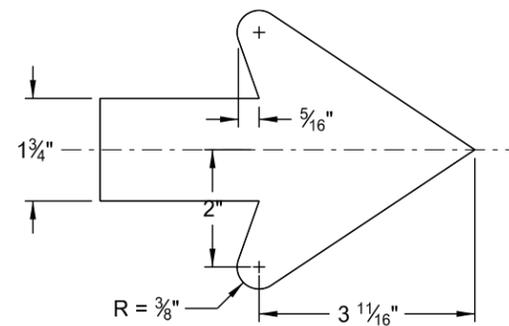
SYMBOL	ROT	X	Y	WID	HT
NDDOT ARDD	270	32.1	1.6	4.8	6.4

BORDER  
R=1.5"  
TH=0.5"  
IN=0.0"

M,U,T,C,D.; 2009 Edition

Dimensions are in inches,tenths  
Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIESSIZE			
P	E	R	K	I	N	S							16.6	ClearviewHwy-1-W 4			
3	5.6	8	10.7	13.4	15	17.8											
M	E	D		P	A	R	K		M	A	L	L	30	ClearviewHwy-1-W 4			
3	6.1	8.3	10.2	12.3	14.5	17.4	20	21.9	23.8	26.7	29.7	31.7					
M	E	D	I	C	A	P		P	H	A	R	M	A	C	Y	36	ClearviewHwy-1-W 4
3	5.9	7.8	10.3	11.4	13.7	16.4	18.2	19.6	21.9	24.2	26.9	29.3	32	34.7	36.9		



Typical Arrow

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Work Zone Traffic Control  
Construction Sign Detail

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

Area: 1.9 Sq. Ft.

SIGN NUMBER	ConSign 13
WIDTH x HIGHT.	2'-6" x 0'-9"
BORDER WIDTH	0.5"
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Blue
LEGEND/BORDER	TYPE: IV Reflective COLOR: White

SYMBOL	ROT	X	Y	WID	HT
NDDOT ARDD	90	3	2.1	4.8	6.4

BORDER  
R=1.5"  
TH=0.5"  
IN=0.0"

M.U.T.C.D.: 2009 Edition

Dimensions are in inches,tenths  
Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)						LENGTH	SERIES/SIZE
H	U	G	O	S			
13,6	16,6	19,4	22,3	25,2		13,4	ClearviewHwy-1-W 4

Area: 1.9 Sq. Ft.

SIGN NUMBER	ConSign 14
WIDTH x HIGHT.	2'-6" x 0'-9"
BORDER WIDTH	0.5"
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Blue
LEGEND/BORDER	TYPE: IV Reflective COLOR: White

SYMBOL	ROT	X	Y	WID	HT
NDDOT ARDD	270	20,6	2,1	4,8	6,4

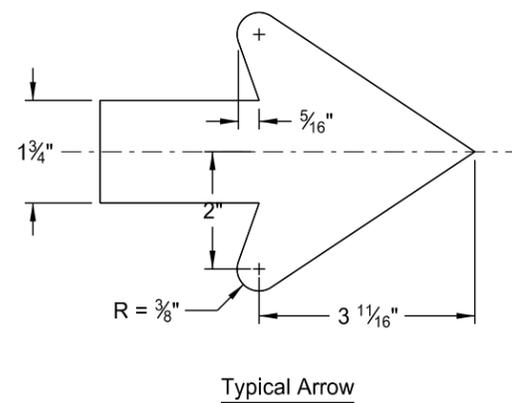
BORDER  
R=1.5"  
TH=0.5"  
IN=0.0"

FONT:  
(1) ClearviewHwy-1-W  
Panel Style: ColumbiaBlz.ssl  
M.U.T.C.D.: 2009 Edition

M.U.T.C.D.: 2009 Edition

Dimensions are in inches,tenths  
Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)						LENGTH	SERIES/SIZE
H	U	G	O	S			
3	5,9	8,8	11,6	14,6		13,4	ClearviewHwy-1-W 4



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Work Zone Traffic Control  
Construction Sign Detail

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
<b>South Columbia Road</b>																						
422+39.7 Lt		10		7.5		10.2			2.25 x 2.25 12 ga	10.7					1	4	2.5 x 2.5 12 ga					
423+91.7 Rt	1,2	SA1B	10.5			8.7			2.5 x 2.5 10 ga	9.2					1	4	3 x 3 7 ga			1	Type IX Reflectivity	
423+97.5 Lt		100		1.9		6.7			2 x 2 12 ga	7.2					1	4	2.25 x 2.25 12 ga					
424+02.5 Lt		10		7.5		10.2			2.25 x 2.25 12 ga	10.7					1	4	2.5 x 2.5 12 ga					
424+02.5 Lt		452		11.2		10.7			2.5 x 2.5 12 ga	11.2					1	4	3 x 3 7 ga					
424+14.4 Lt		20		9.0		11.0			2.5 x 2.5 10 ga	11.5					1	4	3 x 3 7 ga			1		
424+14.4 Lt				0.8																	2" x 5' Yellow Reflective Strip	
424+14.4 Lt				0.8																	2" x 5' White Reflective Strip	
424+14.4 Lt				0.8																	2" x 5' White Reflective Strip	
424+27.9 Lt		10		15.0		10.2			2.25 x 2.25 12 ga	10.7					1	4	2.5 x 2.5 12 ga					
424+27.9 Lt				0.8																	2" x 5' White Reflective Strip	
424+27.9 Lt				0.8																	2" x 5' White Reflective Strip	
424+41.4 Lt		20		9.0		11.0			2.5 x 2.5 10 ga	11.5					1	4	3 x 3 7 ga			1		
424+41.4 Lt				0.8																	2" x 5' Yellow Reflective Strip	
424+41.4 Lt				0.8																	2" x 5' White Reflective Strip	
424+41.4 Lt				0.8																	2" x 5' White Reflective Strip	
424+52.4 Lt		100		1.9		6.7			2 x 2 12 ga	7.2					1	4	2.25 x 2.25 12 ga					
424+54.0 Rt		10		7.5		10.2			2.25 x 2.25 12 ga	10.7					1	4	2.5 x 2.5 12 ga					
424+54.0 Rt		452		11.2		10.7			2.5 x 2.5 12 ga	11.2					1	4	3 x 3 7 ga					
424+63.9 Lt	1,2	SA1B	10.5			8.7			2.5 x 2.5 10 ga	9.2					1	4	3 x 3 7 ga			1	Type IX Reflectivity	
424+81.4 Lt		SAA	3.0	1.5		8.2			2 x 2 12 ga	8.7					1	4	2.25 x 2.25 12 ga					
425+45.9 Lt		16		9.0		10.2			2.5 x 2.5 12 ga	10.7					1	4	3 x 3 7 ga					
426+28.0 Rt				7.5																	Mount on Light Standard	
427+73.1 Rt		399		6.2		10.5			2.25 x 2.25 12 ga	11.0					1	4	2.5 x 2.5 12 ga					
429+05.9 Lt		20		9.0		11.0			2.5 x 2.5 10 ga	11.5					1	4	3 x 3 7 ga			1		
430+00.3 Lt		10		7.5		10.2			2.25 x 2.25 12 ga	10.7					1	4	2.5 x 2.5 12 ga					
433+17.8 Lt		399	6.2			10.5			2.25 x 2.25 12 ga	11.0					1	4	2.5 x 2.5 12 ga					
433+34.9 Rt		10		7.5		10.2			2.25 x 2.25 12 ga	10.7					1	4	2.5 x 2.5 12 ga					
433+73.0 Rt		20		9.0		11.0			2.5 x 2.5 10 ga	11.5					1	4	3 x 3 7 ga			1		
434+38.0 Lt		16		9.0		10.2			2.5 x 2.5 12 ga	10.7					1	4	3 x 3 7 ga					
434+92.1 Rt		412	10.2			12.5			2.5 x 2.5 10 ga	13.0					1	4	3 x 3 7 ga			1		
435+28.1 Lt		27		3.0		8.2			2 x 2 12 ga	8.7					1	4	2.25 x 2.25 12 ga					
436+12.1 Rt	3	Var.	15.0			9.7	9.7		2.5 x 2.5 10 ga	10.2	3.9	3.9			2	4	3 x 3 7 ga			2		
437+35.9 Rt		16		9.0		10.2			2.5 x 2.5 12 ga	10.7					1	4	3 x 3 7 ga					
437+46.7 Lt		10		7.5		10.2			2.25 x 2.25 12 ga	10.7					1	4	2.5 x 2.5 12 ga					
437+98.7 Lt		SAA	3.0	1.5		8.2			2 x 2 12 ga	8.7					1	4	2.25 x 2.25 12 ga					
<b>Sub Total</b>			58.4	175.3		<b>Total</b> 275.7					<b>Total</b> 7.8			<b>Total</b> 28	112			0	0	9		

Basis of Estimate  
Sign Support Lengths  
The sign support lengths have been calculated using the following vertical clearances:  
Roadway: 7.0 Ft  
Shared Use Path: 5.0 Ft

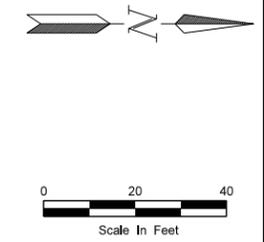
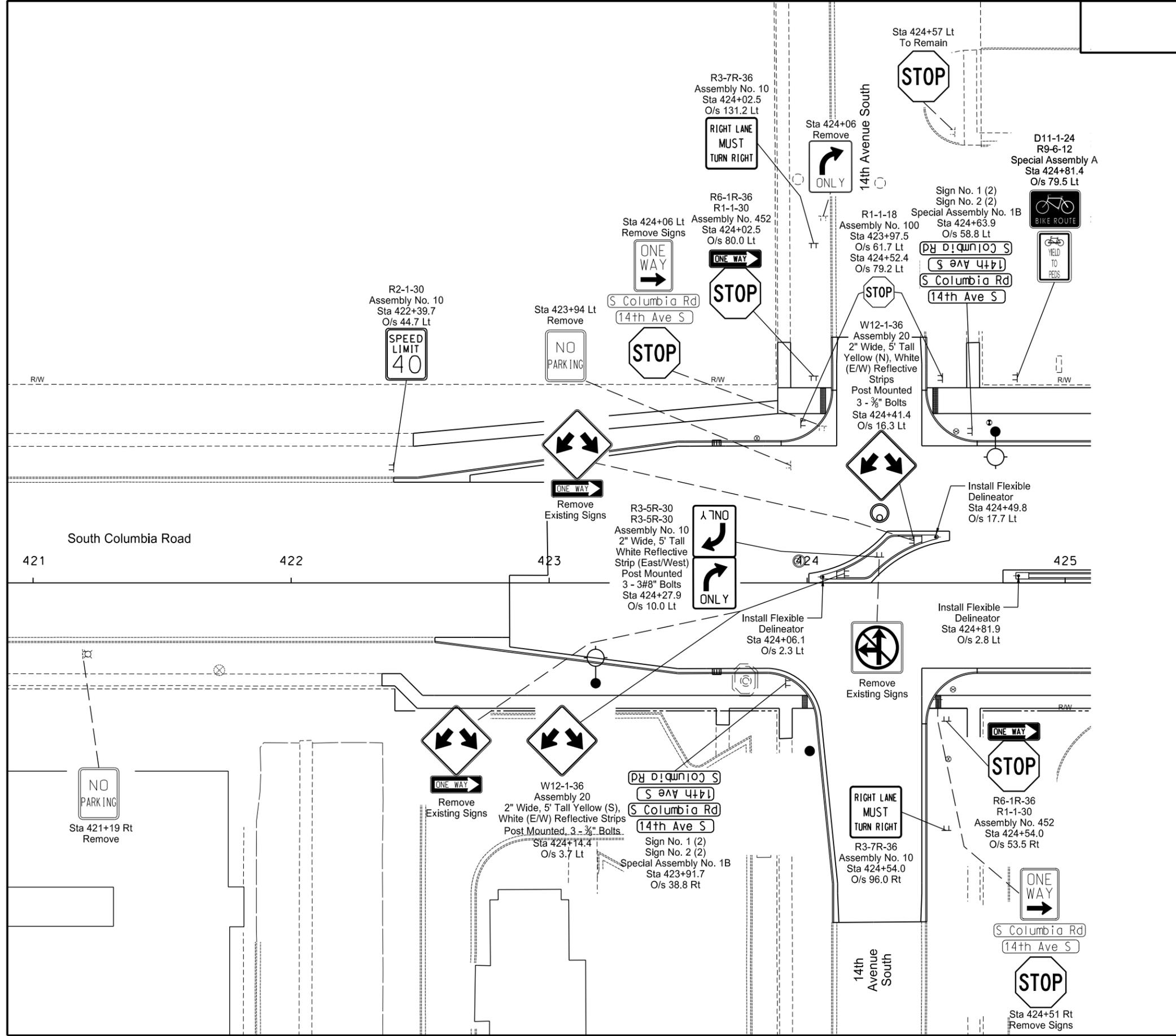
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Sign Summary

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	110	3

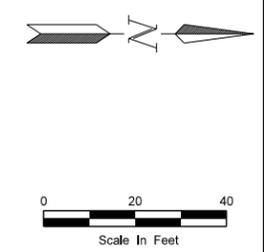
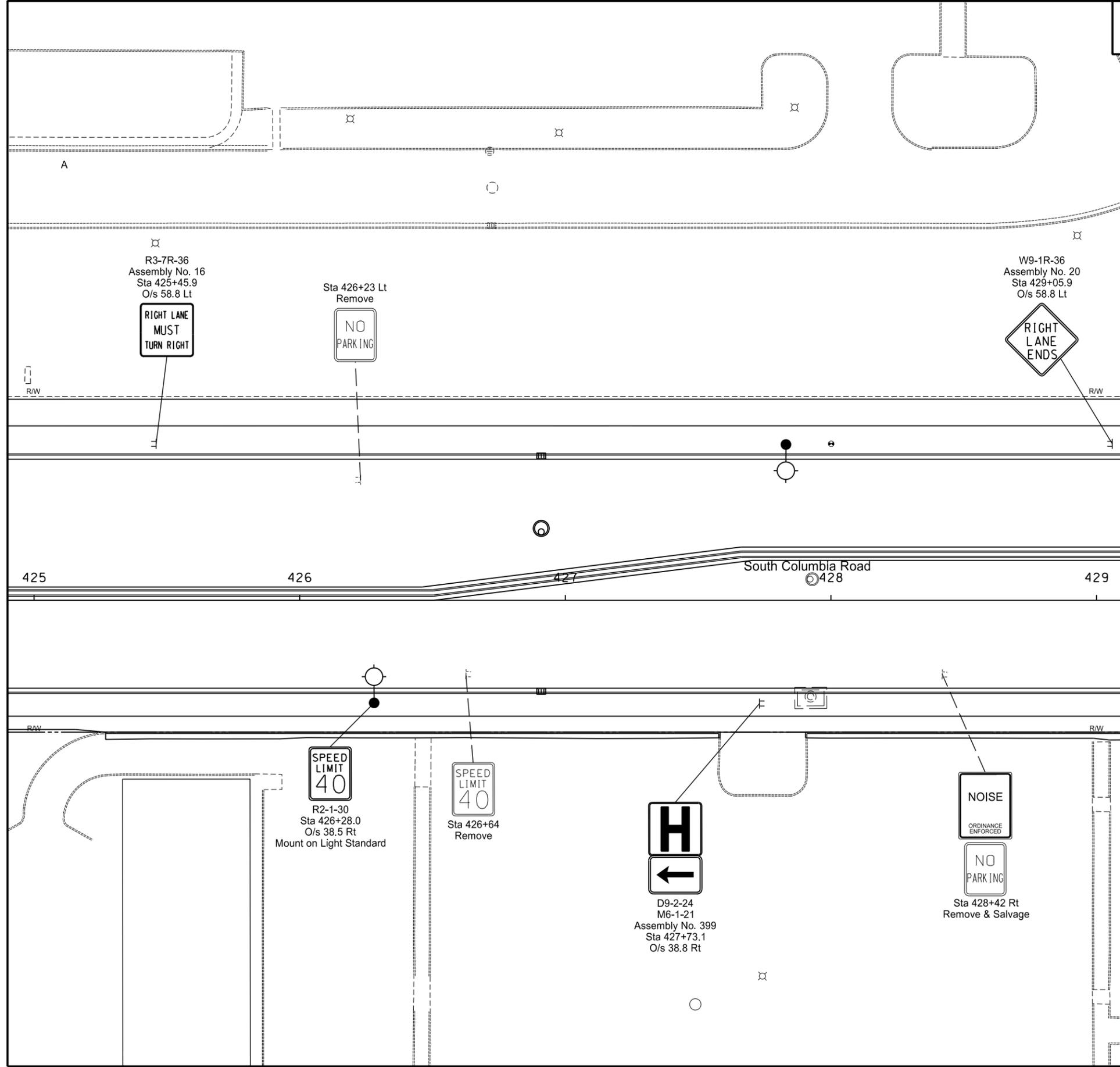


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**Signing**  
Sta 421+00 to 425+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	110	4

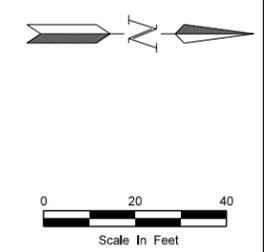
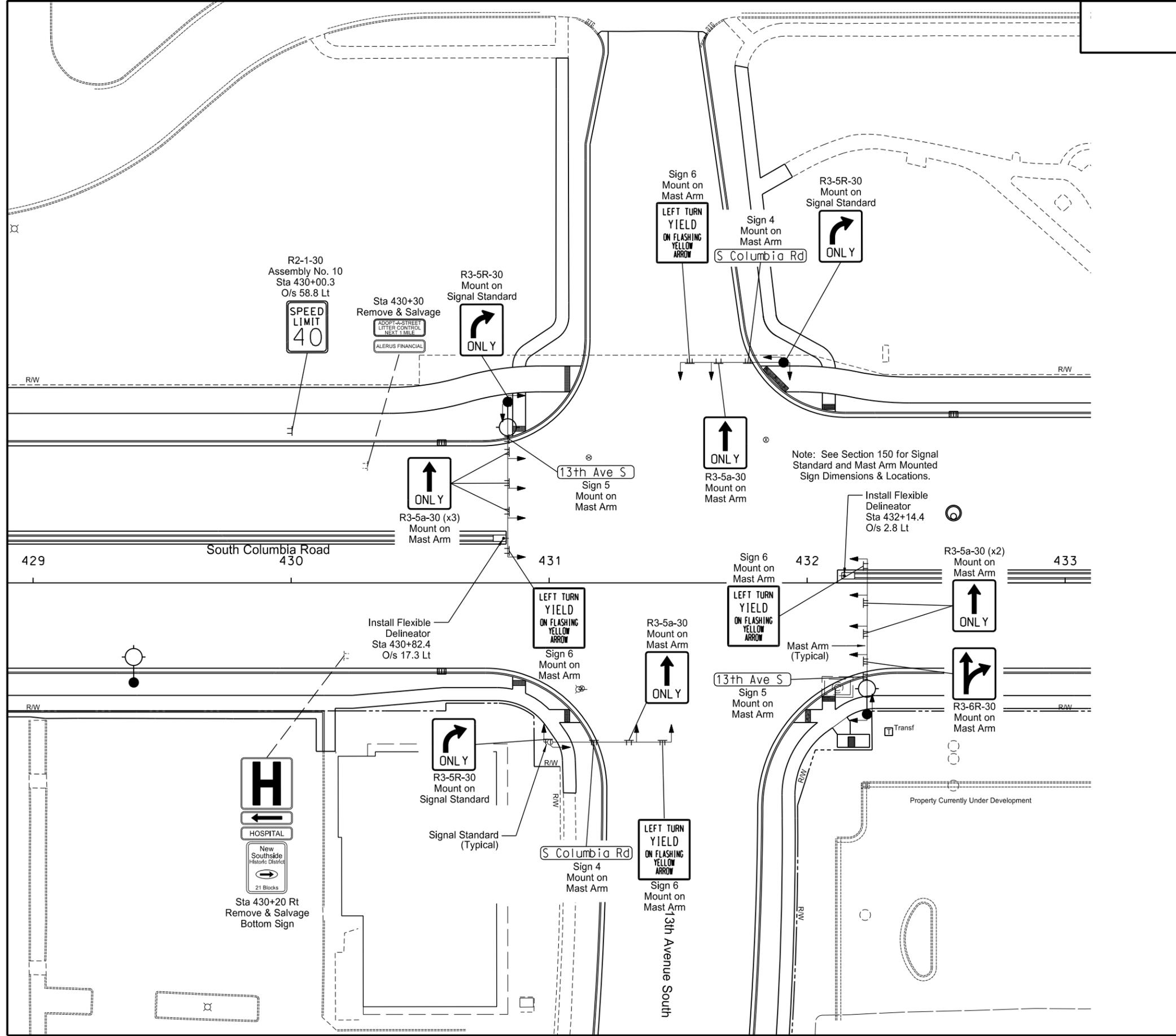


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**Signing**  
Sta 425+00 to 429+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	110	5

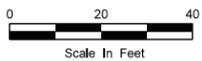
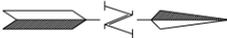
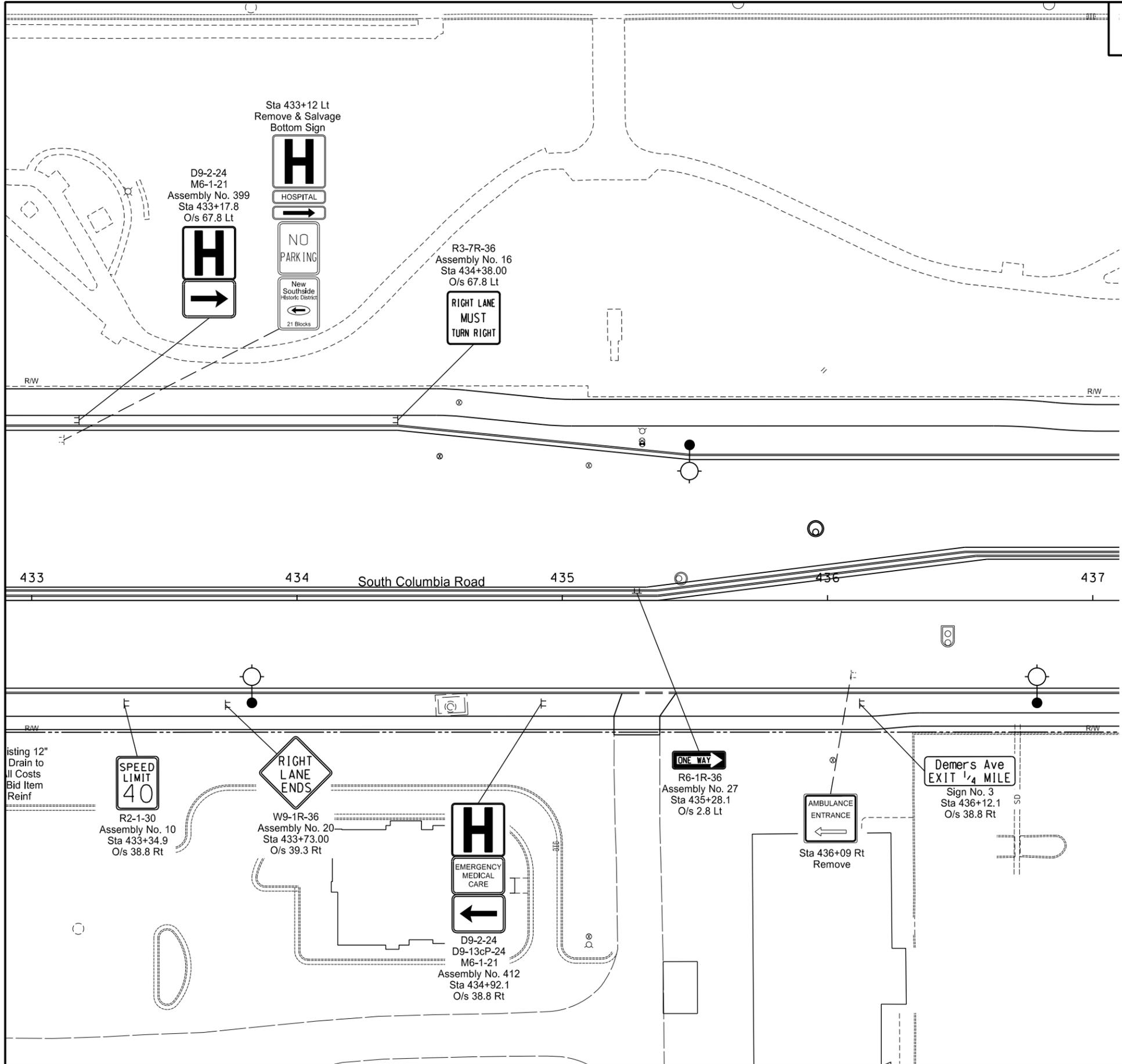


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**Signing**  
Sta 429+00 to 433+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	110	6



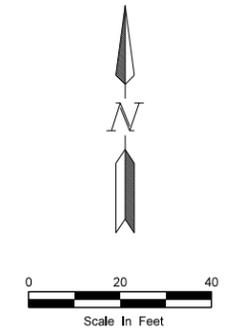
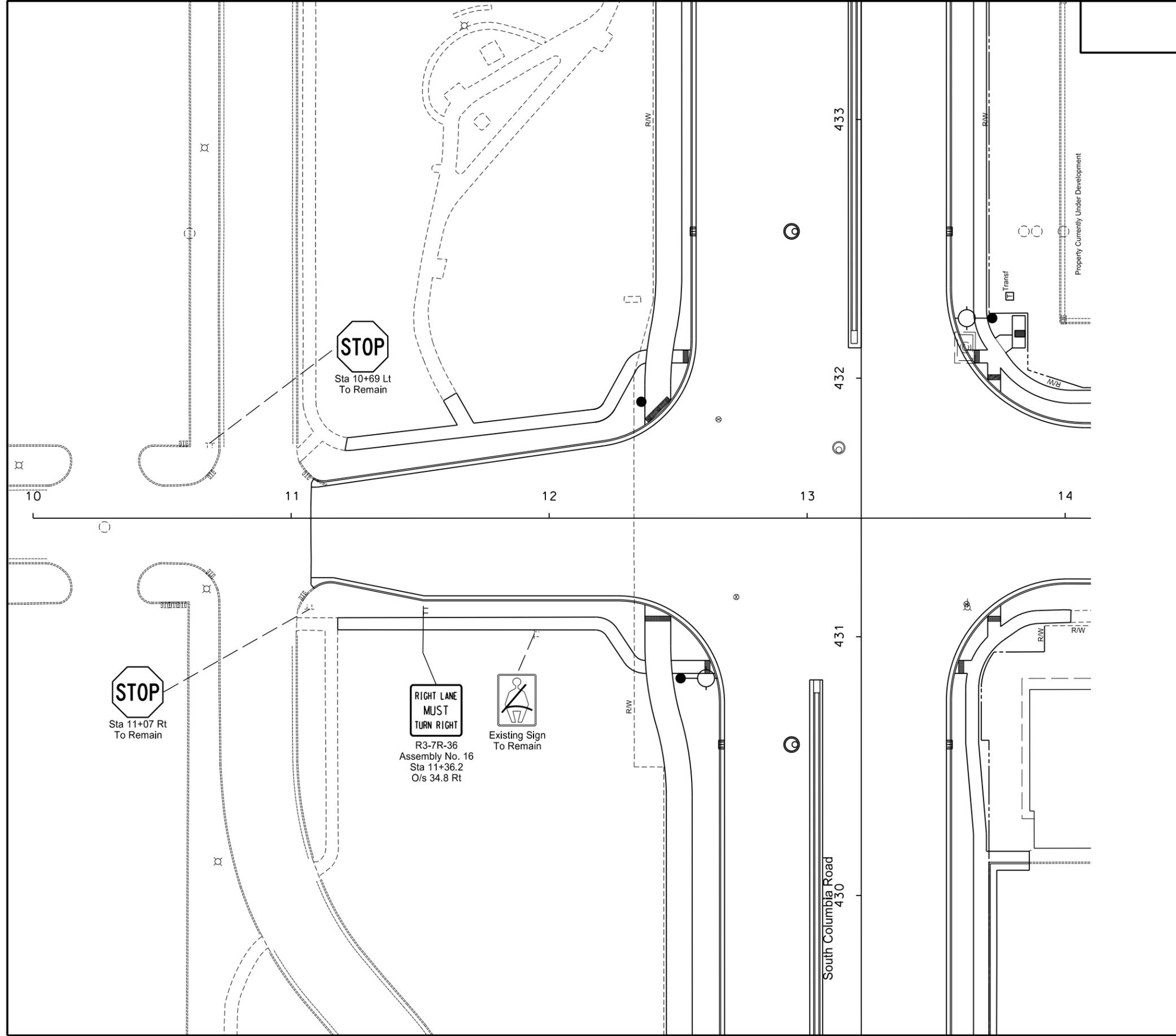
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**Signing**  
Sta 433+00 to 437+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	110	8

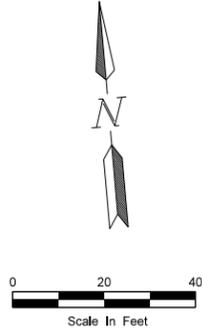
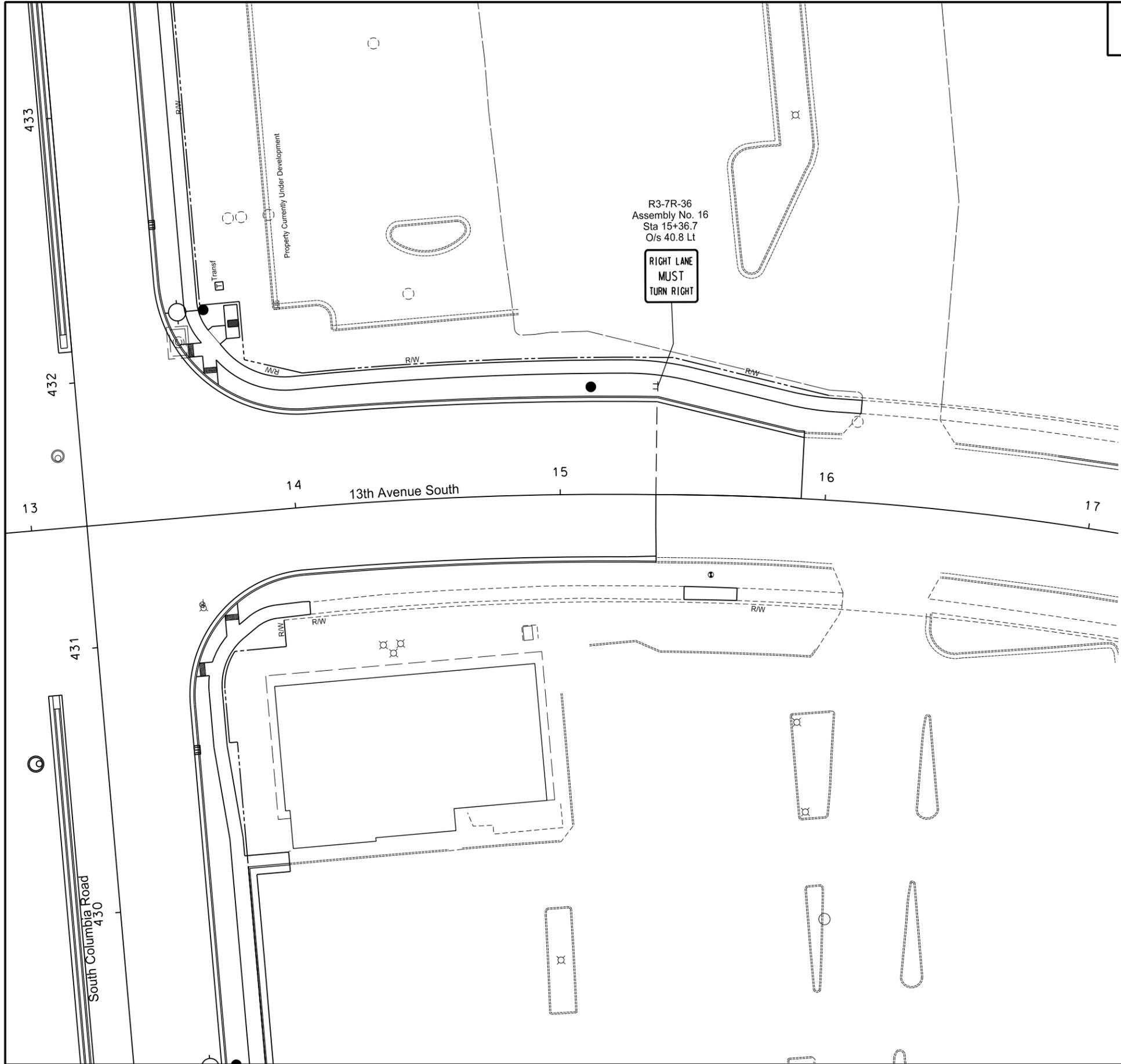


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**Signing**  
 13th Avenue South  
 Sta 11+00 to 12+26.48

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	110	9



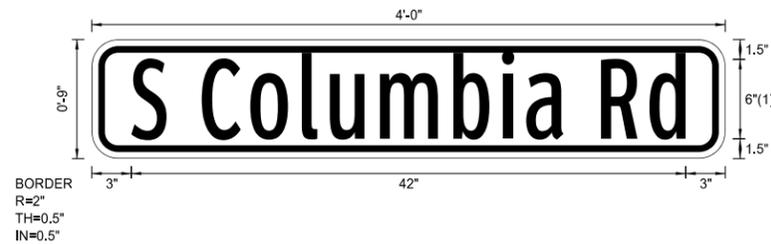
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Signing  
 13th Avenue South  
 Sta 14+08.12 to 16+85.50

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

Station(s)  
423+91.7 O/s 38.8 Rt (2)  
424+63.9 O/s 58.8 Lt (2)

Area: 3.00 SqFt



SIGN NUMBER	1
WIDTH x HGHT.	4'-0" x 0'-9"
BORDER WIDTH	0.5"
CORNER RADIUS	2"
MOUNTING	Ground
BACKGROUND	TYPE: IX Reflective COLOR: Blue
LEGEND/BORDER	TYPE: IX Reflective COLOR: White

SYMBOL	ROT	X	Y	WID	HT

M.U.T.C.D.: 2009 Edition  
Dimensions are in Inches, tenths Letter locations are string start to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIESIZE	
S	C	o	l	u	m	b	i	a	R	d			42	ClearviewHwy-1-W 64.9	
3	0	2.7	5.3	9	12.9	15	18.8	24.4	28.1	29.9	32.7	35.6	39.3		

Station(s)  
423+91.7 O/s 38.8 Rt (2)  
424+63.9 O/s 58.8 Lt (2)

Area: 2.25 SqFt



SIGN NUMBER	2
WIDTH x HGHT.	3'-0" x 0'-9"
BORDER WIDTH	0.5"
CORNER RADIUS	2"
MOUNTING	Ground
BACKGROUND	TYPE: IX Reflective COLOR: Blue
LEGEND/BORDER	TYPE: IX Reflective COLOR: White

SYMBOL	ROT	X	Y	WID	HT

M.U.T.C.D.: 2009 Edition  
Dimensions are in Inches, tenths Letter locations are string start to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIESIZE	
1	4	t	h	A	v	e	S						30	ClearviewHwy-1-W 64.9	
3	0	2.6	6.2	9	11.6	14.4	18.4	22	24.7	27.3					

Station(s)  
437+46.8 O/s 38.8 Rt

Area: 15.00 SqFt

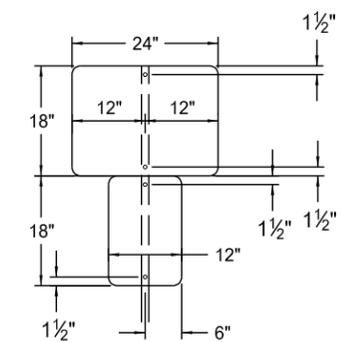


SIGN NUMBER	3
WIDTH x HGHT.	6'-0" x 2'-6"
BORDER WIDTH	0.75"
CORNER RADIUS	2.25"
MOUNTING	Overhead
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White

SYMBOL	ROT	X	Y	WID	HT

M.U.T.C.D.: 2009 Edition  
Dimensions are in inches, tenths Letter locations are string start to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIESIZE	
D	e	M	e	r	s		A	v	e	n	u	e			D 2000
6.8	0	5	9.5	15.3	19.7	22.3	25.1	31.1	36.5	41.3	45.7	50.3	54.8		58.3 64.5
E	x	i	t		1	/	4		M	i	l	e			D 2000
16.5	0	3	7	8.2	10	14.5	16.2	20.9	24.3	28.8	33.3	34.9	36.3		39 45.3,4



Special Assembly A  
Area: 4.50 SF  
Sta 424+81.4 Lt  
Sta 437+98.7 Lt

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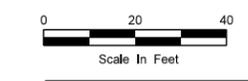
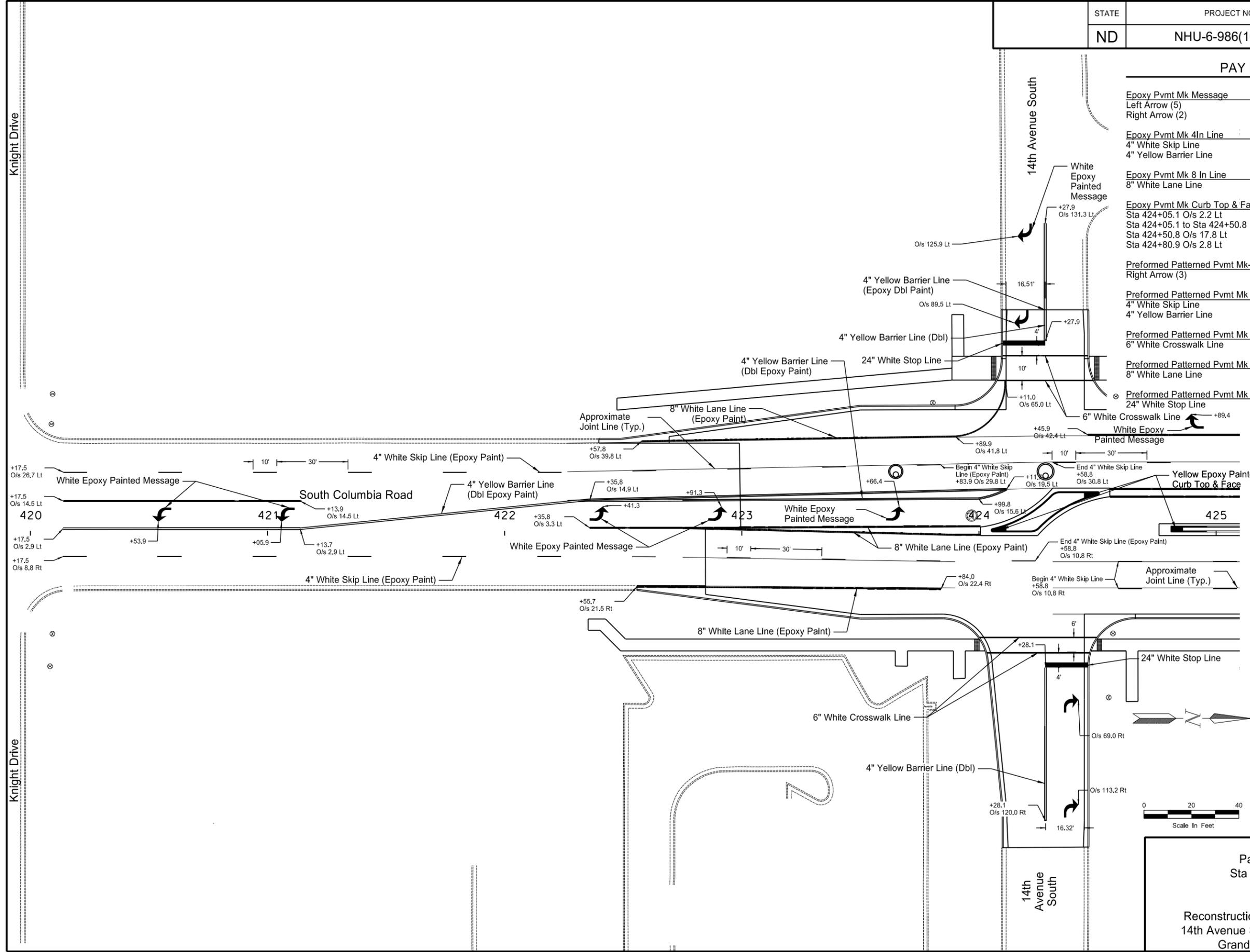
Sign Details  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota





**PAY ITEMS**

Epoxy Pvmt Mk Message	
Left Arrow (5)	80 SF
Right Arrow (2)	32 SF
Epoxy Pvmt Mk 4In Line	
4" White Skip Line	210 LF
4" Yellow Barrier Line	1176 LF
Epoxy Pvmt Mk 8 In Line	
8" White Lane Line	717 LF
Epoxy Pvmt Mk Curb Top & Face	
Sta 424+05.1 O/s 2.2 Lt	13 LF
Sta 424+05.1 to Sta 424+50.8	75 LF
Sta 424+50.8 O/s 17.8 Lt	13 LF
Sta 424+80.9 O/s 2.8 Lt	33 LF
Preformed Patterned Pvmt Mk-Message (Grooved)	
Right Arrow (3)	48 SF
Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" White Skip Line	60 LF
4" Yellow Barrier Line	156 LF
Preformed Patterned Pvmt Mk 6In Line-Grooved	
6" White Crosswalk Line	170 LF
Preformed Patterned Pvmt Mk 8In Line-Grooved	
8" White Lane Line	54 LF
Preformed Patterned Pvmt Mk 24In Line-Grooved	
24" White Stop Line	36 LF



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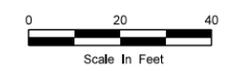
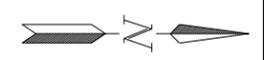
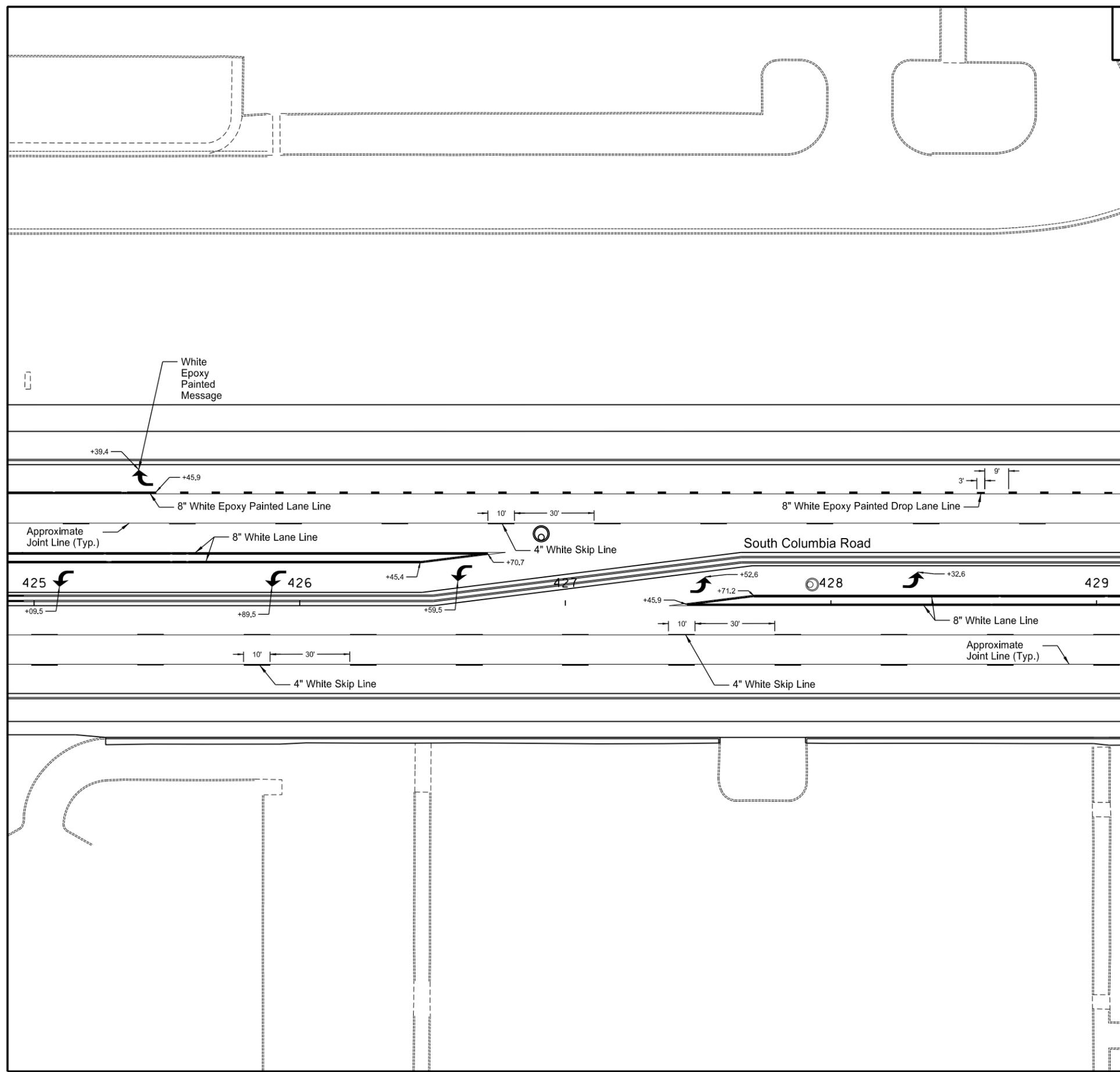
**Pavement Marking**  
Sta 420+00 to 425+00

**Reconstruction of South Columbia Road**  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	2

**PAY ITEMS**

Epoxy Pvmt Mk Message	
Right Arrow (1)	16 SF
Epoxy Pvmt Mk 8In Line	
8" White Lane Line	46 LF
8" White Drop Lane Line	87 LF
Preformed Patterned Pvmt Mk-Message (Grooved)	
Left Arrow (5)	80 SF
Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" White Skip Line	300 LF
Preformed Patterned Pvmt Mk 8In Line-Grooved	
8" White Lane Line	651 LF



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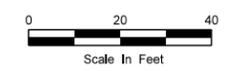
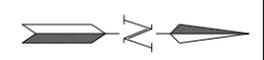
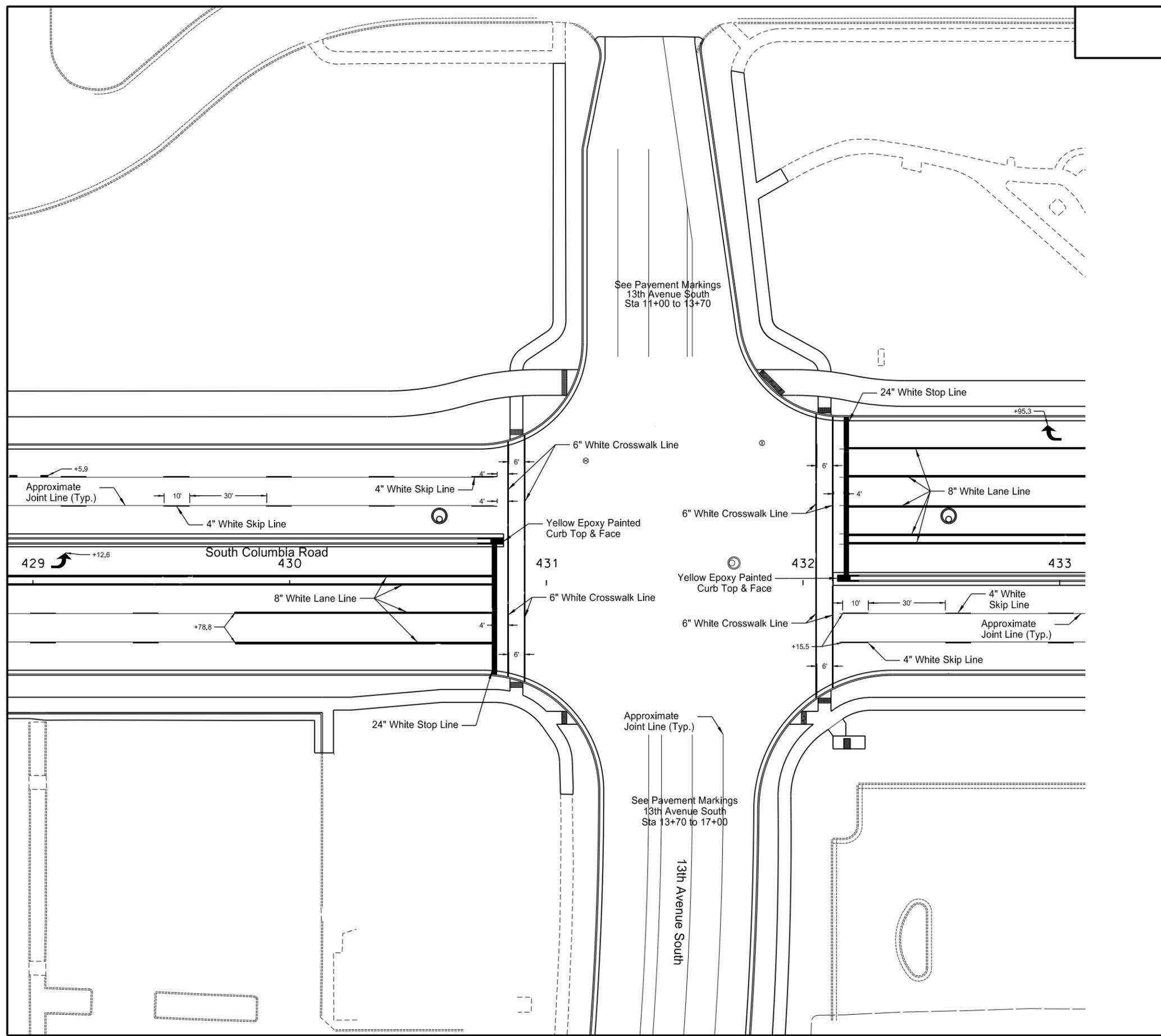
**Pavement Marking**  
 Sta 425+00 to 429+00

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	3

**PAY ITEMS**

Epoxy Pvmt Mk 8In Line	
8" Drop Lane Line	3 LF
Epoxy Pvmt Mk Curb Top & Face	
Sta 430+83.4 O/s 17.5 Lt	23 LF
Sta 432+13.4 O/s 2.8 Lt	20 LF
Preformed Patterned Pvmt Mk-Message (Grooved)	
Left Arrow (1)	16 SF
Right Arrow (1)	16 SF
Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" White Skip Line	180 LF
Preformed Patterned Pvmt Mk 6In Line-Grooved	
6" White Crosswalk Line	404 LF
Preformed Patterned Pvmt Mk 8In Line-Grooved	
8" White Lane Line	968 LF
Preformed Patterned Pvmt Mk 24In Line-Grooved	
24" White Stop Line	115 LF



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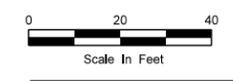
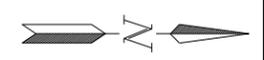
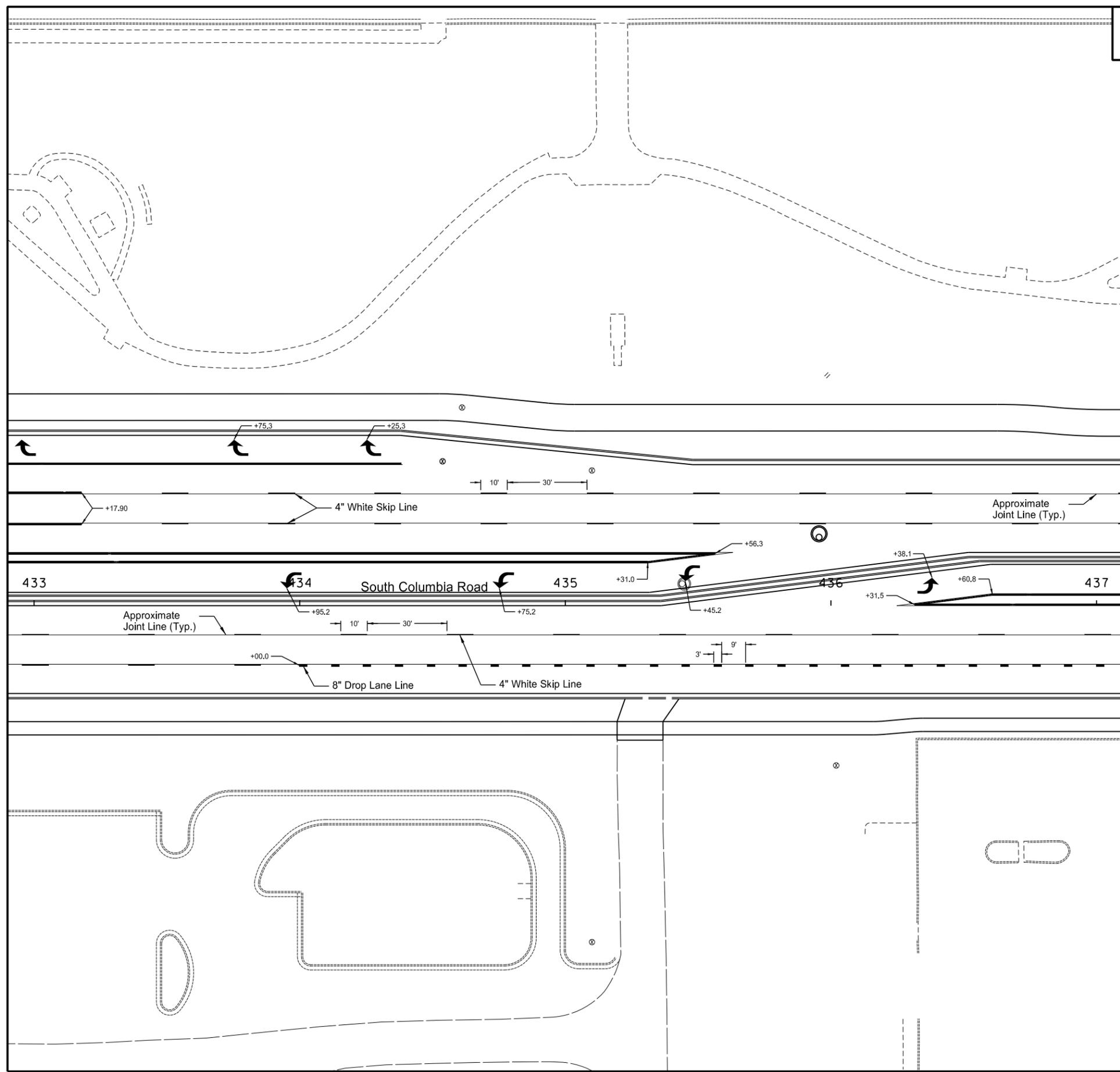
Pavement Marking  
Sta 429+00 to 433+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	4

**PAY ITEMS**

<b>Preformed Patterned Pvmt Mk-Message (Grooved)</b>	
Left Arrow (4)	64 SF
Right Arrow (2)	32 SF
<b>Preformed Patterned Pvmt Mk 4In Line-Grooved</b>	
4" White Skip Line	280 LF
<b>Preformed Patterned Pvmt Mk 8In Line-Grooved</b>	
8" White Lane Line	823 LF
8" White Drop Lane Line	78 LF



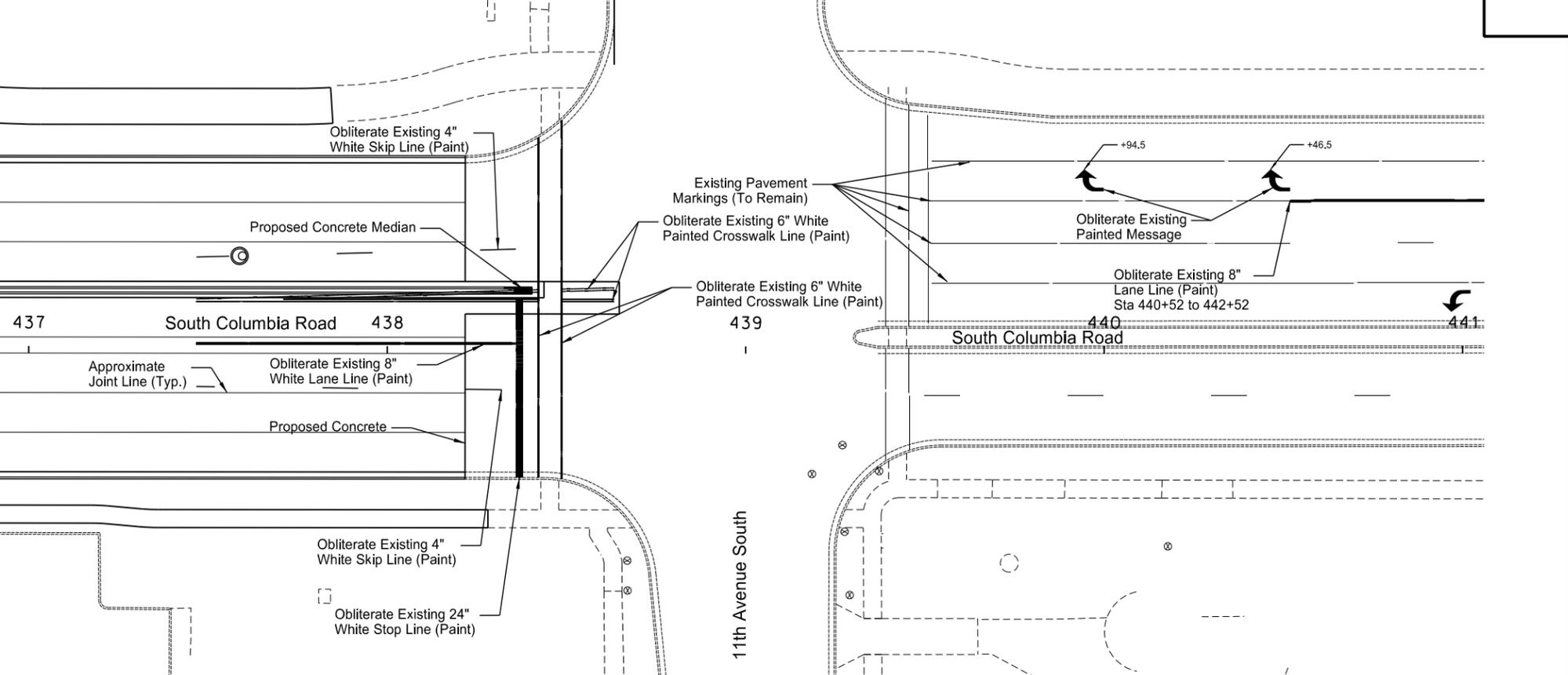
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**Pavement Marking**  
 Sta 433+00 to 437+00

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

REMOVALS

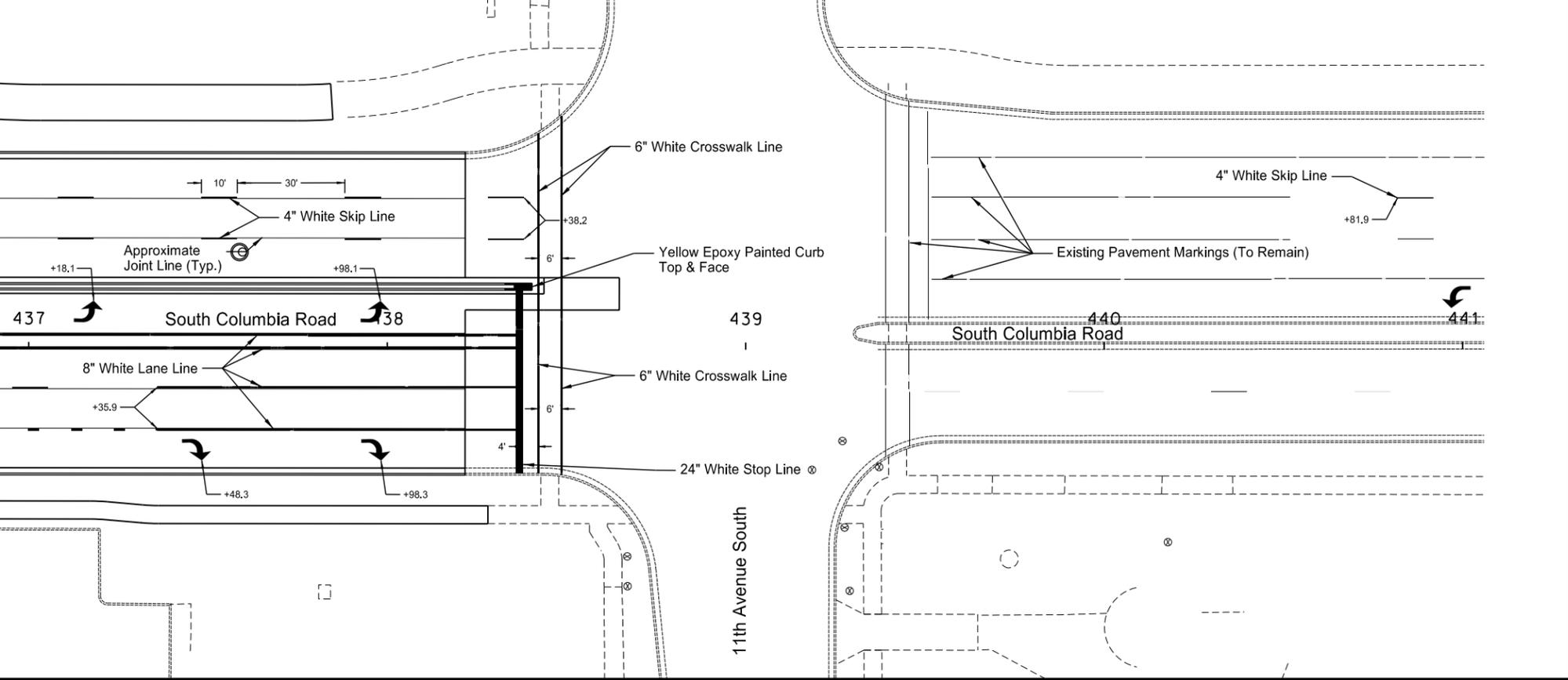
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	5



REMOVAL PAY ITEMS

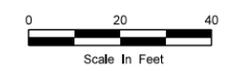
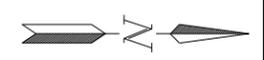
Obliteration of Pvmt Mk	
Right Arrow (2)	32 SF
4" White Skip Line	20 LF x 4/12 LF = 7 SF
4" Yellow Barrier Line	56 LF x 4/12 LF = 19 SF
6" White Crosswalk Line	195 LF x 6/12 LF = 98 SF
8" White Lane Line	58 LF x 8/12 LF = 39 SF
24" White Stop Line	49 LF x 24/12 LF = 98 SF

PROPOSED



PROPOSED PAY ITEMS

Epoxy Pvmt Mk Curb Top & Face	
Sta 438+40.4 O/s 17.5 Lt	18 LF
Preformed Patterned Pvmt Mk-Message (Grooved)	
Left Arrow (1)	32 SF
Right Arrow (1)	32 SF
Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" White Skip Line	90 LF
Preformed Patterned Pvmt Mk 6In Line-Grooved	
6" White Crosswalk Line	195 LF
Preformed Patterned Pvmt Mk 8In Line-Grooved	
8" White Lane Line	472 LF
8" Drop Lane Line	6 LF
Preformed Patterned Pvmt Mk 24In Line-Grooved	
24" White Stop Line	51 LF

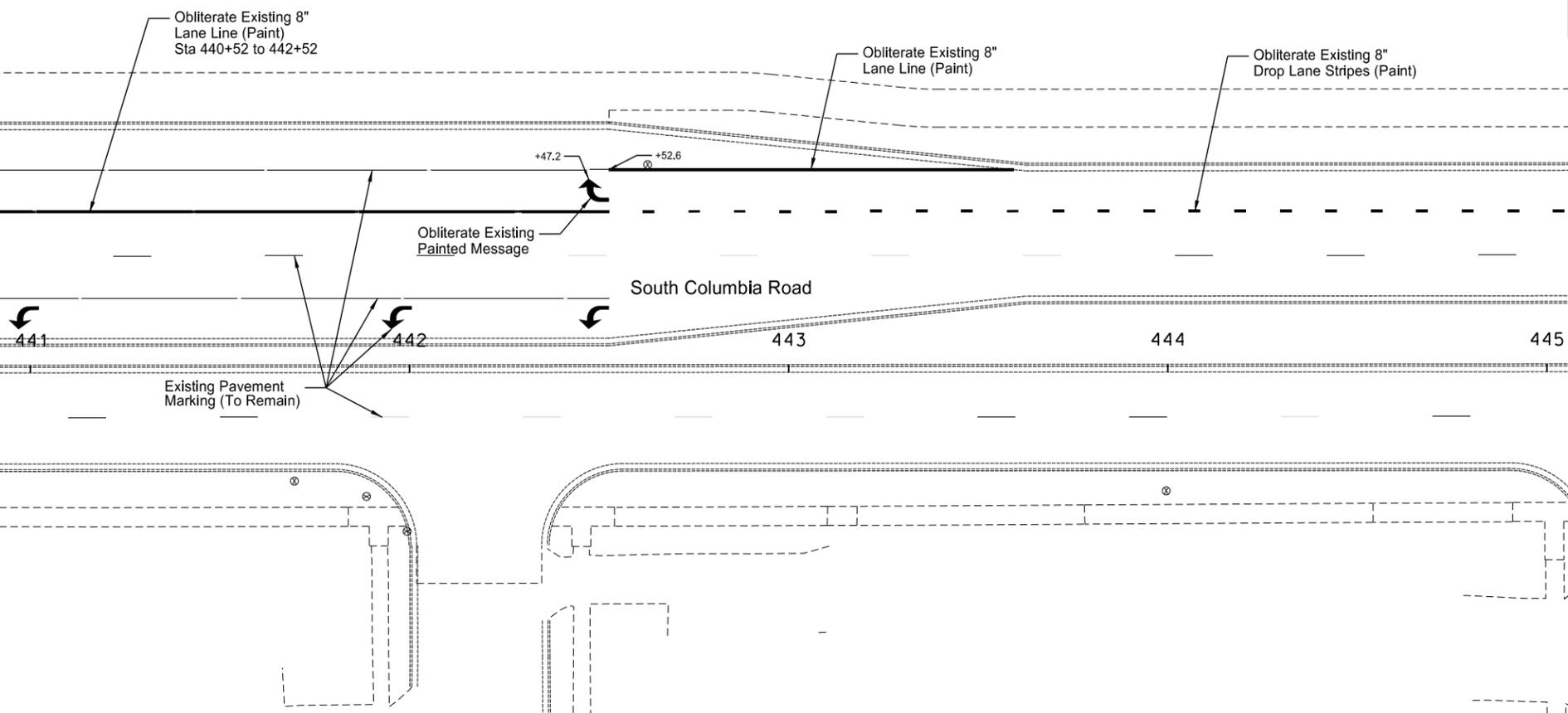


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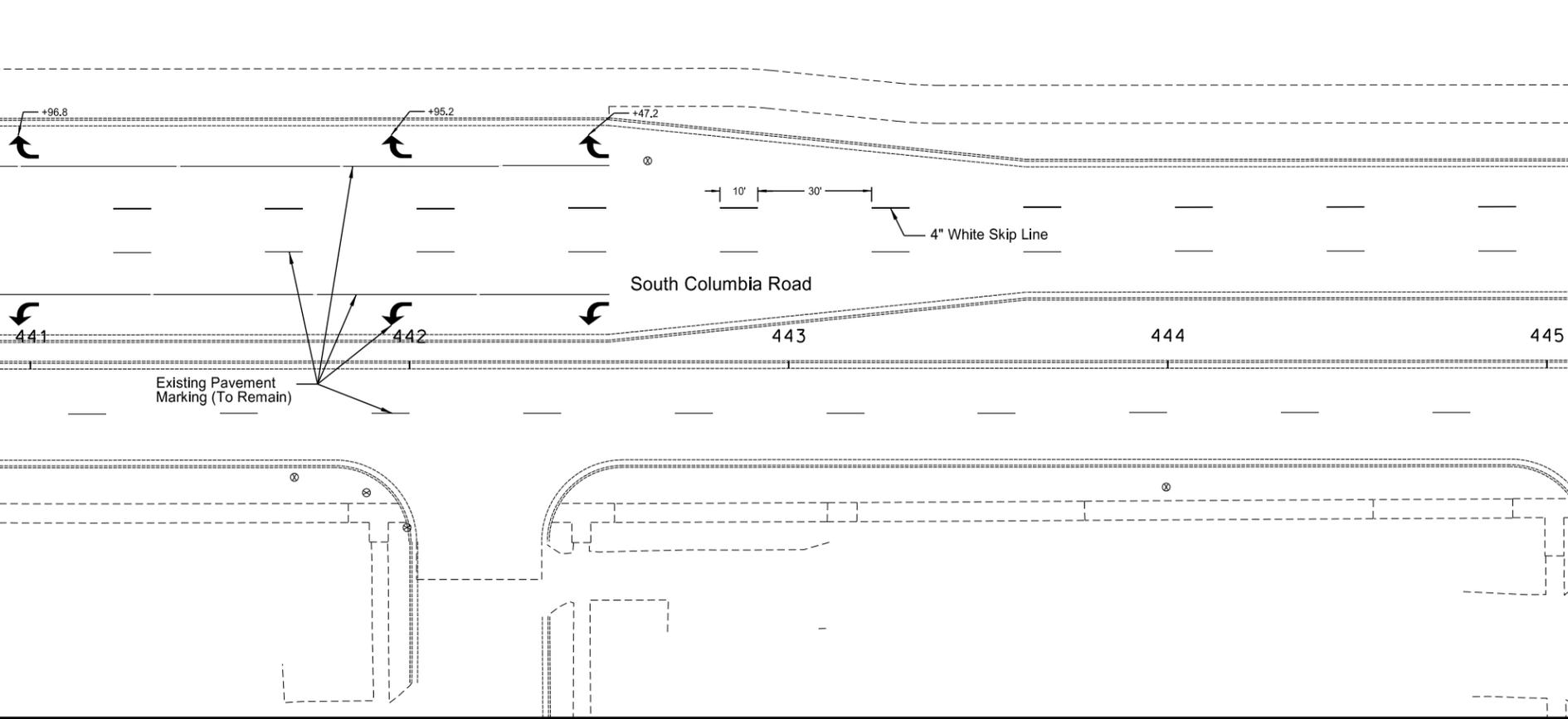
Pavement Marking  
Sta 437+00 to 441+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

REMOVALS



PROPOSED



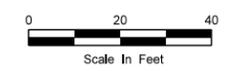
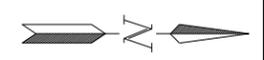
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	6

REMOVAL PAY ITEMS

Obliteration of Pvmt Mk	
Right Arrow (1)	16 SF
8" White Lane Line	260 LF x 8/12 LF = 174 SF
8" White Drop Lane Line	60 LF x 8/12 LF = 40 SF

PROPOSED PAY ITEMS

Preformed Patterned Pvmt Mk-Message (Grooved)	
Right Arrow (3)	48 SF
Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" White Skip Line	100 LF



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Pavement Marking  
Sta 441+00 to 445+00

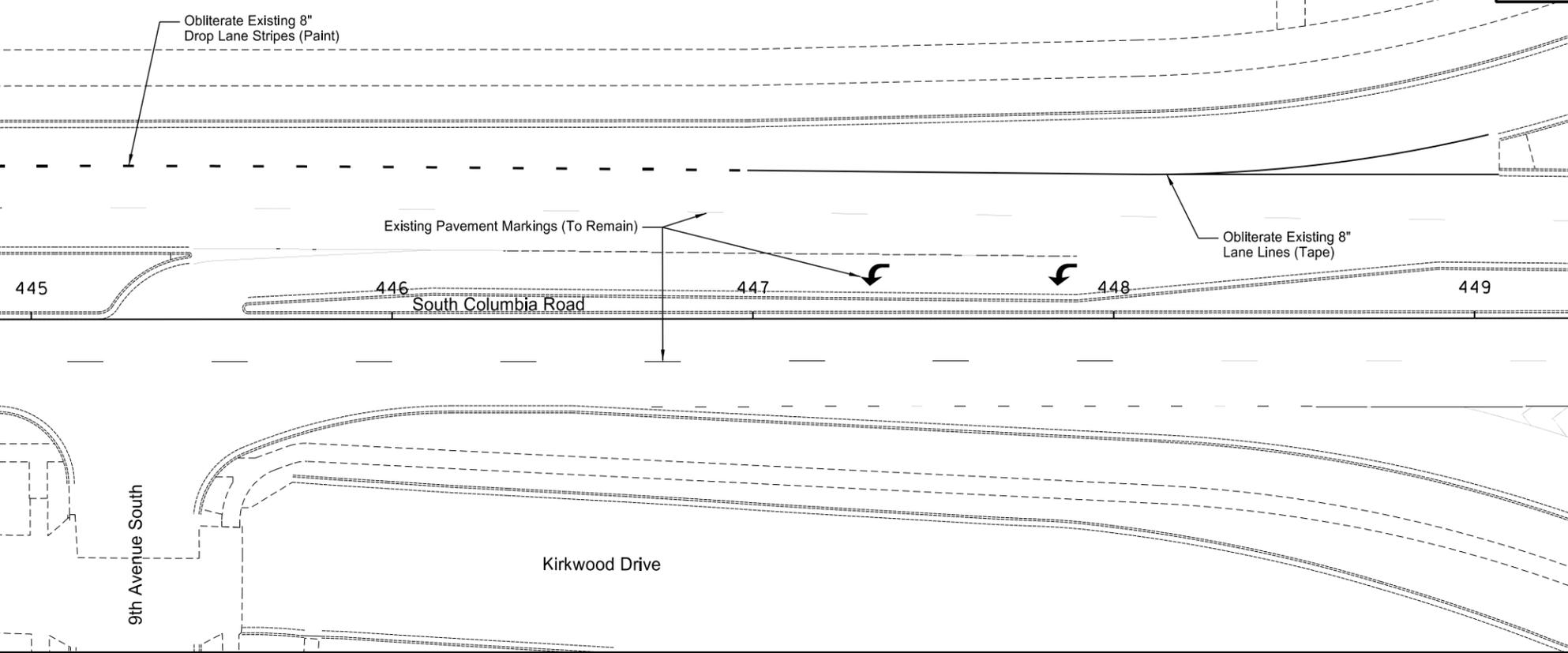
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

REMOVALS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	7

REMOVAL PAY ITEMS

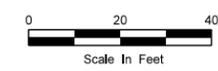
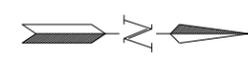
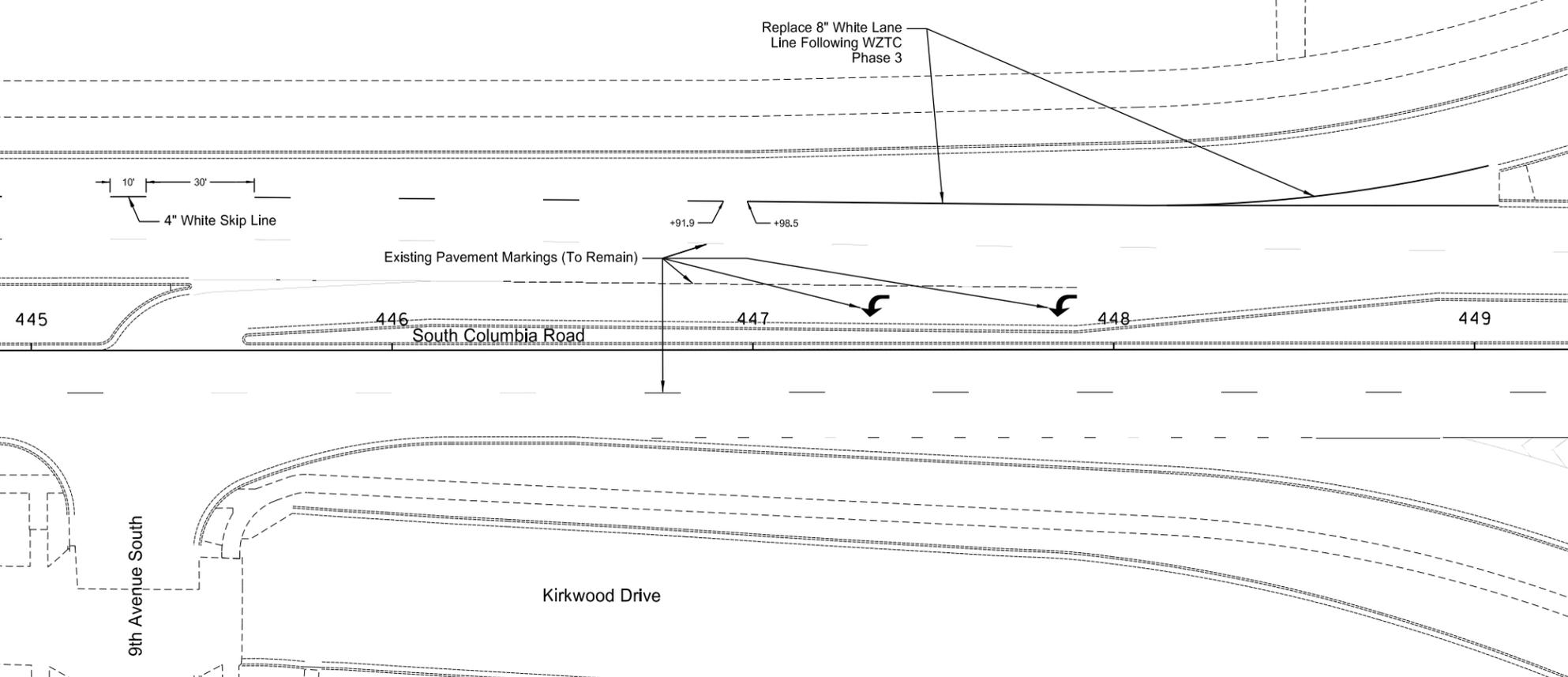
Obliteration of Pvmt Mk	
8" White Drop Lane Line	51 LF x 8/12 LF = 34 SF
8" White Lane Line	300 LF x 8/12 LF = 200 SF



PROPOSED PAY ITEMS

Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" White Skip Line	50 LF
Preformed Patterned Pvmt Mk 8In Line-Grooved	
8" White Lane Line	300 LF

PROPOSED



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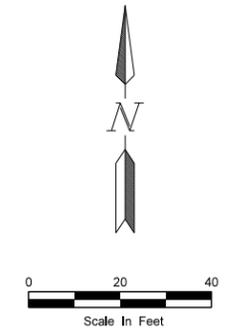
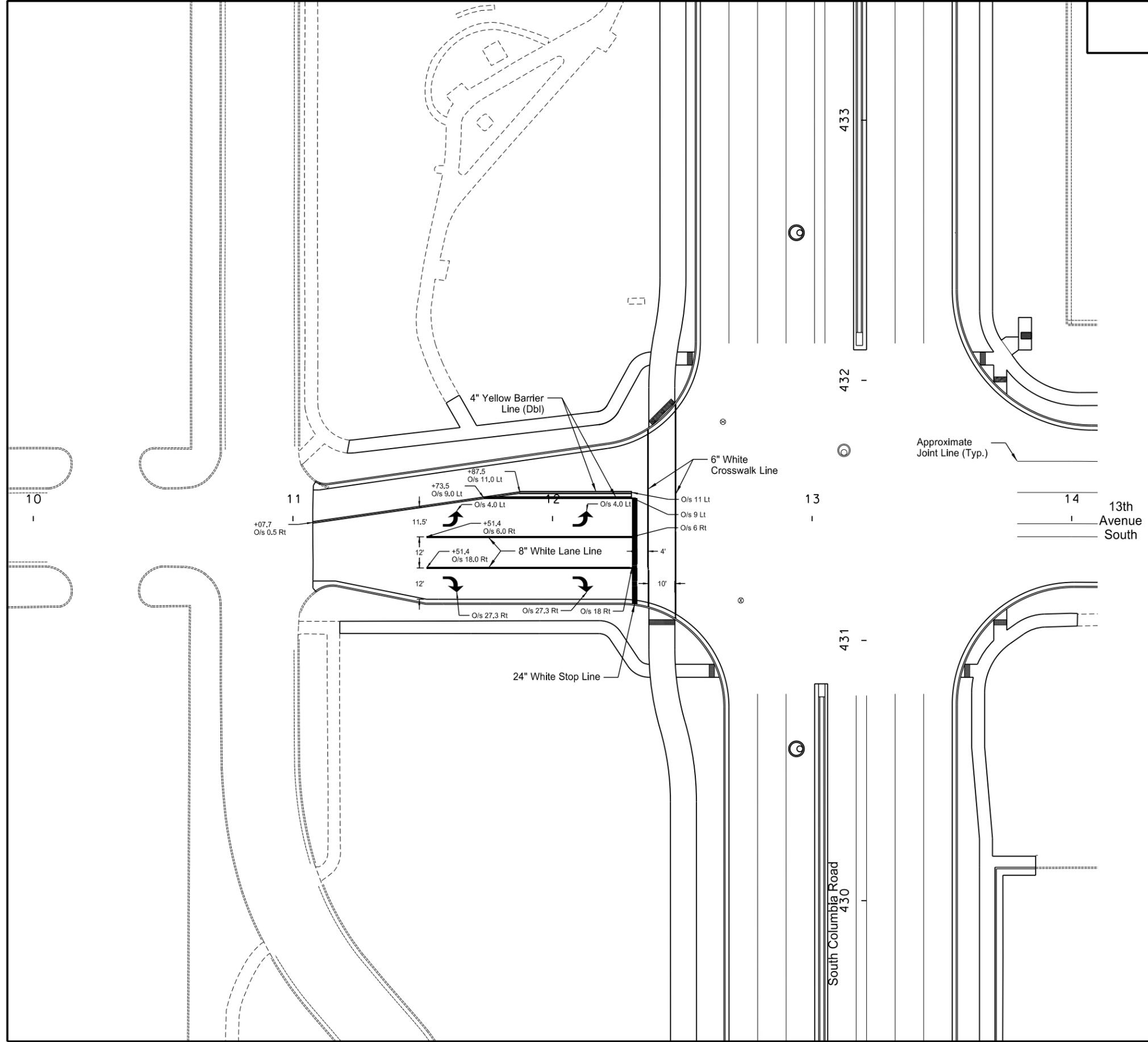
Pavement Marking  
Sta 445+00 to 449+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	8

**PAY ITEMS**

Preformed Patterned Pvmt Mk-Message (Grooved)	
Left Arrow (2)	32 SF
Right Arrow (2)	32 SF
Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" Yellow Barrier Line	362 LF
Preformed Patterned Pvmt Mk 6In Line-Grooved	
6" White Crosswalk Line	151 LF
Preformed Patterned Pvmt Mk 8In Line-Grooved	
8" White Lane Line	159 LF
Preformed Patterned Pvmt Mk 24In Line-Grooved	
24" White Stop Line	41 LF



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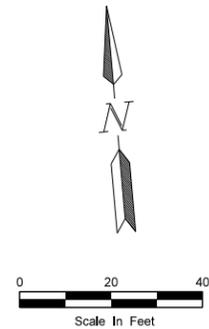
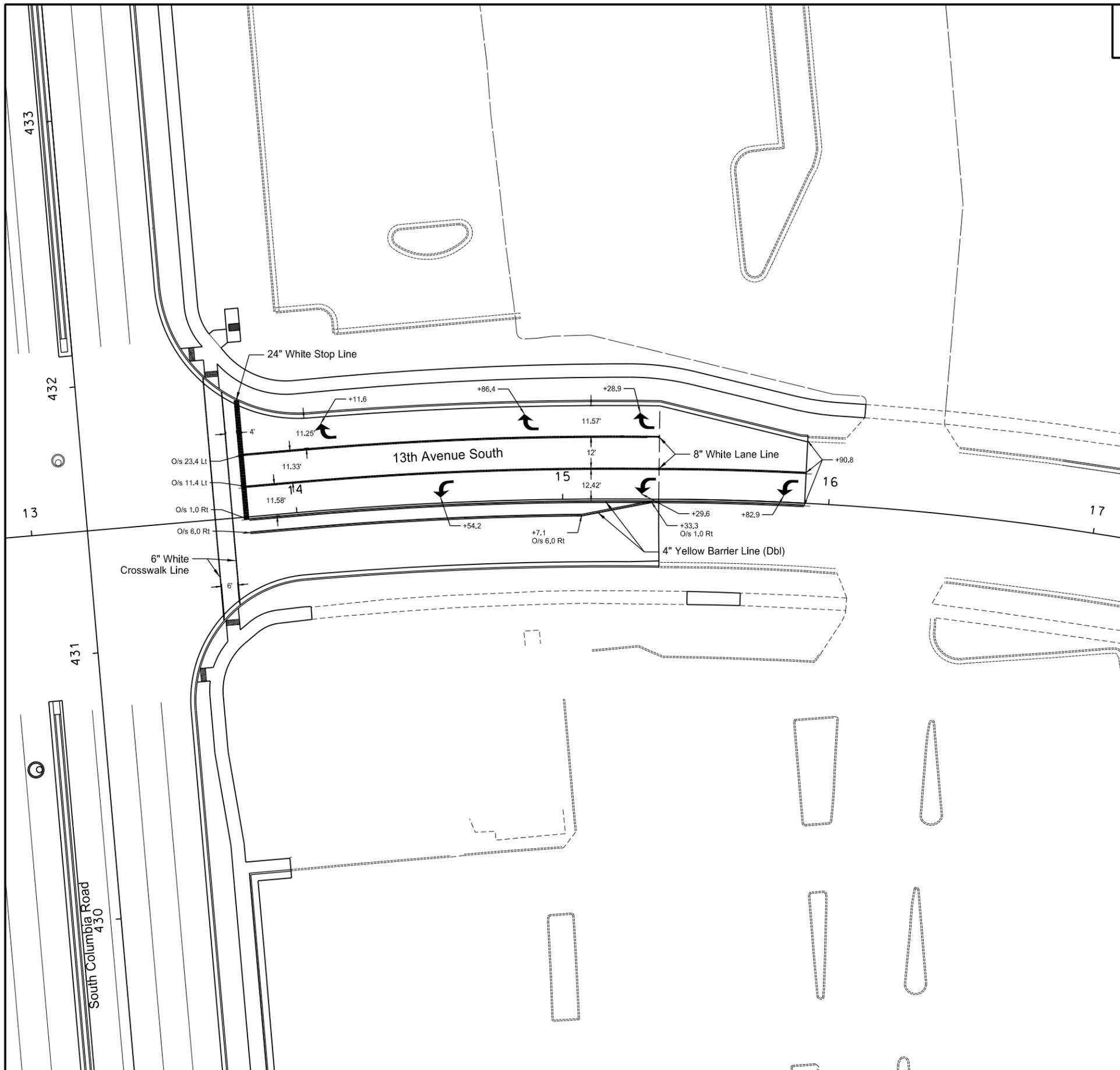
Pavement Marking  
 13th Avenue South  
 Sta 10+00 to 14+00

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	120	9

**PAY ITEMS**

Preformed Patterned Pvmt Mk-Message (Grooved)	
Left Arrow (3)	48 SF
Right Arrow (3)	48 SF
Preformed Patterned Pvmt Mk 4In Line-Grooved	
4" Yellow Barrier Line	722 LF
Preformed Patterned Pvmt Mk 6In Line-Grooved	
6" White Crosswalk Line	172 LF
Preformed Patterned Pvmt Mk 8In Line-Grooved	
8" White Lane Line	369 LF
Preformed Patterned Pvmt Mk 24In Line-Grooved	
24" White Stop Line	45 LF



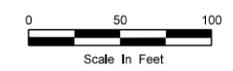
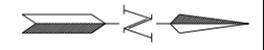
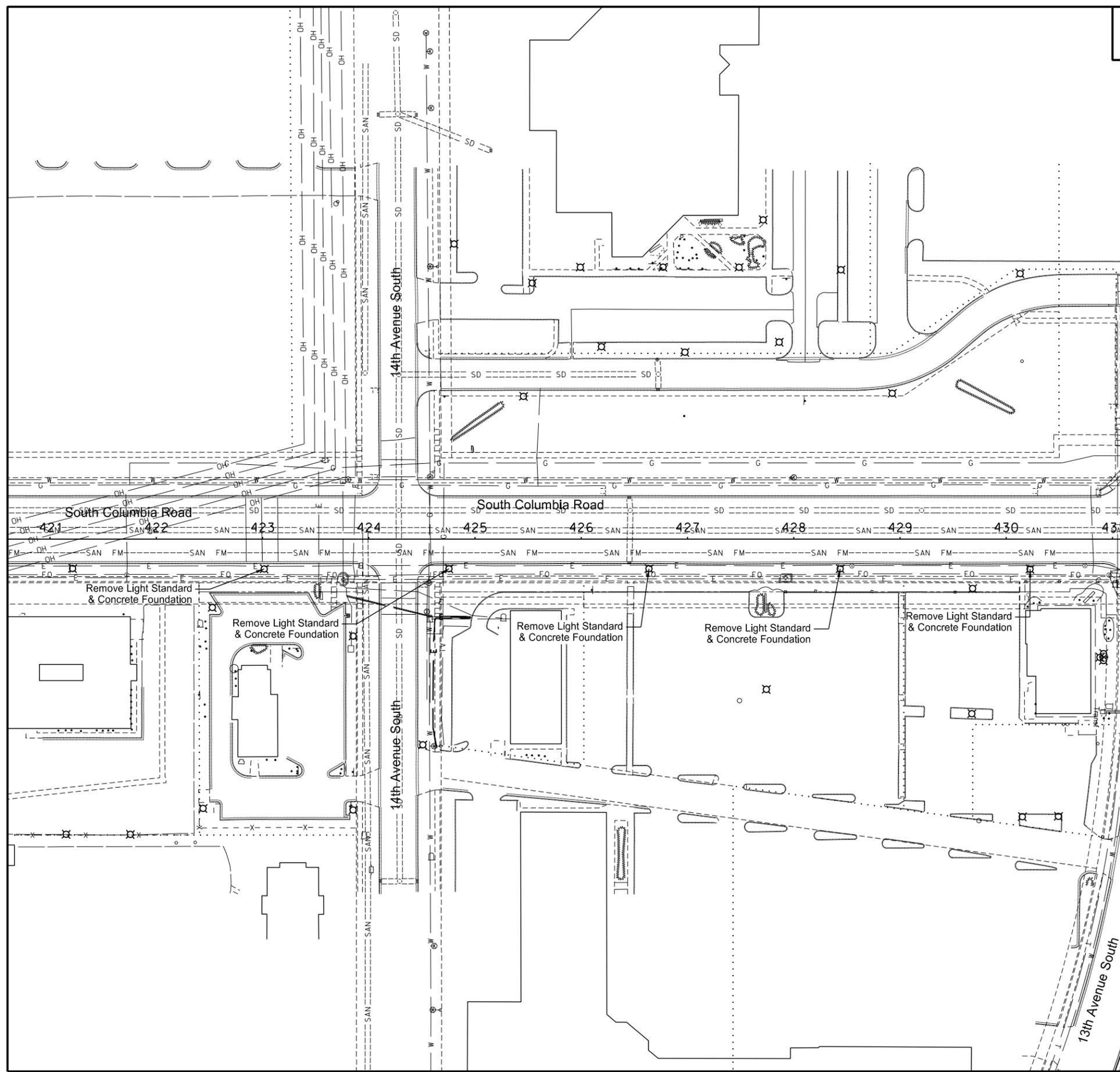
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Pavement Marking  
 13th Avenue South  
 Sta 14+08.12 to 16+85.50  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	1

**PAY ITEMS**

Remove Light Standard Sta 421+00 to 431+00	5 EA
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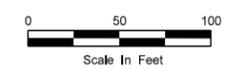
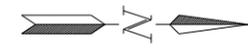
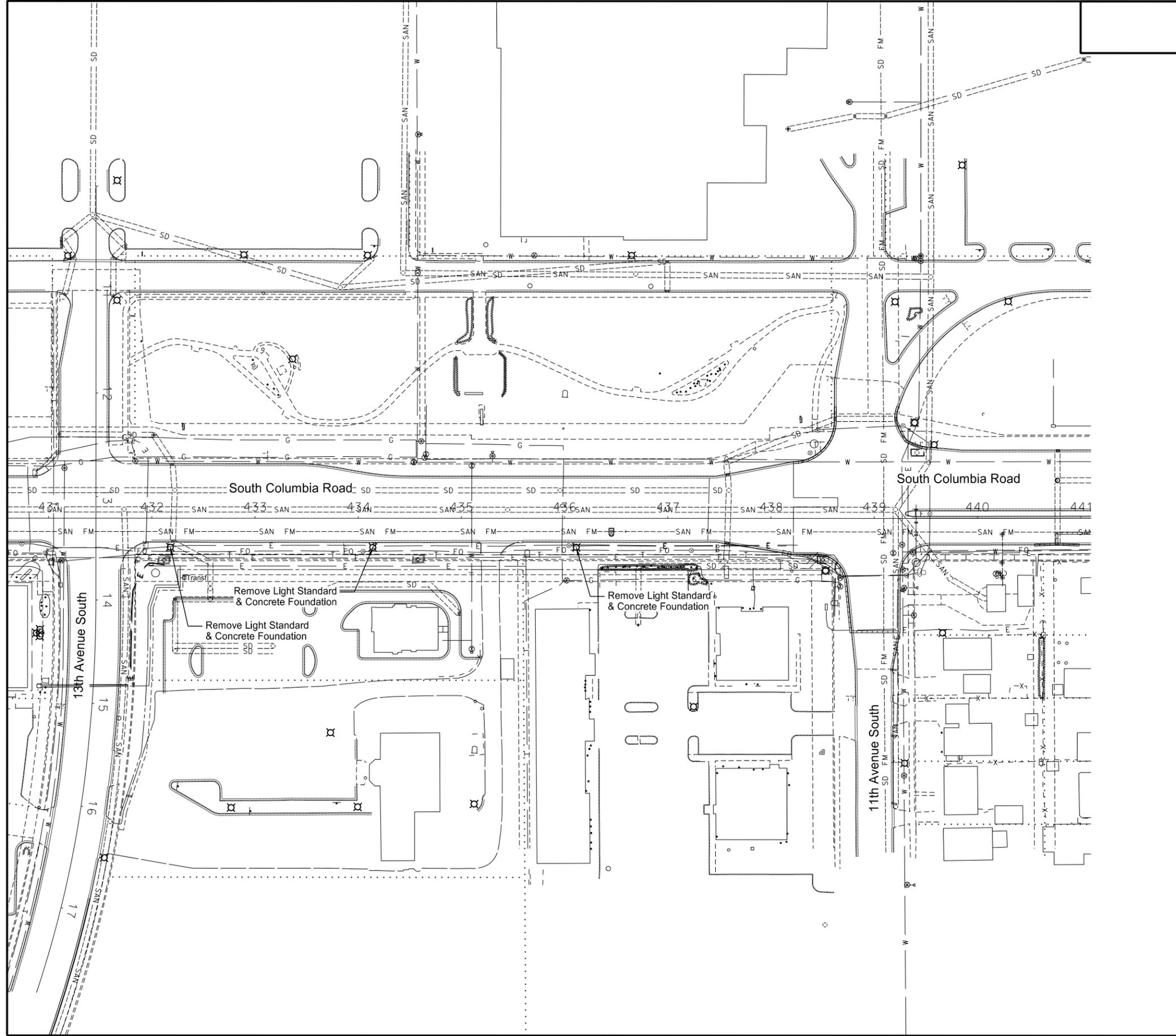
**Lighting Removals**

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	2

**PAY ITEMS**

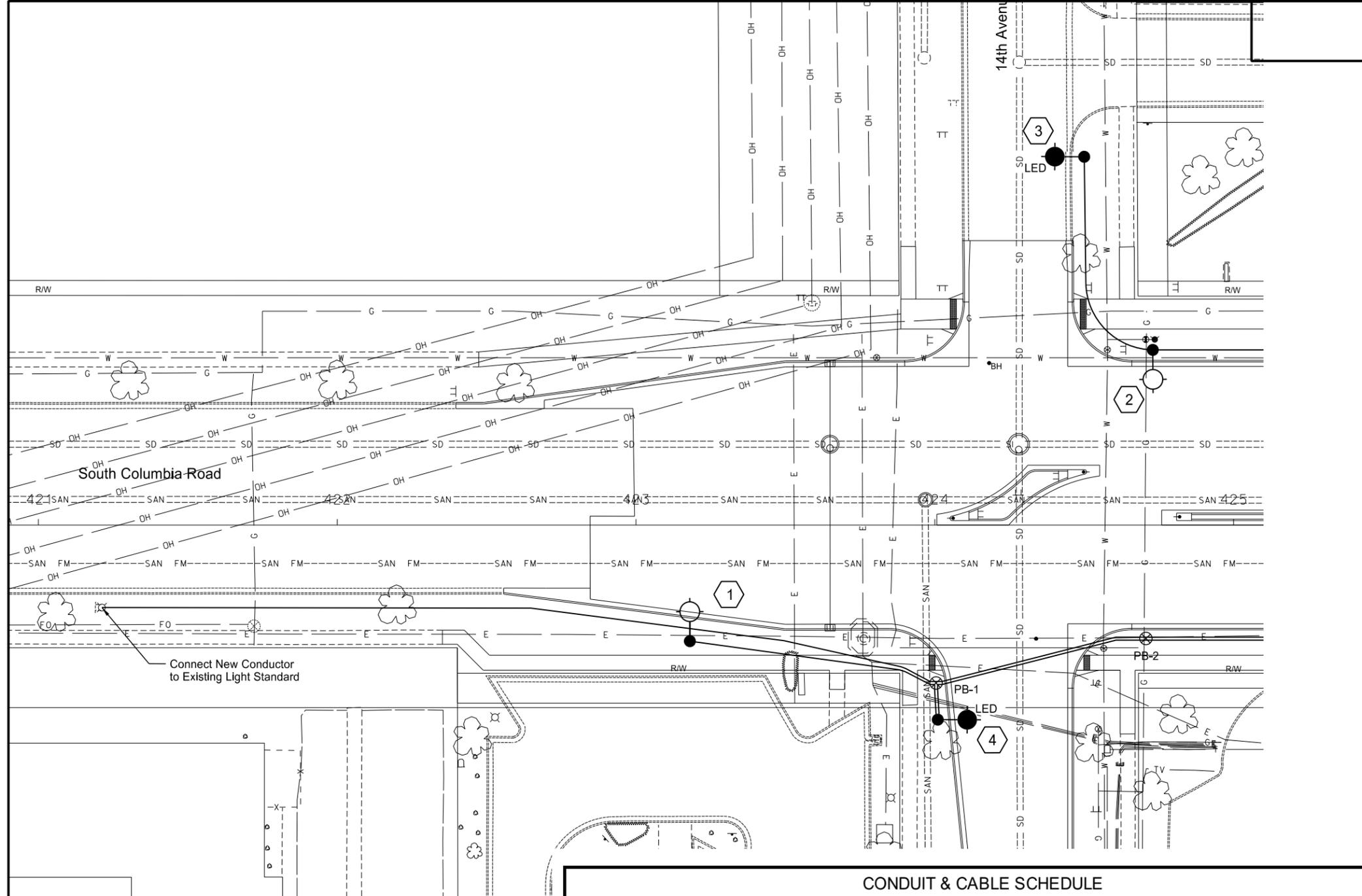
Remove Light Standard Sta 431+00 to 441+00	3 EA
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**Lighting Removals**

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

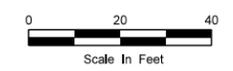
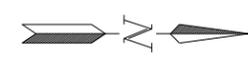


**PAY ITEMS**

Screw In Base Foundation Sta 421+00 to Sta 425+00	4 EA
Pull Box Sta 424+00.4 O/s 52.8' Rt Sta 424+70.6 O/s 37.9' Rt	1 EA 1 EA
1.5IN Diameter Rigid Conduit Sta 421+00 to Sta 425+00	552 LF
2IN Diameter Rigid Conduit Sta 421+00 to Sta 425+00	136 LF
Underground Conductor NO 2-Type RHW Sta 421+00 to Sta 425+00	1218 LF
Underground Conductor NO 4-Type RHW Sta 421+00 to Sta 425+00	1579 LF
Underground Conductor NO 6-Type THW Sta 421+00 to Sta 425+00	391 LF
Lt Std 6 Ft Ma 40 Ft Mt Ht Breakaway Sta 421+00 to Sta 425+00	4 EA
HP Sodium Vapor Luminaire-400 Watt Sta 421+00 to Sta 425+00	2 EA
LED Luminaire Sta 421+00 to Sta 425+00	2 EA

**Legend**

- Rigid Conduit
- Pole Base
- Luminaire Light Standard 216 Watt LED
- Luminaire Light Standard 400 Watt High Pressure Sodium Vapor
- Lighting Structure ID #



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**CONDUIT & CABLE SCHEDULE**

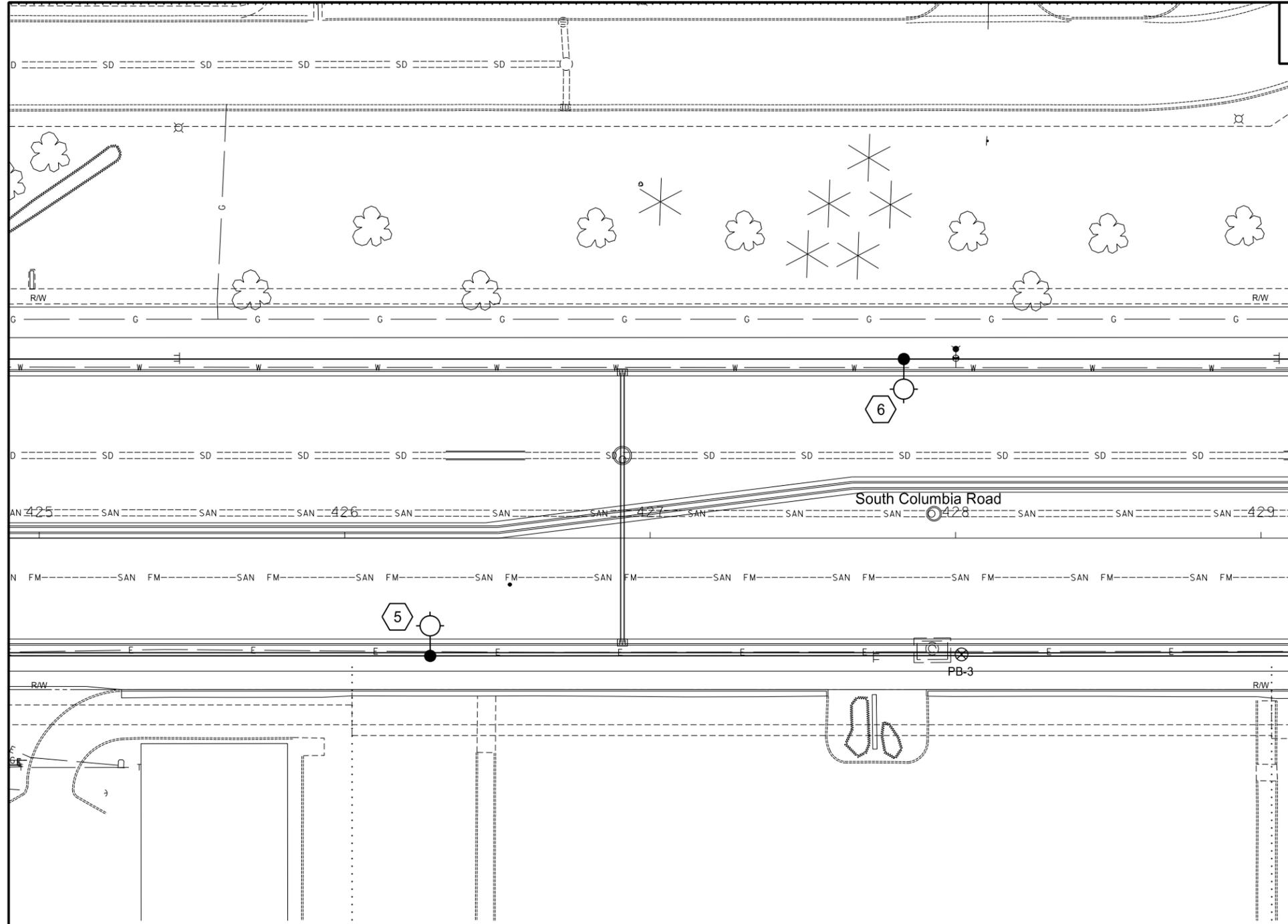
STATION/LOCATION	CONDUIT RUNS		CABLE RUNS		
	LENGTH	SIZE	LENGTH NO. 2 or 4 RHW	LENGTH NO. 4 RHW or 6 THW	TYPE
Existing LP to PB-1	280	1.5"	879	293	(3) No. 2 RHW-USE & (1) No. 4 RHW
PB-1 to PB-2	68	2"	240	80	(3) No. 2 RHW-USE & (1) No. 4 RHW
PB-2 to 425+00 O/s 38.5' Rt	27	1.5"	99	33	(3) No. 2 RHW-USE & (1) No. 4 RHW
No. 1 to PB-1	90	1.5"	309	103	(3) No. 4 RHW-USE & (1) No. 6 THW
PB-1 to No. 4	12	1.5"	75	25	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 4 to PB-1	12	1.5"	75	25	(3) No. 4 RHW-USE & (1) No. 6 THW
PB-1 to PB-2	68	2"	240	80	(3) No. 4 RHW-USE & (1) No. 6 THW
PB-2 to 425+00 O/s 38.5' Rt	27	1.5"	99	33	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 3 to No. 2	77	1.5"	273	91	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 2 to 425+00 O/s 58.0' Lt	27	1.5"	102	34	(3) No. 4 RHW-USE & (1) No. 6 THW

**POLE & FIXTURE SCHEDULE**

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES TYPE	MOUNT HEIGHT	MAST ARM
1	423+18.0	38.8' Rt	400	2	III	40'	6'
2	424+73.0	58.5' Lt	400	1	III	40'	6'
3	424+50.0	123.0' Lt	216 LED	1	II	40'	6'
4	424+01.0	65.0' Rt	216 LED	2	II	40'	6'

Lighting  
Sta 421+00 to Sta 425+00  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	4

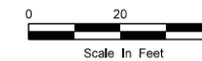
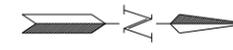


**PAY ITEMS**

Screw In Base Foundation Sta 425+00 to Sta 429+00	2 EA
Pull Box Sta 428+02.0 O/s 38.0' Rt	1 EA
1.5IN Diameter Rigid Conduit Sta 425+00 to Sta 429+00	1200 LF
Underground Conductor NO 2-Type RHW Sta 421+00 to Sta 425+00	1236 LF
Underground Conductor NO 4-Type RHW Sta 425+00 to Sta 429+00	2932 LF
Underground Conductor NO 6-Type THW Sta 425+00 to Sta 429+00	840 LF
Lt Std 6 Ft Ma 40 Ft Mt Ht Breakaway Sta 425+00 to Sta 429+00	2 EA
HP Sodium Vapor Luminaire-400 Watt Sta 425+00 to Sta 429+00	2 EA

**Legend**

- Rigid Conduit
- Pole Base
- Luminaire Light Standard 400 Watt High Pressure Sodium Vapor
- Lighting Structure ID #



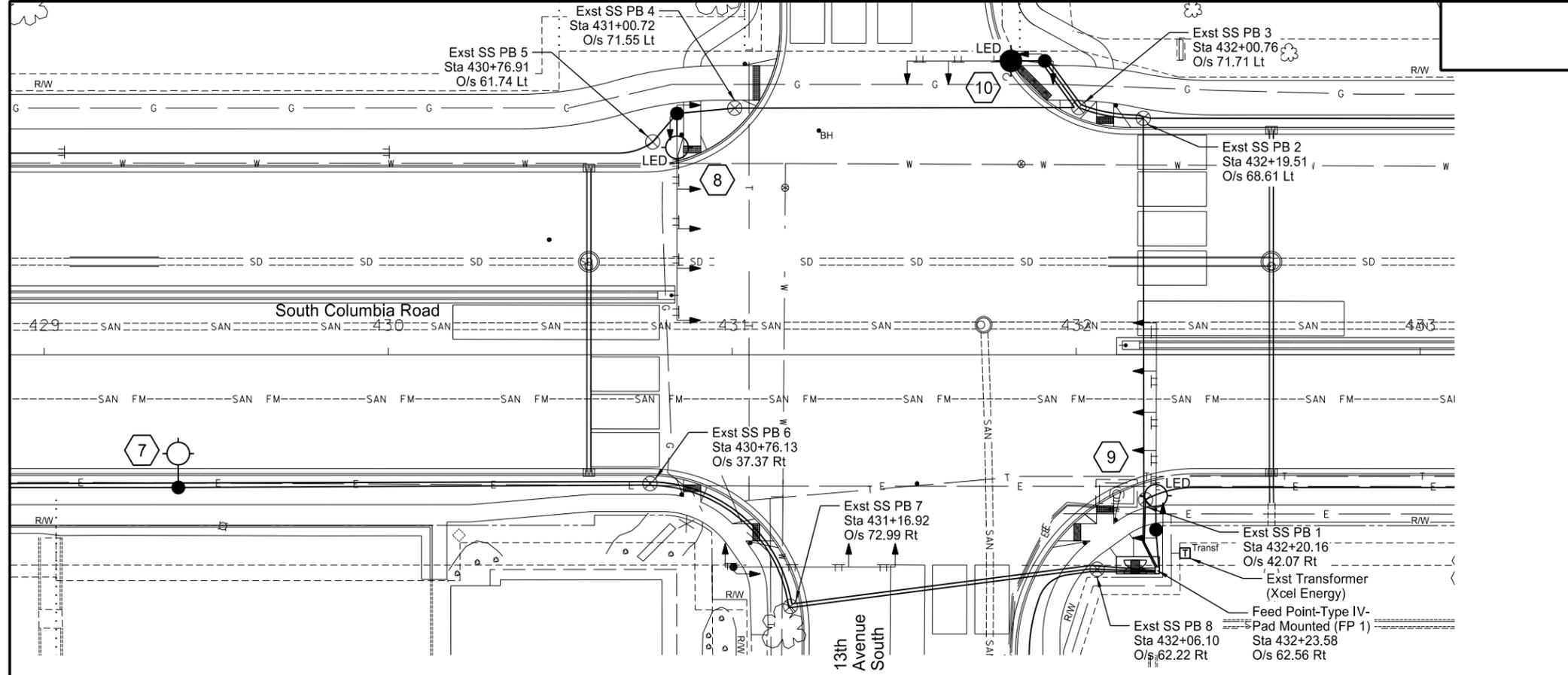
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES TYPE	MOUNT HEIGHT	MAST ARM
5	426+28.0	38.5' Rt	400	2	III	40'	6'
6	427+83.1	58.5' Lt	400	1	III	40'	6'

STATION/LOCATION	CONDUIT RUNS		CABLE RUNS		
	LENGTH	SIZE	LENGTH NO. 2 or 4 RHW	LENGTH NO. 4 RHW or 6 THW	TYPE
425+00 O/s 38.5' Rt to PB-3	302	1.5"	924	308	(3) No. 2 RHW-USE & (1) No. 4 RHW
PB 1 to 429+00 O/s 38.5' Rt	98	1.5"	312	104	(3) No. 2 RHW-USE & (1) No. 4 RHW
425+00 O/s 38.5' Rt to No. 5	128	1.5"	405	135	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 5 to PB-3	174	1.5"	561	187	(3) No. 4 RHW-USE & (1) No. 6 THW
PB-3 to 429+00 O/s 38.5' Rt	98	1.5"	312	104	(3) No. 4 RHW-USE & (1) No. 6 THW
425+00 O/s 58.0' Lt to No. 6	283	1.5"	870	290	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 6 to 429+00 O/s 58.0' Lt	117	1.5"	372	124	(3) No. 4 RHW-USE & (1) No. 6 THW

Lighting  
Sta 425+00 to Sta 429+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota



### PAY ITEMS

Screw In Base Foundation Sta 429+00 to Sta 433+00	1 EA
Concrete Foundation-Feed Point-Type B Sta 429+00 to Sta 433+00	1 EA
1.5IN Diameter Rigid Conduit Sta 429+00 to Sta 433+00	1020 LF
2IN Diameter Rigid Conduit Sta 429+00 to Sta 433+00	391 LF
Underground Conductor NO 2-Type RHW Sta 421+00 to Sta 425+00	1164 LF
Underground Conductor NO 4-Type RHW Sta 429+00 to Sta 433+00	4312 LF
Underground Conductor NO 6-Type THW Sta 429+00 to Sta 433+00	1308 LF
Feed Point-Type IV-Pad Mounted Sta 429+00 to Sta 433+00	1 EA
Lt Std 6 Ft Ma 40 Ft Mt Ht Breakaway Sta 429+00 to Sta 433+00	1 EA
HP Sodium Vapor Luminaire-400 Watt Sta 429+00 to Sta 433+00	1 EA

- Notes:
- See Section 150 for additional details regarding pull boxes Exst SS PB 1 - 8. These pull boxes shall be included in the bid item "Traffic Signal System - Site 2".
  - Luminaires and pole extensions for light fixture locations 8, 9 and 10 shall be included in the bid item "Traffic Signal System - Site 2".

### CONDUIT & CABLE SCHEDULE

STATION/LOCATION	CONDUIT RUNS		CABLE RUNS		
	LENGTH	SIZE	LENGTH NO. 2 or 4 RHW	LENGTH NO. 4 RHW or 6 THW	TYPE
429+00 O/s 38.5' Rt to Exst SS PB 6	176	1.5"	546	182	(3) No. 2 RHW-USE & (1) No. 4 RHW
Exst SS PB 6 to Exst SS PB 7	57	1.5"	207	69	(3) No. 2 RHW-USE & (1) No. 4 RHW
Exst SS PB 7 to Exst SS PB 8	90	2"	306	102	(3) No. 2 RHW-USE & (1) No. 4 RHW
Exst SS PB 8 to FP1	19	1.5"	105	35	(3) No. 2 RHW-USE & (1) No. 4 RHW
429+00 O/s 38.5' Rt to No. 7	39	1.5"	138	46	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 7 to Exst SS PB 6	137	1.5"	450	150	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 6 to Exst SS PB 7	57	1.5"	207	69	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 7 to Exst SS PB 8	90	2"	306	102	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 8 to FP1	19	1.5"	105	35	(3) No. 4 RHW-USE & (1) No. 6 THW
FP1 to No. 9	20	1.5"	111	37	(3) No. 4 RHW-USE & (1) No. 6 THW
FP1 to Exst SS PB 1	20	1.5"	108	36	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 1 to 433+00 O/s 38.5' Rt	80	1.5"	258	86	(3) No. 4 RHW-USE & (1) No. 6 THW
FP1 to Exst SS PB 1	20	1.5"	108	36	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 1 to Exst SS PB 2	111	2"	369	123	(3) No. 4 RHW-USE & (1) No. 6 THW
429+00 O/s 58.0' Lt to Exst SS PB 5	177	1.5"	549	183	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 5 to No. 8	11	1.5"	72	24	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 5 to Exst SS PB 4	17	1.5"	87	29	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 4 to Exst SS PB 3	100	2"	336	112	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 3 to No. 10	17	1.5"	90	30	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 10 to Exst SS PB 3	17	1.5"	90	30	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 3 to Exst SS PB 2	19	1.5"	93	31	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 10 to Exst SS PB 3	17	1.5"	90	30	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 3 to Exst SS PB 2	19	1.5"	93	31	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 2 to 433+00 O/s 69.0 Lt	82	1.5"	264	88	(3) No. 4 RHW-USE & (1) No. 6 THW

### POLE & FIXTURE SCHEDULE

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES TYPE	MOUNT HEIGHT	MAST ARM
7	429+39.0	38.5' Rt	400	2	III	40'	6'
8	430+84.0 On Signal Std	70.0' Lt	284 LED	1	III	40'	12'
9	432+23.2 On Signal Std	50.8' Rt	284 LED	1	III	40'	12'
10	431+90.9 On Signal Std	85.2' Lt	216 LED	1	II	40'	12'

Legend

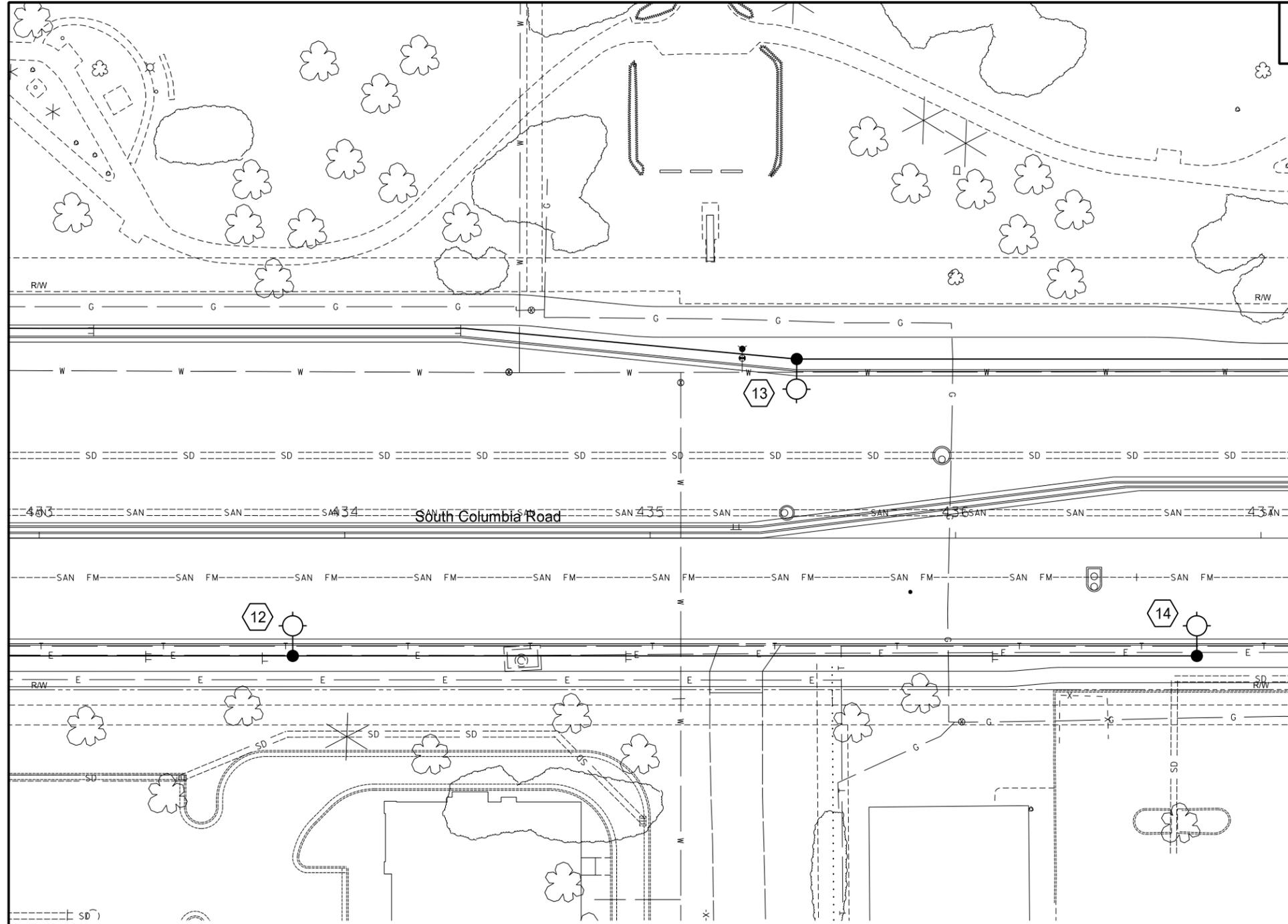
- Rigid Conduit
- Pole Base
- Luminaire Light Standard 216 Watt LED
- Luminaire Light Standard 284 Watt LED
- Luminaire Light Standard 400 Watt High Pressure Sodium Vapor
- Lighting Structure ID #

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Scale In Feet

**Lighting**  
 Sta 429+00 to Sta 433+00  
  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	6

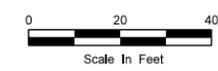
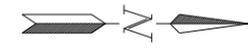


**PAY ITEMS**

Screw In Base Foundation Sta 433+00 to Sta 437+00	3 EA
1.5IN Diameter Rigid Conduit Sta 433+00 to Sta 437+00	779 LF
Underground Conductor NO 4-Type RHW Sta 433+00 to Sta 437+00	2442 LF
Underground Conductor NO 6-Type THW Sta 433+00 to Sta 437+00	814 LF
Lt Std 6 Ft Ma 40 Ft Mt Ht Breakaway Sta 433+00 to Sta 437+00	3 EA
HP Sodium Vapor Luminaire-400 Watt Sta 433+00 to Sta 437+00	3 EA

**Legend**

- Underground Conductor
- Rigid Conduit
- Pole Base
- Luminaire Light Standard 400 Watt High Pressure Sodium Vapor
- Lighting Structure ID #



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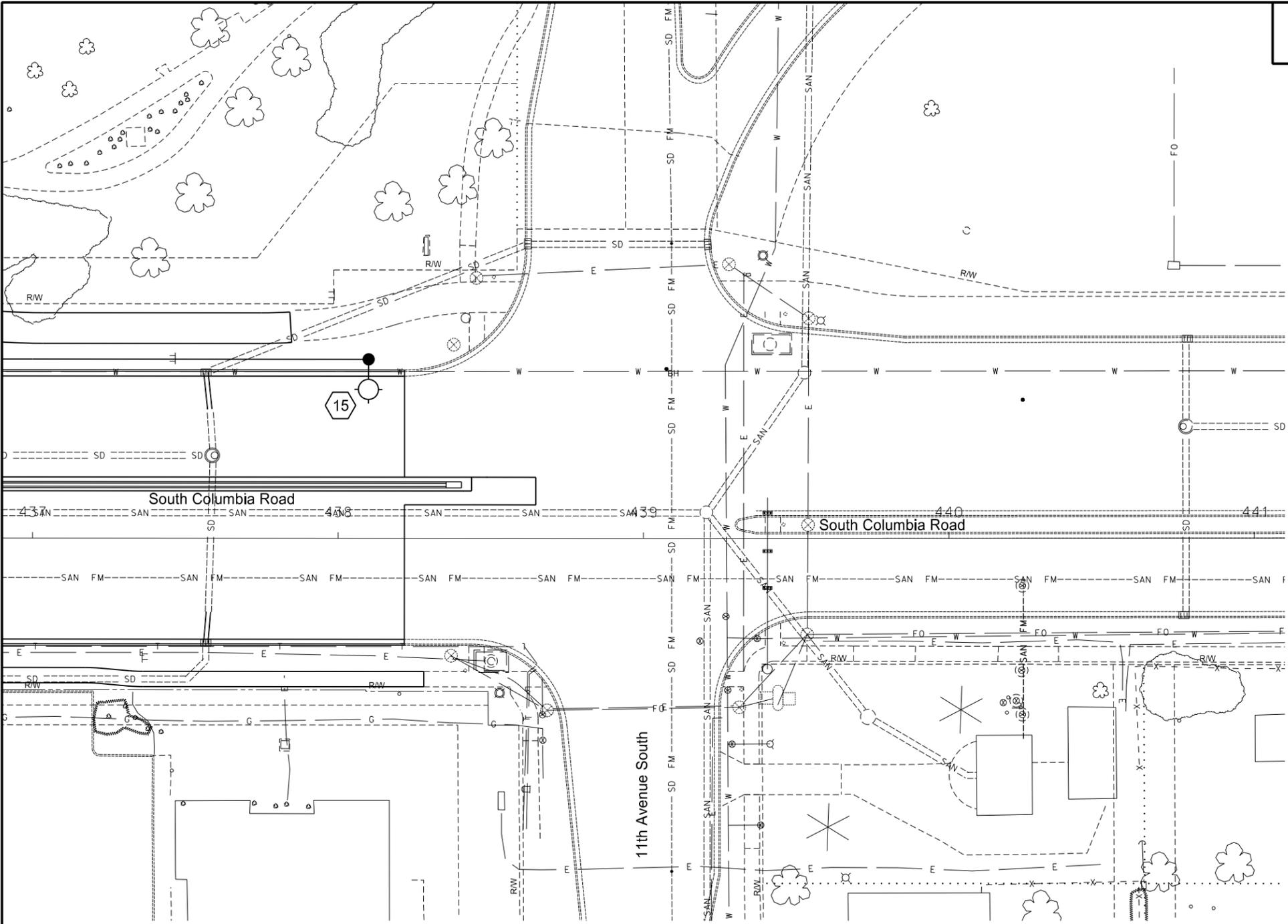
POLE & FIXTURE SCHEDULE							
NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES TYPE	MOUNT HEIGHT	MAST ARM
12	433+83.0	38.5' Rt	400	1	III	40'	6'
13	435+48.0	58.5' Lt	400	1	III	40'	6'
14	436+79.0	38.5' Rt	400	1	III	40'	6'

CONDUIT & CABLE SCHEDULE					
STATION/LOCATION	CONDUIT RUNS		CABLE RUNS		
	LENGTH	SIZE	LENGTH NO. 4 RHW	LENGTH NO. 6 THW	TYPE
433+00 O/s 38.5' Rt to No. 12	83	1.5"	270	90	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 12 to No. 14	296	1.5"	930	310	(3) No. 4 RHW-USE & (1) No. 6 THW
433+00 O/s 69.0' Lt to No. 13	248	1.5"	765	255	(3) No. 4 RHW-USE & (1) No. 6 THW
No. 13 to 437+00 O/s 58.5' Lt	152	1.5"	477	159	(3) No. 4 RHW-USE & (1) No. 6 THW

Lighting  
Sta 433+00 to Sta 437+00

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	7

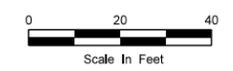


**PAY ITEMS**

Screw In Base Foundation Sta 437+00 to Sta 441+00	1 EA
1.5IN Diameter Rigid Conduit Sta 437+00 to Sta 441+00	110 LF
Underground Conductor NO 4-Type RHW Sta 437+00 to Sta 441+00	351 LF
Underground Conductor NO 6-Type THW Sta 437+00 to Sta 441+00	117 LF
Lt Std 6 Ft Ma 40 Ft Mt Ht Breakaway Sta 437+00 to Sta 441+00	1 EA
HP Sodium Vapor Luminaire-400 Watt Sta 437+00 to Sta 441+00	1 EA

**Legend**

- Underground Conductor
- Rigid Conduit
- Pole Base
- Luminaire Light Standard 400 Watt High Pressure Sodium Vapor
- Lighting Structure ID #



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**POLE & FIXTURE SCHEDULE**

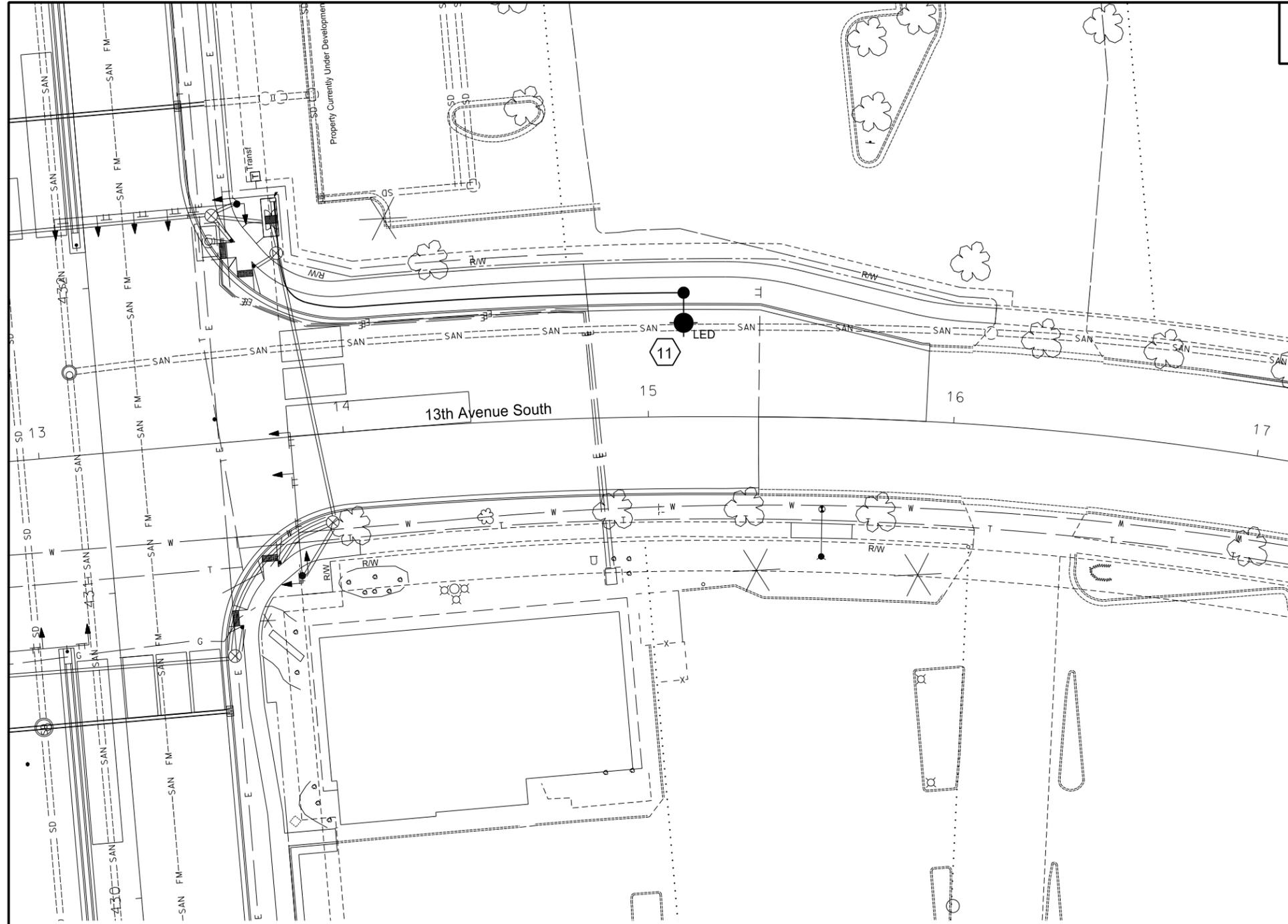
NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES TYPE	MOUNT HEIGHT	MAST ARM
15	438+10.0	58.5' Lt	400	1	III	40'	6'

**CONDUIT & CABLE SCHEDULE**

STATION/LOCATION	CONDUIT RUNS		CABLE RUNS		
	LENGTH	SIZE	LENGTH NO. 4 RHW	LENGTH NO. 6 THW	TYPE
437+00 O/s 58.5' Lt to No. 15	110	1.5"	351	117	(3) No. 4 RHW-USE & (1) No. 6 THW

Lighting  
Sta 437+00 to Sta 441+00  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	8

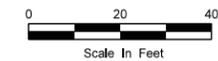


**PAY ITEMS**

Screw In Base Foundation Sta 13+00 to Sta 17+00	1 EA
1.5IN Diameter Rigid Conduit Sta 13+00 to Sta 17+00	163 LF
Underground Conductor NO 4-Type RHW Sta 13+00 to Sta 17+00	576 LF
Underground Conductor NO 6-Type THW Sta 13+00 to Sta 17+00	192 LF
Lt Std 6 Ft Ma 40 Ft Mt Ht Breakaway Sta 13+00 to Sta 17+00	1 EA
LED Luminaire Sta 13+00 to Sta 17+00	1 EA

**Legend**

- Underground Conductor
- Rigid Conduit
- Pole Base
- Luminaire Light Standard 216 Watt LED
- Lighting Structure ID #



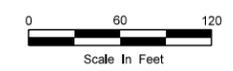
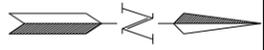
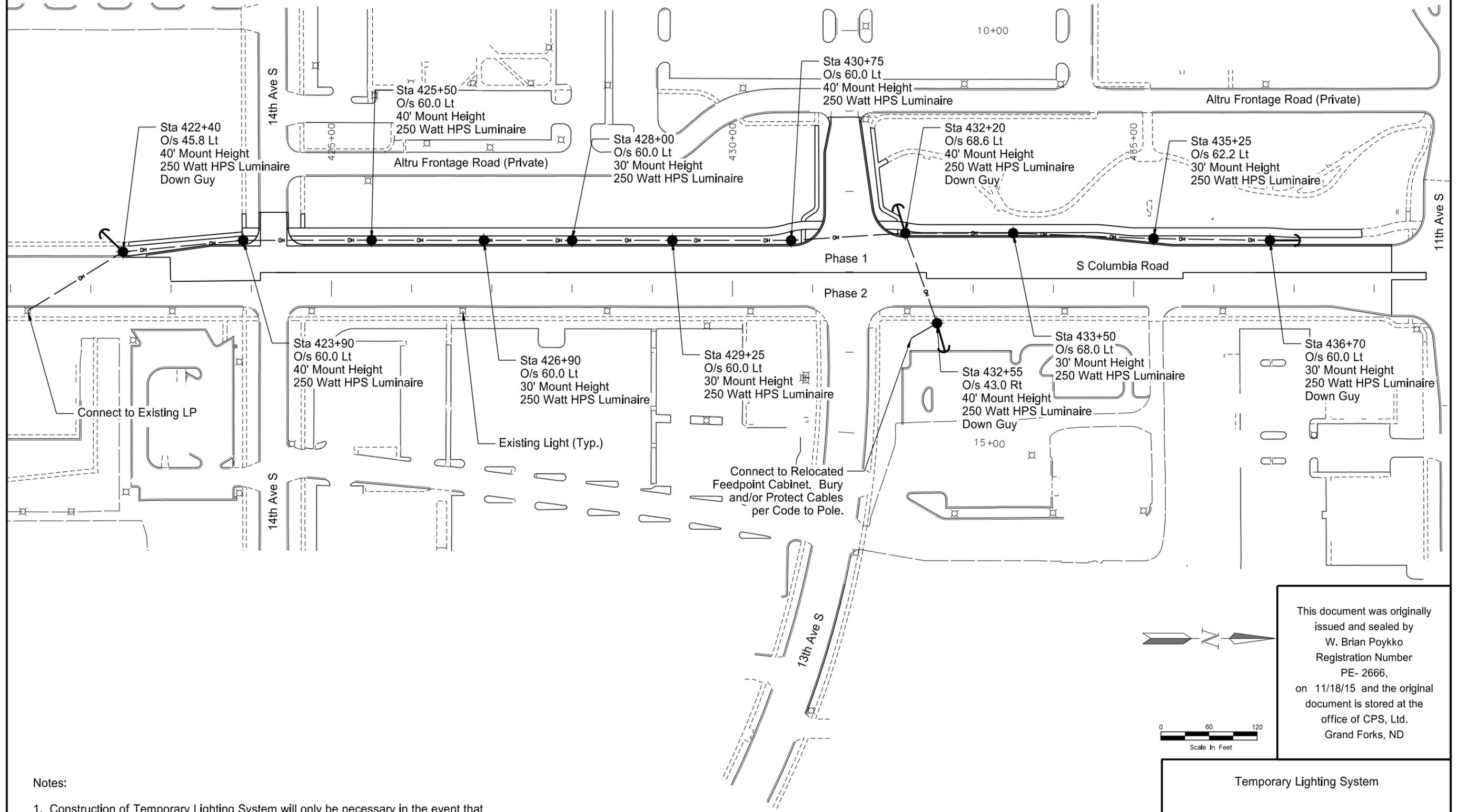
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES TYPE	MOUNT HEIGHT	MAST ARM
11	15+11.7	40.5' Lt	216 LED	2	II	40'	6'

STATION/LOCATION	CONDUIT RUNS		CABLE RUNS		
	LENGTH	SIZE	LENGTH NO. 4 RHW	LENGTH NO. 6 THW	TYPE
Feed Point Type IV to Exst SS PB 8	19	1.5"	105	35	(3) No. 4 RHW-USE & (1) No. 6 THW
Exst SS PB 8 to No. 11	144	1.5"	471	157	(3) No. 4 RHW-USE & (1) No. 6 THW

Lighting  
13th Avenue South  
Sta 14+08.12 to Sta 16+85.50  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	9



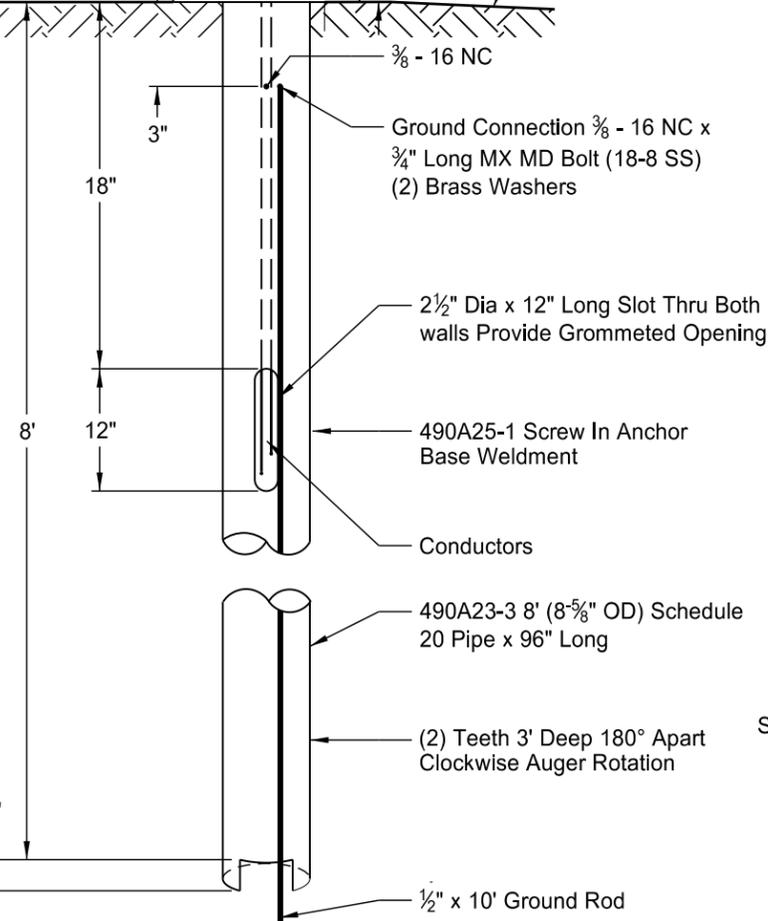
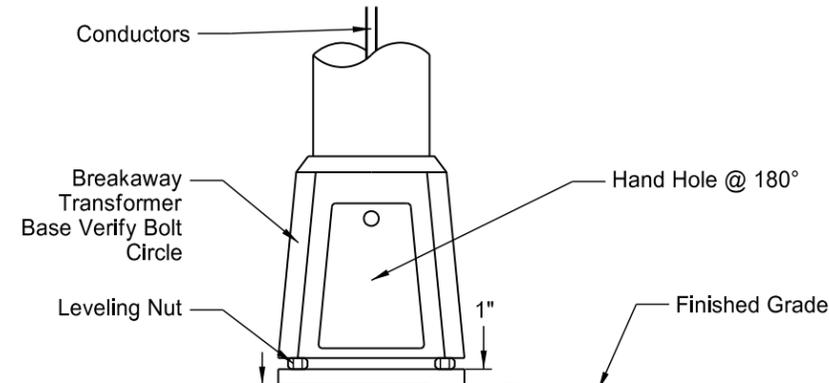
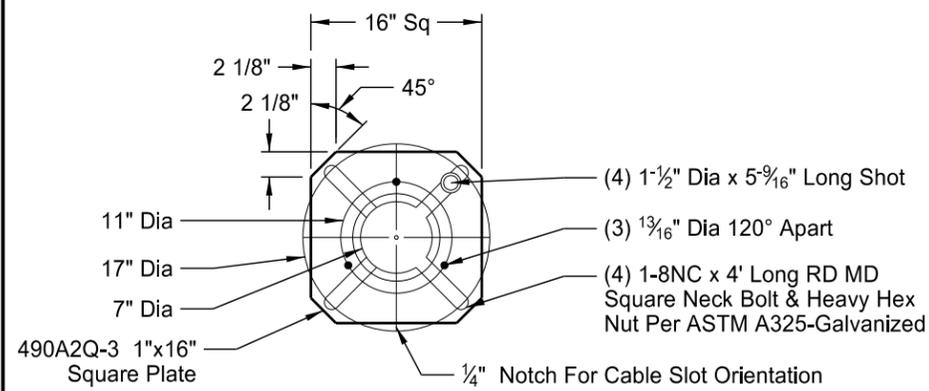
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**Temporary Lighting System**

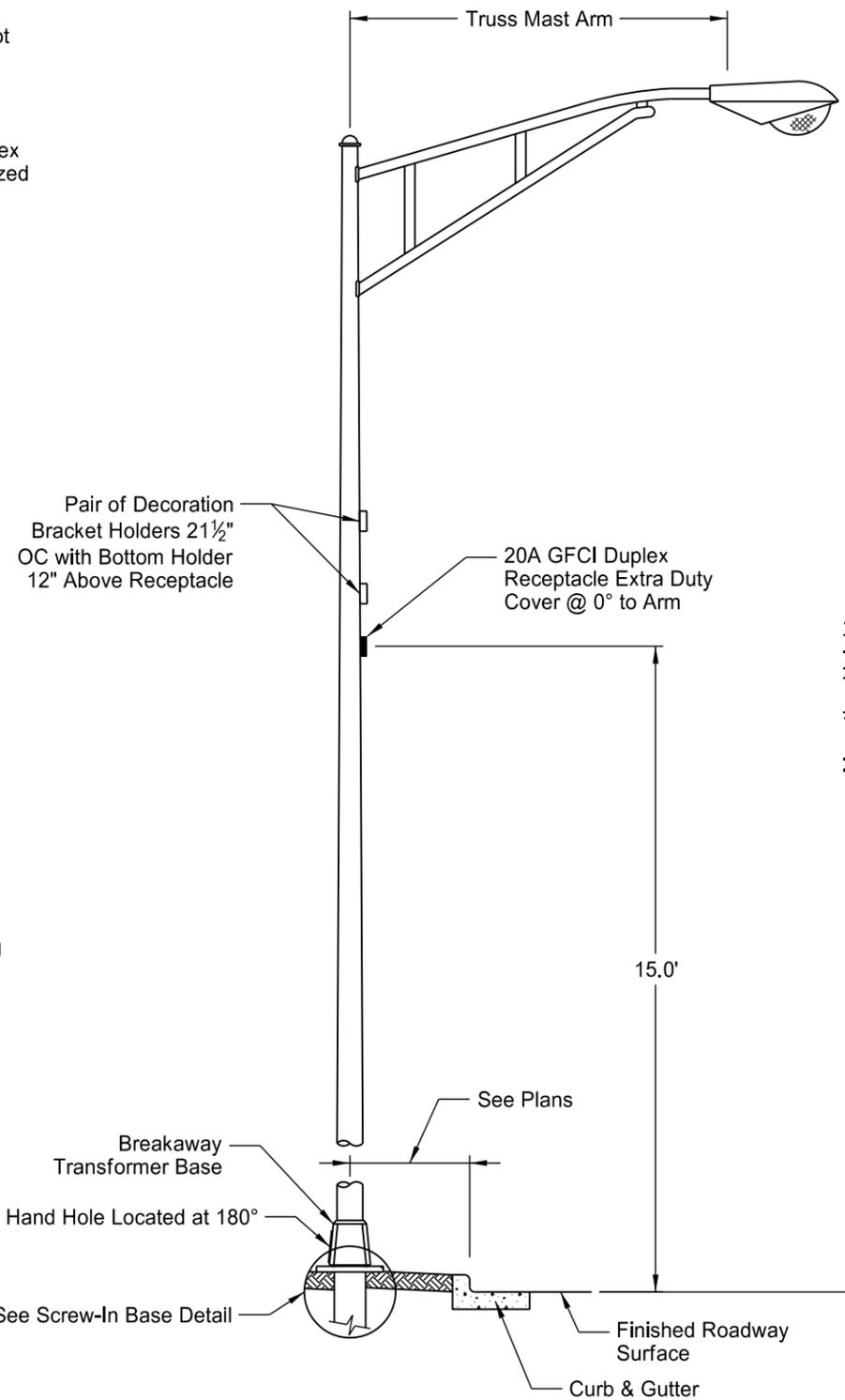
Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

- Notes:
1. Construction of Temporary Lighting System will only be necessary in the event that permanent lighting cannot be established prior to commencement of WZTC Phase 2.

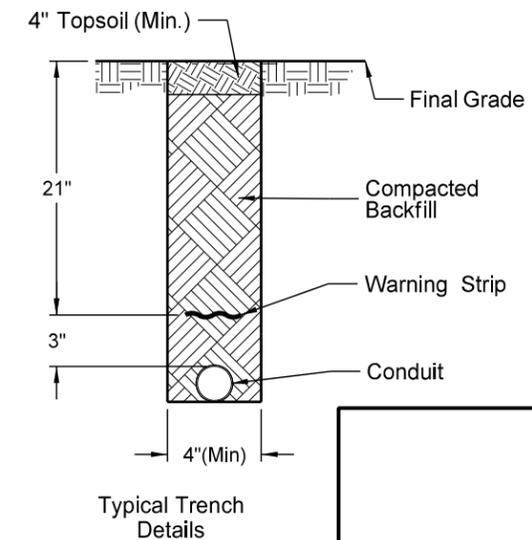
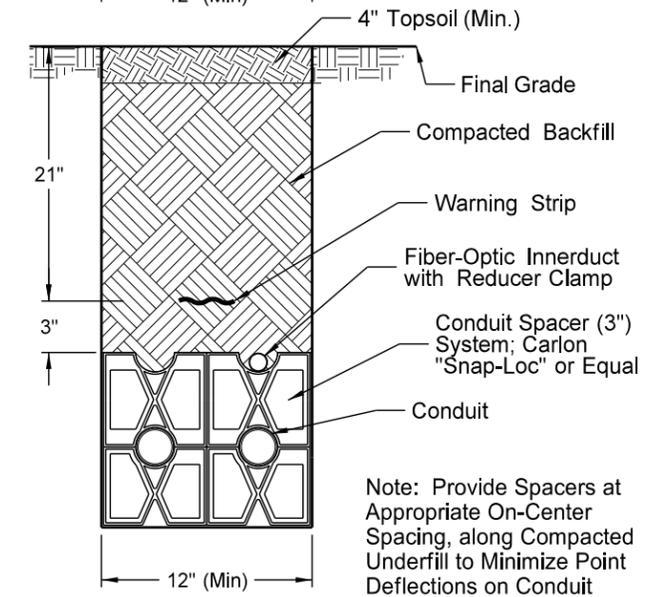
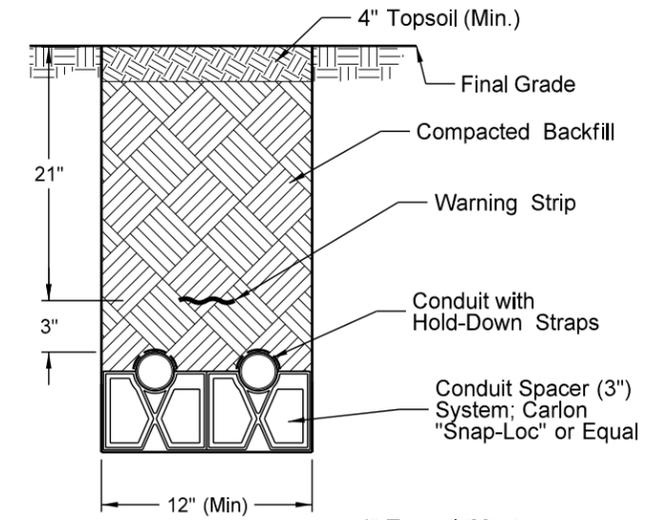
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	140	10



Screw-In Base Detail



Light Standard Detail

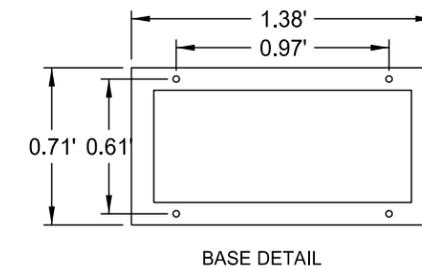
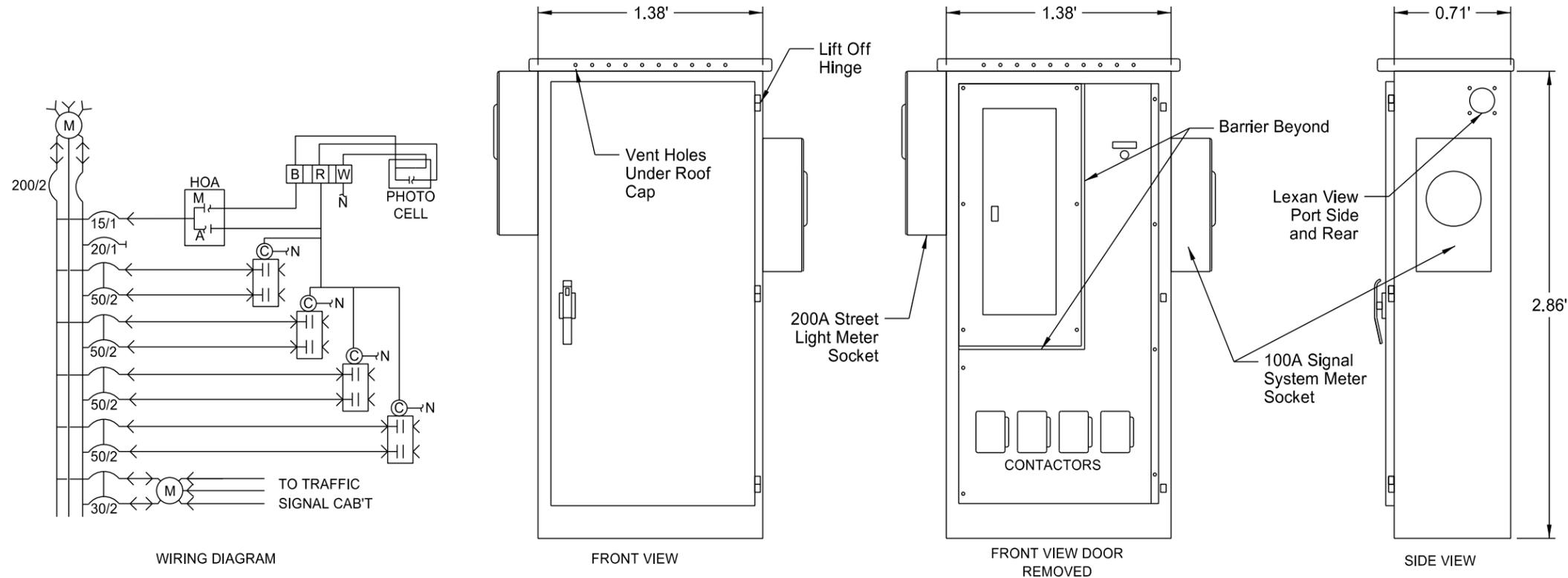


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Lighting Details

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(105)109	140	11



**Notes:**

1. Combination Feed Point to be used when Traffic Signals and Street Lights are to utilize same Feed Point.
2. Cabinet fabricated from 14 Gauge #304 Stainless Steel.
3. Padlockable Vault Type Handle to be Stainless Steel with Three Point Latch.
4. Lift Off Hinges.
5. Inner Dead Front to be Hinged.
6. Cabinet to be Suitable for Service Entrance.
7. Assembly to be UL508 Listed.
8. Bill of Material:

- 200A, 1PH., 3W., 120/240V Load Center  
200A 2P Main Circuit Breaker  
1 - 15A 1P Branch Breaker  
1 - 20A 1P Branch Breaker  
4 - 50A 1P Branch Breaker  
Siemens #G20408120CU, Squared D or Equal
- Test Switch - Allen Bradley #800T-H2A, Square D or Equal

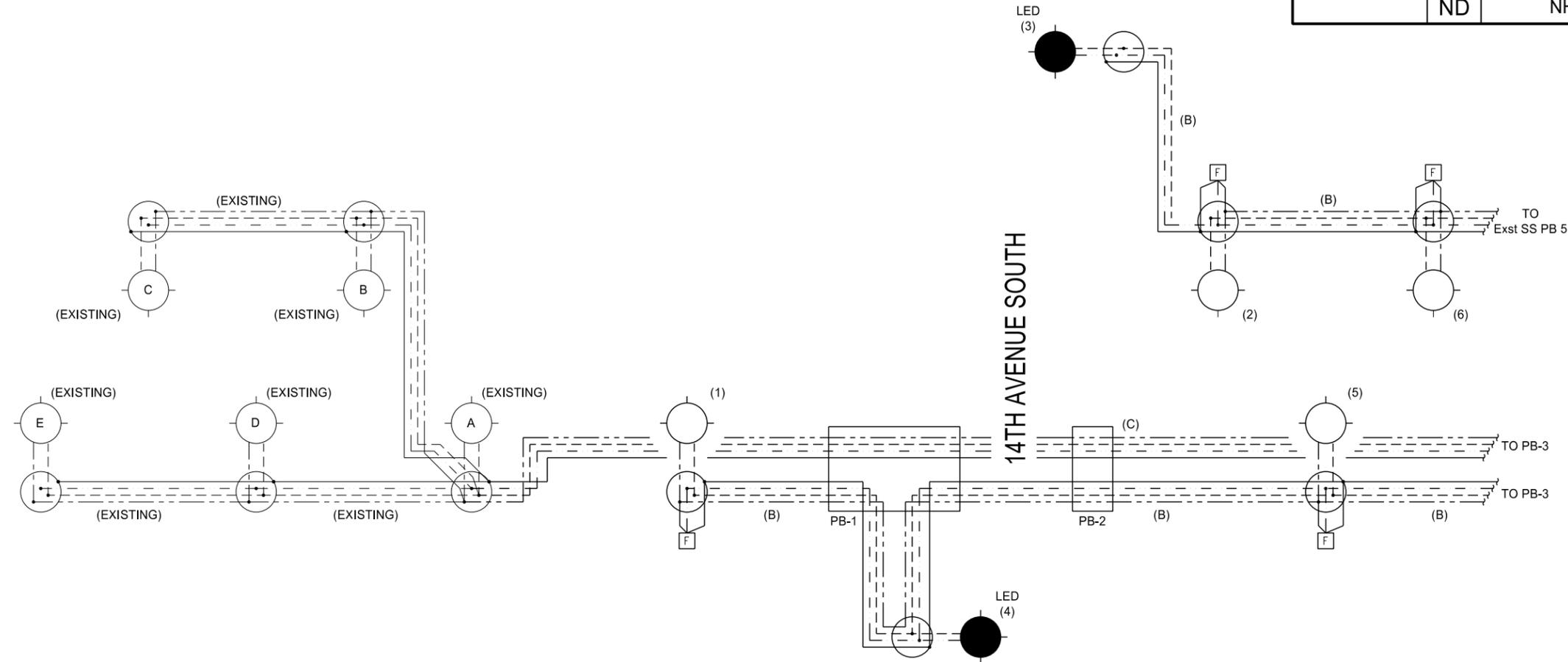
- 50A 2P Mercury Contactors - Mercury Displacement #260N0120AH, Durakool or Equal
- Photocell Base - Area Lighting Research AW2A-NB, Intermatic, Paragon, Tork or Equal
- Photocell - DTL #DP124-0.8-TJUU50, Intermatic, Paragon, Tork or Equal
- Lift Off Hinges - Southco #98-10-500-50, Sugatsume or Equal

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**Lighting Details**

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

Combination Feed Point Type IV - Pad Mounted



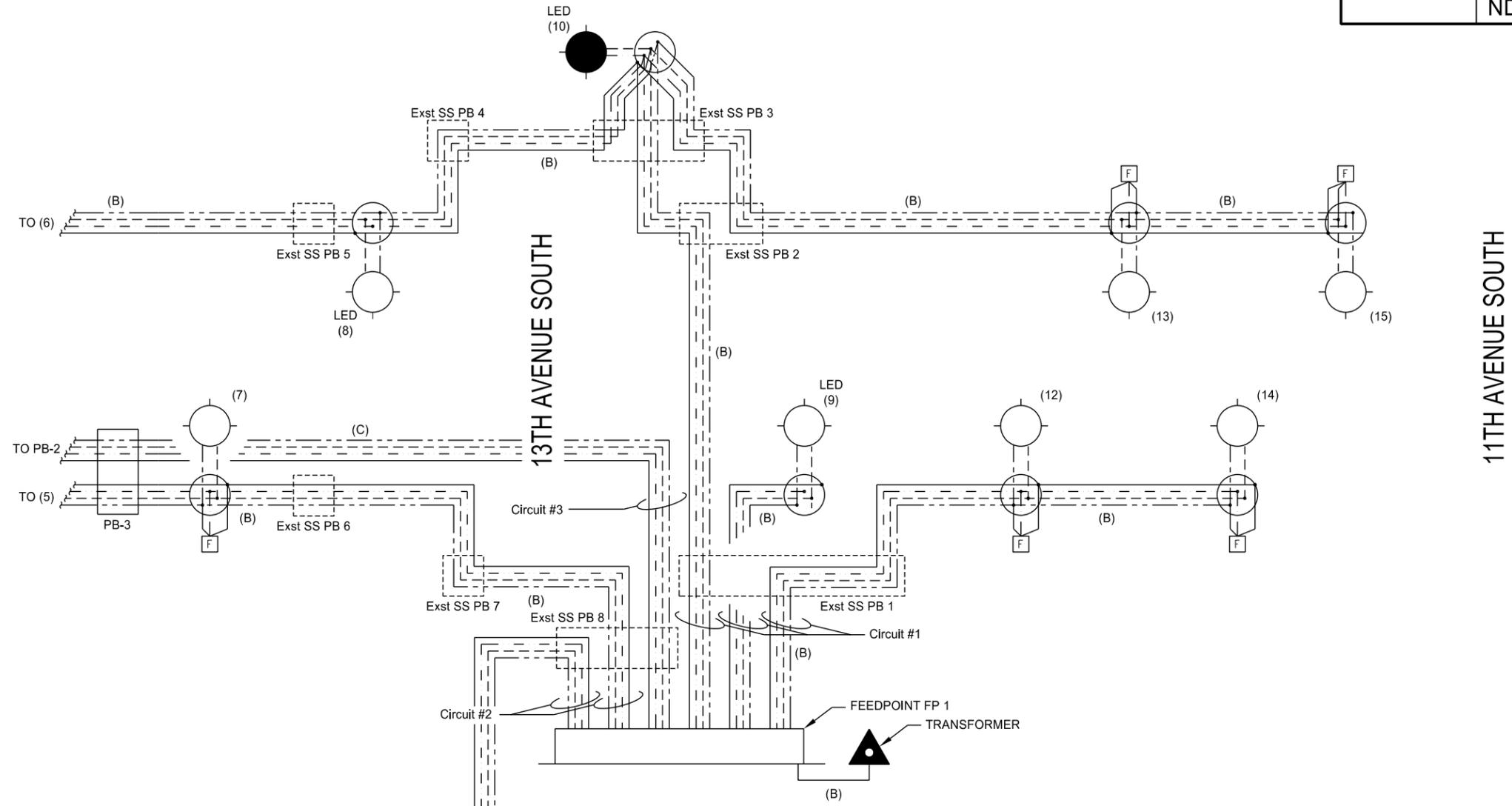
### RISER LEGEND

- |  |   |           |  |
|--|---|-----------|--|
|  | 216 Watt LED luminaire 120/240 Voltage operated on 240 Volts. Number in (#) indicates lighting standard.                        |           | 20A GFCI Festoon Receptacle                        |
|  | 400 Watt high pressure sodium vapor luminaire 120/240 Voltage operated on 240 Volts. Number in (#) indicates lighting standard. | ---       | Phase Conductor                                    |
|  | Light Standard  | - - -     | Phase Conductor                                    |
|  | Pull Box By Electrical Contractor   | - . - . - | Neutral  |
|  | Pull Box By Others<br>Exst SS PB #  | _____     | Ground   |
|  |   | (B)       | (3) NO. 4 RHW USE, (1) NO. 6 THW Ground in Conduit |
|  |   | (C)       | (3) NO. 2 RHW USE, (1) NO. 4 RHW Ground in Conduit |

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Lighting Details  
One Line Schematic

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota



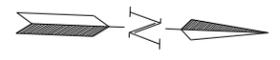
### RISER LEGEND

- |  |   |     |  |
|--|---|-----|--|
|  | 216 Watt LED luminaire 120/240 Voltage operated on 240 Volts. Number in (#) indicates lighting standard.  |     | 20A GFCI Festoon Receptacle                        |
|  | 400 Watt high pressure sodium vapor luminaire or 284 Watt LED luminaire 120/240 Voltage operated on 240 Volts. Number in (#) indicates lighting standard. |     | Phase Conductor                                    |
|  | Light Standard  |     | Phase Conductor                                    |
|  | Pull Box By Electrical Contractor   |     | Neutral  |
|  | Pull Box By Others  |     | Ground   |
|  |   | (B) | (3) NO. 4 RHW USE, (1) NO. 6 THW Ground in Conduit |
|  |   | (C) | (3) NO. 2 RHW USE, (1) NO. 4 RHW Ground in Conduit |

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Lighting Details  
One Line Schematic

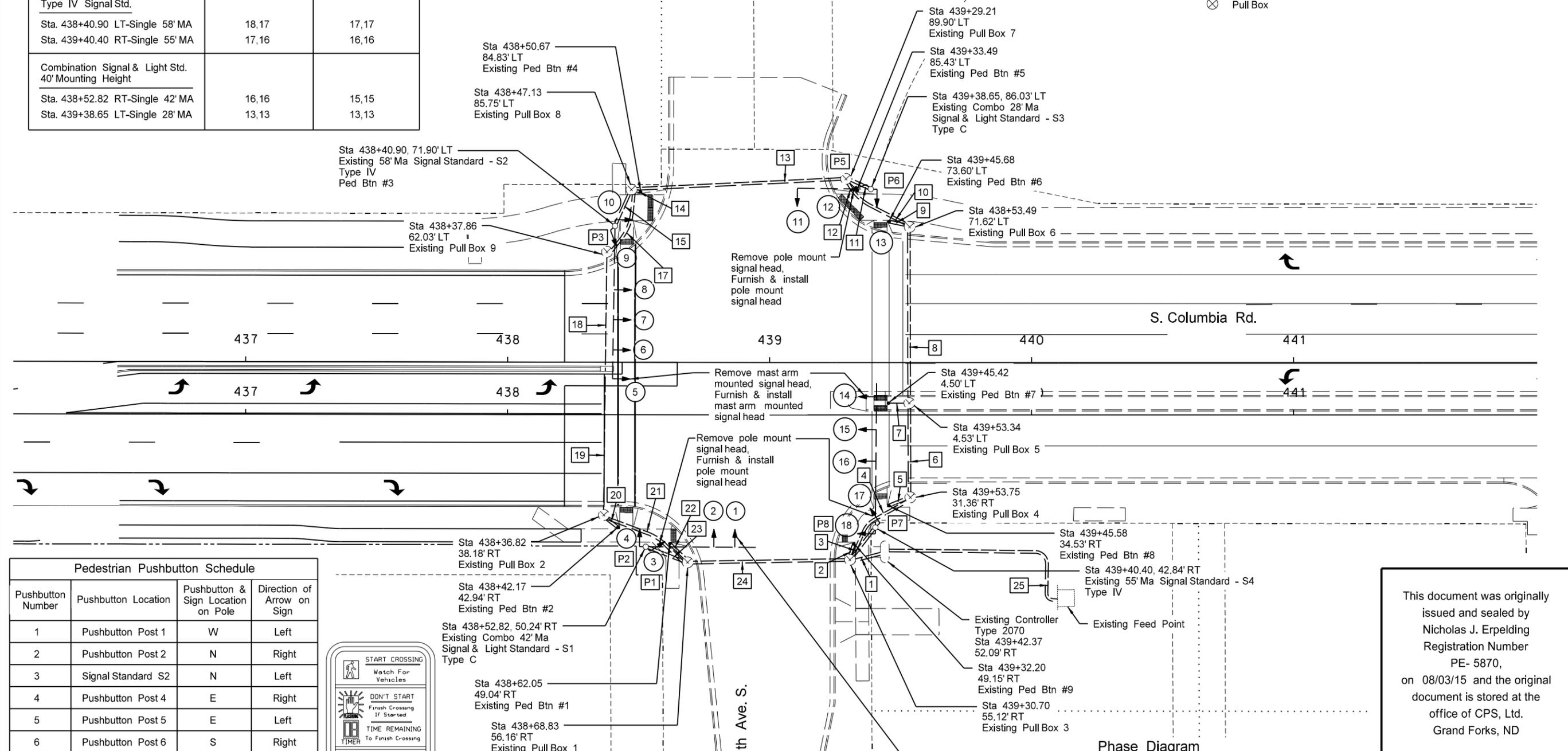
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota



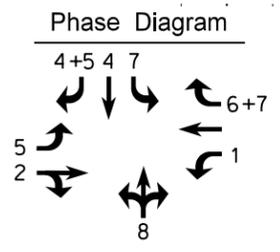
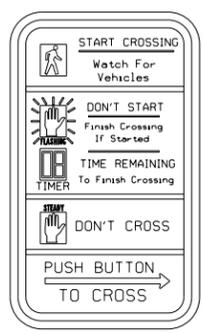
All items are in place and shall remain in place unless noted otherwise

- Legend
- ⑤ Signal Head Number
  - P6 Pedestrian Head Number
  - 15 Cable and Conduit Run Number
  - ⊗ Pull Box

Description	Footing Depth "D"	
	24" & 30" Diameters	36" & 42" Diameters
Type IV Signal Std.		
Sta. 438+40.90 LT-Single 58' MA	18,17	17,17
Sta. 439+40.40 RT-Single 55' MA	17,16	16,16
Combination Signal & Light Std. 40' Mounting Height		
Sta. 438+52.82 RT-Single 42' MA	16,16	15,15
Sta. 439+38.65 LT-Single 28' MA	13,13	13,13



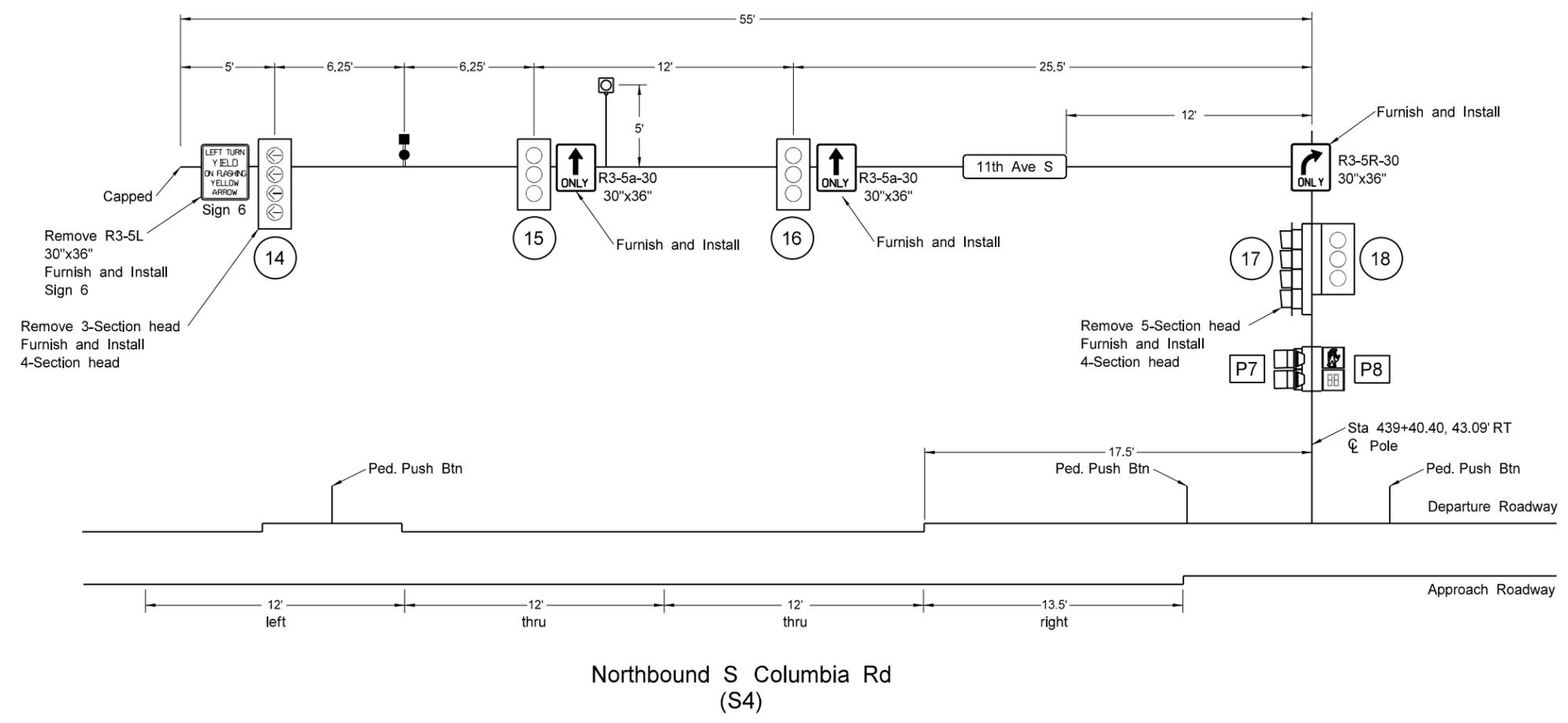
Pushbutton Number	Pushbutton Location	Pushbutton & Sign Location on Pole	Direction of Arrow on Sign
1	Pushbutton Post 1	W	Left
2	Pushbutton Post 2	N	Right
3	Signal Standard S2	N	Left
4	Pushbutton Post 4	E	Right
5	Pushbutton Post 5	E	Left
6	Pushbutton Post 6	S	Right
7	Pushbutton Post 7	S	Both
8	Pushbutton Post 8	S	Left
9	Pushbutton Post 9	W	Right



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Revise Traffic Signal System - Site 1  
Traffic Signal Layout  
11th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

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**Legend**

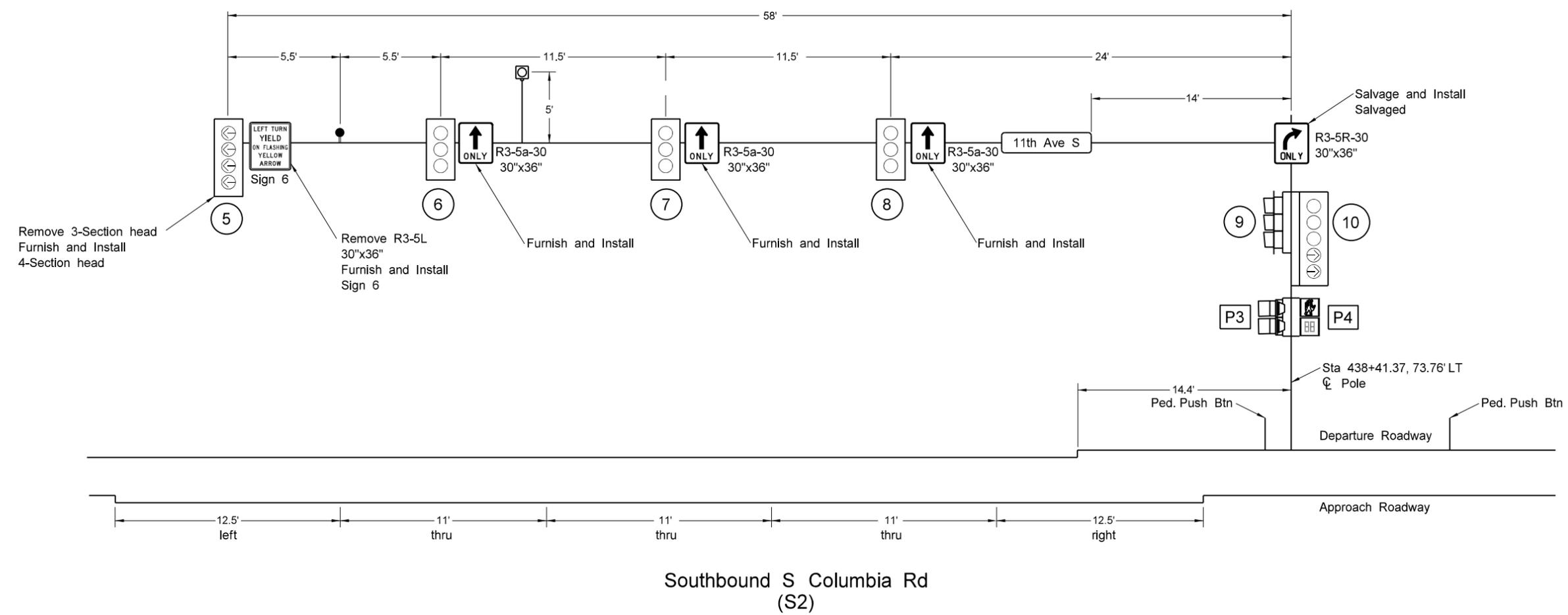
- Video Detection Camera
- Traffic Signal Head
- Vehicle Signal Head Number
- Pedestrian Head Number
- Emergency Vehicle Preemption GPS Detector and Light

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Revise Traffic Signal System - Site 1  
Signal Standard & Head Locations  
11th Avenue South

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

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**Legend**

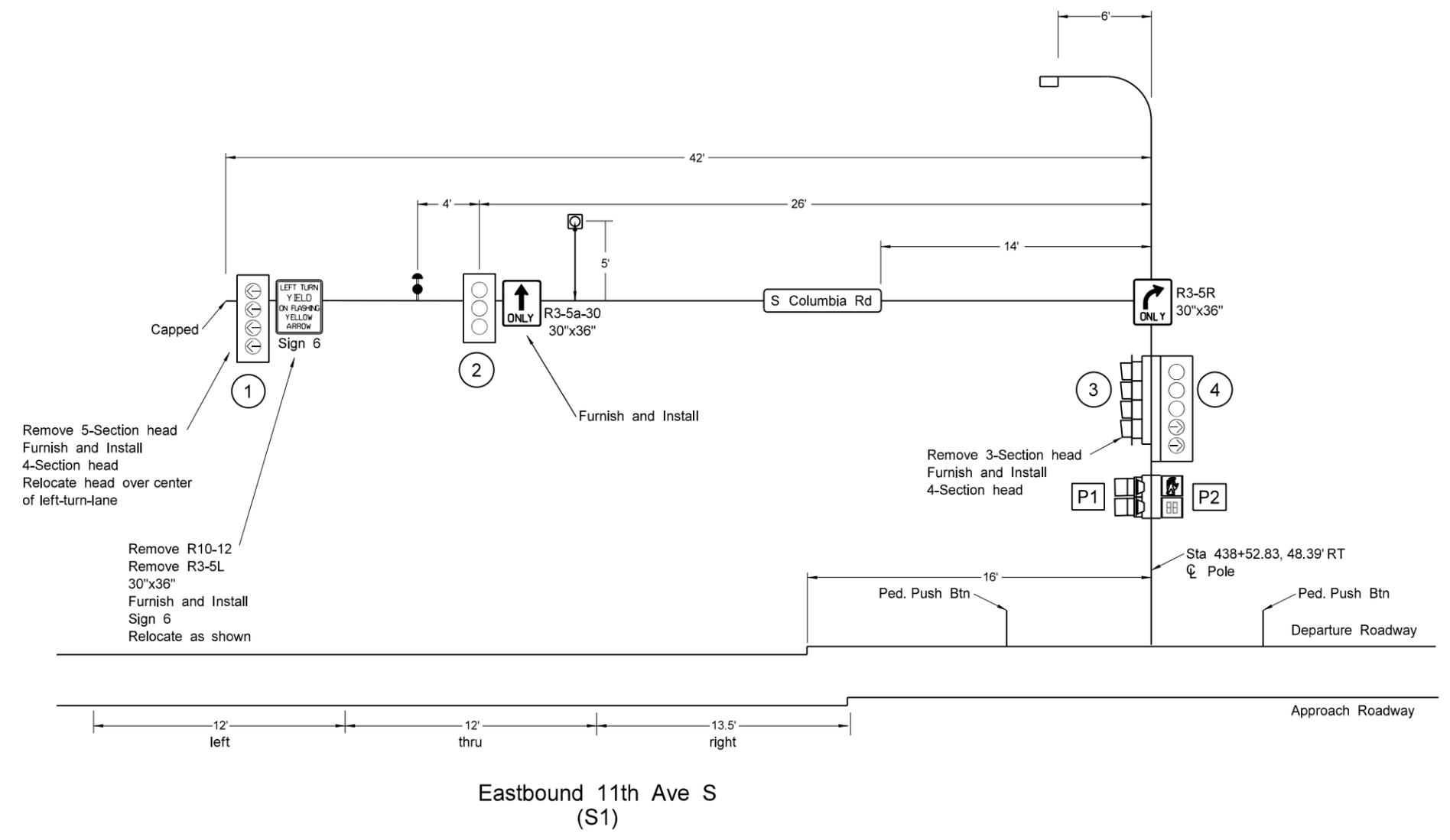
- Video Detection Camera
- Traffic Signal Head
- Vehicle Signal Head Number
- Pedestrian Head Number
- Emergency Vehicle Preemption Indicator Light

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Revise Traffic Signal System - Site 1  
Signal Standard & Head Locations  
11th Avenue South

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

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**Legend**

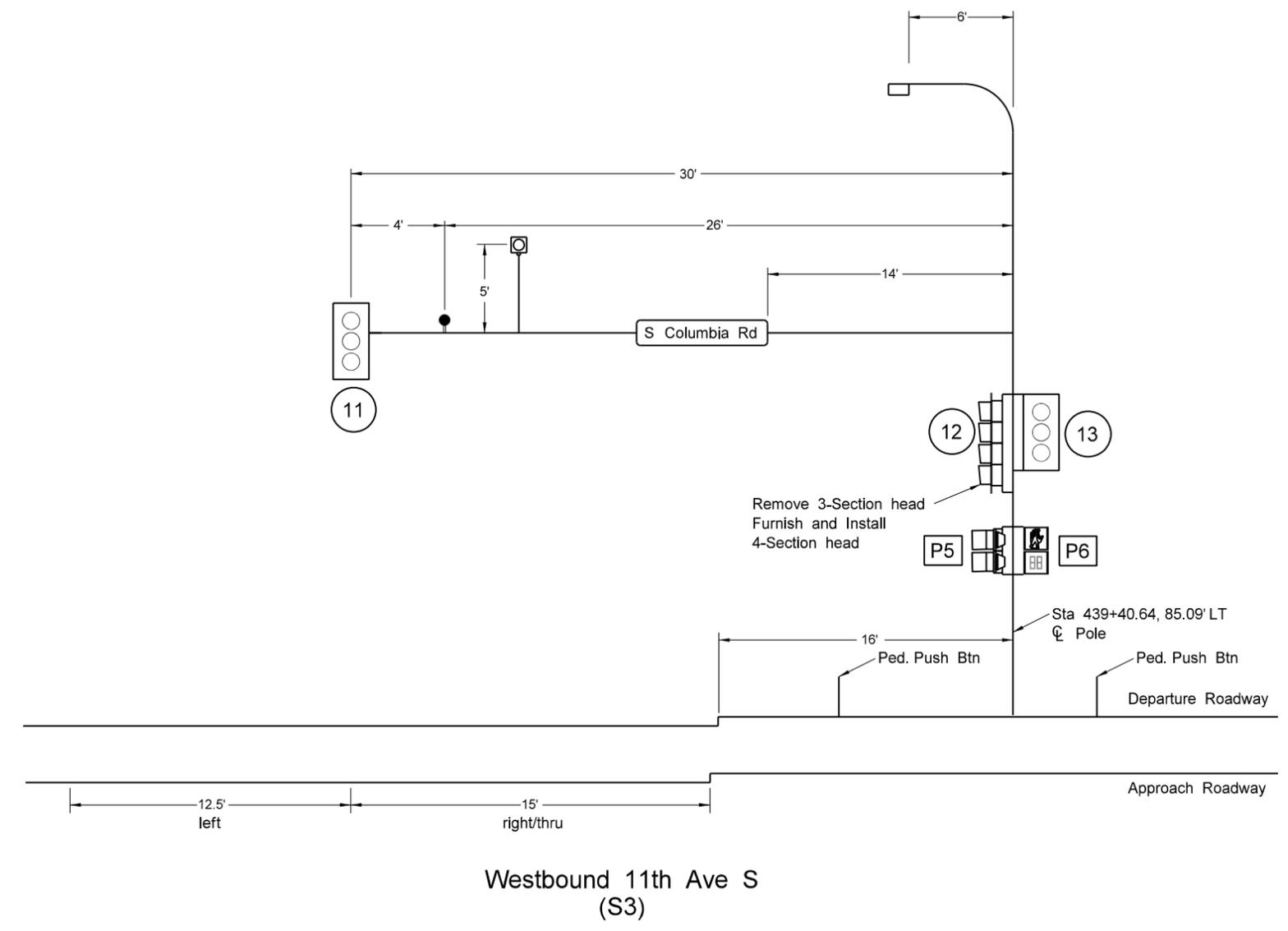
- Video Detection Camera
- Traffic Signal Head
- Vehicle Signal Head Number
- Pedestrian Head Number
- Emergency Vehicle Preemption Opticom Detector and Light

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Revise Traffic Signal System - Site 1  
 Signal Standard & Head Locations  
 11th Avenue South

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

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**Legend**

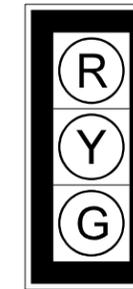
- Video Detection Camera
- Traffic Signal Head
- Vehicle Signal Head Number
- Pedestrian Head Number
- Emergency Vehicle Preemption Indicator Light

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Revise Traffic Signal System - Site 1  
Signal Standard & Head Locations  
11th Avenue South

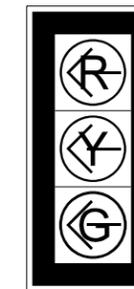
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

Conductor			Cable 1 (No.12 AWG 12)		Cable 2 (No.12 AWG 10)		Cable 3 (No.12 AWG 12)		Cable 4 (No. 12 AWG 12)		Cable 5 (No.12 AWG 10)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		1	Green Left Arrow	3	Sup. Green LT Arrow		Spare	5	Green Left Arrow		Spare
2	White			Neutral		Neutral		Neutral		Neutral		Neutral
3	Red		2,4	Red		Spare	P1	Walk	6-8, 10	Red	9	Sup. Red
4	Green			Ground		Ground		Ground		Ground		Ground
5	Orange		2,4	Yellow		Spare	P1	Don't Walk	6-8, 10	Yellow	9	Sup. Yellow
6	Blue		2,4	Green		Spare		Spare	6-8, 10	Green	9	Sup. Green
7	White	Black	1	Yellow Left Arrow	3	Sup. LT Yellow Arrow	P2	Walk	5	Yellow Left Arrow		Spare
8	Red	Black	1	Red Left Arrow	3	Sup. LT Red Arrow	P2	Don't Walk	5	Red Left Arrow		Spare
9	Green	Black	4	Green Right Arrow	3	Sup. FY Left Arrow		Spare	10	Green Right Arrow		Spare
10	Orange	Black	4	Yellow Rt Arrow		Spare		Spare	10	Yellow Rt Arrow		Spare
11	Blue	Black	1	FY Left Arrow				Spare	5	FY Left Arrow		
12	Black	White		Spare				Spare		Spare		

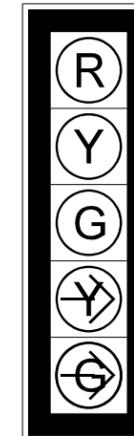


(12" Lenses)  
Inplace  
Heads 2,6,7,8,9,11,13,15,16,18

Conductor			Cable 6 (No.12 AWG 12)		Cable 7 (No. 12 AWG 12)		Cable 8 (No.12 AWG 10)		Cable 9 (No.12 AWG 12)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black			Spare		Spare	12	Sup. Green LT Arrow		Spare
2	White			Neutral		Neutral		Neutral		Neutral
3	Red		P3	Walk	11,13	Red		Spare	P5	Walk
4	Green			Ground		Ground		Ground		Ground
5	Orange		P3	Don't Walk	11,13	Yellow		Spare	P5	Don't Walk
6	Blue			Spare	11,13	Green		Spare		Spare
7	White	Black	P4	Walk		Spare	12	Sup. LT Yellow Arrow	P6	Walk
8	Red	Black	P4	Don't Walk		Spare	12	Sup. LT Red Arrow	P6	Don't Walk
9	Green	Black		Spare		Spare	12	Sup. FY Left Arrow		Spare
10	Orange	Black		Spare		Spare		Spare		Spare
11	Blue	Black		Spare		Spare				Spare
12	Black	White		Spare		Spare				Spare



(12" Lenses)  
Remove  
Heads 3,5,12,14



(12" Lenses)  
Inplace  
Heads 4,10

Conductor			Cable 10 (No. 12 AWG 12)		Cable 11 (No.12 AWG 10)		Cable 12 (No.12 AWG 12)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication
1	Black		14	Green Left Arrow	17	Sup. Green LT Arrow		Spare
2	White			Neutral		Neutral		Neutral
3	Red		15,16,18	Red		Spare	P7	Walk
4	Green			Ground		Ground		Ground
5	Orange		15,16,18	Yellow		Spare	P7	Don't Walk
6	Blue		15,16,18	Green		Spare		Spare
7	White	Black	14	Yellow Left Arrow	17	Sup. LT Yellow Arrow	P8	Walk
8	Red	Black	14	Red Left Arrow	17	Sup. LT Red Arrow	P8	Don't Walk
9	Green	Black	14	FY Left Arrow	17	Sup. FY Left Arrow		Spare
10	Orange	Black		Spare		Spare		Spare
11	Blue	Black		Spare				Spare
12	Black	White		Spare				Spare



(12" Lenses)  
Inplace  
Heads P1-P8



(12" Lenses)  
Furnish & Install  
Heads 1,3,5,12,14,17

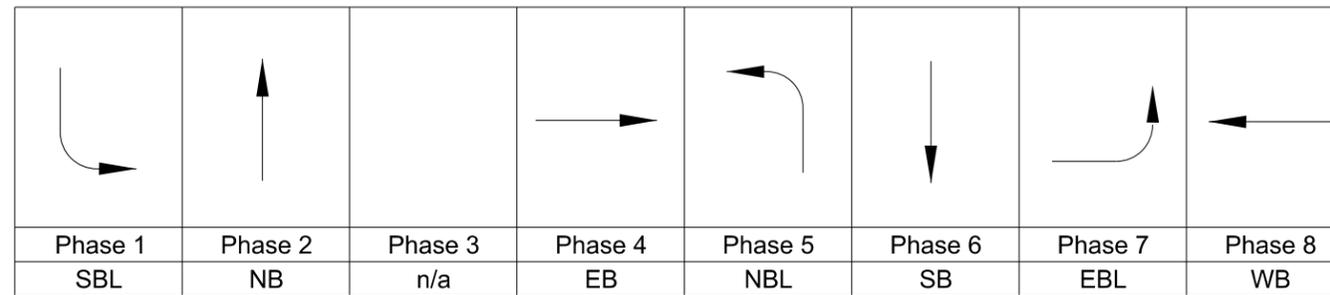
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Note:  
All Heads Shall use LED Indications  
5" Louvered Black Plate (typ.) on all heads

Revise Traffic Signal System - Site 1  
Signal Heads & Conductor Schedule  
11th Avenue South

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota





**BASIC INTERVALS (OR FUNCTIONS)**

Minimum Initial	7	15	0	10	7	15	5	10
Vehicle Extension	1.5	5.0	0.0	3.9	1.5	5.0	3.0	3.0
Maximum Green (Max 1)	25	75	0	40	25	75	25	40
Yellow Change	3.0	4.0	0.0	3.0	3.0	4.0	3.5	3.0
Red Clearance	2.0	1.5	0.0	3.0	2.0	1.5	1.5	3.0
Walk	-	7	-	7	-	7	-	7
Pedestrian Clearance	-	18	-	28	-	20	-	28

**VOLUME DENSITY TIMING FUNCTIONS**

VARIABLE INITIAL TIMING OPTIONS

Actuations Before Added Initial	0	0	0	0	0	0	0	0
Added Initial per Actuation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Initial	0	0.0	0	0	0	0.0	0	0

GAP REDUCTION OPTIONS

Time Before Reduction	0	25	0	0	0	25	0	0
Time to Reduce to Minimum Gap	0	25	0	0	0	25	0	0
Minimum Gap	0.0	2.5	0.0	0.0	0.0	2.5	0.0	0.0

**OTHER CONTROLLER FUNCTIONS**

Locking Memory	-	-	-	-	-	-	-	-
Non-Locking Memory	x	x	x	x	x	x	x	x
Phase recall	-	x	-	-	-	x	-	-
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Backup Prevent Phases	-	-	-	-	-	-	-	7
No Serve Phases	-	-	-	-	-	-	-	-
Flashing-Normal & Conflict Monitor	R	R	R	R	R	R	R	R
Start Up Phasing	R	G	R	R	R	G	R	R
Type of Detector	Presence	X		X	X	X		X
	Calling							
	Passage		X				X	

Notes:

1. Left turn phases 1 and 5 may operate as leading or lagging phases.
2. Left turn phase 7 shall operate as a leading phase only. Backup prevent shall be programmed in the controller.
3. Left turn phases 1, 5 and 7 may operate in protected, protected/permisive, or permisive mode.
4. Default mode for phases 1 and 5 shall be protected only.
5. Default mode for phase 7 shall be protected/permisive.

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Revise Traffic Signal System - Site 1  
Signal Timing Settings  
11th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

**Coordination Timing:**

		Coord Pattern:														
		1	2	3	4	5	6	11	17	18	19	21	23	24	25	31
<b>Cycle Length</b>		120	80	100	120	110	100	100	90	120	110	120	100	120	120	100
<b>Offset</b>		77	42	11	37	16	23	34	68	37	9	105	53	52	57	9
<b>Sequence</b>		1	5	5	1	1	1	1	5	5	1	1	1	1	1	1
<b>Phase 1</b>	<b>SBL</b>	15	16	20	15	16	20	15	15	18	15	18	20	18	15	15
<b>Phase 2</b>	<b>NB</b>	71	40	57	71	64	57	50	52	72	75	68	57	68	71	50
<b>Phase 3</b>	n/a															
<b>Phase 4</b>	<b>EB</b>	34	24	23	34	30	23	35	23	30	20	34	23	34	34	35
<b>Phase 5</b>	<b>NBL</b>	18	15	15	15	16	15	15	16	18	18	18	15	18	15	15
<b>Phase 6</b>	<b>SB</b>	68	41	62	71	64	62	50	51	72	72	68	62	68	71	50
<b>Phase 7</b>	<b>EBL</b>	13	0	0	13	0	0	0	0	13	0	13	0	13	13	0
<b>Phase 8</b>	<b>WB</b>	21	24	23	21	30	23	35	23	17	20	21	23	21	21	35
<b>Coord Phase(s)</b>		2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6
<b>Leading Phase(s)</b>		1,5,7	1,6	1,6	1,5,7	1,5	1,5	1,5	1,6	1,6,7	1,5	1,5,7	1,5	1,5,7	1,5,7	1,5
<b>Omitted Phase(s)</b>			7	7		7	7	7	7		7		7			7

**Coord Pattern Descriptions:**

- |                    |   |
|--------------------|---|
| 1 AM Peak          | 17 Weekday AM Peak                      |
| 2 AM Off Peak      | 18 Weekday PM Peak                      |
| 3 PM Off Peak      | 19 Saturday Midday Peak                 |
| 4 PM Peak          | 21 Snow Day Plan; Morning Peak, Evening |
| 5 Weekend Midday   | 23 Snow Day Plan; Morning Off Peak      |
| 6 Weekend Off Peak | 24 Snow Day Plan; Weekday Afternoon     |
| 11 Overnight       | 25 Snow Day Plan; Weekend Midday        |
|                    | 31 Snow Day Plan; Overnight             |

**Time of Day Schedules:**

Day Plan:	1	Day Plan:	2	Day Plan:	3
In Effect:	Monday - Friday	In Effect:	Saturday	In Effect:	Sunday
Time	Pattern	Time	Pattern	Time	Pattern
0	11	0	11	0	11
630	2	830	2	900	2
715	17	1030	5	1100	5
815	2	1800	2	1700	2
1100	5	2230	11	2100	11
1430	18				
1455	18				
1530	18				
1800	3				
2000	2				
2300	11				

**Coordination Left Turn Phasing:**

		Coord Pattern:														
		1	2	3	4	5	6	11	17	18	19	21	23	24	25	31
<b>Phase 1</b>	<b>SBL</b>	Prot.	Prot.	Prot.	Prot.	Prot.	Prot.	P/P	Prot.	P/P						
<b>Phase 3</b>	n/a															
<b>Phase 5</b>	<b>NBL</b>	Prot.	Prot.	Prot.	Prot.	Prot.	Prot.	P/P	Prot.	P/P						
<b>Phase 7</b>	<b>EBL</b>	P/P	Perm.	Perm.	P/P	Perm.	Perm.	Perm.	Perm.	P/P	Perm.	P/P	Perm.	P/P	P/P	Perm.

**Legend:**

- Prot. Protected Only
- P/P Protected/Permissive
- Perm. Permissive Only

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Revise Traffic Signal System - Site 1  
 Coordination Signal Timing Settings  
 11th Avenue South  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(105)109	150	10

SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL
772	1820	1-WAY 4 SEC HEAD W/12IN LENS-POST MTD	EA	3
772	1822	1-WAY 4 SEC HEAD W/12IN LENS-MA MTD	EA	3
772	3140	REMOVE VEHICLE HEADS	EA	6
772	2906	REVISE TRAFFIC SIGNAL SYSTEM - SITE 1	EA	1
		Items shown above are for informational purposes; contractor shall provide all labor and equipment necessary for the signal system to be fully operational as shown in the Plans. Items shall be included in the corresponding price bid for "REVISE TRAFFIC SIGNAL SYSTEM - SITE 1"		

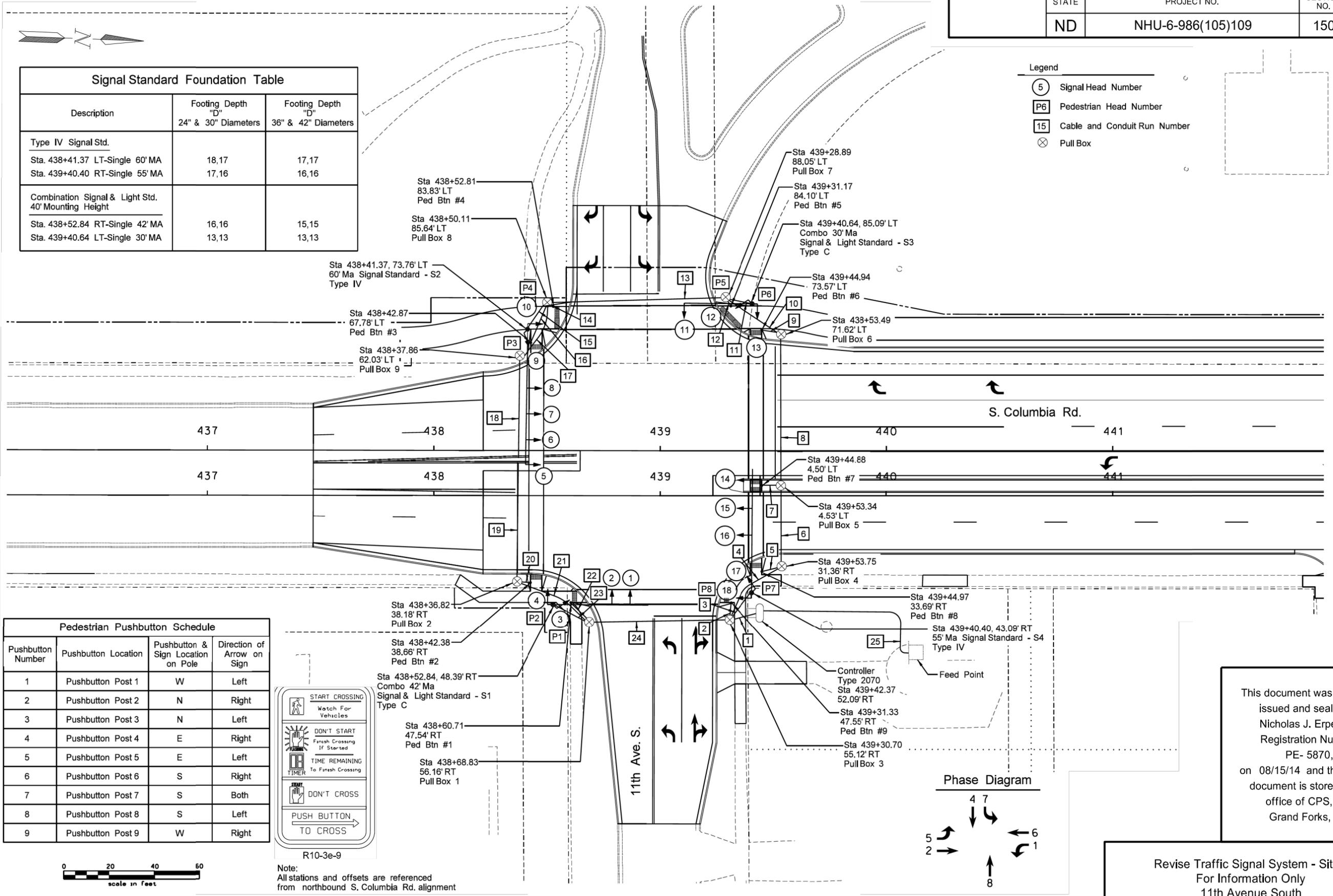
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Revise Traffic Signal System - Site 1  
 Estimated Traffic Signal Quantities  
 11th Avenue South  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

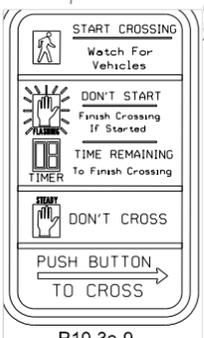


Description	Footings	
	24" & 30" Diameters	36" & 42" Diameters
<b>Type IV Signal Std.</b>		
Sta. 438+41.37 LT-Single 60' MA	18,17	17,17
Sta. 439+40.40 RT-Single 55' MA	17,16	16,16
<b>Combination Signal &amp; Light Std.</b>		
40' Mounting Height		
Sta. 438+52.84 RT-Single 42' MA	16,16	15,15
Sta. 439+40.64 LT-Single 30' MA	13,13	13,13

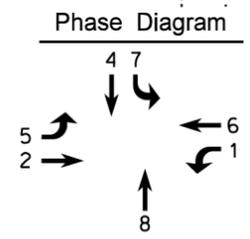
- Legend
- 5 Signal Head Number
  - P6 Pedestrian Head Number
  - 15 Cable and Conduit Run Number
  - ⊗ Pull Box



Pushbutton Number	Pushbutton Location	Pushbutton & Sign Location on Pole	Direction of Arrow on Sign
1	Pushbutton Post 1	W	Left
2	Pushbutton Post 2	N	Right
3	Pushbutton Post 3	N	Left
4	Pushbutton Post 4	E	Right
5	Pushbutton Post 5	E	Left
6	Pushbutton Post 6	S	Right
7	Pushbutton Post 7	S	Both
8	Pushbutton Post 8	S	Left
9	Pushbutton Post 9	W	Right



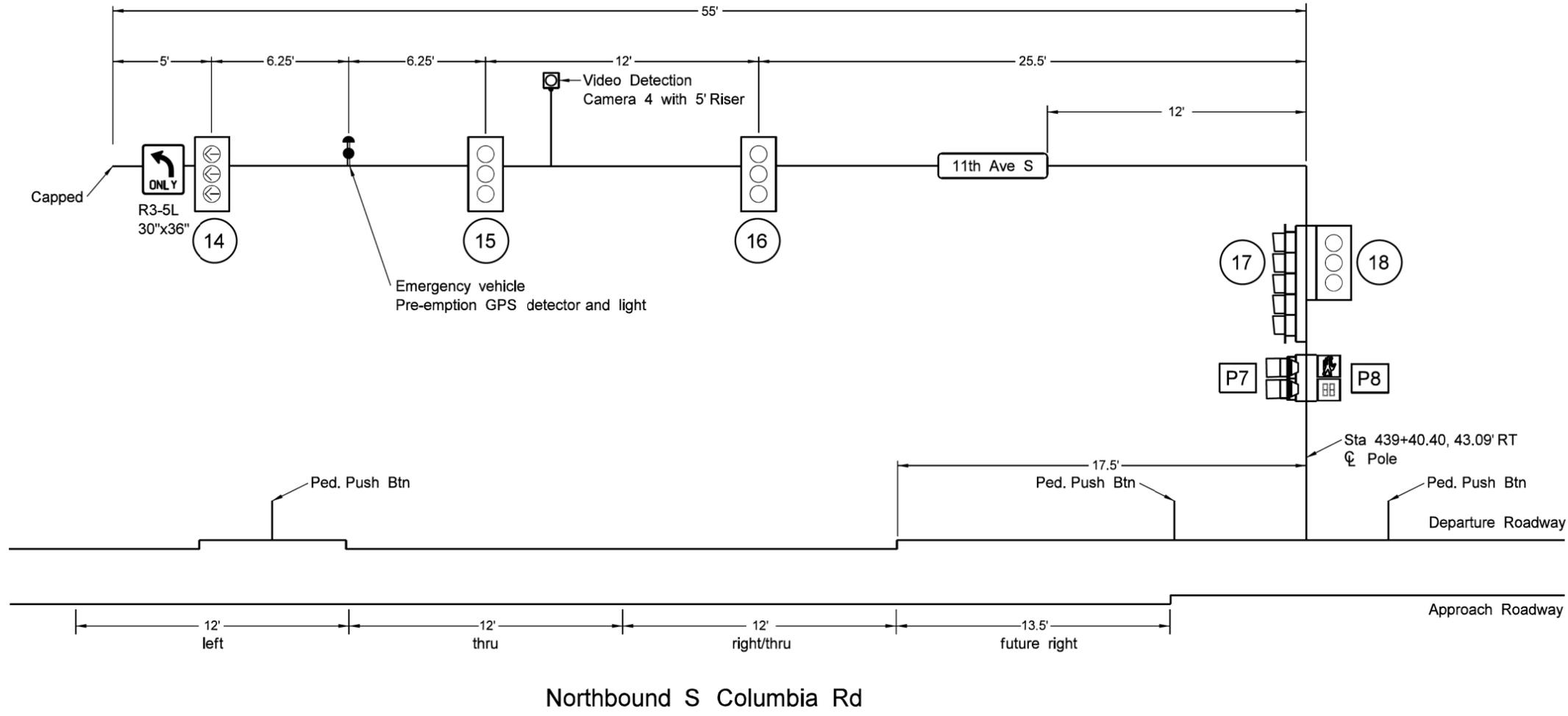
Note:  
All stations and offsets are referenced from northbound S. Columbia Rd. alignment



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For Information Only  
11th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

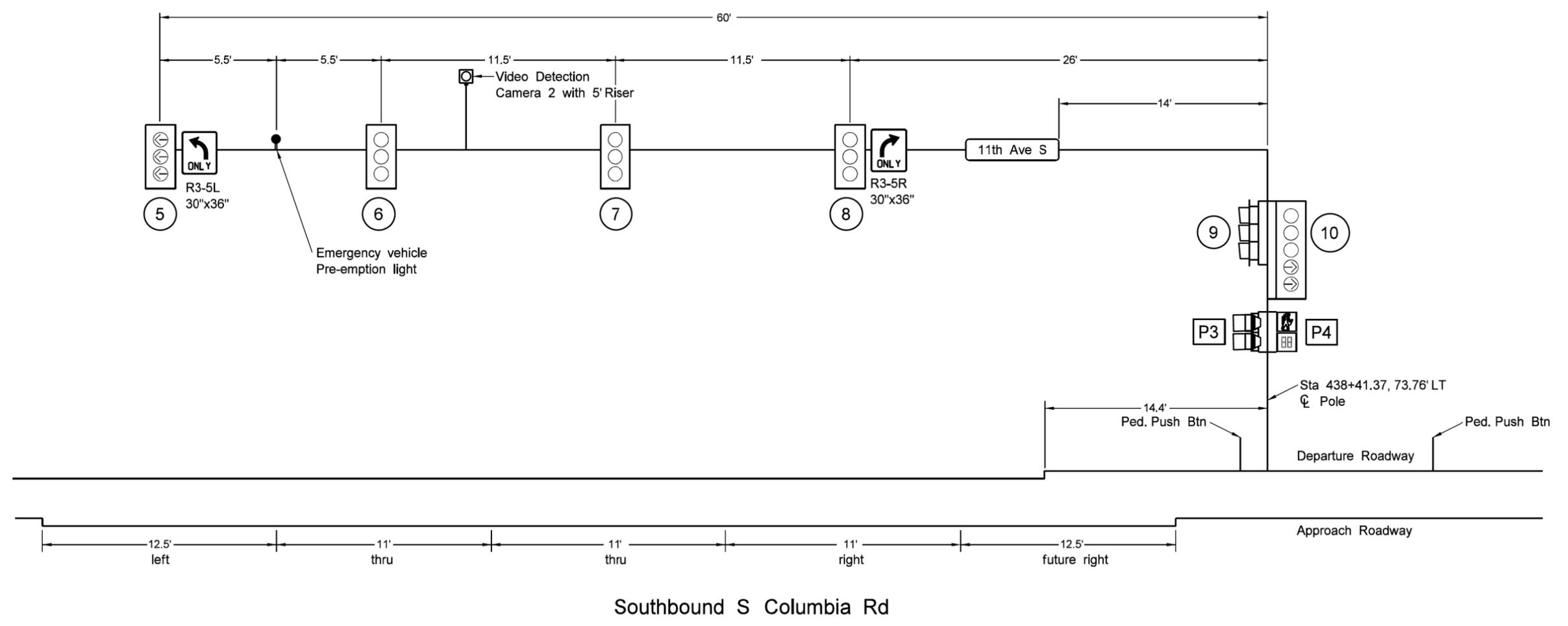
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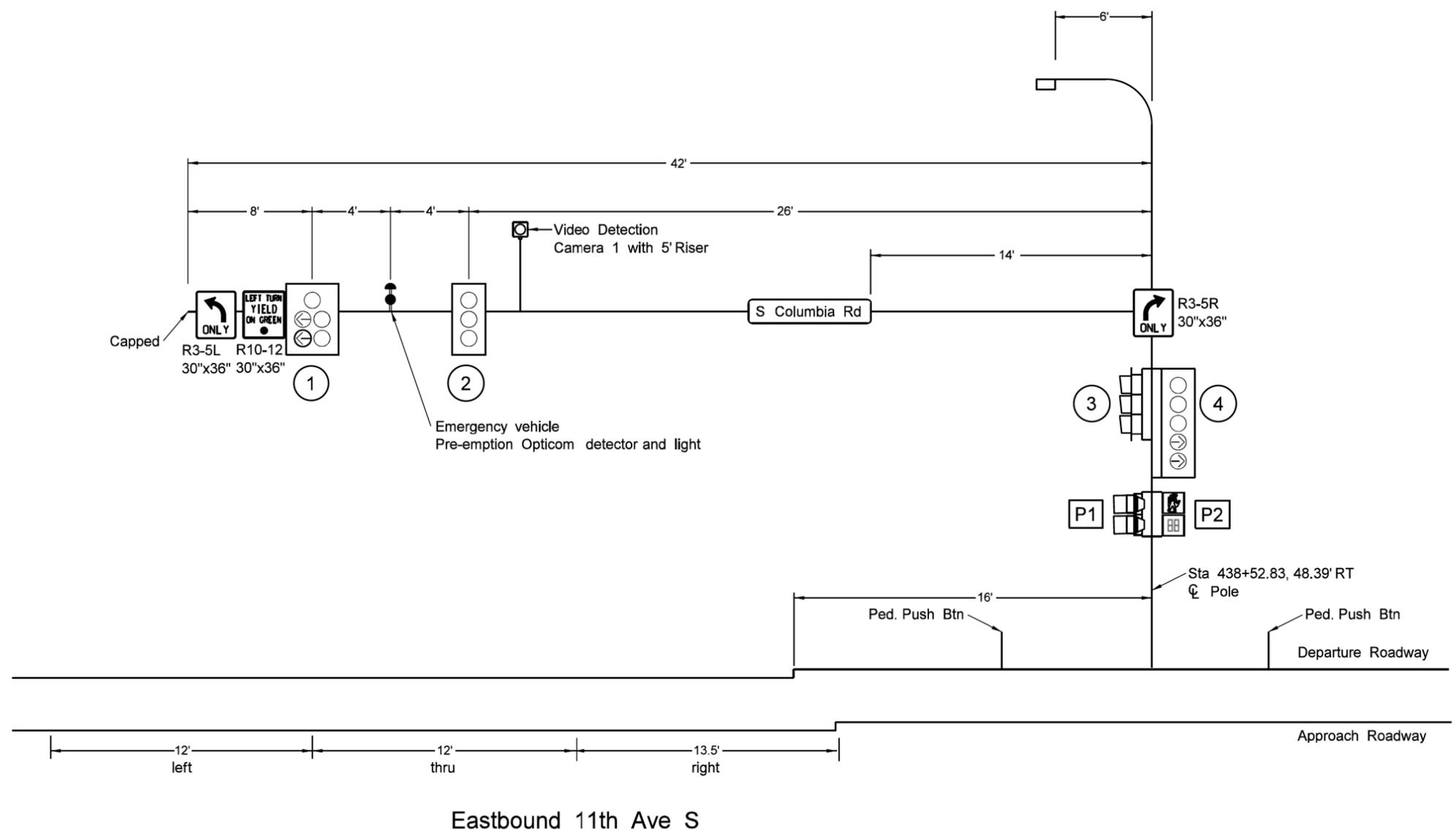


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 11th Avenue South  
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 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	150	14

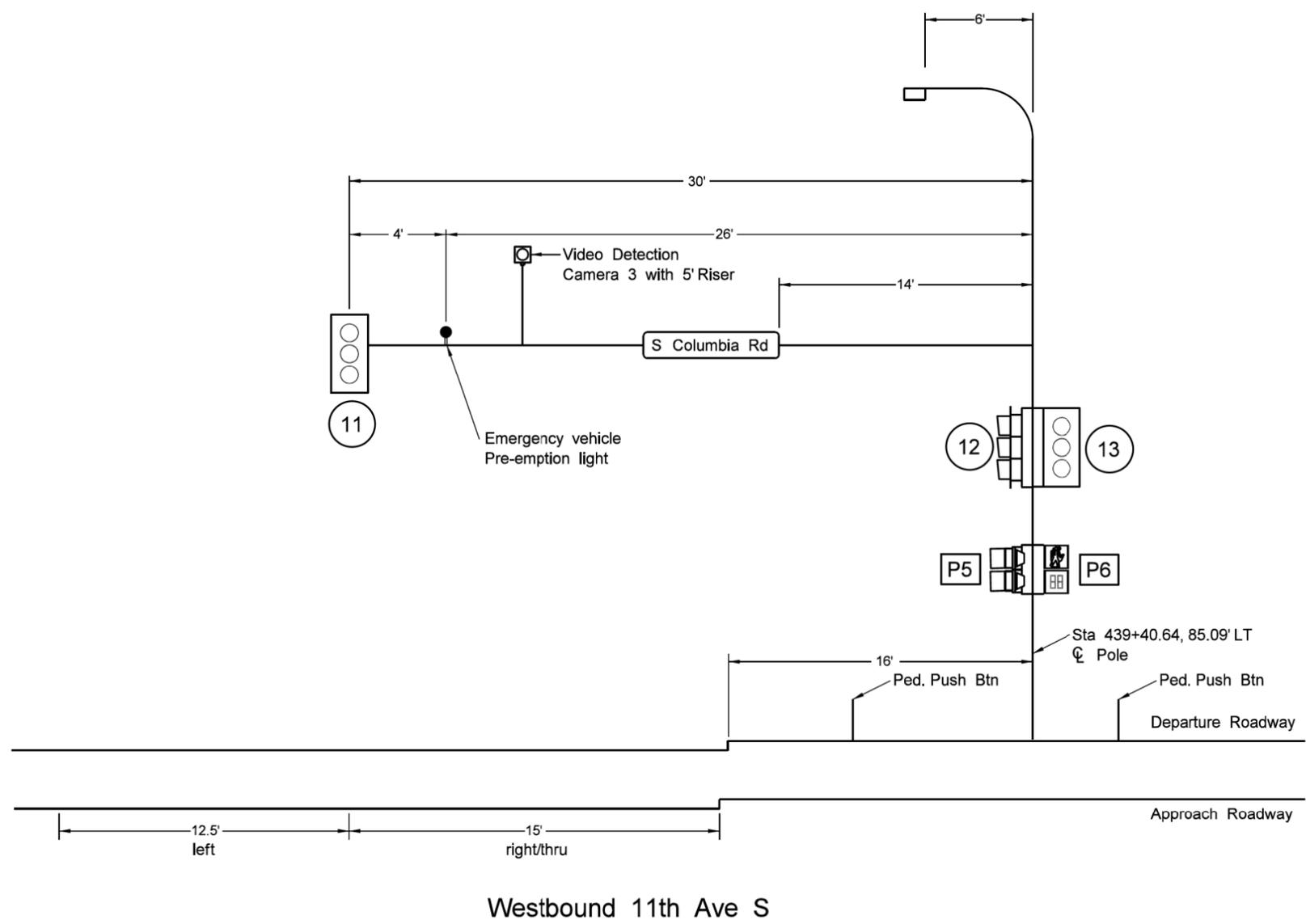


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Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

**FOR INFORMATION ONLY**

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	150	15

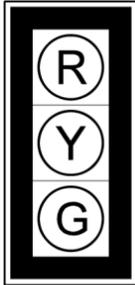


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 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

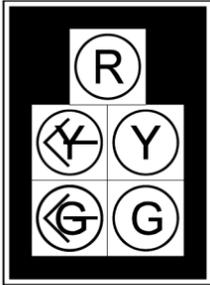
**FOR INFORMATION ONLY**

Conductor			Cable 1 (No.12 AWG 12)		Cable 2 (No.12 AWG 10)		Cable 3 (No.12 AWG 12)		Cable 4 (No. 12 AWG 12)		Cable 5 (No.12 AWG 10)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		1	Green Left Arrow	3	Sup. Green LT Arrow		Spare	5	Green Left Arrow		Spare
2	White			Neutral		Neutral		Neutral		Neutral		Neutral
3	Red		1,2,4	Red		Spare	P1	Walk	6-8, 10	Red	9	Sup. Red
4	Green			Ground		Ground		Ground		Ground		Ground
5	Orange		1,2,4	Yellow		Spare	P1	Don't Walk	6-8, 10	Yellow	9	Sup. Yellow
6	Blue		1,2,4	Green		Spare		Spare	6-8, 10	Green	9	Sup. Green
7	White	Black	1	Yellow Left Arrow	3	Sup. LT Yellow Arrow	P2	Walk	5	Yellow Left Arrow		Spare
8	Red	Black		Spare	3	Sup. LT Red Arrow	P2	Don't Walk	5	Red Left Arrow		Spare
9	Green	Black	4	Green Right Arrow		Spare		Spare	10	Green Right Arrow		Spare
10	Orange	Black	4	Yellow Rt Arrow		Spare		Spare	10	Yellow Rt Arrow		Spare
11	Blue	Black		Spare				Spare		Spare		
12	Black	White		Spare				Spare		Spare		

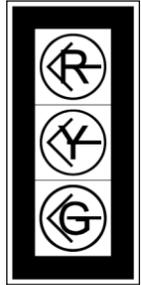


(12" Lenses)  
Heads 2,6,7,8,9,11,13,15,16,18

Conductor			Cable 6 (No.12 AWG 12)		Cable 7 (No. 12 AWG 12)		Cable 8 (No.12 AWG 10)		Cable 9 (No.12 AWG 12)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black			Spare		Spare	12	Sup. Green LT Arrow		Spare
2	White			Neutral		Neutral		Neutral		Neutral
3	Red		P3	Walk	11,13	Red		Spare	P5	Walk
4	Green			Ground		Ground		Ground		Ground
5	Orange		P3	Don't Walk	11,13	Yellow		Spare	P5	Don't Walk
6	Blue			Spare	11,13	Green		Spare		Spare
7	White	Black	P4	Walk		Spare	12	Sup. LT Yellow Arrow	P6	Walk
8	Red	Black	P4	Don't Walk		Spare	12	Sup. LT Red Arrow	P6	Don't Walk
9	Green	Black		Spare		Spare		Spare		Spare
10	Orange	Black		Spare		Spare		Spare		Spare
11	Blue	Black		Spare		Spare		Spare		Spare
12	Black	White		Spare		Spare		Spare		Spare



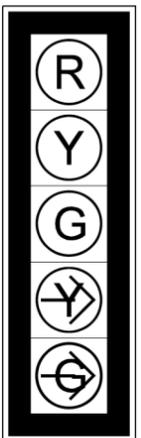
(12" Lenses)  
Head 1



(12" Lenses)  
Heads 3,5,12,14



(12" Lenses)  
Head 17



(12" Lenses)  
Heads 4,10

Conductor			Cable 10 (No. 12 AWG 12)		Cable 11 (No.12 AWG 10)		Cable 12 (No.12 AWG 12)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication
1	Black		14	Green Left Arrow	17	Sup. Green LT Arrow		Spare
2	White			Neutral		Neutral		Neutral
3	Red		15,16,18	Red	17	Sup. LT Red	P7	Walk
4	Green			Ground		Ground		Ground
5	Orange		15,16,18	Yellow	17	Sup. LT Yellow	P7	Don't Walk
6	Blue		15,16,18	Green	17	Sup. LT Green		Spare
7	White	Black	14	Yellow Left Arrow	17	Sup. LT Yellow Arrow	P8	Walk
8	Red	Black	14	Red Left Arrow		Spare	P8	Don't Walk
9	Green	Black		Spare		Spare		Spare
10	Orange	Black		Spare		Spare		Spare
11	Blue	Black		Spare				Spare
12	Black	White		Spare				Spare



(12" Lenses)  
Heads P1-P8

Note:  
All Heads Shall use LED Indications  
5" Louvered Black Plate (typ.) on all heads

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For Information Only  
11th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

# FOR INFORMATION ONLY

Run	Station	Location	Conduit Run		Cable Run			
			Length	Size	Length	Code	QTY	Type
1	439+42.37 to 439+30.70	Controller to Pull Box 3	12	2 - 4"	50	A	4	No. 12 AWG 2 Conductor Cable
					25	B	2	Emergency Detector Cable
					50	C	4	No. 12 AWG 10 Conductor Cable
					101	C	8	No. 12 AWG 12 Conductor Cable
					113	C	9	Push Button
				50	D	4	Video Detector Cable	
2	439+30.70 to 439+31.33	Pull Box 3 to Pedestrian Push Btn. 9	6	2"	7	C	1	Push Button
3	439+30.70 to 439+40.40	Pull Box 3 to Signal S4	15	3"	16	A	1	No. 12 AWG 2 Conductor Cable
					16	B	1	Emergency Detector Cable
					16	C	1	No. 12 AWG 10 Conductor Cable
					32	C	2	No. 12 AWG 12 Conductor Cable
					16	D	1	Video Detector Cable
4	439+30.70 to 439+53.75	Pull Box 3 to Pull Box 4	35	4"	74	A	2	No. 12 AWG 2 Conductor Cable
					74	C	2	No. 12 AWG 10 Conductor Cable
					147	C	4	No. 12 AWG 12 Conductor Cable
					221	C	6	Push Button
					74	D	2	Video Detector Cable
5	439+53.75 to 439+44.97	Pull Box 4 to Pedestrian Push Btn. 8	9	2"	10	C	1	Push Button
6	439+53.75 to 439+53.34	Pull Box 4 to Pull Box 5	36	4"	76	A	2	No. 12 AWG 2 Conductor Cable
					76	C	2	No. 12 AWG 10 Conductor Cable
					151	C	4	No. 12 AWG 12 Conductor Cable
					189	C	5	Push Button
					76	D	2	Video Detector Cable
7	439+53.34 to 439+44.88	Pull Box 5 to Pedestrian Push Btn. 7	9	2"	10	C	1	Push Button
8	439+53.34 to 439+53.49	Pull Box 5 to Pull Box 6	65	4"	137	A	2	No. 12 AWG 2 Conductor Cable
					137	C	2	No. 12 AWG 10 Conductor Cable
					273	C	4	No. 12 AWG 12 Conductor Cable
					273	C	4	Push Button
					137	D	2	Video Detector Cable
9	439+53.49 to 439+44.94	Pull Box 6 to Pedestrian Push Btn. 6	10	2"	12	C	1	Push Button
10	439+53.49 to 439+28.89	Pull Box 6 to Pull Box 7	31	4"	65	A	2	No. 12 AWG 2 Conductor Cable
					65	C	2	No. 12 AWG 10 Conductor Cable
					130	C	4	No. 12 AWG 12 Conductor Cable
					98	C	3	Push Button
					65	D	2	Video Detector Cable
11	439+28.89 to 439+40.64	Pull Box 7 to Signal S3	15	3"	16	A	1	No. 12 AWG 2 Conductor Cable
					16	C	1	No. 12 AWG 10 Conductor Cable
					32	C	2	No. 12 AWG 12 Conductor Cable
					16	D	1	Video Detector Cable
12	439+28.89 to 439+31.17	Pull Box 7 to Pedestrian Push Btn. 5	5	2"	6	C	1	Push Button

Run	Station	Location	Conduit Run		Cable Run			
			Length	Size	Length	Code	QTY	Type
13	439+28.89 to 438+50.11	Pull Box 7 to Pull Box 8	71	4"	75	A	1	No. 12 AWG 2 Conductor Cable
					75	C	1	No. 12 AWG 10 Conductor Cable
					149	C	2	No. 12 AWG 12 Conductor Cable
					149	C	2	Push Button
					75	D	1	Video Detector Cable
14	438+50.11 to 438+52.81	Pull Box 8 to Pedestrian Push Btn. 4	6	2"	7	C	1	Push Button
15	438+50.11 to 438+41.37	Pull Box 8 to Signal S2	26	3"	27	A	1	No. 12 AWG 2 Conductor Cable
					27	C	1	No. 12 AWG 10 Conductor Cable
					55	C	2	No. 12 AWG 12 Conductor Cable
					27	D	1	Video Detector Cable
16	438+50.11 to 438+46.91	Pull Box 8 to Pedestrian Push Btn. 3	22	2"	24	C	1	Push Button
17	438+50.11 to 438+37.86	Pull Box 8 to Pull Box 9	26	4"				Empty
18+19	438+37.86 to 438+36.82	Pull Box 9 to Pull Box 2	100	4"				Empty
20	438+36.82 to 438+46.90	Pull Box 2 to Pedestrian Push Btn. 2	10	2"	25	C	1	Push Button

Cable Code

- A = Emergency Vehicle Indicator Lamp
- B = Emergency Vehicle Detector Cable
- C = Signal Control Cable
- D = Video Detection Cable
- E = Power Cable
- F = Interconnect Cable

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Revise Traffic Signal System - Site 1  
For Information Only  
11th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

**FOR INFORMATION ONLY**

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(105)109	150	18

Run	Station	Location	Conduit Run		Cable Run			
			Length	Size	Length	Code	QTY	Type
21	438+36.82 to 438+68.83	Pull Box 2 to Pull Box 1	32	4"	34	C	1	Push Button
22	438+68.83 to 438+60.71	Pull Box 1 to Pedestrian Push Btn. 1	10	2"	11	C	1	Push Button
23	438+68.83 to 438+53.34	Pull Box 1 to Signal S1	17	3"	18	A	1	No. 12 AWG 2 Conductor Cable
					18	B	1	Emergency Detector Cable
					18	C	1	No. 12 AWG 10 Conductor Cable
					36	C	2	No. 12 AWG 12 Conductor Cable
24	438+68.83 to 439+30.70	Pull Box 1 to Pull Box 3	62	4"	18	D	1	Video Detector Cable
					65	A	1	No. 12 AWG 2 Conductor Cable
					65	B	1	Emergency Detector Cable
					65	C	1	No. 12 AWG 10 Conductor Cable
					130	C	2	No. 12 AWG 12 Conductor Cable
25	INPLACE to 439+42.37	Feedpoint to Controller	80	2"	130	C	2	Push Button
					65	D	1	Video Detector Cable
					95	F	1	#6 U.S.E.

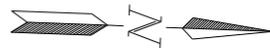
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- E = Power Cable
- F = Interconnect Cable

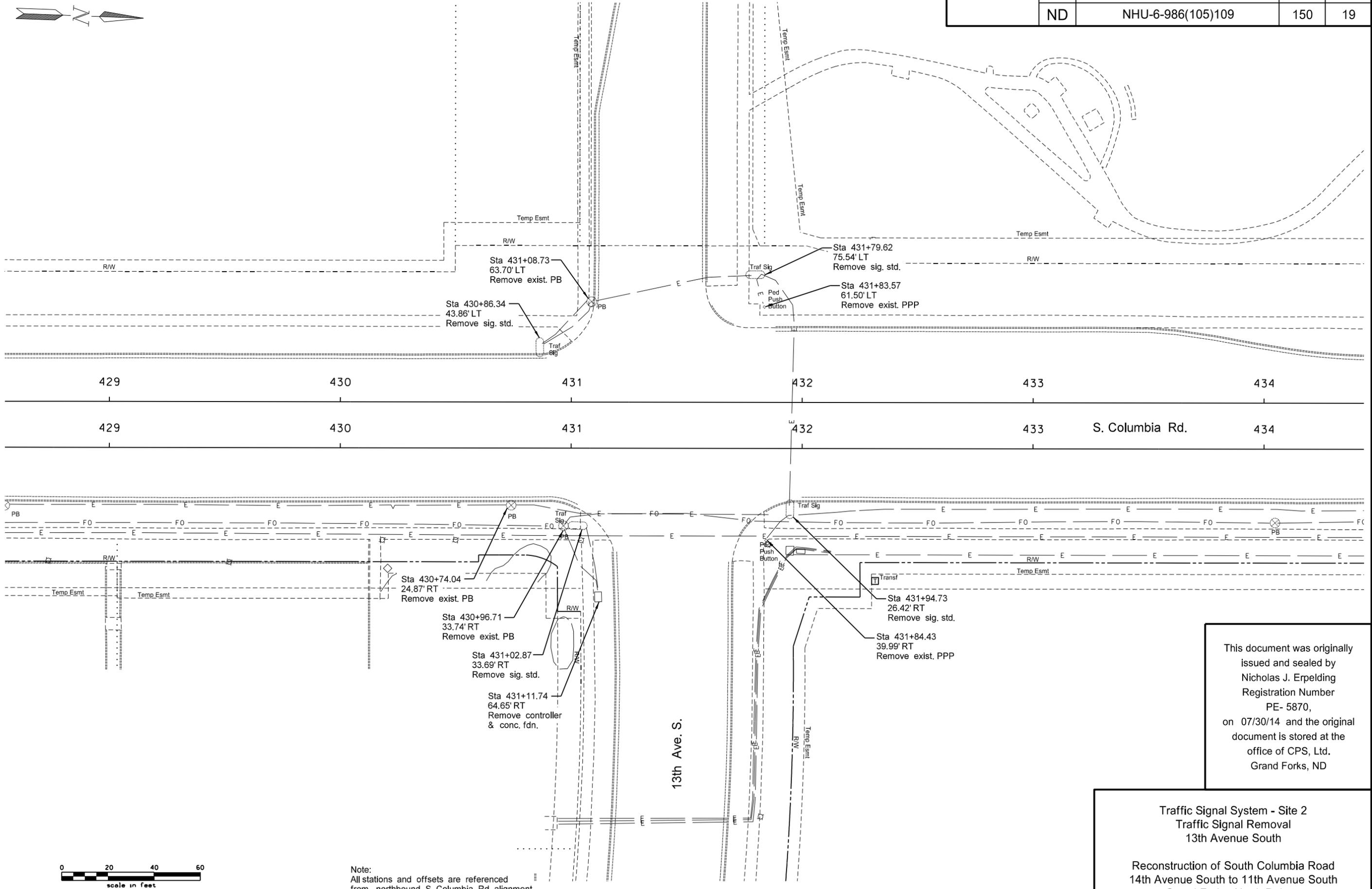
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Revise Traffic Signal System - Site 1  
For Information Only  
11th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

**FOR INFORMATION ONLY**



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	150	19



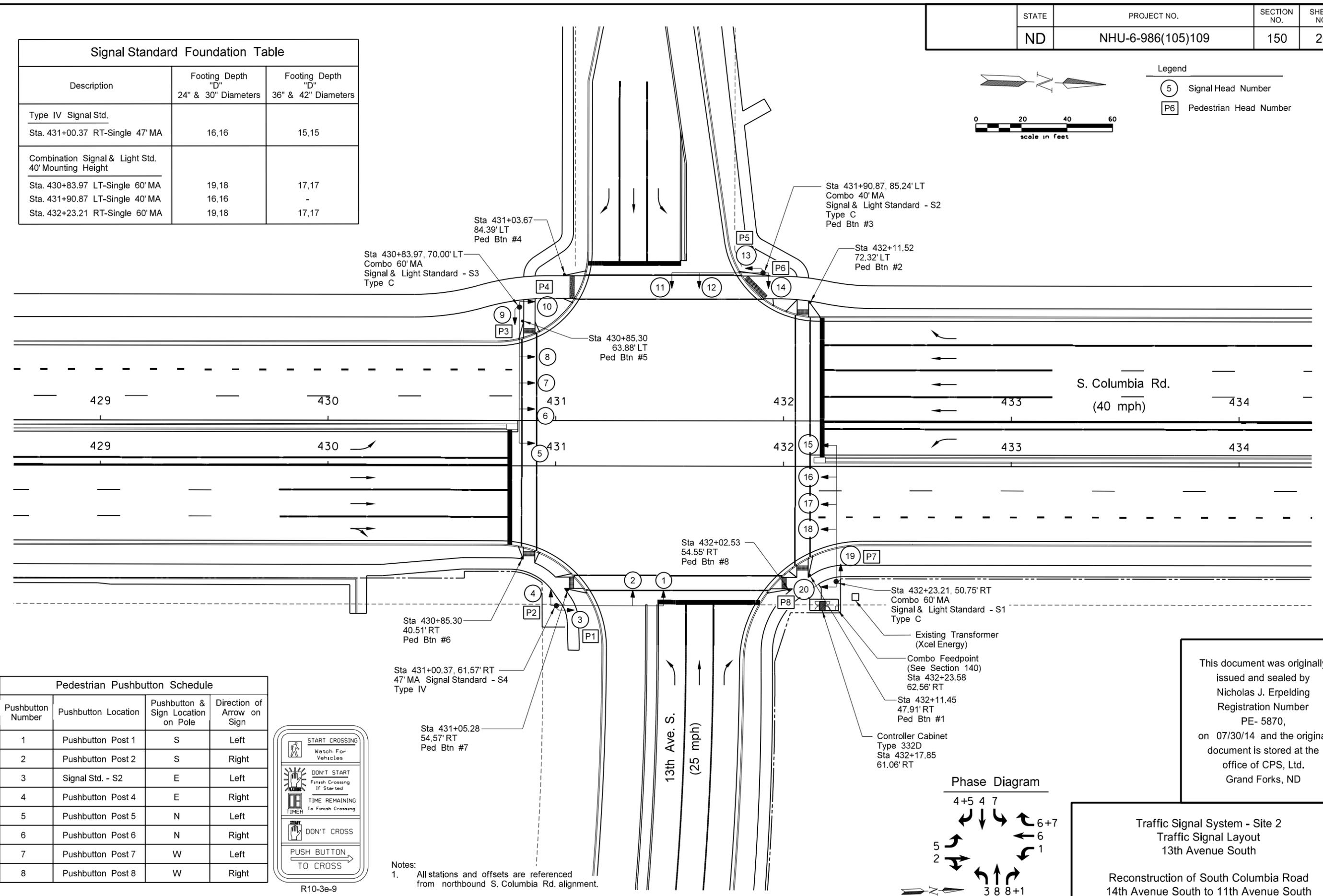
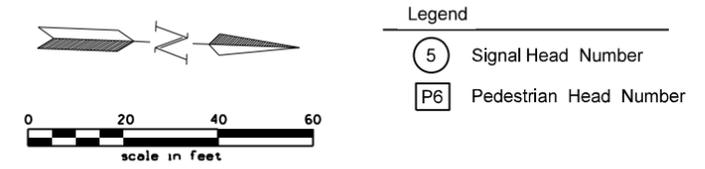
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Traffic Signal System - Site 2  
 Traffic Signal Removal  
 13th Avenue South  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

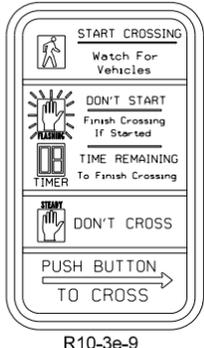


Note:  
 All stations and offsets are referenced from northbound S. Columbia Rd. alignment

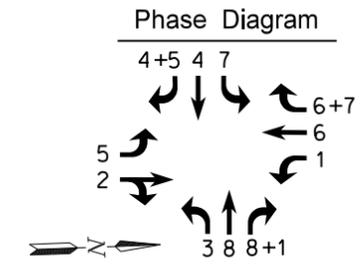
Description	Footing Depth "D" 24" & 30" Diameters	Footing Depth "D" 36" & 42" Diameters
Type IV Signal Std.		
Sta. 431+00.37 RT-Single 47' MA	16,16	15,15
Combination Signal & Light Std. 40' Mounting Height		
Sta. 430+83.97 LT-Single 60' MA	19,18	17,17
Sta. 431+90.87 LT-Single 40' MA	16,16	-
Sta. 432+23.21 RT-Single 60' MA	19,18	17,17



Pushbutton Number	Pushbutton Location	Pushbutton & Sign Location on Pole	Direction of Arrow on Sign
1	Pushbutton Post 1	S	Left
2	Pushbutton Post 2	S	Right
3	Signal Std. - S2	E	Left
4	Pushbutton Post 4	E	Right
5	Pushbutton Post 5	N	Left
6	Pushbutton Post 6	N	Right
7	Pushbutton Post 7	W	Left
8	Pushbutton Post 8	W	Right

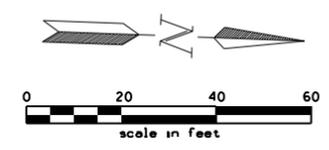


Notes:  
1. All stations and offsets are referenced from northbound S. Columbia Rd. alignment.



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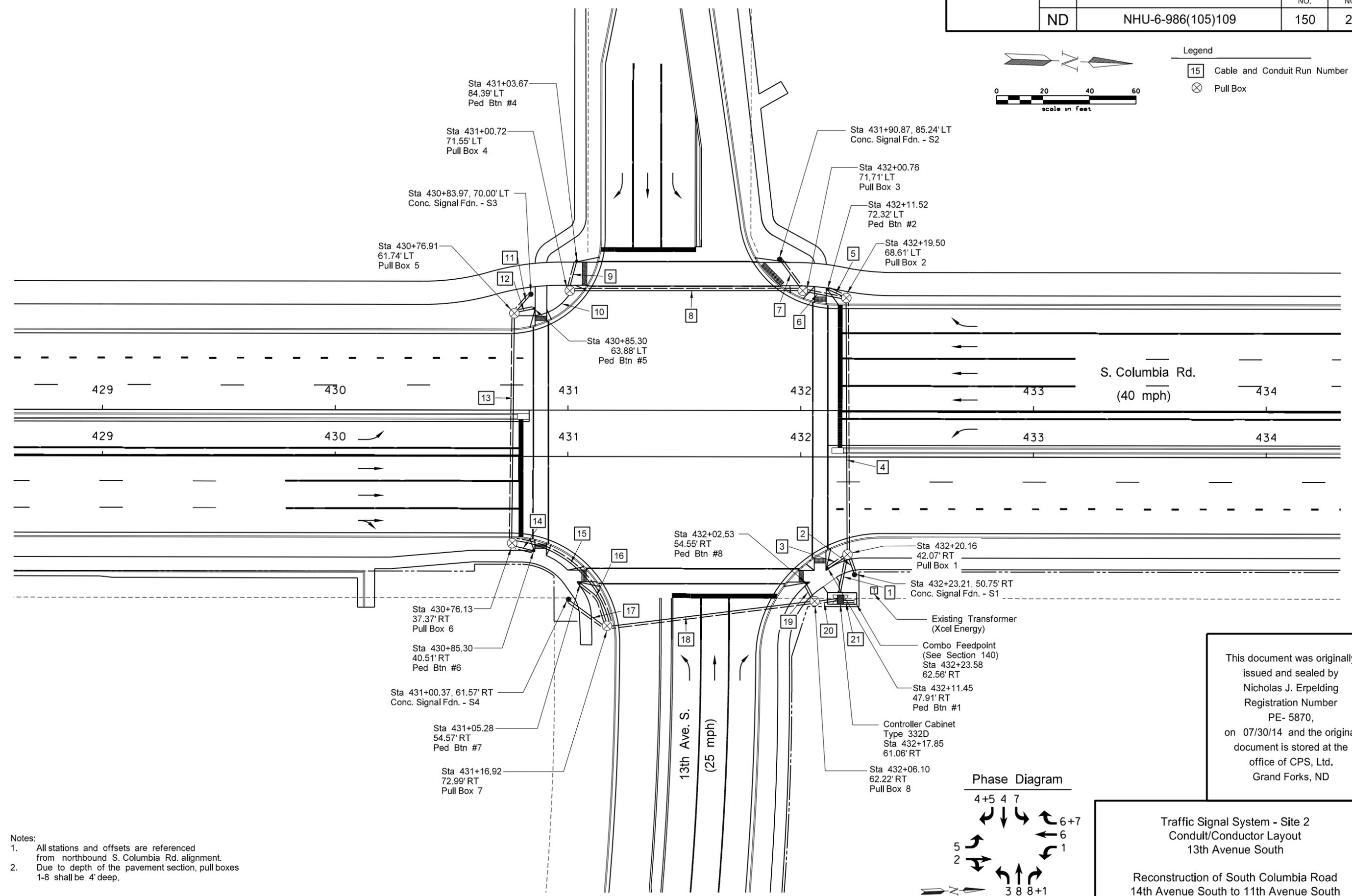
Traffic Signal System - Site 2  
Traffic Signal Layout  
13th Avenue South  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota



Legend

15 Cable and Conduit Run Number

⊗ Pull Box



Notes:

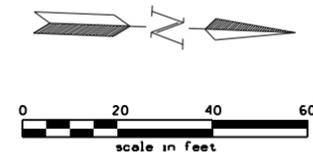
- All stations and offsets are referenced from northbound S. Columbia Rd. alignment.
- Due to depth of the pavement section, pull boxes 1-8 shall be 4' deep.

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Traffic Signal System - Site 2  
 Conduit/Conductor Layout  
 13th Avenue South

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

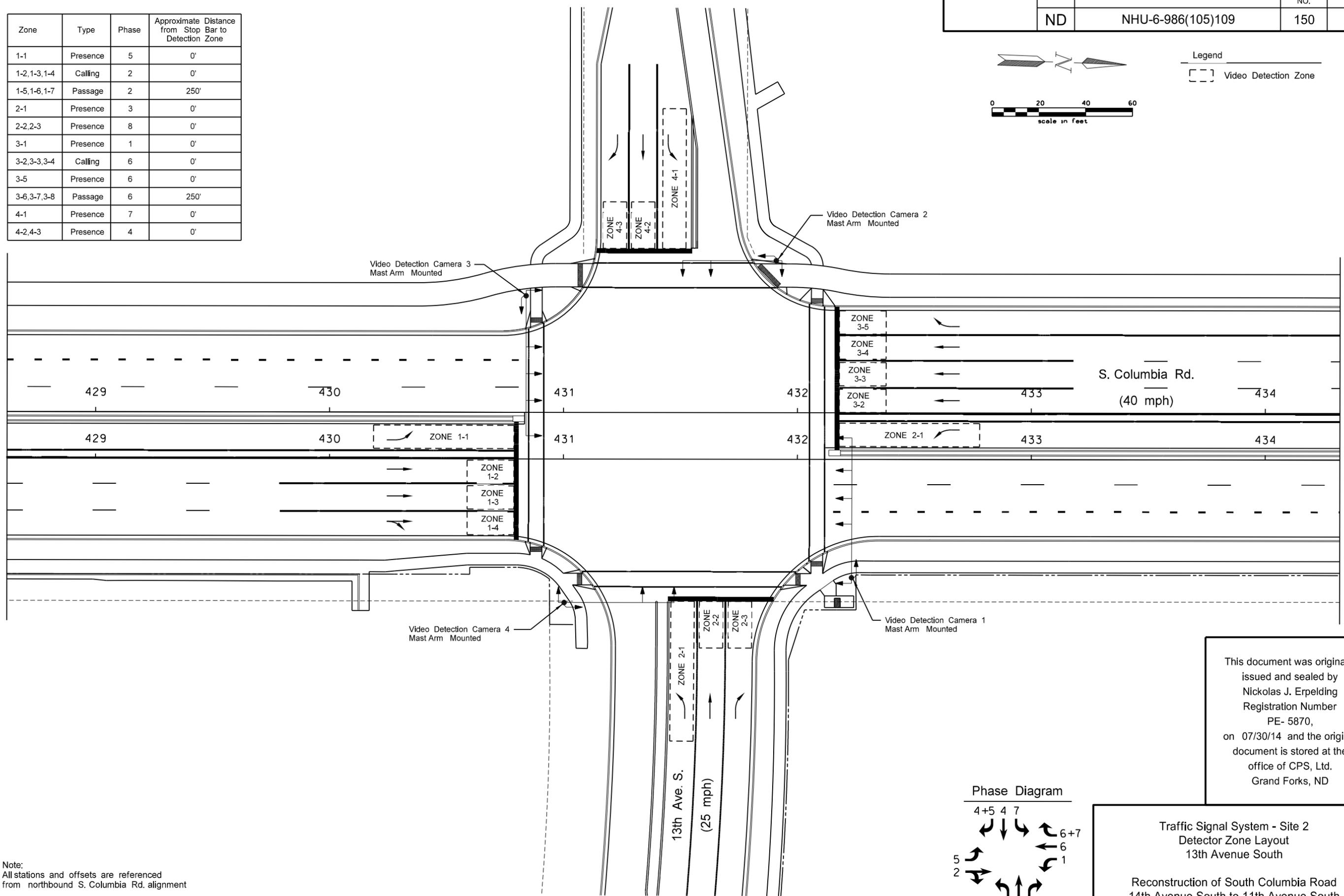
Zone	Type	Phase	Approximate Distance from Stop Bar to Detection Zone
1-1	Presence	5	0'
1-2,1-3,1-4	Calling	2	0'
1-5,1-6,1-7	Passage	2	250'
2-1	Presence	3	0'
2-2,2-3	Presence	8	0'
3-1	Presence	1	0'
3-2,3-3,3-4	Calling	6	0'
3-5	Presence	6	0'
3-6,3-7,3-8	Passage	6	250'
4-1	Presence	7	0'
4-2,4-3	Presence	4	0'



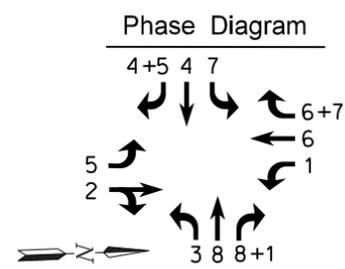
Legend  
 [---] Video Detection Zone

Match Line A

Match Line B



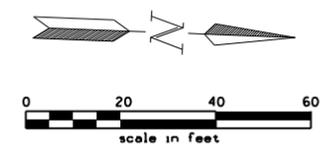
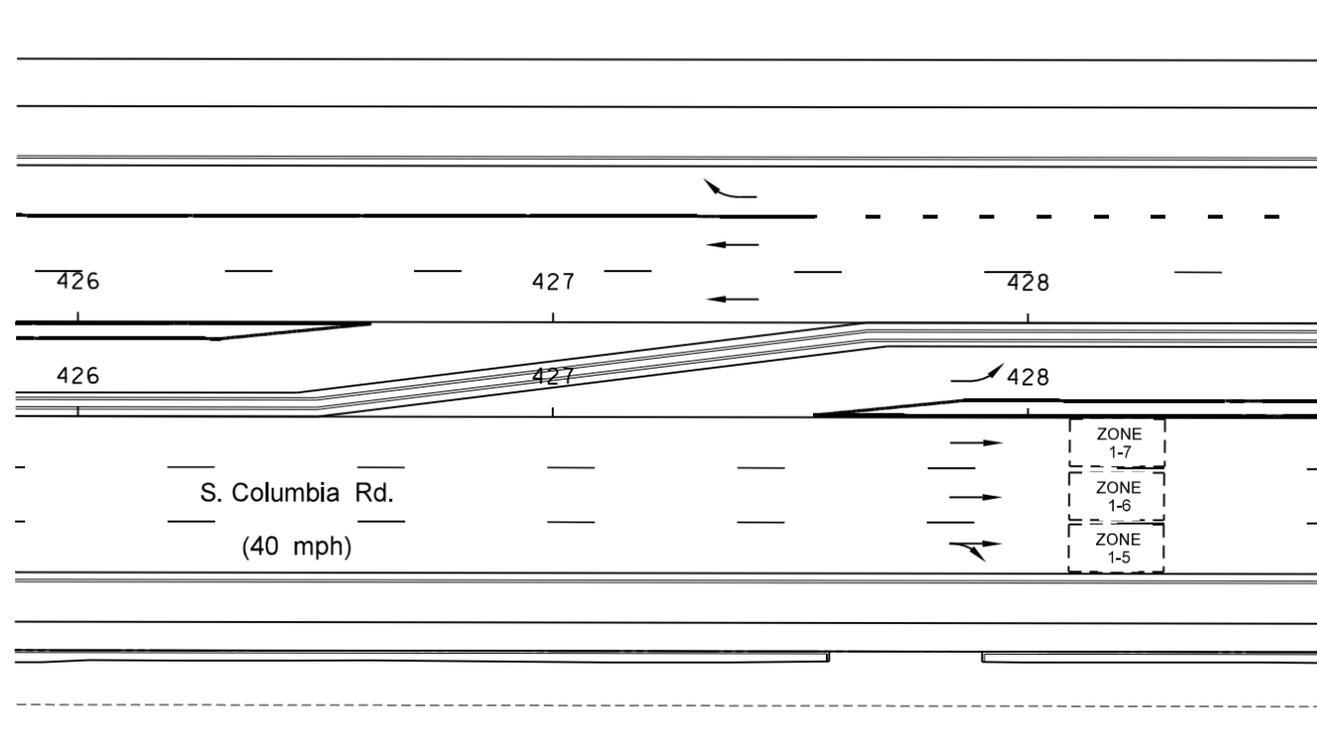
Note:  
 All stations and offsets are referenced from northbound S. Columbia Rd. alignment



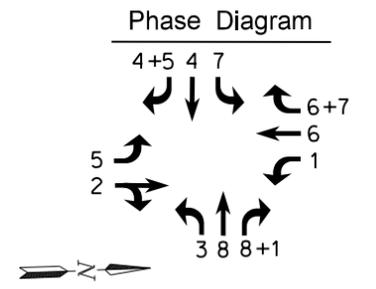
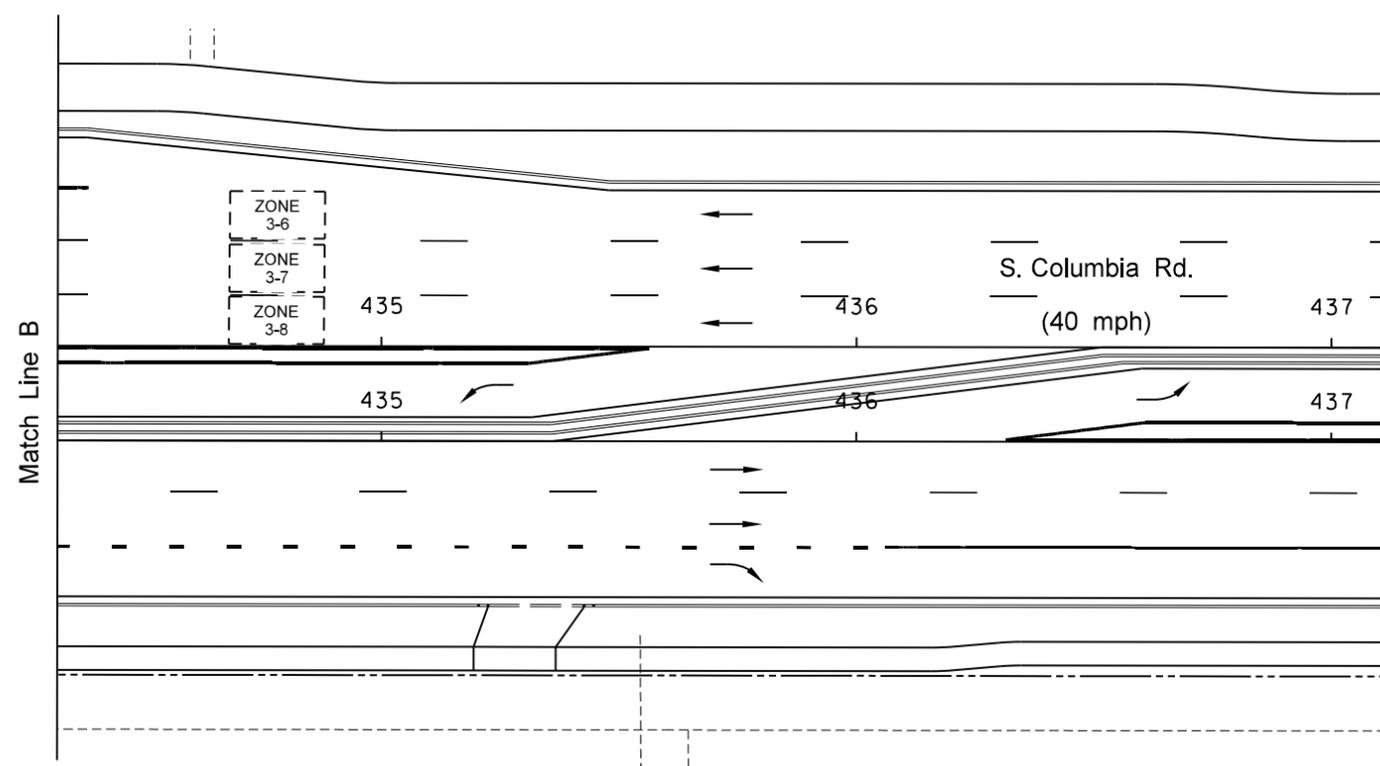
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 Grand Forks, ND

Traffic Signal System - Site 2  
 Detector Zone Layout  
 13th Avenue South  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	150	23



Legend  
 [---] Video Detection Zone



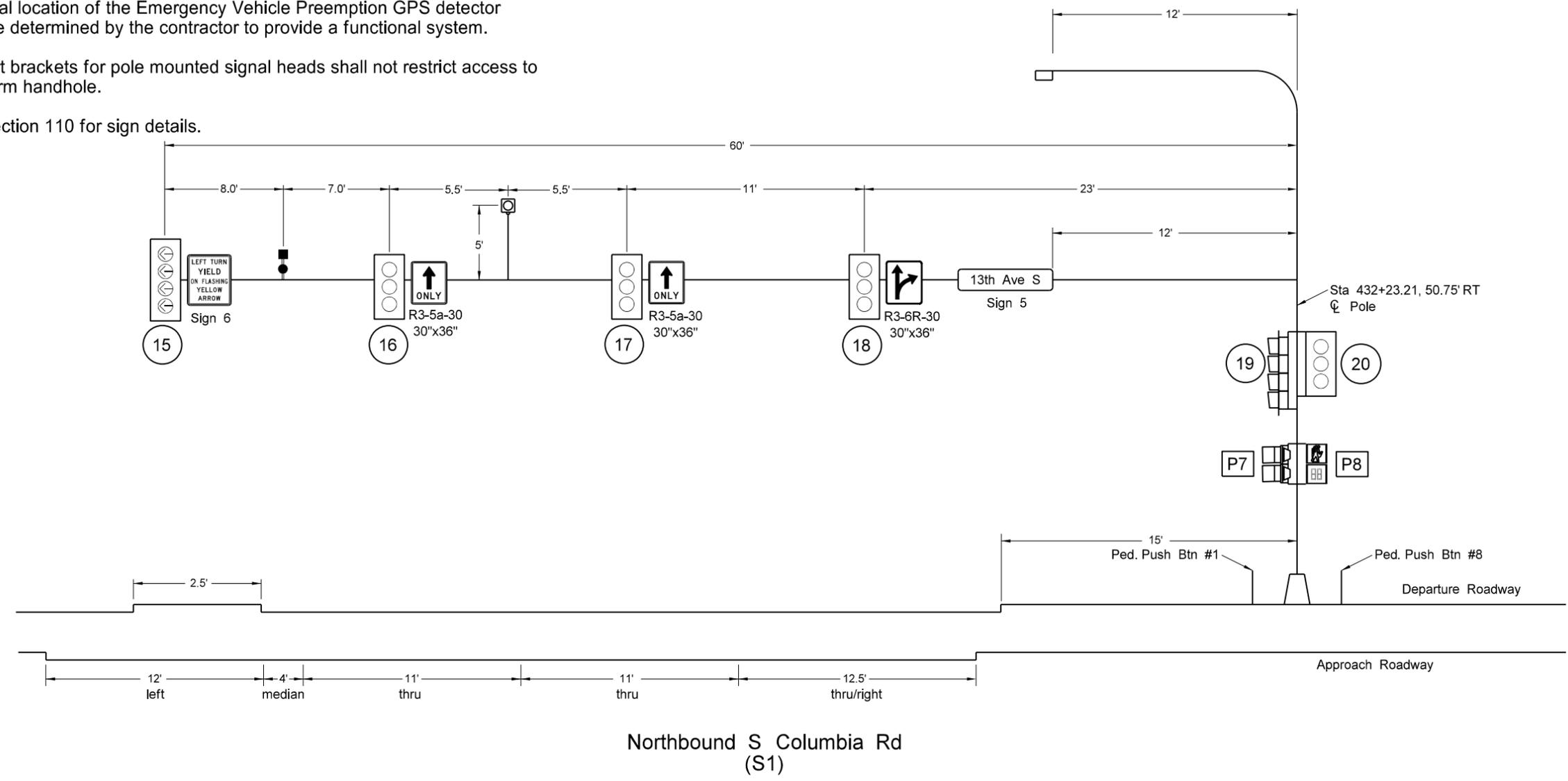
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 PE- 5870,  
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 Grand Forks, ND

Traffic Signal System - Site 2  
 Detector Zone Layout  
 13th Avenue South  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

Note:  
 All stations and offsets are referenced from northbound S. Columbia Rd. alignment

- Notes:
1. All stations and offsets are referenced from northbound S. Columbia Rd. alignment.
  2. Luminaire extension shall be 40' mounting height and 12' mast arm.
  3. Furnish and Install LED luminaire. See Section 140 for details. (Typ.)
  4. The final location of the video detection camera shall be determined by the contractor to provide a functional system.
  5. The final location of the Emergency Vehicle Preemption GPS detector shall be determined by the contractor to provide a functional system.
  6. Support brackets for pole mounted signal heads shall not restrict access to mast arm handhole.
  7. See Section 110 for sign details.

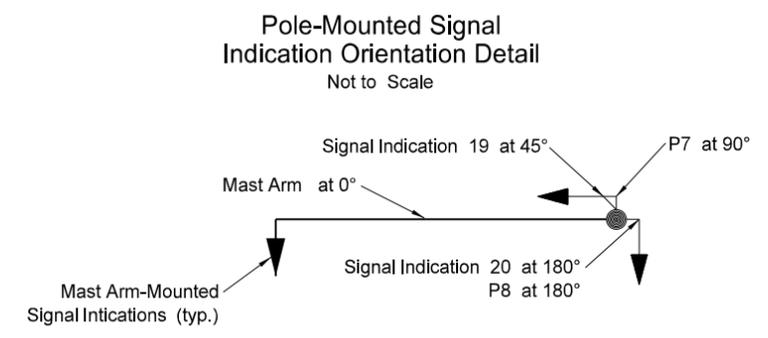
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	150	24



**Legend**

- Transformer Base
- Video Detection Camera
- Traffic Signal Head
- Vehicle Signal Head Number
- Pedestrian Head Number
- Emergency Vehicle Preemption GPS Detector and Light

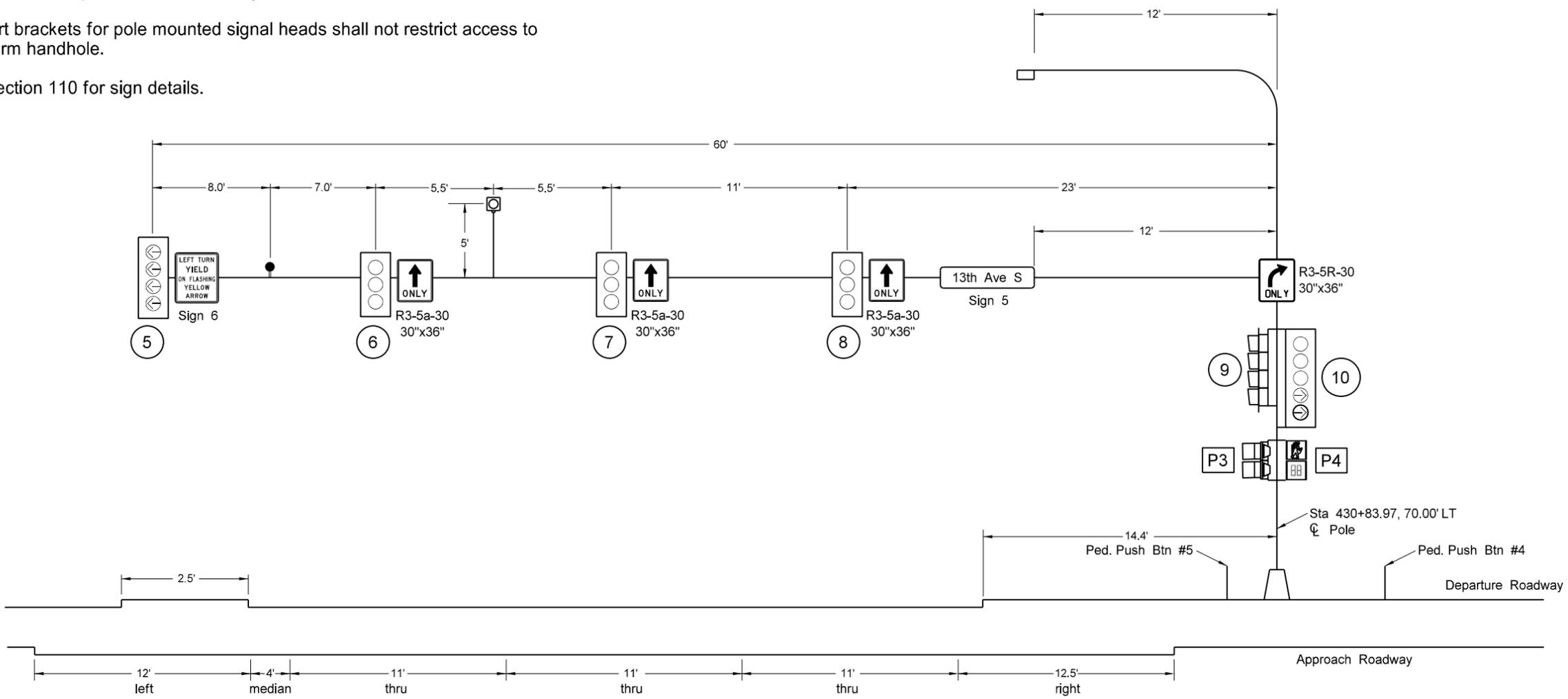
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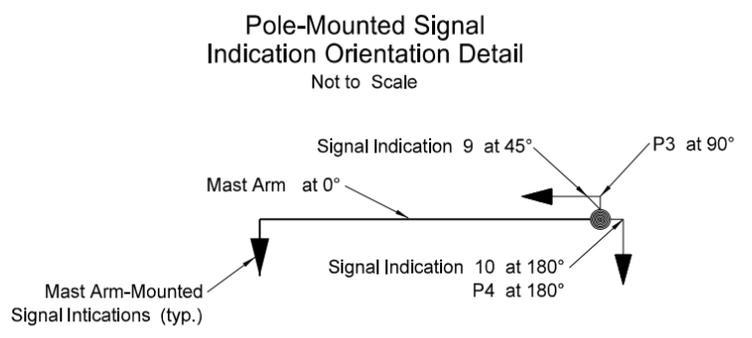
**Traffic Signal System - Site 2**  
Signal Standard & Head Locations  
13th Avenue South

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

- Notes:
- All stations and offsets are referenced from northbound S. Columbia Rd. alignment.
  - Luminaire extension shall be 40' mounting height and 12' mast arm.
  - Furnish and Install LED luminaire. See Section 140 for details. (Typ.)
  - The final location of the video detection camera shall be determined by the contractor to provide a functional system.
  - Support brackets for pole mounted signal heads shall not restrict access to mast arm handhole.
  - See Section 110 for sign details.



Southbound S Columbia Rd  
(S3)



**Legend**

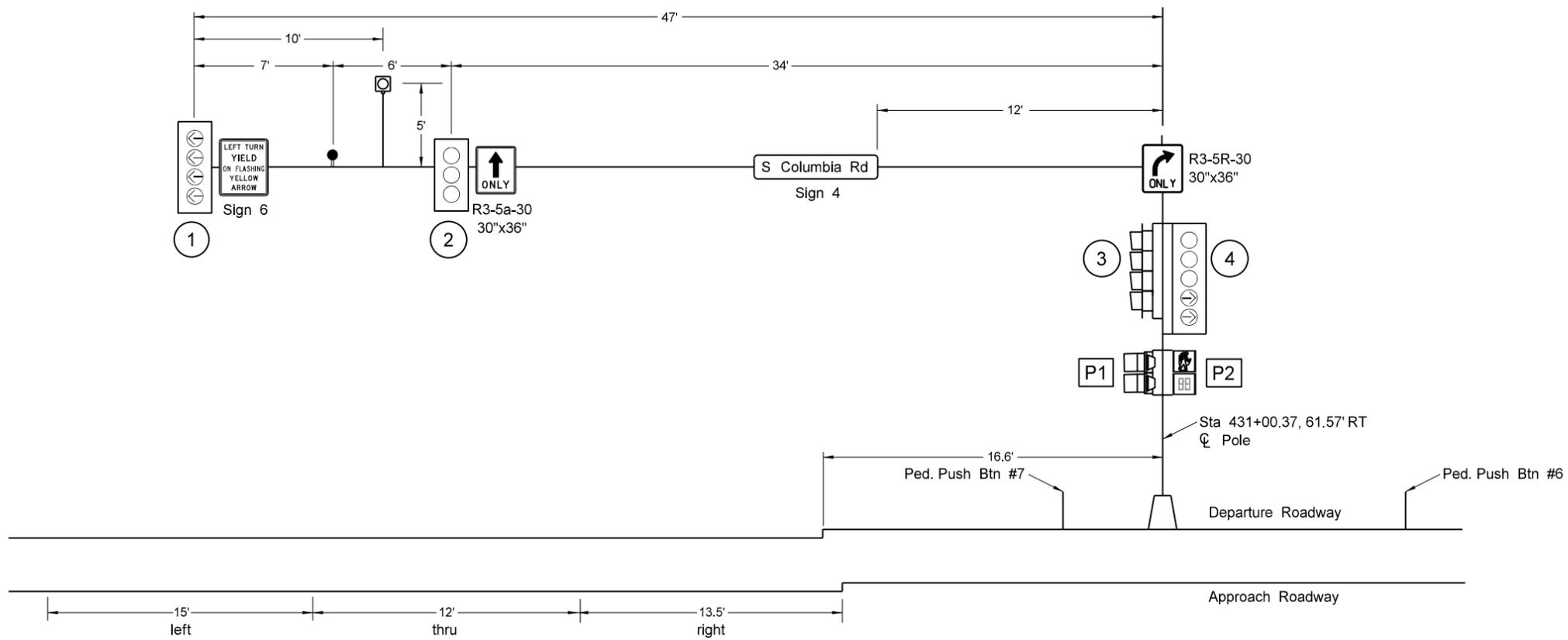
- Transformer Base
- Video Detection Camera
- Traffic Signal Head
- Vehicle Signal Head Number
- Pedestrian Head Number
- Emergency Vehicle Preemption Indicator Light

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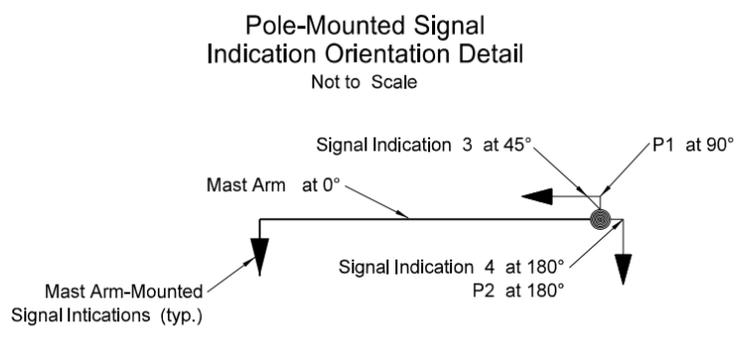
Traffic Signal System - Site 2  
Signal Standard & Head Locations  
13th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	150	26

- Notes:
1. All stations and offsets are referenced from northbound S. Columbia Rd. alignment.
  2. The final location of the video detection camera shall be determined by the contractor to provide a functional system.
  3. Support brackets for pole mounted signal heads shall not restrict access to mast arm handhole.
  4. See Section 110 for sign details.



Eastbound 13th Ave S (S4)



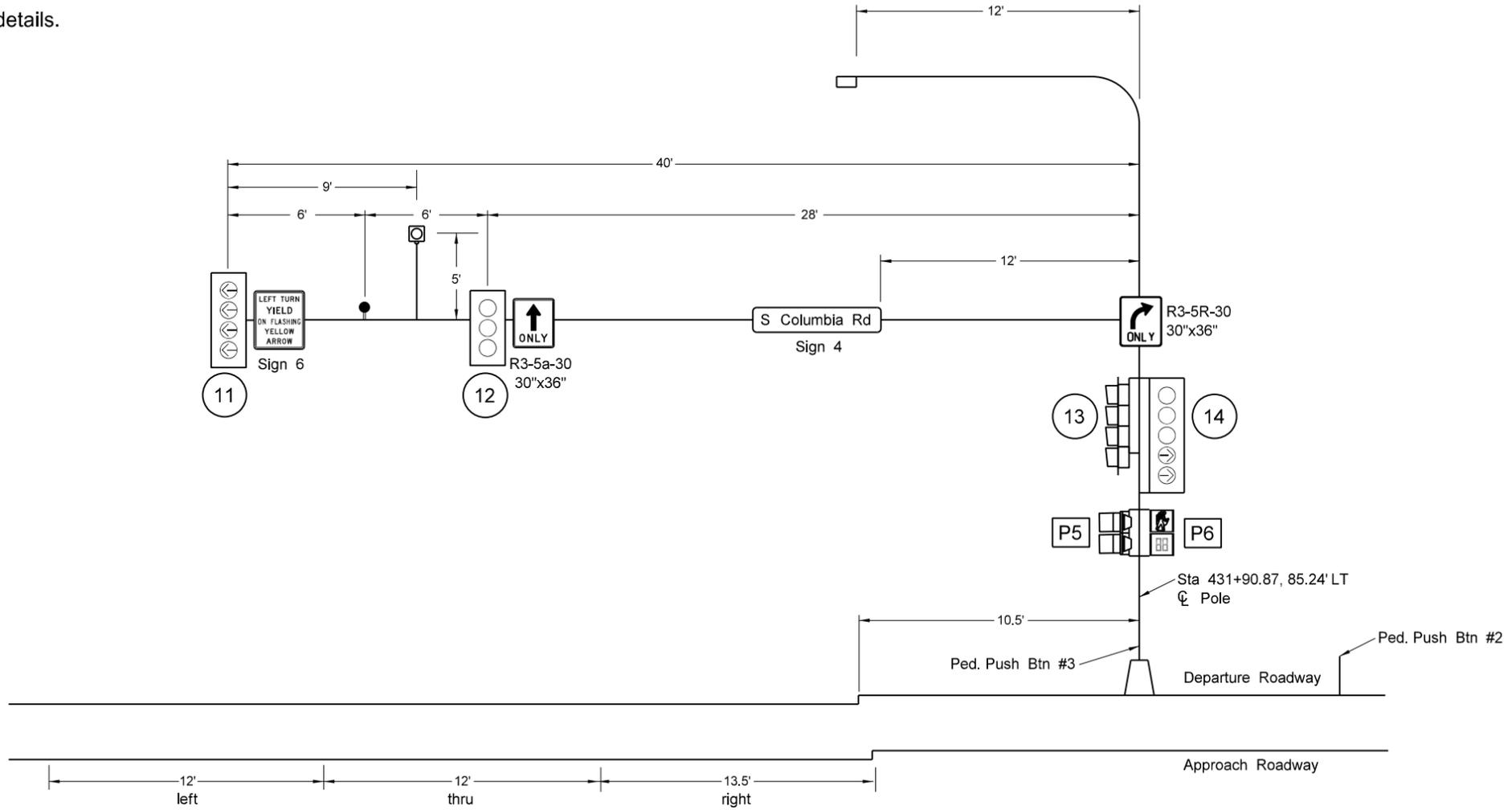
Legend	
	Transformer Base
	Video Detection Camera
	Traffic Signal Head
	Vehicle Signal Head Number
	Pedestrian Head Number
	Emergency Vehicle Preemption Indicator Light

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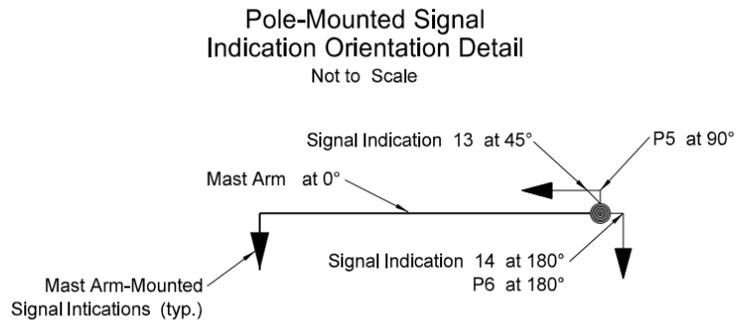
Traffic Signal System - Site 2  
Signal Standard & Head Locations  
13th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	150	27

- Notes:
1. All stations and offsets are referenced from northbound S. Columbia Rd. alignment.
  2. Luminaire extension shall be 40' mounting height and 12' mast arm.
  3. Furnish and Install LED luminaire. See Section 140 for details. (Typ.)
  4. The final location of the video detection camera shall be determined by the contractor to provide a functional system.
  5. Support brackets for pole mounted signal heads shall not restrict access to mast arm handhole.
  6. See Section 110 for sign details.



Westbound 13th Ave S (S2)



**Legend**

- Transformer Base
- Video Detection Camera
- Traffic Signal Head
- Vehicle Signal Head Number
- Pedestrian Head Number
- Emergency Vehicle Preemption Indicator Light

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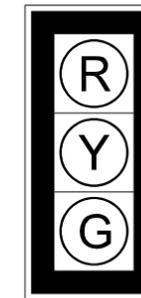
Traffic Signal System - Site 2  
 Signal Standard & Head Locations  
 13th Avenue South  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

Conductor			Cable 1 (No.14 AWG 12)		Cable 2 (No.14 AWG 12)		Cable 3 (No.14 AWG 10)		Cable 4 (No.14 AWG 12)		Cable 5 (No.14 AWG 12)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		2,4	Green	3	Green Left Arrow		Spare	6,7,8,10	Green	9	Green Left Arrow
2	White			Neutral		Neutral		Neutral		Neutral		Neutral
3	Red		2,4	Red	3	Red Left Arrow	P1	Walk	6,7,8,10	Red	9	Red Left Arrow
4	Green			Ground		Ground		Ground		Ground		Ground
5	Orange		2,4	Yellow	3	Yellow Left Arrow	P1	Don't Walk	6,7,8,10	Yellow	9	Yellow Left Arrow
6	Blue			Spare	3	FY Left Arrow		Spare		Spare	9	FY Left Arrow
7	White	Black		Spare	1	Yellow Left Arrow	P2	Walk		Spare	5	Yellow Left Arrow
8	Red	Black		Spare	1	Red Left Arrow	P2	Don't Walk		Spare	5	Red Left Arrow
9	Green	Black	4	Green Right Arrow	1	Green Left Arrow		Spare	10	Green Right Arrow	5	Green Left Arrow
10	Orange	Black	4	Yellow Rt Arrow	1	FY Left Arrow		Spare	10	Yellow Rt Arrow	5	FY Left Arrow
11	Blue	Black		Spare		Spare				Spare		Spare
12	Black	White		Spare		Spare				Spare		Spare

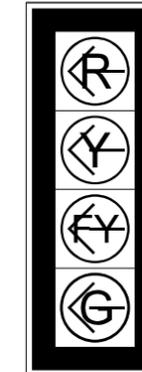


(12" Lenses)  
Heads P1,P2,P3,P4,P5,P6,P7,P8

Conductor			Cable 6 (No.14 AWG 10)		Cable 7 (No.14 AWG 12)		Cable 8 (No.14 AWG 12)		Cable 9 (No.14 AWG 10)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black			Spare	12,14	Green	13	Green Left Arrow		Spare
2	White			Neutral		Neutral		Neutral		Neutral
3	Red		P3	Walk	12,14	Red	13	Red Left Arrow	P5	Walk
4	Green			Ground		Ground		Ground		Ground
5	Orange		P3	Don't Walk	12,14	Yellow	13	Yellow Left Arrow	P5	Don't Walk
6	Blue			Spare		Spare	13	FY Left Arrow		Spare
7	White	Black	P4	Walk		Spare	11	Yellow Left Arrow	P6	Walk
8	Red	Black	P4	Don't Walk		Spare	11	Red Left Arrow	P6	Don't Walk
9	Green	Black		Spare	14	Green Right Arrow	11	Green Left Arrow		Spare
10	Orange	Black		Spare	14	Yellow Rt Arrow	11	FY Left Arrow		Spare
11	Blue	Black				Spare		Spare		
12	Black	White				Spare		Spare		



(12" Lenses)  
Heads 2,6,7,8,12,16,17,18,20



(12" Lenses)  
Heads 1,3,5,9,11,13,15,19



(12" Lenses)  
Heads 4,10,14

Conductor			Cable 10 (No.14 AWG 12)		Cable 11 (No.14 AWG 12)		Cable 12 (No.14 AWG 10)	
Run	Base	Tracer	Head	Indication	Head	Indication	Head	Indication
1	Black		16,17,18,20	Green	19	Green Left Arrow		Spare
2	White			Neutral		Neutral		Neutral
3	Red		16,17,18,20	Red	19	Red Left Arrow	P7	Walk
4	Green			Ground		Ground		Ground
5	Orange		16,17,18,20	Yellow	19	Yellow Left Arrow	P7	Don't Walk
6	Blue			Spare	19	FY Left Arrow		Spare
7	White	Black		Spare	15	Yellow Left Arrow	P8	Walk
8	Red	Black		Spare	15	Red Left Arrow	P8	Don't Walk
9	Green	Black		Spare	15	Green Left Arrow		Spare
10	Orange	Black		Spare	15	FY Left Arrow		Spare
11	Blue	Black		Spare		Spare		
12	Black	White		Spare		Spare		

Note:

- All Heads Shall use LED Indications
- 5" Louvered Black Plate with Type XI Yellow Reflective Border (typ.) on all heads

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Traffic Signal System - Site 2  
Signal Heads & Conductor Schedule  
13th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

Run	Station	Location	Conduit Run		Cable Run			
			Length	Size	Length	Code	QTY	Type
1	432+17.85 to 432+20.16	Controller to Pull Box 1	20	4"	50	A	2	No. 14 AWG 2 Conductor Cable
					30	B	1	GPS Emergency Detector Cable
					50	C	2	No. 14 AWG 10 Conductor Cable
					90	C	4	No. 14 AWG 12 Conductor Cable
					90	C	4	Push Button
2	432+20.16 to 432+23.21	Pull Box 1 to Signal S1	10	3"	20	A	1	No. 14 AWG 2 Conductor Cable
					20	B	1	GPS Emergency Detector Cable
					20	C	1	No. 14 AWG 10 Conductor Cable
					30	C	2	No. 14 AWG 12 Conductor Cable
					20	D	1	Video Detector Cable
3	432+20.16 to 432+11.45	Pull Box 1 to Pedestrian Push Btn. 1	10	2"	20	C	1	Push Button
4	432+20.16 to 432+19.50	Pull Box 1 to Pull Box 2	115	4"	125	A	1	No. 14 AWG 2 Conductor Cable
					125	C	1	No. 14 AWG 10 Conductor Cable
					240	C	2	No. 14 AWG 12 Conductor Cable
					355	C	3	Push Button
					125	D	1	Video Detector Cable
5	432+19.50 to 432+11.52	Pull Box 2 to Pedestrian Push Btn. 2	10	2"	20	C	1	Push Button
6	432+19.50 to 432+00.76	Pull Box 2 to Pull Box 3	20	4"	30	A	1	No. 14 AWG 2 Conductor Cable
					30	C	1	No. 14 AWG 10 Conductor Cable
					50	C	2	No. 14 AWG 12 Conductor Cable
					50	C	2	Push Button
					30	D	1	Video Detector Cable
7	432+00.76 to 431+90.87	Pull Box 3 to Signal S2	20	3"	30	A	1	No. 14 AWG 2 Conductor Cable
					30	C	1	No. 14 AWG 10 Conductor Cable
					50	C	2	No. 14 AWG 12 Conductor Cable
					50	C	2	Push Button
					30	D	1	Video Detector Cable
8	432+00.76 to 431+00.72	Pull Box 3 to Pull Box 4	105	4"	115	C	1	Push Button
9	431+00.72 to 431+03.67	Pull Box 4 to Pedestrian Push Btn. 4	15	2"	25	C	1	Push Button
10	431+00.72 to 430+76.91	Pull Box 4 to Pull Box 5	30	4"				Empty
11	430+76.91 to 430+83.97	Pull Box 5 to Signal S3	15	3"	25	A	1	No. 14 AWG 2 Conductor Cable
					25	C	1	No. 14 AWG 10 Conductor Cable
					40	C	2	No. 14 AWG 12 Conductor Cable
					40	C	2	Push Button
					25	D	1	Video Detector Cable

Run	Station	Location	Conduit Run		Cable Run			
			Length	Size	Length	Code	QTY	Type
12	430+76.91 to 430+85.30	Pull Box 5 to Pedestrian Push Btn. 5	10	2"	20	C	1	Push Button
13	430+76.13 to 430+76.91	Pull Box 6 to Pull Box 5	100	4"	110	A	1	No. 14 AWG 2 Conductor Cable
					110	C	1	No. 14 AWG 10 Conductor Cable
					210	C	2	No. 14 AWG 12 Conductor Cable
					110	C	1	Push Button
					110	D	1	Video Detector Cable
14	430+76.13 to 430+85.30	Pull Box 6 to Pedestrian Push Btn. 6	10	2"	20	C	1	Push Button
15	431+16.92 to 430+76.13	Pull Box 7 to Pull Box 6	65	4"	75	A	1	No. 14 AWG 2 Conductor Cable
					75	C	1	No. 14 AWG 10 Conductor Cable
					140	C	2	No. 14 AWG 12 Conductor Cable
					140	C	2	Push Button
					75	D	1	Video Detector Cable
16	431+16.92 to 431+05.28	Pull Box 7 to Pedestrian Push Btn. 7	25	2"	35	C	1	Push Button
17	431+16.92 to 431+00.37	Pull Box 7 to Signal S4	20	3"	30	A	1	No. 14 AWG 2 Conductor Cable
					30	C	1	No. 14 AWG 10 Conductor Cable
					50	C	2	No. 14 AWG 12 Conductor Cable
					30	D	1	Video Detector Cable
18	432+06.10 to 431+16.92	Pull Box 8 to Pull Box 7	95	4"	200	A	2	No. 14 AWG 2 Conductor Cable
					200	C	2	No. 14 AWG 10 Conductor Cable
					390	C	4	No. 14 AWG 12 Conductor Cable
					295	C	3	Push Button
					200	D	2	Video Detector Cable
19	432+06.10 to 432+02.53	Pull Box 8 to Pedestrian Push Btn. 8	10	2"	20	C	1	Push Button
20	432+17.85 to 432+06.10	Controller to Pull Box 8	10	4"	30	A	2	No. 14 AWG 2 Conductor Cable
					30	C	2	No. 14 AWG 10 Conductor Cable
					50	C	4	No. 14 AWG 12 Conductor Cable
					50	C	4	Push Button
					30	D	2	Video Detector Cable
21	432+23.58 to 432+17.85	Feedpoint to Controller	10	2"	20	E	1	Power Cables

Cable Code

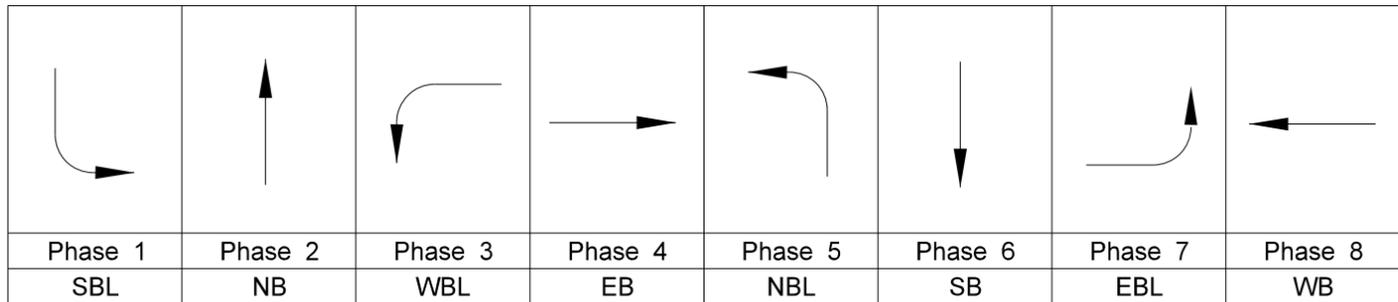
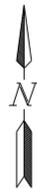
A = Emergency Vehicle Indicator Lamp  
 B = Emergency Vehicle Detector Cable  
 C = Signal Control Cable  
 D = Video Detection Cable  
 E = Power Cable

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Traffic Signal System - Site 2  
 Cable & Conduit Schedule  
 13th Avenue South

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota





**BASIC INTERVALS (OR FUNCTIONS)**

Minimum Initial	5	15	5	10	5	15	5	10
Vehicle Extension	1.5	4.0	1.5	3.0	1.5	4.0	1.5	3.0
Maximum Green (Max 1)	20	45	25	25	30	25	25	20
Yellow Change	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
Red Clearance	2.0	1.5	2.0	3.0	2.0	1.5	2.0	3.0
Walk	-	7	-	7	-	7	-	7
Pedestrian Clearance	-	24	-	27	-	22	-	31

**VOLUME DENSITY TIMING FUNCTIONS**

VARIABLE INITIAL TIMING OPTIONS

Actuations Before Added Initial	0	0	0	0	0	0	0	0
Added Initial per Actuation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Initial	0	0.0	0	0	0	0.0	0	0

GAP REDUCTION OPTIONS

Time Before Reduction	0	25	0	0	0	25	0	0
Time to Reduce to Minimum Gap	0	25	0	0	0	25	0	0
Minimum Gap	0.0	2.5	0.0	0.0	0.0	2.5	0.0	0.0

**OTHER CONTROLLER FUNCTIONS**

Locking Memory	-	x	-	x	-	x	-	x
Non-Locking Memory	x	-	x	-	x	-	x	-
Phase recall	-	x	-	-	-	x	-	-
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Backup Prevent Phases	-	-	-	-	-	-	-	-
No Serve Phases	-	-	-	-	-	-	-	-
Flashing-Normal & Conflict Monitor	R	R	R	R	R	R	R	R
Start Up Phasing	R	G	R	R	R	G	R	R
Type of Detector	Presence	X	X	X	X	X	X	X
	Calling							
	Passage		X				X	

Notes:

1. All left turn phases may operate as leading or lagging phases.
2. All left turn phases may operate in protected, protected/permisive, or permisive mode.
3. Default mode for phases 1 and 5 shall be protected only.
4. Default mode for phases 3 and 7 shall be protected/permisive.

This document was originally issued and sealed by Nicholas J. Erpelding Registration Number PE- 5870, on 07/30/14 and the original document is stored at the office of CPS, Ltd. Grand Forks, ND

Traffic Signal System - Site 2  
Signal Timing Settings  
13th Avenue South  
  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

**Coordination Timing:**

		Coord Pattern:														
		1	2	3	4	5	6	11	17	18	19	21	23	24	25	31
<b>Cycle Length</b>		120	80	100	120	110	100	50	90	120	110	120	100	120	120	50
<b>Offset</b>		65	56	25	39	20	25	33	75	48	109	93	57	51	53	33
<b>Sequence</b>		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>Phase 1</b>	<b>SBL</b>	12	12	13	21	15	13	0	16	22	15	12	13	21	20	0
<b>Phase 2</b>	<b>NB</b>	78	35	54	62	57	54	30	43	57	53	75	54	62	54	30
<b>Phase 3</b>	<b>WBL</b>	12	0	0	17	15	0	0	11	12	15	12	0	17	13	0
<b>Phase 4</b>	<b>EB</b>	18	33	33	20	23	33	20	20	29	27	21	33	20	33	20
<b>Phase 5</b>	<b>NBL</b>	12	12	13	13	15	15	0	11	13	15	12	13	13	13	0
<b>Phase 6</b>	<b>SB</b>	78	35	54	70	57	54	30	48	66	53	75	54	70	61	30
<b>Phase 7</b>	<b>EBL</b>	12	0	0	17	20	0	0	14	20	24	15	0	15	13	0
<b>Phase 8</b>	<b>WB</b>	18	33	33	20	18	33	20	17	21	18	18	33	22	33	20
<b>Coord Phase(s)</b>		2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6
<b>Leading Phase(s)</b>		1,3,5,7	1,5	1,5	1,3,5,7	1,3,5,7	1,5	-	1,3,5,7	1,3,5,7	1,3,5,7	1,3,5,7	1,5	1,3,5,7	1,3,5,7	-
<b>Omitted Phase(s)</b>			3,7	3,7			3,7	1,3,5,7					3,7			1,3,5,7

**Coord Pattern Descriptions:**

- |                    |   |
|--------------------|---|
| 1 AM Peak          | 17 Weekday AM Peak                      |
| 2 AM Off Peak      | 18 Weekday PM Peak                      |
| 3 PM Off Peak      | 19 Saturday Midday Peak                 |
| 4 PM Peak          | 21 Snow Day Plan; Morning Peak, Evening |
| 5 Weekend Midday   | 23 Snow Day Plan; Morning Off Peak      |
| 6 Weekend Off Peak | 24 Snow Day Plan; Weekday Afternoon     |
| 11 Overnight       | 25 Snow Day Plan; Weekend Midday        |
|                    | 31 Snow Day Plan; Overnight             |

**Time of Day Schedules:**

Day Plan:	1	Day Plan:	2	Day Plan:	3
In Effect:	Monday - Friday	In Effect:	Saturday	In Effect:	Sunday
Time	Pattern	Time	Pattern	Time	Pattern
0	11	0	11	0	11
630	2	830	2	900	2
715	17	1030	5	1100	5
815	2	1800	2	1700	2
1100	5	2230	11	2100	11
1430	18				
1455	18				
1530	18				
1800	3				
2000	2				
2300	11				

**Coordination Left Turn Phasing:**

		Coord Pattern:														
		1	2	3	4	5	6	11	17	18	19	21	23	24	25	31
<b>Phase 1</b>	<b>SBL</b>	Prot.	Prot.	Prot.	Prot.	Prot.	Prot.	Perm.	Prot.	Perm.						
<b>Phase 3</b>	<b>WBL</b>	P/P	Perm.	Perm.	P/P	P/P	Perm.	Perm.	P/P	P/P	P/P	P/P	Perm.	P/P	P/P	Perm.
<b>Phase 5</b>	<b>NBL</b>	Prot.	Prot.	Prot.	Prot.	Prot.	Prot.	Perm.	Prot.	Perm.						
<b>Phase 7</b>	<b>EBL</b>	P/P	Perm.	Perm.	P/P	P/P	Perm.	Perm.	P/P	P/P	P/P	P/P	Perm.	P/P	P/P	Perm.

**Legend:**

- Prot. Protected Only
- P/P Protected/Permissive
- Perm. Permissive Only

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Traffic Signal System - Site 2  
 Coordination Signal Timing Settings  
 13th Avenue South  
 Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-986(105)109	150	33

SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL
770	1226	LT STD 12FT MA 40FT MT HT	EA	3
770	4220	LED LUMINAIRE-150 WATT	EA	3
772	0100	PULL BOX	EA	8
772	0020	CONCRETE FOUNDATION-TRAFFIC SIGNALS	EA	4
772	0240	2IN DIAMETER RIGID CONDUIT	LF	100
772	0270	3IN DIAMETER RIGID CONDUIT	LF	65
772	0290	4IN DIAMETER RIGID CONDUIT	LF	560
772	0310	UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	20
772	0375	EMERGENCY VEHICLE DETECTOR CABLE	LF	705
772		NO14 AWG 2 CONDUCTOR CABLE	LF	1435
772		NO14 AWG 10 CONDUCTOR CABLE	LF	725
772		NO14 AWG 12 CONDUCTOR CABLE	LF	1340
772	647	TYPE IV SIGNAL STD 47FT MA	EA	1
772	1102	COMBO 40FT MA SIG & LT STD-TYPE C	EA	1
772	1295	COMBO 60FT MA SIG & LT STD-TYPE C	EA	2
772	1812	1-WAY 3 SEC HEAD W/12IN LENS-MA MTD	EA	8
772	1820	1-WAY 4 SEC HEAD W/12IN LENS-POST MTD	EA	4
772	1822	1-WAY 4 SEC HEAD W/12IN LENS-MA MTD	EA	4
772	1830	1-WAY 5 SEC HEAD W/12IN LENS-POST MTD	EA	4
772	2060	PEDESTRIAN COUNTDOWN SIGNAL HEAD-POST MTD	EA	8
772	2200	PEDESTRIAN PUSHBUTTON POST	EA	7
772	2215	PEDESTRIAN PUSHBUTTON & SIGN	EA	8
772	2260	VIDEO DETECTION CABLE	LF	725
772	2265	VIDEO DETECTION SYSTEM	EA	1
772	2522	VOLUME DENSITY CONTR W/EMER PREEMPTION & CABINET	EA	1
772	2610	EMERGENCY VEHICLE PREEMPTION UNIT	EA	4
772	9811	TRAFFIC SIGNAL SYSTEM - SITE 2	EA	1
		Items shown above are for informational purposes; contractor shall provide all labor and equipment necessary for the signal system to be fully operational as shown in the Plans. Items shall be included in the corresponding price bid for "TRAFFIC SIGNAL SYSTEM - SITE 2"		

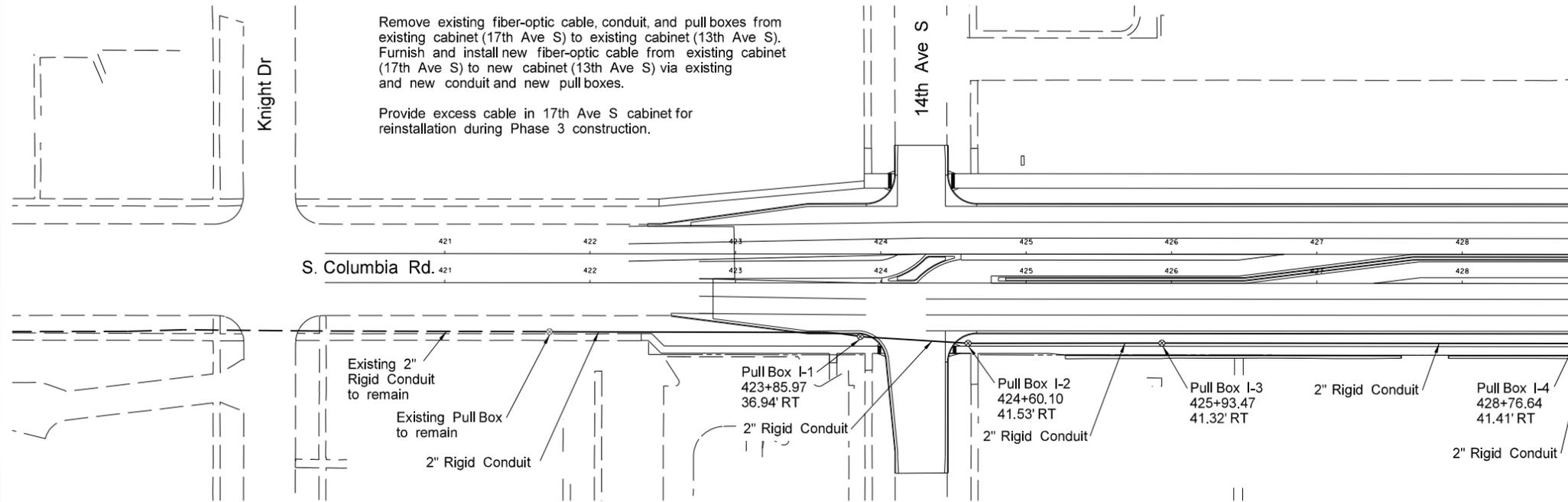
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Traffic Signal System - Site 2  
Estimated Traffic Signal Quantities  
13th Avenue South  
Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

Notes:  
All stations and offsets are referenced from northbound S. Columbia Rd. alignment.

Remove existing fiber-optic cable, conduit, and pull boxes from existing cabinet (17th Ave S) to existing cabinet (13th Ave S).  
Furnish and install new fiber-optic cable from existing cabinet (17th Ave S) to new cabinet (13th Ave S) via existing and new conduit and new pull boxes.

Provide excess cable in 17th Ave S cabinet for reinstallation during Phase 3 construction.

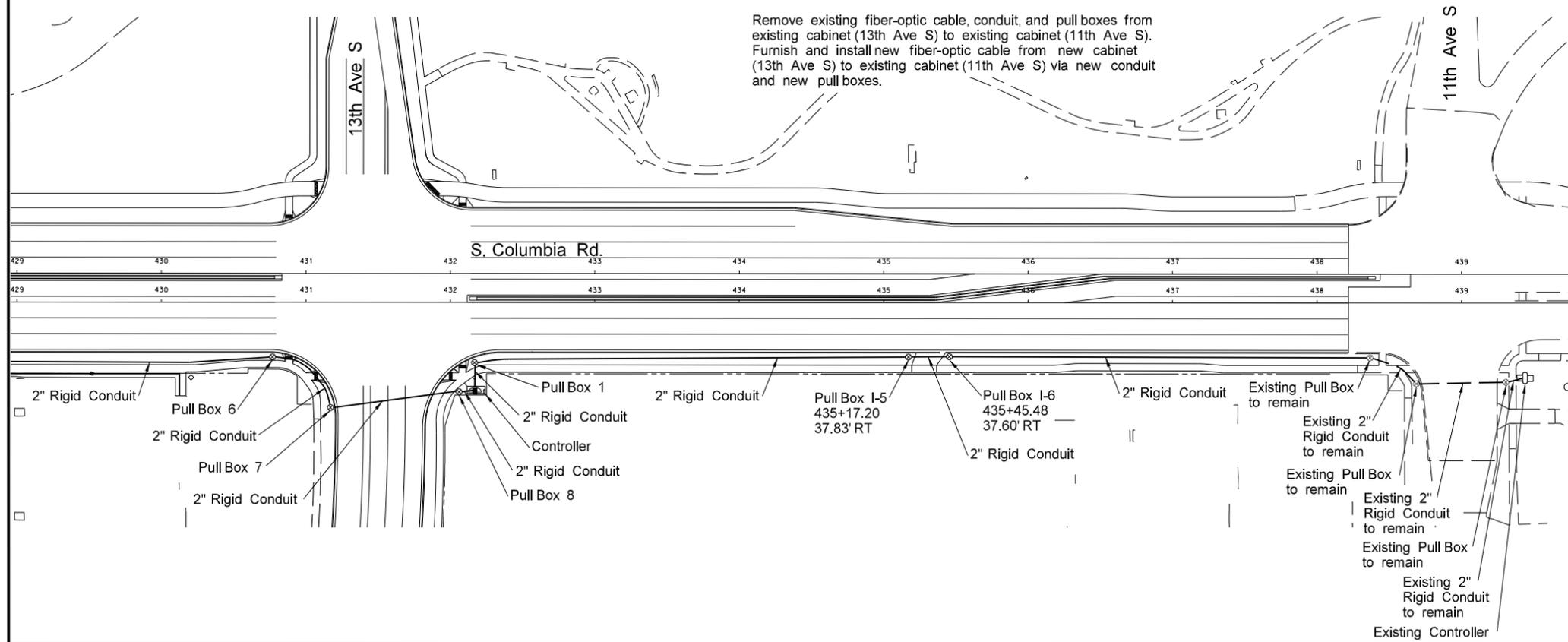


Remove Conduit	720 LF
Remove Pull Boxes	4 EA
Fiber Optic Line	
Existing cabinet (17th Ave S) to sta 428+90 o/s RT	1665 LF
2IN Rigid Conduit	
Sta 421+70 to sta 428+90 o/s RT	720 LF
Pull Box	
Existing cabinet (17th Ave S) to sta 428+90 o/s RT	4 EA

Note:  
All items and quantities are for estimating purposes only.  
All work shall be included in IT system bid item.

Notes:  
All stations and offsets are referenced from northbound S. Columbia Rd. alignment.

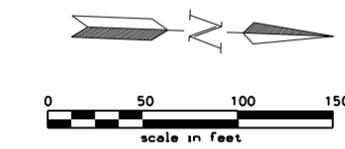
Remove existing fiber-optic cable, conduit, and pull boxes from existing cabinet (13th Ave S) to existing cabinet (11th Ave S).  
Furnish and install new fiber-optic cable from new cabinet (13th Ave S) to existing cabinet (11th Ave S) via new conduit and new pull boxes.



Remove Conduit	970 LF
Remove Pull Boxes	2 EA
Fiber Optic Line	
Sta 428+90 to 439+45 o/s RT	1110 LF
2IN Rigid Conduit	
Sta 428+90 to 438+37 o/s RT	970 LF
Pull Box	
Sta 428+90 to 439+40 o/s RT	2 EA

Note:  
All items and quantities are for estimating purposes only.  
All work shall be included in IT system bid item.

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Registration Number  
PE- 5870,  
on 08/19/14 and the original document is stored at the office of CPS, Ltd.  
Grand Forks, ND



IT System Interconnect Layout

Reconstruction of South Columbia Road  
14th Avenue South to 11th Avenue South  
Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	175	1



JOB NO.: G4498      LOG OR TEST BORING NO.: 2      VERTICAL SCALE: 1"=2'  
 PROJECT: Proposed Reconstruction of South Columbia Road, Demers to 14<sup>th</sup> Avenue South,  
 Grand Forks, North Dakota

DEPTH IN FEET	SOIL DESCRIPTION	SAMPLE			LABORATORY TESTS			
		NO.	TYPE	N VALUE	MOISTURE	DENSITY	LL/PL	Qu
	SURFACE ELEVATION: 830.3							
7"	CONCRETE PAVEMENT							
	FILL - LEAN CLAY - brown and grayish brown, with a trace of sand and gravel	1	SS	4				
		2	SS	4				
		3	SS	4				
6	FAT CLAY - grayish brown mottled, medium stiff, with lenses of silt (CH)	4	SS	5				
		5	SS	8				
11	End of Boring							
WATER LEVEL DATA				BORING DATA				
DATE	TIME	CAVE IN DEPTH	WATER LEVEL	STARTED:	COMPLETED:			
9-9-10	4:45	HSA 9 1/2'	None	9-9-10	9-9-10 @ 4:45			
9-9-10	4:52	Reversed Auger		METHOD USED:	3 1/4" HSA 0-9 1/2'			
				CREW CHIEF:	T. Messelt			

Location:  
 Sta 426+54.08 O/s 15.2 Lt (Mainline)

Stationing and Offset Based on the Alignment PRCOLNB.



JOB NO.: G4498      LOG OR TEST BORING NO.: 3      VERTICAL SCALE: 1"=2'  
 PROJECT: Proposed Reconstruction of South Columbia Road, Demers to 14<sup>th</sup> Avenue South,  
 Grand Forks, North Dakota

DEPTH IN FEET	SOIL DESCRIPTION	SAMPLE			LABORATORY TESTS			
		NO.	TYPE	N VALUE	MOISTURE	DENSITY	LL/PL	Qu
	SURFACE ELEVATION: 830.5							
7 1/2"	CONCRETE PAVEMENT							
	FILL - LEAN CLAY - dark grayish brown to brown, with a trace of sand and gravel	1	SS	7				
		2	SS	6				
3 1/2"	LEAN CLAY - grayish brown mottled, medium stiff, with lenses of silt (CL)	3	SS	5				
6	FAT CLAY - grayish brown mottled, medium stiff, with lenses of silt (CH)	4	SS	5				
		5	SS	8				
11	End of Boring							
WATER LEVEL DATA				BORING DATA				
DATE	TIME	CAVE IN DEPTH	WATER LEVEL	STARTED:	COMPLETED:			
9-9-10	5:38	HSA 9 1/2'	None	9-9-10	9-9-10 @ 5:38			
9-9-10	5:44	Reversed Auger		METHOD USED:	3 1/4" HSA 0-9 1/2'			
				CREW CHIEF:	T. Messelt			

Location:  
 Sta 430+46.80 O/s 33.7 Lt (Mainline)

Boring Logs

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-986(105)109	175	2



JOB NO.: G4498      LOG OR TEST BORING NO.: 4      VERTICAL SCALE: 1"=2'  
 PROJECT: Proposed Reconstruction of South Columbia Road, Demers to 14<sup>th</sup> Avenue South,  
 Grand Forks, North Dakota

DEPTH IN FEET	SOIL DESCRIPTION	SAMPLE			LABORATORY TESTS			
		NO	TYPE	N VALUE	MOISTURE	DENSITY	LL/PL	Qu
	SURFACE ELEVATION: 831.0							
7"	CONCRETE PAVEMENT							
	FILL - LEAN CLAY - brown and dark grayish brown, with a trace of sand and gravel	1	SS	8				
2 1/2"	LEAN CLAY - grayish brown mottled, soft to medium stiff, with lenses and laminations of silt (CL)	2	SS	4	28.8			
		3	SS	6				
7	FAT CLAY - grayish brown mottled, medium stiff, with a few lenses of silt (CH)	4	SS	6	37.5	82	66/28	
		5	SS	6				
11	End of Boring							
WATER LEVEL DATA				BORING DATA				
DATE	TIME	CAVE IN DEPTH	WATER LEVEL	STARTED: 9-13-10		COMPLETED: 9-13-10 @ 3:38		
9-13-10	3:36	HSA 9 1/2'	None	METHOD USED:		3 1/4" HSA 0-9 1/2'		
9-13-10	3:38	Reversed Auger		CREW CHIEF: T. Messelt				

Core Number	Core Location	Pavement Thickness (Inches)	Pavement Type	Aggregate Base Thickness (Inches)
C1	Sta 424+18.20 O/s 54.1 Lt	8.6	PCC	4
C2	Sta 424+33.90 O/s 38.0 Rt	6.3	PCC	1
C3	Sta 431+25.22 O/s 65.0 Lt	7.9	PCC	8
C4	Sta 431+53.76 O/s 37.4 Rt	8.3	PCC	18+

**Notes:**

1. Cores were obtained and measured in accordance with ASTM C 174.
2. Cores were obtained on September 8, 2011

Location:  
 Sta 435+85.19 O/s 17.6 Rt (Mainline)

Stationing and Offset Based on the Alignment PRCOLNB.

Boring Logs

Reconstruction of South Columbia Road  
 14th Avenue South to 11th Avenue South  
 Grand Forks, North Dakota