DESIGN DATA				
Traffic	Average Daily			
Current N/A	Pass: N/A	Trucks: N/A	Total: N/A	
Forecast N/A	Pass: N/A	Trucks: N/A	Total: N/A	
Clear Zone Distance: 2 FT		Design Speed: 20 MPH		
Minimum Sight Dist. for Stopping:N/A		Bridges: N/A		
Sight Dist. for No Passing Zone: N/A				
Pavement Design Life: N/A				

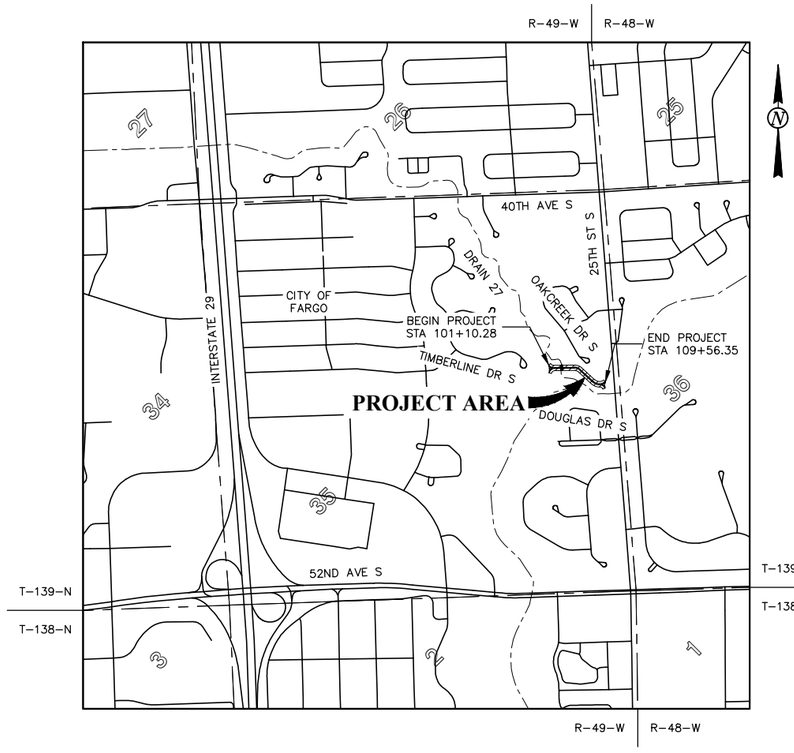
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	23946	1	1

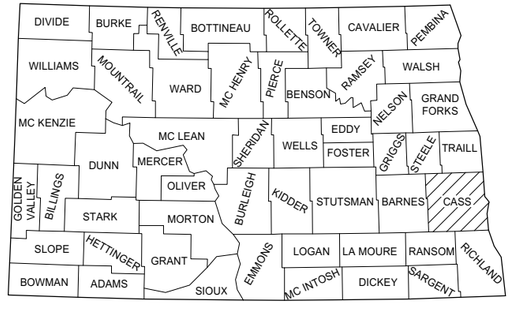
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

TMA-TAU-8-984(177)
SN-25-A0
CASS COUNTY
DRAIN 27 TRAIL CROSSING
TIMBERLINE TO MILWAUKEE TRAIL
GRADING, SHARED USE PATH, AND BOX CULVERT

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	4/1/2023
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
TMA-TAU-8-984(177)	0.160	0.160





STATE COUNTY MAP

THE CITY OF Fargo FAR MORE

Proj. No. 6059-0205
Houston Engineering Inc.
Ph: 701.237.5065

DESIGNERS

DEREK KAYSER

APPROVED DATE 8/22/2024

Tom Knakmuhs
FARGO
CITY ENGINEER

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

APPROVED DATE 8/20/2024

HOUSTON ENGINEERING INC

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/20/2024

08/05/24 10:19:36AM H:\JBN\6000\6059\6059_0205 Multi-Project RFP\CAD\Plans\Drain 27\001-COVER.dwg

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	2	1

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6	3	Environmental Notes
8	1	Quantities
10	1	Basis of Estimate
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20	1	General Details
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75	1 - 2	Wetland Impacts
76	1	Temporary Erosion Control
77	1 - 2	Permanent Erosion Control
80	1 - 2	Layouts
82	1	Alignment Definition
85	1	Landscaping
90	1	Paving Layouts
100	1 - 2	Work Zone Traffic Control
170	1 - 3	Box Culverts
200	1 - 11	Cross Sections

LIST OF STANDARD DRAWINGS

Number	Description
D-260-1	Erosion And Siltation Controls - Silt Fence
D-261-1	Erosion Control - Fiber Roll Placement Details
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-23	Short Term Urban Detour And Lane Closure On A Divided Highway Layouts

SPECIAL PROVISIONS

Number	Description
SSP 1	Temporary Erosion and Sediment Best Management Practices
SP 634(23)	City of Fargo Specifications for Construction
PSP 129(23)	Permits and Environmental Considerations
SP 619(23)	Temporary Pedestrian Facility

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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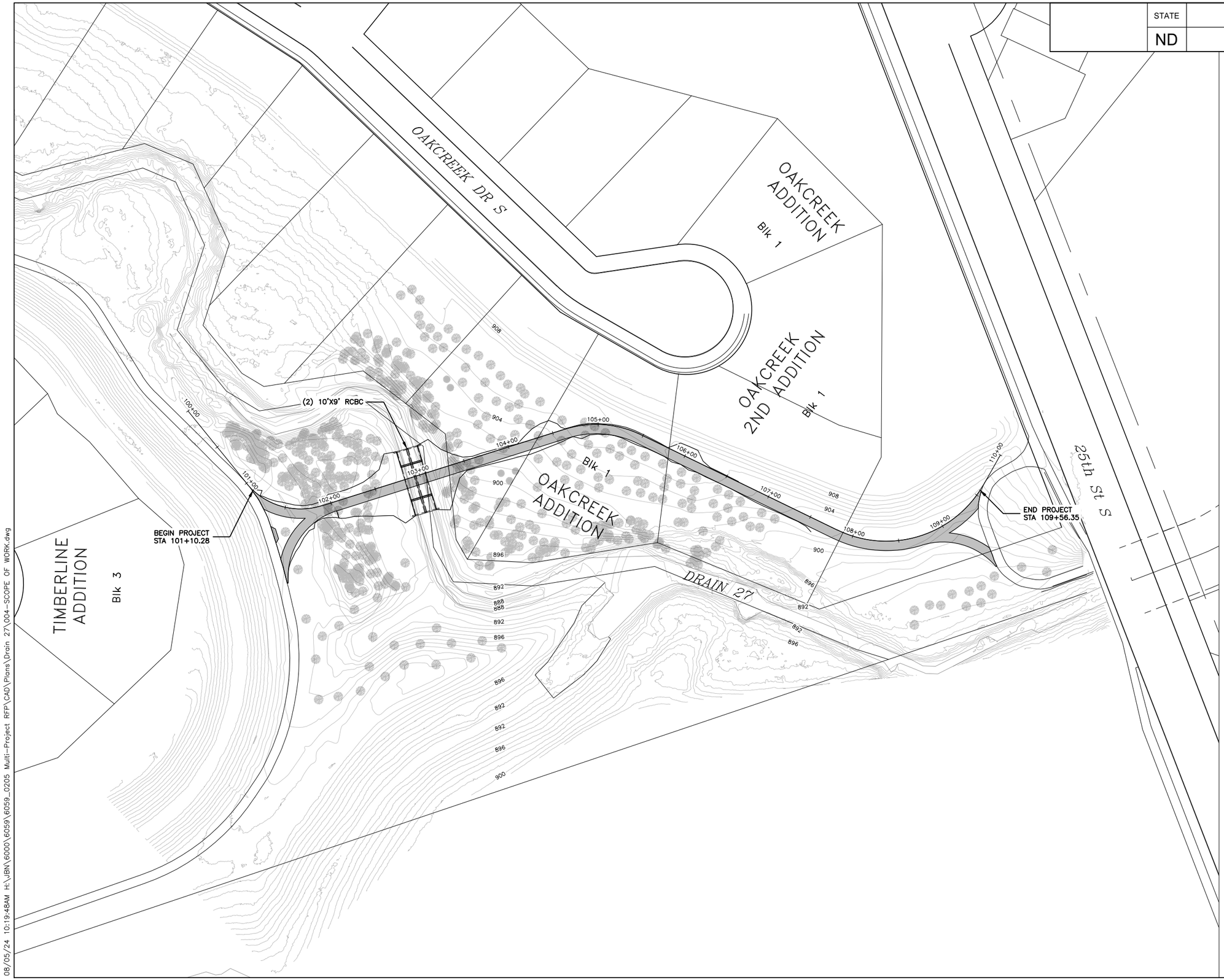

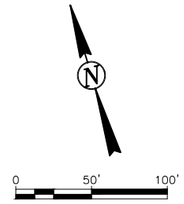

LEGEND:

SIDEWALK CONCRETE 5IN (ON 2" BASE)

THE CITY OF Fargo FAR MORE

Proj. No. 6059-0205
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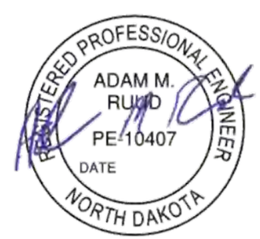
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)



8/12/2024

Scope of Work

Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	6	1

NOTES

100-P01 COORDINATION OF PROJECTS: Other projects may be under contract in the vicinity of this project during the 2025 construction season.

100-P02 PROJECT COMPLETION: Phase and schedule construction activities to meet the following requirements:

Substantial Completion: Complete all work except for clearing and grubbing and turf establishment within 40 calendar days of mobilizing to the site and no later than September 12, 2025.

Final Completion: Complete all work by October 15, 2025.

100-P03 SITE ACCESS: Access the site only from 25th St S. Close the right southbound lane of 25th St S as necessary per Standard Drawing 704-23. Do not operate equipment on or impact the existing levees adjacent to or within the project limits. It is anticipated concrete may need to be buggied or pumped for the construction of the trail due to the space constraints.

It is anticipated concrete box culverts will be installed as single cell units due to the limited space onsite. It is assumed the box culvert segments will be delivered to the project site via the single lane closure on 25th St and carried into position within Drain 27 with construction equipment.

Alternative construction methods are acceptable provided no additional traffic, flood control features, environmental areas, wetlands, other waters, or trees will be impacted during construction. Repair or replace any damage to existing infrastructure that results from construction operations.

100-P04 WEEKLY LOOK AHEAD SCHEDULE: Submit a Weekly Look Ahead Schedule at the end of each week or at such other time of the week as determined by the Engineer. Include those work activities that are scheduled to begin or are in progress for the next three weeks on the form provided.

Pay estimates may be withheld if the required schedules are not received. Receipt of a pay estimate does not relieve the Contractor of the requirement to provide the schedules. Include all costs for the Weekly Look Ahead Schedule in the price bid for other items.

100-P05 PRECONSTRUCTION MEETING: Organize, schedule, and attend a meeting with private utility companies and subcontractors at least 7 days prior to the start of construction for coordination purposes.

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

Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection.

Use a vacuum or pick-up type sweeper to perform this work.

105-P01 NOISE RESTRICTIONS: Do not perform construction activities or moving of equipment between the hours of 10:00 pm and 7:00 am except for sawing of new concrete. Notify residents within ½ block of the work area by 7:30 pm when sawing is planned to occur during these hours.

105-P02 LOCATION OF EXISTING UTILITIES: Existing utilities have been shown for reference. Such utilities have been plotted from record drawings. The location of private utilities shown on the plans are approximate.

All existing utilities may not be shown. The location of existing utilities is not guaranteed. Determine the exact location of, and protection of, the existing utilities.

Before commencing any excavation or construction, determine the location and seek aid in locating all public and private utilities.

Contact and coordinate with utility owners to allow access to their own utilities to perform the relocations and/or inspections. Schedule work accordingly so as not to delay or prevent each utility from maintaining their relocation schedule.

Include all costs to complete this work in the price bid for other items.

203-010 SHRINKAGE: 15 percent additional volume is included for shrinkage in earth embankment.

203-360 COMPACTION AND DENSITY CONTROL: Compact material as specified in Section 203.04 G.2.b, “ND T 99”.

Manipulate embankment material with disking equipment.

203-385 AVERAGE HAUL: No average haul has been computed for this project.

203-P01 BORROW EXCAVATION: Provide contractor optioned borrow material. Payment for borrow material will be done based on plan quantity. No measurement will be completed. If material underrun or overrun is encountered, no price adjustment will be considered.

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
8/12/2024

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	6	2

NOTES

251-P01 SEEDING CLASS III: Use the following seed mix for all permanent seeding.

Species	Percent by Weight	Purity	Germination
Perennial Ryegrass	40%	90%	85%
Creeping Red Fescue	30%	90%	85%
Annual Ryegrass	15%	90%	85%
Kentucky Bluegrass	15%	90%	85%

Rate of Seeding = 220 Lbs/Acre

Remove all stumps, brush, sticks, roots, stones larger than 1/2 inch in diameter, concrete chunks, rebar, wire or other material that may hinder seeding and maintenance operations. Dispose of any accumulated material at no additional cost to the City/State.

704-P01 TEMPORARY TRAFFIC CONTROL: Utilize pedestrian channelization as shown in Section 100 while work is active. Open the full width of the existing path by moving pedestrian channelization to the edge of the path at the conclusion of each working day. Close the right southbound lane of 25th Street S as necessary during construction. Utilize layouts as shown in Standard Drawing 704-23. Remove lane closure at the end of each working day.

750-P01 SIDEWALK CONCRETE: Provide at least two employees with a current ACI concrete flatwork technician or flatwork finisher certification. At least one of those employees must be onsite performing quality control and guidance during all concrete forming, placement of reinforcement steel, dowel bars, and tie bars, pouring, finishing, and curing operations.

More information about the ACI Flatwork Finisher training schedule can be found by going to www.ndconcrete.com or by calling 701-223-2770.

750-P02 SIDEWALK CONCRETE: Provide concrete materials with a maximum water to cementitious ratio of 0.42. Provide a concrete mix with a maximum of 620 lbs total cementitious content including fly ash and slag cement. Provide a concrete mix with at least 20% of the cementitious content, by mass, as fly ash or slag cement.

750-P03 SIDEWALK CONCRETE: Provide ½" thick expansion material. Provide a minimum of ½" diameter reinforcement.

Expansion Joints – Coat the "free" end of the smooth dowel with an approved lubricant and covered with an approved metal or plastic dowel cap or sleeve.

Completely remove concrete to the nearest planned longitudinal and transverse joint if uncontrolled cracking occurs. Remove and replace the concrete sidewalk using a method approved by Engineer at the Contractor's expense.

Match the existing elevation of all adjoining concrete within +/- 1/8". Remove and replace any placed concrete not properly matching elevations as deemed by the Engineer at the Contractor's expense.

970-P01 REPLANT TREES: Replant trees at locations determined by the Engineer in the field. Protect all trees within the work area that are not noted for removal or replanting. Minimize damage to the critical root zone (CRZ). The CRZ is an area defined by the diameter of the tree as measured at a point 4.5 feet above the ground line. For every 1 inch of tree diameter, a 1 foot clear zone must be established to protect the CRZ. Establish and mark out the CRZ areas prior to construction or staging.

Submit a plan outlining tree damage minimization procedures to the engineer for approval 7 days prior to beginning work within the CRZ. Contact the Engineer prior to cutting or damaging any branch or root over 4" diameter. Clean cut exposed roots and backfill as quickly as possible to avoid drying out.

If damage is caused to any existing tree due to failure to adhere to the tree protection requirements, damage will be assessed to determine if the damage can be repaired or if the tree must be removed. Use a certified arborist to complete any action plan to repair damaged trees at no additional cost. If damage is severe and tree removal is necessary, the tree's appraised value, as determined by the Engineer utilizing the most recent edition of the Guide for Plant Appraisal by the Council of Tree and Landscape Appraisers, will be deducted from the contract.

Complete spading and planting operations under favorable weather conditions between May 1 and June 15 or between September 1 and October 15. Replant all trees following the specifications in Section 7000 of the City of Fargo's Standard Specifications for Construction and in Section 20 of the plans.

Include all costs to spade, transport, replant, maintain and establish identified trees in the price bid for "Replant Trees".

REGISTERED PROFESSIONAL ENGINEER
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL NOTES

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

EN-1 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

Permits
USACE 404 Permit
NDPDES Permit
City of Fargo Floodplain Permit

REGISTERED PROFESSIONAL ENGINEER
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8/12/2024

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	8	1

Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	DRAIN 27 TRAIL				TOTAL
103	0100	CONTRACT BOND	L SUM	1				1
201	0330	CLEARING & GRUBBING	L SUM	1				1
203	0103	COMMON EXCAVATION-TYPE C	CY	550				550
203	0109	TOPSOIL	CY	604				604
203	0140	BORROW-EXCAVATION	CY	40				40
210	0050	BOX CULVERT EXCAVATION	EA	1				1
210	0210	FOUNDATION FILL	CY	348				348
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1				1
216	0100	WATER	M GAL	33				33
251	0300	SEEDING CLASS III	ACRE	0.242				0.242
251	2000	TEMPORARY COVER CROP	ACRE	0.444				0.444
253	0201	HYDRAULIC MULCH	ACRE	0.686				0.686
256	0200	RIPRAP GRADE II	CY	654				654
260	0100	SILT FENCE UNSUPPORTED	LF	30				30
260	0101	REMOVE SILT FENCE UNSUPPORTED	LF	30				30
261	0112	FIBER ROLLS 12IN	LF	2394				2394
261	0113	REMOVE FIBER ROLLS 12IN	LF	1182				1182
606	1009	10FT X 9FT PRECAST RCB CULVERT	LF	72				72
606	5009	10FT X 9FT PRECAST RCB END SECTION	EA	4				4
702	0100	MOBILIZATION	L SUM	1				1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	276				276
704	1052	TYPE III BARRICADE	EA	2				2
704	1056	PEDESTRIAN CHANNELIZATION	LF	270				270
704	1060	DELINEATOR DRUMS	EA	11				11
704	1067	TUBULAR MARKERS	EA	11				11
704	1086	SEQUENCING ARROW PANEL-TYPE B	EA	1				1
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	349				349
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	981				981
750	0125	SIDEWALK CONCRETE 5IN	SY	1065				1065
970	0075	WOOD MULCH	SF	1392				1392
970	0300	BENCH	EA	1				1
970	1000	TREES	EA	6				6
970	1030	PERENNIALS GROUP A	EA	59				59

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BASIS OF ESTIMATE

Sidewalk Concrete 5IN					
Station Range	Length LF	Width LF	Surface Area SF	Depth IN	Area SY
Sta 101+10.28 to Sta 101+30.20	-	-	91.55	5	10
Sta 101+41.93 to Sta 101+50.30	-	-	60.30	5	7
Sta 900+36.18 to Sta 900+59.73	-	-	112.12	5	12
Sta 900+59.73 to Sta 901+05.61	45.88	10.00	-	5	51
Sta 901+05.61 to Sta 901+37.11	-	-	91.32	5	10
Sta 101+30.20 to Sta 109+40.35	810.15	10.00	-	5	900
Sta 1000+00.00 to Sta 1000+28.58	-	-	92.91	5	10
Sta 1000+28.58 to Sta 1000+69.82	41.24	10.00	-	5	46
Sta 1000+69.82 to Sta 1000+87.56	-	-	89.14	5	10
Sta 109+40.35 to Sta 109+56.35	-	-	81.07	5	9
				Total	**1,065**

Aggregate Base Course CL 5*					
Station Range	Length LF	Width LF	Surface Area SF	Depth IN	Volume CY
Sta 101+10.28 to Sta 101+30.20	-	-	101.48	2	0.63
Sta 101+41.93 to Sta 101+50.30	-	-	72.12	2	0.45
Sta 900+36.18 to Sta 900+59.73	-	-	123.86	2	0.76
Sta 900+59.73 to Sta 901+05.61	45.88	11.00	-	2	3.12
Sta 901+05.61 to Sta 901+37.11	-	-	89.64	2	0.55
Sta 101+30.20 to Sta 109+40.35	810.15	11.00	-	2	55.01
Sta 1000+00.00 to Sta 1000+28.58	-	-	91.24	2	0.56
Sta 1000+28.58 to Sta 1000+69.82	41.24	11.00	-	2	2.80
Sta 1000+69.82 to Sta 1000+87.56	-	-	97.98	2	0.60
Sta 109+40.35 to Sta 109+56.35	-	-	89.06	2	0.55
				Total	**65.03**

*Included in price bid for Sidewalk Concrete 5IN.

Water
25 MGal/Mile for Dust Palliative
20 Gal/Ton for Aggregates
10 Gal/CY for Embankment

Conversions
Aggregate Base Course CL 5 – 1.875 TON/CY

REGISTERED PROFESSIONAL ENGINEER
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PE-10407
DATE
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8/12/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Drain 27 Trail

Station	Distance (LF)	Excavation Area (SF)	Excavation Volume (CY)	Excavation Accumulated Volume (CY)	Embankment Area (SF)	Embankment Adjusted Volume (CY)*	Embankment Accumulated Volume (CY)	Mass Ordinate (CY)
101+10.28		1.24			0.00			
101+50.00	39.72	5.29	5	5	9.15	8	8	-3
102+00.00	50.00	8.86	13	18	19.57	31	39	-21
102+50.00	50.00	4.97	13	31	19.37	41	80	-49
103+00.00	50.00	104.68	102	133	381.10	426	506	-373
103+50.00	50.00	10.54	107	240	0.04	406	912	-672
104+00.00	50.00	1.44	11	251	1.19	1	913	-662
104+50.00	50.00	3.64	5	256	3.19	5	918	-662
105+00.00	50.00	1.61	5	261	0.00	3	921	-660
105+50.00	50.00	2.80	4	265	0.00	0	921	-656
106+00.00	50.00	3.27	6	271	0.63	1	922	-651
106+50.00	50.00	0.87	4	275	0.00	1	923	-648
107+00.00	50.00	0.61	1	276	0.52	1	924	-648
107+50.00	50.00	0.60	1	277	0.00	1	925	-648
108+00.00	50.00	0.18	1	278	0.30	0	925	-647
108+50.00	50.00	3.94	4	282	0.00	0	925	-643
109+00.00	50.00	1.14	5	287	5.67	6	931	-644
109+50.00	50.00	3.86	5	292	0.00	6	937	-645
109+56.35	6.35	2.25	1	293	0.00	0	937	-644
Box Culverts				293		-384	553	-260
			Total	**293**		Total	**553**	

Drain 27 Trail East

Station	Distance (LF)	Excavation Area (SF)	Excavation Volume (CY)	Excavation Accumulated Volume (CY)	Embankment Area (SF)	Embankment Adjusted Volume (CY)*	Embankment Accumulated Volume (CY)	Mass Ordinate (CY)
1000+00.00		0.73			0.53			
1000+50.00	50.00	2.53	3	3	14.26	16	16	-13
1000+87.56	37.56	0.19	2	5	0.03	11	27	-22
			Total	**5**		Total	**27**	

Drain 27

Station	Distance (LF)	Excavation Area (SF)	Excavation Volume (CY)	Excavation Accumulated Volume (CY)	Embankment Area (SF)	Embankment Adjusted Volume (CY)*	Embankment Accumulated Volume (CY)	Mass Ordinate (CY)
0+00.00		74.65			0.00			
0+29.28	29.28	212.10	155	155	0.00	0	0	155
Box Culverts Gap								
1+01.26		200.49		155	0.00		0	155
1+20.22	18.96	52.34	89	244	0.00	0	0	244
			Total	**244**		Total	**0**	

Drain 27 Trail West

Station	Distance (LF)	Excavation Area (SF)	Excavation Volume (CY)	Excavation Accumulated Volume (CY)	Embankment Area (SF)	Embankment Adjusted Volume (CY)*	Embankment Accumulated Volume (CY)	Mass Ordinate (CY)
900+36.18		0.04			0.00			
900+50.00	13.82	0.16	0	0	0.04	0	0	0
901+00.00	50.00	3.18	3	3	4.92	5	5	-2
901+37.09	37.09	3.88	5	8	1.05	5	10	-2
			Total	**8**		Total	**10**	

Earthwork Summary

Location	Excavation (CY)	Embankment (CY)	Common Excavation - Type C (CY) Pay Item	Borrow Excavation (CY) Pay Item	Topsoil Stripping (CY) Pay Item	Topsoil Placement (CY)	Topsoil Waste (CY)
Drain 27 Trail	550	590	550	40	604	348	256

Topsoil Stripping based on 6" depth.
Topsoil Placement based on 10.7" depth.
Include all costs to strip and place topsoil and waste excess topsoil in the price bid for "Topsoil".

THE CITY OF Fargo FAR MORE

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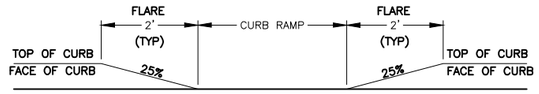
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/16/2024

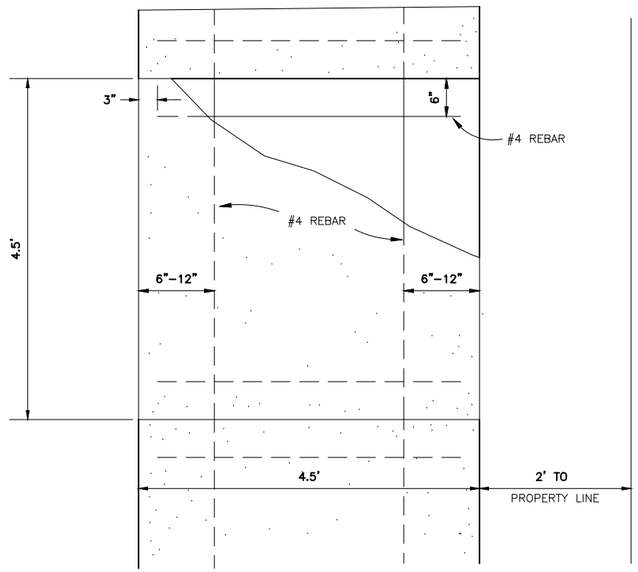
Data Tables

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	20	1



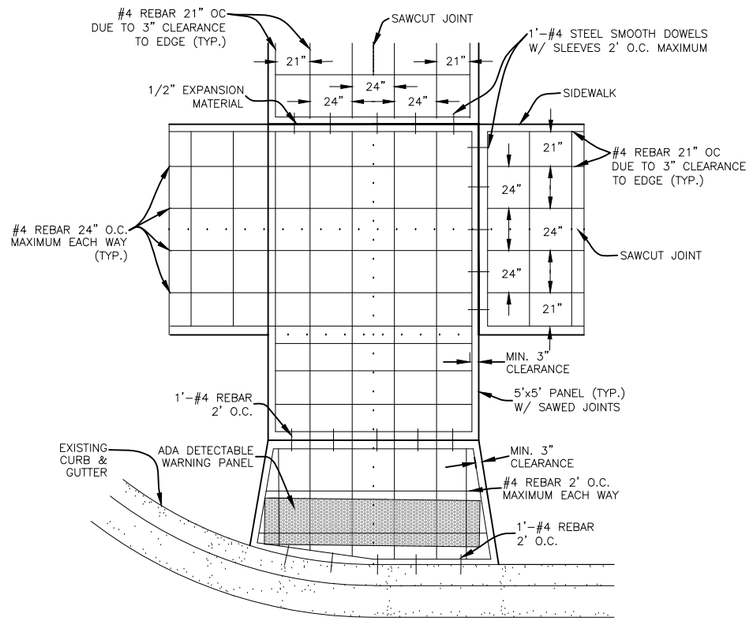
25% FLARES



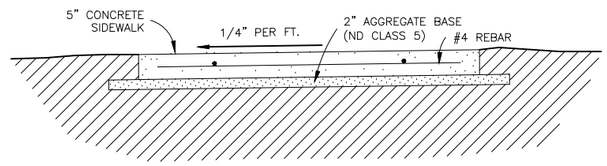
4.5' REINFORCEMENT

SIDEWALK WIDTH	PANELS (L'xW')
6'	5'x6'
8'	4.5'x4'
10'	5'x5'

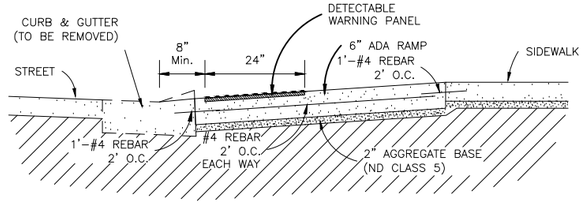
JOINT DIMENSION



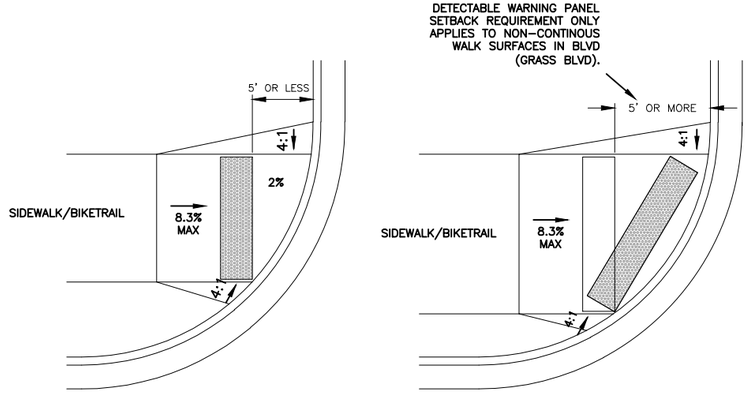
10' REINFORCEMENT



SIDEWALK CROSS SECTION



SIDEWALK REINFORCEMENT



CONCRETE APRON FOR SIDEWALK/BIKETRAIL

THE CITY OF Fargo FAR MORE

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Ph: 701.237.5065

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REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/12/2024

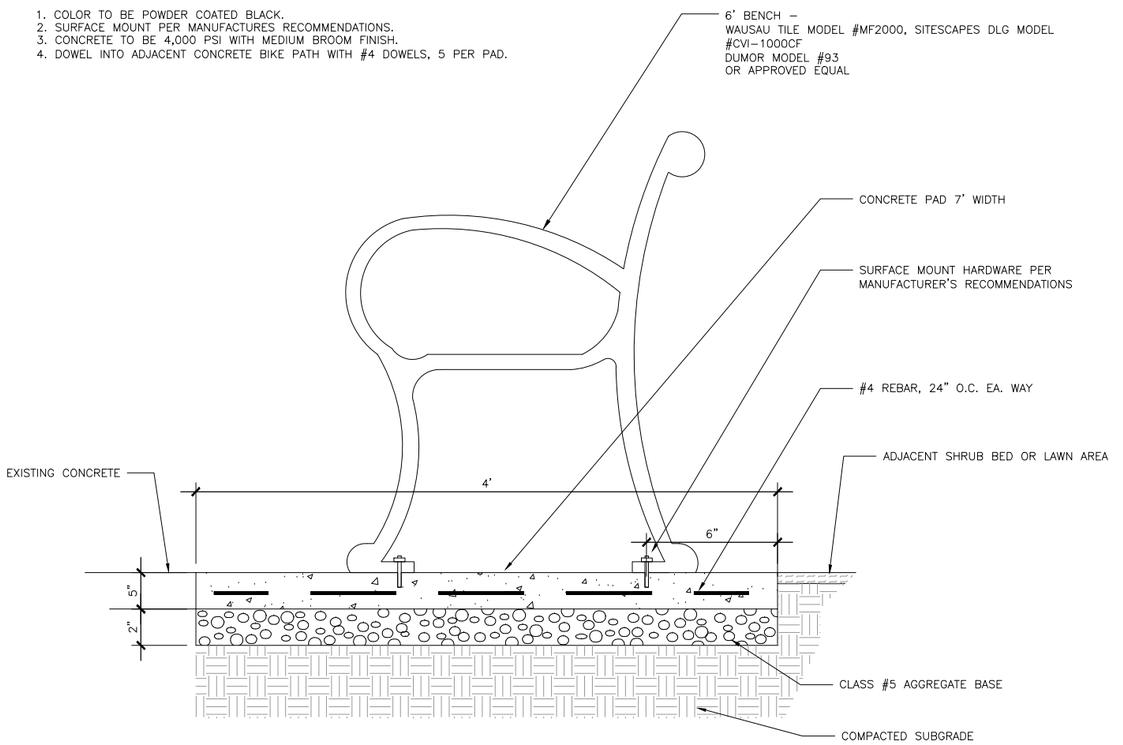
General Details

Drain 27 Trail

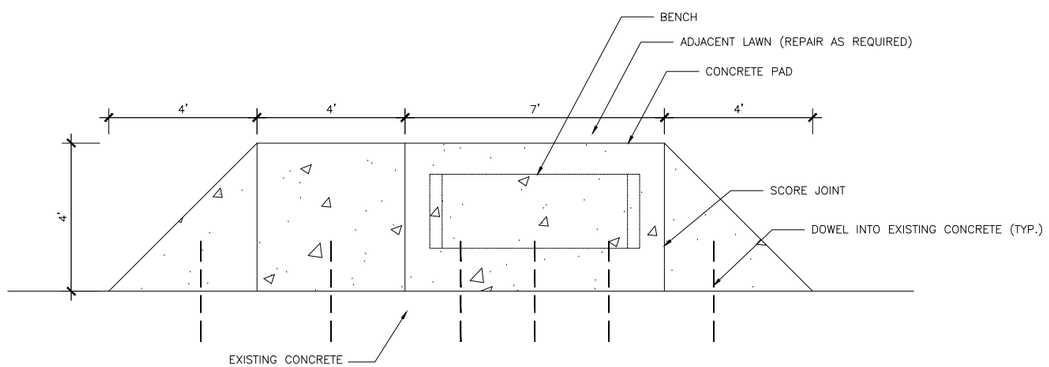
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**20**	**2**

NOTES:

1. COLOR TO BE POWDER COATED BLACK.
2. SURFACE MOUNT PER MANUFACTURES RECOMMENDATIONS.
3. CONCRETE TO BE 4,000 PSI WITH MEDIUM BROOM FINISH.
4. DOWEL INTO ADJACENT CONCRETE BIKE PATH WITH #4 DOWELS, 5 PER PAD.



BENCH AND CONCRETE PAD DETAIL
NOT TO SCALE



PLAN VIEW
N.T.S.

THE CITY OF Fargo AR MORE

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8/12/2024

General Details

Drain 27 Trail

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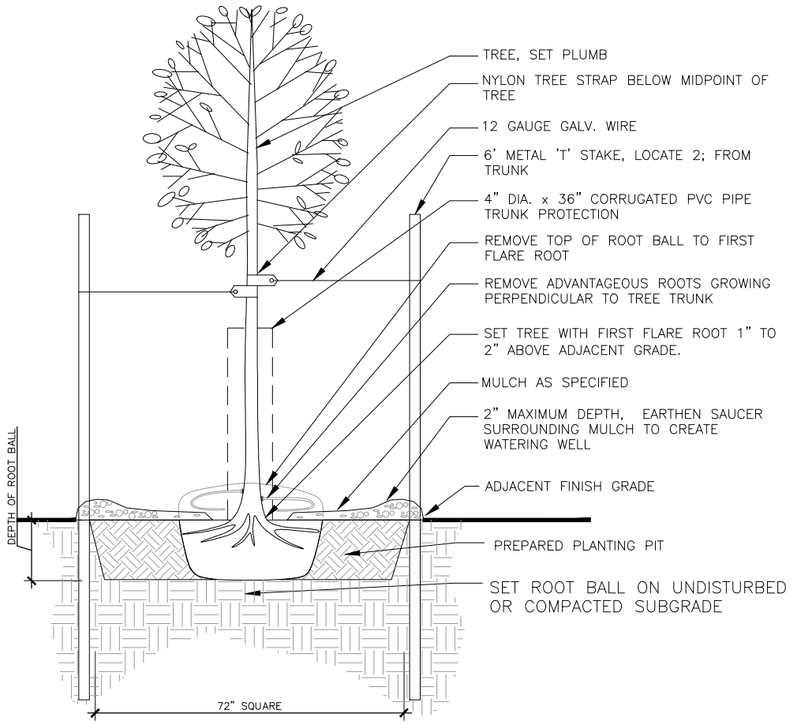
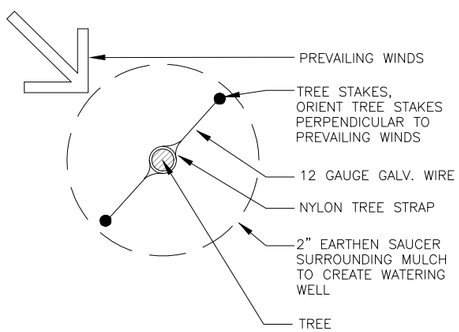
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	20	3

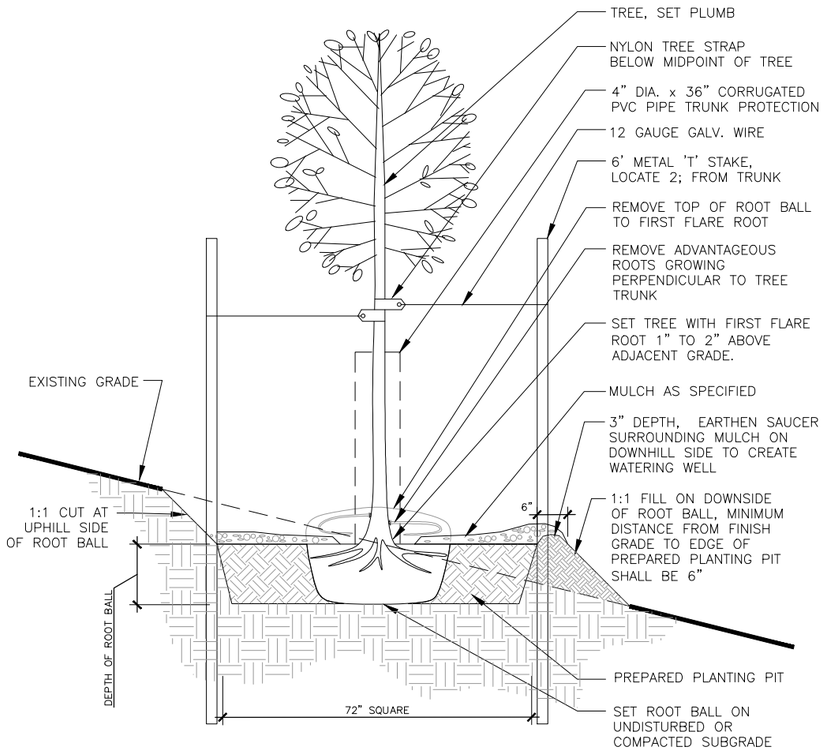
NOTES:

1. REFER TO CITY OF FARGO SECTION 7000 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. PLANT FIRST FLAIR ROOT 1" to 2" ABOVE SURROUNDING GRADE.
3. TREES LOCATED IN LAWN TO HAVE 4" DEPTH BY 6' DIAMETER WOOD MULCH, UNLESS OTHERWISE NOTED.
4. KEEP MULCH 6" AWAY FROM TRUNK.
5. REFER TO 'TREE ROOT BALL PREPARATION' FOR ADDITIONAL INFORMATION.





TREE PLANTING DETAIL
NOT TO SCALE



ON SLOPE TREE PLANTING DETAIL
NOT TO SCALE

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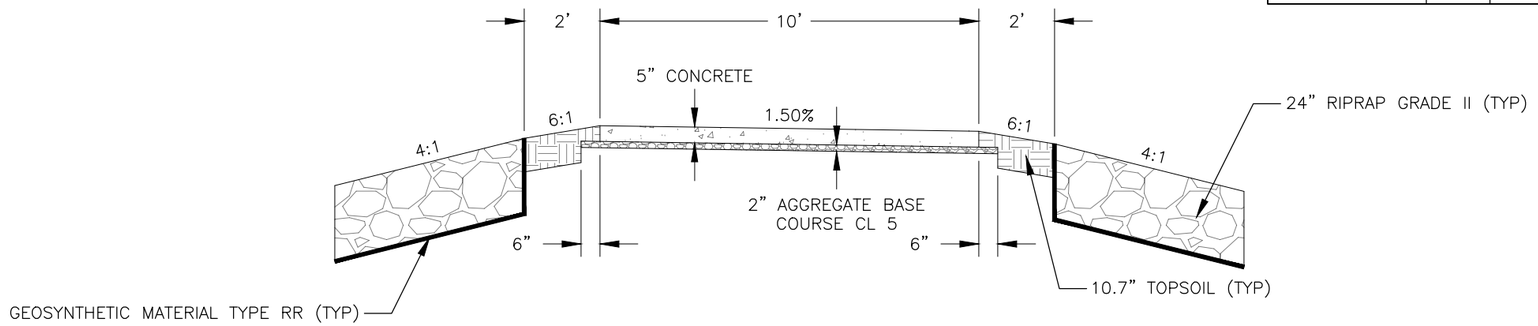
NORTH DAKOTA

8/12/2024

General Details

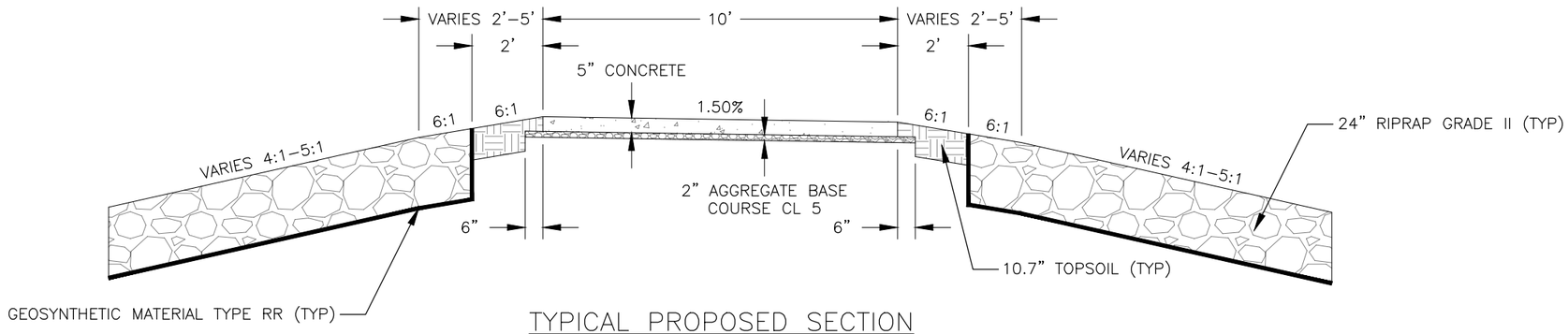
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	30	1



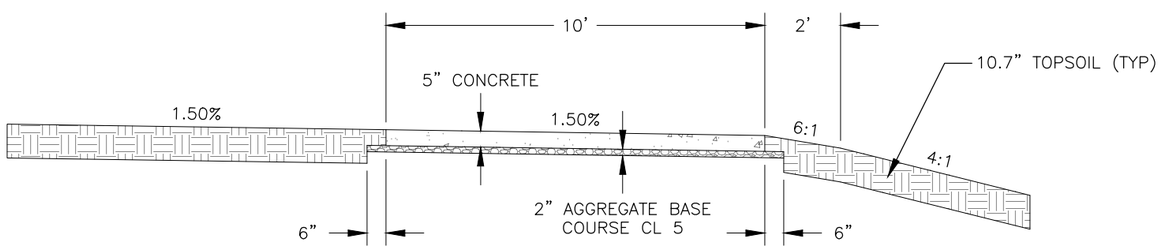
TYPICAL PROPOSED SECTION

SHARED USE PATH NOT TO SCALE
STA 101+10.28 TO STA 102+50.00
STA 900+36.18 TO STA 901+37.11



TYPICAL PROPOSED SECTION

SHARED USE PATH NOT TO SCALE
STA 102+50.00 TO STA 102+70.00
STA 103+20.00 TO STA 103+50.00



TYPICAL PROPOSED SECTION

SHARED USE PATH NOT TO SCALE
STA 103+50.00 TO STA 109+56.35
STA 1000+00.00 TO STA 1000+87.56

THE CITY OF Fargo
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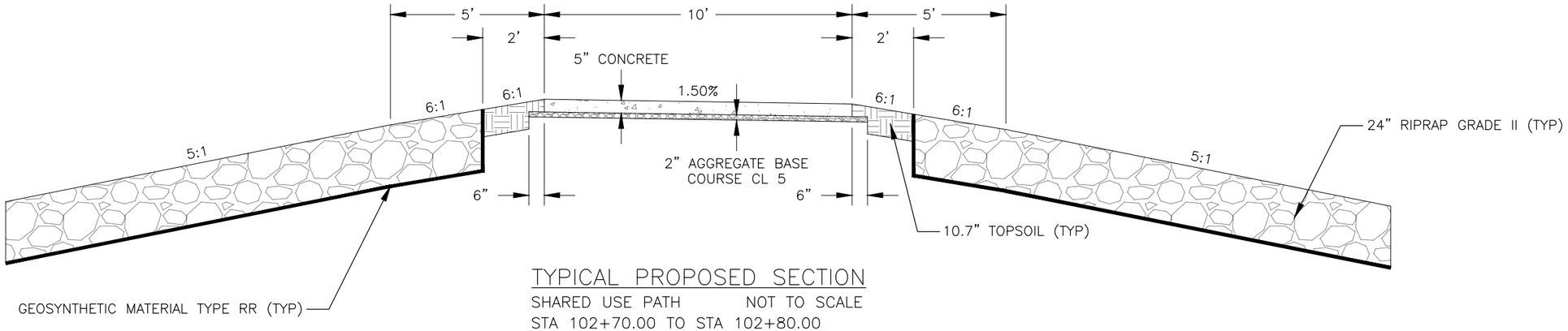
8/12/2024

Typical Sections

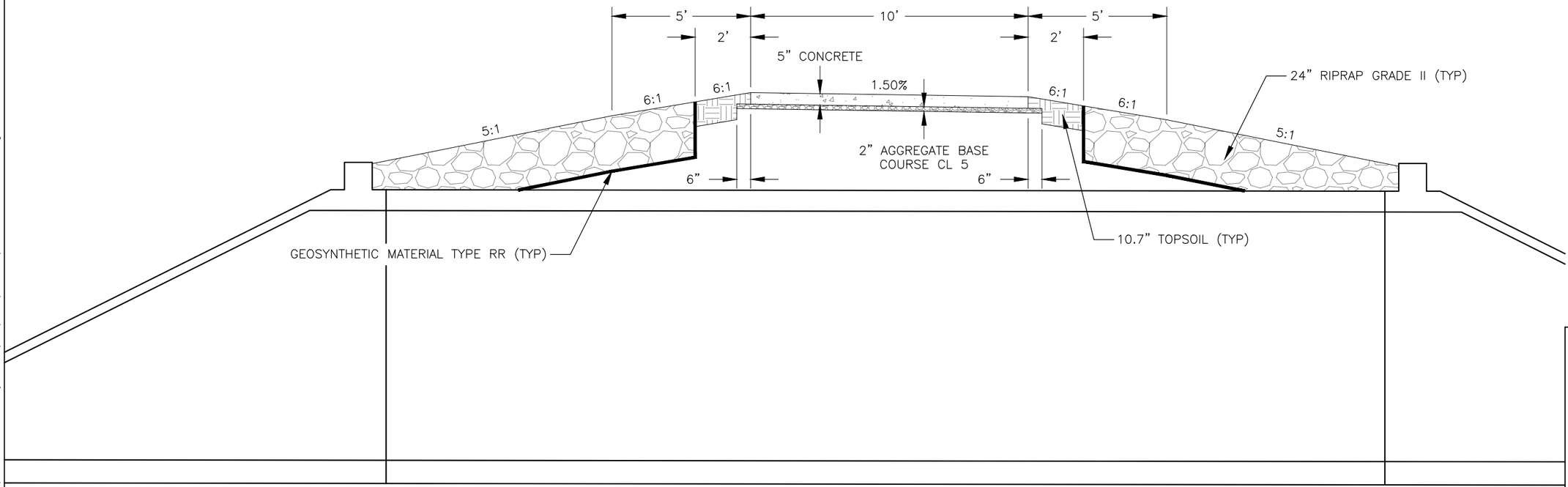
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	30	2



TYPICAL PROPOSED SECTION

SHARED USE PATH NOT TO SCALE
STA 102+70.00 TO STA 102+80.00
STA 103+10.00 TO STA 103+20.00



TYPICAL PROPOSED SECTION

PATH DRAIN CROSSING NOT TO SCALE
STA 102+80.00 TO STA 103+10.00

THE CITY OF Fargo
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ADAM M. RUUD
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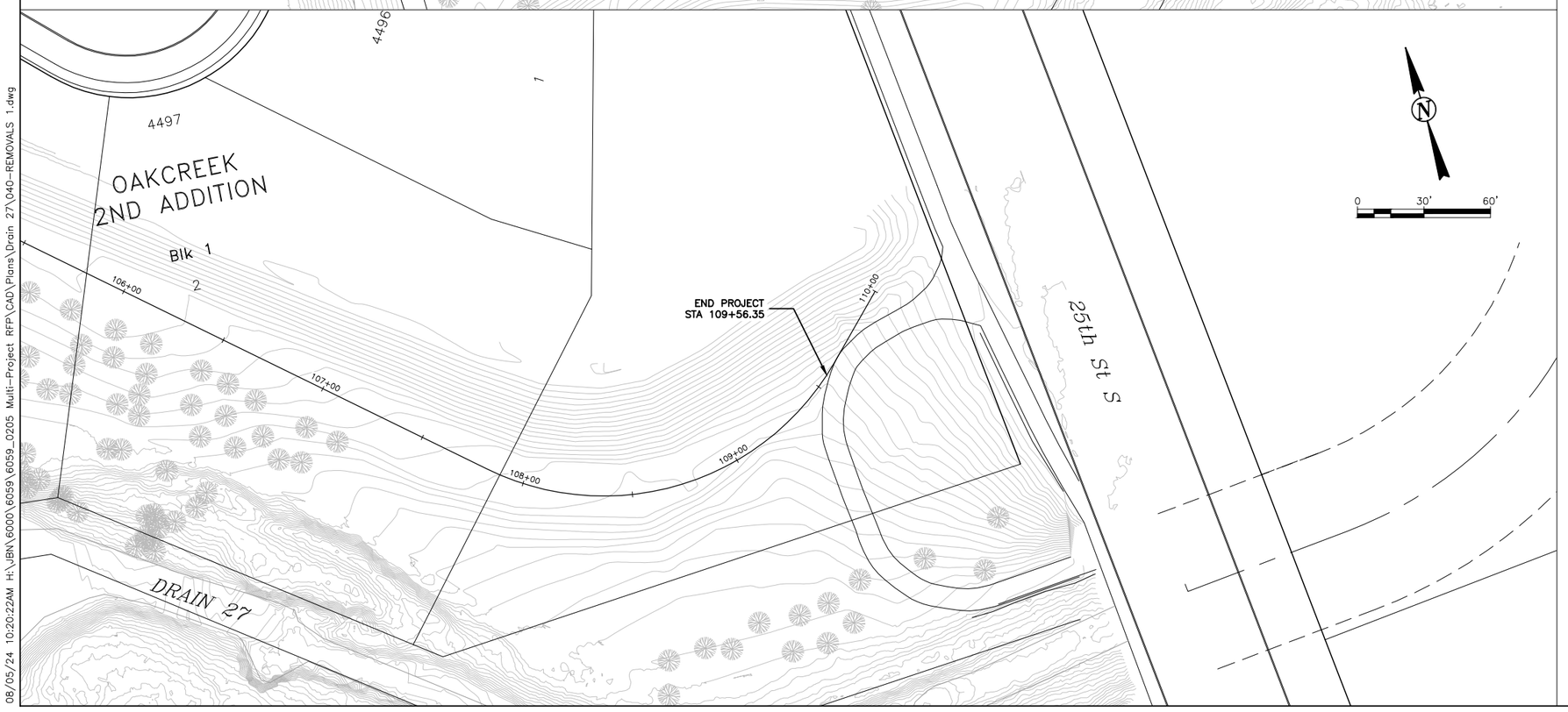
NORTH DAKOTA

8/12/2024

Typical Sections

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	40	1



SPEC CODE	BID ITEM	QTY	UNIT
201 0330	CLEARING & GRUBBING STA 101+00 TO STA 106+00	1	L SUM

LEGEND:

X CLEARING & GRUBBING

Tree Removal		
Tree Size	Station	Offset
6"	101+55	26' Rt
6"	103+23	57' Rt
24"	103+20	61' Rt
6"	103+94	0' Lt
12"	104+27	22' Rt
3"	104+34	2' Lt
6"	104+56	11' Rt
12"	104+64	10' Lt
3"	104+86	3' Lt
3"	104+85	11' Rt
3"	104+92	2' Rt
3"	105+09	9' Rt

NOTES:

1. INCLUDE ALL COSTS FOR THE REMOVAL OF TREES, REGARDLESS OF SIZE, IN THE PRICE BID FOR "CLEARING & GRUBBING".

THE CITY OF Fargo FAR MORE

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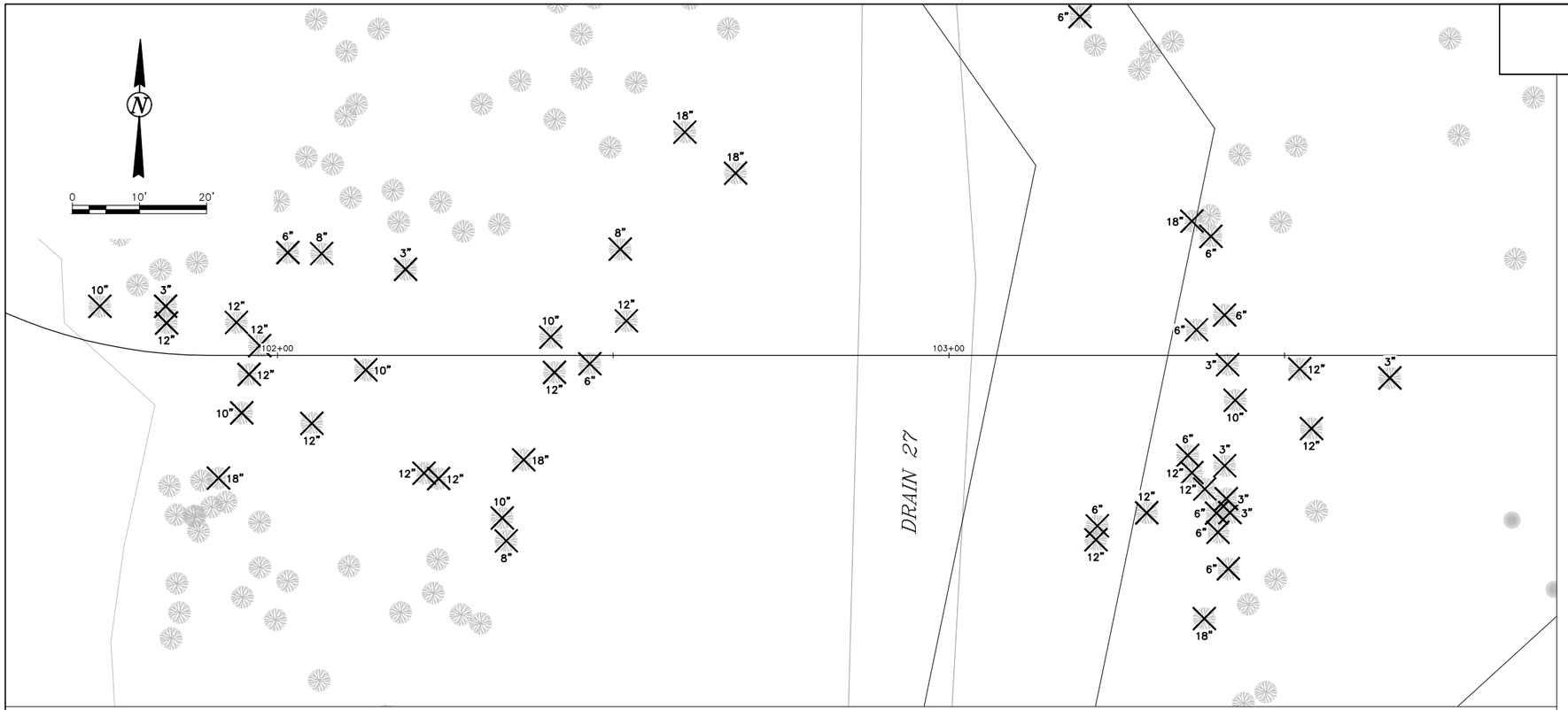
8/12/2024

Removals

Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	40	2



Tree Removal		
Tree Size	Station	Offset
10"	101+72	5' Lt
3"	101+83	7' Lt
12"	101+83	5' Lt
12"	101+94	5' Lt
18"	101+91	18' Rt
10"	101+95	5' Rt
12"	101+96	3' Rt
12"	101+97	1' Lt
6"	102+02	15' Lt
8"	102+07	15' Lt
12"	102+05	10' Rt
10"	102+13	2' Rt
3"	102+19	13' Lt
12"	102+22	18' Rt
12"	102+24	18' Rt
8"	102+33	24' Rt
10"	102+34	28' Rt
18"	102+37	16' Rt
12"	102+41	2' Rt
6"	102+47	1' Rt
10"	102+41	3' Lt
12"	102+52	5' Lt
8"	102+51	16' Lt
18"	102+61	33' Lt

Tree Removal		
Tree Size	Station	Offset
18"	102+68	27' Lt
6"	103+20	50' Lt
18"	103+36	20' Lt
6"	103+39	18' Lt
6"	103+37	4' Lt
6"	103+41	6' Lt
3"	103+42	1' Rt
10"	103+43	7' Rt
6"	103+36	15' Rt
3"	103+41	16' Rt
12"	103+36	17' Rt
12"	103+38	20' Rt
3"	103+41	21' Rt
3"	103+42	23' Rt
6"	103+40	23' Rt
6"	103+40	26' Rt
6"	103+42	32' Rt
12"	103+29	23' Rt
6"	103+22	25' Rt
12"	103+22	27' Rt
18"	103+38	39' Rt
12"	103+54	11' Rt
12"	103+52	2' Rt
3"	103+66	3' Rt

LEGEND:

CLEARING & GRUBBING

NOTES:

1. INCLUDE ALL COSTS FOR THE REMOVAL OF TREES, REGARDLESS OF SIZE, IN THE PRICE BID FOR "CLEARING & GRUBBING".

THE CITY OF Fargo FAR MORE

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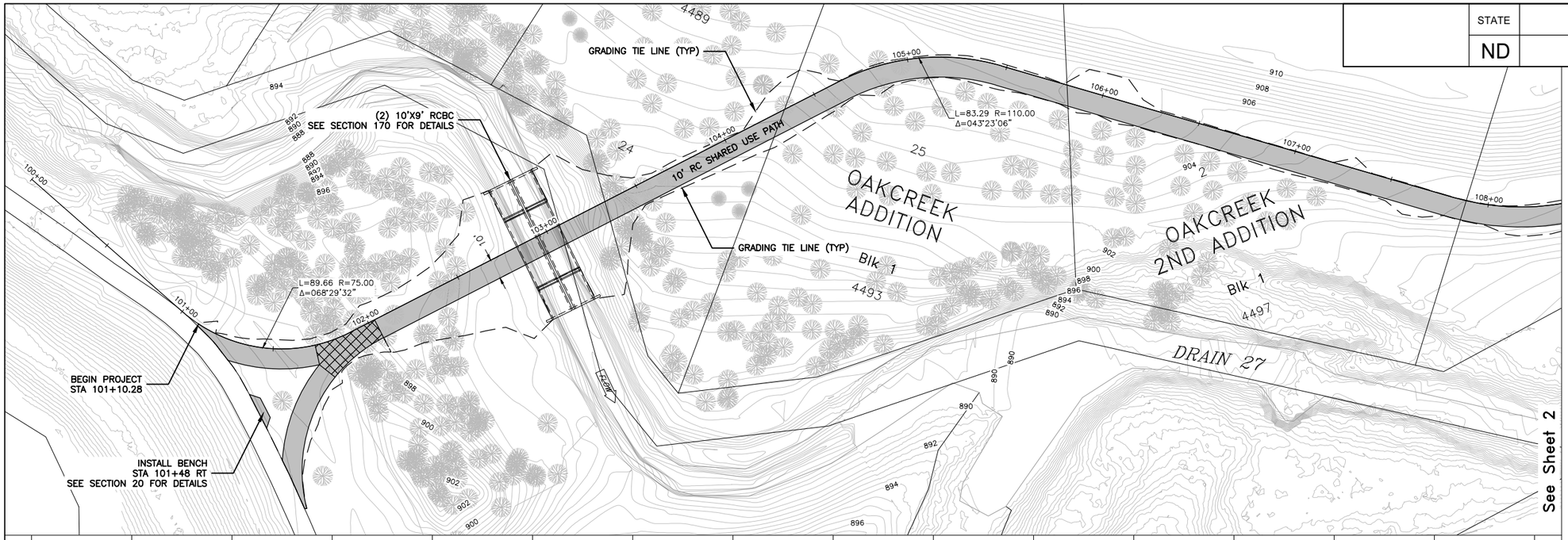
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

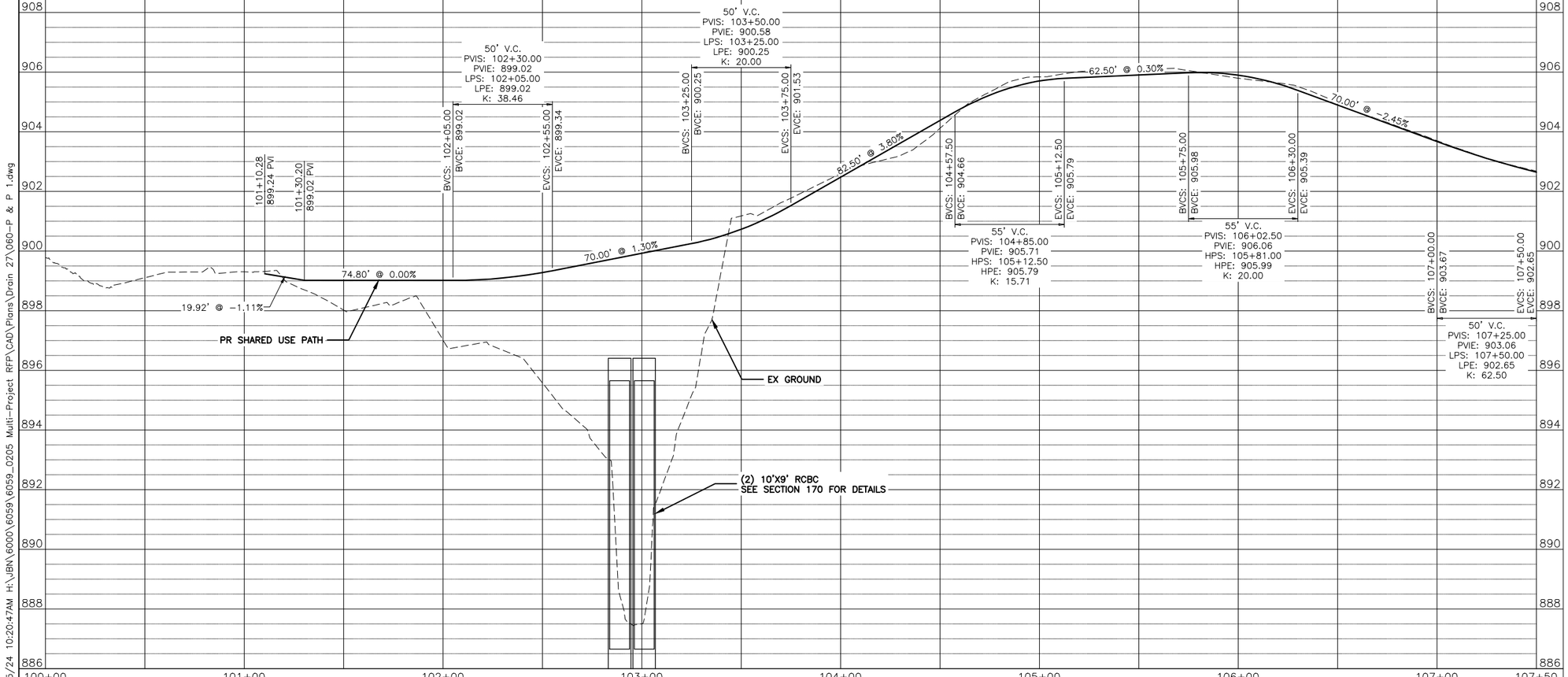
8/12/2024

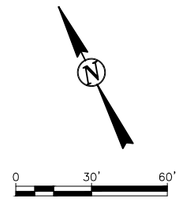
Removals

Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	60	1







LEGEND:

- SIDEWALK CONCRETE 5IN
- RIPRAP GRADE III SEE SECTION 170 FOR DIMENSIONS
- LANDING: 1.5% PREFERRED SLOPE (2% MAXIMUM) ALL DIRECTIONS

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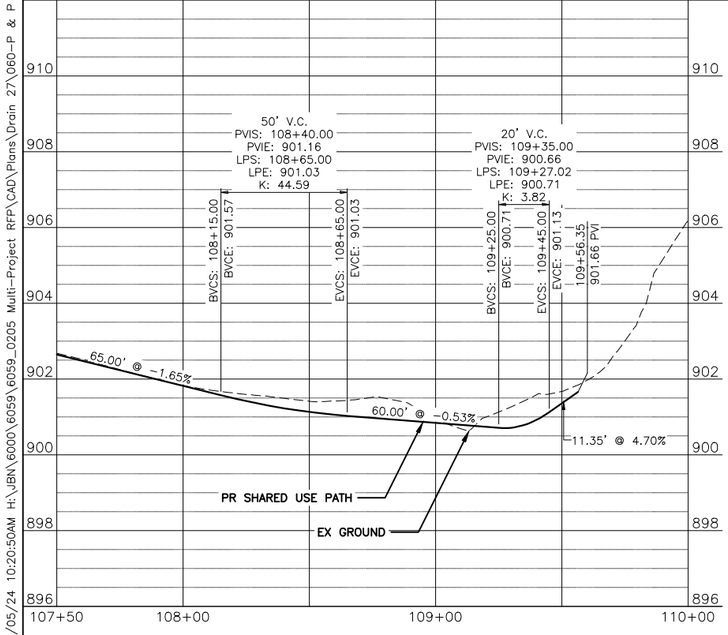
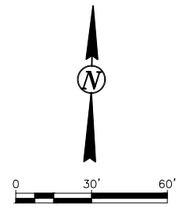
Plan & Profile

Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	60	2





LEGEND:

SIDEWALK CONCRETE 5IN

LANDING: 1.5% PREFERRED SLOPE (2% MAXIMUM) ALL DIRECTIONS

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NORTH DAKOTA

8/12/2024

Plan & Profile

Drain 27 Trail

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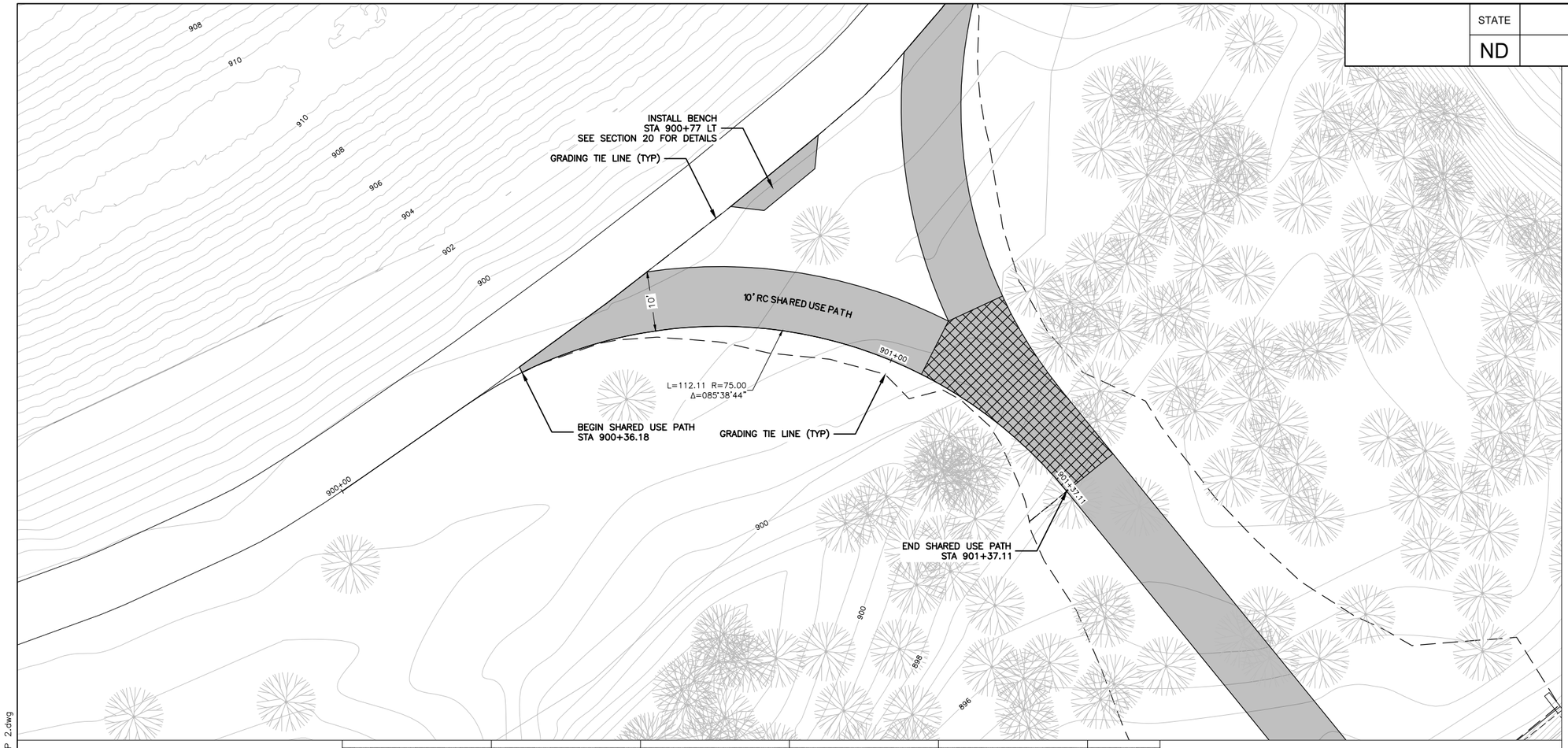
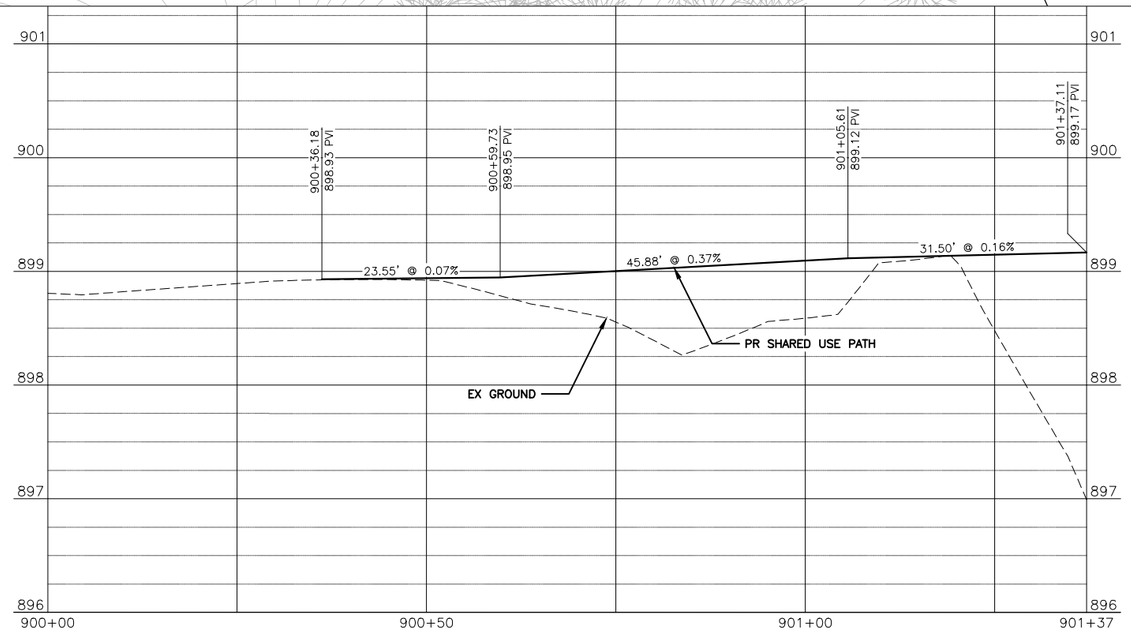
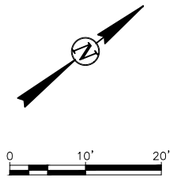
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	60	3







LEGEND:

SIDEWALK CONCRETE 5IN

LANDING: 1.5% PREFERRED SLOPE (2% MAXIMUM) ALL DIRECTIONS

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NORTH DAKOTA

8/12/2024

Plan & Profile

Drain 27 Trail

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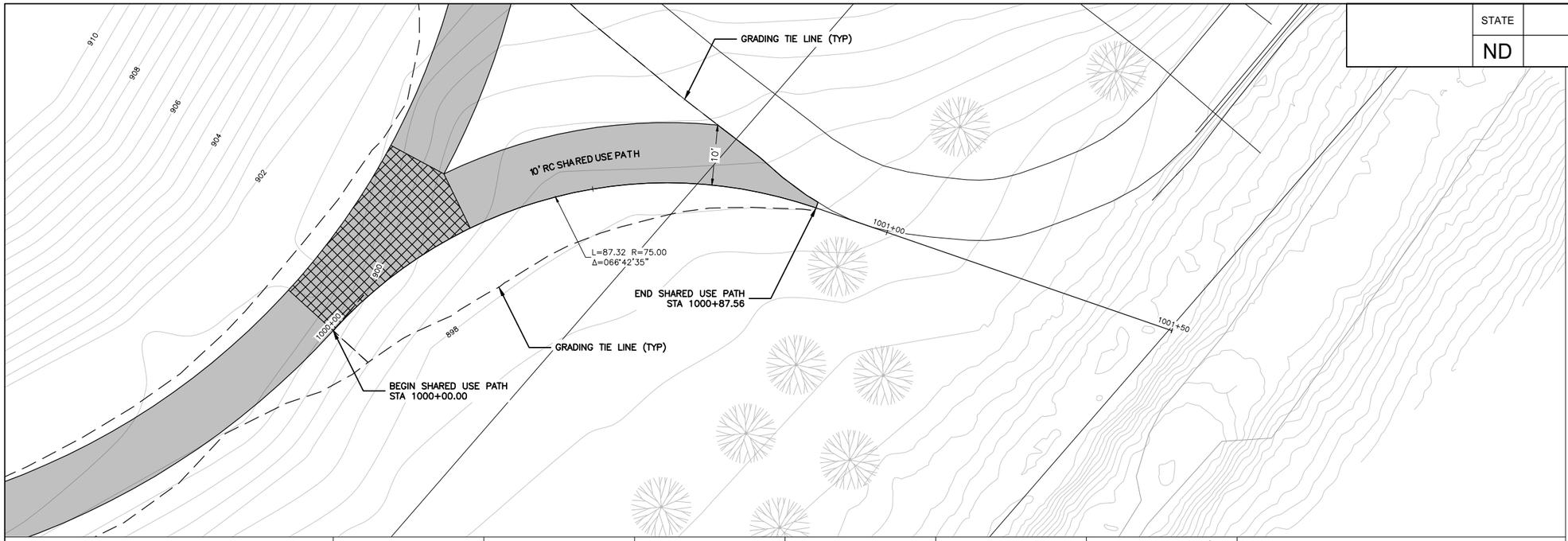
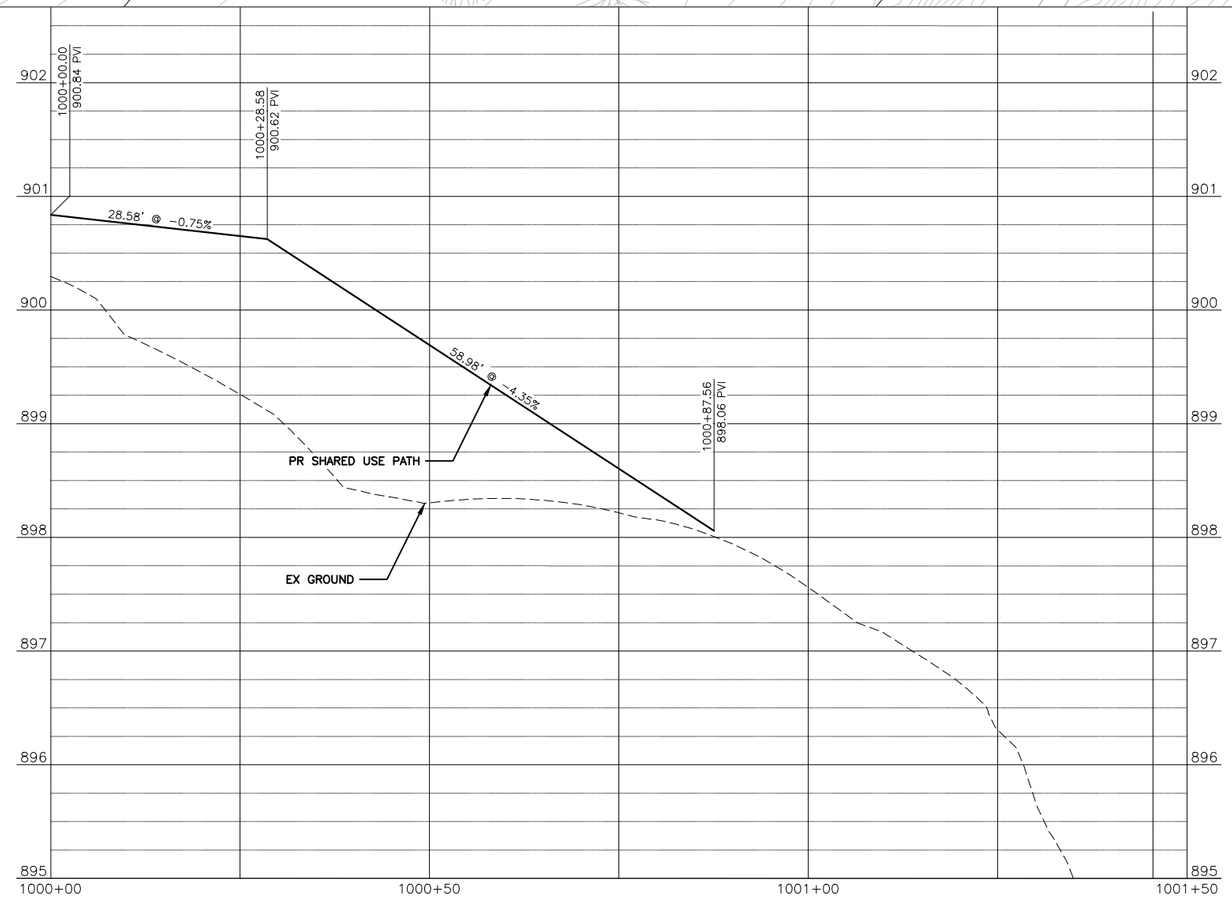
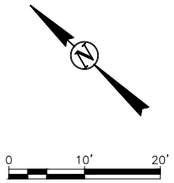
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	60	4







LEGEND:

SIDEWALK CONCRETE 5IN

LANDING: 1.5% PREFERRED SLOPE (2% MAXIMUM) ALL DIRECTIONS

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Plan & Profile

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation											
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
1a	Sec. 35, T139N, R49W	Depression	Y	0.000	0.000	0.000	0.000	N	N	N										
				0.000	**0.000**	**0.000**	**0.000**													

Other Waters Impact Table

Other Waters											Other Water Mitigation				
			Size				Impacts to Other Waters				Mitigation Required			USACE Mitigation Bank	
							Acre(s)		Linear Feet						
Number	Location	Type	Acre(s)	Linear Feet	Feature	USACE Jurisdictional[1]	Temp	Perm	Temp	Perm	EO 11990	USACE	USFWS	Location	Acre(s)
OW 1b	Sec. 35, T139N, R49W	Stream	0.937	1862.86	Natural	Y	0.011	0.043	30.93	102.09	Y	Y	N	Ducks Unlimited; 2:1	0.086
OW 1c	Sec. 35, T139N, R49W	Modified Stream	0.234	564.75	Natural	Y	0.000	0.000	0.00	0.00	N	N	N	N/A	N/A
		Totals	**1.171**	**2427.61**			**0.011**	**0.043**	**25.88**	**102.09**					**0.043**

[1] A wetland Jurisdictional Determination has not been issued by the USACE. All wetlands are assumed to be Jurisdictional.

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres / Lf)
Natural/JD	0.000	Temporary JD	0.000
Natural/Non-JD	0.000	Non-JD Temporary	0.000
Artificial/JD	0.000	Permanent JD > 0.10	0.000
Artificial /Non-JD	0.000	Permanent OW	0.043 / 102.09
Total	**0.000**	Temporary OW	0.011 / 30.93

Mitigation Summary Table

	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only	Ducks Unlimited			0.086	
EO 11990 Only					
USACE/11990					
USFWS					
	Total			**0.086**	

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ADAM M. RUUD
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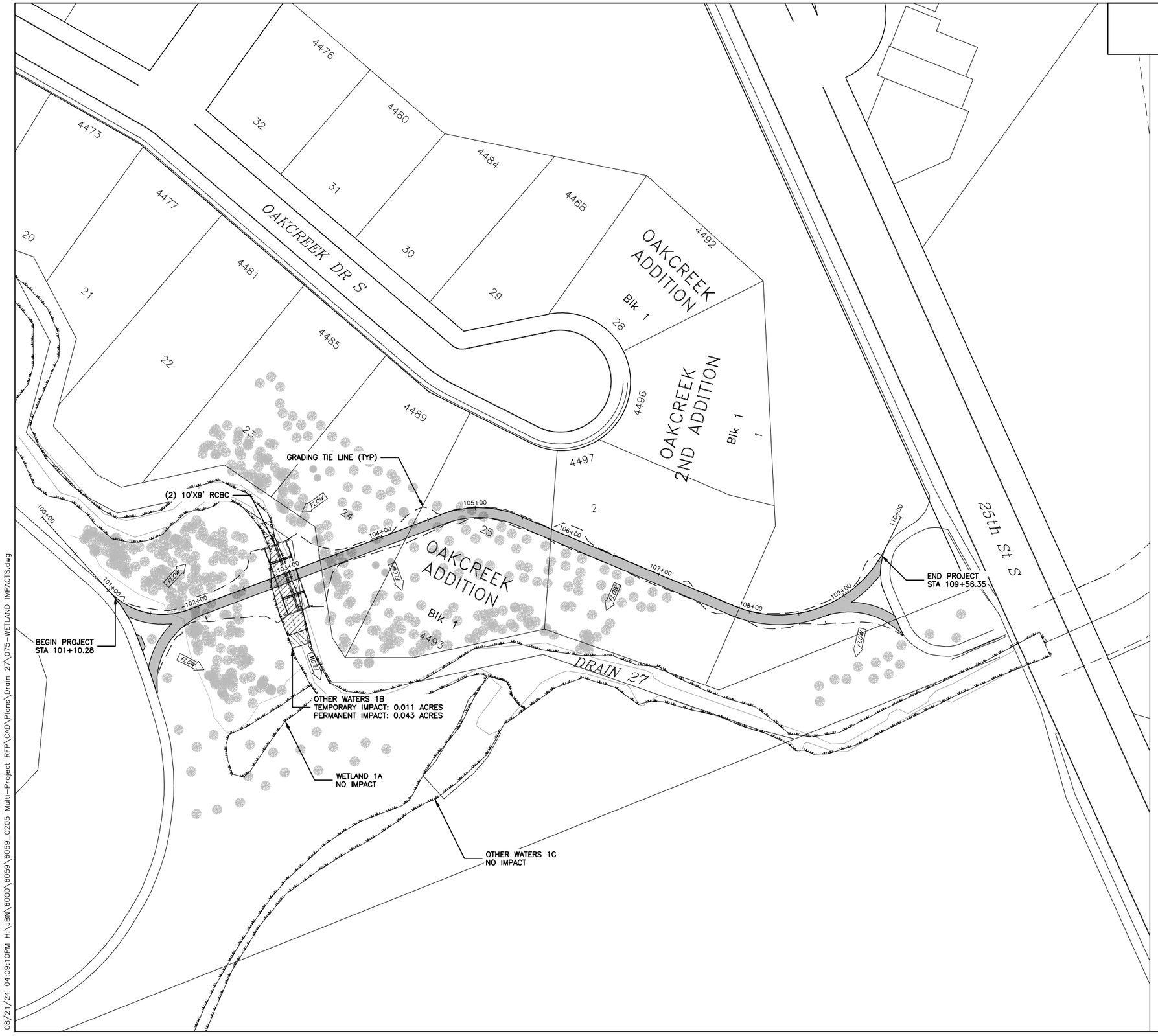
DATE
NORTH DAKOTA

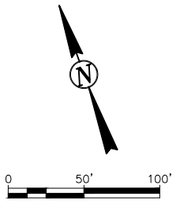
8/21/2024

Wetland Impacts

Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	75	2





LEGEND:

- FLOW DIRECTION
- OTHER WATERS TEMPORARY IMPACT
- OTHER WATERS PERMANENT IMPACT
- SIDEWALK CONCRETE 5IN

THE CITY OF Fargo
FAR MORE

Proj. No. 6059-0205
Houston Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

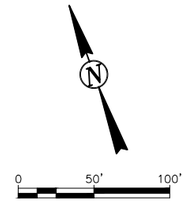
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/21/2024

Wetland Impacts

Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	76	1



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP STA 101+10 TO STA 109+56	0.444	ACRE
253	0201	HYDRAULIC MULCH STA 101+10 TO STA 109+56	0.444	ACRE
260	0100	SILT FENCE UNSUPPORTED STA 102+80 TO STA 103+10	30	LF
260	0101	REMOVE SILT FENCE UNSUPPORTED STA 102+80 TO STA 103+10	30	LF
261	0112	FIBER ROLLS 12IN STA 101+10 TO STA 109+56	1182	LF
261	0113	REMOVE FIBER ROLLS 12IN STA 101+10 TO STA 109+56	1182	LF

LEGEND:

- FLOW / FLOW — FLOW DIRECTION
- TEMPORARY COVER CROP HYDRAULIC MULCH
- SILT FENCE UNSUPPORTED
- FIBER ROLLS 12IN
- SIDEWALK CONCRETE 5IN

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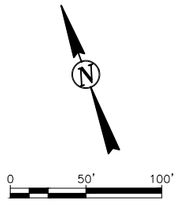
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/12/2024

Temporary Erosion Control

Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	77	1



SPEC CODE	BID ITEM	QTY	UNIT
251 0300	SEEDING CLASS III STA 101+10 TO STA 109+56	0.242	ACRE
253 0201	HYDRAULIC MULCH STA 101+10 TO STA 109+56	0.242	ACRE
256 0200	RIPRAP GRADE II STA 101+10 TO STA 103+50	654	CY
261 0112	FIBER ROLLS 12IN STA 101+10 TO STA 109+56	1212	LF
709 0155	GEOSYNTHETIC MATERIAL TYPE RR STA 101+10 TO STA 103+50	981	SY

LEGEND:

- FLOW / FLOW — FLOW DIRECTION
- SEEDING CLASS III HYDRAULIC MULCH
- RIPRAP GRADE II
- FIBER ROLLS 12IN
- SIDEWALK CONCRETE 5IN

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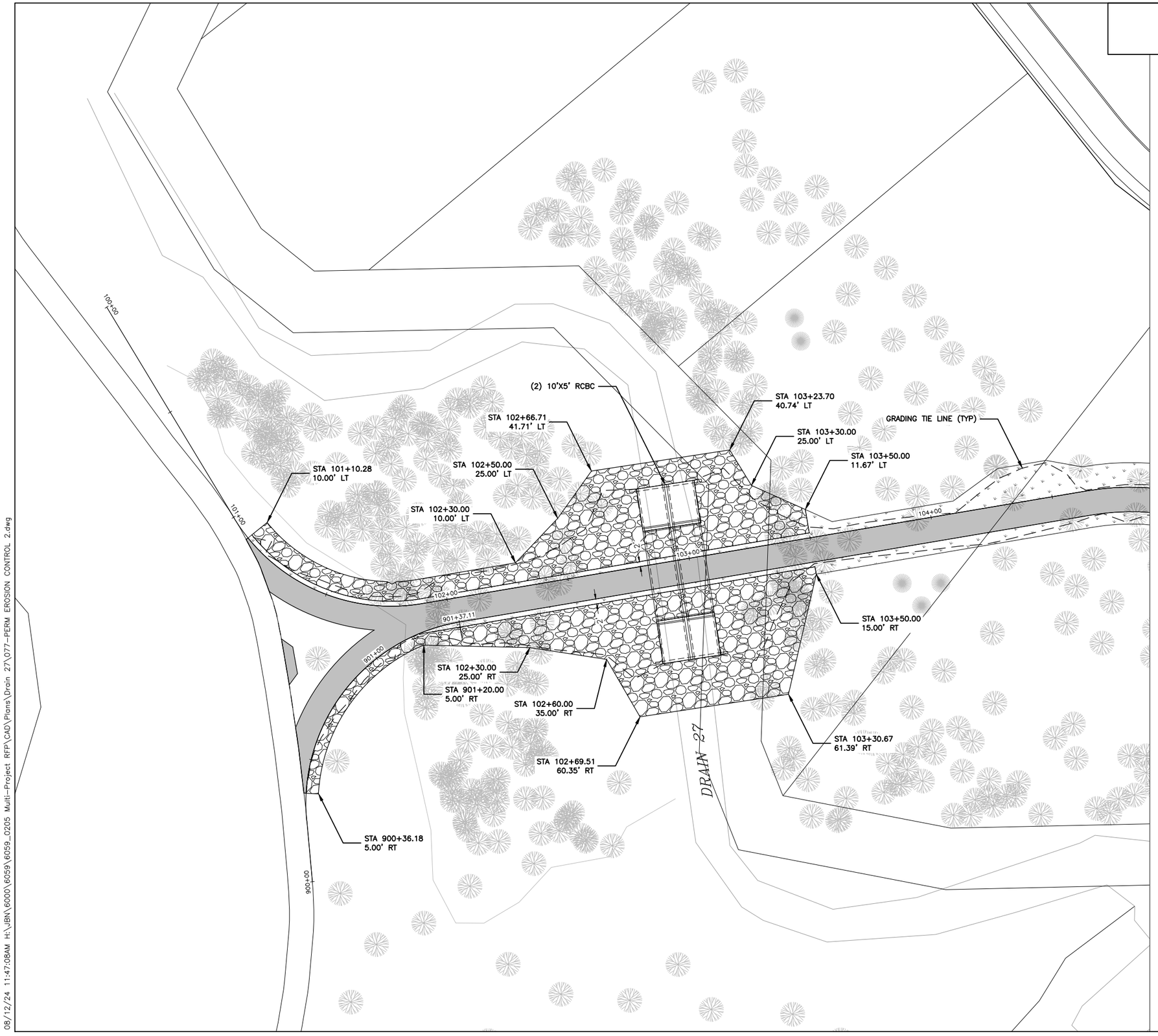
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/12/2024

Permanent Erosion Control

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	77	2



N

0 20' 40'

LEGEND:

- SEEDING CLASS III HYDRAULIC MULCH
- RIPRAP GRADE II
- SIDEWALK CONCRETE 5IN

THE CITY OF Fargo FAR MORE

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DATE
NORTH DAKOTA

8/12/2024

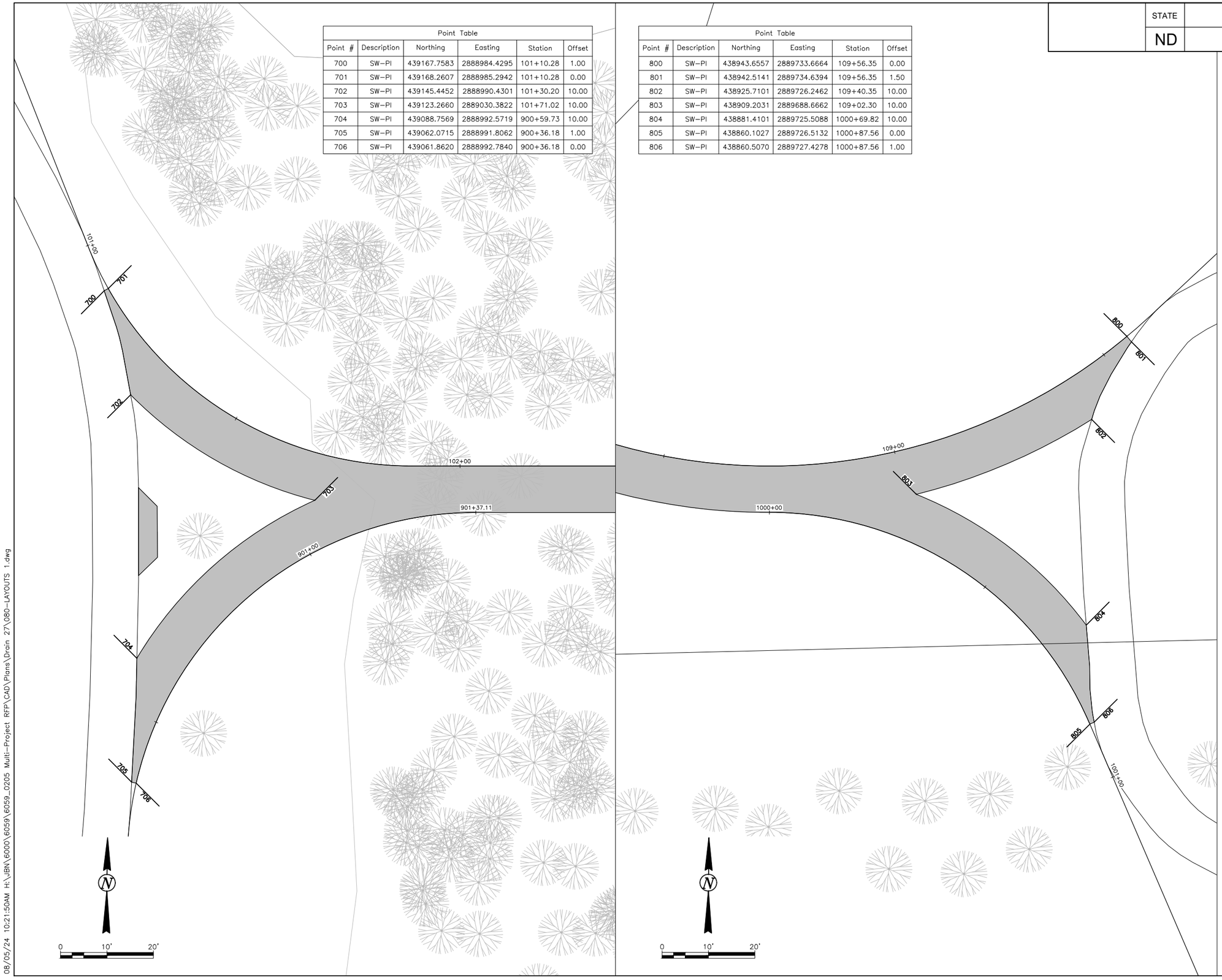
Permanent Erosion Control

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	80	1

Point Table					
Point #	Description	Northing	Easting	Station	Offset
700	SW-PI	439167.7583	2888984.4295	101+10.28	1.00
701	SW-PI	439168.2607	2888985.2942	101+10.28	0.00
702	SW-PI	439145.4452	2888990.4301	101+30.20	10.00
703	SW-PI	439123.2660	2889030.3822	101+71.02	10.00
704	SW-PI	439088.7569	2888992.5719	900+59.73	10.00
705	SW-PI	439062.0715	2888991.8062	900+36.18	1.00
706	SW-PI	439061.8620	2888992.7840	900+36.18	0.00

Point Table					
Point #	Description	Northing	Easting	Station	Offset
800	SW-PI	438943.6557	2889733.6664	109+56.35	0.00
801	SW-PI	438942.5141	2889734.6394	109+56.35	1.50
802	SW-PI	438925.7101	2889726.2462	109+40.35	10.00
803	SW-PI	438909.2031	2889688.6662	109+02.30	10.00
804	SW-PI	438881.4101	2889725.5088	1000+69.82	10.00
805	SW-PI	438860.1027	2889726.5132	1000+87.56	0.00
806	SW-PI	438860.5070	2889727.4278	1000+87.56	1.00



THE CITY OF Fargo FAR MORE

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ADAM M. RUUD
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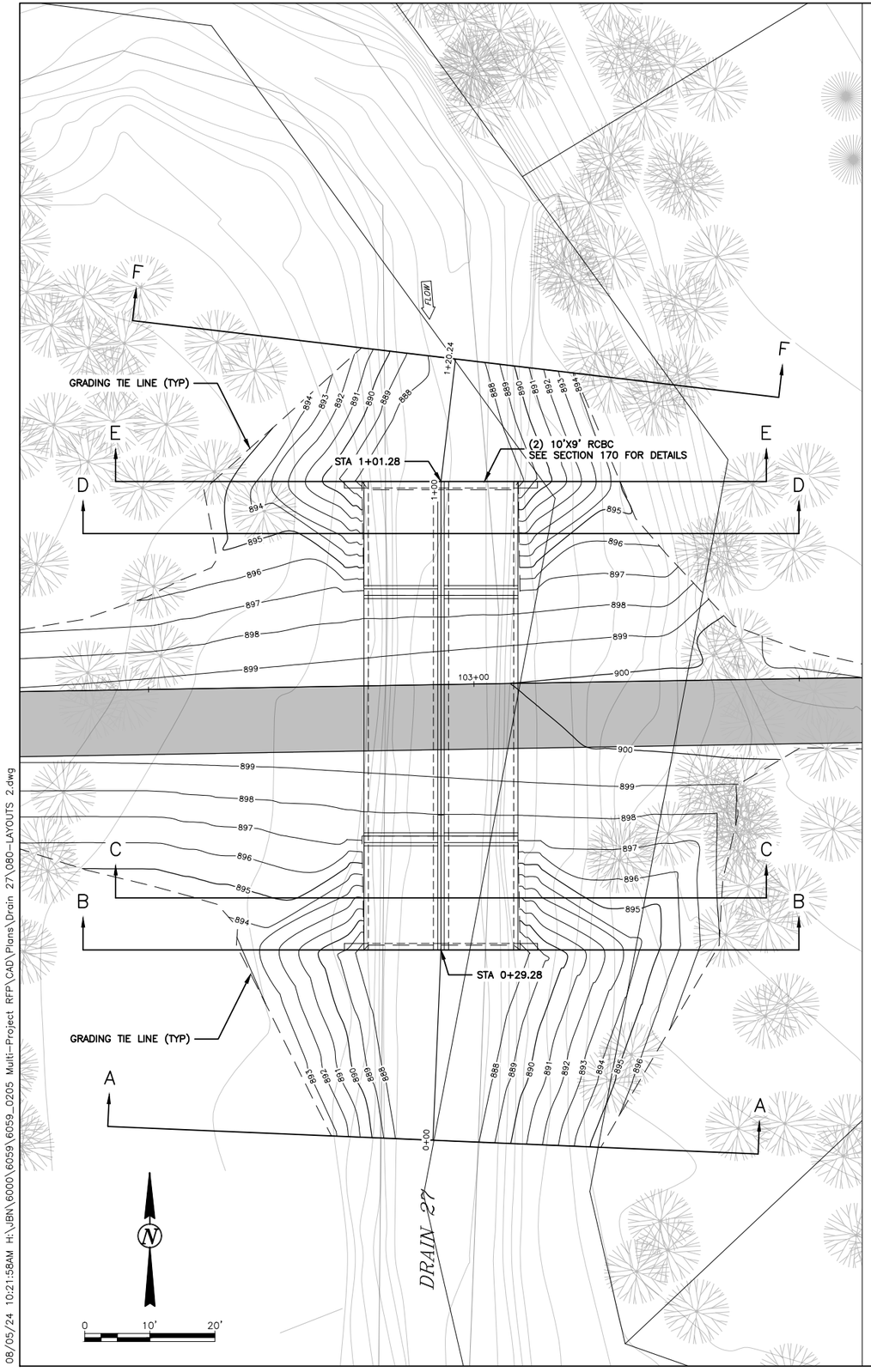
NORTH DAKOTA

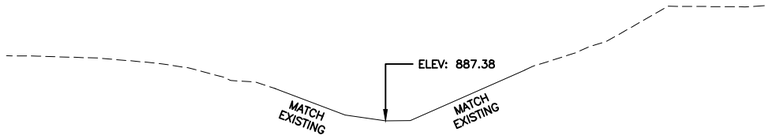
8/12/2024

Layouts

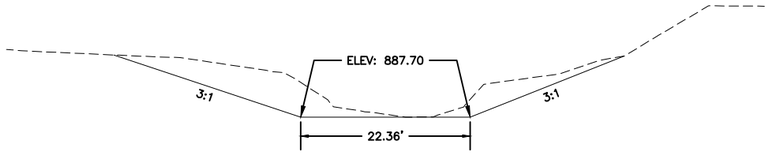
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	80	2



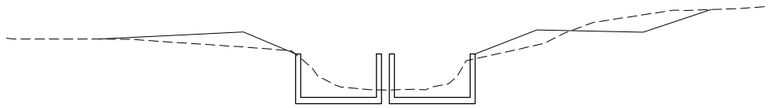


SECTION F–F

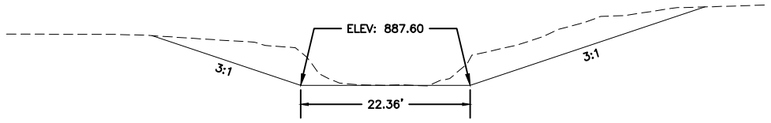


SECTION E–E

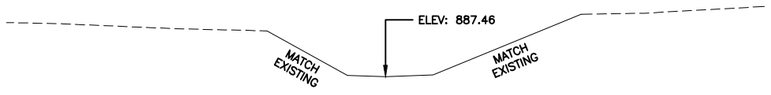
SECTION D–D



SECTION C–C



SECTION B–B



SECTION A–A

THE CITY OF Fargo FAR MORE

Proj. No. 6059-0205
Houston Engineering Inc.
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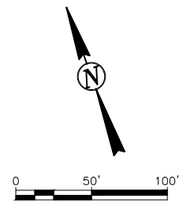
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

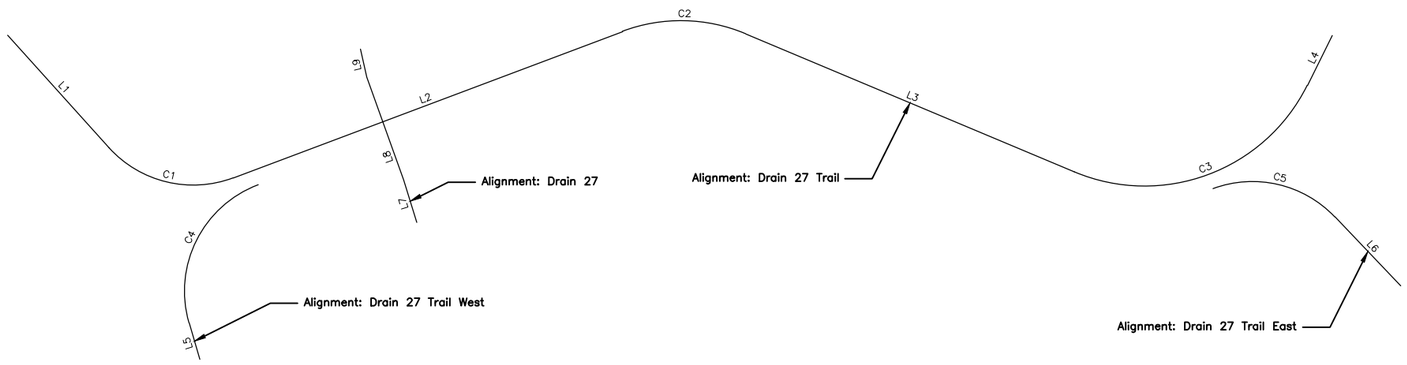
8/12/2024

Layouts

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	82	1





Line Table: Alignments – Drain 27					
Number	PI Station	Northing	Easting	Distance	Direction
L7	0+00.00	439062.3786	2889155.0118	29.28	N02°35'23.23"E
L8	0+29.28	439091.6299	2889156.3349	72.00	N00°10'20.26"E
L9	1+01.28	439163.6296	2889156.5514	18.95	N06°57'36.08"E

Line Table: Alignments – Drain 27 Trail West					
Number	PI Station	Northing	Easting	Distance	Direction
L5	900+00.00	439025.8473	2888989.7110	25.00	N03°33'32.85"E
C4	900+94.51	439120.1713	2888995.5778	112.11	N89°12'16.97"E

Line Table: Alignments – Drain 27 Trail					
Number	PI Station	Northing	Easting	Distance	Direction
L1	100+00.00	439269.9930	2888942.8043	100.00	S22°18'10.84"E
C1	101+51.06	439130.2354	2889000.1317	89.66	N89°12'16.97"E
L2	101+89.66	439130.9441	2889051.1850	274.40	N89°12'16.97"E
C2	105+07.82	439135.3602	2889369.3165	83.29	S47°24'37.48"E
L3	105+47.35	439105.7476	2889401.5317	235.11	S47°24'37.48"E
C3	108+94.86	438870.5733	2889657.3752	180.65	N46°20'01.87"E
L4	109+63.11	438948.1829	2889738.6851	36.89	N46°20'01.87"E

Line Table: Alignments – Drain 27 Trail East					
Number	PI Station	Northing	Easting	Distance	Direction
C5	1000+49.37	438905.4732	2889706.4585	87.32	S23°50'47.12"E
L6	1000+87.32	438860.3190	2889726.4176	62.68	S23°50'47.12"E

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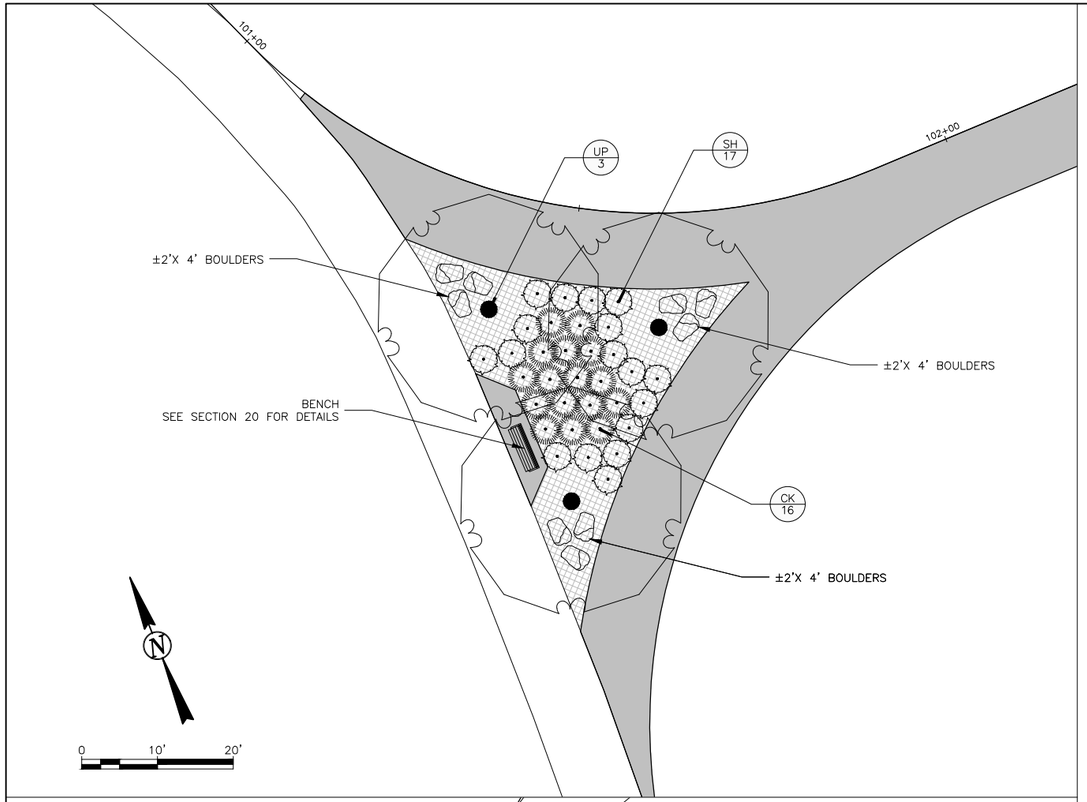
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

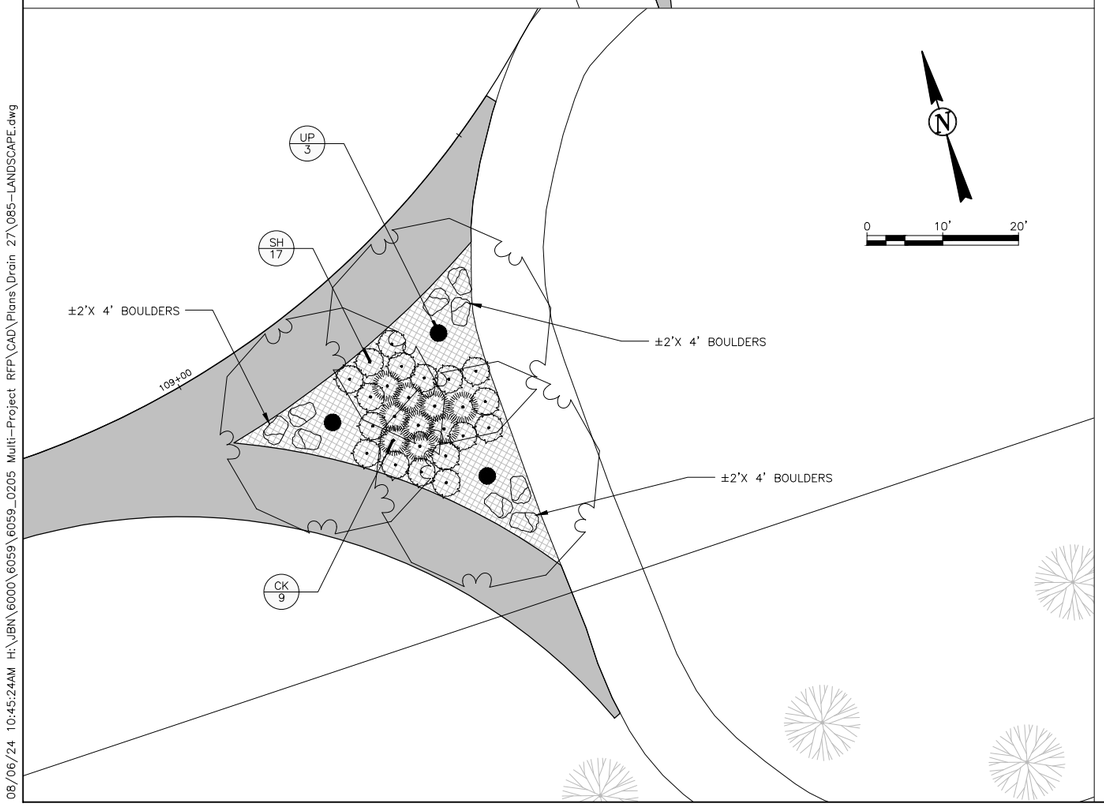
8/12/2024

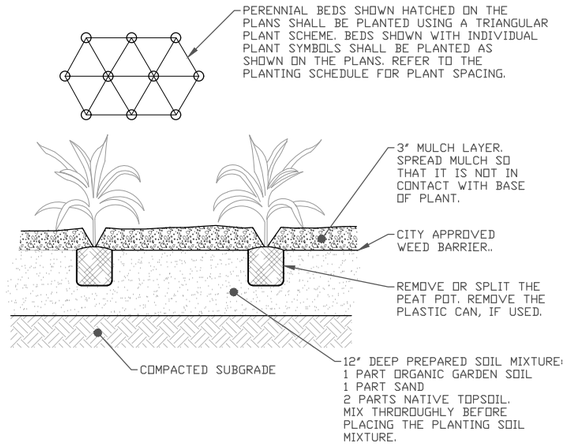
Alignment Definition

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	85	1







PERENNIAL PLANTING

NO SCALE

SPEC	CODE	BID ITEM		QTY	UNIT
970	0075	WOOD MULCH			
		STA 101+30 TO STA 101+71		772	SF
		STA 109+02 TO STA 109+40		620	SF
			TOTAL	1392	SF
970	0300	BENCH			
		STA 101+48		1	EA
970	1000	TREES			
		STA 101+30 TO STA 101+71		3	EA
		STA 109+02 TO STA 109+40		3	EA
			TOTAL	6	EA
970	1030	PERENNIALS GROUP A			
		STA 101+30 TO STA 101+71		33	EA
		STA 109+02 TO STA 109+40		26	EA
			TOTAL	59	EA

PLANT SCHEDULE

TREES	BOTANICAL NAME	COMMON NAME	SIZE	QTY	REMARKS
UP	Ulmus americana 'Princeton'	Princeton American Elm	2.5" Cal.	6	
PERENNIALS	**BOTANICAL NAME**	**COMMON NAME**	**SIZE**	**QTY**	**REMARKS**
CK	Calamagrostis x acutiflora `Karl Foerster`	Karl Foerster Feather Reed Grass	3 gal.	25	
SH	Sporobolus heterolepis	Prairie Dropseed	3 gal.	34	

GROUND COVERS	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QTY	REMARKS
	MULCH	SHREDDED HARDWOOD	MULCH		1,393 sf	

THE CITY OF Fargo FAR MORE

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REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/12/2024

Landscaping

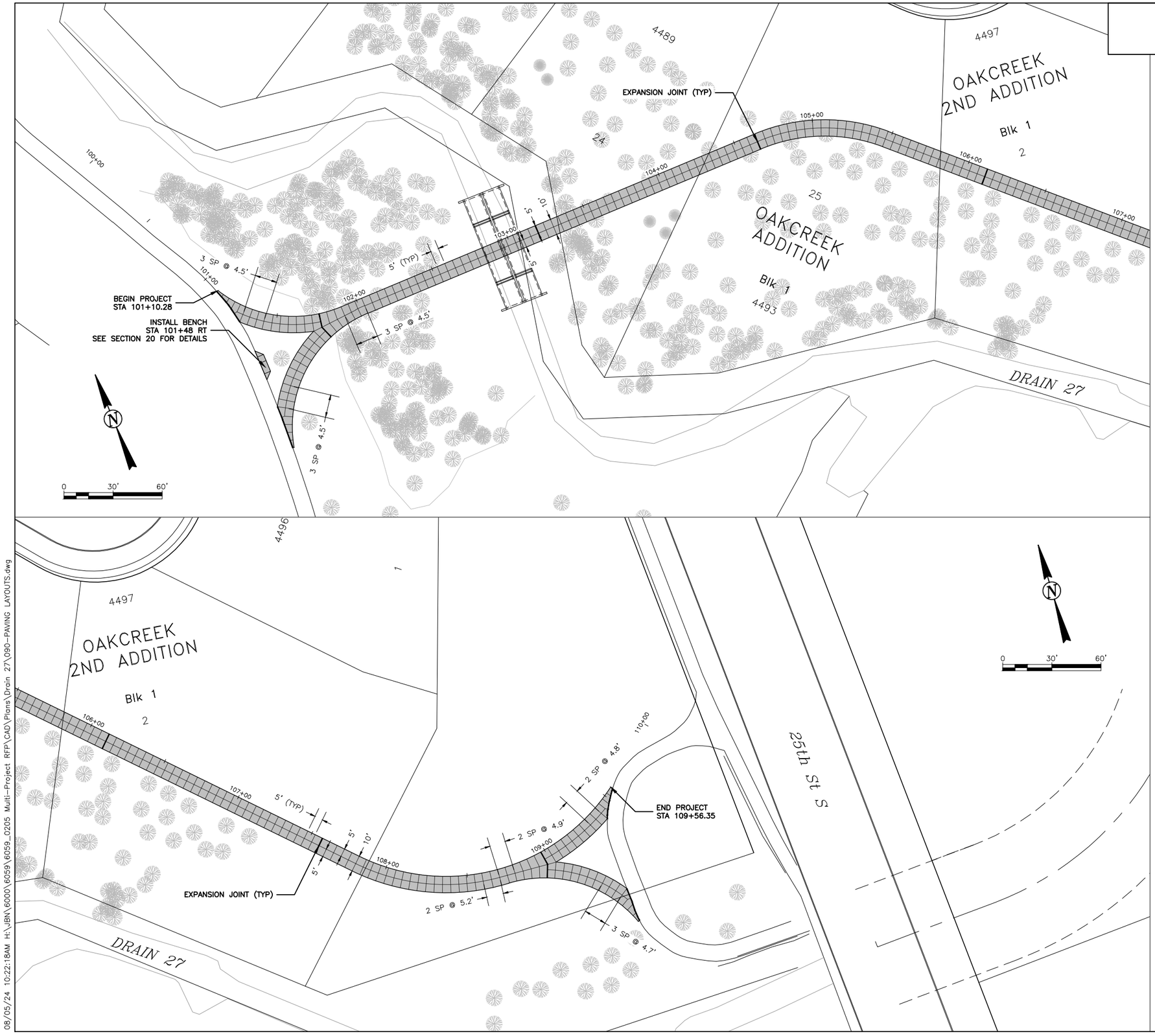
Drain 27 Trail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	90	1

SPEC CODE	BID ITEM	QTY	UNIT
750 0125	SIDEWALK CONCRETE 5IN		
	STA 101+10 TO STA 106+00	612	SY
	STA 106+00 TO STA 109+56	453	SY
	TOTAL	1065	SY

LEGEND:

- SIDEWALK CONCRETE 5IN
- CONTRACTION JOINT
- EXPANSION JOINT



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ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

8/12/2024

Paving Layouts

Drain 27 Trail

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMA-TAU-8-984(177)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**1**	**26**	**26**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**3**	**30**	**90**
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**2**	**10**	**20**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**1**	**35**	**35**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**1**	**35**	**35**
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**1**	**35**	**35**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE		35	
W20-5-48	**48"x48"**	**RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE**	**1**	**35**	**35**
W20-7-48	48"x48"	FLAGGER		35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back		5	
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		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 or _ MILE		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	48"x48"	RUMBLE STRIPS AHEAD		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**276**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**2**
704-1056	**PEDESTRIAN CHANNELIZATION**	**LF**	**270**
704-1060	**DELINEATOR DRUMS**	**EACH**	**11**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**11**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	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**	**1**
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

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

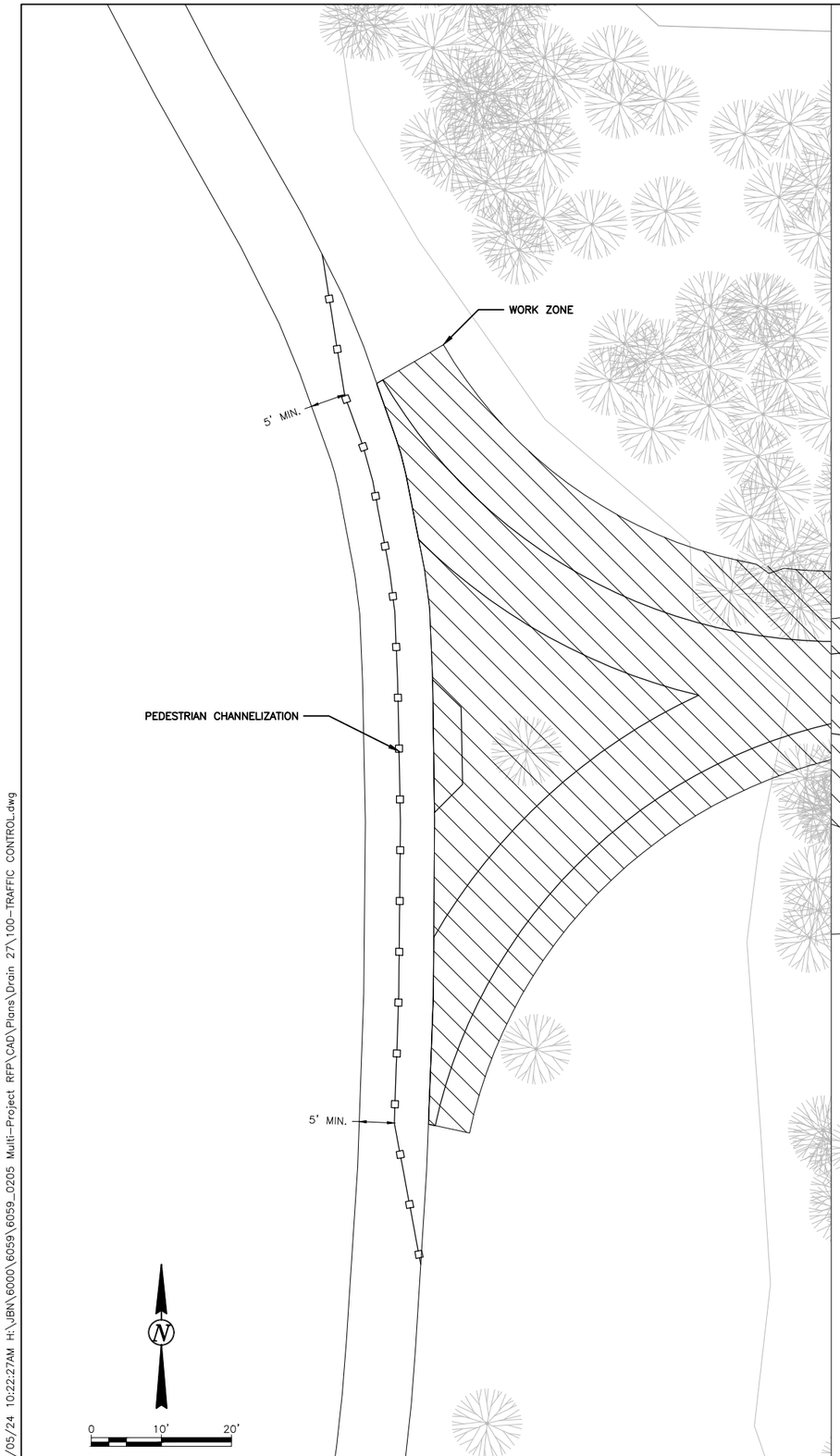
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

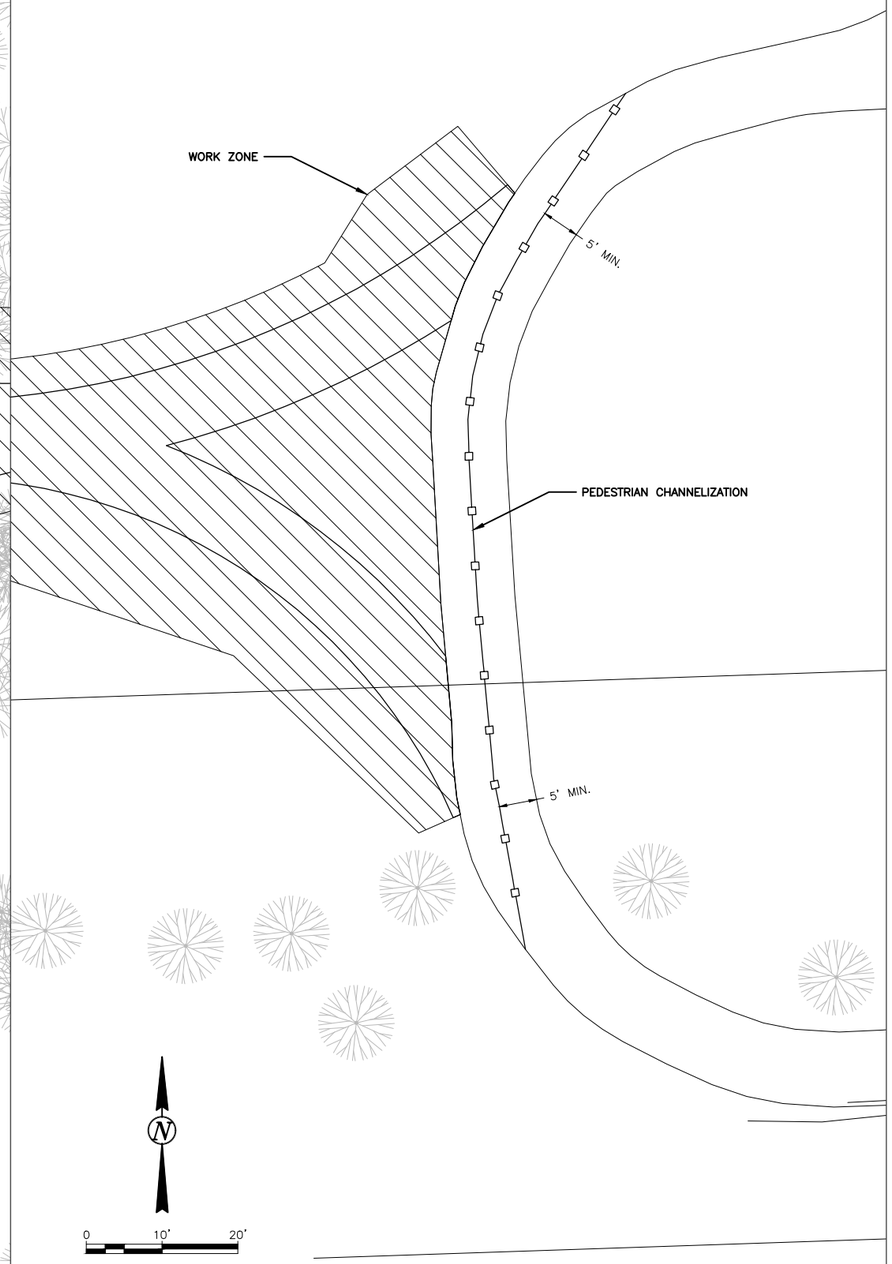
8/12/2024

Traffic Control Devices List

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	100	2





LEGEND:

PEDESTRIAN CHANNELIZATION

WORK ZONE

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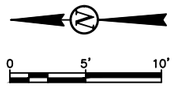
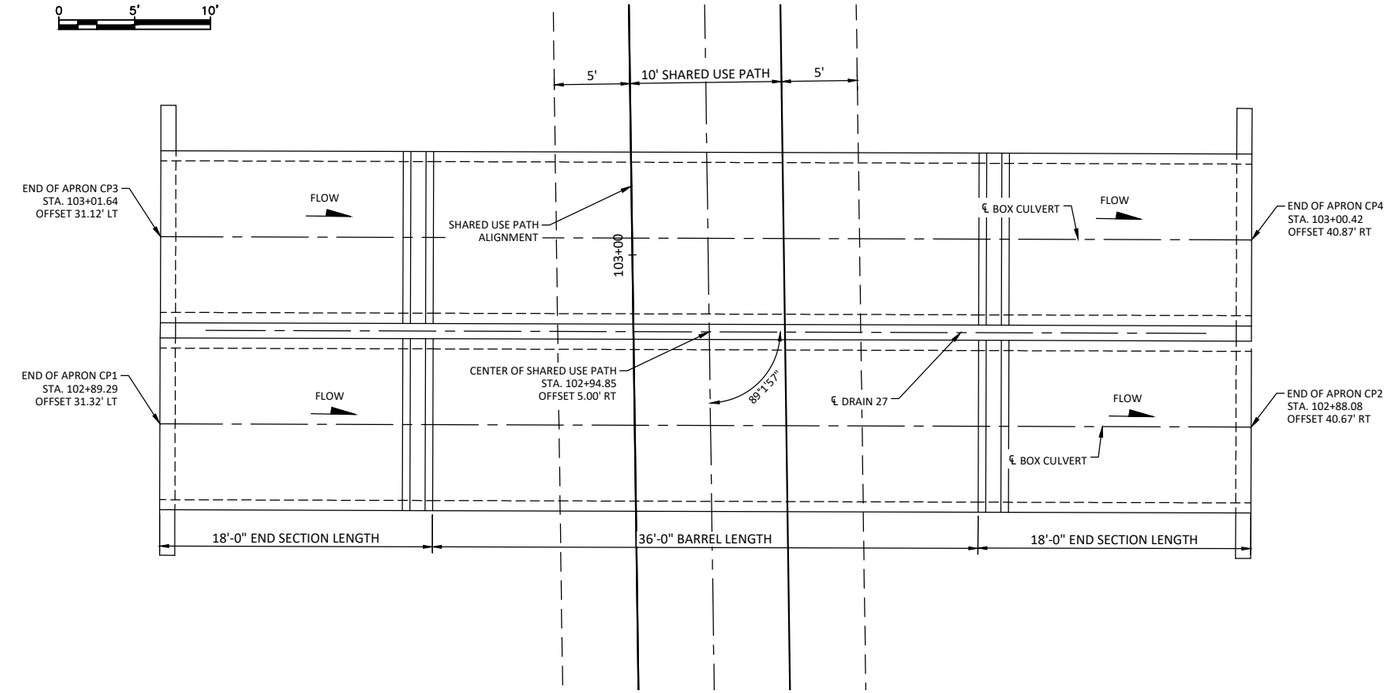
8/12/2024

Work Zone Traffic Control

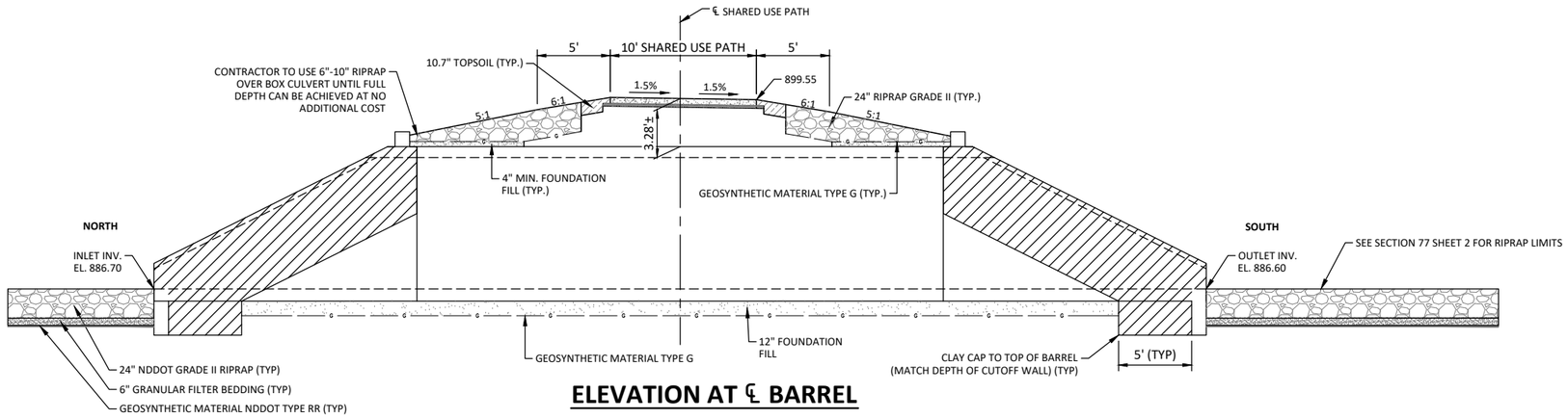
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	170	1

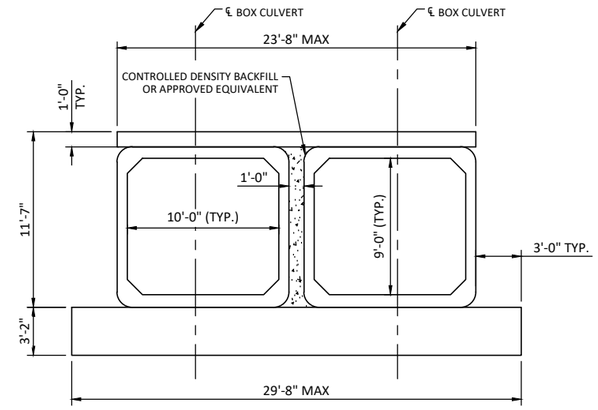




PLAN



ELEVATION AT ℄ BARREL



END VIEW

DESIGN LOADING:

HL-93 Live Load	
Maximum Fill Height	= 6'-0"
Minimum Fill Height	= 2'-0"

DESIGN DATA:

Barrel Inside Width	= 10'-0"
Barrel Inside Height	= 9'-0"
Barrel Length	= 36'-0"
Skew Angle	= 0°

HYDRAULIC DATA:

Drainage Area	25.7	sq mi
Stream Gradient	0.0009	ft/ft
Design Frequency	10	yr
Design Discharge	800	cfs
Design Headwater Stage	895.85	ft
Design Tailwater Stage	895.31	ft
Velocity Through Culvert	3.6	fps
100-Year Frequency Discharge*	N/A	cfs
100-Year Frequency Headwater	906.00	ft
Overtopping Stage	899.10	ft
Overtopping Discharge	1450	cfs

*100-Year Frequency Is Controlled By Backwater Effects From The Red River

For a single barrel box culvert with 9" thick roof, 10" floor and 8" walls,the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (SINGLE)		FACTORED DESIGN SHEARS (SINGLE)	
WALL MOMENT	-9,380 FT-LBS	WALL SHEAR	3,460 LBS
ROOF MOMENTS		ROOF SHEARS	
CORNER	-3,060 FT-LBS	CORNER	10,490 LBS
BOTTOM	21,960 FT-LBS	FLOOR SHEARS	
		CORNER	9,040 LBS
FLOOR MOMENTS			
CORNER	-2,270 FT-LBS		
TOP	21,960 FT-LBS		

For a double barrel box culvert with 9" thick roof, 10" floor and 8" walls,the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (DOUBLE)		FACTORED DESIGN SHEARS (DOUBLE)	
WALL MOMENT	-6,190 FT-LBS	WALL SHEAR	3,610 LBS
ROOF MOMENTS		ROOF SHEARS	
CORNER	-2,170 FT-LBS	CORNER	9,310 LBS
BOTTOM	16,120 FT-LBS	WALL	12,000 LBS
TOP	-14,340 FT-LBS	FLOOR SHEARS	
		CORNER	6,110 LBS
FLOOR MOMENTS		WALL	9,960 LBS
CORNER	-2,290 FT-LBS		
TOP	10,000 FT-LBS		
BOTTOM	-14,530 FT-LBS		

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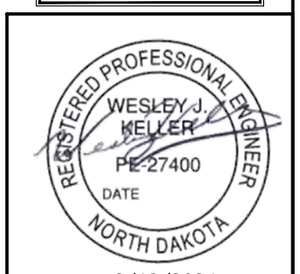

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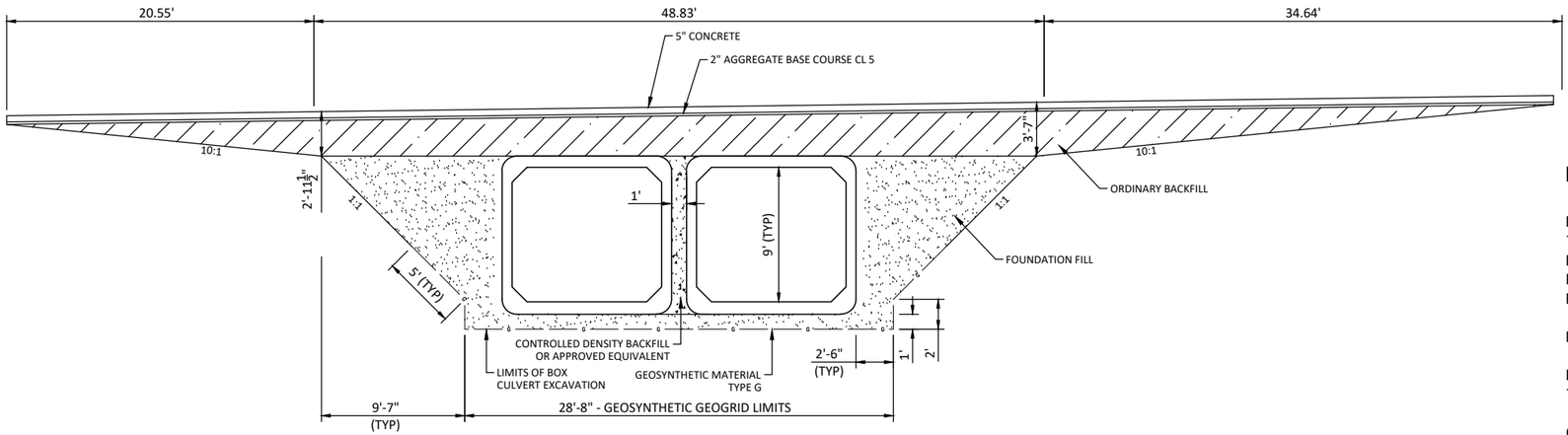
Box Culvert Layout

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	170	2



ELEVATION AT ℄ BARREL

NOTES:

PLACE A 1'-0" MINIMUM DEPTH OF FOUNDATION FILL AND BEDDING UNDER THE FLOOR. PROVIDE BEDDING IN ACCORDANCE WITH SECTION 606.E.1. REMOVE AND REPLACE ALL UNSOUND MATERIAL UNDER THE BOX WITH FOUNDATION FILL. THE ENGINEER WILL DETERMINE THE DEPTH REQUIRED.

PLACE ALL BEDDING PRIOR TO PLACING BOX CULVERT SECTIONS.

EXTEND GEOSYNTHETIC MATERIAL AND FOUNDATION FILL TO THE END OF THE APRON.

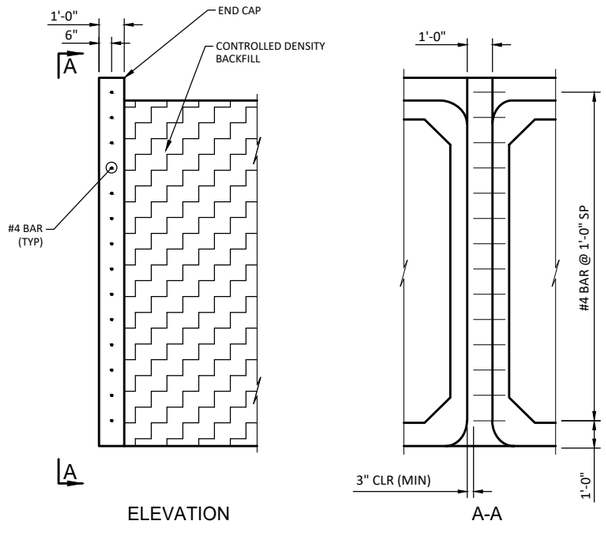
CONTRACTOR IS TO EXCAVATE TO A SUITABLE SUBGRADE AS DETERMINED BY THE ENGINEER AND BACKFILL WITH FOUNDATION FILL AS NEEDED. MUCK DEPTH IS ANTICIPATED TO BE APPROXIMATELY 2.5' BELOW EXISTING CHANNEL BOTTOM. ADDITIONAL SUBGRADE EXCAVATION BELOW THE LIMITS SHOWN WILL BE CONSIDERED INCIDENTAL TO BOX CULVERT INSTALLATION.

NOTES:

THE INTENT OF THIS DETAIL IS TO SHOW ONLY THE PLACEMENT OF THE CONTROLLED DENSITY BACKFILL BETWEEN ADJACENT BARRELS. THE REPRESENTATION OF THE SIZE OF BARRELS IS ARBITRARY.

EMBED THE # 4 OR 6" INTO THE SIDE OF ONE OF THE BOX CULVERT END SECTIONS MAINTAINING A 3" MINIMUM CLEARANCE FROM THE OTHER BOX CULVERT. SPACING MEASURED 1'-0" FROM THE BOTTOM OF THE BOX AND SPACED AT 1'-0" UP THE FRONT FACE.

INSTALL THE # 4 BARS ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE AND THAT MEETS THE REQUIREMENTS OF SECTION 806.02.



CONTROLLED DENSITY BACKFILL DETAIL

BOX CULVERT BID ITEM

SPEC	ITEM DESCRIPTION	UNIT	QUANTITY
210	BOX CULVERT EXCAVATION	EA	1
210	FOUNDATION FILL	CY	348
210	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	RIPRAP GRADE II	CY	654
606	10FT X 9FT PRECAST RCB CULVERT	LF	72
606	10FT X 9FT PRECAST RCB END SECTION	EA	4
709	GEOSYNTHETIC MATERIAL TYPE G	SY	349
709	GEOSYNTHETIC MATERIAL TYPE RR	SY	981

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REGISTERED PROFESSIONAL ENGINEER
WESLEY J. KELLER
PE-27400
DATE
NORTH DAKOTA

8/12/2024

Box Culvert Details

Drain 27 Trail

NOTES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	170	3

100 SCOPE OF WORK: Work at this site consists of installing two lines of 10' x 9' x 36'-0" precast concrete box culverts.

210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 E.2.a, "ND T 180."

606 JOINTS: Provide joints in accordance with Section 606.E.3, with the exception that a 12" minimum width waterproof membrane is allowable around the exterior surfaces of the box culvert walls and roof

606 PRECAST SECTION: Tie the barrel sections together with 1"Ø tie bolts as shown on Standard Drawing D-714-22. Place two ties per exterior wall joint, located at third points of the wall clear height.

Payment for "10Ft X 9Ft Precast RCB End Section" includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

Use ASTM A36 steel for bolts, plates, angles, and studs. Use heavy hex nuts meeting the requirements of ASTM A563 and washers meeting ASTM F436, Type 1. Provide welded pipe sleeves meeting the requirements of ASTM A53, Grade B. Galvanize hardware and structural steel according to Section 854.

Welders are to meet the requirements of Section 105.06 D. Galvanize field welds according to Section 854.02.

Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section

Provide a distance of 1'-0" between separate precast units. Fill this gap with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is fluid on placement to flow around and fill voids in the backfill area. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. If the mix design shown is used, no further testing will be required. The mix design yields approximately one cubic yard of flowable mortar.

MIX DESIGNS

Mix Design 1		Mix Design 2 (No Fly Ash)	
Cement	100 LBS	Cement	165 LBS
Fly Ash	300 LBS	Fly Ash	NA
Fine Aggregate	2600 LBS	Fine Aggregate	2600 LBS
Water	70 GALS	Water	50 GALS

For the 12" cap, use a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as Sikagrout 212, BASF Masterflow 928, Euclid NS grout, or an approved equal which complies with ASTM C1107.

Include the controlled density backfill and materials used for the 12" cap in the price bid for each specific culvert section, 10ft x 9ft precast RCB culvert.

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REGISTERED PROFESSIONAL ENGINEER
WESLEY J. KELLER
PE-27400
DATE
NORTH DAKOTA

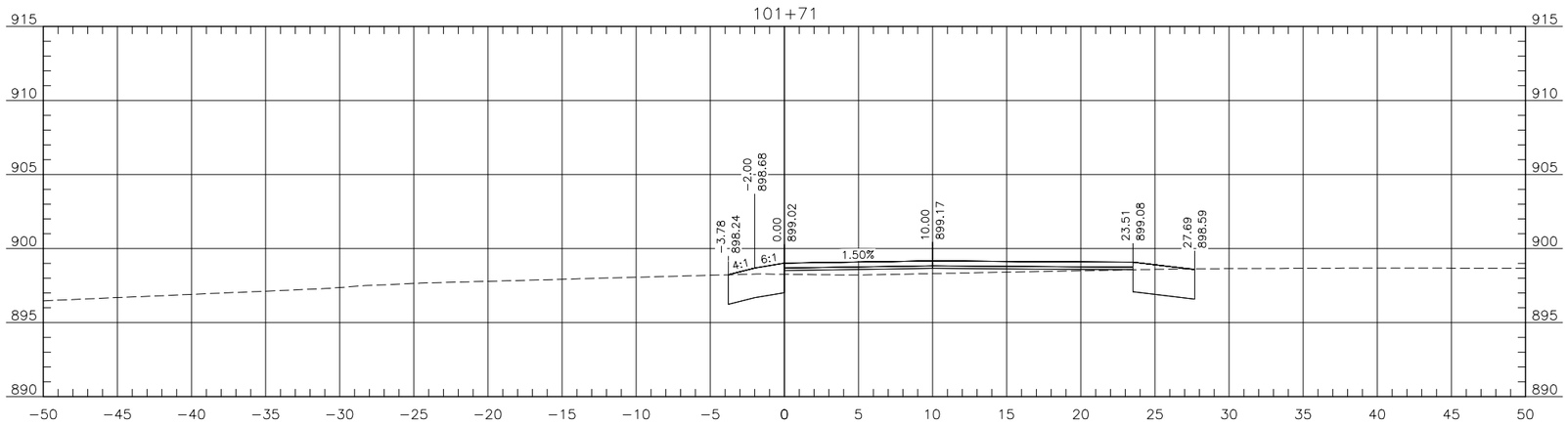
8/12/2024

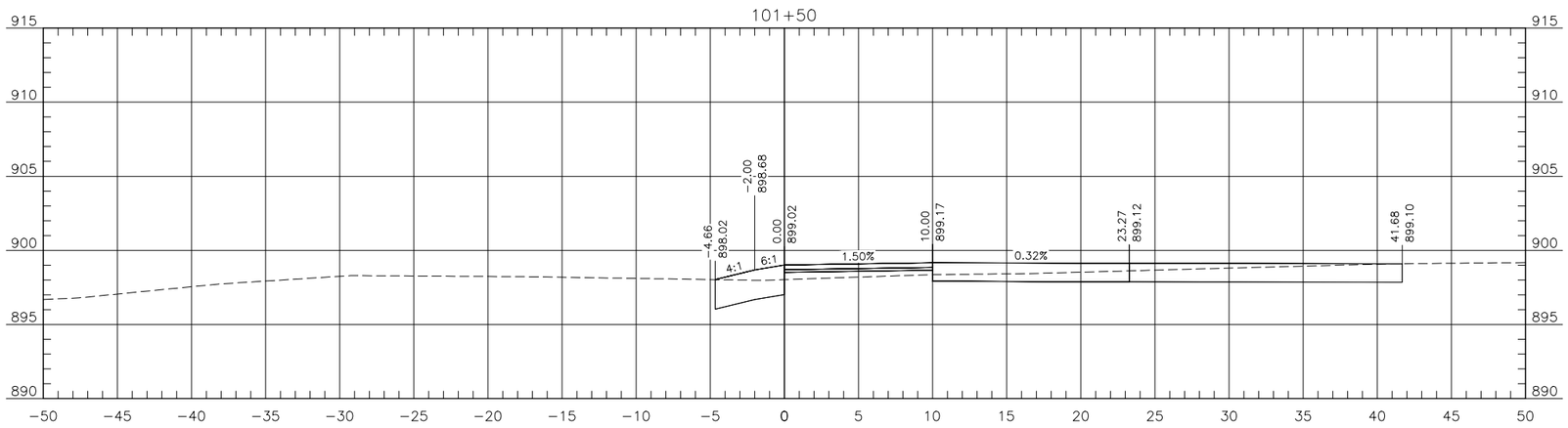
Box Culvert Notes

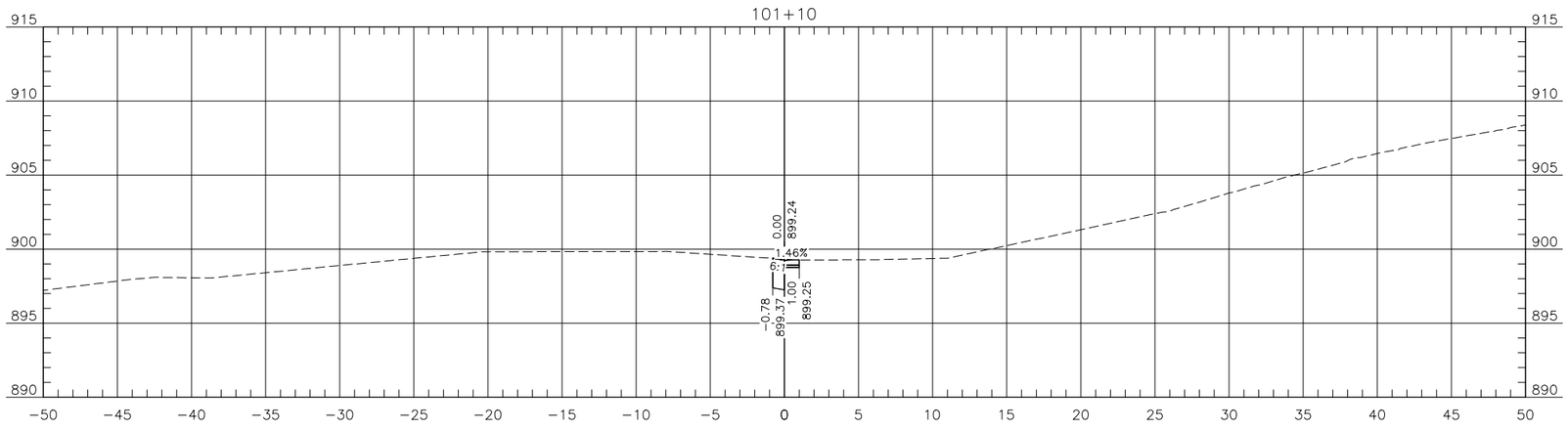
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**1**

ALIGNMENT: Drain 27 Trail







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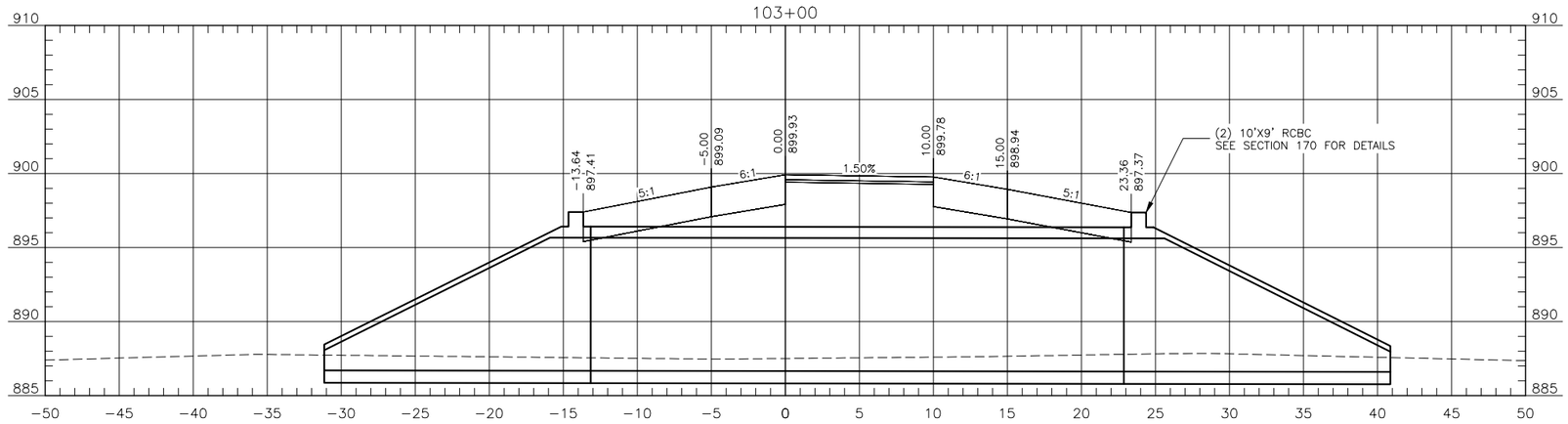
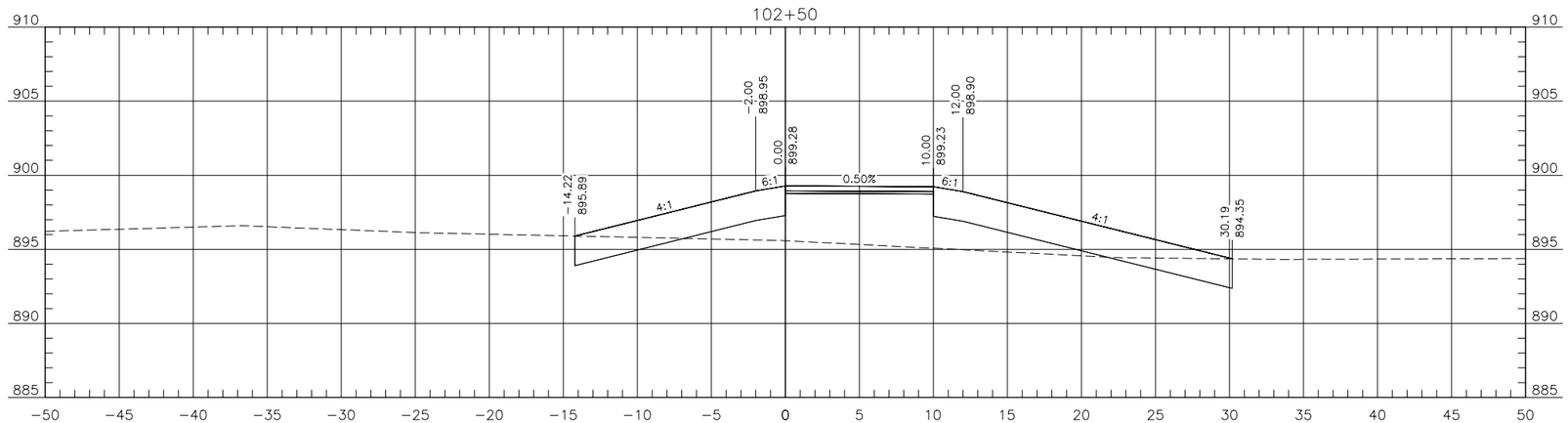
Cross Sections

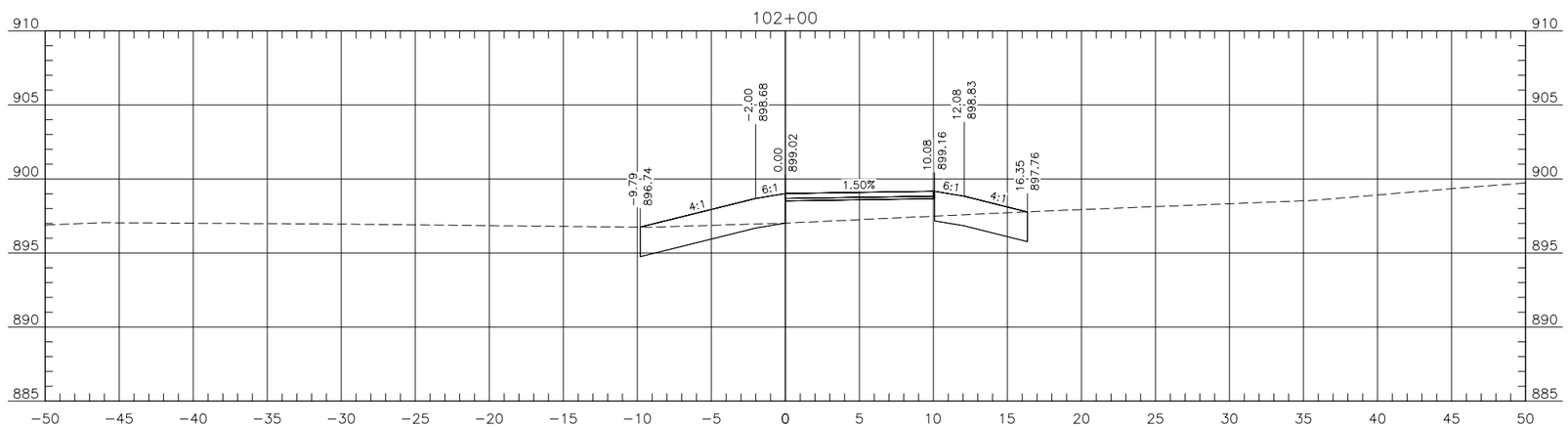
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**2**

ALIGNMENT: Drain 27 Trail







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Cross Sections

Drain 27 Trail

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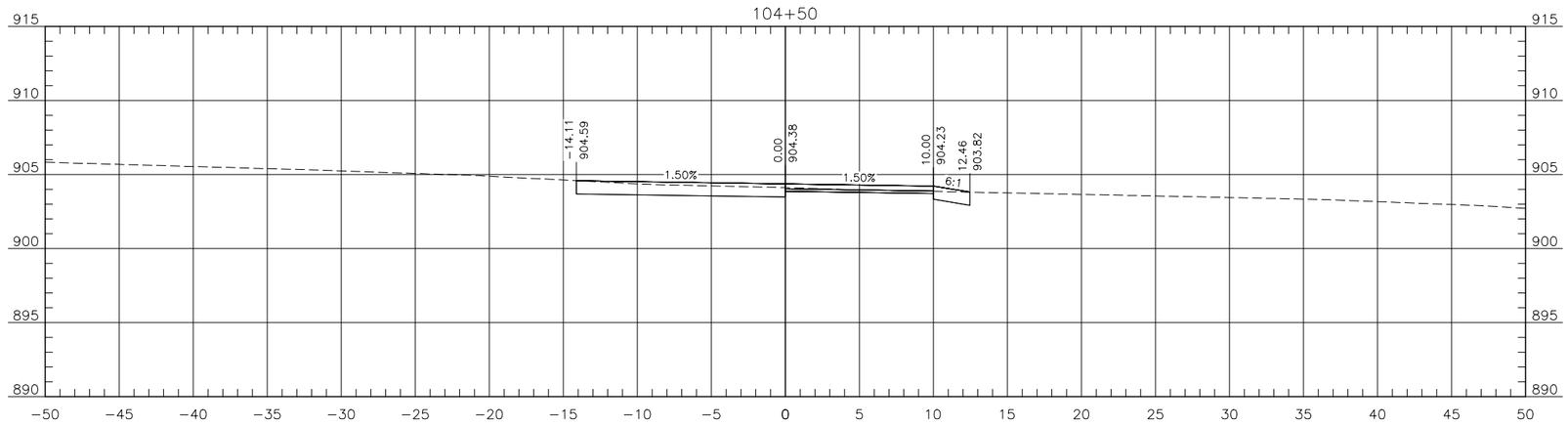
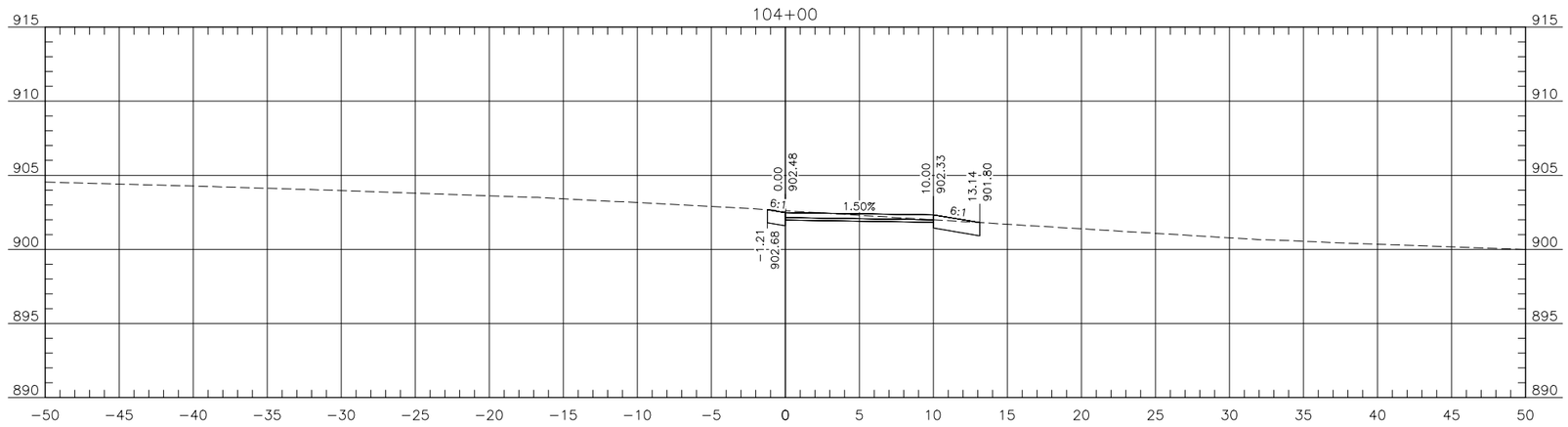
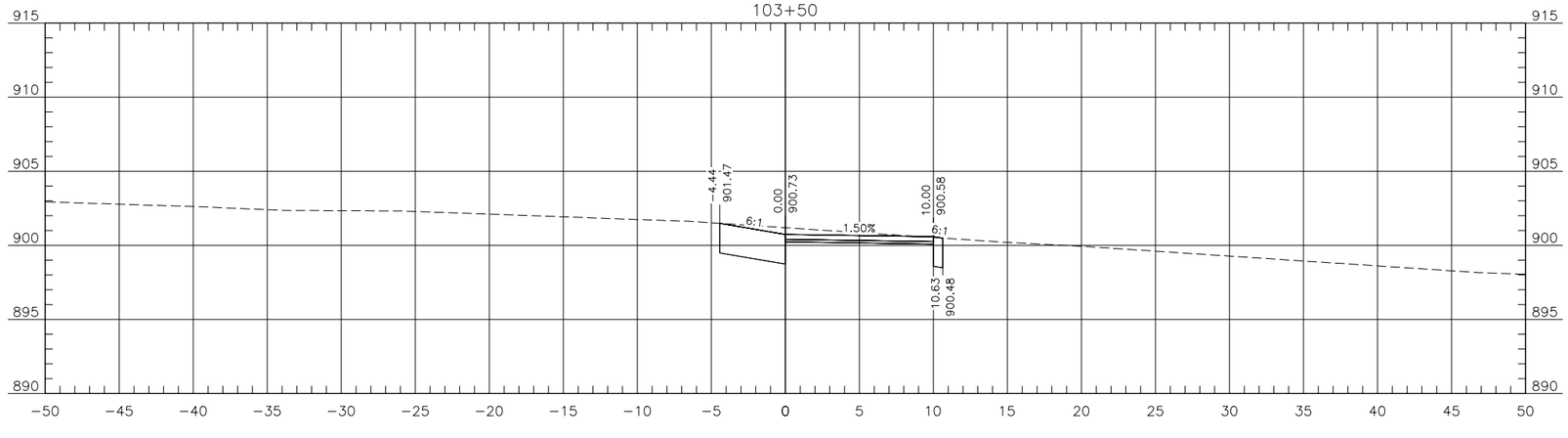
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**3**

ALIGNMENT: Drain 27 Trail







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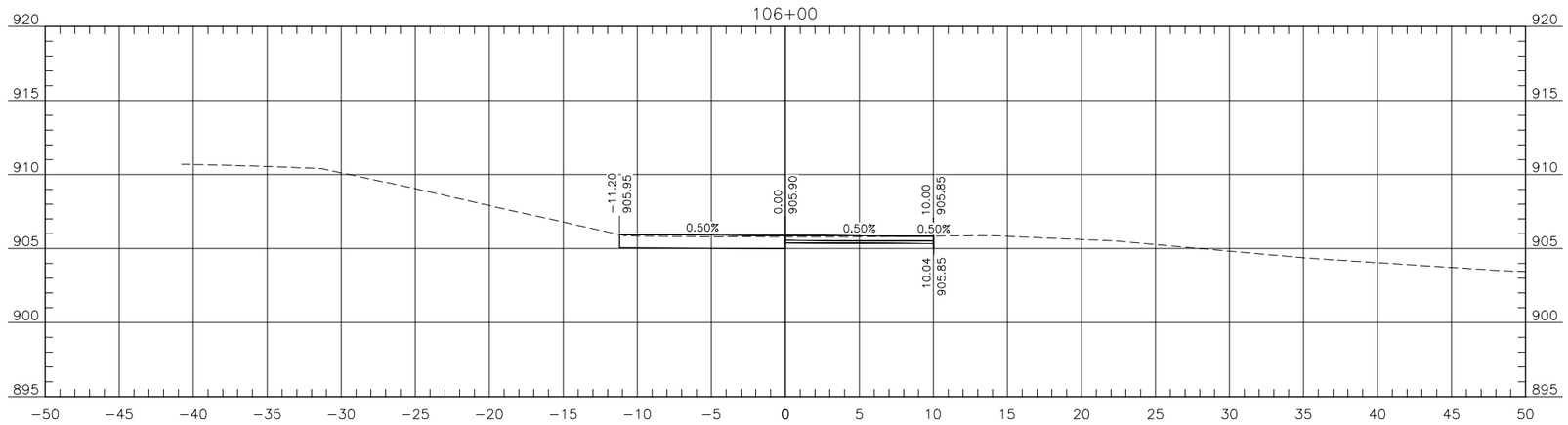
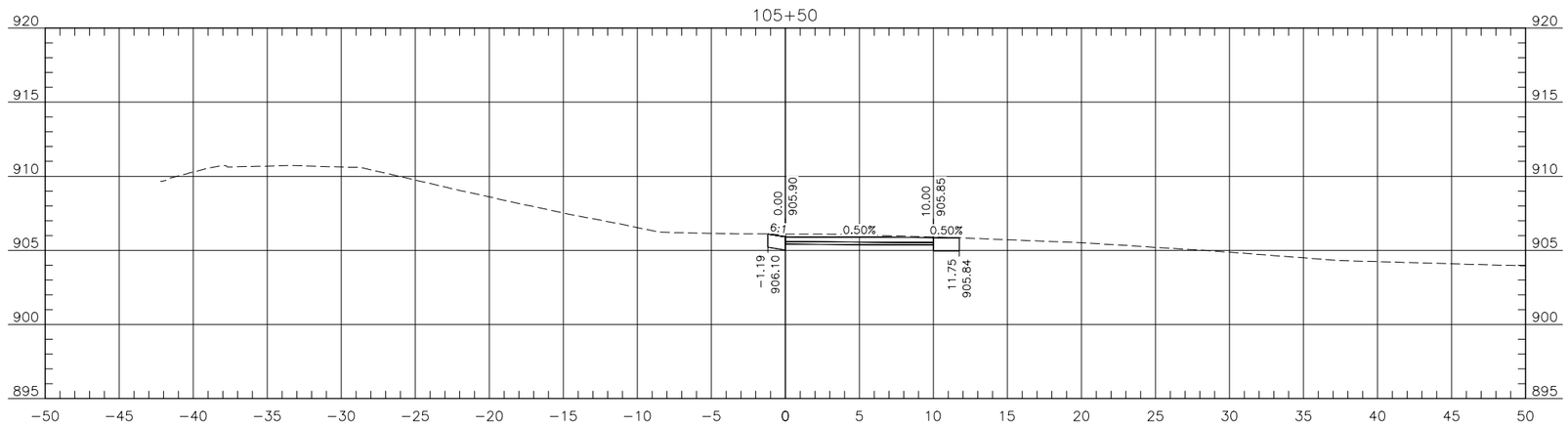
Cross Sections

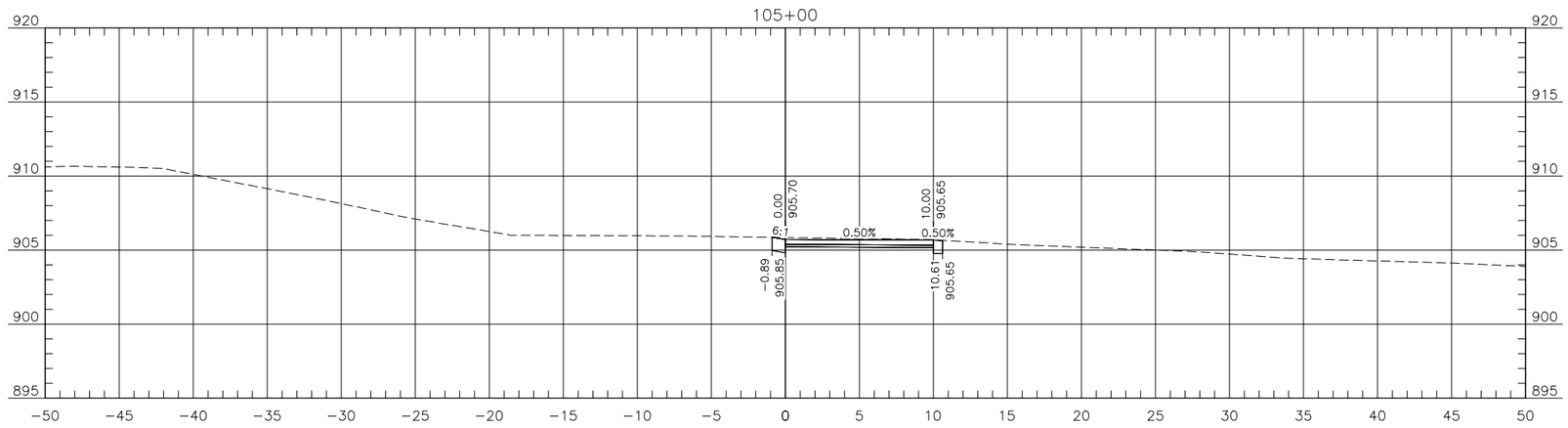
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**4**

ALIGNMENT: Drain 27 Trail







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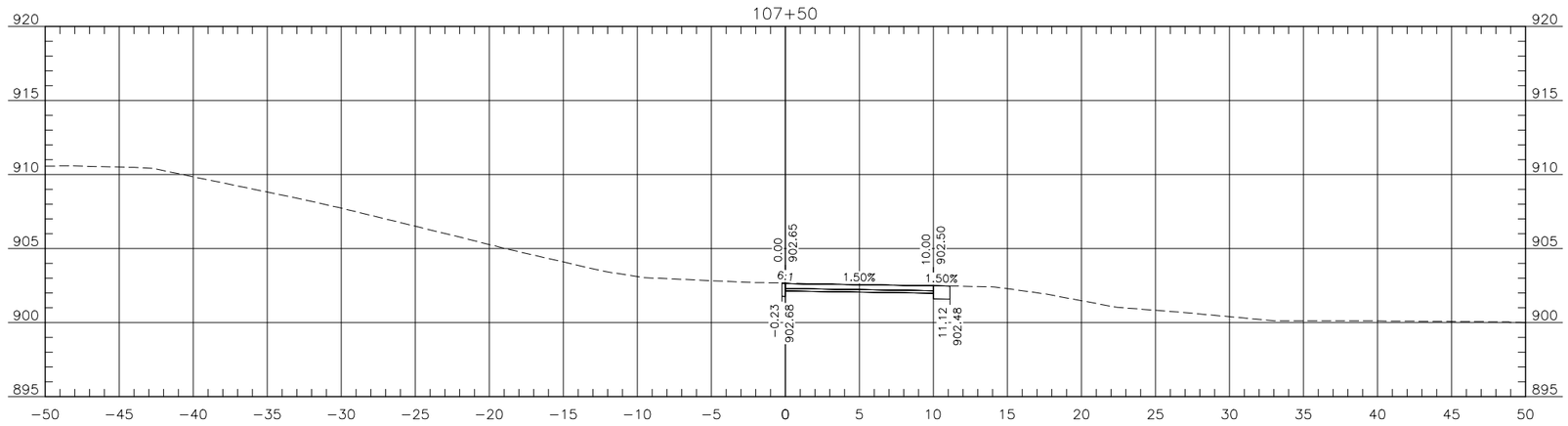
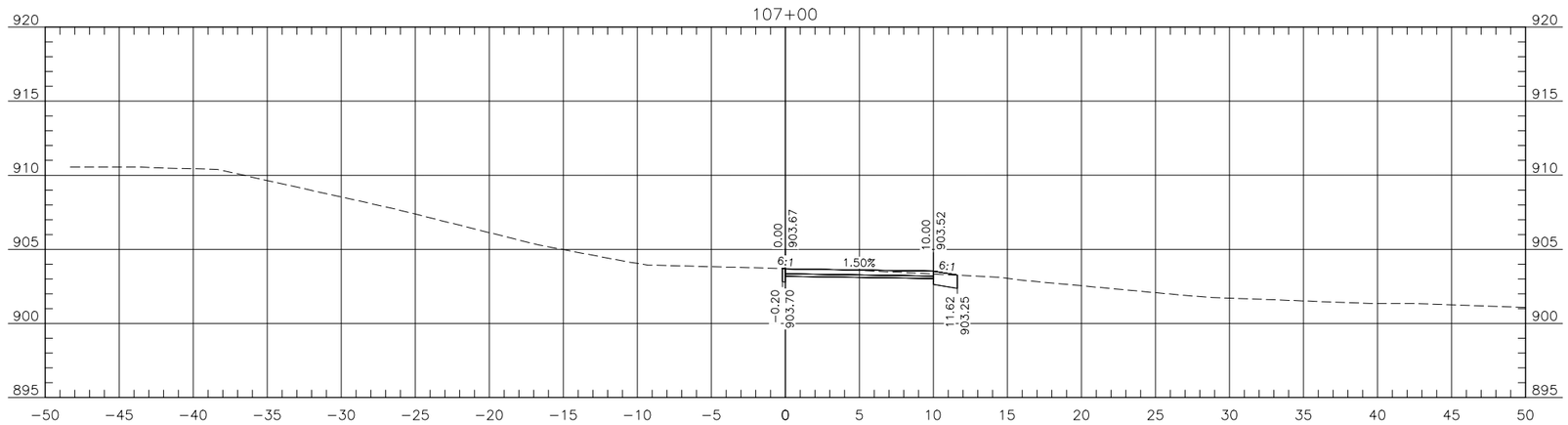
Cross Sections

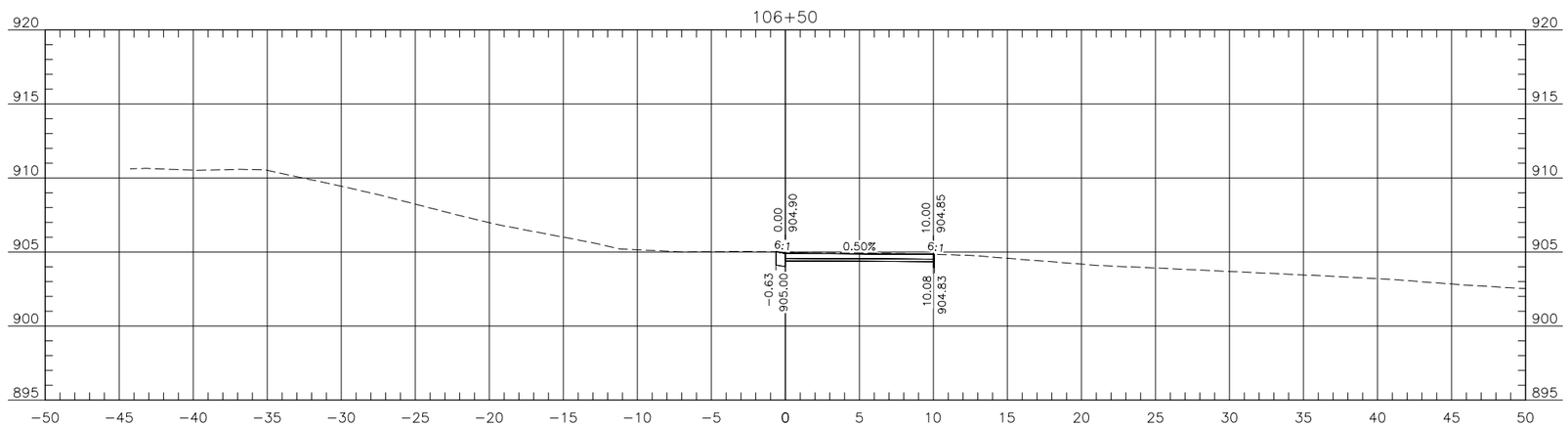
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**5**

ALIGNMENT: Drain 27 Trail







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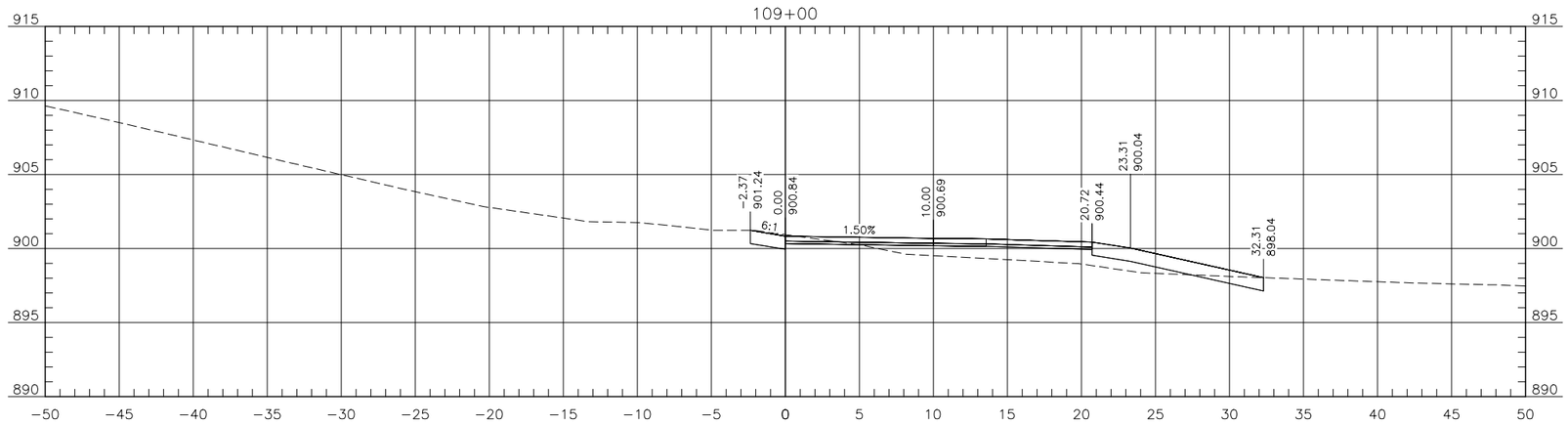
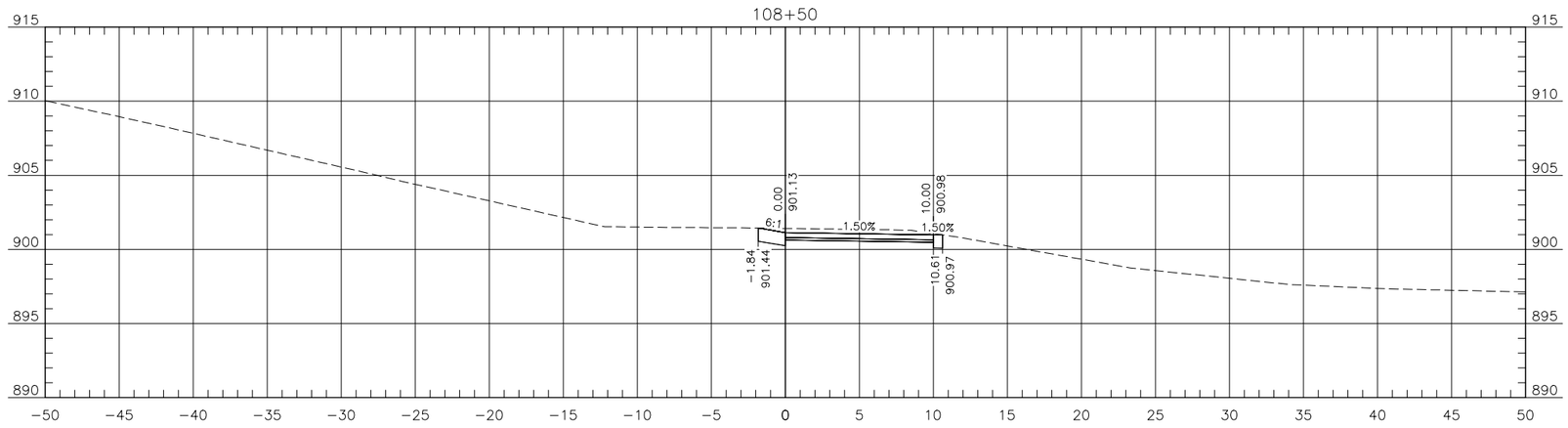
Cross Sections

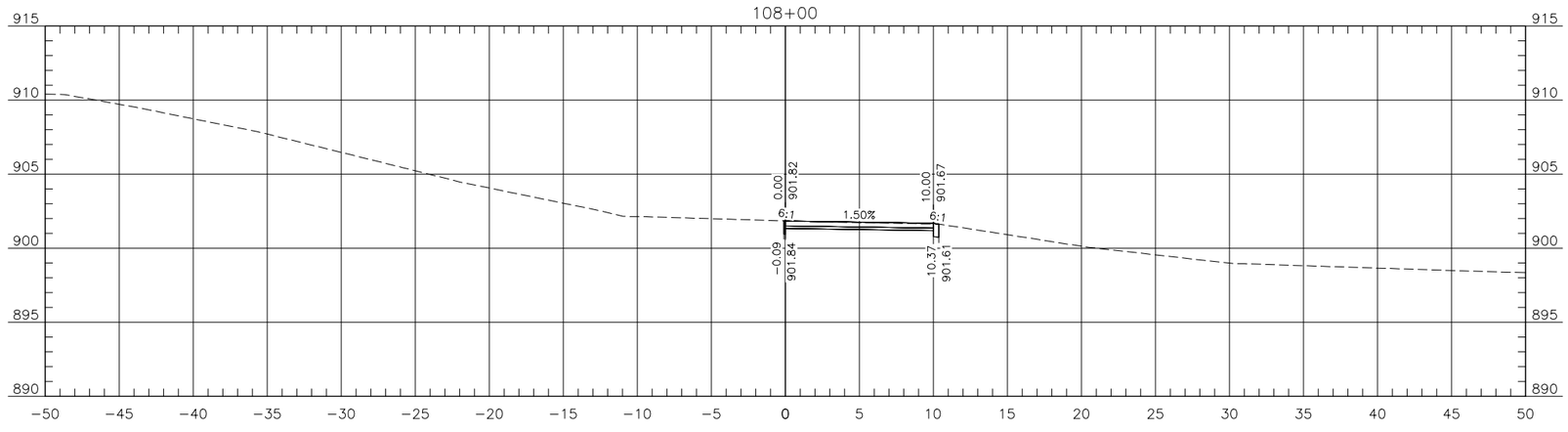
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**6**

ALIGNMENT: Drain 27 Trail







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Cross Sections

Drain 27 Trail

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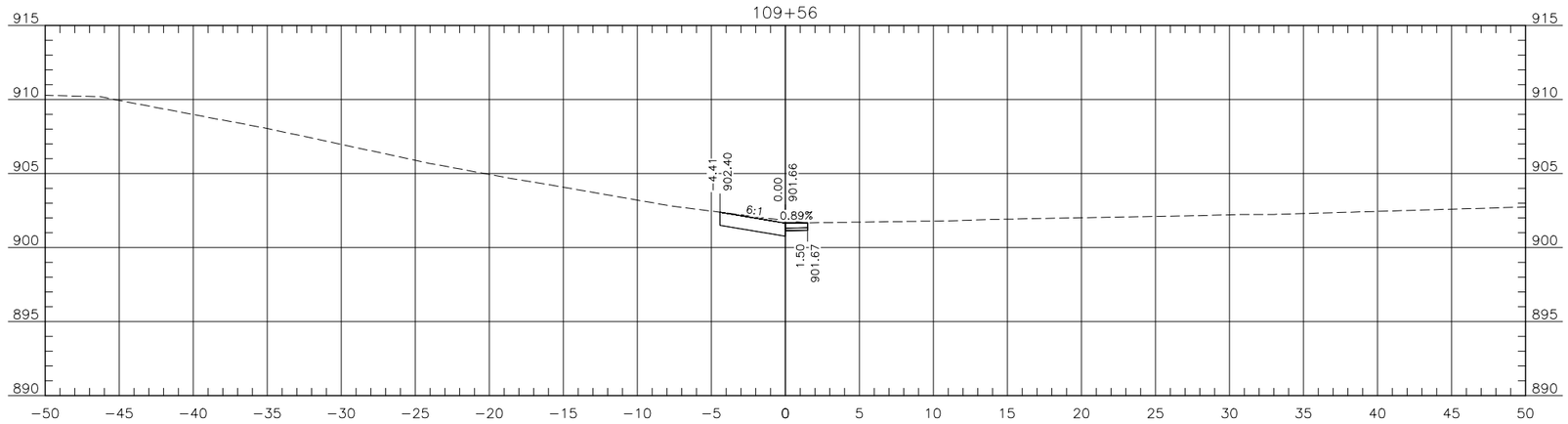
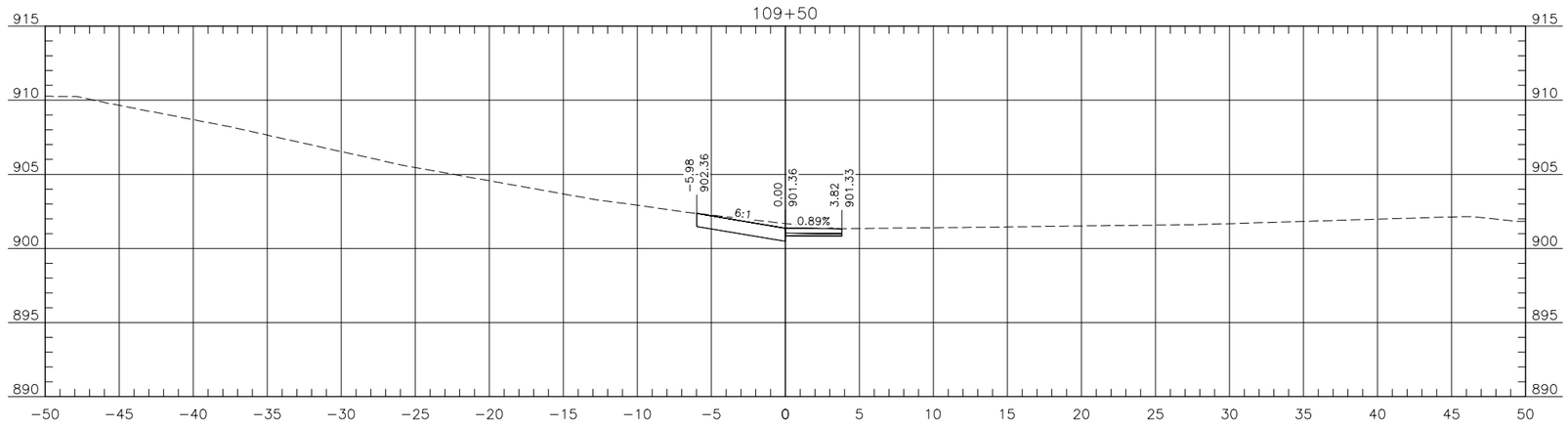
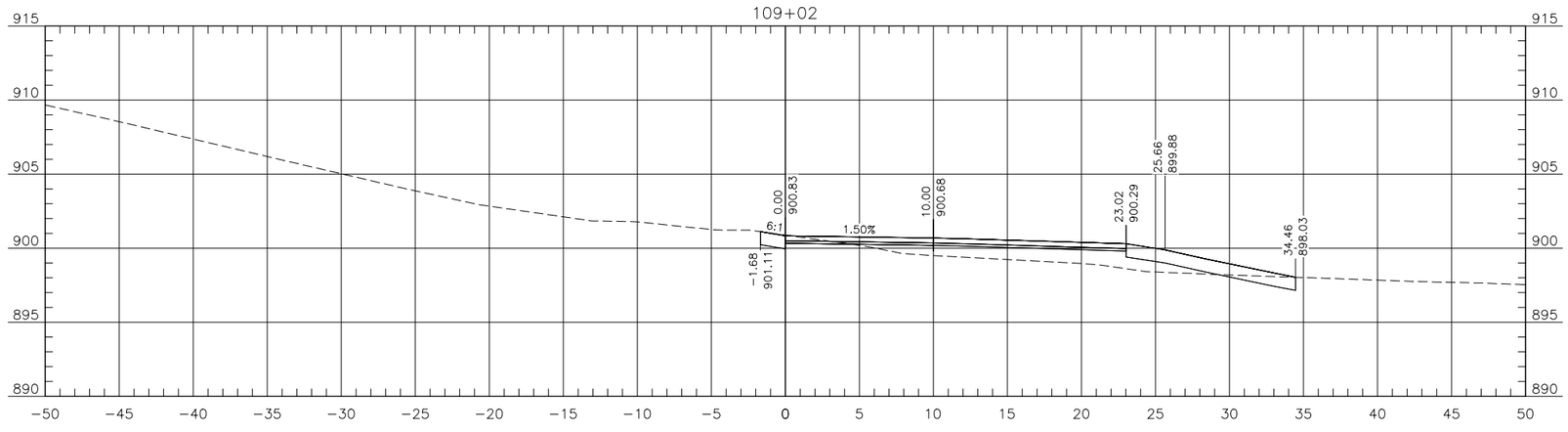
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**7**

ALIGNMENT: Drain 27 Trail







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Cross Sections

Drain 27 Trail

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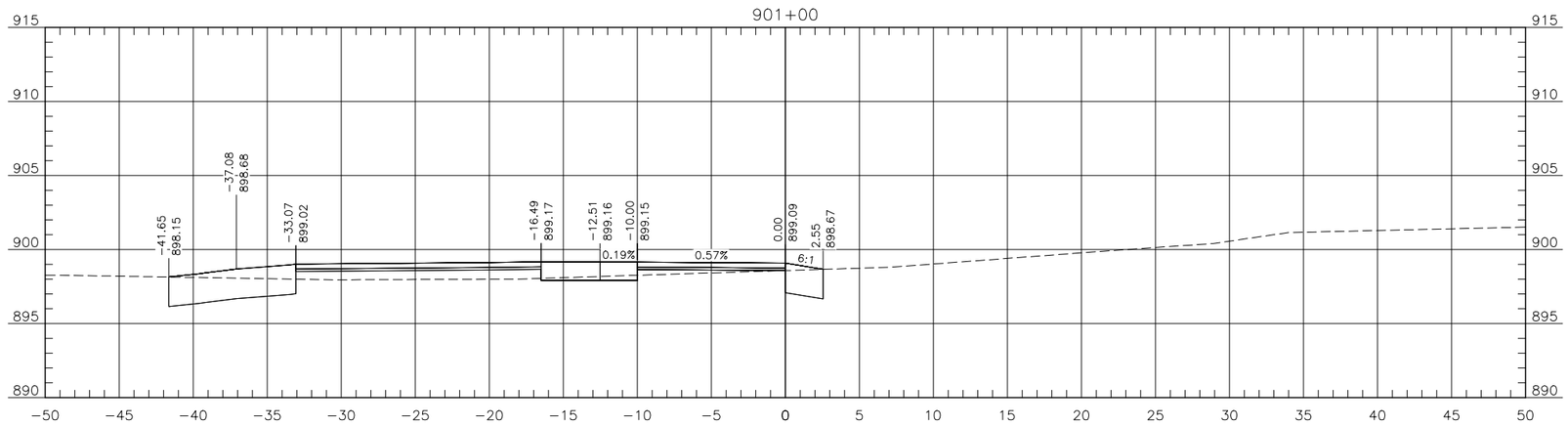
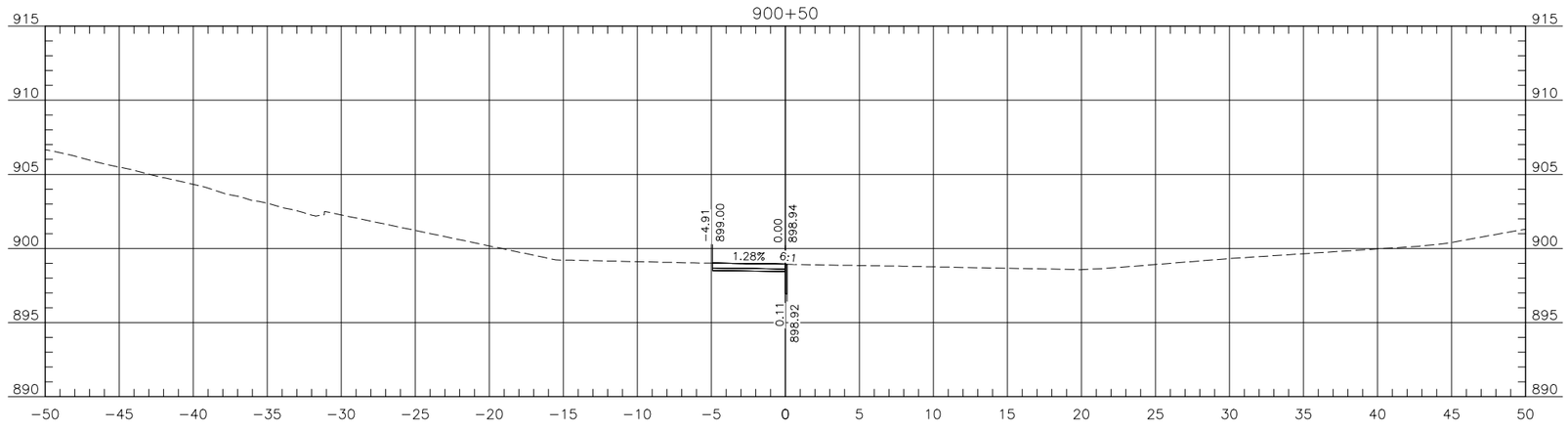
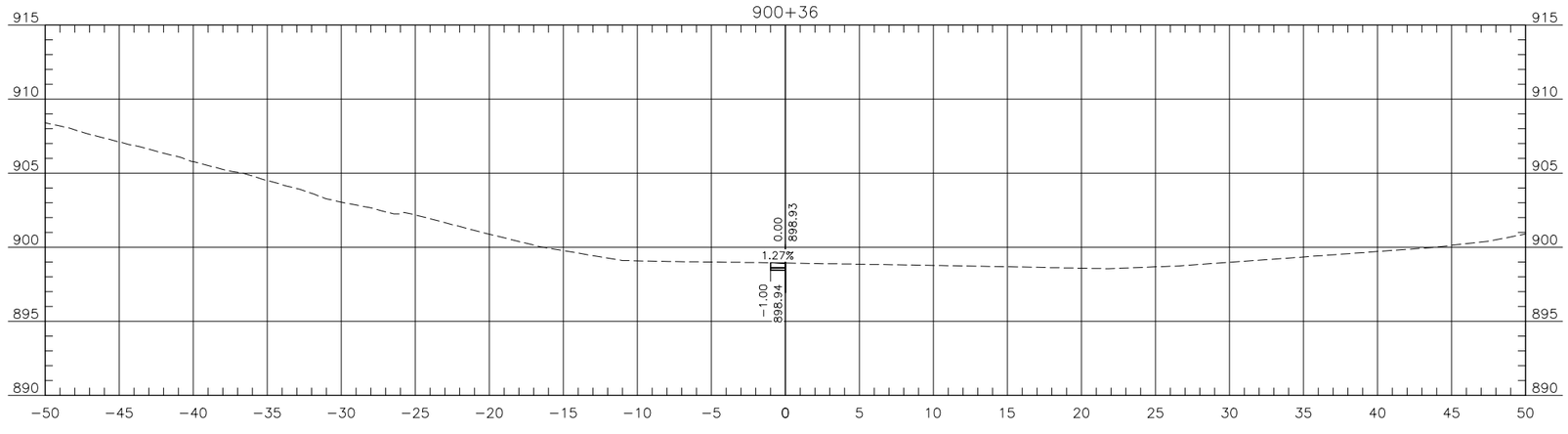
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMA-TAU-8-984(177)	200	8

ALIGNMENT: Drain 27 Trail West







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Cross Sections

Drain 27 Trail

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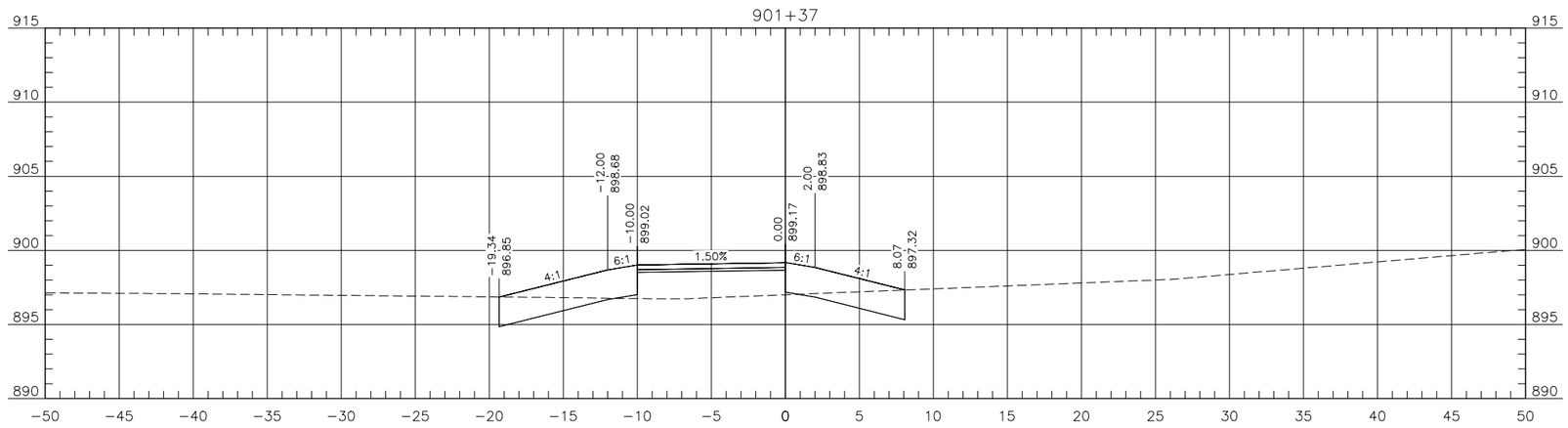
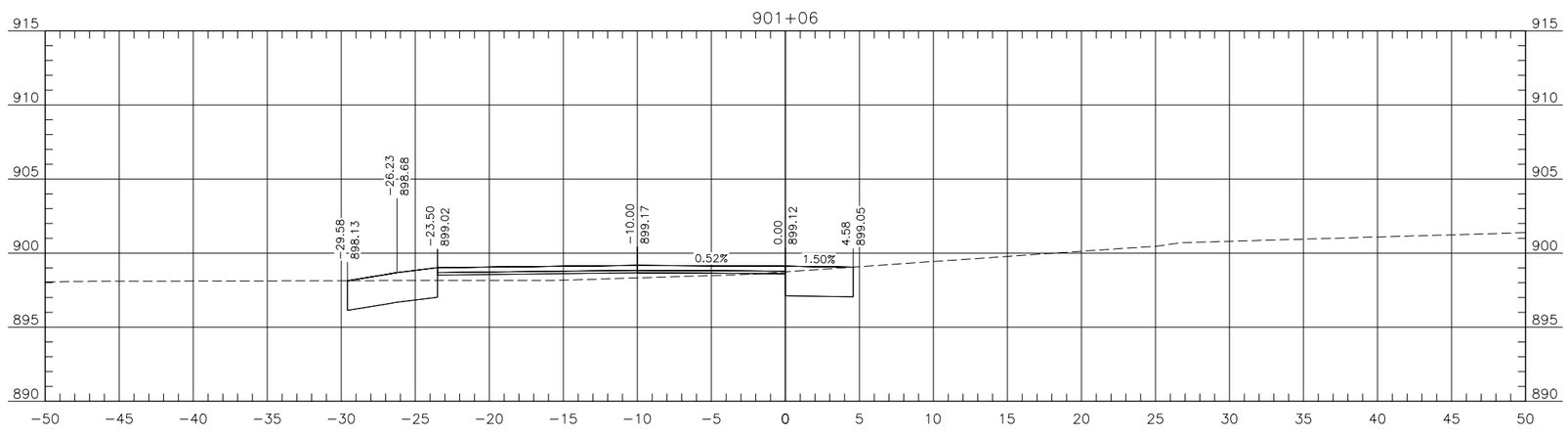
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**9**

ALIGNMENT: Drain 27 Trail West





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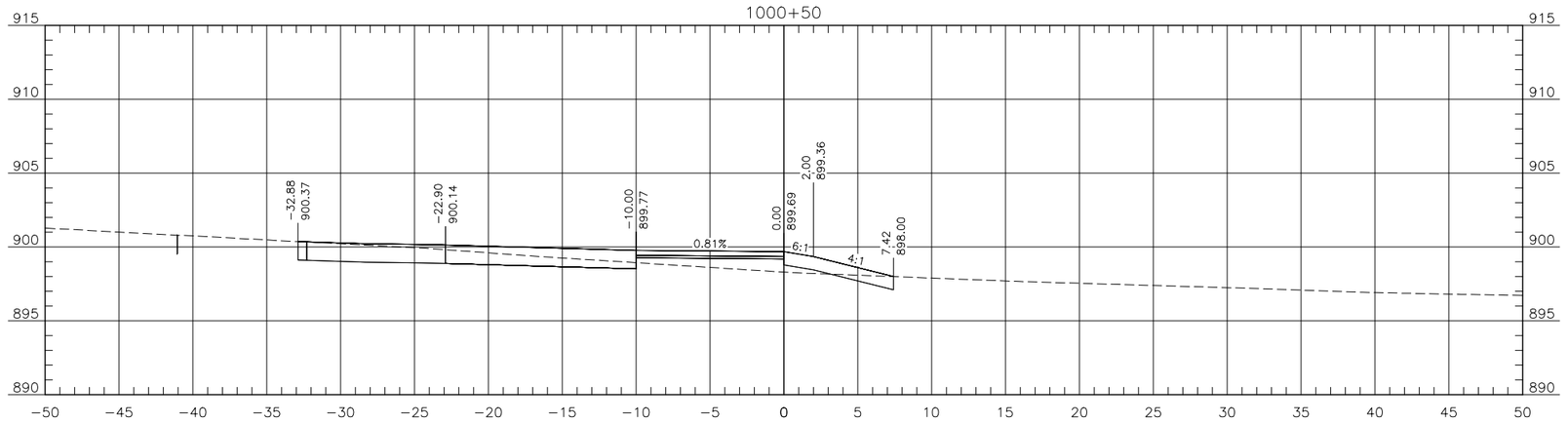
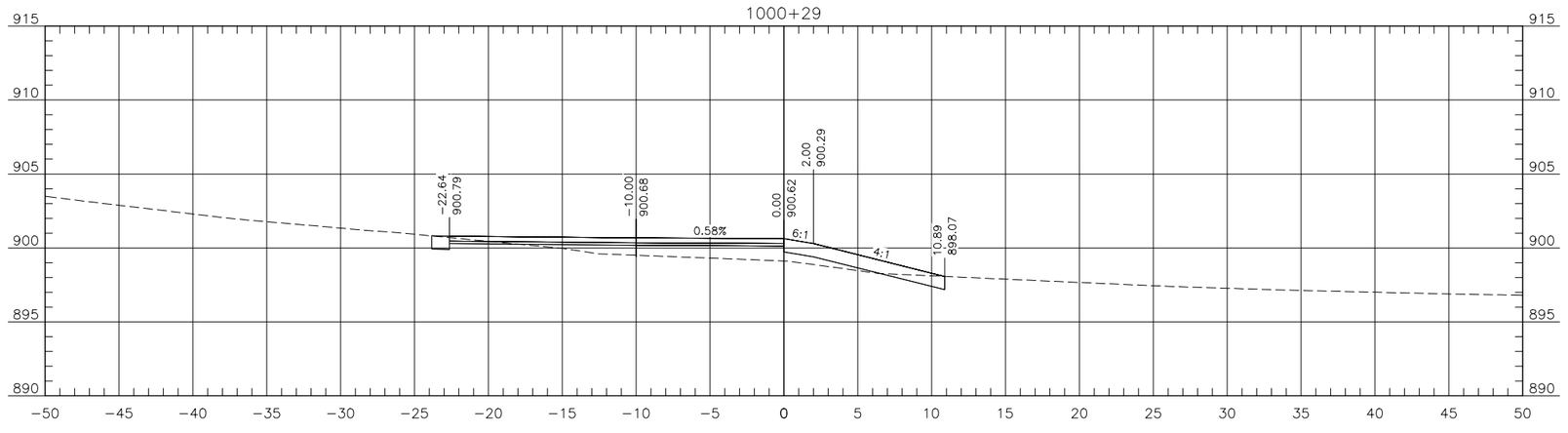
Cross Sections

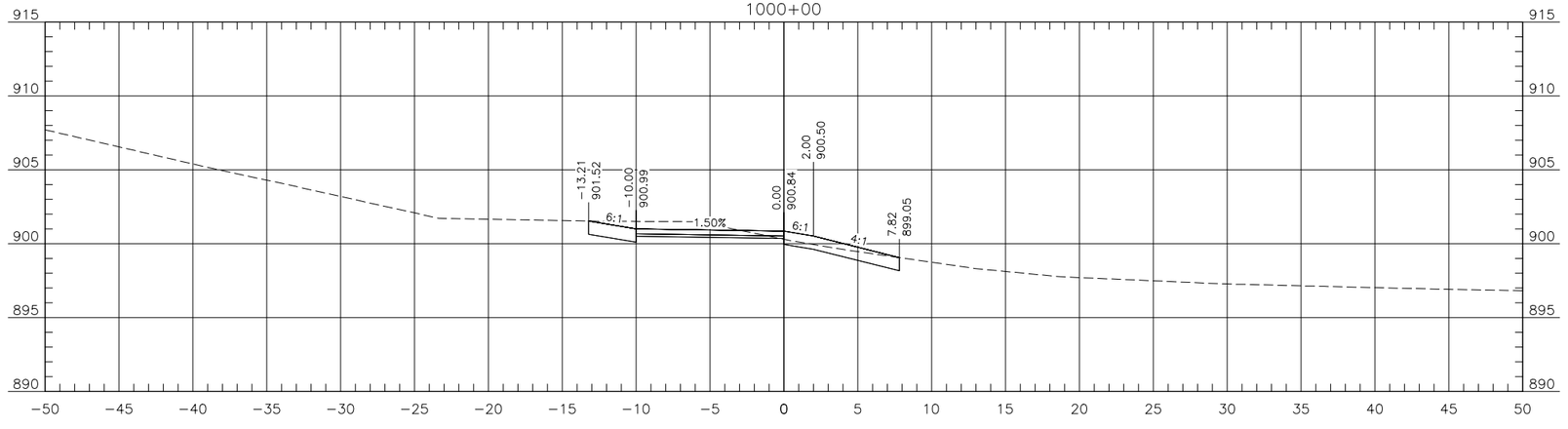
Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**10**

ALIGNMENT: Drain 27 Trail East







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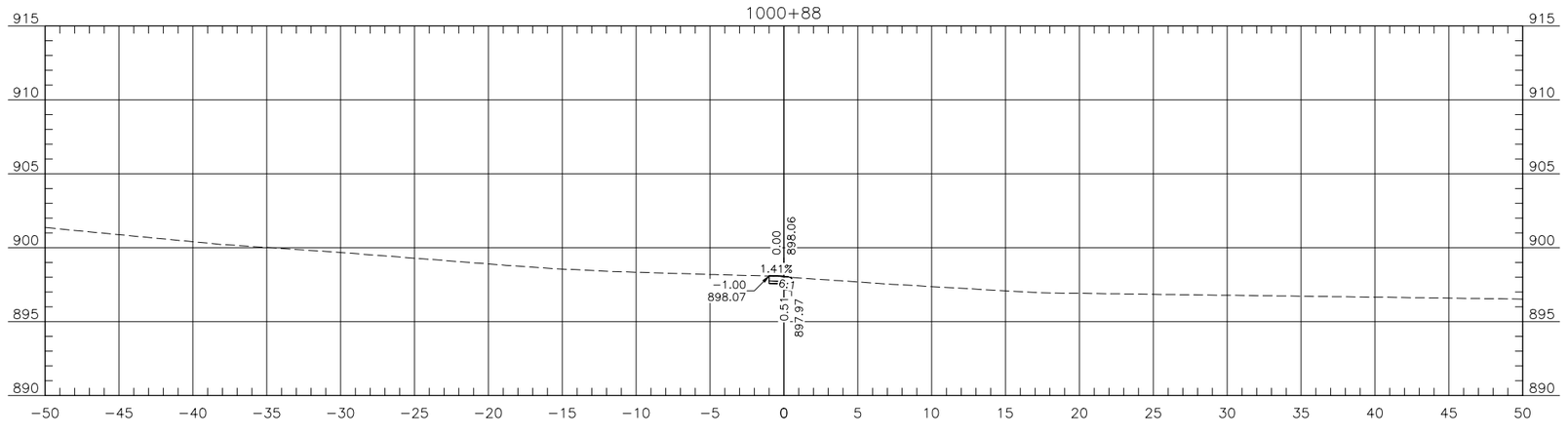
Cross Sections

Drain 27 Trail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	**TMA-TAU-8-984(177)**	**200**	**11**

ALIGNMENT: Drain 27 Trail East



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Drain 27 Trail