STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0042(80)371	1	10

Revised - November 10, 2026

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

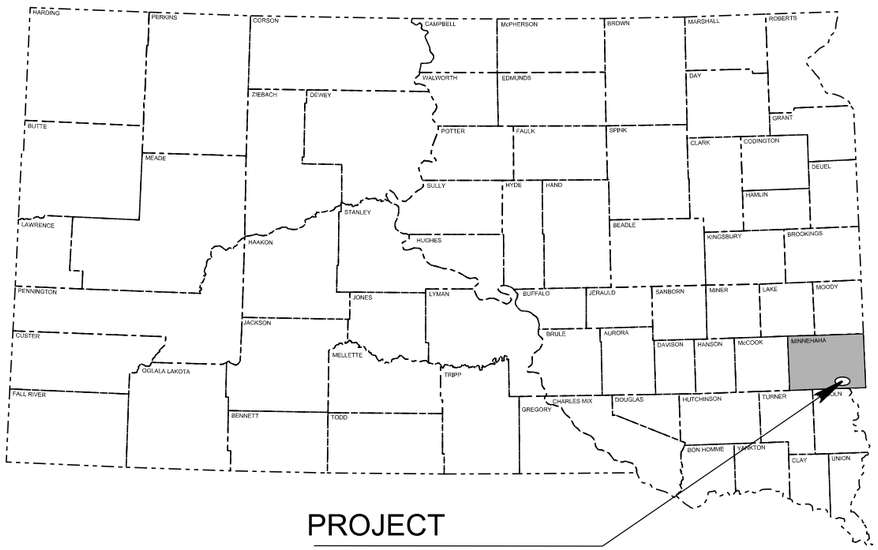
PROJECT NH 0042(80)371
HIGHWAY 42
MINNEHAHA COUNTY

MSE PANELS
PCN 0ANU

INDEX OF SHEETS -

Sheet 1 — *Layout Map and Index*
Sheet 2 to 10 — *M.S.E. Large Panel Retaing Walls*

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 16087
TREGAN ALBERS II
SOUTH DAKOTA
11–17–2026



BEGIN NH 0042(80)371

Station 224+38.56 located 1627.79 feet East and 1264.94 feet North of the Southwest Quarter of Section 20 - Township 101 North - Range 48 West of the 5th P.M.

END NH 0042(80)371

Station 313+57.13 = Station 305+38.94 (03TE) located 751.67 feet West and 698.30 feet North of the Northeast corner of Southwest Quarter of Section 28 - Township 101 North - Range 48 West of the 5th P.M.

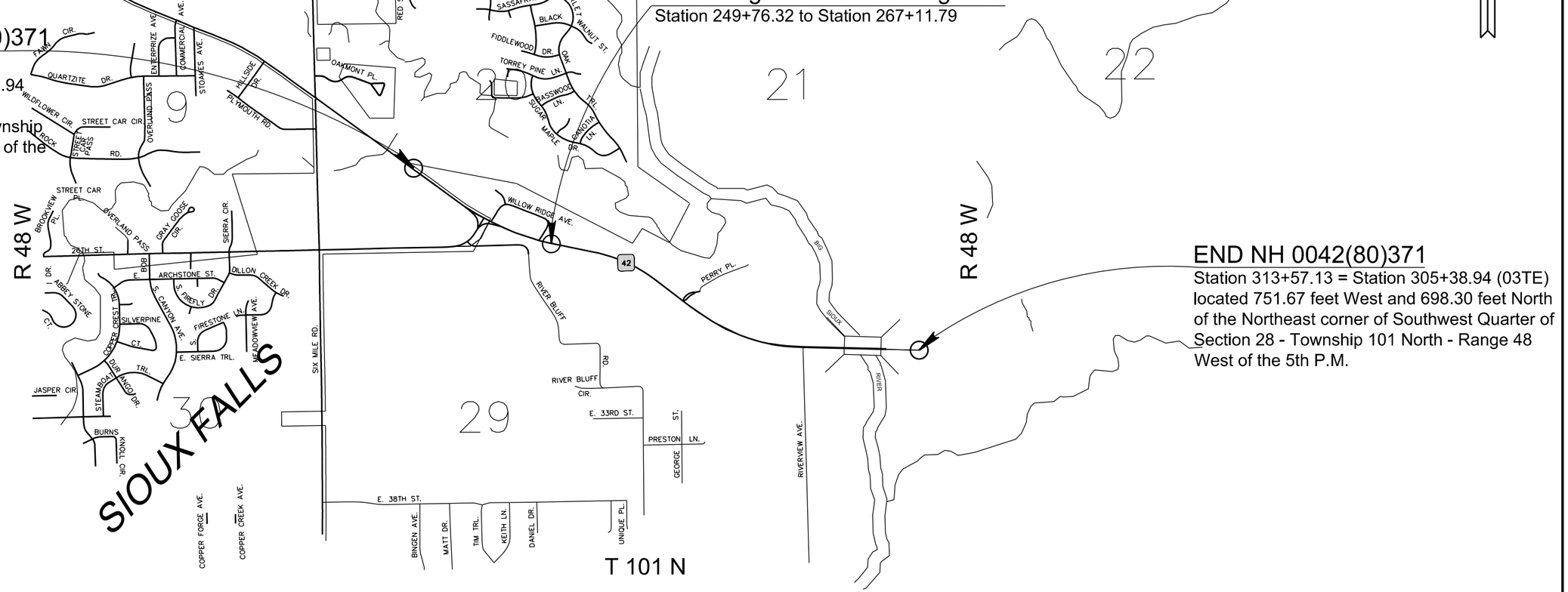
T 101 N

MSE Large Panel Retaining Wall

Station 249+76.32 to Station 267+11.79

R 48 W

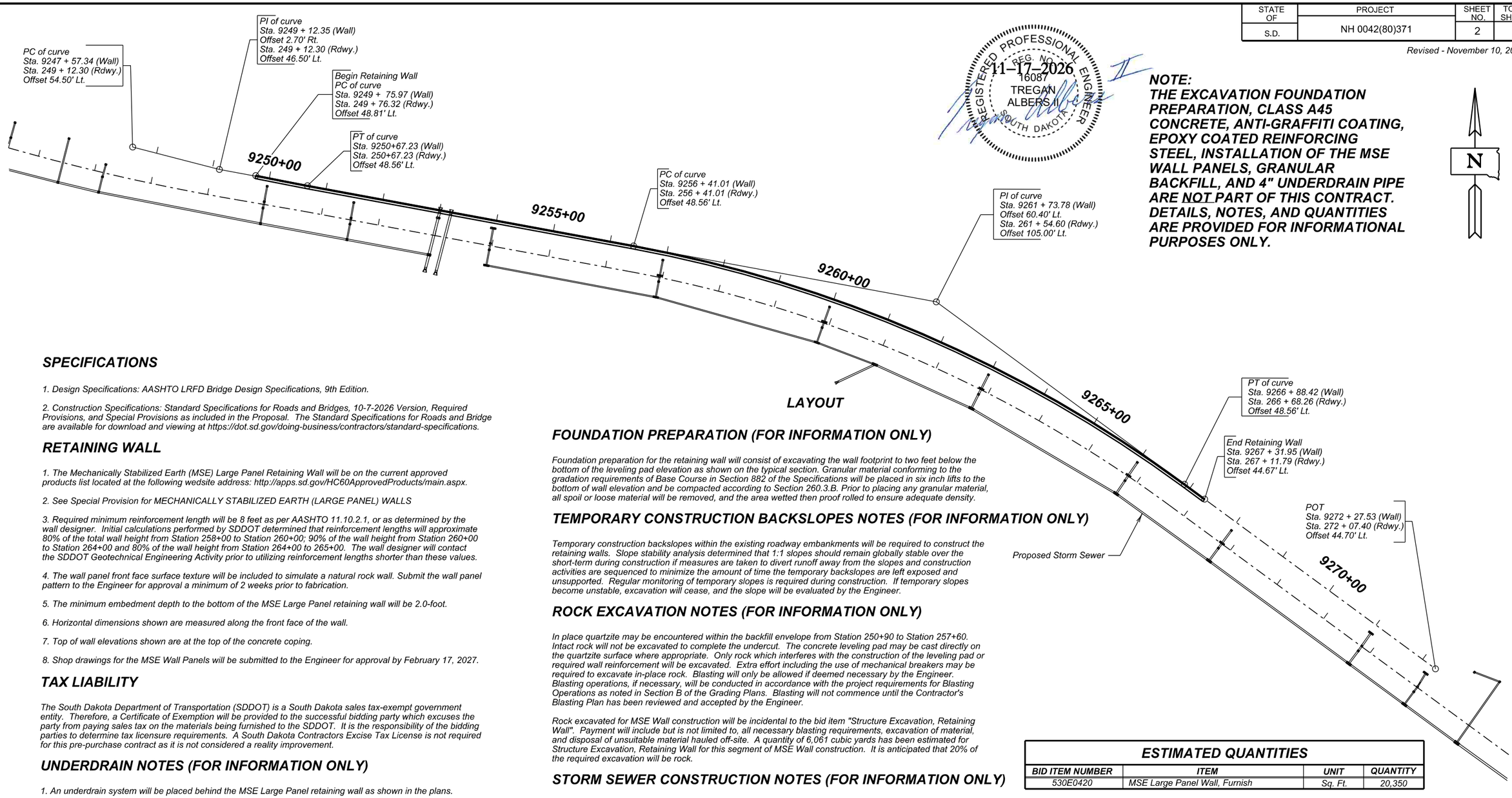
SIOUX FALLS



PLANS BY :
KIRKHAM MICHAEL

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0042(80)371	2	10

Revised - November 10, 2026



LAYOUT

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 16087
TREGAN ALBERS II
SOUTH DAKOTA
11–17–2026

NOTE:
THE EXCAVATION FOUNDATION PREPARATION, CLASS A45 CONCRETE, ANTI-GRAFFITI COATING, EPOXY COATED REINFORCING STEEL, INSTALLATION OF THE MSE WALL PANELS, GRANULAR BACKFILL, AND 4" UNDERDRAIN PIPE ARE NOT PART OF THIS CONTRACT. DETAILS, NOTES, AND QUANTITIES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-2026 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridge are available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

RETAINING WALL

1. The Mechanically Stabilized Earth (MSE) Large Panel Retaining Wall will be on the current approved products list located at the following wedsite address: http://apps.sd.gov/HC60ApprovedProducts/main.aspx.

2. See Special Provision for MECHANICALLY STABILIZED EARTH (LARGE PANEL) WALLS

3. Required minimum reinforcement length will be 8 feet as per AASHTO 11.10.2.1, or as determined by the wall designer. Initial calculations performed by SDDOT determined that reinforcement lengths will approximate 80% of the total wall height from Station 258+00 to Station 260+00; 90% of the wall height from Station 260+00 to Station 264+00 and 80% of the wall height from Station 264+00 to 265+00. The wall designer will contact the SDDOT Geotechnical Engineering Activity prior to utilizing reinforcement lengths shorter than these values.

4. The wall panel front face surface texture will be included to simulate a natural rock wall. Submit the wall panel pattern to the Engineer for approval a minimum of 2 weeks prior to fabrication.

5. The minimum embedment depth to the bottom of the MSE Large Panel retaining wall will be 2.0-foot.

6. Horizontal dimensions shown are measured along the front face of the wall.

7. Top of wall elevations shown are at the top of the concrete coping.

8. Shop drawings for the MSE Wall Panels will be submitted to the Engineer for approval by February 17, 2027.

TAX LIABILITY

The South Dakota Department of Transportation (SDDOT) is a South Dakota sales tax-exempt government entity. Therefore, a Certificate of Exemption will be provided to the successful bidding party which excuses the party from paying sales tax on the materials being furnished to the SDDOT. It is the responsibility of the bidding parties to determine tax licensure requirements. A South Dakota Contractors Excise Tax License is not required for this pre-purchase contract as it is not considered a reality improvement.

UNDERDRAIN NOTES (FOR INFORMATION ONLY)

1. An underdrain system will be placed behind the MSE Large Panel retaining wall as shown in the plans.

2. The 4-inch diameter Perforated PVC Drain Pipe will be perforated dual wall HDPE pipe conforming to ASTM D3350 and AASHTO M252, Type SP. The 4" Dia. PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe Sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. Drain Sleeve will conform to ASTM D6707.

3. Care will be taken to ensure that the 4-inch diameter Perforated PVC Drain Pipe and the 4-inch diameter PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.

4. All labor, tools, equipment, and any incidentals necessary for the installation of 4-inch diameter Perforated PVC Drain Pipe, 4-inch diameter PVC Outlet Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.

FOUNDATION PREPARATION (FOR INFORMATION ONLY)

Foundation preparation for the retaining wall will consist of excavating the wall footprint to two feet below the bottom of the leveling pad elevation as shown on the typical section. Granular material conforming to the gradation requirements of Base Course in Section 882 of the Specifications will be placed in six inch lifts to the bottom of wall elevation and be compacted according to Section 260.3.B. Prior to placing any granular material, all spoil or loose material will be removed, and the area wetted then proof rolled to ensure adequate density.

TEMPORARY CONSTRUCTION BACKSLOPES NOTES (FOR INFORMATION ONLY)

Temporary construction backslopes within the existing roadway embankments will be required to construct the retaining walls. Slope stability analysis determined that 1:1 slopes should remain globally stable over the short-term during construction if measures are taken to divert runoff away from the slopes and construction activities are sequenced to minimize the amount of time the temporary backslopes are left exposed and unsupported. Regular monitoring of temporary slopes is required during construction. If temporary slopes become unstable, excavation will cease, and the slope will be evaluated by the Engineer.

ROCK EXCAVATION NOTES (FOR INFORMATION ONLY)

In place quartzite may be encountered within the backfill envelope from Station 250+90 to Station 257+60. Intact rock will not be excavated to complete the undercut. The concrete leveling pad may be cast directly on the quartzite surface where appropriate. Only rock which interferes with the construction of the leveling pad or required wall reinforcement will be excavated. Extra effort including the use of mechanical breakers may be required to excavate in-place rock. Blasting will only be allowed if deemed necessary by the Engineer. Blasting operations, if necessary, will be conducted in accordance with the project requirements for Blasting Operations as noted in Section B of the Grading Plans. Blasting will not commence until the Contractor's Blasting Plan has been reviewed and accepted by the Engineer.

Rock excavated for MSE Wall construction will be incidental to the bid item "Structure Excavation, Retaining Wall". Payment will include but is not limited to, all necessary blasting requirements, excavation of material, and disposal of unsuitable material hauled off-site. A quantity of 6,061 cubic yards has been estimated for Structure Excavation, Retaining Wall for this segment of MSE Wall construction. It is anticipated that 20% of the required excavation will be rock.

STORM SEWER CONSTRUCTION NOTES (FOR INFORMATION ONLY)

Storm sewer pipe and associated drop inlets and junction boxes located adjacent to the proposed MSE wall backfill will be installed prior to, or concurrently with MSE wall backfill placement. Excavation adjacent to the wall backfill envelope after reinforcement and backfill have been placed will not be allowed.

ESTIMATED QUANTITIES

BID ITEM NUMBER	ITEM	UNIT	QUANTITY
530E0420	MSE Large Panel Wall, Furnish	Sq. Ft.	20,350

INDEX OF RETAINING WALL SHEETS -

Sheet No. 1 - Layout
Sheet No. 2 - Details of Wall (West Half)
Sheet No. 3 - Details of Wall (East Half)
Sheet No. 4 - Typical Section
Sheet No. 5 - Reinforced Integral Slab and Barrier Details
Sheet No. 5 - Site Plan & Subsurface Profile

ESTIMATED QUANTITIES (FOR INFORMATION ONLY)

ITEM	UNIT	QUANTITY
Structure Excavation, Retaining Wall	Cu. Yd.	6,061
Foundation Preparation, Retaining Wall	Cu. Yd.	1,469.8
Class A45 Concrete, Miscellaneous	Cu. Yd.	476.9
Anti-Graffiti Coating	Sq. Ft.	29,130
Epoxy Coated Reinforcing Steel	Lb.	82,736
MSE Large Panel Wall, Furnish	Sq. Ft.	20,350
MSE Large Panel Wall, Install	Sq. Ft.	20,350
Granular Backfill for MSE Large Panel Wall	Cu. Yd.	6,757.2
4" Underdrain Pipe	Ft.	1,806

PLANS BY :
KIRKHAM MICHAEL

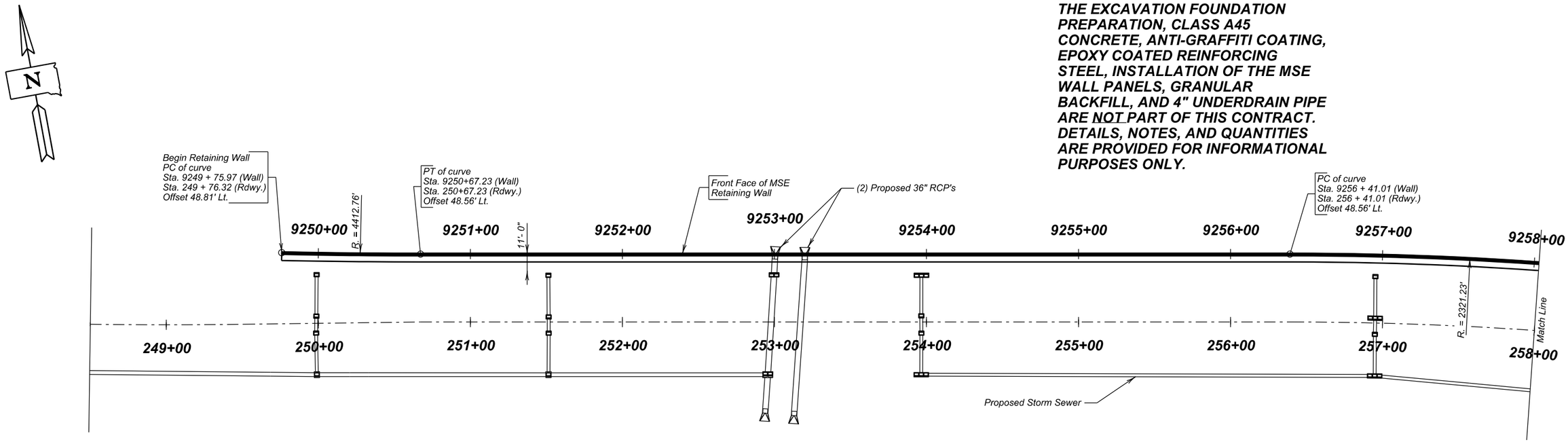
LAYOUT
FOR
M.S.E. LARGE PANEL RETAINING WALLS
ADJ. SD 42 SEC. 28-T101S-R48W
STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	TA	RAL	
MINN06YP	06YPGA01		BRIDGE ENGINEER

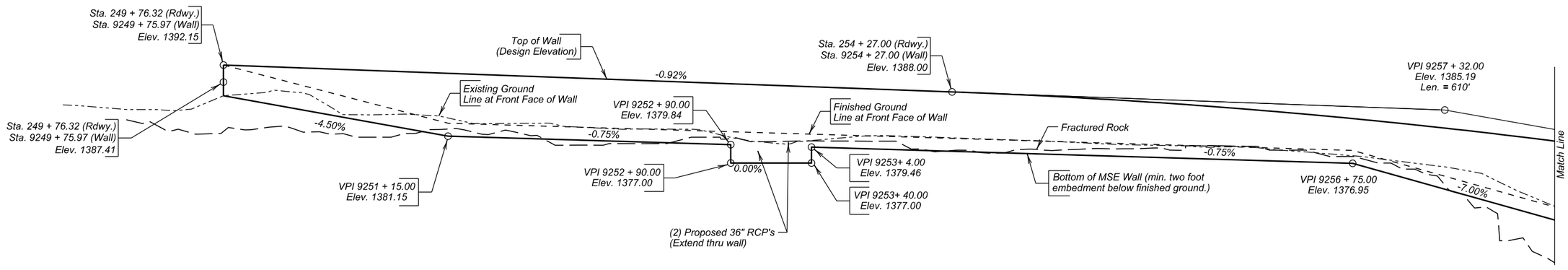
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0042(80)371	3	10

NOTE:
THE EXCAVATION FOUNDATION PREPARATION, CLASS A45 CONCRETE, ANTI-GRAFFITI COATING, EPOXY COATED REINFORCING STEEL, INSTALLATION OF THE MSE WALL PANELS, GRANULAR BACKFILL, AND 4" UNDERDRAIN PIPE ARE NOT PART OF THIS CONTRACT. DETAILS, NOTES, AND QUANTITIES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.



PLAN



ELEVATION



11–17–2026

DETAILS OF WALL (WEST HALF)

FOR

M.S.E. LARGE PANEL RETAINING WALLS

ADJ. SD 42 SEC. 28-T101S-R48W

STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371

MINNEHAHA COUNTY

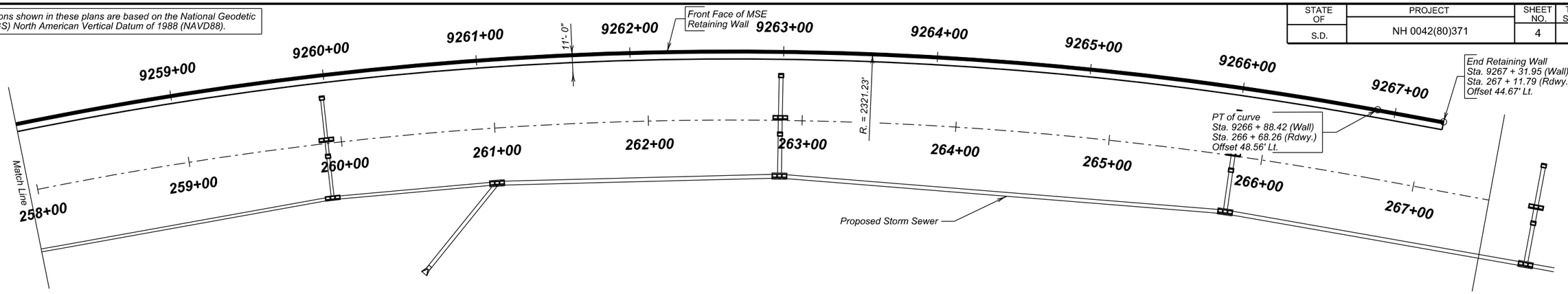
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

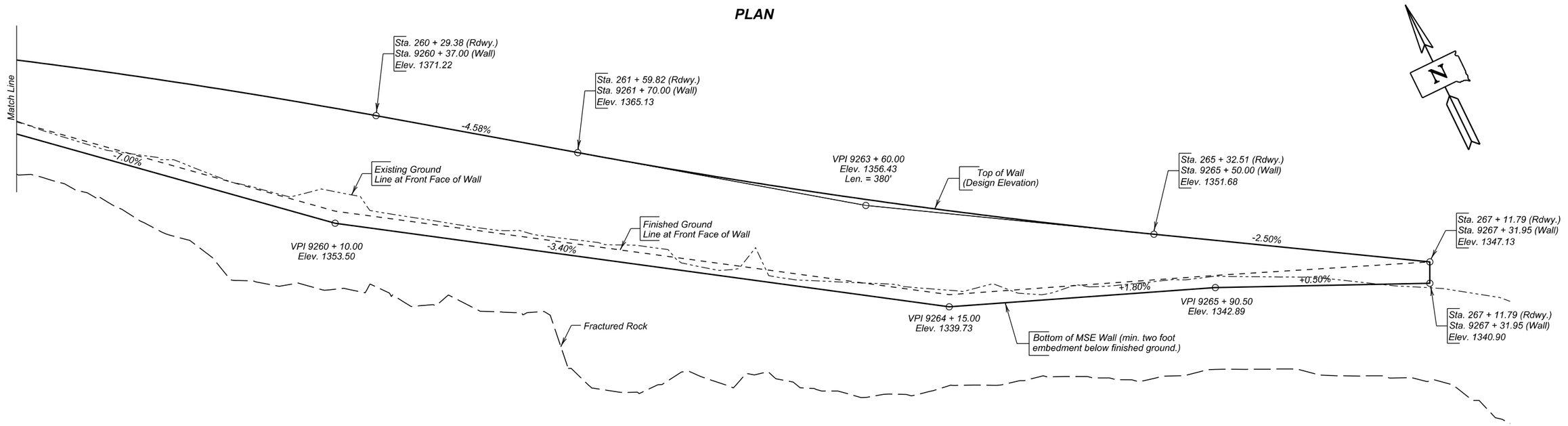
DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	TA	RAL	
MINN06YP	06YPGA01		BRIDGE ENGINEER

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0042(80)371	4	10



PLAN



NOTE:
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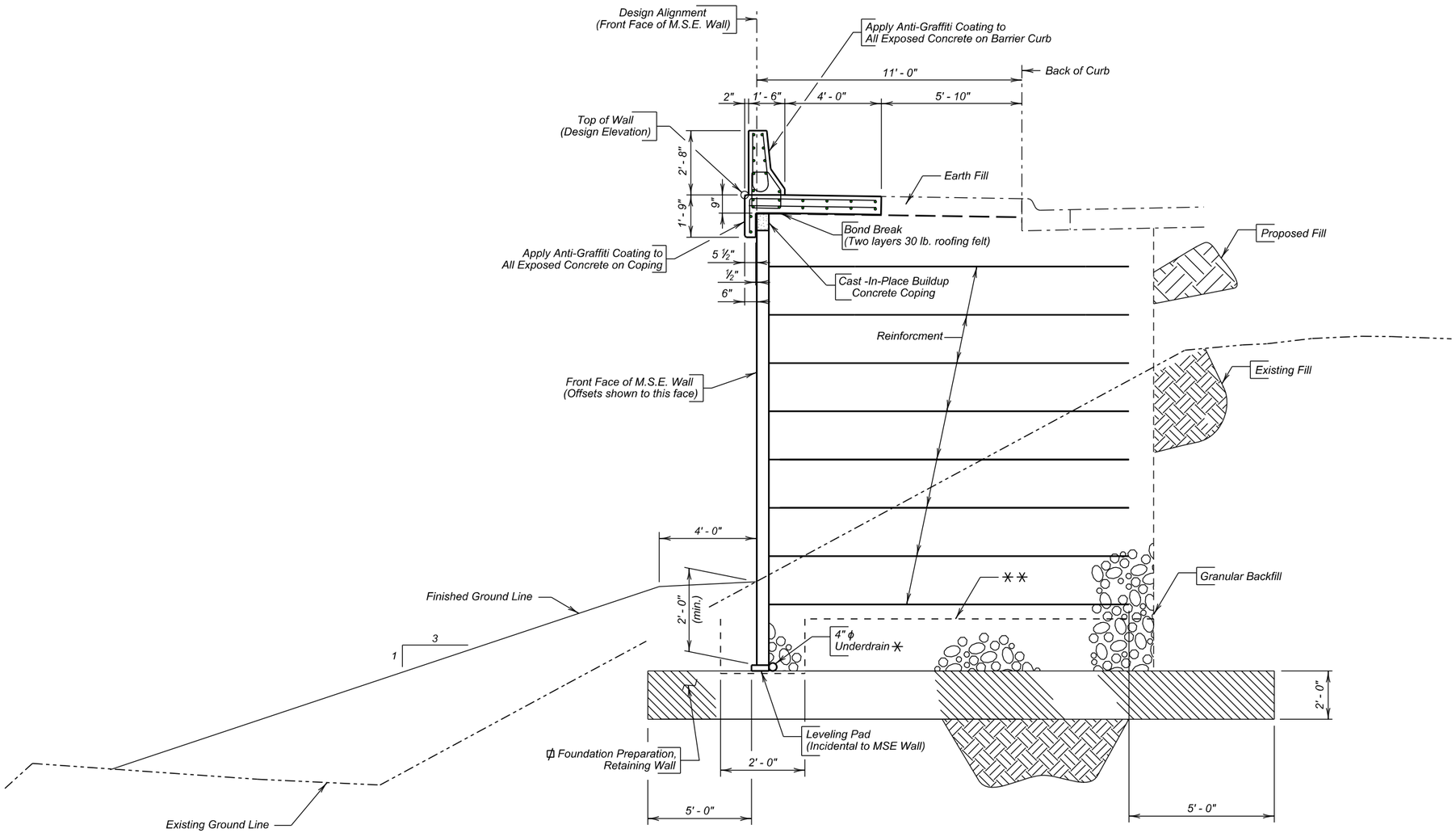
ELEVATION

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 16087
TREGAN ALBERSU
SOUTH DAKOTA
11–17–2026

DETAILS OF WALL (EAST HALF)
FOR
M.S.E. LARGE PANEL RETAINING WALLS
ADJ. SD 42 SEC. 28-T101S-R48W
STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	TA	RAL	BRIDGE ENGINEER
MINN06YP	06YPGA01		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0042(80)371	5	10



TYPICAL SECTION

(Perpendicular to Roadway Back of Curb)

⚹⚹ *Fractured rock may be encountered between Sta. 250+90 and Sta. 257+60. In these regions, excavate to the approximate lines shown. It is estimated that 20% of the structure excavation will be fractured rock.*

⚹ *4" ϕ Underdrain shall be daylighted through MSE wall and Finished Grade Line at 300-400 ft. intervals.*

ϕ *Extend foundation preparation 5' - 0" beyond Begin and End wall.*

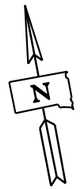
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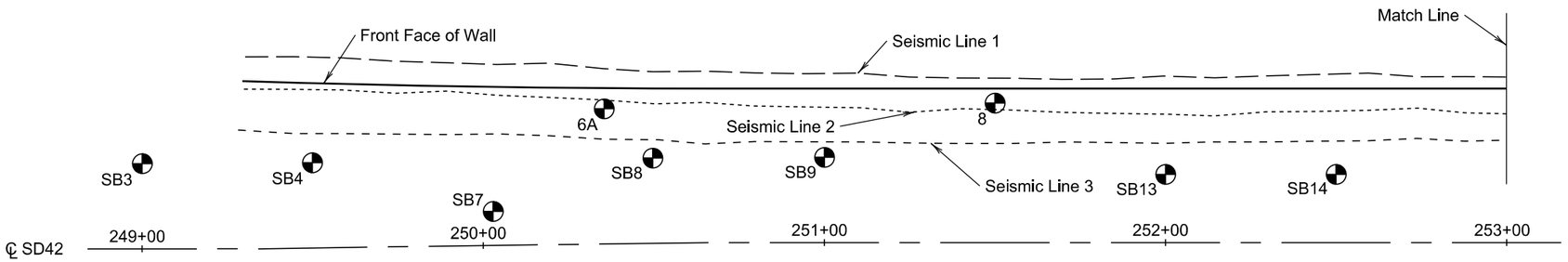
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 16087
TREGAN ALBERSON
SOUTH DAKOTA
11–17–2026

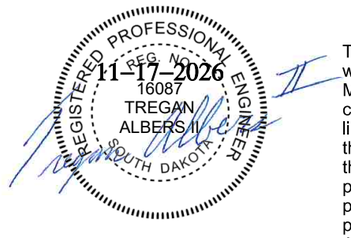
TYPICAL SECTION
FOR
M.S.E. LARGE PANEL RETAINING WALLS
ADJ. SD 42 SEC. 28-T101S-R48W
STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	TA	RAL	
MINN06YP	06YPGA01		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PROJECT	6	10







The approximate depth to the quartzite bedrock within the reinforcement envelope of the proposed M.S.E. wall was determined by a geophysical survey completed in August of 2023. Three seismic refraction lines were utilized to define the fractured surface of the Sioux Quartzite. The surface of the quartzite at the front face of the wall is depicted on the subsurface profile. Where possible, auger test holes and penetration test holes were advanced to practical refusal to confrim the depth to bedrock. Additional rock information obtained from borings and seismic surveys has been plotted on the cross sections.

Sioux Quartzite is pink to red, hard silica cemented sandstone. It is jointed, bedded, and cross-bedded with thin red to purple pipestone shales and coarse conglomerate. Layers of poorly cemented sands may also be present. The surface of the quartzite is not flat. It may vary several feet vertically in a short horizontal distance.

The Geotechnical Engineering Activity has all of the boring logs available for review at the Central Office in Pierre.

LEGEND

Auger Test

All auger test holes are drilled with a 4½ inch diameter continuous flight auger.

GROUNDWATER ELEVATIONS

JULY 2020

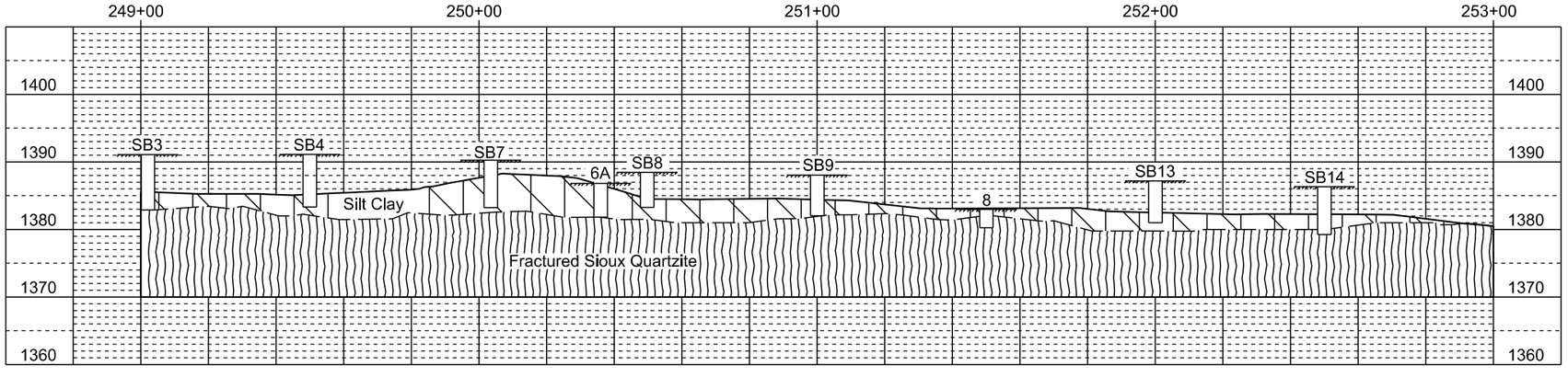
6A	DRY
8	DRY

AUGUST 2020

SB3	DRY
SB4	DRY
SB7	DRY
SB8	DRY
SB9	DRY
SB13	DRY
SB14	DRY

Retaining Wall Soil Parameters

	Factored Bearing Resistance, Rr	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Foundation Soils	4500 psf	24°	150 psf	115 pcf
Base Course / Gravel Cushion	4500 psf	32°	0 psf	135 pcf
Reinforced Soils	-	34°	0 psf	105 pcf
Retained Soils	-	22°	250 psf	125 pcf



SITE PLAN & SUBSURFACE PROFILE

FOR

M.S.E. LARGE PANEL RETAINING WALLS

ADJ. SD 42 SEC. 28-T101S-R48W

STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371

MINNEHAHA COUNTY

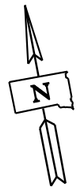
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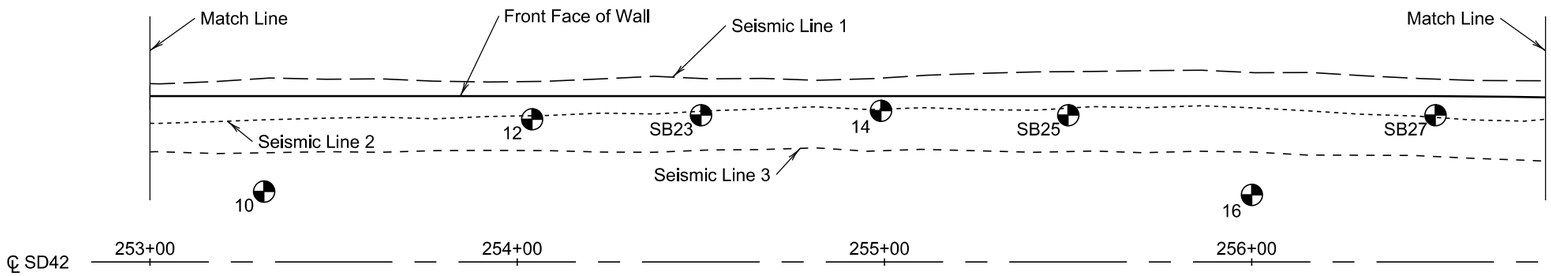
DECEMBER 2023

5 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	XX	RAL	
MINN06YP	06YPGA01		BRIDGE ENGINEER

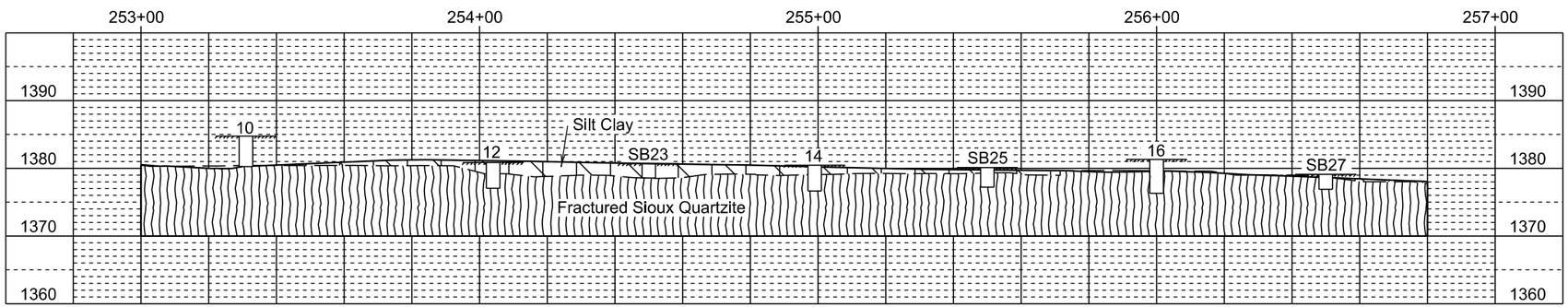
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PROJECT	7	10





Retaining Wall Soil Parameters

	Factored Bearing Resistance, Rr	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Foundation Soils	4500 psf	24°	150 psf	115 pcf
Base Course / Gravel Cushion	4500 psf	32°	0 psf	135 pcf
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11–17–2026

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Sioux Quartzite is pink to red, hard silica cemented sandstone. It is jointed, bedded, and cross-bedded with thin red to purple pipestone shales and coarse conglomerate. Layers of poorly cemented sands may also be present. The surface of the quartzite is not flat. It may vary several feet vertically in a short horizontal distance.

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LEGEND

Auger Test

All auger test holes are drilled with a 4½ inch diameter continuous flight auger.

GROUNDWATER ELEVATIONS

JULY 2020

10	DRY
12	DRY
14	DRY
16	DRY

AUGUST 2020

SB23	DRY
SB25	DRY
SB27	DRY

SITE PLAN & SUBSURFACE PROFILE

FOR

M.S.E. LARGE PANEL RETAINING WALLS

ADJ. SD 42 SEC. 28-T101S-R48W

STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371

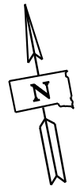
MINNEHAHA COUNTY

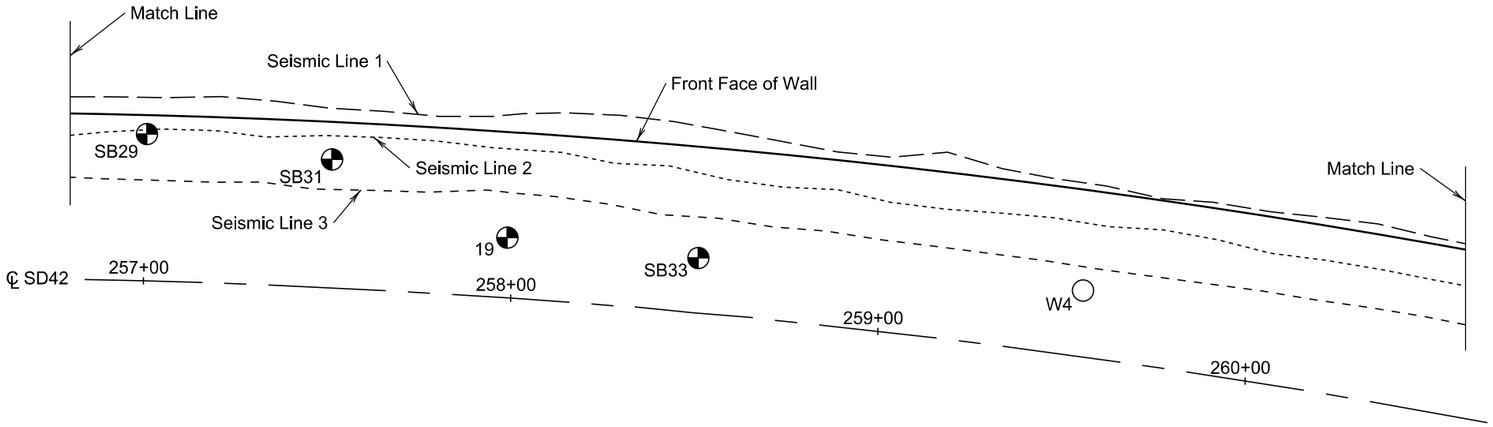
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	XX	RAL	
MINN06YP	06YPGA01		BRIDGE ENGINEER

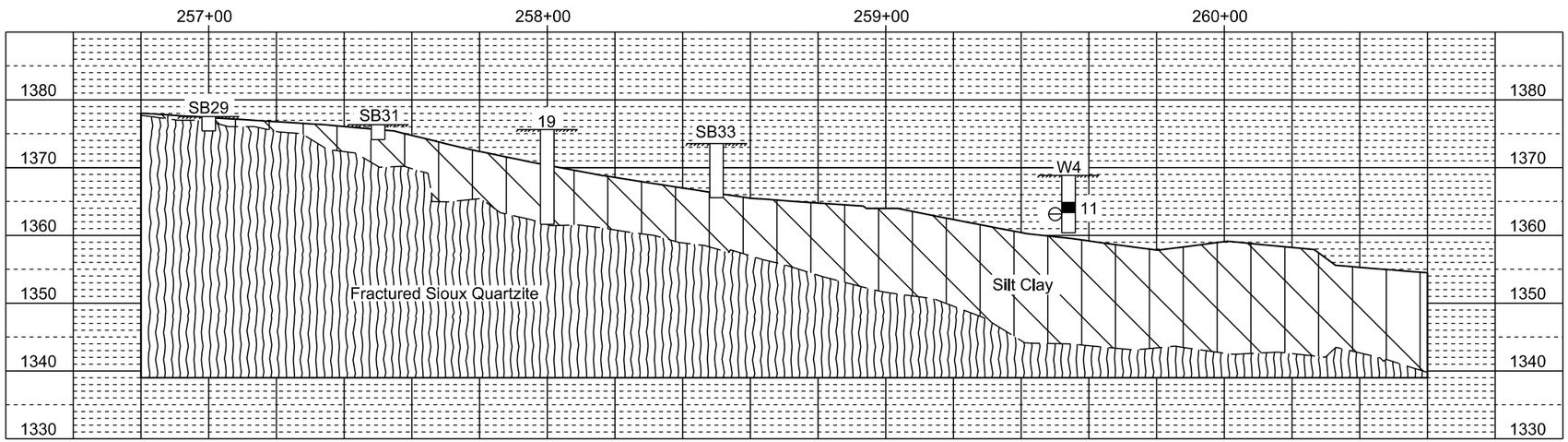
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PROJECT	8	10





Retaining Wall Soil Parameters

	Factored Bearing Resistance, Rr	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Foundation Soils	4500 psf	24°	150 psf	115 pcf
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The Geotechnical Engineering Activity has all of the boring logs available for review at the Central Office in Pierre.

LEGEND

Auger Test ◐ | Penetration Test ○ | Caved ⊖ | Sample Zone ▮

All auger test holes are drilled with a 4½ inch diameter continuous flight auger.

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot.

GROUNDWATER ELEVATIONS

JULY 2020

19 DRY

AUGUST 2020

SB29 DRY
SB31 DRY
SB33 DRY

OCTOBER 2022

W4 (CAVED) 1363.2

SITE PLAN & SUBSURFACE PROFILE

FOR

M.S.E. LARGE PANEL RETAINING WALLS

ADJ. SD 42 SEC. 28-T101S-R48W

STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371

MINNEHAHA COUNTY

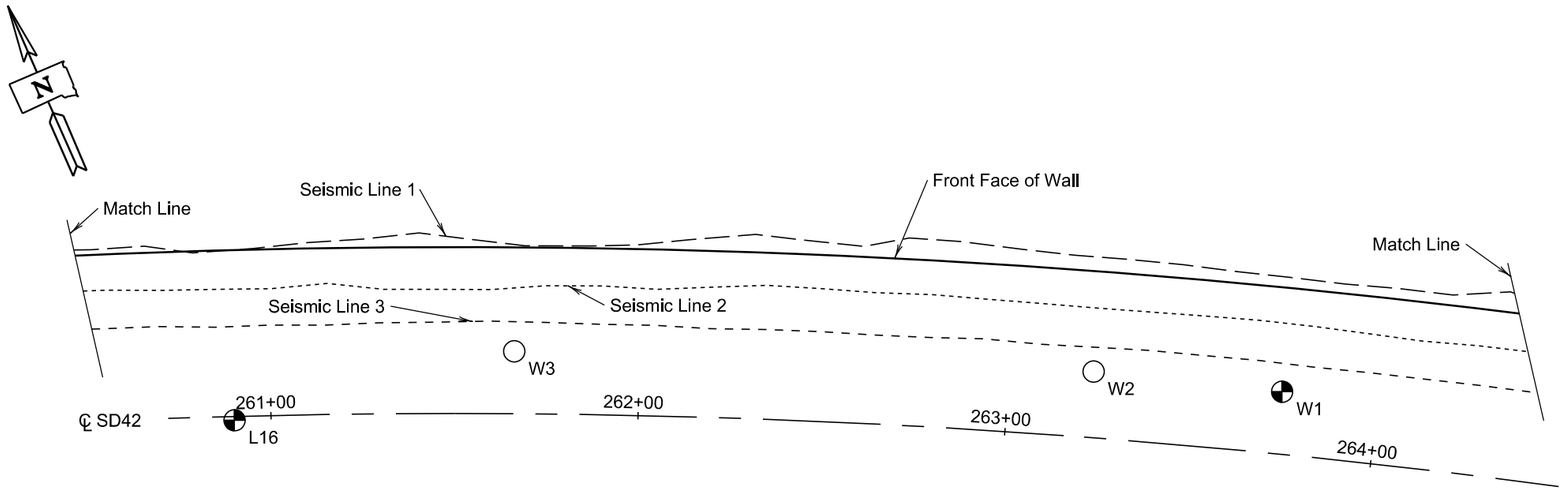
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

7 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	XX	RAL	
MINN06YP	06YPGA01		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PROJECT	9	10





The approximate depth to the quartzite bedrock within the reinforcement envelope of the proposed M.S.E. wall was determined by a geophysical survey completed in August of 2023. Three seismic refraction lines were utilized to define the fractured surface of the Sioux Quartzite. The surface of the quartzite at the front face of the wall is depicted on the subsurface profile. Where possible, auger test holes and penetration test holes were advanced to practical refusal to confrim the depth to bedrock. Additional rock information obtained from borings and seismic surveys has been plotted on the cross sections.

Sioux Quartzite is pink to red, hard silica cemented sandstone. It is jointed, bedded, and cross-bedded with thin red to purple pipestone shales and coarse conglomerate. Layers of poorly cemented sands may also be present. The surface of the quartzite is not flat. It may vary several feet vertically in a short horizontal distance.

The Geotechnical Engineering Activity has all of the boring logs available for review at the Central Office in Pierre.

LEGEND

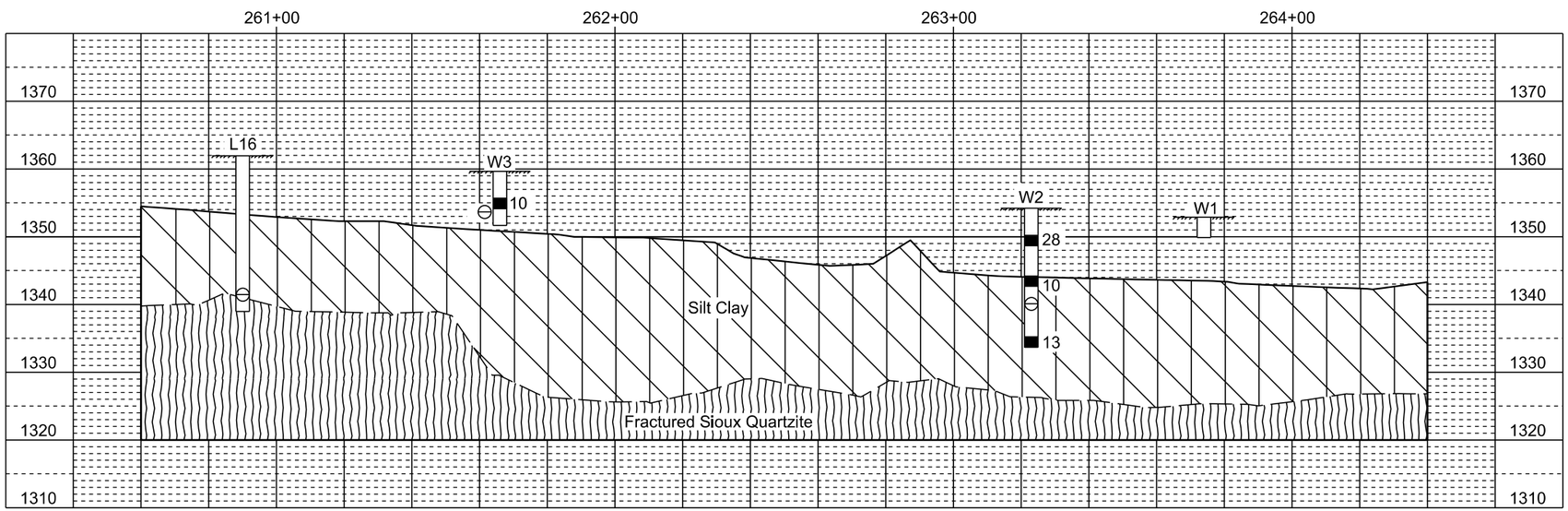
Auger Test | Penetration Test | Caved | Sample Zone

All auger test holes are drilled with a 4½ inch diameter continuous flight auger.

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot.

Retaining Wall Soil Parameters

	Factored Bearing Resistance, Rr	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Foundation Soils	4500 psf	24°	150 psf	115 pcf
Base Course / Gravel Cushion	4500 psf	32°	0 psf	135 pcf
Reinforced Soils	-	34°	0 psf	105 pcf
Retained Soils	-	22°	250 psf	125 pcf



GROUNDWATER ELEVATIONS
OCTOBER 2022

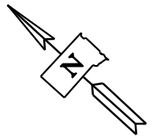
W1	DRY
W2	(CAVED) 1340.1
W3	(CAVED) 1353.7
L16	(CAVED) 1341.5

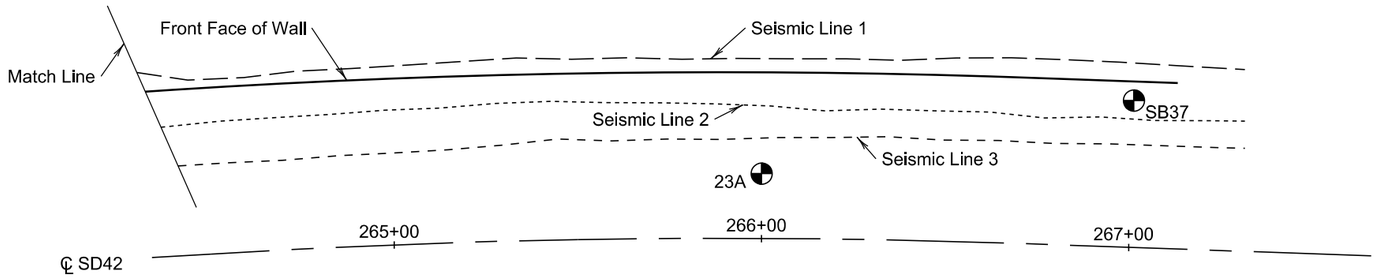
SITE PLAN & SUBSURFACE PROFILE
FOR
M.S.E. LARGE PANEL RETAINING WALLS

ADJ. SD 42 SEC. 28-T101S-R48W
STA. 249 + 29.76 TO STA. 267 + 11.79 NH 0042(80)371
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
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DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	XX	RAL	
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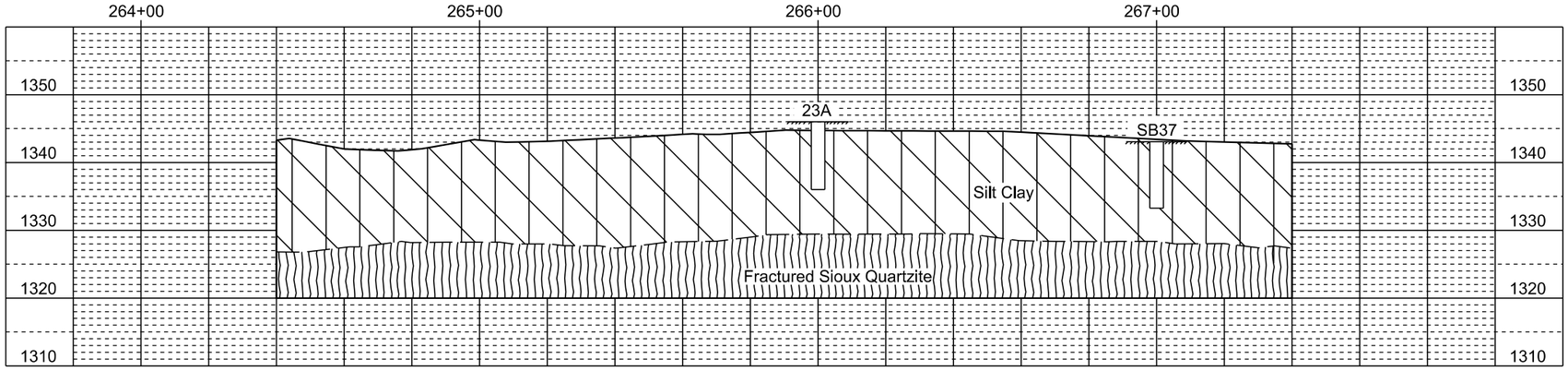
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PROJECT	10	10





Retaining Wall Soil Parameters

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REGISTERED PROFESSIONAL ENGINEER
REG. NO. 16087
TREGAN ALBERS II
SOUTH DAKOTA
11-17-2026

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LEGEND

Auger Test

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GROUNDWATER ELEVATIONS

JULY 2020

23A DRY

AUGUST 2020

SB37 DRY

SITE PLAN & SUBSURFACE PROFILE

FOR

M.S.E. LARGE PANEL RETAINING WALLS

ADJ. SD 42 SEC. 28-T101S-R48W

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MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

9 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
KA	XX	RAL	BRIDGE ENGINEER
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