

Sample Plan

RETAINING WALL PLANS AND PROFILES ----- NARRATIVE

References:

Design Scene: Chapter 11 - Walls

Road Design Manual: Chapter 9-4

Standard Plans:

- 5-297.620 - Retaining Wall General Notes and Summary of Quantities
- 5-297.621 - Retaining Wall Reinforcement Details (Short Walls)
- 5-297.622 - Retaining Wall Reinforcement (Medium Walls)
- 5-297.623 - Retaining Wall Reinforcement (Tall Walls)
- 5-297.624 - Retaining Wall Miscellaneous Details (6 Sheets)
- 5-297.625 - Retaining Wall Shear Lug Details
- 5-297.626 - Retaining Wall Panel Tabulations (Level Fill)(4 Sheets)
- 5-297.627 - Retaining Wall Panel Tabulations (1V:2H Sloped Fill)(3 Sheets)
- 5-297.628 - Retaining Wall Panel Tabulations (Live Load Surcharge)(3 Sheets)
- 5-297.630 - Retaining Wall (Level Fill) Spread Footing Geometry and Data (2 Sheets)
- 5-297.631 - Retaining Wall (1V:2H) Sloped Fill Spread Footing Geometry and Data (2 Sheets)
- 5-297.632 - Retaining Wall (Live Load Surcharge) Spread Footing Geometry and Data (2 Sheets)
- 5-297.633 - Retaining Wall Concrete Parapet (Type P-1)
- 5-297.634 - Retaining Wall Concrete Parapet (Type P-4)
- 5-297.635 - Retaining Wall Concrete Barrier (Type F, TL-4)
- 5-297.638 - Concrete Retaining Wall Rustication
- 5-297.639 - Cast In Place Concrete RETAINING WALL Basis of Design(Do Not Include In Plan)
- 5-297.640 - Modular Block Retaining Wall General Notes
- 5-297.641 - Modular Block Retaining Wall Soil Reinforcement for Level Fill, Case 1
- 5-297.643 - Modular Block Retaining Wall Soil Reinforcement for 1:2 Fill Slope, Case 3
- 5-297.644 - Modular Block Retaining Wall Soil Reinforcement for 1:3 Fill Slope, Case 4
- 5-297.645 - Modular Block Retaining Wall Details
- 5-297.646 - Reinforced Soil Slope General Notes
- 5-297.647 - Reinforced Soil Slope (45° Maximum Slope)
- 5-297.648 - Reinforced Soil Slope (70° Maximum Slope)
- 5-297.649 - Reinforced Soil Slope Details

Technical Memorandum: No. 14-03-MRR-01
Use of Dry-Cast Segmental Masonry Retaining Wall Units

Technical Memorandum: No. 14-02-B-01
Use of Mechanically Stabilized Earth (MSE) Walls
with a Precast Concrete Panel Facing

General Information:

Design usually has determined the need for Retaining Walls. Alternate wall designs should be considered for all projects (see the Alternative Retaining Wall process - Design Manual 9-4.0). Work with the Bridge Office and Foundations to determine wall types. More complicated situations (non-standard heights, excessive loading, etc.) should be addressed by the Bridge Office.

For ease of construction, minimize the stepping of footings. The steps can be less than the full depth of the footing.

After the Designer has calculated alignment and profiles for a proposed wall, contact the Foundations Unit for foundation requirements. Show location, depth and extent of any unsuitable material to be removed and replaced. Show details of any required ground improvement.

General Information (cont'd):

If Noise Walls are to be located on top of retaining walls, contact the Bridge Office for structural recommendations.

Compute all quantities (reinforcement and concrete for stem, footing, parapet or railing, etc.) using the charts in the Standard Plans Manual. Wall quantities should be tabulated.

Determine the need for traffic barrier, fence, light standards, sign bridges, parapet or railing and/or moment slabs.

Determine the need for ditches and drop inlets behind the wall. Coordinate with Water Resources.

Determine the need for end protection (plate beam guardrail or impact attenuator).

Provide a general note indicating the basic wall design parameters.

Coordinate the location, rustication, top of wall, footings etc. with the Bridge Office when tying into adjacent bridge abutments and wingwalls. Submit Wall Plans and Details to the Bridge Designer prior to plan submittal.

Footnotes should be provided for the basis of computation of rebar quantities. For example, "All reinforcement bar quantities were computed using the taller stem height of the 30.5 in. ft. panel" or "For computation factors used for the structural concrete and reinforcement bar quantities, see sheet ---".

Indicate where the retaining wall alignment is located. (Example: Front Face)
Generally, the wall alignment and finished ground line profile should be located at the bottom front face of the wall.

If the subsurface drainage system behind the retaining wall is to be outletted to a specific drainage structure, show this on the Retaining Wall Plan and Profile. In addition, obstructions, such as drainage structures, should be shown on cross sections for Earth Retaining Systems with tie backs or earth reinforcement. Give these wall locations to the Metro Design GIS Mapper.

Include all appropriate Standard Plan Sheets in this section of the Plan.

Miscellaneous Retaining Wall Guideline notes:

Limit maximum length of No. 4 bars to 40 feet. Limit maximum length of larger reinforcement bars to 60 feet.

Consider aesthetic treatment on parapet or railing of retaining walls.

Any retaining walls which are judged to be prime targets for graffiti should be treated with either one-tone paint (for easy repainting) or a clear cover anti-graffiti coating (from which graffiti can be more easily removed). This should be addressed in the Special Provisions. Contact the Bridge Office for anti-graffiti coating recommendations.

Show construction staging requirements, if applicable, including sequence of traffic control, access, temporary construction, temporary fencing, temporary or permanent barrier, and temporary and permanent drainage.

To protect structures, restrictions on the location of new or existing buried utilities and drainage pipes must be considered near retaining walls supported by spread footings. Location restrictions, installation techniques, protection measures and review of plans for these utilities are required within 50 feet laterally, 50 feet below and 15 feet above the base of spread footing foundations. See the Bridge LRFD Manual.

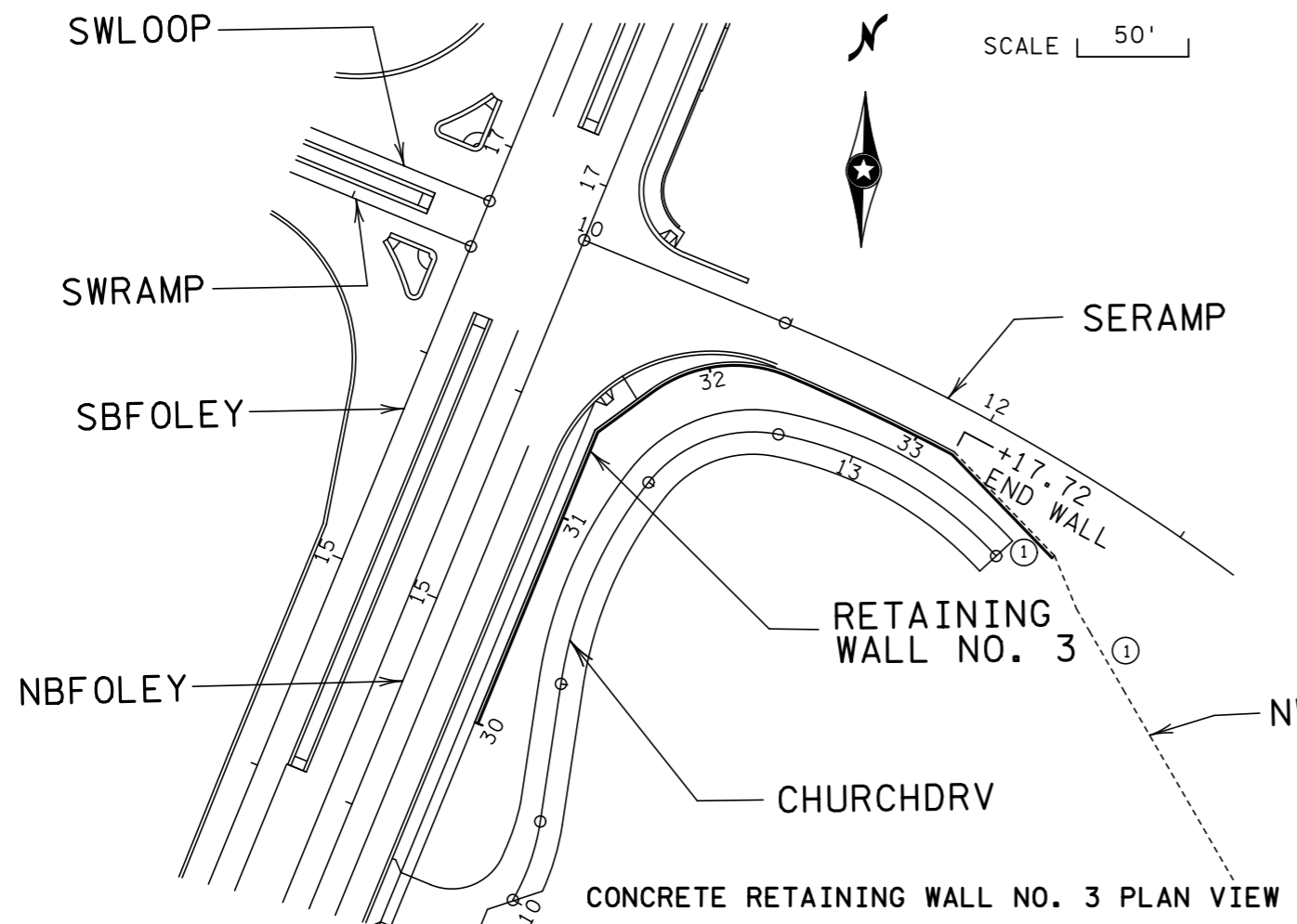
Placement of utilities behind MSE retaining walls should not be considered in the backfill area that contains the wall reinforcement. Some proprietary wall manufacturers advise that utilities can be placed in the reinforcement zone and that reinforcing can be cut and spliced, but this is not allowed on MnDOT walls because of possible damage to such reinforcement during future utility maintenance operations. However, utilities which are aligned normal to the retaining wall can usually be spanned without any difficulty.

Sample Plan

RETAINING WALL PLANS AND PROFILES ----- CHECKLIST

- ___ 1. Label top of Retaining Wall
- ___ 2. Bar Scale
- ___ 3. Show Sewers, Utilities, Culverts and Wall Drainage (utilities near spread footings must be in compliance with Bridge LRFD Manual)
- ___ 4. Finished and Inplace Ground Lines
- ___ 5. Top and Bottom of Footing, if applicable
- ___ 6. Show Easements that must accommodate Construction and Maintenance of Retaining Wall
- ___ 7. Stationing
- ___ 8. Elevations
- ___ 9. Aesthetic Treatments, Guardrail, Railing, Fence, Light Standards, Conduits, Moment Slabs, Sign Bridge Foundations, Interfaces with other Structures, and End Treatments, if applicable
- ___ 10. North Arrow
- ___ 11. Subsurface Drainage Provided
- ___ 12. General Parameters Note
- ___ 13. Standard Plan Sheets Included
- ___ 14. At stream locations, show extreme high water and normal water levels
- ___ 15. Cross references to other sheets (as applicable)
- ___ 16. Drawn by: and Checked by: Initials and Engineer's signature

REVISION DATE 12/27/16
 PLOTTED/REVISED: 26-JAN-2017 08:47
 DISTRICT #: METRO
 IPLOT NAME: sprewall
 FILENAME: Projects\DM_R0S\Non_Project\Design\SamplePlan\Eng\Isht\retwall.dgn



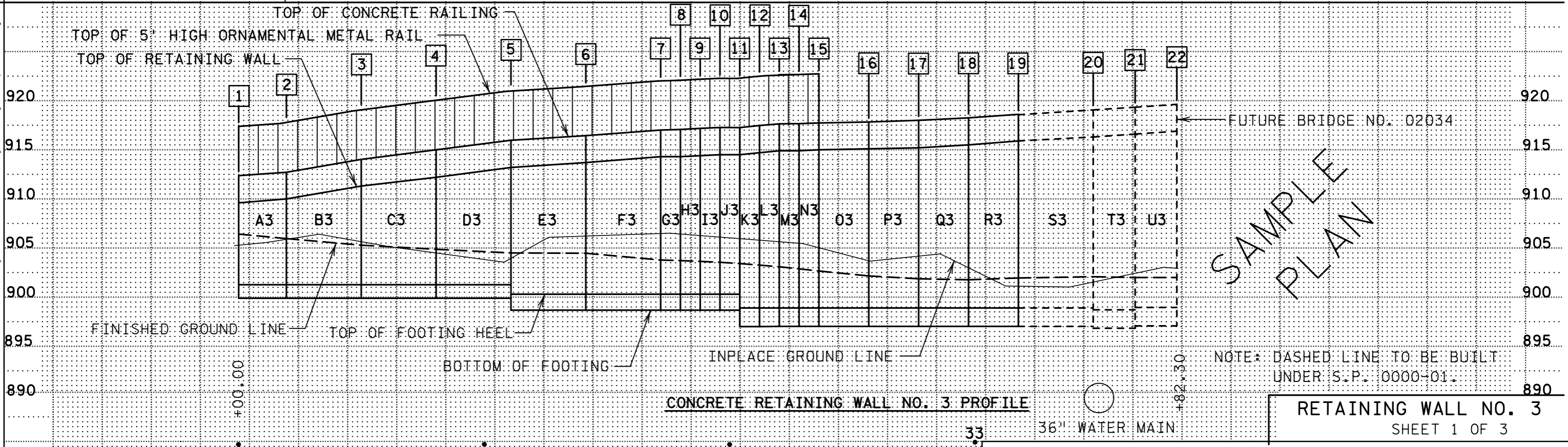
JOINT NUMBER	STATION	X	Y	GROUND	TOP OF	TOP OF	WALL	TOP OF	BOTTOM	PANEL	PANEL	REMARKS
				ELEVATION	WALL	BARRIER		FOOTING	HEEL			
				ELEV.	ELEV.	ELEV.	FT	ELEV.	ELEV.	FT		
1	30+00.00	887,223.224	84,909.398	906.42	909.66	912.50						
2	30+19.45	887,230.631	84,927.383	905.96	910.00	912.84	9	901.265	899.890	19.45	A3	②
3	30+49.95	887,242.246	84,955.584	905.29	911.31	914.15	10	901.265	899.890	30.50	B3	②
4	30+80.45	887,253.861	84,983.786	904.87	912.29	915.13	11	901.265	899.890	30.50	C3	②
5	31+10.95	887,265.475	85,011.988	904.50	913.26	916.10	12	901.265	899.890	30.50	D3	②
6	31+41.45	887,277.090	85,040.190	904.47	913.73	916.57	13	901.300	898.675	30.50	E3	②
7	31+71.95	887,301.710	85,058.193	903.78	914.30	917.14	14	901.300	898.675	30.50	F3	②
8	31+80.01	887,308.502	85,062.516	903.72	914.36	917.20	14	901.300	898.675	8.06	G3	②
9	31+88.06	887,315.795	85,065.929	903.64	914.47	917.31	14	901.300	898.675	8.06	H3	②
10	31+96.12	887,323.466	85,068.374	903.55	914.56	917.40	14	901.300	898.675	8.06	I3	②
11	32+04.18	887,331.388	85,069.812	903.42	914.55	917.39	14	901.300	898.675	8.06	J3	②
12	32+12.24	887,339.431	85,070.217	903.26	914.76	917.60	16	898.900	897.025	8.06	K3	②
13	32+20.29	887,347.456	85,069.584	903.09	914.93	917.77	16	898.900	897.025	8.06	L3	②
14	32+28.35	887,355.334	85,067.922	902.88	914.95	917.79	16	898.900	897.025	8.06	M3	②
15	32+36.45	887,362.971	85,065.244	902.66	915.02	917.86	16	898.900	897.025	8.06	N3	②
16	32+56.77	887,381.579	85,057.088	902.16	915.12	917.96	16	898.900	897.025	20.32	O3	③
17	32+77.08	887,400.004	85,048.530	901.87	915.29	918.13	16	898.900	897.025	20.32	P3	③
18	32+97.40	887,418.239	85,039.572	901.77	915.54	918.39	17	898.900	897.025	20.32	Q3	③
19	33+17.72	887,436.275	85,030.219	901.95	915.90	918.74	17	898.900	897.025	20.32	R3	③
20	33+48.22	887,457.479	85,008.297	902.08	916.39	919.23	17	898.900	897.025	30.50	S3	①
21	33+65.30	887,469.357	84,996.016	902.00	916.67	919.50	18	898.710	896.835	17.09	T3	①
22	33+82.30	887,481.176	84,983.797	902.00	916.95	919.79	18	898.950	897.075	17.09	U3	①

WALL IS STANDARD CANTILEVER 2' LIVE LOAD SURCHARGE, SPREAD FOOTING, TYPE II DRAINAGE.

NOTES:

- ① TO BE CONSTRUCTED UNDER S.P. 0000-01.
- ② ORNAMENTAL METAL RAIL - TYPE MOD F CONCRETE BARRIER. SEE DETAIL SHEET NO. 49 AND 147.
- ③ TYPE MOD F CONCRETE BARRIER.

SEE SHEET NO. 137, 138 AND 139 FOR WALL QUANTITIES.

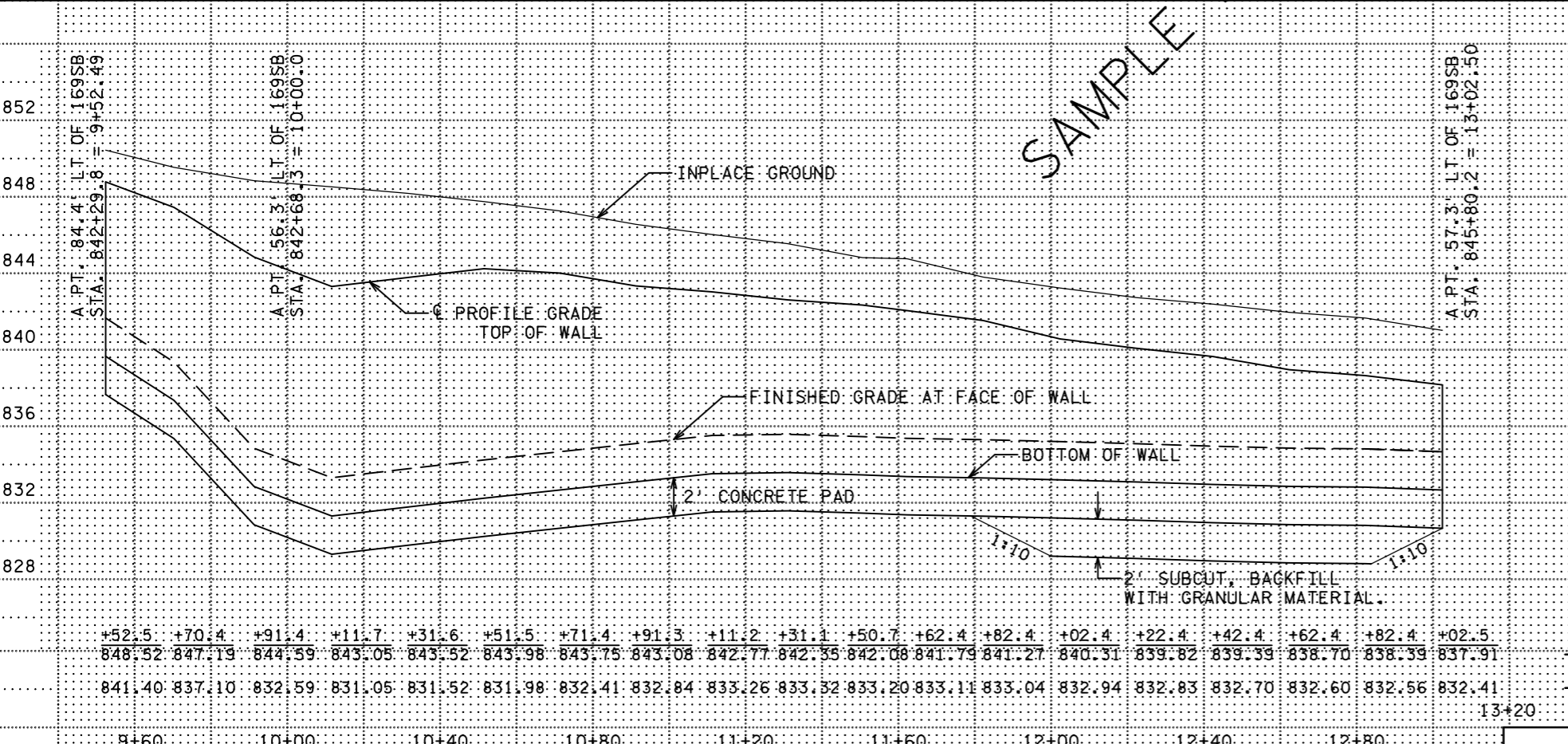
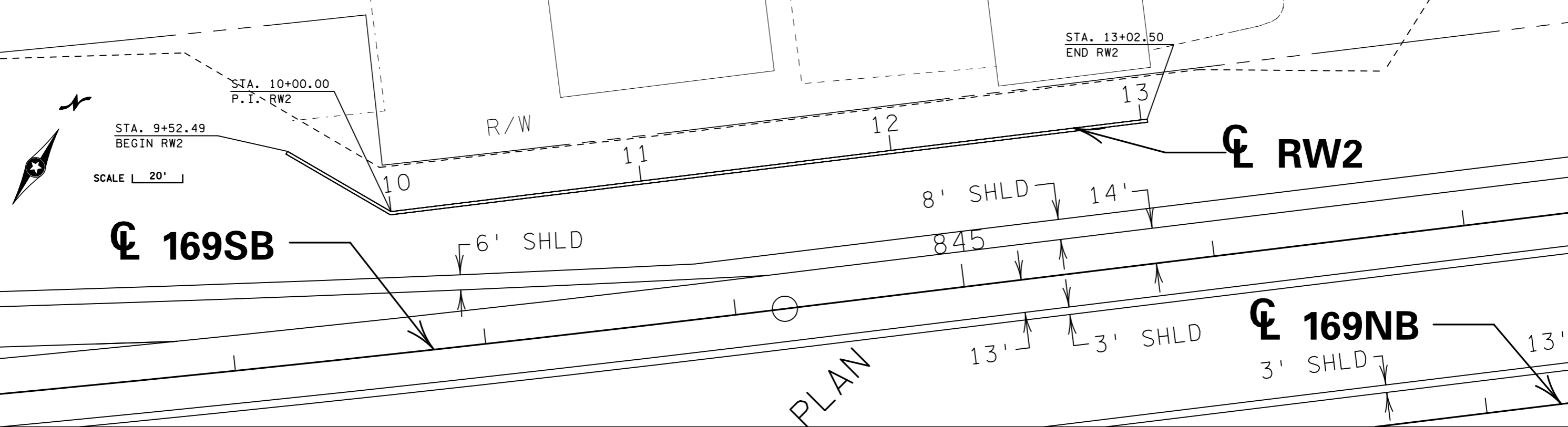


SAMPLE PLAN

RETAINING WALL NO. 3
SHEET 1 OF 3

REVISION DATE 12/27/16
 PLOTTED/REVISED: 26-JAN-2017 08:47

MODULAR BLOCK RETAINING WALL NO. 2



QUANTITIES - MODULAR BLOCK WALL RW2 ④ AA		
ITEM		QUANTITIES
STRUCTURE EXCAVATION CLASS U	CU YD	1995.0
SELECT GRANULAR EMBANKMENT MODIFIED 10% (CV) ③	CU YD	735.0
STRUCTURAL CONCRETE (MIX. NO. 1A43)	CU YD	51.9
MODULAR BLOCK RETAINING WALL ① ② ⑥	SQ YD	355.4
MODULAR BLOCK RETAINING WALL SEALANT ⑤	SQ YD	486.1
COARSE FILTER AGGREGATE (CV)	CU YD	103.0

- ① MEASUREMENT BASED ON VERTICAL FACE AREA OF MODULAR BLOCK AS MEASURED FROM PLAN TOP OF WALL TO 2 FT. BELOW FINISHED GRADE AT BOTTOM OF WALL.
- ② THE FOLLOWING WORK ASSOCIATED WITH CONSTRUCTION OF THE MODULAR BLOCK WALL IS INCLUDED IN THIS ITEM: CONCRETE MODULAR BLOCKS, CAP UNIT, GEOSYNTHETIC REINFORCEMENT, PIPE DRAIN OUTLETS, GEOTEXTILE AROUND PERF. PIPE DRAINS AND GEOTEXTILE FABRIC TYPE I, SPEC. 3733.
- ③ ITEM USED FOR REINFORCED WALL FILL.
- ④ SEE STANDARD PLAN SHEETS ON SHT. NO. 47-49 FOR REINFORCEMENT DETAILS.
- ⑤ MEASUREMENT BASED ON VERTICAL FACE AREA OF MODULAR BLOCK AS MEASURED FROM PLAN TOP OF WALL TO 2 FT. BELOW FINISHED GRADE AT BOTTOM OF WALL. AREA ALSO INCLUDES CAP UNIT AND BACKSIDE OF TOP THREE BLOCK COURSES.
- ⑥ POSITION 4" PERF TP PIPE ALONG THE BASE OF THE WALL EXCAVATION TO MAXIMIZE DRAINAGE AT THE BASE OF THE WALL WHILE MINIMIZING THE POSSIBILITY OF WATER BACKING UP FROM STRUCTURE 5065.

+52.5	+70.4	+91.4	+11.7	+31.6	+51.5	+71.4	+91.3	+11.2	+31.1	+50.7	+62.4	+82.4	+02.4	+22.4	+42.4	+62.4	+82.4	+02.5
848.52	847.19	844.59	843.05	843.52	843.98	843.75	843.08	842.77	842.35	842.08	841.79	841.27	840.31	839.82	839.39	838.70	838.39	837.91
841.40	837.10	832.59	831.05	831.52	831.98	832.41	832.84	833.26	833.32	833.20	833.11	833.04	832.94	832.83	832.70	832.60	832.56	832.41

← TOP OF WALL ELEVATION
 ← BOTTOM OF WALL ELEVATION

RETAINING WALL NO. 2
 SHEET 2 OF 3

REVISION DATE 012417
 PLOTTED/REVISED: 26-JAN-2017 08:47

DISTRICT #: METRO
 IPLOT NAME: spreWall3
 FILENAME: Projects\DM_R0S\Non_Project\Design\SamplePlan\English\retwall.dgn

CONCRETE RETAINING WALL ②																		CC			
JOINT NO.	STATION	X COORDINATE	Y COORDINATE	TOP RAIL ELEV.	TOP WALL ELEV.	FRONT FACE ELEV. (GROUND ELEV.)	WALL BOTTOM OF HEEL ELEV.	HEIGHT (h) AT JOINT LIN FT	WALL HEIGHT (h) (REBAR, FOR FOOTING QUANTITIES) LIN FT	PANEL LENGTH LIN FT	PANEL NAME	STRUCTURAL CONCRETE ⑥		REINFORCEMENT BARS ⑥		STRUCTURAL BACKFILL CU YD	F RAIL LIN FT	DRAINAGE SYSTEM ⑦		PANEL NAME	DRAINS TO STRUCT NO
												1A43 (FOOTING) ④	3Y43 (STEM) ⑤	PLAIN ③	EPOXY ③			4" TP PERFORATED PIPE	4" TP PIPE DRAIN		
												CU YD	CU YD	POUND	POUND			LIN FT	LIN FT		
1	26+00.0	496800.176	125348.295	854.665	851.992	851.992	845.742	5.00	6.00	30.5	A	4.483	7.598	227.385	577.716	30.5	30	4.6	A	5307	
2	26+30.5	496770.846	125339.907	854.511	851.837	849.521	844.587	6.00	7.00	30.5	B	5.022	9.095	272.676	627.471	30.5	30	4.6	B	5321	
3	26+61.0	496741.939	125330.166	854.354	851.680	848.369	843.428	7.00	8.00	30.5	C	5.589	10.635	287.184	676.668	30.5	30	4.6	C	⑧	
4	26+91.5	496713.894	125318.165	854.196	851.522	847.329	842.270	8.00	9.00	30.5	D	6.147	12.206	333.963	729.213	30.5	30	4.6	D	⑧	
5	27+22.0	496686.887	125303.985	854.035	851.362	846.401	841.109	9.00	9.00	30.5	E	6.147	12.983	333.963	729.213	30.5	30	4.6	E	⑧	
6	27+52.5	496661.090	125287.712	853.878	851.204	845.581	840.951	9.00	10.00	30.5	F	6.696	13.815	348.471	864.900	30.5	30	4.6	F	5329	
7	27+83.0	496636.322	125269.890	853.724	851.050	844.833	839.797	10.00	10.00	30.5	G	6.696	12.243	348.471	864.900	30.5	30	4.6	G	⑧	
8	28+13.5	496611.631	125251.967	853.570	850.896	850.896	842.644	7.00													
TOTALS												40.780	78.575	2152.113	5070.081	442	213.5	210	32.2		

NOTE: WALL IS STANDARD CANTILEVER,
 2' LIVE LOAD SURCHARGE,
 SPREAD FOOTING, TYPE I DRAINAGE.

- ① DELETED
- ② NO STRUCTURE EXCAVATION REQUIRED. MUCK EXCAVATION EXTENDS BELOW BOTTOM OF FOOTING.
- ③ ALL REINFORCEMENT BAR QUANTITIES WERE COMPUTED USING THE TALLER STEM HEIGHT OF THE 30.5 LIN. FT. PANEL.
- ④ FOOTING CONCRETE QUANTITIES WERE COMPUTED USING THE TALLER STEM HEIGHT OF THE 30.5 LIN. FT. PANEL.
- ⑤ STEM CONCRETE QUANTITIES WERE COMPUTED BY AVERAGING THE VOLUMES DERIVED FROM THE CHART ON SHEET NO. 170, USING BOTH STEM HEIGHTS OF THE 30.5 LIN. FT. PANEL.
- ⑥ FOR COMPUTATION FACTORS USED FOR STRUCTURAL CONCRETE AND REINFORCEMENT BAR QUANTITIES, SEE SHEET NO. 170.
- ⑦ END CAPS AND TEES ARE INCIDENTAL.
- ⑧ DRAINS THROUGH WALL.

SAMPLE PLAN

TABULATION
 SHEET 3 OF 3

RETAINING WALL PLANS AND PROFILES