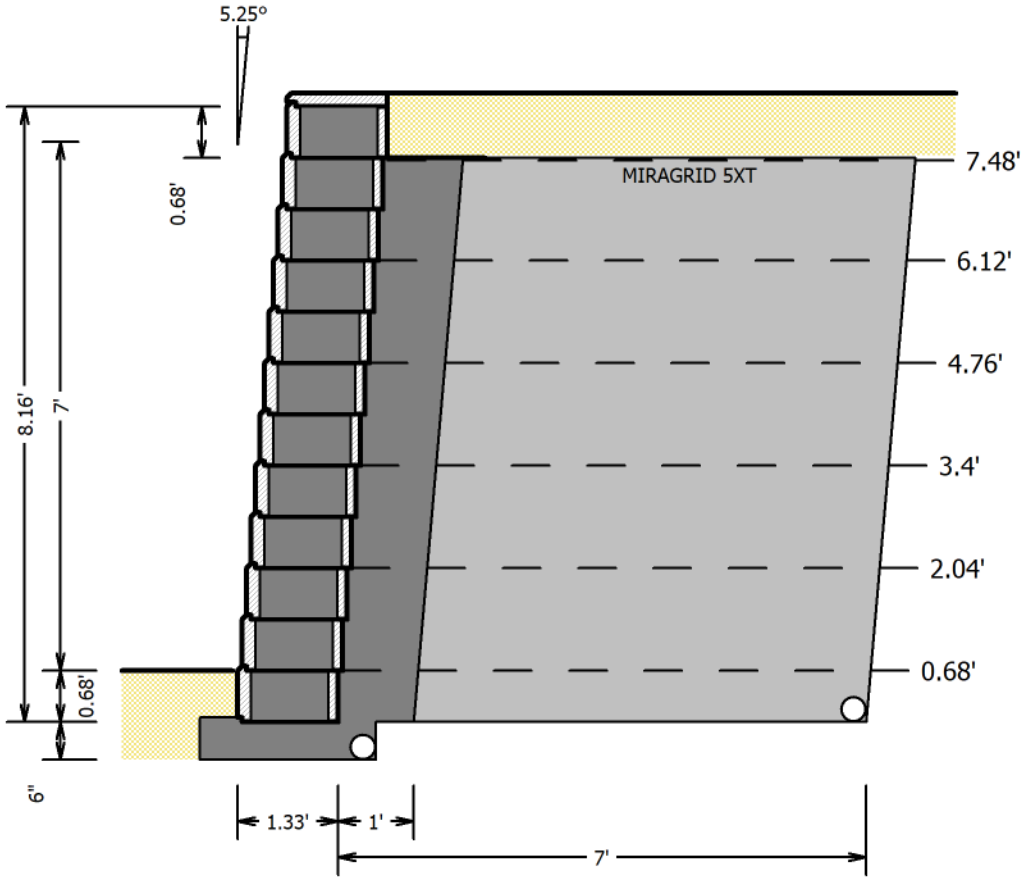
Segmental Retaining Wall Analysis

Organization: **SoilStructure Software**
Project Name: **7 ft GeoGrid Segmntal Wall**
Job #: **5555**
Design by:
Date: **3/12/2023**



References:

1. Design Manual for Segmental Retaining Walls, 3rd Ed., 2010, NCMA.
2. 2021 IBC
3. Retaining Walls, EM 110-2-2502, Corps of Engineers, 1961
4. Segmental Retaining Wall Software v1.0.0 by SoilStructure.com, 2023

Inputs

General Data	
Units	English
Exposed wall height (H')	7.00 ft
Wall embedment (Hemb)	0.68 ft
Backslope angle (beta)	0.00 degree
Live load surcharge (ql)	0.00 psf
Dead load surcharge (qd)	0.00 psf
Offset to crest of slope	20.00 ft
Offset to surcharge (dead)	0.00 ft
Offset to surcharge (live)	0.00 ft

Moduler Block Parameters	
Block height (Hu)	0.680 ft
Block depth (Wu)	1.33 ft
Cap height (Hcu)	0.0000 ft
Unit weight of conc. (gu)	140.00 pcf
Set back of unit (sbu)	0.750 in
Reinforcement length	7.00 ft

Soil Parameters	Fric. Angle, degree	Un. Weight, pcf
Infill Soil	25	120
Retained Soil	30	115
Foundation Soil	32	140
Cohesion (cf)	300 psf	
Leveling Pad Soil	35	125

SWR Unit Interface Shear Data	
Apparent ult. shear cap (au)	1100 lb/ft
Apparent fric. ang. (lambdau)	35 degree
Sliding Resistance	
Direct sliding coef.	0.70
Shear stress interaction coef.	0.70

Geosynthetic Data			
Geosynthetic	MIRAGRID 5X		
Tult	4700.00 lb/ft		
CRS/RFcr	2975.00 lb/ft		
Apparent Peak Connect.	Seg 1	Seg 2	
Min. Strength (acs)	600.00	600.00	lb/ft
Ang. of Frict. (lambda cs)	37.00	20.00	degree
Creep reduction factor (RFcr)	1.58		
Durability reduction fact. (RFd)	1.10		
Inst. damage red. fact. (RFid)	1.05		
Seismic Factors			
Allowable deformation	3.00 in		
Max. earthquake acc. factor, g	0.80 g		
Horiz. Acc. Coefficient, Kh	0.25 g		

Results

General	
Retaining wall inclination (w)	5.25 degree
Total wall height (Ht)	7.68 ft
Number of block courses (N)	12
Final total wall height (H)	8.16 ft

Resultant Forces			
Delta c	20.00 degree		
hs	0.00 ft		
hmax	0.00 ft		
Beta ext	0.00 degree		
Ka ext	0.260		
	Hor	Ver	
Active earth pressure coefficient	0.245	0.088	
From soil self-weight (Ps)	936.3	336.2	lb/ft
From dead load un. surcharge	0.0	0.0	lb/ft
From live load un. surcharge	0.0	0.0	lb/ft
External	936.3	336.2	lb/ft

Sliding Check		
Weight of reinforced infill zone (Wri)	6854	lb/ft
Sliding resist. at base of soil reinf. SRW (Rs)	3817.106	lb/ft
Factor of safety for sliding (FSsl)	4.08	

Overturning Check		
Resisting mom. due to vertical comp. (Mr)	28569.50	lb-ft
Driving moment arm (Mo)	2546.82	lb-ft
Factor of safety for overturning (FSot)	11.22	

Bearing Check		
Eccentricity of resultant vert. bearing force (ec)	-0.12	ft
B	7.24	ft
Ult. bearing capacity of foundation soils (Qult)	30136	psf
Applied bearing pressure (Qac)	993	psf
Factor of safety bearing capacity (FSbc)	30.33	

Internal Stability		
Internal active earth pressure coefficient (Kaint)	0.33	
Long Term Design Strength of reinforcement	2575.76	lb/ft
Number of geogrid layers (NI)	6	
Factors of Safety at Bottom		
Overstress (FSto)	6.60	
Pullout (FSpo)	7.81	
Sliding (FSsl)	5.32	
Connection w/surcharge influence (FSconninfl)	6.24	

Seismic Stability		
Seismic force	1056.563	lb/ft
Seismic moment	2465.31	lb-ft
Factor of safety seismic sliding	3.61	
Factor of safety seismic overturning	11.59	

Results of Internal Stability Analysis

SRW #	Elevation ft	Length ft	Anchor Length ft	FS Overstress	FS Pullout	FS Sliding	Grid Type	Allow. Strength lb/ft	Tensile Conn. Load lb/ft
11	7.48	7.50	1.00	72.60	1.50	59.77	TYPE 1	2575.76	35.48
9	6.12	7.00	1.44	24.20	2.17	19.20	TYPE 1	2575.76	106.43
7	4.76	7.00	2.38	14.52	3.58	11.57	TYPE 1	2575.76	177.38
5	3.40	7.00	3.32	10.37	4.99	8.30	TYPE 1	2575.76	248.34
3	2.04	7.00	4.26	8.07	6.40	6.48	TYPE 1	2575.76	319.29
1	0.68	7.00	5.20	6.60	7.81	5.32	TYPE 1	2575.76	390.24

SRW #	Pullout Capacity lb/ft	Hor. Sliding Force lb/ft	Ver. Sliding Force lb/ft	Sliding Resistance lb/ft	Tensile Load w/surcharge lb/ft	Connection Capacity lb/ft	FS Connection w/surcharge
11	53.27	6.50	2.33	151.79	35.48	1078.41	6.68
9	230.78	58.52	21.01	459.93	106.43	1269.24	6.24
7	634.76	162.56	58.36	774.17	177.38	1460.06	6.24
5	1238.86	318.61	114.38	1094.50	248.34	1650.88	6.24
3	2043.06	526.69	189.08	1420.93	319.29	1841.71	6.24
1	3047.36	786.78	282.46	1753.46	390.24	2032.53	6.24