



April 22, 2021

Summit Homes
120 SE 30th St.
Lee's Summit, MO 64082

Retaining wall design for Lot # 62 Woodside Ridge – 103 NW Joshua Drive Lee's Summit, MO 64082

The following specification for retaining wall design for Lot # 62 Woodside Ridge is noted on sheet A3 of plans and is summarized below:

- Keystone Retaining wall – Compac III
- 9 blocks offset by 1" per block (for 6'-0" tall section)
- 7'-6" base width mirafi geogrid – miragrid 3XT (base width includes width of retaining wall block)
- (1) Geogrid layer on 3rd block per construction drawing
- Base pad 12" deep x 24" wide per construction drawing
- Grade required to cover base pad only per construction drawing

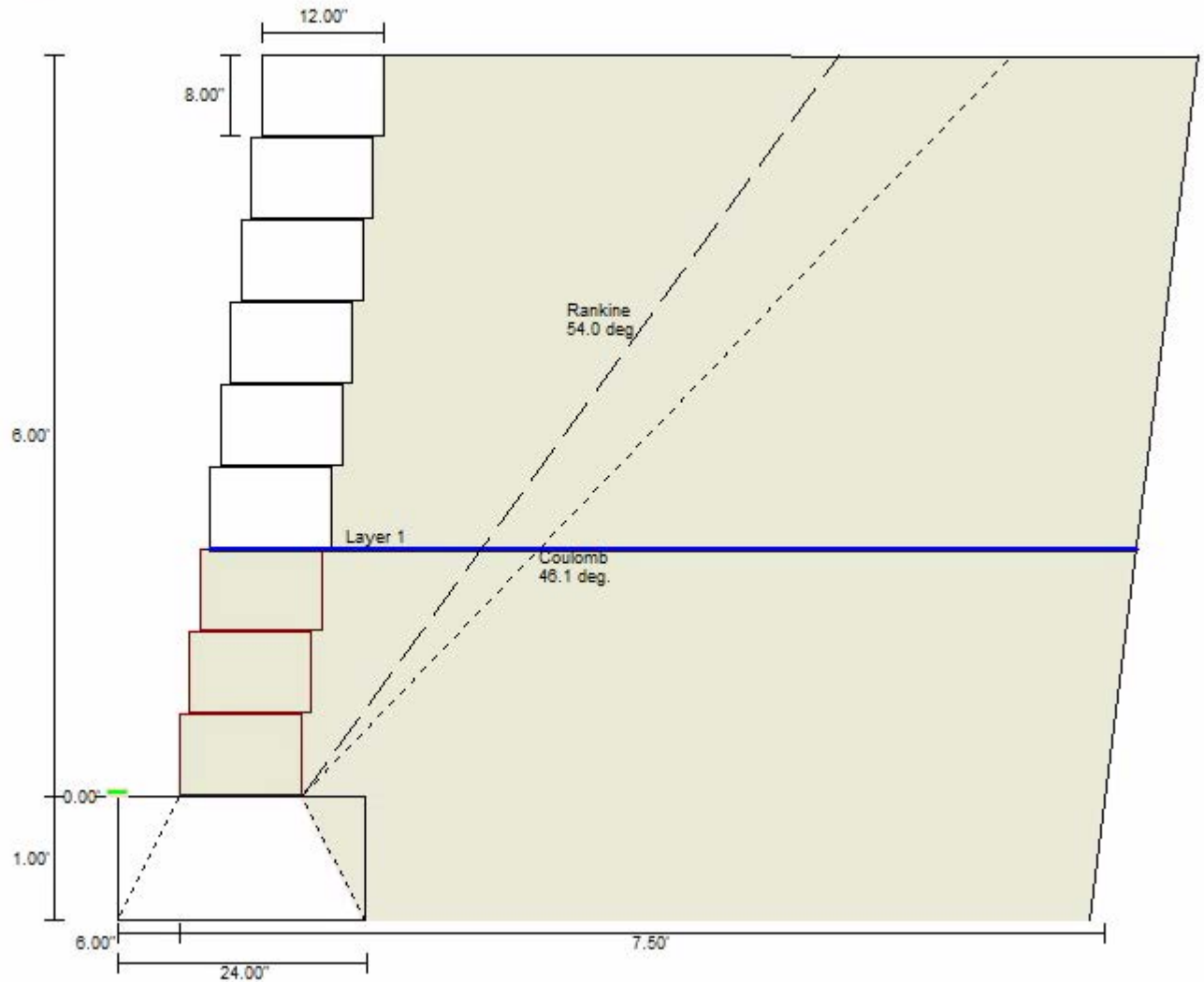
Sincerely,

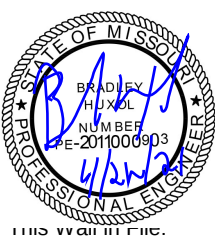
A handwritten signature in blue ink, appearing to read "Bradley Huxol", is written over a light blue horizontal line.

Bradley Huxol, PE



Block Vendor: Keystone Retaining Wall
Block Type: Compac III
Geogrid Vendor: Mirafix Geogrid
Geogrid Type: Miragrid 3XT
Offset per Block: 1"





Project Name/Number :

Title **Kiser Ultra Build Retaining Wall**

Dsgnr:

Description....

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Segmental Retaining Wall with Geogrids

Code: NCMA 3rd

Criteria

Wall height (retained height) 6.00 ft
Backfill slope Level
Backfill angle 0.0 deg
Embedment 0.0 ft

Soil data

External Soil, Φ_e 18 deg
External soil density (In situ) 110 pcf
Internal Soil, Φ_i 18 deg
Internal soil density 110 pcf
Wall Soil Friction Angle 12 deg
 $K_a(\text{Horiz})$ 0.43

Loading

Dead load 0 psf
Live load 0 psf
Seismic Factor, A 0.00
 d_{seismic} 0.00 in

Stability

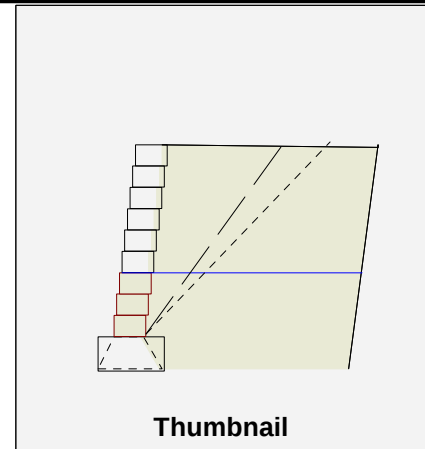
Base length 7.50 ft

Base Sliding Force (w/o Seismic) 804.15 lb
Base Resisting Force (w/o Seismic) 1,444.10 lb
Base Sliding (w/o Seismic) FS 1.80

Overturning Moment (w/o Seismic) 1,608.30 ft lb
Resisting Moment (w/o Seismic) 18,714.80 ft lb
Overturning (w/o Seismic) FS 11.64

Applied Bearing Pressure (w/o Seismic) 577.37 psf
Allowable Bearing Pressure (w/o Seismic) 1,500.00 psf
Bearing (w/o Seismic) FS 2.60

Eccentricity of Vert. Force (w/o Seismic) 0.10 ft
Effective Base Width (w/o Seismic) 7.70 ft



Segmental block data

Vendor selection	Keystone Retaining Wall		
Vendor ESR	ICC ESR-2113	Valid through	08/01/18
Block selection type	Compac III		
Block height	8.00 in	$\alpha(u_1)$	1543.00 lb
Block depth	12.00 in	$\tan(\lambda_{u1})$	0.74
Offset per block	1.00 in	Max_1	4138.00 lb
Batter angle	7.13 deg	$\alpha(u_2)$	1543.00 lb
Wall weight	72.00 psf	$\tan(\lambda_{u2})$	0.74
		Max_2	4138.00 lb

Geogrid material

Vendor Selection	Mirafi Geogrid		
Geogrid type	Miragrid 3XT		
LTDS	1,999.00 lb/ft		
C_i	0.90		
RF_CR	1.58		
α_u	1,271.00 lb		
$\tan(\lambda_{u1})$	0.65		
Max	3,539.00 lb		
α_{cs1}	1,345.22 lb	α_{cs2}	2,020.24 lb
$\tan(\lambda_{cs1})$	0.27	$\tan(\lambda_{cs2})$	0.00
Max_1	2,020.24 lb	Max_2	2,020.24 lb

Factors of Safety

Failure Mode	Static Condition			
	Min			
	Acceptable	Actual	Status	Acceptable
Base Sliding	1.50	1.80	OK	
Overturning	2.00	11.64	OK	
Bearing	2.00	2.60	OK	
Internal Sliding	1.50	4.08	OK	
Tensile Overstress	1.50	2.12	OK	
Pullout	1.50	1.88	OK	
Connection	1.50	1.51	OK	

Project Name/Number :Title **Kiser Ultra Build Retaining Wall**

Dsgnr:

Description....

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This Wall in File:

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Segmental Retaining Wall with Geogrids

Code: NCMA 3rd

Wall Analysis Table:

Layer	Height ft	Trib Height	Depth to Midpoint	Tension From Surcharge			Static Total Fg	LTDS	LTDS (Seismic)	Total Tension (W/seismic), Fi	FS Tensile Overstress (Static) w/Seismic	
Soil	DL	LL										
1	2.00	5.00	4.00	940.8	0.0	0.0	940.8	1,999.0	1,265.2	940.8	2.12	1.34

Wall Analysis Table Continued:

Layer	Pullout Strength	FS Pullout (Static) (Seismic)		Connection Strength	FS Conn (Static) (Seismic)		Internal Sliding Force (Static)	FS Internal Sliding (Static)	Internal Sliding Force (Seismic)	FS Internal Sliding (Seismic)
1	1,766.7	1.88	0.00	1,423.0	1.51	1.51	357.4	4.08	357.4	4.08

ASSUMPTIONS AND CRITERIA USED

- References used include *Design Manual for Segmental Retaining Walls, 3rd Edition*, by NCMA.
- Blocks are all same size and uniform offsets (batter) for full wall height.
- Coulomb earth pressure theory used for earth pressures and failure plane angle.
- Refer to geotechnical report for backfill material, compaction, and other design data and recommendations.
- Cap blocks if used are above the retained height and are neglected in this design.
- Geogrid LTDS and connection values for block vendors obtained from ICC Evaluation Service (ES Legacy Reports) or as provided by vendors. Since these may change or be updated, verification of values is recommended.
- Block sizes obtained from vendors' literature and may vary with locality.
- Geogrid layers are equally spaced vertically, all same length, and laid horizontally.
- Average weight of block and cell infill assumed to be 120 pcf.
- See vendor web sites (on input screen) for more information and specifications.
- Vendor specifications or project specifications, whichever is most restrictive, to be followed for construction procedures.
- Add notes and details for proper drainage.
- See *User's Manual* Design Example #10 for methodology and sample verification calculations.
- Final design responsibility is with the project Engineer-of-Record.