Client True North Outdoors

Name Lovins Residence **Number**

Site Lee's Summit, MO **Designer** AMA

Revision 1 **Created** 1/25/2024 **Modified** 1/25/2024

Standard National Concrete Masonry Association 3rd Edition

Comments

1.

Note †: **Total Facing quantity is based on using full-sized units only on bottom course and an even mix of defined facing sizes, as identified elsewhere in this report, on remaining courses of each Section. The use of corners, tapered or cut units is not reflected in this quantity.**

Note ‡: **Infill values are calculated based on the average geogrid length in each Section. They do not account for anything beyond the reinforced zone (end of the geogrids). Actual infill values may be significantly higher.**

Note Δ: **Face drain values do not include the drainage stone within block. Drainage stone within block is calculated based on the percentage hollow core of the wall unit selected. If the percentage hollow core is not defined then the drainage stone within block will not be calculated.**

Note §: **Retained soil values are calculated based on the the entered Cut Angle. Actual retained soil values may be significantly higher.**

Quantities

Wall	Facing	Wall/Cap Length [ft]	TOW Steps [#]	Facing Area [ft²]	Total Wall Area [ft²]
Wall A	Limestone Block 14"x4...	82	4	411	411
Wall A Small blo	Diamond Pro	80	5	345	372
		162	**9**	**756**	**783**

Wall Unit	Wall A	Wall A Small block
Diamond Pro	0	346
Limestone Block 14"x48"x 24" depth	88	0

Wall	Leveling Pad [yd³]	Reinforced Fill [yd³]	Drainage Fill [yd³]	Core Fill [yd³]	Retained Fill [yd³]
Wall A	5	52	0	0	11
Wall A Small block	3	41	0	6	9
Totals:	**8**	**93**	**0**	**6**	**20**

Reinforcements

Wall	3XT [yd²]	Geogrid Connectors
Wall A	70	0
Wall A Small block	79	0
Totals:	**149**	**0**

NOTE: THESE CALCULATIONS, QUANTITIES, AND LAYOUTS ARE FOR PRELIMINARY DESIGN ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION WITHOUT REVIEW BY A QUALIFIED ENGINEER

Project Information

Client	True North Outdoors				
Name	Lovins Residence			**Number**	
Site	Lee's Summit, MO			**Designer**	AMA
Revision	1	**Created**	1/25/2024	**Modified**	1/25/2024
Standard	National Concrete Masonry Association 3rd Edition				
Seismic As	N/A				
Comments	1.				

Selected Facing Unit

Licensor/Product Line: Anchor Wall Systems, Inc.
Name: Diamond Pro

Project Design Inputs

Design Standard National Concrete Masonry Association 3rd Edition

Minimum Factors of Safety

Conventional

External		Value	Internal		Value	Facing	Value
FSsl	Base Sliding	1.50	FSsl	Internal Sliding	1.50		
FSbc	Bearing Capacity	2.00	FSsc	Shear Capacity	1.50		
FSot	Overturning	1.50					

MultiDepth

External		Value	Internal	Value	Facing	Value
FSsl	Base Sliding	1.50				
FSbc	Bearing Capacity	2.00				
FSsh	Interface Shear	1.50				
FSot	Overturning	1.50				

No Fines

External		Value	Internal	Value	Facing	Value
FSsl	Base Sliding	1.50				
FSbc	Bearing Capacity	2.00				
FSot	Overturning	1.50				

Reinforced

External		Value	Internal		Value	Facing		Value
FSsl	Base Sliding	1.50	FSsl	Internal Sliding	1.50	FScs	Connection Strength	1.50
FSbc	Bearing Capacity	2.00	FSpo	Pullout	1.50	FSsc	Facing Shear	1.50
FSct	Crest Toppling	1.50	FSto	Tensile Overstress	1.50			
FSot	Overturning	2.00						

Design Factors

Term	Description	Minimum (as appl.)	Maximum (as appl.)
RC	Reinforced coverage ratio	1.00	0.00

Selected Facing Unit

Licensor/Product Line: Anchor Wall Systems, Inc.
Name: Diamond Pro

Facing Height	Hu	0.67 ft
Facing Width	Lu	1.50 ft
Facing Depth	Wu	1.00 ft
Facing Weight	Xu	120 lb/ft³
Center of Gravity	Gu	0.50 ft
Setback	Δu	0.08 ft
Batter	ω	7.13 °
Cap Height	Hcu	0.33 ft
Initial Shear Capacity	au	1180.97 lb/ft
Apparent Shear Angle	λu	45.00 °
Maximum Shear Capacity	Vu(max)	2660.97 lb/ft

Selected Reinforcement Types

Reinforcements

3XT - Mirafi Miragrid 3XT **Supplier: TenCate Geosynthetics - Mirafi, Fill Type:**

Tult	3,500.00 lb/ft	RFcr	1.44	RFd	1.10	LTDS	2,104.38 lb/ft
RFid	1.05	Cds	0.70	Ci	0.70		

Connection/Shear Properties

αcs1	801.25 lb/ft	IP-1	1,000.31 lb/ft	αcs2	1,782.57 lb/ft	IP-2	2,183.69 lb/ft
αcs max	2,085.67 lb/ft	au	1,181.38 lb/ft	λu	45.00 lb/ft	Vu(max)	2,660.84 lb/ft

Selected Soil Types

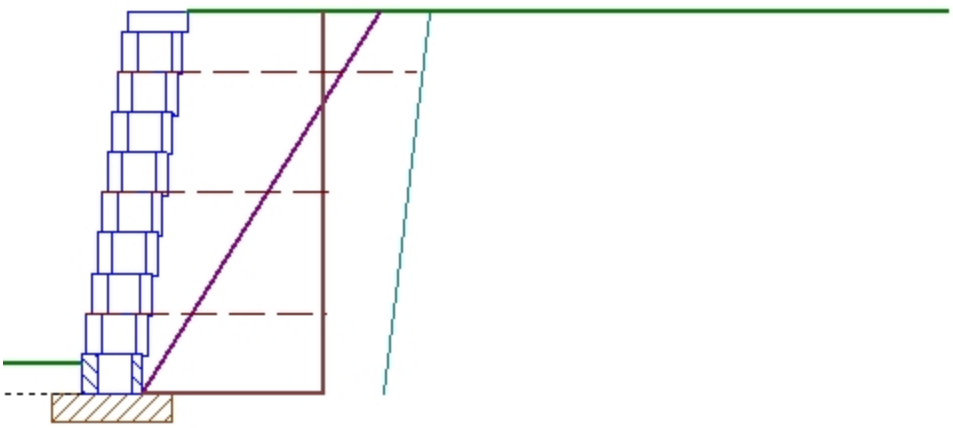
Soil Zone	Soil Type	Friction Angle φ	In Situ Density γ [lb/ft³]	Cohesion Cf [lb/ft²]
Infill (i)	GP	38°	110.00	n/a
Retained (r)	CL	26°	120.00	n/a
Foundation (f)	CL	26°	120.00	0.00
Base (b)	GW	38°	135.00	n/a
Drainage (d)	GP	38°	110.00	n/a

Soil Glossary

CH: Inorganic clays, high plasticity
CL: Inorganic clays, low to medium plasticity, gravelly, sandy, silty, lean clays
GC: Clayey gravels, poorly graded gravel-sand-clay mixtures
GM: Silty gravels, poorly graded gravel-sand-silt mixtures
GP: 1/2"-3/4" clean crushed stone or crushed gravel
GW: Well-graded gravels, gravel-sand. Little or no fines.
MH: Inorganic clayey silts, elastic silts
ML: Inorganic silts, very fine sands, silty or clayey, slight plasticty
SC: Clayey sands, poorly graded sand-clay mixtures
SM: Silty sands, poorly graded sand-silt mixtures
SP: Poorly-graded sands, gravelly sands. Little or no fines.
SW: Well-graded sands, gravelly sands. Little or no fines.

Section 1 Details

Section 1 Cross-section



Section 1 Cross-section Details

Upper Slope Angle	β	0.00 °
Crest Offset		0.00 ft
Live Load	ql	0 lb/ft²
Live Offset	qlofs	0.00 ft
Dead Load	qd	0 lb/ft²
Dead Offset	qdofs	0.00 ft
Top of Section		105.83 ft
Bottom Grade		100.00 ft
Base of Section		99.50 ft
Design Height	H	6.33 ft
Embedment Depth	Hemb	0.50 ft

*** Analysis includes Vertical Forces**

*** Embedment is not included in Bearing Capacity**

Empirical Checks

Check	Description	Min. Requirement	Result	Status
Hemb	Minimum Embedment %	5.0000	8.6300	Pass
L	Min. Reinforcement Length	4.0000	4.0000	Pass
L/H Ratio	Min. L/H Ratio	0.6000	0.6316	Pass
La	Min. Anchorage Length	1.0000	1.3323	Pass
MinHemb	Minimum Embedment	6.0000	6.0394	Pass
Rs	Max. Reinforcement Separation	0.0000	2.0000	Pass
RsBottom	Max. multiple of Hu at bottom	0.0000	2.0000	Pass
RsTop	Max. multiple of Hu at top	0.0000	1.5000	Pass

External Checks

Static

Check	Description	Min. Requirement	Result	Status
FSbc	Bearing Capacity	2.00	3.99	Pass
FSct	Crest Toppling	1.50	13.33	Pass
FSot	Overturning	2.00	5.37	Pass
FSsl	Base Sliding	1.50	2.21	Pass

Internal and Local Checks

Static

Layer	Elevation (ft)	FScs	FSpo	FSsl	FSto
1	100.83	6.45	6.51	6.67	9.77
2	102.83	10.77	4.49	14.16	19.63

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Layer	Elevation (ft)	FScs	FSpo	FSsl	FSto
3	104.83	25.71	4.49	93.31	58.87