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#### Construction Stages

Name	Term	Objects present in this stage
Stage 1 (Generated)	Long	Wall 1 (Generated) On retained side: Ground 1 (Generated), Borehole 1 (Generated), Surcharge 1, On excavated side: Excavation 1 (Generated), Borehole 1 (Generated),

#### Ground Profiles

Name	Type	Other Properties
Ground 1 (Generated)	Horizontal	

#### Excavations

Name	Type	Depth (m)	Plan length (m)	Plan breadth (m)	Other Properties
Excavation 1 (Generated)	Horizontal	5.00	-	-	

#### Soils

Name	Type	Class	State	Other Properties
Soil 1 (Generated)	Clay	Unclassified	Unspecified	Soil is not fissured

#### Soil properties

Name	Wet weight kN/m <sup>3</sup>	Dry weight kN/m <sup>3</sup>	Failure state	Friction °	Cohesion kPa	Poisson's ratio
Soil 1 (Generated)	20.1	20.1	Peak	20.0	0.0	0.30

#### Soil properties (undrained)

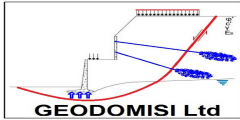
Name	Strength kPa	Strength increase kN/m <sup>3</sup>	From depth m
Soil 1 (Generated)	65.0	0.0	0.00

#### Layers

Name	Type	Thickness (m)	Soil	Dip (°)	OCR	Tension crack	
Layer 1 (Generated)	Undrained	22.50	Soil 1 (Generated)	0.0	1.0	Flooded	Not rigid

#### Boreholes

Name	Depth (m)	Contains layers:
Borehole 1 (Generated)	22.5	Layer 1 (Generated);



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**Retaining Walls**

Name	Type	Depth of toe m	Upstand m	Material	Density kg/m <sup>3</sup>	E GPa
Wall 1 (Generated)	Contiguous Pile	15.00	0.00	Concrete	2400	20.0

**Retaining Wall sections**

Name	Section	Sectional area cm <sup>2</sup> /m	Moment of inertia cm <sup>4</sup> /m	Section modulus cm <sup>3</sup> /m
Wall 1 (Generated)	Diameter = 0.6 m Spacing = 1.2 m	2356	530144	17671

**Surcharges**

Name	Type	Depth (m)	Magnitude			Other Properties
Surcharge 1	Uniform	0.00	10.0 kPa	P	U	Load type = Custom Loading

**Design Standard**

Type = Eurocode 7 (Case B)  
 Earth pressure coefficients  
 Type = Caquot & Kerisel  
 Tension crack limited to the retained height  
 Cantilever toe-in = 20%

Equilibrium calculated at the minimum safe embedment (with designated safety factors)

Unfavourable  
 Permanent (G) = 1.35  
 Variable (Q) = 1.50  
 Accidental (A) = 1.00

Favourable  
 Permanent (G) = 1.00  
 Variable (Q) = 0.00  
 Accidental (A) = 0.00

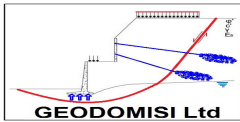
Minimum surcharge = 0 kPa

On shearing resistance = 1.00  
 On effective cohesion = 1.00  
 On undrained strength = 1.00

On effective earth pressures = 1.00  
 On total earth pressures = 1.00  
 Safety factor on resistance applied via: Gross passive pressures  
 Minimum active pressure = 0.00 kN/m<sup>3</sup>

Unplanned excavation = 10% of clear height, but maximum of 0.5m  
 Softened formation = 0 m

On bending moments = 1.00  
 On shear forces = 1.00  
 On prop forces  
 Short-term = 1.00/1.00  
 Long-term = 1/1



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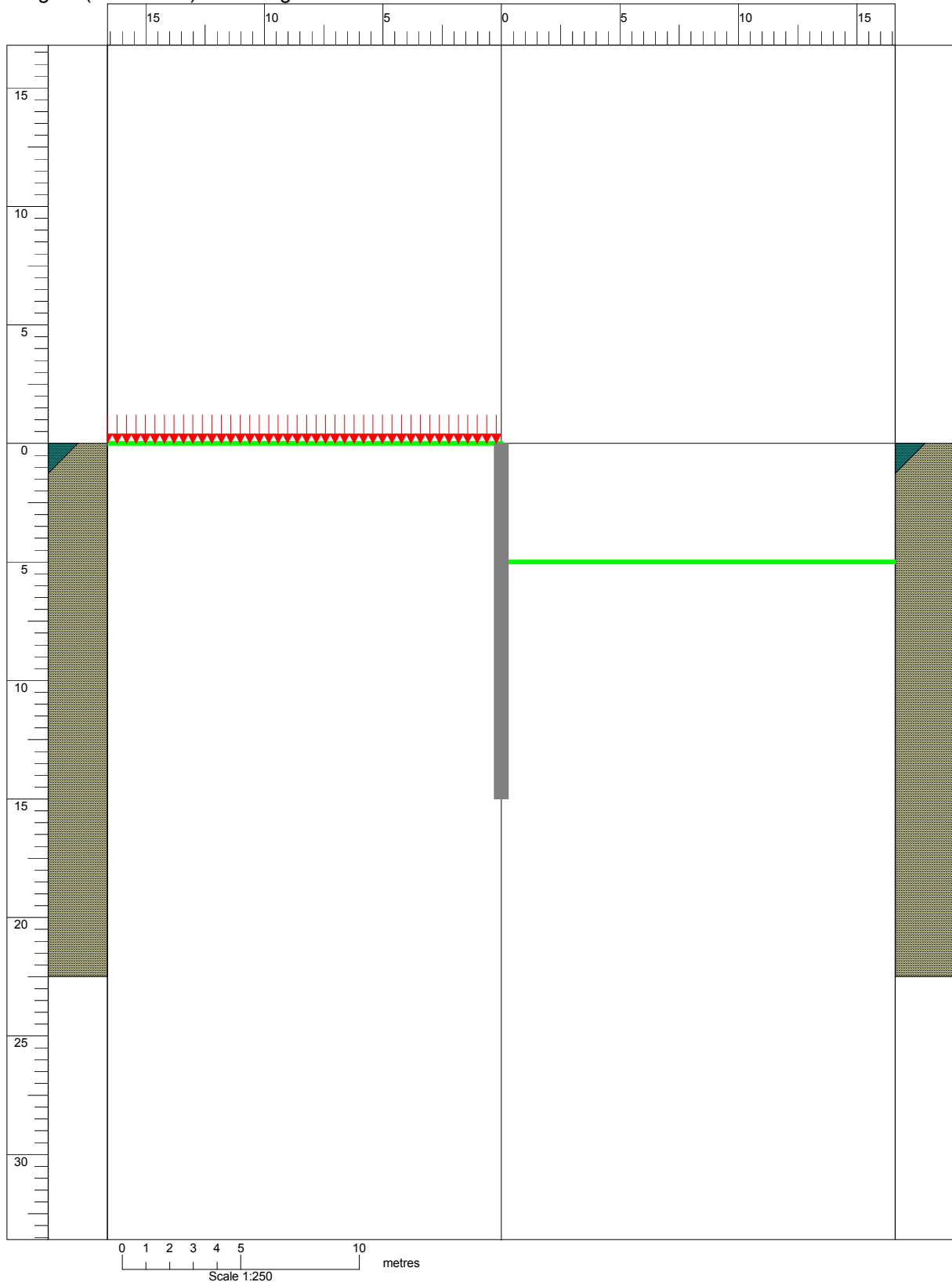
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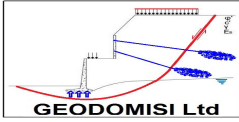
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Stage 1 (Generated) - Drawing Board





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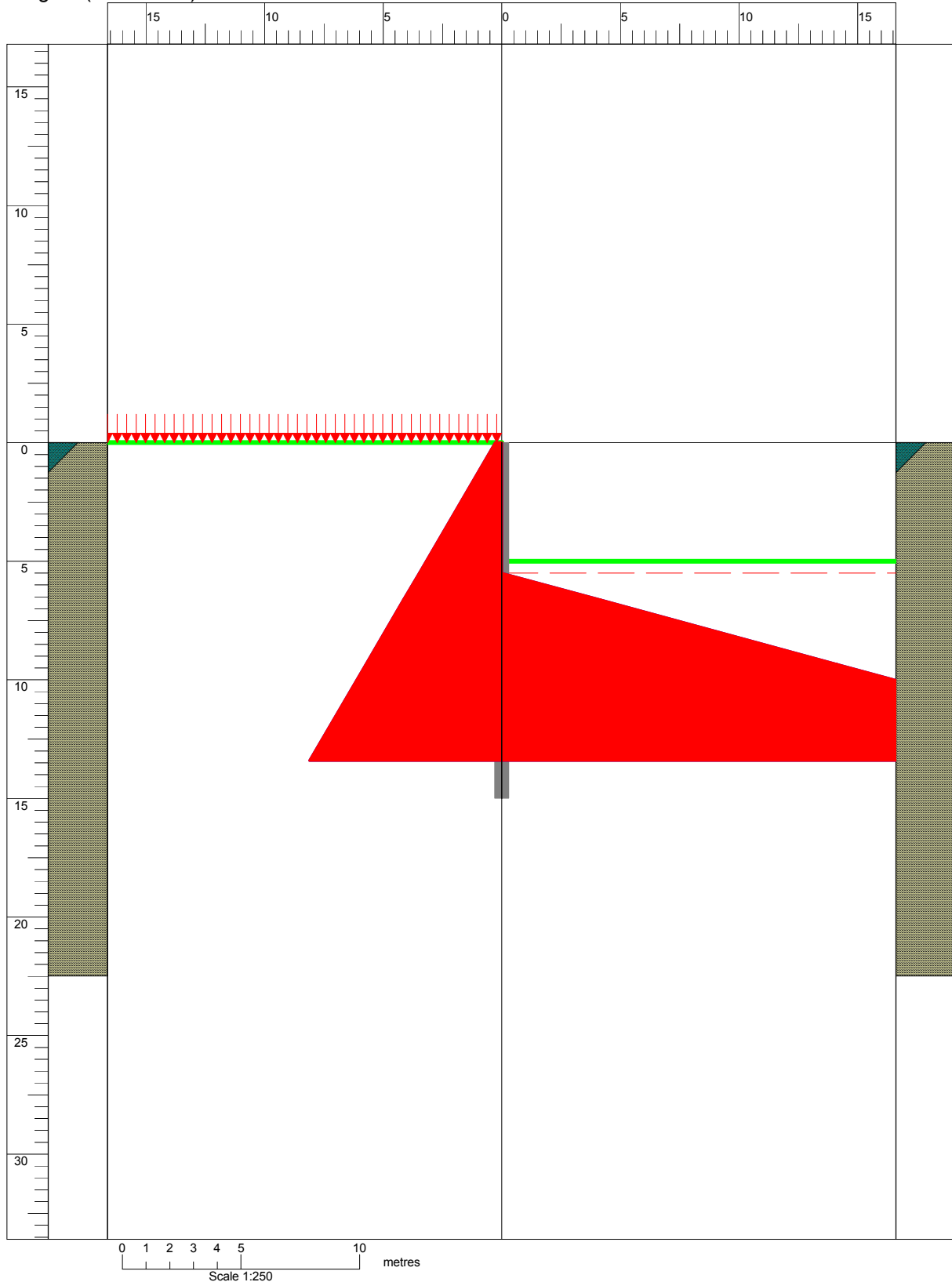
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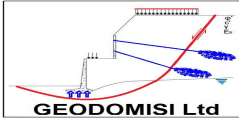
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Stage 1 (Generated) - Earth Pressures As Built





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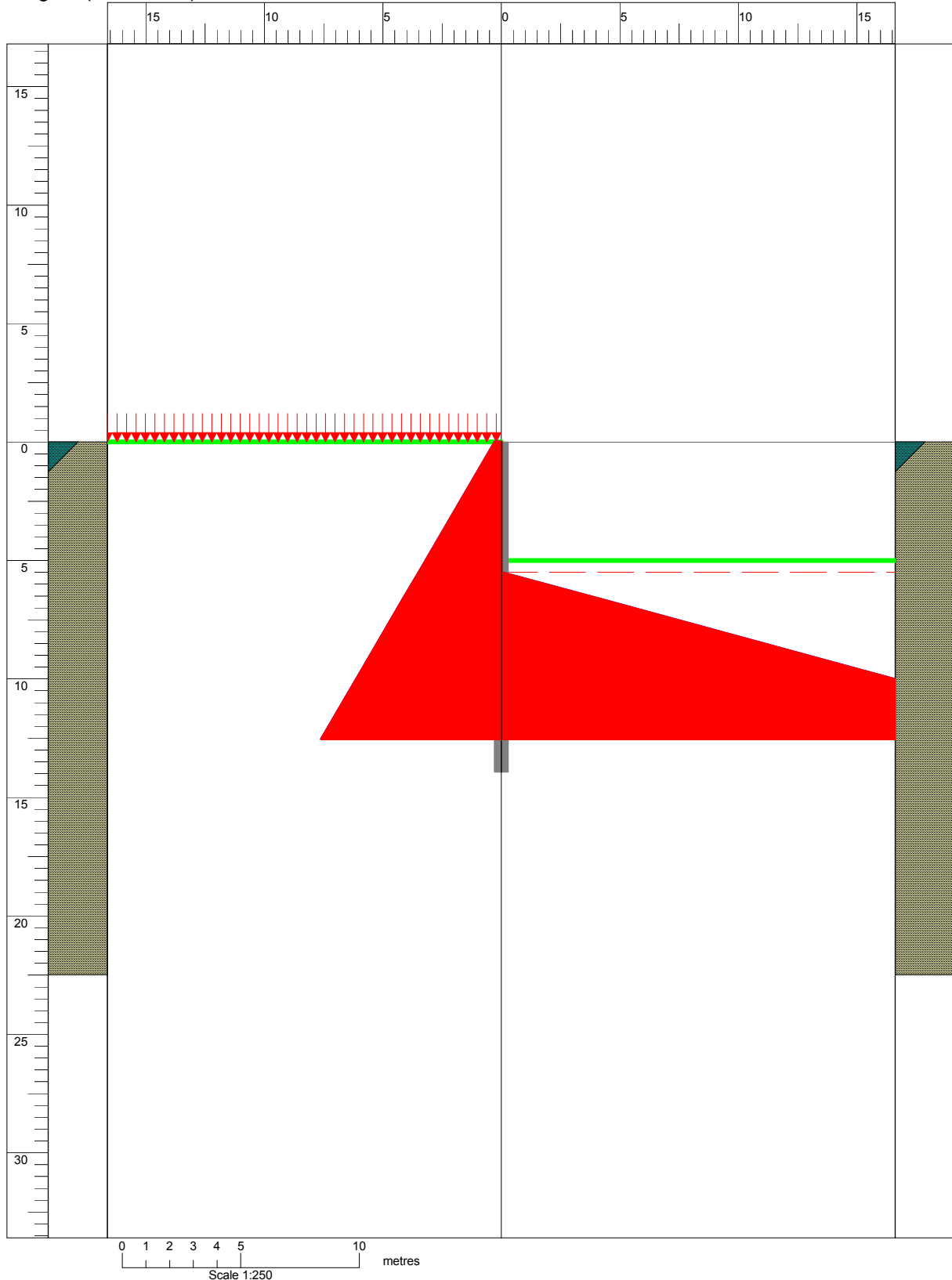
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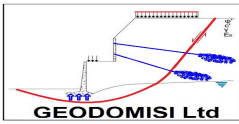
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Stage 1 (Generated) - Earth Pressures At Minimum Safe Embedment





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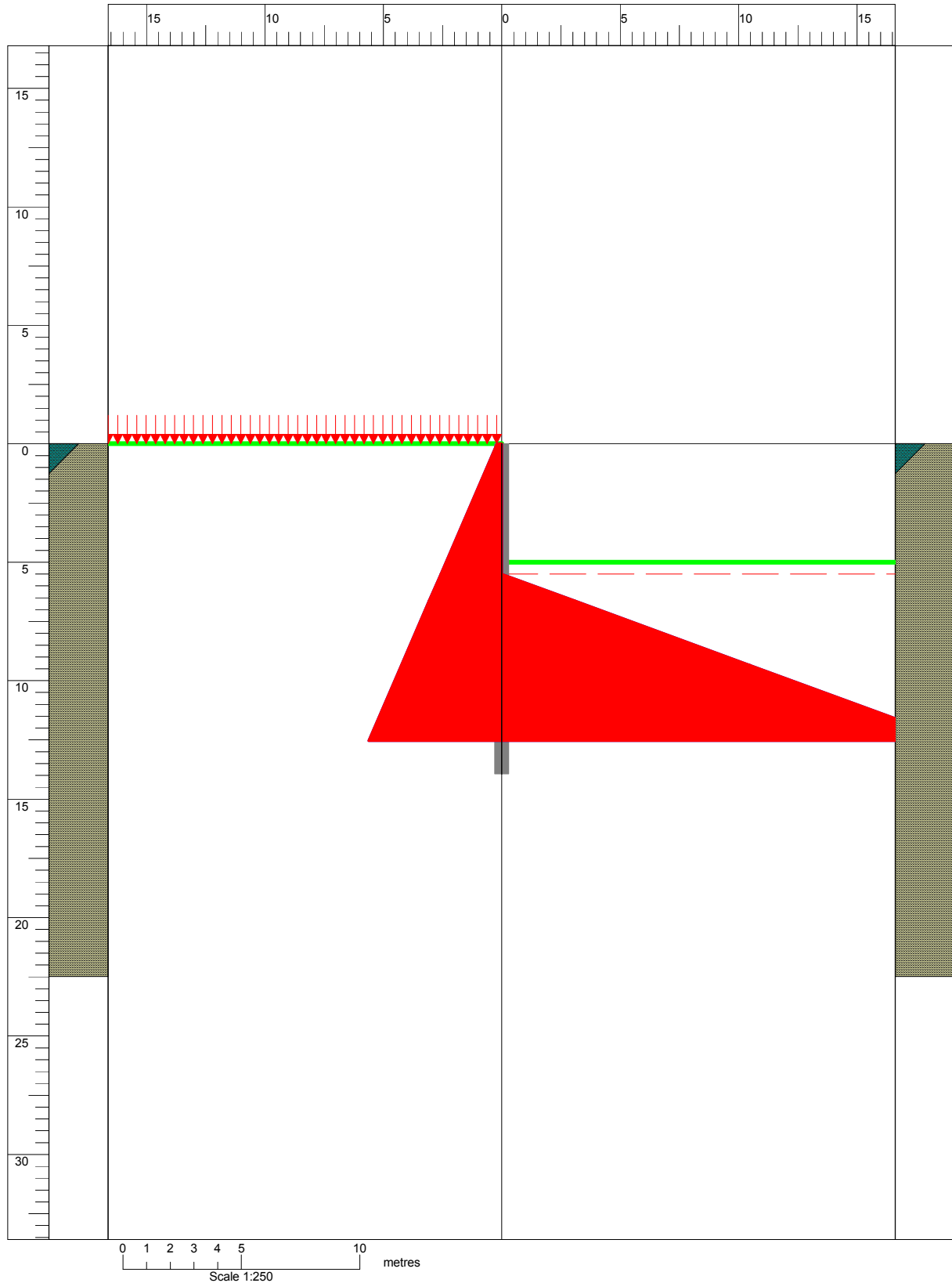
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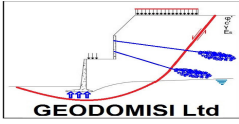
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Stage 1 (Generated) - Earth Pressures At Failure





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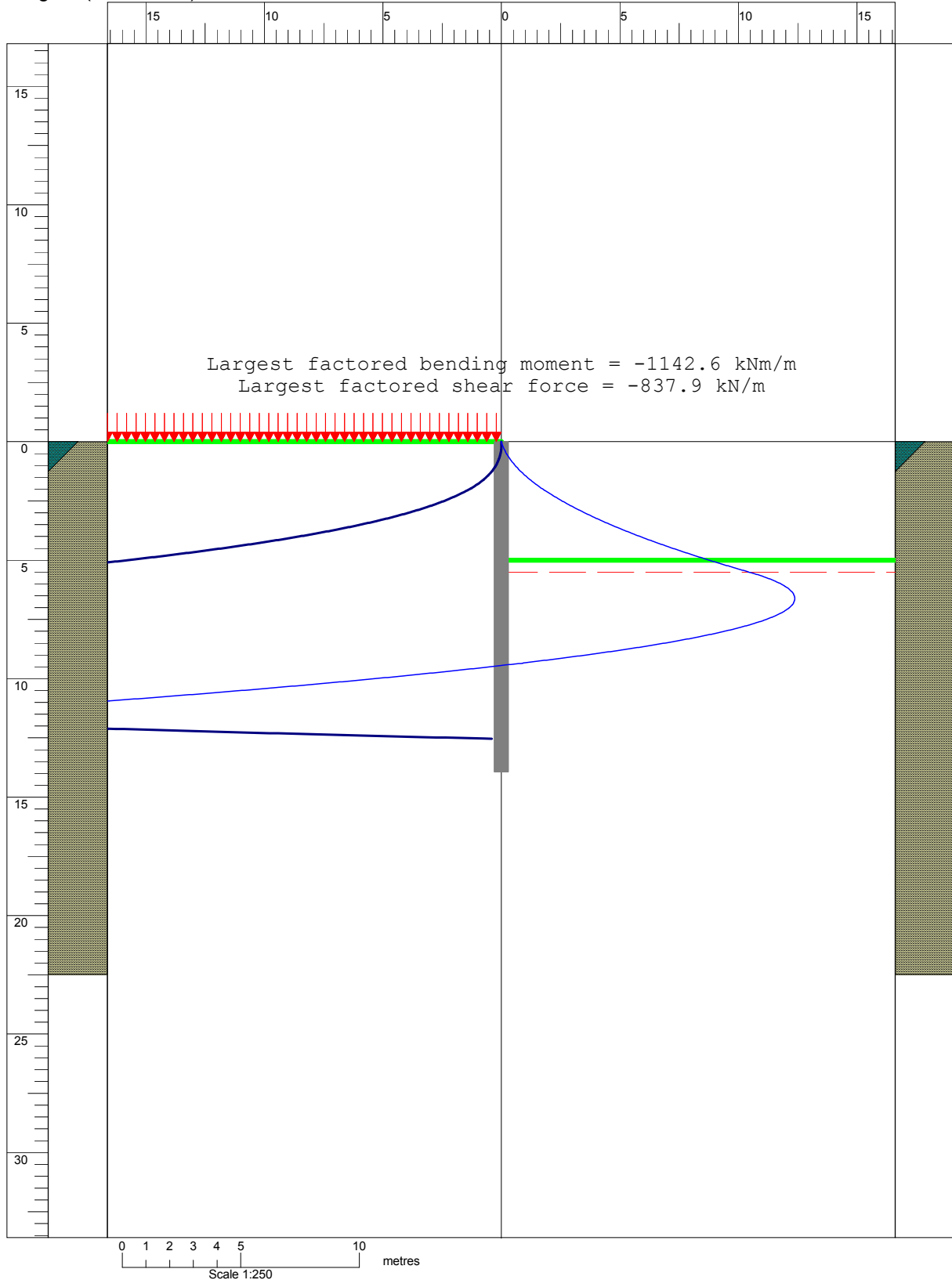
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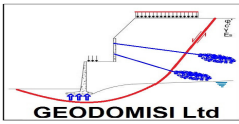
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Stage 1 (Generated) - Structural Forces





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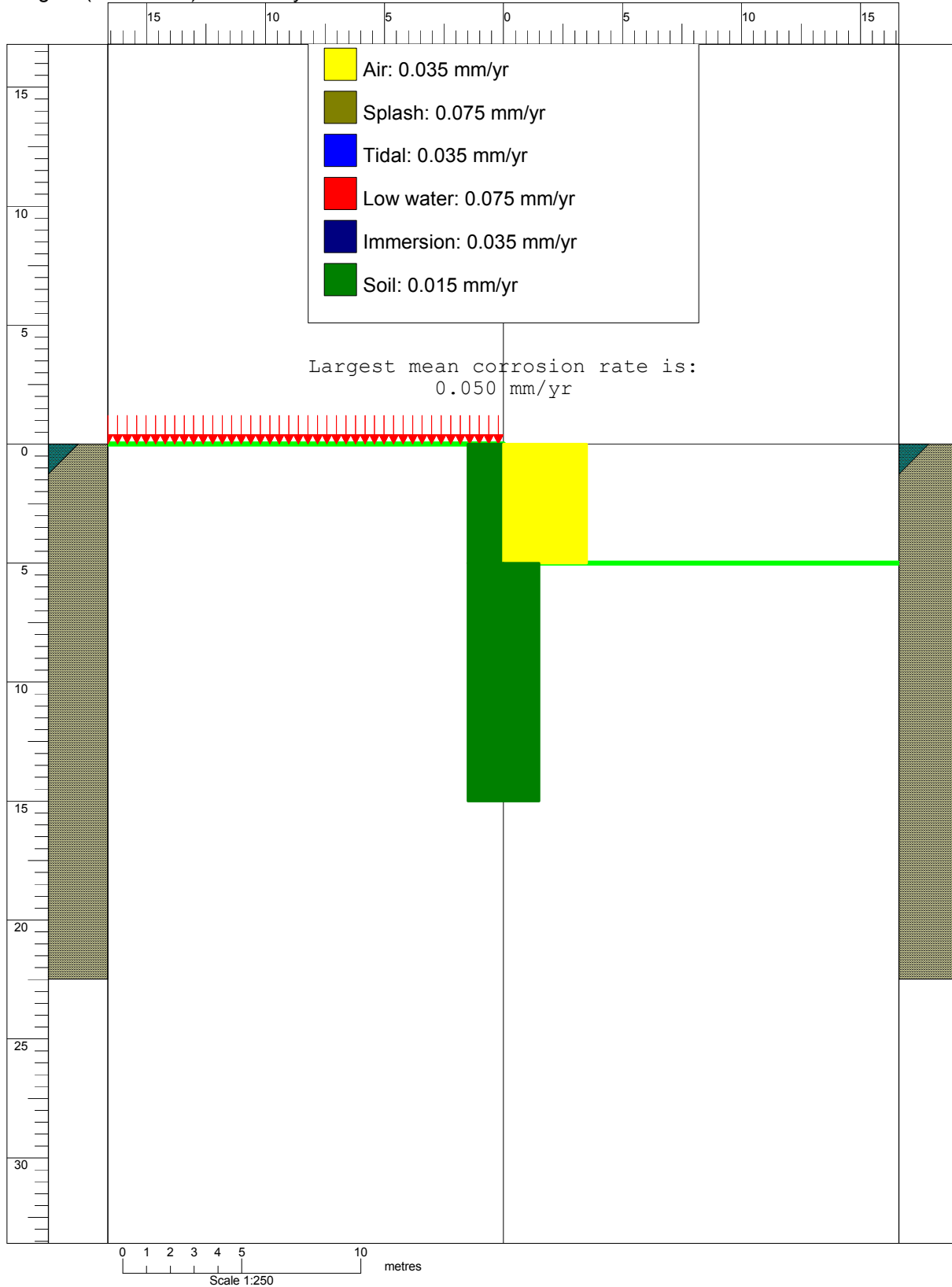
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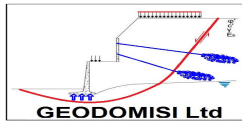
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**Stage 1 (Generated) - Durability**







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**Stage 1 (Generated) - Earth Pressures As Built**

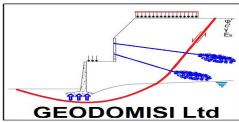
Depth	EarthPr	WaterPr	TotalPr	EarthPr	WaterPr	TotalPr
m	kPa	kPa	kPa	kPa	kPa	kPa
	Retained	Retained	Retained	Excavated	Excavated	Excavated
0.00	5.80	0.00	5.80	0.00	0.00	0.00
5.50	69.93	0.00	69.93	0.00	0.00	0.00
5.50	69.93	0.00	69.93	0.00	0.00	0.00
6.63	83.08	0.00	83.08	83.08	0.00	83.08
6.63	83.08	0.00	83.08	83.08	0.00	83.08
9.35	114.82	0.00	114.82	283.49	0.00	283.49
9.35	114.82	0.00	114.82	283.49	0.00	283.49
13.42	162.23	0.00	162.23	582.93	0.00	582.93

**Stage 1 (Generated) - Earth Pressures At Minimum Safe Embedment**

Depth	EarthPr	WaterPr	TotalPr	EarthPr	WaterPr	TotalPr
m	kPa	kPa	kPa	kPa	kPa	kPa
	Retained	Retained	Retained	Excavated	Excavated	Excavated
0.00	5.80	0.00	5.80	0.00	0.00	0.00
5.50	69.93	0.00	69.93	0.00	0.00	0.00
5.50	69.93	0.00	69.93	0.00	0.00	0.00
6.63	83.08	0.00	83.08	83.08	0.00	83.08
6.63	83.08	0.00	83.08	83.08	0.00	83.08
9.35	114.82	0.00	114.82	283.49	0.00	283.49
9.35	114.82	0.00	114.82	283.49	0.00	283.49
12.55	152.10	0.00	152.10	518.91	0.00	518.91

**Stage 1 (Generated) - Earth Pressures At Failure**

Depth	EarthPr	WaterPr	TotalPr	EarthPr	WaterPr	TotalPr
m	kPa	kPa	kPa	kPa	kPa	kPa
	Retained	Retained	Retained	Excavated	Excavated	Excavated
0.00	4.30	0.00	4.30	0.00	0.00	0.00
5.50	51.80	0.00	51.80	0.00	0.00	0.00
5.50	51.80	0.00	51.80	0.00	0.00	0.00
6.63	61.54	0.00	61.54	61.54	0.00	61.54
6.63	61.54	0.00	61.54	61.54	0.00	61.54
9.35	85.05	0.00	85.05	209.99	0.00	209.99
9.35	85.05	0.00	85.05	209.99	0.00	209.99
12.55	112.66	0.00	112.66	384.38	0.00	384.38



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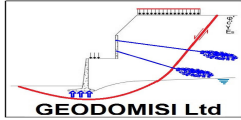
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**Stage 1 (Generated) - Required Embedment As Built  
 Results of earth pressure calculation**

<p><b>Retaining Wall</b>          Name = Prototype: Wall 1 (Generated)          Retained height = 5.50 m          Depth of toe = 15.00 m  <b>Partial factors</b>  <b>Factors on actions</b>          Unfavourable          Permanent (G) = 1.35          Variable (Q) = 1.50          Accidental (A) = 1.00          Favourable          Permanent (G) = 1.00          Variable (Q) = 0.00          Accidental (A) = 0.00          Minimum surcharge = 0 kPa  <b>Factors on material properties</b>          On shearing resistance = 1.00          On effective cohesion = 1.00          On undrained strength = 1.00  <b>Factors on resistance</b>          On effective earth pressures = 1.00          On total earth pressures = 1.00          Safety factor on resistance applied via: Gross passive pressures          Minimum active pressure = 0.00 kN/m<sup>3</sup>  <b>Safety margins on geometry</b>          Unplanned excavation = 10% of clear height, but maximum of 0.5m          Softened formation = 0 m  <b>Factors on structural forces</b>          On bending moments = 1.00          On shear forces = 1.00          On prop forces          Short-term = 1.00/1.00          Long-term = 1/1  <b>Moments</b>          Overturning = 5215 kNm/m          Restoring = 6089 kNm/m          Out-of-balance = -874 kNm/m          Restoring/Overturning = 117 %          Reaction at wall toe = -1180.2 kN/m</p>
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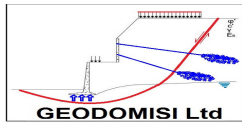
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**Stage 1 (Generated) - Required Embedment At Minimum Safe Embedment  
 Results of earth pressure calculation**

Retaining Wall  
 Name = Prototype: Wall 1 (Generated)  
 Retained height = 5.50 m  
 Depth of toe = 13.96 m  
 Partial factors  
 Factors on actions  
 Unfavourable  
 Permanent (G) = 1.35  
 Variable (Q) = 1.50  
 Accidental (A) = 1.00  
 Favourable  
 Permanent (G) = 1.00  
 Variable (Q) = 0.00  
 Accidental (A) = 0.00  
 Minimum surcharge = 0 kPa  
 Factors on material properties  
 On shearing resistance = 1.00  
 On effective cohesion = 1.00  
 On undrained strength = 1.00  
 Factors on resistance  
 On effective earth pressures = 1.00  
 On total earth pressures = 1.00  
 Safety factor on resistance applied via: Gross passive pressures  
 Minimum active pressure = 0.00 kN/m<sup>3</sup>  
 Safety margins on geometry  
 Unplanned excavation = 10% of clear height, but maximum of 0.5m  
 Softened formation = 0 m  
 Factors on structural forces  
 On bending moments = 1.00  
 On shear forces = 1.00  
 On prop forces  
 Short-term = 1.00/1.00  
 Long-term = 1/1  
 Moments  
 Overturning = 4295 kNm/m  
 Restoring = 4295 kNm/m  
 Out-of-balance = 0 kNm/m  
 Restoring/Overturning = 100 %  
 The wall is in equilibrium  
 Reaction at wall toe = -837.9 kN/m



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**Stage 1 (Generated) - Required Embedment At Failure**  
**Results of earth pressure calculation**

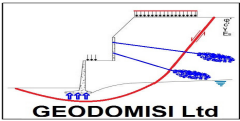
<p><b>Retaining Wall</b>          Name = Prototype: Wall 1 (Generated)          Retained height = 5.50 m          Depth of toe = 13.96 m  <b>Partial factors</b>          Factors on actions            Unfavourable              Permanent (G) = 1.00              Variable (Q) = 1.00              Accidental (A) = 1.00            Favourable              Permanent (G) = 1.00              Variable (Q) = 1.00              Accidental (A) = 1.00          Minimum surcharge = 0 kPa          Factors on material properties            On shearing resistance = 1.00            On effective cohesion = 1.00            On undrained strength = 1.00          Factors on resistance            On effective earth pressures = 1.00            On total earth pressures = 1.00          Safety factor on resistance applied via: Gross passive pressures          Minimum active pressure = 0.00 kN/m<sup>3</sup>          Safety margins on geometry            Unplanned excavation = None            Softened formation = 0 m          Factors on structural forces            On bending moments = 1.00            On shear forces = 1.00            On prop forces              Short-term = 1.00/1.00              Long-term = 1/1  <b>Moments</b>          Overturning = 3182 kNm/m          Restoring = 3182 kNm/m          Out-of-balance = 0 kNm/m          Restoring/Overturning = 100 %          The wall is in equilibrium          Reaction at wall toe = -620.6 kN/m</p>
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**Stage 1 (Generated): Structural Forces**

Depth (m)	Bending Moment (kNm/m)	Shear Force (kN/m)	Prop Force (kN/m)	Notes
9.47	-1142.6	-2.5		See above Maximum bending moment
12.55	-8.4	-837.9		See above Maximum shear force

**Stage 1 (Generated): Messages**  
 Validating the construction stage

Calculating earth pressures as built (for the specified wall length and safety factors)  
 Calculating earth pressures at the minimum safe embedment (with the specified safety factors)

 <p><b>GEODOMISI Ltd. - Dr. Costas Sachpazis</b>          Civil &amp; Geotechnical Engineering Consulting Company for          Structural Engineering, Soil Mechanics, Rock Mechanics,          Foundation Engineering &amp; Retaining Structures.          Tel.: (+30) 210 5238127, 210 5711263 - Fax.: +30 210 5711461 -          Mobile: (+30) 6936425722 &amp; (+44) 7585939944,  <a href="http://www.geodomisi.com">www.geodomisi.com</a> - <a href="mailto:costas@sachpazis.info">costas@sachpazis.info</a></p>	<b>Project: Cantilever Pile Retaining Wall Embedded          Analysis &amp; Design, Free Earth Support In          accordance Eurocode 7.</b>				Job Ref. <a href="http://www.geodomisi.com">www.geodomisi.com</a>	
	Section <b>Civil &amp; Geotechnical Engineering Calculations for</b>				Sheet no./rev. 1	
	Calc. Made by Dr. C. Sachpazis	Date 27/02/2016	Chk'd by	Date	App'd by	Date

Stage 1 (Generated): Messages [Continued]

Calculating structural forces

Calculating durability

Calculating earth pressures with maximized safety factors (for the specified wall length)

Calculating earth pressures at failure (with safety factors set to 1)

1 error/warning message(s) generated during the calculations: please inspect the Messages View for more information