

Cantilever wall analysis

Input data

Project

Task : Check Sperona b/a, H=1.0-3.5m
Date : 10/1/2024

Settings

(input for current task)

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0.333
Verification methodology : according to EN 1997
Design approach : 3 - reduction of actions (GEO, STR) and soil parameters

Partial factors on actions (A)						
Permanent design situation						
		State STR			State GEO	
		Unfavourable	Favourable	Unfavourable	Favourable	
Permanent actions :	$\gamma_G =$	1.35 [-]	1.00 [-]	1.00 [-]	1.00 [-]	
Variable actions :	$\gamma_Q =$	1.50 [-]	0.00 [-]	1.30 [-]	0.00 [-]	
Water load :	$\gamma_w =$			1.00 [-]		

Partial factors for soil parameters (M)		
Permanent design situation		
Partial factor on internal friction :	$\gamma_\phi =$	1.25 [-]
Partial factor on effective cohesion :	$\gamma_c =$	1.25 [-]
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1.40 [-]
Partial factor on Poisson's ratio :	$\gamma_\nu =$	1.00 [-]

Partial factors for variable actions**Permanent design situation**

Factor for combination value :	$\psi_0 =$	0.70	[-]
Factor for frequent value :	$\psi_1 =$	0.50	[-]
Factor for quasi-permanent value :	$\psi_2 =$	0.30	[-]

Partial factors on actions (A)**Seismic design situation**

		State STR		State GEO	
		Unfavourable	Favourable	Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1.00 [-]	1.00 [-]	1.00 [-]	1.00 [-]
Variable actions :	$\gamma_Q =$	1.00 [-]	0.00 [-]	1.00 [-]	0.00 [-]
Water load :	$\gamma_w =$			1.00 [-]	

Partial factors for soil parameters (M)**Seismic design situation**

Partial factor on internal friction :	$\gamma_\phi =$	1.00	[-]
Partial factor on effective cohesion :	$\gamma_c =$	1.00	[-]
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1.00	[-]
Partial factor on Poisson's ratio :	$\gamma_v =$	1.00	[-]

Material of structureUnit weight $\gamma = 23.00 \text{ kN/m}^3$

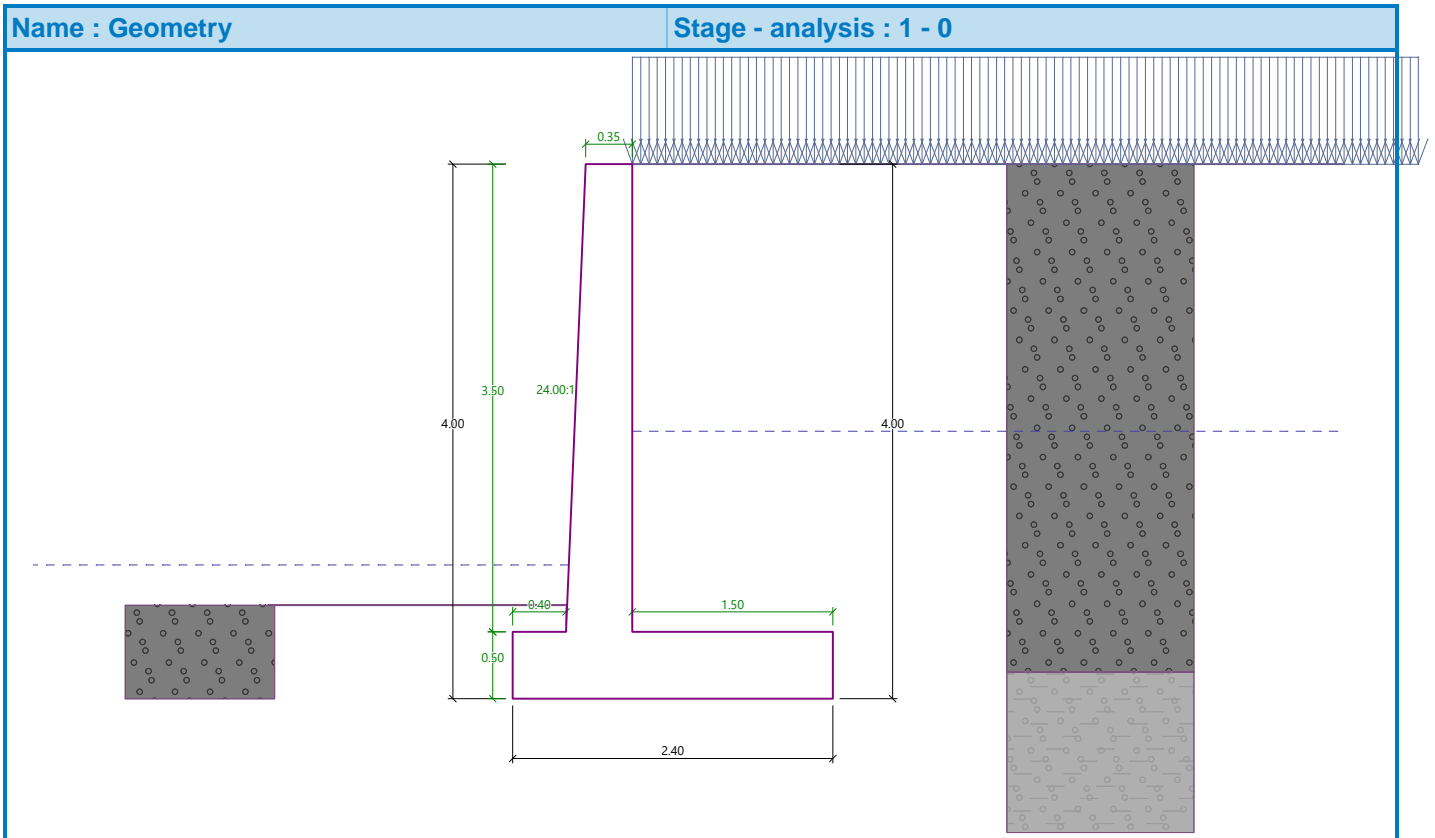
Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete : C 30/37Cylinder compressive strength $f_{ck} = 30.00 \text{ MPa}$ Tensile strength $f_{ctm} = 2.90 \text{ MPa}$ **Longitudinal steel : B500**Yield strength $f_{yk} = 500.00 \text{ MPa}$ **Geometry of structure**

No.	Coordinate X [m]	Depth Z [m]
1	0.00	0.00
2	0.00	3.50
3	1.50	3.50
4	1.50	4.00
5	-0.90	4.00
6	-0.90	3.50

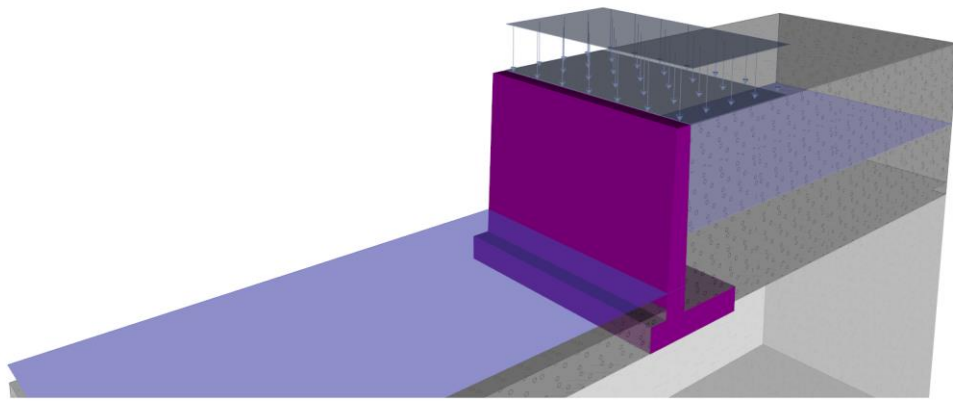
No.	Coordinate X [m]	Depth Z [m]
7	-0.50	3.50
8	-0.35	0.00

The origin [0,0] is located at the most upper right point of the wall.
 Wall section area = 2.68 m².



Name : Geometry

Stage - analysis : 1 - 0



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]	γ_{su} [kN/m ³]	δ [°]
1	Shtresa 1		35.00	5.00	20.00	11.00	23.00
2	Mbushje Rrugore		35.00	0.00	19.00	10.00	23.00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters




Shtresa 1

Unit weight : $\gamma = 20.00 \text{ kN/m}^3$
 Stress-state : effective
 Angle of internal friction : $\varphi_{ef} = 35.00^\circ$
 Cohesion of soil : $c_{ef} = 5.00 \text{ kPa}$
 Angle of friction struc.-soil : $\delta = 23.00^\circ$
 Soil : cohesionless
 Saturated unit weight : $\gamma_{sat} = 21.00 \text{ kN/m}^3$

Mbushje Rrugore

Unit weight : $\gamma = 19.00 \text{ kN/m}^3$
 Stress-state : effective
 Angle of internal friction : $\varphi_{\text{ef}} = 35.00^\circ$
 Cohesion of soil : $c_{\text{ef}} = 0.00 \text{ kPa}$
 Angle of friction struc.-soil : $\delta = 23.00^\circ$
 Soil : cohesionless
 Saturated unit weight : $\gamma_{\text{sat}} = 20.00 \text{ kN/m}^3$

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	3.80	0.00 .. 3.80	Mbushje Rrugore	
2	6.20	3.80 .. 10.00	Shtresa 1	
3	-	10.00 .. ∞	Shtresa 1	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

GWT behind the structure lies at a depth of 2.00 m
 GWT in front of the structure lies at a depth of 3.00 m
 Subgrade at the heel is not permeable.
 Uplift in foot. bottom due to different pressures is not considered.

Input surface surcharges

No.	Surcharge		Action	Mag.1 [kN/m ²]	Mag.2 [kN/m ²]	Ord.x x [m]	Length l [m]	Depth z [m]
	new	change						
1	Yes		variable	20.00				on terrain

No.	Name
1	Traffic

Resistance on front face of the structure

Resistance on front face of the structure: at rest
 Soil on front face of the structure - Mbushje Rrugore
 Soil thickness in front of structure h = 0.70 m

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent

The wall is free to move. Active earth pressure is therefore assumed.

Verification No. 1 (Stage of construction 1)

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	29.26	0.00	10.00	0.511	
2	0.00	89.81(80.00)	29.26	0.00	10.00	0.511	MODIFIED
3	0.50	0.00	29.26	0.00	10.00	0.511	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	2.00	0.00	1.03	1.02	0.08
2	0.20	2.00	0.00	1.98	0.18	1.97
	0.20	2.01	0.00	1.99	0.18	1.98
3	0.20	2.01	0.00	1.03	1.03	0.00
	0.70	7.00	0.00	3.58	3.58	0.00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0.62	0.00	29.26	0.00	19.00	19.23	0.306	
2	1.38	27.50	29.26	0.00	19.00	29.26	0.625	
3	1.00	27.50	29.26	0.00	10.00	29.26	0.625	
4	0.50	27.50	29.26	0.00	10.00	29.26	0.625	
5	0.30	0.00	29.26	0.00	10.00	19.23	0.306	
6	0.20	0.00	29.26	4.00	11.00	19.23	0.306	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.62	11.76	0.00	3.60	3.40	1.19

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
2	0.62	11.76	0.00	7.34	4.02	6.14
	2.00	38.00	0.00	23.73	13.01	19.85
3	2.00	38.00	0.00	23.73	13.01	19.85
	3.00	48.00	10.00	29.98	16.43	25.07
4	3.00	48.00	10.00	29.98	16.43	25.07
	3.50	53.00	10.00	33.10	18.15	27.69
5	3.50	53.00	10.00	16.23	15.32	5.34
	3.80	56.00	10.00	17.15	16.19	5.65
6	3.80	56.00	10.00	13.16	12.42	4.33
	4.00	58.20	10.00	13.83	13.06	4.55

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00
2	0.62	0.00	0.00
3	2.00	0.00	0.00
4	3.00	10.00	0.00
5	3.50	10.00	0.00
6	3.80	10.00	0.00
7	4.00	10.00	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	5.78	2.02
2	0.62	5.78	2.02
3	0.62	6.85	10.45
4	2.00	6.85	10.45
5	3.00	6.85	10.45
6	3.50	6.85	10.45
7	3.50	5.78	2.02
8	3.80	5.78	2.02
9	4.00	5.78	2.02

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
Weight - wall	0.00	-1.59	47.19	0.85	1.000	1.000	1.350

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
FF resistance	-1.25	-0.23	0.01	0.35	1.000	1.000	1.000
Weight - earth wedge	0.00	-1.63	26.08	1.35	1.000	1.000	1.000
Active pressure	43.46	-1.48	56.51	1.81	1.000	1.000	1.000
Water pressure	15.00	-0.78	0.00	0.90	1.000	1.000	1.000
Uplift pressure	0.00	-4.00	0.00	0.90	1.000	1.000	1.000
Traffic	26.20	-1.99	32.36	1.64	1.300	1.300	1.300

Verification of complete wall

Check for overturning stability

Resisting moment $M_{res} = 246.88$ kNm/m

Overturning moment $M_{ovr} = 143.40$ kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 101.08$ kN/m

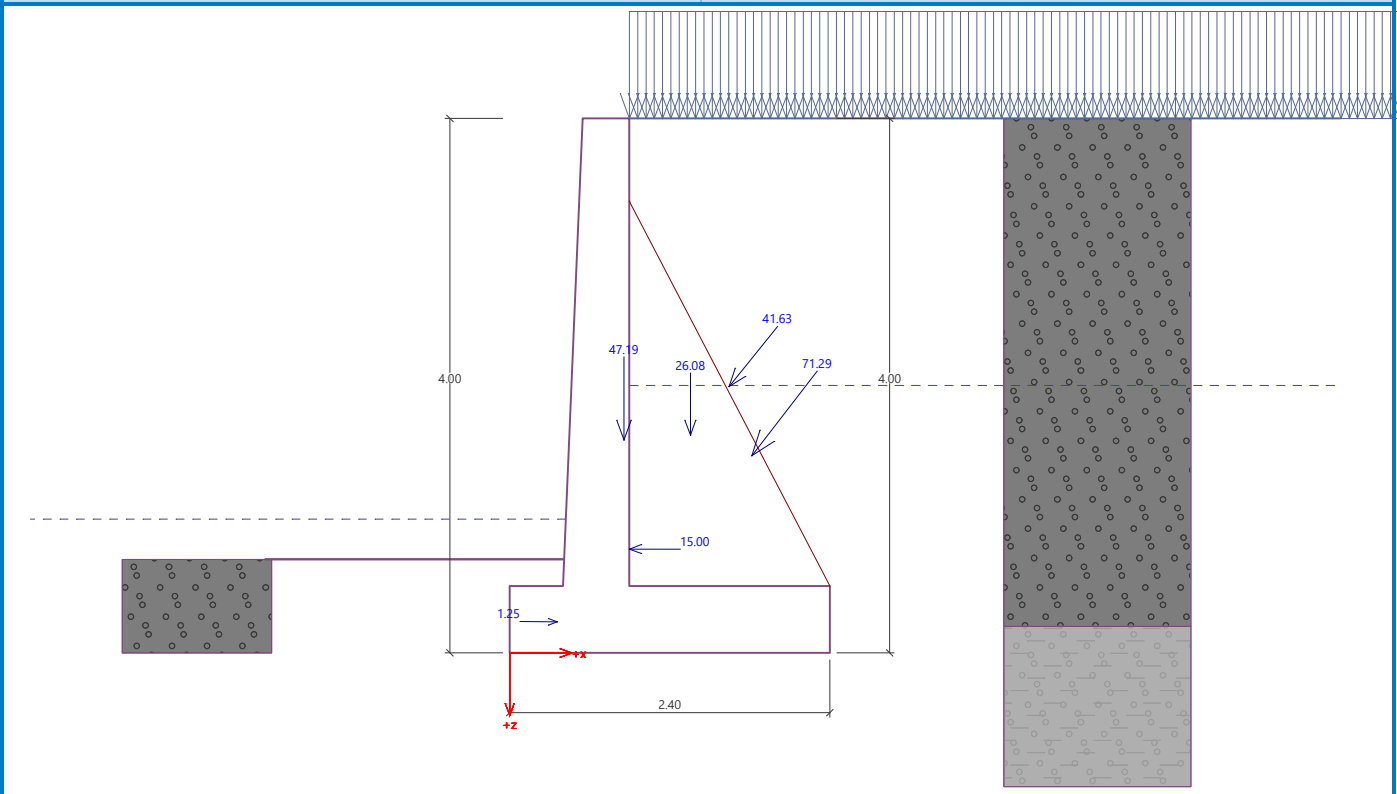
Active horizontal force $H_{act} = 91.27$ kN/m

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 150.89 kPa

Name : Verification Stage - analysis : 1 - 1



Bearing capacity of foundation soil (Stage of construction 1)

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	108.07	188.37	91.27	0.239	150.89
2	102.39	171.85	91.27	0.249	142.71

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	66.99	161.49	68.66
2	66.99	161.49	48.01

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0.249$

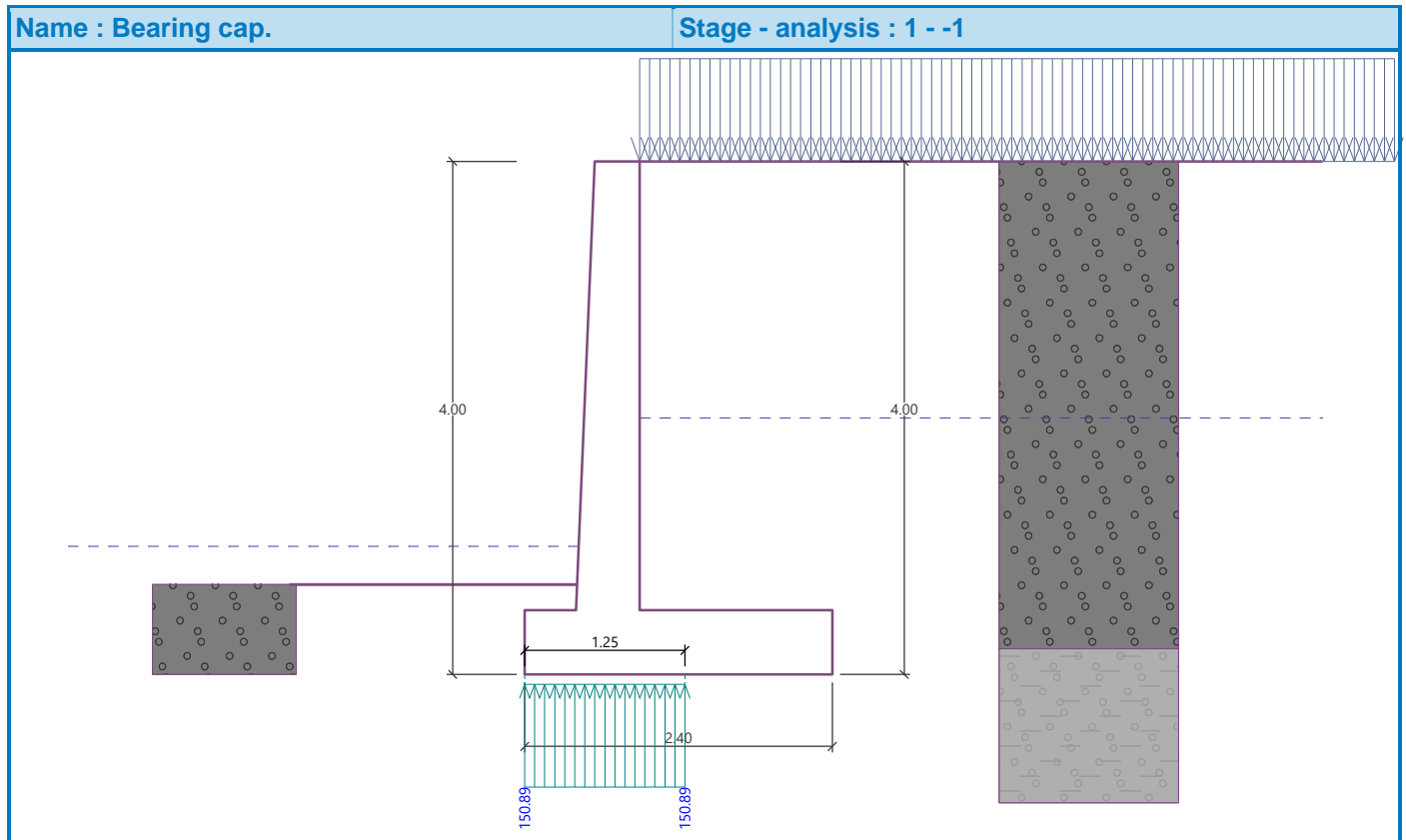
Maximum allowable eccentricity $e_{alw} = 0.333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Max. stress at footing bottom $\sigma = 150.89$ kPa
 Bearing capacity of foundation soil $R_d = 250.00$ kPa

Bearing capacity of foundation soil is SATISFACTORY
Overall verification - bearing capacity of found. soil is SATISFACTORY



Dimensioning No. 1 (Stage of construction 1)

Wall stem check - front reinf.

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	29.26	0.00	10.00	0.511	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m]	End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.20	0.00	0.00	0.00	0.00	0.00
	0.20		1.99	0.00	1.02	1.02	0.08

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	2.00	0.00	29.26	0.00	19.00	0.511	
2	1.00	0.00	29.26	0.00	10.00	0.511	
3	0.50	0.00	29.26	0.00	10.00	0.511	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	2.00	38.00	0.00	19.43	19.43	0.00
2	2.00	38.00	0.00	19.43	19.43	0.00
	3.00	48.00	10.00	24.54	24.54	0.00
3	3.00	48.00	10.00	24.54	24.54	0.00
	3.50	52.99	10.00	27.09	27.09	0.00

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00
2	2.00	0.00	0.00
3	3.00	10.00	0.00
4	3.50	10.00	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	10.23	0.00
2	2.00	10.23	0.00
3	3.00	10.23	0.00
4	3.50	10.23	0.00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0.00	-1.76	31.61	0.28	1.000	1.350	1.000
FF resistance	-0.10	-0.07	0.01	0.00	1.000	1.000	1.000
Pressure at rest	54.29	-1.23	0.00	0.50	1.000	1.000	1.000
Water pressure	9.99	-0.54	0.00	0.50	1.000	1.000	1.000
Uplift pressure	0.00	-3.50	0.00	0.50	1.000	1.000	1.000

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Traffic	35.78	-1.75	0.00	0.50	1.300	0.000	1.300

Wall stem check - front reinf.

Front reinforcement is not required.

Wall stem check - back reinf.**Pressure at rest on front face of the structure - partial results**

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	29.26	0.00	10.00	0.511	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	1.99	0.00	1.02	1.02	0.08

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	2.00	0.00	29.26	0.00	19.00	0.511	
2	1.00	0.00	29.26	0.00	10.00	0.511	
3	0.50	0.00	29.26	0.00	10.00	0.511	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	2.00	38.00	0.00	19.43	19.43	0.00
2	2.00	38.00	0.00	19.43	19.43	0.00
	3.00	48.00	10.00	24.54	24.54	0.00
3	3.00	48.00	10.00	24.54	24.54	0.00
	3.50	52.99	10.00	27.09	27.09	0.00

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
2	2.00	0.00	0.00
3	3.00	10.00	0.00
4	3.50	10.00	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	10.23	0.00
2	2.00	10.23	0.00
3	3.00	10.23	0.00
4	3.50	10.23	0.00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0.00	-1.76	31.61	0.28	1.000	1.350	1.000
FF resistance	-0.10	-0.07	0.01	0.00	1.000	1.000	1.000
Pressure at rest	54.29	-1.23	0.00	0.50	1.000	1.000	1.000
Water pressure	9.99	-0.54	0.00	0.50	1.000	1.000	1.000
Uplift pressure	0.00	-3.50	0.00	0.50	1.000	1.000	1.000
Traffic	35.78	-1.75	0.00	0.50	1.300	0.000	1.300

Wall stem check - back reinf.

Wall check at the construction joint 3.50 m from the wall crest

Reinforcement and dimensions of the cross-section

7 prof. 14.0 mm, cover 50.0 mm

Inputted reinforcement area = 1077.6 mm²

Required reinforcement area = 815.2 mm²

Cross-section width = 1.00 m

Cross-section height = 0.50 m

Reinforcement ratio ρ = 0.25 % > 0.15 % = ρ_{min}

Position of neutral axis x = 0.04 m < 0.27 m = x_{max}

Ultimate shear force V_{Rd} = 182.37 kN > 110.69 kN = V_{Ed}

Ultimate moment M_{Rd} = 205.48 kNm > 152.37 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Wall jump check

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	29.26	0.00	10.00	0.511	
2	0.00	89.81(80.00)	29.26	0.00	10.00	0.511	MODIFIED
3	0.50	0.00	29.26	0.00	10.00	0.511	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	2.00	0.00	1.03	1.02	0.08
2	0.20	2.00	0.00	1.98	0.18	1.97
	0.20	2.01	0.00	1.99	0.18	1.98
3	0.20	2.01	0.00	1.03	1.03	0.00
	0.70	7.00	0.00	3.58	3.58	0.00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0.62	0.00	29.26	0.00	19.00	19.23	0.306	
2	1.38	27.50	29.26	0.00	19.00	29.26	0.625	
3	1.00	27.50	29.26	0.00	10.00	29.26	0.625	
4	0.50	27.50	29.26	0.00	10.00	29.26	0.625	
5	0.30	0.00	29.26	0.00	10.00	19.23	0.306	
6	0.20	0.00	29.26	4.00	11.00	19.23	0.306	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.62	11.76	0.00	3.60	3.40	1.19
2	0.62	11.76	0.00	7.34	4.02	6.14
	2.00	38.00	0.00	23.73	13.01	19.85
3	2.00	38.00	0.00	23.73	13.01	19.85
	3.00	48.00	10.00	29.98	16.43	25.07
4	3.00	48.00	10.00	29.98	16.43	25.07
	3.50	53.00	10.00	33.10	18.15	27.69
5	3.50	53.00	10.00	16.23	15.32	5.34
	3.80	56.00	10.00	17.15	16.19	5.65

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
6	3.80	56.00	10.00	13.16	12.42	4.33
	4.00	58.20	10.00	13.83	13.06	4.55

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00
2	0.62	0.00	0.00
3	2.00	0.00	0.00
4	3.00	10.00	0.00
5	3.50	10.00	0.00
6	3.80	10.00	0.00
7	4.00	10.00	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	5.78	2.02
2	0.62	5.78	2.02
3	0.62	6.85	10.45
4	2.00	6.85	10.45
5	3.00	6.85	10.45
6	3.50	6.85	10.45
7	3.50	5.78	2.02
8	3.80	5.78	2.02
9	4.00	5.78	2.02

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0.00	-1.59	47.19	0.85	1.350
FF resistance	-1.25	-0.23	0.01	0.35	1.000
Weight - earth wedge	0.00	-1.63	26.08	1.35	1.000
Active pressure	43.46	-1.48	56.51	1.81	1.000
Water pressure	15.00	-0.78	0.00	0.90	1.000
Uplift pressure	0.00	-4.00	0.00	0.90	1.000
Traffic	26.20	-1.99	32.36	1.64	1.300

Wall jump check

Reinforcement and dimensions of the cross-section

7 prof. 12.0 mm, cover 50.0 mm

Inputted reinforcement area = 791.7 mm²Required reinforcement area = 669.6 mm²

Cross-section width = 1.00 m

Cross-section height = 0.50 m

Reinforcement ratio $\rho = 0.18 \% > 0.15 \% = \rho_{\min}$ Position of neutral axis $x = 0.02 \text{ m} < 0.27 \text{ m} = x_{\max}$ Ultimate shear force $V_{Rd} = 183.88 \text{ kN} > 67.28 \text{ kN} = V_{Ed}$ Ultimate moment $M_{Rd} = 149.87 \text{ kNm} > 19.48 \text{ kNm} = M_{Ed}$ **Cross-section is SATISFACTORY.**

Wall heel check

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0.00	-0.25	17.25	1.65	1.350
Weight - earth wedge	0.00	-1.63	26.08	1.35	1.000
Active pressure	43.46	-1.48	56.51	1.81	1.000
Traffic	26.20	-1.99	32.36	1.64	1.300
Contact stress	0.00	0.00	-51.25	1.22	1.000

Wall heel check

Reinforcement and dimensions of the cross-section

7 prof. 14.0 mm, cover 50.0 mm

Inputted reinforcement area = 1077.6 mm²Required reinforcement area = 702.0 mm²

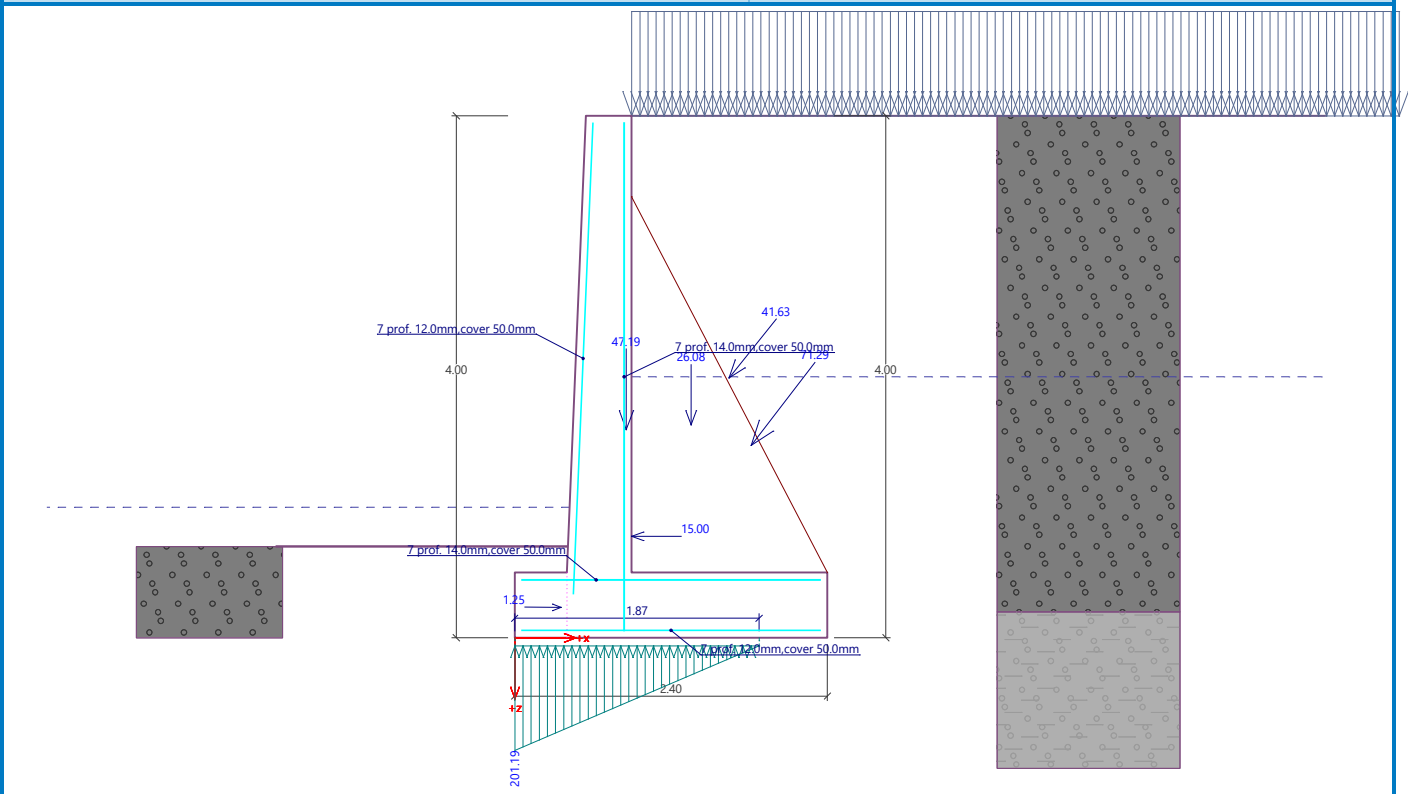
Cross-section width = 1.00 m

Cross-section height = 0.50 m

Reinforcement ratio $\rho = 0.24 \% > 0.15 \% = \rho_{\min}$ Position of neutral axis $x = 0.03 \text{ m} < 0.27 \text{ m} = x_{\max}$ Ultimate shear force $V_{Rd} = 183.59 \text{ kN} > 96.69 \text{ kN} = V_{Ed}$ Ultimate moment $M_{Rd} = 202.06 \text{ kNm} > 132.89 \text{ kNm} = M_{Ed}$ **Cross-section is SATISFACTORY.**

Name : Dimensioning

Stage - analysis : 1 - 1



Slope stability analysis

Input data

Project

Settings

(input for current task)

Stability analysis

Earthquake analysis : Standard

Verification methodology : according to EN 1997

Design approach : 3 - reduction of actions (GEO, STR) and soil parameters

Partial factors on actions (A)					
Permanent design situation					
		State STR		State GEO	
		Unfavourable	Favourable	Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1.35 [-]	1.00 [-]	1.00 [-]	1.00 [-]
Variable actions :	$\gamma_Q =$	1.50 [-]	0.00 [-]	1.30 [-]	0.00 [-]
Water load :	$\gamma_w =$			1.00 [-]	

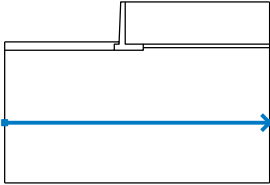
Partial factors for soil parameters (M)

Permanent design situation


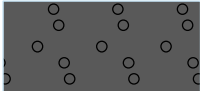
Partial factor on internal friction :	$\gamma_\phi =$	1.25	[-]
Partial factor on effective cohesion :	$\gamma_c =$	1.25	[-]
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1.40	[-]

Interface

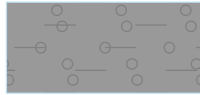
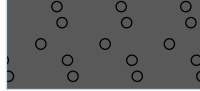
No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		-10.00	-3.30	-0.49	-3.30	-0.35	0.00
		0.00	0.00	12.00	0.00		
2		0.00	0.00	0.00	-3.50	1.50	-3.50
3		-10.00	-4.00	-0.90	-4.00	-0.90	-3.50
		-0.50	-3.50	-0.49	-3.30		
4		-0.90	-4.00	1.50	-4.00	1.50	-3.80
		1.50	-3.50	12.00	-3.50		
5		1.50	-3.80	12.00	-3.80		

No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
6		-10.00	-10.00	12.00	-10.00		

Soil parameters - effective stress state

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]
1	Shtresa 1		35.00	5.00	20.00
2	Mbushje Rrugore		35.00	0.00	19.00

Soil parameters - uplift

No.	Name	Pattern	γ_{sat} [kN/m ³]	γ_s [kN/m ³]	n [-]
1	Shtresa 1		21.00		
2	Mbushje Rrugore		20.00		

Soil parameters

Shtresa 1


Unit weight : $\gamma = 20.00$ kN/m³
 Stress-state : effective
 Angle of internal friction : $\varphi_{ef} = 35.00$ °
 Cohesion of soil : $c_{ef} = 5.00$ kPa
 Saturated unit weight : $\gamma_{sat} = 21.00$ kN/m³

Mbushje Rrugore

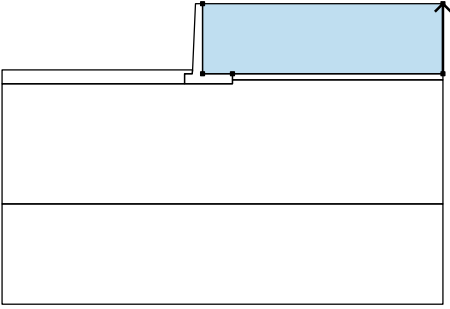
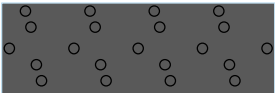
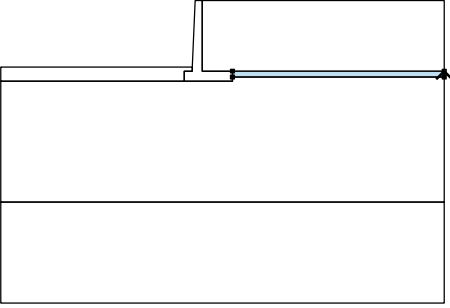
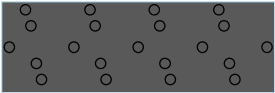
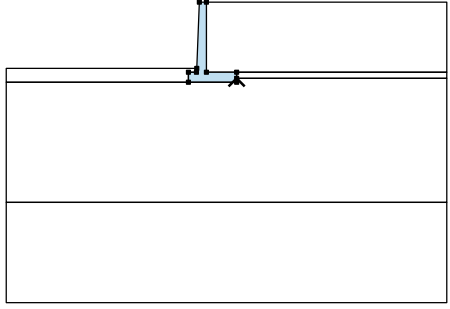

Unit weight : $\gamma = 19.00$ kN/m³
 Stress-state : effective
 Angle of internal friction : $\varphi_{ef} = 35.00$ °

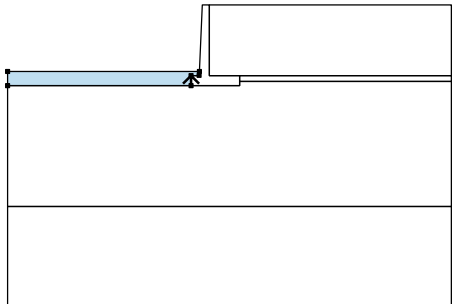
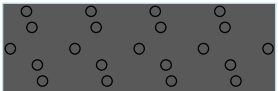
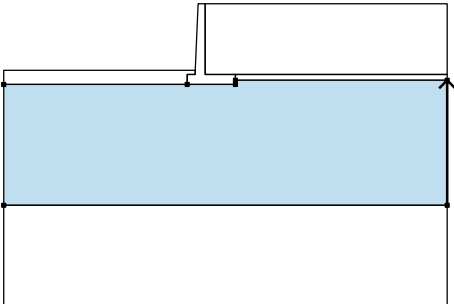

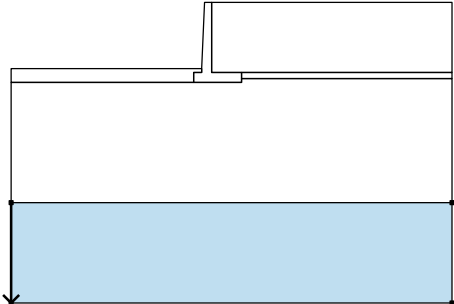

Cohesion of soil : $c_{ef} = 0.00$ kPa
 Saturated unit weight : $\gamma_{sat} = 20.00$ kN/m³

Rigid bodies

No.	Name	Sample	γ [kN/m ³]
1	Material of structure		23.00

Assigning and surfaces

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		12.00	-3.50	12.00	0.00	Mbushje Rrugore 
		0.00	0.00	0.00	-3.50	
		1.50	-3.50			
2		12.00	-3.80	12.00	-3.50	Mbushje Rrugore 
		1.50	-3.50	1.50	-3.80	
3		1.50	-4.00	1.50	-3.80	Material of structure 
		1.50	-3.50	0.00	-3.50	
		0.00	0.00	-0.35	0.00	
		-0.49	-3.30	-0.50	-3.50	
		-0.90	-3.50	-0.90	-4.00	

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
4		-0.90	-4.00	-0.90	-3.50	Mbushje Rrugore 
		-0.50	-3.50	-0.49	-3.30	
		-10.00	-3.30	-10.00	-4.00	
5		12.00	-10.00	12.00	-3.80	Shtresa 1 
		1.50	-3.80	1.50	-4.00	
		-0.90	-4.00	-10.00	-4.00	
		-10.00	-10.00			
6		-10.00	-10.00	-10.00	-15.00	Shtresa 1 
		12.00	-15.00	12.00	-10.00	

Surcharge

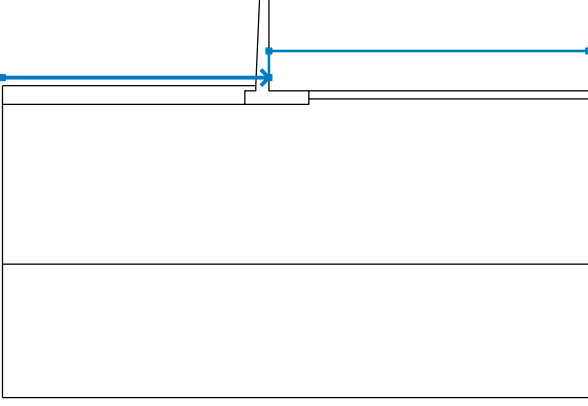
No.	Type	Type of action	Location z [m]	Origin x [m]	Length l [m]	Width b [m]	Slope α [°]	Magnitude		
								q, q ₁ , f, F	q ₂	unit
1	strip	variable	on terrain	x = 0.00	l = 12.00		0.00	20.00		kN/m ²

Surcharges

No.	Name
1	Traffic

Water

Water type : GWT

No.	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1		-10.00	-3.00	0.00	-3.00	0.00	-2.00
		12.00	-2.00				

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Stage of construction 1)

Analysis 1

Circular slip surface

Slip surface parameters					
Center :	x =	-1.61 [m]	Angles :	$\alpha_1 =$	-43.64 [°]
	z =	0.89 [m]		$\alpha_2 =$	81.16 [°]
Radius :	R =	5.79 [m]			
The slip surface after optimization.					

Slope stability verification (Bishop)

Sum of active forces : $F_a = 212.12$ kN/m

Sum of passive forces : $F_p = 274.04$ kN/m

Sliding moment : $M_a = 1228.17$ kNm/m

Resisting moment : $M_p = 1586.68$ kNm/m

Utilization : 77.4 %

Slope stability ACCEPTABLE**Optimization of circular slip surface (Bishop)**

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
1	-2.45	21.17	25.58	40.4 %	ACCEPTABLE
2	-2.45	21.17	25.58	40.4 %	ACCEPTABLE
3	0.88	10.06	14.85	38.9 %	ACCEPTABLE
4	2.71	0.44	9.10	23.4 %	ACCEPTABLE
5	-1.26	13.15	18.53	39.8 %	ACCEPTABLE
6	0.95	9.72	14.57	38.7 %	ACCEPTABLE
7	0.19	3.64	12.17	30.9 %	ACCEPTABLE
8	-0.82	5.64	10.13	54.9 %	ACCEPTABLE
9	-1.14	12.37	17.90	39.6 %	ACCEPTABLE
10	3.47	5.46	9.96	0.7 %	ACCEPTABLE
11	0.23	3.39	12.05	30.4 %	ACCEPTABLE
12	-12.96	17.56	23.92	2.2 %	ACCEPTABLE
13	-5.08	5.55	10.03	2.0 %	ACCEPTABLE
14	-3.94	1.03	7.29	6.4 %	ACCEPTABLE
15	-2.20	19.32	23.87	40.5 %	ACCEPTABLE
16	3.68	4.63	9.35	0.8 %	ACCEPTABLE
17	-75.87	394.38	403.11	0.6 %	ACCEPTABLE
18	-19.17	130.68	134.30	1.1 %	ACCEPTABLE
19	-64.23	353.09	361.18	1.2 %	ACCEPTABLE
20	-0.82	5.64	10.13	54.9 %	ACCEPTABLE
21	3.29	0.71	7.21	21.6 %	ACCEPTABLE
22	-2.08	16.06	20.39	45.1 %	ACCEPTABLE
23	-1.11	10.46	15.61	43.6 %	ACCEPTABLE
24	2.06	5.64	10.13	34.9 %	ACCEPTABLE
25	0.04	3.89	11.14	36.3 %	ACCEPTABLE
26	-3.70	5.64	10.13	1.5 %	ACCEPTABLE
27	-3.01	2.87	8.24	69.7 %	ACCEPTABLE
28	-2.71	0.22	4.55	1.1 %	ACCEPTABLE
29	-13.01	61.12	64.50	0.9 %	ACCEPTABLE
30	-6.49	28.28	31.59	1.5 %	ACCEPTABLE
31	-2.77	7.12	12.57	60.5 %	ACCEPTABLE
32	-2.53	5.86	11.69	58.7 %	ACCEPTABLE
33	-0.13	2.87	8.24	57.6 %	ACCEPTABLE
34	-1.63	1.11	9.29	43.5 %	ACCEPTABLE
35	-7.28	9.96	13.50	1.1 %	ACCEPTABLE
36	-6.52	8.80	12.14	1.2 %	ACCEPTABLE
37	-4.92	1.67	6.96	1.1 %	ACCEPTABLE
38	-4.61	0.58	6.47	1.9 %	ACCEPTABLE
39	-2.85	7.58	12.91	60.7 %	ACCEPTABLE
40	-0.05	2.57	8.07	56.4 %	ACCEPTABLE
41	-47.26	144.49	153.55	0.6 %	ACCEPTABLE
42	-66.58	334.26	343.02	1.1 %	ACCEPTABLE
43	-44.38	144.49	153.55	1.3 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
44	-3.01	2.87	8.24	69.7 %	ACCEPTABLE
45	-0.81	1.74	7.64	57.6 %	ACCEPTABLE
46	-3.20	2.08	6.34	1.5 %	ACCEPTABLE
47	-5.64	18.56	22.25	1.7 %	ACCEPTABLE
48	-3.10	10.90	14.61	1.4 %	ACCEPTABLE
49	-3.22	6.49	11.80	64.0 %	ACCEPTABLE
50	-2.96	5.20	10.91	61.8 %	ACCEPTABLE
51	-1.09	2.87	8.24	63.0 %	ACCEPTABLE
52	-2.30	1.91	9.14	50.8 %	ACCEPTABLE
53	-5.75	6.91	10.99	2.1 %	ACCEPTABLE
54	-4.09	4.62	8.29	2.1 %	ACCEPTABLE
55	-4.57	2.42	7.75	2.1 %	ACCEPTABLE
56	-3.98	0.16	6.77	6.2 %	ACCEPTABLE
57	-4.36	1.60	7.33	2.3 %	ACCEPTABLE
58	-3.18	6.29	11.65	63.8 %	ACCEPTABLE
59	-1.12	2.97	8.30	63.4 %	ACCEPTABLE
60	-53.28	170.55	179.54	0.2 %	ACCEPTABLE
61	-66.19	297.14	305.93	0.6 %	ACCEPTABLE
62	-51.36	170.55	179.54	0.5 %	ACCEPTABLE
63	-3.01	2.87	8.24	69.7 %	ACCEPTABLE
64	-1.70	2.74	8.17	66.2 %	ACCEPTABLE
65	-3.21	2.65	7.16	1.6 %	ACCEPTABLE
66	-4.50	10.87	15.11	1.7 %	ACCEPTABLE
67	-2.75	6.95	11.17	1.2 %	ACCEPTABLE
68	-3.43	5.73	11.03	65.6 %	ACCEPTABLE
69	-1.15	0.56	7.17	53.5 %	ACCEPTABLE
70	-3.21	4.72	10.35	63.3 %	ACCEPTABLE
71	-1.73	2.87	8.24	66.8 %	ACCEPTABLE
72	-2.74	2.46	9.07	55.4 %	ACCEPTABLE
73	-2.65	0.82	6.14	2.5 %	ACCEPTABLE
74	-4.98	5.61	10.11	1.6 %	ACCEPTABLE
75	-3.55	3.72	7.91	1.6 %	ACCEPTABLE
76	-4.29	2.87	8.24	2.3 %	ACCEPTABLE
77	-3.93	1.43	7.50	4.5 %	ACCEPTABLE
78	-2.50	0.34	5.94	66.6 %	ACCEPTABLE
79	-3.64	0.29	7.08	49.9 %	ACCEPTABLE
80	-4.15	2.30	7.92	2.6 %	ACCEPTABLE
81	-2.63	0.78	6.12	3.0 %	ACCEPTABLE
82	-3.36	5.41	10.81	64.8 %	ACCEPTABLE
83	-1.78	3.06	8.35	67.6 %	ACCEPTABLE
84	-55.39	189.09	198.03	0.3 %	ACCEPTABLE
85	-64.00	273.48	282.30	0.5 %	ACCEPTABLE
86	-54.11	189.09	198.03	0.5 %	ACCEPTABLE
87	-3.01	2.87	8.24	69.7 %	ACCEPTABLE
88	-2.19	3.02	8.33	69.1 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
89	-3.17	2.83	7.57	1.8 %	ACCEPTABLE
90	-3.88	7.39	11.99	1.6 %	ACCEPTABLE
91	-2.75	5.24	9.83	2.2 %	ACCEPTABLE
92	-3.30	4.75	10.05	67.7 %	ACCEPTABLE
93	-1.76	1.30	7.44	60.0 %	ACCEPTABLE
94	-3.16	4.12	9.65	65.8 %	ACCEPTABLE
95	-2.16	2.87	8.24	68.5 %	ACCEPTABLE
96	-2.81	2.57	8.77	59.9 %	ACCEPTABLE
97	-2.80	1.54	6.83	4.8 %	ACCEPTABLE
98	-4.30	4.63	9.38	1.7 %	ACCEPTABLE
99	-3.32	3.35	7.92	1.6 %	ACCEPTABLE
100	-3.86	2.87	8.24	2.5 %	ACCEPTABLE
101	-2.90	0.56	6.78	58.5 %	ACCEPTABLE
102	-2.37	0.07	6.23	58.1 %	ACCEPTABLE
103	-3.66	2.04	7.79	6.0 %	ACCEPTABLE
104	-2.68	1.14	6.64	68.2 %	ACCEPTABLE
105	-3.40	1.03	7.34	56.5 %	ACCEPTABLE
106	-3.78	2.53	8.04	2.8 %	ACCEPTABLE
107	-2.76	1.43	6.78	7.1 %	ACCEPTABLE
108	-3.24	4.51	9.90	66.9 %	ACCEPTABLE
109	-2.20	3.05	8.34	69.3 %	ACCEPTABLE
110	-56.81	202.02	210.93	0.3 %	ACCEPTABLE
111	-62.55	258.28	267.11	0.5 %	ACCEPTABLE
112	-55.95	202.02	210.93	0.5 %	ACCEPTABLE
113	-3.01	2.87	8.24	69.7 %	ACCEPTABLE
114	-2.49	3.06	8.35	68.8 %	ACCEPTABLE
115	-3.12	2.88	7.81	2.2 %	ACCEPTABLE
116	-3.55	5.60	10.46	2.2 %	ACCEPTABLE
117	-2.81	4.33	9.17	4.2 %	ACCEPTABLE
118	-3.21	4.11	9.43	68.6 %	ACCEPTABLE
119	-2.18	1.81	7.67	62.2 %	ACCEPTABLE
120	-3.11	3.71	9.18	67.1 %	ACCEPTABLE
121	-2.44	2.87	8.24	67.9 %	ACCEPTABLE
122	-2.87	2.66	8.58	62.9 %	ACCEPTABLE
123	-2.88	2.00	7.30	7.0 %	ACCEPTABLE
124	-3.87	4.01	8.96	2.1 %	ACCEPTABLE
125	-3.20	3.16	7.99	2.1 %	ACCEPTABLE
126	-3.58	2.87	8.24	3.4 %	ACCEPTABLE
127	-2.92	1.23	7.17	62.1 %	ACCEPTABLE
128	-2.57	0.88	6.77	62.6 %	ACCEPTABLE
129	-3.46	2.38	7.96	8.6 %	ACCEPTABLE
130	-2.80	1.70	7.15	68.9 %	ACCEPTABLE
131	-3.26	1.58	7.57	61.7 %	ACCEPTABLE
132	-3.53	2.66	8.12	4.3 %	ACCEPTABLE
133	-2.85	1.88	7.24	9.8 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
134	-3.17	3.94	9.33	68.0 %	ACCEPTABLE
135	-2.48	3.01	8.32	68.6 %	ACCEPTABLE
136	-57.75	210.89	219.79	0.4 %	ACCEPTABLE
137	-61.59	248.39	257.24	0.5 %	ACCEPTABLE
138	-57.19	210.89	219.79	0.4 %	ACCEPTABLE
139	-3.01	2.87	8.24	69.7 %	ACCEPTABLE
140	-2.67	3.04	8.34	69.7 %	ACCEPTABLE
141	-3.08	2.89	7.96	3.1 %	ACCEPTABLE
142	-3.35	4.59	9.61	3.6 %	ACCEPTABLE
143	-2.86	3.80	8.82	5.9 %	ACCEPTABLE
144	-3.14	3.69	9.02	69.0 %	ACCEPTABLE
145	-2.45	2.15	7.85	65.2 %	ACCEPTABLE
146	-3.08	3.43	8.87	67.8 %	ACCEPTABLE
147	-2.63	2.87	8.24	68.9 %	ACCEPTABLE
148	-2.91	2.72	8.46	64.9 %	ACCEPTABLE
149	-2.93	2.29	7.61	8.9 %	ACCEPTABLE
150	-3.58	3.62	8.70	2.2 %	ACCEPTABLE
151	-3.13	3.05	8.06	2.4 %	ACCEPTABLE
152	-3.39	2.87	8.24	5.4 %	ACCEPTABLE
153	-2.94	1.73	7.48	64.7 %	ACCEPTABLE
154	-2.71	1.48	7.20	64.5 %	ACCEPTABLE
155	-3.31	2.57	8.07	12.2 %	ACCEPTABLE
156	-2.87	2.08	7.50	68.6 %	ACCEPTABLE
157	-3.17	1.98	7.76	64.1 %	ACCEPTABLE
158	-3.36	2.74	8.16	6.7 %	ACCEPTABLE
159	-2.90	2.20	7.56	21.5 %	ACCEPTABLE
160	-3.12	3.58	8.95	68.6 %	ACCEPTABLE
161	-2.66	2.97	8.30	69.2 %	ACCEPTABLE
162	-58.39	216.92	225.80	0.4 %	ACCEPTABLE
163	-60.94	241.92	250.77	0.4 %	ACCEPTABLE
164	-58.01	216.92	225.80	0.4 %	ACCEPTABLE
165	-3.01	2.87	8.24	69.7 %	ACCEPTABLE
166	-2.79	3.00	8.31	69.9 %	ACCEPTABLE
167	-2.57	3.13	8.39	69.8 %	ACCEPTABLE
168	-2.84	3.02	8.13	8.0 %	ACCEPTABLE
169	-3.02	4.13	9.21	9.2 %	ACCEPTABLE
170	-2.69	3.62	8.69	22.6 %	ACCEPTABLE
171	-2.88	3.55	8.84	69.3 %	ACCEPTABLE
172	-2.41	2.51	8.03	66.9 %	ACCEPTABLE
173	-2.84	3.38	8.73	68.4 %	ACCEPTABLE
174	-2.54	3.00	8.31	69.2 %	ACCEPTABLE
175	-2.72	2.89	8.44	66.6 %	ACCEPTABLE
176	-2.74	2.61	7.89	71.3 %	ACCEPTABLE
177	-2.52	2.74	7.96	70.9 %	ACCEPTABLE
178	-2.79	2.62	7.70	4.7 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
179	-2.97	3.69	8.75	5.9 %	ACCEPTABLE
180	-2.64	3.20	8.25	13.5 %	ACCEPTABLE
181	-2.83	3.15	8.40	70.5 %	ACCEPTABLE
182	-2.36	2.14	7.63	67.8 %	ACCEPTABLE
183	-2.79	2.98	8.30	69.6 %	ACCEPTABLE
184	-2.49	2.61	7.89	70.3 %	ACCEPTABLE
185	-2.67	2.51	8.03	67.5 %	ACCEPTABLE
186	-2.68	2.23	7.48	23.9 %	ACCEPTABLE
187	-3.12	3.09	8.18	3.2 %	ACCEPTABLE
188	-2.82	2.72	7.76	4.3 %	ACCEPTABLE
189	-2.99	2.61	7.89	8.9 %	ACCEPTABLE
190	-2.68	1.84	7.37	68.4 %	ACCEPTABLE
191	-2.53	1.67	7.18	68.7 %	ACCEPTABLE
192	-2.94	2.42	7.78	21.4 %	ACCEPTABLE
193	-2.64	2.09	7.40	71.4 %	ACCEPTABLE
194	-2.42	2.20	7.46	71.3 %	ACCEPTABLE
195	-2.69	2.09	7.20	4.3 %	ACCEPTABLE
196	-2.86	3.11	8.19	6.0 %	ACCEPTABLE
197	-2.54	2.64	7.71	10.6 %	ACCEPTABLE
198	-2.73	2.60	7.88	71.4 %	ACCEPTABLE
199	-2.27	1.65	7.17	67.7 %	ACCEPTABLE
200	-2.69	2.44	7.80	70.4 %	ACCEPTABLE
201	-2.39	2.09	7.40	70.6 %	ACCEPTABLE
202	-2.58	2.01	7.56	68.0 %	ACCEPTABLE
203	-2.58	1.73	7.00	13.3 %	ACCEPTABLE
204	-3.01	2.54	7.65	3.3 %	ACCEPTABLE
205	-2.71	2.18	7.25	3.8 %	ACCEPTABLE
206	-2.89	2.09	7.40	7.0 %	ACCEPTABLE
207	-2.59	1.37	6.93	66.9 %	ACCEPTABLE
208	-2.43	1.21	6.75	68.5 %	ACCEPTABLE
209	-2.85	1.92	7.31	23.1 %	ACCEPTABLE
210	-2.54	1.60	6.94	71.4 %	ACCEPTABLE
211	-2.74	1.53	7.12	66.9 %	ACCEPTABLE
212	-2.87	2.01	7.36	9.1 %	ACCEPTABLE
213	-2.57	1.67	6.97	22.5 %	ACCEPTABLE
214	-2.71	2.53	7.84	71.1 %	ACCEPTABLE
215	-2.40	2.15	7.43	71.0 %	ACCEPTABLE
216	-58.81	220.98	229.86	0.4 %	ACCEPTABLE
217	-60.52	237.65	246.51	0.4 %	ACCEPTABLE
218	-58.56	220.98	229.86	0.4 %	ACCEPTABLE
219	-2.64	2.09	7.40	71.4 %	ACCEPTABLE
220	-2.49	2.17	7.44	71.1 %	ACCEPTABLE
221	-2.67	2.10	7.27	7.7 %	ACCEPTABLE
222	-2.79	2.75	7.91	9.6 %	ACCEPTABLE
223	-2.57	2.45	7.60	13.7 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
224	-2.70	2.43	7.72	71.4 %	ACCEPTABLE
225	-2.39	1.80	7.24	68.9 %	ACCEPTABLE
226	-2.68	2.33	7.66	70.8 %	ACCEPTABLE
227	-2.47	2.09	7.40	70.6 %	ACCEPTABLE
228	-2.60	2.03	7.51	68.9 %	ACCEPTABLE
229	-2.60	1.85	7.14	22.5 %	ACCEPTABLE
230	-2.89	2.39	7.57	4.8 %	ACCEPTABLE
231	-2.69	2.15	7.30	5.9 %	ACCEPTABLE
232	-2.81	2.09	7.40	12.8 %	ACCEPTABLE
233	-2.60	1.60	7.08	69.3 %	ACCEPTABLE
234	-2.50	1.49	6.95	69.7 %	ACCEPTABLE
235	-2.78	1.98	7.34	21.7 %	ACCEPTABLE
236	-2.58	1.76	7.09	71.5 %	ACCEPTABLE
237	-2.43	1.83	7.13	71.1 %	ACCEPTABLE
238	-2.61	1.76	6.95	7.9 %	ACCEPTABLE
239	-2.73	2.39	7.57	7.2 %	ACCEPTABLE
240	-2.51	2.10	7.27	23.2 %	ACCEPTABLE
241	-2.64	2.08	7.40	71.3 %	ACCEPTABLE
242	-2.33	1.48	6.95	68.6 %	ACCEPTABLE
243	-2.62	1.99	7.35	71.0 %	ACCEPTABLE
244	-2.41	1.76	7.09	70.6 %	ACCEPTABLE
245	-2.54	1.71	7.20	69.0 %	ACCEPTABLE
246	-2.54	1.53	6.83	22.6 %	ACCEPTABLE
247	-2.83	2.04	7.24	5.3 %	ACCEPTABLE
248	-2.62	1.81	6.98	7.3 %	ACCEPTABLE
249	-2.75	1.76	7.09	13.8 %	ACCEPTABLE
250	-2.55	1.29	6.79	67.7 %	ACCEPTABLE
251	-2.44	1.18	6.67	69.3 %	ACCEPTABLE
252	-2.72	1.66	7.04	21.8 %	ACCEPTABLE
253	-2.52	1.44	6.79	71.5 %	ACCEPTABLE
254	-2.65	1.40	6.91	67.6 %	ACCEPTABLE
255	-2.74	1.71	7.07	23.2 %	ACCEPTABLE
256	-2.53	1.49	6.81	24.1 %	ACCEPTABLE
257	-2.63	2.04	7.37	71.2 %	ACCEPTABLE
258	-2.42	1.80	7.11	71.1 %	ACCEPTABLE
259	-54.94	191.93	200.86	0.4 %	ACCEPTABLE
260	-56.06	202.18	211.09	0.5 %	ACCEPTABLE
261	-54.77	191.93	200.86	0.4 %	ACCEPTABLE
262	-2.58	1.76	7.09	71.5 %	ACCEPTABLE
263	-2.48	1.81	7.12	71.8 %	ACCEPTABLE
264	-2.38	1.86	7.15	71.0 %	ACCEPTABLE
265	-2.50	1.81	7.03	22.7 %	ACCEPTABLE
266	-2.58	2.23	7.44	72.8 %	ACCEPTABLE
267	-2.48	2.29	7.48	72.2 %	ACCEPTABLE
268	-2.60	2.24	7.36	8.1 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
269	-2.68	2.68	7.79	9.6 %	ACCEPTABLE
270	-2.53	2.47	7.58	14.8 %	ACCEPTABLE
271	-2.62	2.46	7.66	72.1 %	ACCEPTABLE
272	-2.41	2.03	7.33	70.7 %	ACCEPTABLE
273	-2.60	2.39	7.62	71.8 %	ACCEPTABLE
274	-2.47	2.23	7.44	72.1 %	ACCEPTABLE
275	-2.55	2.19	7.51	70.5 %	ACCEPTABLE
276	-2.56	2.07	7.26	24.1 %	ACCEPTABLE
277	-2.75	2.43	7.56	6.1 %	ACCEPTABLE
278	-2.61	2.27	7.38	7.4 %	ACCEPTABLE
279	-2.69	2.23	7.44	13.1 %	ACCEPTABLE
280	-2.55	1.89	7.21	71.5 %	ACCEPTABLE
281	-2.48	1.81	7.12	71.8 %	ACCEPTABLE
282	-2.67	2.16	7.40	23.9 %	ACCEPTABLE
283	-2.54	2.00	7.23	72.8 %	ACCEPTABLE
284	-2.62	1.97	7.30	71.3 %	ACCEPTABLE
285	-2.68	2.19	7.42	13.1 %	ACCEPTABLE
286	-2.55	2.04	7.24	24.1 %	ACCEPTABLE
287	-2.61	2.43	7.64	72.0 %	ACCEPTABLE
288	-2.48	2.26	7.46	72.2 %	ACCEPTABLE
289	-53.86	183.67	192.62	0.4 %	ACCEPTABLE
290	-54.60	190.32	199.26	0.4 %	ACCEPTABLE
291	-53.74	183.67	192.62	0.4 %	ACCEPTABLE
292	-2.58	2.23	7.44	72.8 %	ACCEPTABLE
293	-2.52	2.27	7.46	72.3 %	ACCEPTABLE
294	-2.59	2.23	7.38	9.6 %	ACCEPTABLE
295	-2.65	2.52	7.67	9.7 %	ACCEPTABLE
296	-2.55	2.39	7.53	14.8 %	ACCEPTABLE
297	-2.61	2.38	7.59	72.0 %	ACCEPTABLE
298	-2.47	2.09	7.37	71.1 %	ACCEPTABLE
299	-2.60	2.34	7.56	71.9 %	ACCEPTABLE
300	-2.51	2.23	7.44	72.1 %	ACCEPTABLE
301	-2.56	2.20	7.48	71.1 %	ACCEPTABLE
302	-2.56	2.12	7.32	22.6 %	ACCEPTABLE
303	-2.69	2.37	7.52	8.0 %	ACCEPTABLE
304	-2.60	2.26	7.40	7.9 %	ACCEPTABLE
305	-2.65	2.23	7.44	22.4 %	ACCEPTABLE
306	-2.56	2.00	7.28	72.0 %	ACCEPTABLE
307	-2.52	1.95	7.23	72.0 %	ACCEPTABLE
308	-2.64	2.18	7.41	22.4 %	ACCEPTABLE
309	-2.55	2.08	7.30	24.1 %	ACCEPTABLE
310	-2.61	2.05	7.34	72.0 %	ACCEPTABLE
311	-2.65	2.21	7.43	22.4 %	ACCEPTABLE
312	-2.56	2.10	7.31	22.6 %	ACCEPTABLE
313	-2.60	2.36	7.57	72.0 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
314	-2.51	2.25	7.45	72.2 %	ACCEPTABLE
315	-54.79	191.92	200.85	0.4 %	ACCEPTABLE
316	-55.28	196.44	205.37	0.5 %	ACCEPTABLE
317	-54.71	191.92	200.85	0.4 %	ACCEPTABLE
318	-2.58	2.23	7.44	72.8 %	ACCEPTABLE
319	-2.54	2.26	7.46	72.4 %	ACCEPTABLE
320	-2.59	2.23	7.40	13.9 %	ACCEPTABLE
321	-2.62	2.42	7.59	13.6 %	ACCEPTABLE
322	-2.56	2.34	7.50	23.1 %	ACCEPTABLE
323	-2.60	2.33	7.54	23.0 %	ACCEPTABLE
324	-2.51	2.14	7.39	71.7 %	ACCEPTABLE
325	-2.59	2.30	7.52	72.0 %	ACCEPTABLE
326	-2.53	2.23	7.44	72.2 %	ACCEPTABLE
327	-2.57	2.21	7.47	72.0 %	ACCEPTABLE
328	-2.57	2.16	7.36	22.6 %	ACCEPTABLE
329	-2.65	2.32	7.49	9.5 %	ACCEPTABLE
330	-2.59	2.25	7.41	13.8 %	ACCEPTABLE
331	-2.63	2.23	7.44	22.4 %	ACCEPTABLE
332	-2.57	2.08	7.33	72.3 %	ACCEPTABLE
333	-2.54	2.04	7.30	72.2 %	ACCEPTABLE
334	-2.62	2.20	7.42	24.0 %	ACCEPTABLE
335	-2.56	2.13	7.34	24.1 %	ACCEPTABLE
336	-2.60	2.11	7.37	72.2 %	ACCEPTABLE
337	-2.63	2.21	7.43	22.4 %	ACCEPTABLE
338	-2.57	2.14	7.35	22.6 %	ACCEPTABLE
339	-2.59	2.32	7.53	23.0 %	ACCEPTABLE
340	-2.53	2.24	7.45	72.1 %	ACCEPTABLE
341	-54.87	192.67	201.60	0.4 %	ACCEPTABLE
342	-55.20	195.69	204.61	0.5 %	ACCEPTABLE
343	-54.82	192.67	201.60	0.5 %	ACCEPTABLE
344	-2.58	2.23	7.44	72.8 %	ACCEPTABLE
345	-2.55	2.25	7.45	72.5 %	ACCEPTABLE
346	-2.59	2.23	7.42	23.2 %	ACCEPTABLE
347	-2.61	2.36	7.54	13.8 %	ACCEPTABLE
348	-2.57	2.30	7.48	23.1 %	ACCEPTABLE
349	-2.59	2.30	7.50	23.0 %	ACCEPTABLE
350	-2.53	2.17	7.41	71.9 %	ACCEPTABLE
351	-2.59	2.28	7.49	24.7 %	ACCEPTABLE
352	-2.55	2.23	7.44	72.1 %	ACCEPTABLE
353	-2.57	2.22	7.46	72.2 %	ACCEPTABLE
354	-2.57	2.18	7.39	72.8 %	ACCEPTABLE
355	-2.54	2.20	7.40	24.7 %	ACCEPTABLE
356	-2.58	2.18	7.37	13.4 %	ACCEPTABLE
357	-2.60	2.31	7.49	23.2 %	ACCEPTABLE
358	-2.56	2.25	7.43	24.6 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
359	-2.58	2.25	7.45	24.7 %	ACCEPTABLE
360	-2.52	2.12	7.36	71.8 %	ACCEPTABLE
361	-2.58	2.23	7.44	72.8 %	ACCEPTABLE
362	-2.54	2.18	7.39	72.2 %	ACCEPTABLE
363	-2.56	2.17	7.41	72.3 %	ACCEPTABLE
364	-2.56	2.13	7.34	24.1 %	ACCEPTABLE
365	-2.62	2.24	7.42	13.3 %	ACCEPTABLE
366	-2.58	2.19	7.37	13.4 %	ACCEPTABLE
367	-2.60	2.18	7.39	22.5 %	ACCEPTABLE
368	-2.56	2.08	7.32	72.6 %	ACCEPTABLE
369	-2.54	2.05	7.29	72.7 %	ACCEPTABLE
370	-2.60	2.16	7.38	22.5 %	ACCEPTABLE
371	-2.56	2.11	7.33	24.1 %	ACCEPTABLE
372	-2.58	2.10	7.35	72.4 %	ACCEPTABLE
373	-2.60	2.17	7.38	22.5 %	ACCEPTABLE
374	-2.56	2.12	7.33	24.1 %	ACCEPTABLE
375	-2.58	2.24	7.45	72.7 %	ACCEPTABLE
376	-2.54	2.19	7.40	72.2 %	ACCEPTABLE
377	-54.93	193.17	202.10	0.4 %	ACCEPTABLE
378	-55.15	195.18	204.11	0.5 %	ACCEPTABLE
379	-54.89	193.17	202.10	0.5 %	ACCEPTABLE
380	-2.57	2.18	7.39	72.8 %	ACCEPTABLE
381	-2.55	2.19	7.40	72.2 %	ACCEPTABLE
382	-2.57	2.18	7.37	23.2 %	ACCEPTABLE
383	-2.59	2.27	7.46	23.2 %	ACCEPTABLE
384	-2.56	2.23	7.42	24.6 %	ACCEPTABLE
385	-2.58	2.23	7.43	23.2 %	ACCEPTABLE
386	-2.54	2.14	7.37	72.0 %	ACCEPTABLE
387	-2.57	2.21	7.43	72.6 %	ACCEPTABLE
388	-2.55	2.18	7.39	72.2 %	ACCEPTABLE
389	-2.56	2.17	7.40	72.5 %	ACCEPTABLE
390	-2.57	2.15	7.35	22.6 %	ACCEPTABLE
391	-2.60	2.22	7.41	13.4 %	ACCEPTABLE
392	-2.58	2.19	7.38	13.9 %	ACCEPTABLE
393	-2.59	2.18	7.39	22.5 %	ACCEPTABLE
394	-2.56	2.11	7.34	22.6 %	ACCEPTABLE
395	-2.55	2.10	7.33	72.6 %	ACCEPTABLE
396	-2.59	2.17	7.38	22.5 %	ACCEPTABLE
397	-2.56	2.14	7.35	72.9 %	ACCEPTABLE
398	-2.54	2.15	7.36	72.3 %	ACCEPTABLE
399	-2.56	2.14	7.33	13.4 %	ACCEPTABLE
400	-2.58	2.23	7.41	23.2 %	ACCEPTABLE
401	-2.55	2.19	7.38	23.1 %	ACCEPTABLE
402	-2.57	2.18	7.39	72.8 %	ACCEPTABLE
403	-2.53	2.10	7.33	72.0 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
404	-2.56	2.17	7.38	72.8 %	ACCEPTABLE
405	-2.54	2.14	7.35	72.3 %	ACCEPTABLE
406	-2.55	2.13	7.36	72.5 %	ACCEPTABLE
407	-2.56	2.11	7.32	24.1 %	ACCEPTABLE
408	-2.59	2.18	7.37	13.4 %	ACCEPTABLE
409	-2.57	2.15	7.34	13.9 %	ACCEPTABLE
410	-2.58	2.14	7.35	22.5 %	ACCEPTABLE
411	-2.55	2.07	7.30	72.8 %	ACCEPTABLE
412	-2.54	2.06	7.29	72.8 %	ACCEPTABLE
413	-2.58	2.13	7.34	22.5 %	ACCEPTABLE
414	-2.55	2.10	7.31	22.6 %	ACCEPTABLE
415	-2.57	2.09	7.32	72.6 %	ACCEPTABLE
416	-2.58	2.13	7.35	22.5 %	ACCEPTABLE
417	-2.55	2.10	7.31	22.6 %	ACCEPTABLE
418	-2.57	2.18	7.39	72.8 %	ACCEPTABLE
419	-2.54	2.15	7.35	72.5 %	ACCEPTABLE
420	-54.75	191.82	200.75	0.4 %	ACCEPTABLE
421	-54.89	193.15	202.08	0.5 %	ACCEPTABLE
422	-54.73	191.82	200.75	0.4 %	ACCEPTABLE
423	-2.56	2.14	7.35	72.9 %	ACCEPTABLE
424	-2.55	2.15	7.35	73.1 %	ACCEPTABLE
425	-2.54	2.16	7.35	23.1 %	ACCEPTABLE
426	-2.55	2.15	7.34	24.8 %	ACCEPTABLE
427	-2.56	2.21	7.39	23.1 %	ACCEPTABLE
428	-2.54	2.18	7.37	23.1 %	ACCEPTABLE
429	-2.56	2.18	7.38	24.8 %	ACCEPTABLE
430	-2.53	2.12	7.34	72.1 %	ACCEPTABLE
431	-2.55	2.17	7.37	73.0 %	ACCEPTABLE
432	-2.54	2.15	7.35	72.5 %	ACCEPTABLE
433	-2.55	2.14	7.36	72.7 %	ACCEPTABLE
434	-2.55	2.13	7.33	73.1 %	ACCEPTABLE
435	-2.54	2.14	7.33	23.3 %	ACCEPTABLE
436	-2.55	2.13	7.32	13.4 %	ACCEPTABLE
437	-2.56	2.19	7.37	23.3 %	ACCEPTABLE
438	-2.54	2.16	7.35	23.1 %	ACCEPTABLE
439	-2.56	2.16	7.36	73.0 %	ACCEPTABLE
440	-2.53	2.10	7.32	72.6 %	ACCEPTABLE
441	-2.55	2.15	7.35	73.1 %	ACCEPTABLE
442	-2.54	2.13	7.33	73.1 %	ACCEPTABLE
443	-2.55	2.12	7.34	72.7 %	ACCEPTABLE
444	-2.55	2.11	7.31	22.6 %	ACCEPTABLE
445	-2.57	2.16	7.34	14.5 %	ACCEPTABLE
446	-2.55	2.14	7.32	23.3 %	ACCEPTABLE
447	-2.56	2.13	7.33	22.6 %	ACCEPTABLE
448	-2.55	2.08	7.30	24.1 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
449	-2.54	2.07	7.29	22.6 %	ACCEPTABLE
450	-2.56	2.12	7.33	24.1 %	ACCEPTABLE
451	-2.54	2.10	7.30	73.1 %	ACCEPTABLE
452	-2.53	2.11	7.30	23.3 %	ACCEPTABLE
453	-2.54	2.10	7.29	13.4 %	ACCEPTABLE
454	-2.55	2.16	7.34	24.8 %	ACCEPTABLE
455	-2.53	2.13	7.32	23.2 %	ACCEPTABLE
456	-2.55	2.13	7.33	73.1 %	ACCEPTABLE
457	-2.52	2.07	7.29	72.9 %	ACCEPTABLE
458	-2.54	2.12	7.32	73.0 %	ACCEPTABLE
459	-2.53	2.10	7.30	73.1 %	ACCEPTABLE
460	-2.54	2.09	7.31	72.8 %	ACCEPTABLE
461	-2.54	2.08	7.28	22.6 %	ACCEPTABLE
462	-2.56	2.13	7.31	14.0 %	ACCEPTABLE
463	-2.54	2.11	7.29	13.4 %	ACCEPTABLE
464	-2.55	2.10	7.30	22.6 %	ACCEPTABLE
465	-2.54	2.05	7.27	22.6 %	ACCEPTABLE
466	-2.53	2.04	7.26	22.6 %	ACCEPTABLE
467	-2.55	2.09	7.30	24.1 %	ACCEPTABLE
468	-2.53	2.07	7.27	22.6 %	ACCEPTABLE
469	-2.55	2.06	7.28	22.6 %	ACCEPTABLE
470	-2.55	2.10	7.30	22.6 %	ACCEPTABLE
471	-2.54	2.07	7.27	22.6 %	ACCEPTABLE
472	-2.54	2.13	7.33	73.1 %	ACCEPTABLE
473	-2.53	2.10	7.30	73.1 %	ACCEPTABLE
474	-54.60	190.69	199.63	0.4 %	ACCEPTABLE
475	-54.70	191.58	200.51	0.4 %	ACCEPTABLE
476	-54.58	190.69	199.63	0.4 %	ACCEPTABLE
477	-2.22	7.97	13.58	56.7 %	ACCEPTABLE
478	-0.82	10.26	16.26	38.7 %	ACCEPTABLE
479	1.67	6.16	11.85	35.7 %	ACCEPTABLE
480	0.52	1.52	11.39	26.1 %	ACCEPTABLE
481	-3.85	3.43	8.98	5.7 %	ACCEPTABLE
482	-3.58	2.26	8.34	60.5 %	ACCEPTABLE
483	-1.28	2.65	10.39	46.3 %	ACCEPTABLE
484	-1.73	5.18	11.70	53.0 %	ACCEPTABLE
485	0.74	2.26	8.34	40.2 %	ACCEPTABLE
486	-9.67	12.91	16.21	0.1 %	ACCEPTABLE
487	-1.96	6.49	12.54	55.2 %	ACCEPTABLE
488	1.11	0.66	7.68	33.7 %	ACCEPTABLE
489	-40.84	83.80	93.28	0.0 %	ACCEPTABLE
490	-69.02	340.92	349.68	0.8 %	ACCEPTABLE
491	-36.52	83.80	93.28	0.9 %	ACCEPTABLE
492	-3.58	2.26	8.34	60.5 %	ACCEPTABLE
493	-3.43	0.29	5.01	1.0 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
494	-6.88	27.67	31.10	1.4 %	ACCEPTABLE
495	-2.27	3.74	10.30	54.9 %	ACCEPTABLE
496	-2.37	4.23	10.58	56.3 %	ACCEPTABLE
497	-0.70	2.26	8.34	56.2 %	ACCEPTABLE
498	-6.44	6.35	10.22	1.1 %	ACCEPTABLE
499	-5.07	4.50	8.02	1.2 %	ACCEPTABLE
500	-4.62	0.09	6.19	1.7 %	ACCEPTABLE
501	-2.52	5.03	11.06	58.3 %	ACCEPTABLE
502	-0.60	1.85	8.14	54.3 %	ACCEPTABLE
503	-54.93	173.34	182.32	0.1 %	ACCEPTABLE
504	-74.49	378.46	387.20	0.5 %	ACCEPTABLE
505	-52.05	173.34	182.32	0.5 %	ACCEPTABLE
506	-3.58	2.26	8.34	60.5 %	ACCEPTABLE
507	-1.40	1.14	7.85	52.3 %	ACCEPTABLE
508	-3.71	1.61	6.44	1.7 %	ACCEPTABLE
509	-4.47	11.84	16.05	1.7 %	ACCEPTABLE
510	-2.99	7.98	12.29	1.3 %	ACCEPTABLE
511	-2.81	3.70	9.89	58.6 %	ACCEPTABLE
512	-2.79	3.59	9.83	58.2 %	ACCEPTABLE
513	-1.66	2.26	8.34	58.6 %	ACCEPTABLE
514	-2.17	0.60	8.56	44.5 %	ACCEPTABLE
515	-5.30	4.56	9.05	2.1 %	ACCEPTABLE
516	-4.20	3.17	7.44	2.3 %	ACCEPTABLE
517	-4.30	0.85	6.89	1.7 %	ACCEPTABLE
518	-4.23	0.57	6.78	1.7 %	ACCEPTABLE
519	-2.89	4.08	10.11	59.7 %	ACCEPTABLE
520	-1.65	2.23	8.33	58.3 %	ACCEPTABLE
521	-58.10	201.77	210.68	0.2 %	ACCEPTABLE
522	-71.16	338.52	347.28	0.5 %	ACCEPTABLE
523	-56.18	201.77	210.68	0.4 %	ACCEPTABLE
524	-3.58	2.26	8.34	60.5 %	ACCEPTABLE
525	-2.24	2.01	8.22	58.5 %	ACCEPTABLE
526	-3.72	2.05	7.18	2.1 %	ACCEPTABLE
527	-3.93	7.28	12.10	2.1 %	ACCEPTABLE
528	-3.03	5.42	10.30	4.9 %	ACCEPTABLE
529	-3.11	3.40	9.47	60.6 %	ACCEPTABLE
530	-1.80	3.26	9.39	57.5 %	ACCEPTABLE
531	-3.29	3.29	8.42	3.3 %	ACCEPTABLE
532	-3.51	9.10	13.90	3.2 %	ACCEPTABLE
533	-2.60	7.05	11.92	65.7 %	ACCEPTABLE
534	-1.44	7.63	12.37	51.3 %	ACCEPTABLE
535	-3.14	7.75	11.78	1.6 %	ACCEPTABLE
536	-3.01	14.99	18.77	1.1 %	ACCEPTABLE
537	-3.11	11.26	16.02	49.5 %	ACCEPTABLE
538	-0.57	3.54	9.54	44.5 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
539	-2.77	9.44	14.54	48.6 %	ACCEPTABLE
540	-1.32	7.05	11.92	50.8 %	ACCEPTABLE
541	-2.12	5.87	11.96	56.0 %	ACCEPTABLE
542	-2.31	4.47	9.20	7.7 %	ACCEPTABLE
543	-5.02	12.40	16.41	3.5 %	ACCEPTABLE
544	-3.69	9.91	13.68	1.8 %	ACCEPTABLE
545	-3.88	7.05	11.92	2.4 %	ACCEPTABLE
546	-2.27	2.13	8.28	59.1 %	ACCEPTABLE
547	-1.50	1.31	7.35	59.7 %	ACCEPTABLE
548	-3.41	4.84	10.34	65.1 %	ACCEPTABLE
549	-2.01	3.30	8.41	70.0 %	ACCEPTABLE
550	-0.73	3.28	8.40	62.9 %	ACCEPTABLE
551	-2.26	3.11	7.39	1.4 %	ACCEPTABLE
552	-3.73	12.38	16.39	1.0 %	ACCEPTABLE
553	-1.93	8.01	12.00	0.5 %	ACCEPTABLE
554	-2.46	6.42	11.44	65.0 %	ACCEPTABLE
555	-0.10	0.83	7.15	51.1 %	ACCEPTABLE
556	-2.21	5.21	10.58	63.1 %	ACCEPTABLE
557	-0.73	3.30	8.41	63.0 %	ACCEPTABLE
558	-1.69	2.79	9.14	55.7 %	ACCEPTABLE
559	-1.65	1.18	6.21	73.9 %	ACCEPTABLE
560	-0.25	0.79	6.02	60.6 %	ACCEPTABLE
561	-1.76	0.74	4.98	1.3 %	ACCEPTABLE
562	-3.29	8.32	12.27	1.9 %	ACCEPTABLE
563	-1.47	4.64	8.56	0.9 %	ACCEPTABLE
564	-2.12	3.72	8.68	71.5 %	ACCEPTABLE
565	-1.87	2.75	8.08	67.7 %	ACCEPTABLE
566	-0.37	1.18	6.21	63.8 %	ACCEPTABLE
567	-1.41	0.92	7.19	57.1 %	ACCEPTABLE
568	-3.59	3.26	7.50	1.6 %	ACCEPTABLE
569	-2.19	1.78	5.65	1.6 %	ACCEPTABLE
570	-2.93	1.18	6.21	2.2 %	ACCEPTABLE
571	-2.76	0.65	5.96	1.6 %	ACCEPTABLE
572	-2.05	3.43	8.50	70.4 %	ACCEPTABLE
573	-0.41	1.29	6.27	64.7 %	ACCEPTABLE
574	-68.95	313.16	321.95	0.4 %	ACCEPTABLE
575	-58.96	222.00	230.88	0.4 %	ACCEPTABLE
576	-1.65	1.18	6.21	73.9 %	ACCEPTABLE
577	-0.81	1.21	6.22	69.2 %	ACCEPTABLE
578	-1.76	1.01	5.45	1.7 %	ACCEPTABLE
579	-2.60	5.11	9.41	1.3 %	ACCEPTABLE
580	-1.43	3.16	7.43	2.0 %	ACCEPTABLE
581	-1.97	2.83	7.81	72.8 %	ACCEPTABLE
582	-1.81	2.24	7.46	69.9 %	ACCEPTABLE
583	-0.80	1.18	6.21	68.9 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
584	-1.47	0.99	6.84	61.8 %	ACCEPTABLE
585	-1.38	0.00	4.97	75.1 %	ACCEPTABLE
586	-2.31	3.26	7.50	1.3 %	ACCEPTABLE
587	-1.13	1.58	5.79	1.6 %	ACCEPTABLE
588	-1.72	1.38	6.31	75.7 %	ACCEPTABLE
589	-0.89	1.45	6.35	71.0 %	ACCEPTABLE
590	-1.84	1.21	5.56	1.6 %	ACCEPTABLE
591	-2.72	5.53	9.73	1.2 %	ACCEPTABLE
592	-1.54	3.49	7.67	1.4 %	ACCEPTABLE
593	-2.06	3.11	7.98	74.3 %	ACCEPTABLE
594	-1.88	2.46	7.58	71.0 %	ACCEPTABLE
595	-0.87	1.38	6.31	70.5 %	ACCEPTABLE
596	-1.52	1.16	6.91	63.1 %	ACCEPTABLE
597	-1.45	0.18	5.04	5.7 %	ACCEPTABLE
598	-3.03	2.82	7.19	1.4 %	ACCEPTABLE
599	-2.05	1.76	5.90	1.2 %	ACCEPTABLE
600	-2.57	1.38	6.31	2.3 %	ACCEPTABLE
601	-2.31	0.55	5.92	22.4 %	ACCEPTABLE
602	-2.47	1.04	6.14	3.4 %	ACCEPTABLE
603	-1.43	0.11	5.01	10.8 %	ACCEPTABLE
604	-1.99	2.88	7.83	73.3 %	ACCEPTABLE
605	-0.92	1.54	6.39	71.7 %	ACCEPTABLE
606	-45.24	125.77	134.92	0.5 %	ACCEPTABLE
607	-50.71	170.13	179.12	0.6 %	ACCEPTABLE
608	-44.38	125.77	134.92	0.7 %	ACCEPTABLE
609	-1.72	1.38	6.31	75.7 %	ACCEPTABLE
610	-1.20	1.54	6.39	73.2 %	ACCEPTABLE
611	-1.82	1.32	5.83	1.9 %	ACCEPTABLE
612	-2.33	3.85	8.28	1.6 %	ACCEPTABLE
613	-1.56	2.66	7.08	3.1 %	ACCEPTABLE
614	-1.95	2.51	7.40	75.0 %	ACCEPTABLE
615	-0.86	0.46	5.88	63.8 %	ACCEPTABLE
616	-1.83	2.11	7.16	72.7 %	ACCEPTABLE
617	-1.15	1.38	6.31	71.9 %	ACCEPTABLE
618	-1.58	1.22	6.70	66.7 %	ACCEPTABLE
619	-1.56	0.60	5.46	10.9 %	ACCEPTABLE
620	-2.59	2.33	6.87	1.8 %	ACCEPTABLE
621	-1.92	1.60	6.01	1.7 %	ACCEPTABLE
622	-2.29	1.38	6.31	3.3 %	ACCEPTABLE
623	-2.13	0.89	6.07	23.4 %	ACCEPTABLE
624	-1.46	0.33	5.34	74.8 %	ACCEPTABLE
625	-1.93	0.26	5.81	67.4 %	ACCEPTABLE
626	-2.22	1.17	6.20	5.2 %	ACCEPTABLE
627	-1.53	0.51	5.42	25.4 %	ACCEPTABLE
628	-1.90	2.35	7.30	74.1 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
629	-1.19	1.51	6.38	72.9 %	ACCEPTABLE
630	-46.11	132.47	141.59	0.5 %	ACCEPTABLE
631	-49.76	162.03	171.03	0.6 %	ACCEPTABLE
632	-45.54	132.47	141.59	0.6 %	ACCEPTABLE
633	-1.72	1.38	6.31	75.7 %	ACCEPTABLE
634	-1.39	1.53	6.39	75.4 %	ACCEPTABLE
635	-1.79	1.36	6.00	2.7 %	ACCEPTABLE
636	-2.11	2.91	7.51	2.9 %	ACCEPTABLE
637	-1.60	2.19	6.78	5.2 %	ACCEPTABLE
638	-1.88	2.13	7.02	75.6 %	ACCEPTABLE
639	-1.14	0.76	6.01	68.8 %	ACCEPTABLE
640	-1.80	1.87	6.88	73.7 %	ACCEPTABLE
641	-1.34	1.38	6.31	74.2 %	ACCEPTABLE
642	-1.62	1.27	6.56	69.5 %	ACCEPTABLE
643	-1.62	0.87	5.74	11.7 %	ACCEPTABLE
644	-2.30	2.01	6.67	2.0 %	ACCEPTABLE
645	-1.84	1.52	6.09	2.3 %	ACCEPTABLE
646	-2.10	1.38	6.31	5.5 %	ACCEPTABLE
647	-1.62	0.39	5.69	70.6 %	ACCEPTABLE
648	-1.38	0.17	5.44	69.8 %	ACCEPTABLE
649	-2.01	1.08	6.16	25.0 %	ACCEPTABLE
650	-1.55	0.67	5.65	75.7 %	ACCEPTABLE
651	-1.21	0.77	5.70	74.3 %	ACCEPTABLE
652	-1.61	0.64	5.32	3.0 %	ACCEPTABLE
653	-1.93	2.03	6.68	3.2 %	ACCEPTABLE
654	-1.41	1.38	6.01	6.7 %	ACCEPTABLE
655	-1.70	1.34	6.29	75.3 %	ACCEPTABLE
656	-0.98	0.11	5.42	66.8 %	ACCEPTABLE
657	-1.64	1.13	6.18	73.6 %	ACCEPTABLE
658	-1.17	0.67	5.65	73.2 %	ACCEPTABLE
659	-1.47	0.59	5.93	68.4 %	ACCEPTABLE
660	-1.44	0.19	5.12	76.3 %	ACCEPTABLE
661	-1.09	0.27	5.15	74.5 %	ACCEPTABLE
662	-1.49	0.15	4.79	1.6 %	ACCEPTABLE
663	-1.82	1.45	6.05	2.5 %	ACCEPTABLE
664	-1.30	0.84	5.42	4.8 %	ACCEPTABLE
665	-1.60	0.81	5.71	25.3 %	ACCEPTABLE
666	-1.53	0.62	5.62	75.2 %	ACCEPTABLE
667	-1.06	0.19	5.12	73.3 %	ACCEPTABLE
668	-1.36	0.12	5.42	69.2 %	ACCEPTABLE
669	-2.01	0.70	5.35	2.0 %	ACCEPTABLE
670	-1.54	0.28	4.84	1.2 %	ACCEPTABLE
671	-1.82	0.19	5.12	4.0 %	ACCEPTABLE
672	-1.78	0.09	5.08	5.1 %	ACCEPTABLE
673	-1.57	0.73	5.67	76.5 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
674	-1.23	0.84	5.72	75.2 %	ACCEPTABLE
675	-1.63	0.70	5.35	2.8 %	ACCEPTABLE
676	-1.95	2.12	6.72	2.7 %	ACCEPTABLE
677	-1.44	1.45	6.05	5.3 %	ACCEPTABLE
678	-1.73	1.41	6.32	76.0 %	ACCEPTABLE
679	-1.00	0.17	5.43	67.7 %	ACCEPTABLE
680	-1.66	1.19	6.20	74.3 %	ACCEPTABLE
681	-1.19	0.73	5.67	74.0 %	ACCEPTABLE
682	-1.48	0.65	5.95	69.1 %	ACCEPTABLE
683	-1.46	0.25	5.14	14.8 %	ACCEPTABLE
684	-2.14	1.29	5.96	2.1 %	ACCEPTABLE
685	-1.68	0.84	5.42	2.1 %	ACCEPTABLE
686	-1.95	0.73	5.67	4.2 %	ACCEPTABLE
687	-1.86	0.47	5.55	14.0 %	ACCEPTABLE
688	-1.40	0.09	5.08	74.9 %	ACCEPTABLE
689	-1.71	0.04	5.39	68.6 %	ACCEPTABLE
690	-1.91	0.62	5.62	6.3 %	ACCEPTABLE
691	-1.44	0.19	5.12	76.3 %	ACCEPTABLE
692	-1.70	1.32	6.27	75.4 %	ACCEPTABLE
693	-1.22	0.81	5.71	74.9 %	ACCEPTABLE
694	-46.71	137.17	146.27	0.5 %	ACCEPTABLE
695	-49.15	156.88	165.90	0.6 %	ACCEPTABLE
696	-46.33	137.17	146.27	0.6 %	ACCEPTABLE
697	-1.57	0.73	5.67	76.5 %	ACCEPTABLE
698	-1.35	0.82	5.71	74.3 %	ACCEPTABLE
699	-1.61	0.71	5.46	5.1 %	ACCEPTABLE
700	-1.82	1.61	6.33	4.3 %	ACCEPTABLE
701	-1.48	1.20	5.91	8.4 %	ACCEPTABLE
702	-1.68	1.18	6.10	76.1 %	ACCEPTABLE
703	-1.19	0.35	5.51	68.7 %	ACCEPTABLE
704	-1.63	1.04	6.03	74.8 %	ACCEPTABLE
705	-1.32	0.73	5.67	73.2 %	ACCEPTABLE
706	-1.51	0.67	5.85	71.1 %	ACCEPTABLE
707	-1.50	0.41	5.32	25.4 %	ACCEPTABLE
708	-1.95	1.10	5.86	2.8 %	ACCEPTABLE
709	-1.64	0.80	5.50	3.6 %	ACCEPTABLE
710	-1.82	0.73	5.67	6.7 %	ACCEPTABLE
711	-1.50	0.12	5.30	72.0 %	ACCEPTABLE
712	-1.77	0.57	5.60	25.2 %	ACCEPTABLE
713	-1.46	0.30	5.27	75.5 %	ACCEPTABLE
714	-1.66	0.26	5.47	70.3 %	ACCEPTABLE
715	-1.80	0.66	5.64	10.0 %	ACCEPTABLE
716	-1.48	0.36	5.30	76.1 %	ACCEPTABLE
717	-1.66	1.12	6.06	75.7 %	ACCEPTABLE
718	-1.34	0.79	5.70	74.0 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
719	-44.27	121.39	130.56	0.5 %	ACCEPTABLE
720	-45.85	133.54	142.65	0.6 %	ACCEPTABLE
721	-44.01	121.39	130.56	0.6 %	ACCEPTABLE
722	-1.57	0.73	5.67	76.5 %	ACCEPTABLE
723	-1.43	0.80	5.70	75.5 %	ACCEPTABLE
724	-1.60	0.72	5.53	6.9 %	ACCEPTABLE
725	-1.73	1.30	6.09	6.8 %	ACCEPTABLE
726	-1.51	1.03	5.82	10.8 %	ACCEPTABLE
727	-1.64	1.03	5.95	76.8 %	ACCEPTABLE
728	-1.50	1.11	5.99	75.8 %	ACCEPTABLE
729	-1.67	1.02	5.81	5.8 %	ACCEPTABLE
730	-1.80	1.63	6.40	5.6 %	ACCEPTABLE
731	-1.58	1.35	6.12	15.0 %	ACCEPTABLE
732	-1.71	1.34	6.25	76.1 %	ACCEPTABLE
733	-1.38	0.77	5.82	72.4 %	ACCEPTABLE
734	-1.68	1.24	6.19	75.3 %	ACCEPTABLE
735	-1.47	1.03	5.95	74.9 %	ACCEPTABLE
736	-1.60	0.98	6.07	72.8 %	ACCEPTABLE
737	-1.60	0.81	5.71	25.3 %	ACCEPTABLE
738	-1.90	1.29	6.09	4.3 %	ACCEPTABLE
739	-1.69	1.08	5.84	5.0 %	ACCEPTABLE
740	-1.81	1.03	5.95	10.7 %	ACCEPTABLE
741	-1.59	0.59	5.67	74.2 %	ACCEPTABLE
742	-1.48	0.49	5.56	73.6 %	ACCEPTABLE
743	-1.77	0.92	5.90	25.0 %	ACCEPTABLE
744	-1.57	0.73	5.66	76.7 %	ACCEPTABLE
745	-1.70	0.69	5.79	74.3 %	ACCEPTABLE
746	-1.79	0.98	5.92	10.7 %	ACCEPTABLE
747	-1.58	0.77	5.69	76.8 %	ACCEPTABLE
748	-1.44	0.84	5.72	75.8 %	ACCEPTABLE
749	-1.61	0.76	5.55	5.5 %	ACCEPTABLE
750	-1.74	1.35	6.12	6.8 %	ACCEPTABLE
751	-1.52	1.08	5.84	10.8 %	ACCEPTABLE
752	-1.65	1.07	5.97	77.3 %	ACCEPTABLE
753	-1.51	1.15	6.01	76.1 %	ACCEPTABLE
754	-1.68	1.07	5.83	5.0 %	ACCEPTABLE
755	-1.82	1.68	6.43	4.9 %	ACCEPTABLE
756	-1.59	1.40	6.14	8.3 %	ACCEPTABLE
757	-1.72	1.38	6.27	76.5 %	ACCEPTABLE
758	-1.39	0.81	5.84	72.8 %	ACCEPTABLE
759	-1.69	1.28	6.21	75.8 %	ACCEPTABLE
760	-1.48	1.07	5.97	75.4 %	ACCEPTABLE
761	-1.61	1.02	6.08	73.4 %	ACCEPTABLE
762	-1.61	0.85	5.73	15.1 %	ACCEPTABLE
763	-1.91	1.34	6.11	4.2 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
764	-1.70	1.12	5.86	4.8 %	ACCEPTABLE
765	-1.82	1.07	5.97	8.3 %	ACCEPTABLE
766	-1.60	0.62	5.69	74.4 %	ACCEPTABLE
767	-1.49	0.52	5.57	74.0 %	ACCEPTABLE
768	-1.78	0.96	5.92	26.6 %	ACCEPTABLE
769	-1.58	0.76	5.68	76.9 %	ACCEPTABLE
770	-1.70	0.72	5.80	74.7 %	ACCEPTABLE
771	-1.80	1.02	5.94	10.7 %	ACCEPTABLE
772	-1.59	0.81	5.71	25.3 %	ACCEPTABLE
773	-1.71	1.34	6.24	76.4 %	ACCEPTABLE
774	-1.50	1.11	5.99	75.8 %	ACCEPTABLE
775	-44.53	123.37	132.53	0.5 %	ACCEPTABLE
776	-45.59	131.47	140.59	0.6 %	ACCEPTABLE
777	-44.36	123.37	132.53	0.6 %	ACCEPTABLE
778	-1.65	1.07	5.97	77.3 %	ACCEPTABLE
779	-1.56	1.13	6.00	76.4 %	ACCEPTABLE
780	-1.67	1.07	5.88	8.4 %	ACCEPTABLE
781	-1.76	1.47	6.27	8.2 %	ACCEPTABLE
782	-1.61	1.28	6.08	16.1 %	ACCEPTABLE
783	-1.70	1.28	6.17	26.5 %	ACCEPTABLE
784	-1.48	0.89	5.88	74.0 %	ACCEPTABLE
785	-1.68	1.21	6.13	75.9 %	ACCEPTABLE
786	-1.54	1.07	5.97	75.8 %	ACCEPTABLE
787	-1.62	1.04	6.05	74.2 %	ACCEPTABLE
788	-1.62	0.93	5.81	25.3 %	ACCEPTABLE
789	-1.82	1.25	6.06	5.4 %	ACCEPTABLE
790	-1.68	1.10	5.90	6.9 %	ACCEPTABLE
791	-1.76	1.07	5.97	10.7 %	ACCEPTABLE
792	-1.62	0.77	5.78	75.4 %	ACCEPTABLE
793	-1.54	0.70	5.70	75.3 %	ACCEPTABLE
794	-1.74	1.00	5.93	15.0 %	ACCEPTABLE
795	-1.60	0.86	5.78	76.9 %	ACCEPTABLE
796	-1.68	0.84	5.86	75.5 %	ACCEPTABLE
797	-1.75	1.04	5.95	10.7 %	ACCEPTABLE
798	-1.61	0.90	5.79	26.9 %	ACCEPTABLE
799	-1.69	1.25	6.15	76.4 %	ACCEPTABLE
800	-1.55	1.10	5.99	76.0 %	ACCEPTABLE
801	-45.90	132.66	141.77	0.5 %	ACCEPTABLE
802	-46.61	138.24	147.33	0.6 %	ACCEPTABLE
803	-45.79	132.66	141.77	0.6 %	ACCEPTABLE
804	-1.65	1.07	5.97	77.3 %	ACCEPTABLE
805	-1.59	1.11	5.99	76.4 %	ACCEPTABLE
806	-1.66	1.07	5.91	10.8 %	ACCEPTABLE
807	-1.72	1.33	6.17	10.6 %	ACCEPTABLE
808	-1.62	1.21	6.04	16.1 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
809	-1.68	1.21	6.10	24.9 %	ACCEPTABLE
810	-1.54	0.95	5.91	74.8 %	ACCEPTABLE
811	-1.67	1.17	6.08	76.2 %	ACCEPTABLE
812	-1.58	1.07	5.97	76.0 %	ACCEPTABLE
813	-1.63	1.05	6.02	75.2 %	ACCEPTABLE
814	-1.63	0.97	5.86	16.3 %	ACCEPTABLE
815	-1.76	1.19	6.03	6.8 %	ACCEPTABLE
816	-1.67	1.09	5.92	10.8 %	ACCEPTABLE
817	-1.72	1.07	5.97	15.0 %	ACCEPTABLE
818	-1.63	0.87	5.84	76.1 %	ACCEPTABLE
819	-1.58	0.82	5.79	76.0 %	ACCEPTABLE
820	-1.71	1.02	5.95	25.1 %	ACCEPTABLE
821	-1.62	0.93	5.84	26.9 %	ACCEPTABLE
822	-1.67	0.91	5.89	76.0 %	ACCEPTABLE
823	-1.72	1.05	5.96	15.0 %	ACCEPTABLE
824	-1.62	0.95	5.85	25.2 %	ACCEPTABLE
825	-1.68	1.19	6.09	76.5 %	ACCEPTABLE
826	-1.58	1.09	5.98	76.2 %	ACCEPTABLE
827	-46.02	133.58	142.69	0.6 %	ACCEPTABLE
828	-46.49	137.30	146.40	0.6 %	ACCEPTABLE
829	-45.94	133.58	142.69	0.6 %	ACCEPTABLE
830	-1.65	1.07	5.97	77.3 %	ACCEPTABLE
831	-1.61	1.10	5.98	76.6 %	ACCEPTABLE
832	-1.66	1.07	5.93	15.1 %	ACCEPTABLE
833	-1.70	1.24	6.10	16.0 %	ACCEPTABLE
834	-1.63	1.16	6.02	25.0 %	ACCEPTABLE
835	-1.67	1.16	6.06	24.9 %	ACCEPTABLE
836	-1.57	0.99	5.93	75.4 %	ACCEPTABLE
837	-1.66	1.13	6.04	76.2 %	ACCEPTABLE
838	-1.60	1.07	5.97	76.2 %	ACCEPTABLE
839	-1.64	1.06	6.00	75.6 %	ACCEPTABLE
840	-1.64	1.01	5.90	25.2 %	ACCEPTABLE
841	-1.73	1.15	6.01	10.7 %	ACCEPTABLE
842	-1.66	1.08	5.94	15.1 %	ACCEPTABLE
843	-1.70	1.07	5.97	25.1 %	ACCEPTABLE
844	-1.63	0.93	5.88	76.4 %	ACCEPTABLE
845	-1.60	0.90	5.85	76.3 %	ACCEPTABLE
846	-1.69	1.04	5.96	77.1 %	ACCEPTABLE
847	-1.63	0.98	5.88	77.3 %	ACCEPTABLE
848	-1.59	1.01	5.89	76.4 %	ACCEPTABLE
849	-1.64	0.98	5.84	15.1 %	ACCEPTABLE
850	-1.68	1.15	6.01	15.0 %	ACCEPTABLE
851	-1.61	1.07	5.93	25.0 %	ACCEPTABLE
852	-1.65	1.07	5.97	77.3 %	ACCEPTABLE
853	-1.55	0.90	5.84	75.3 %	ACCEPTABLE

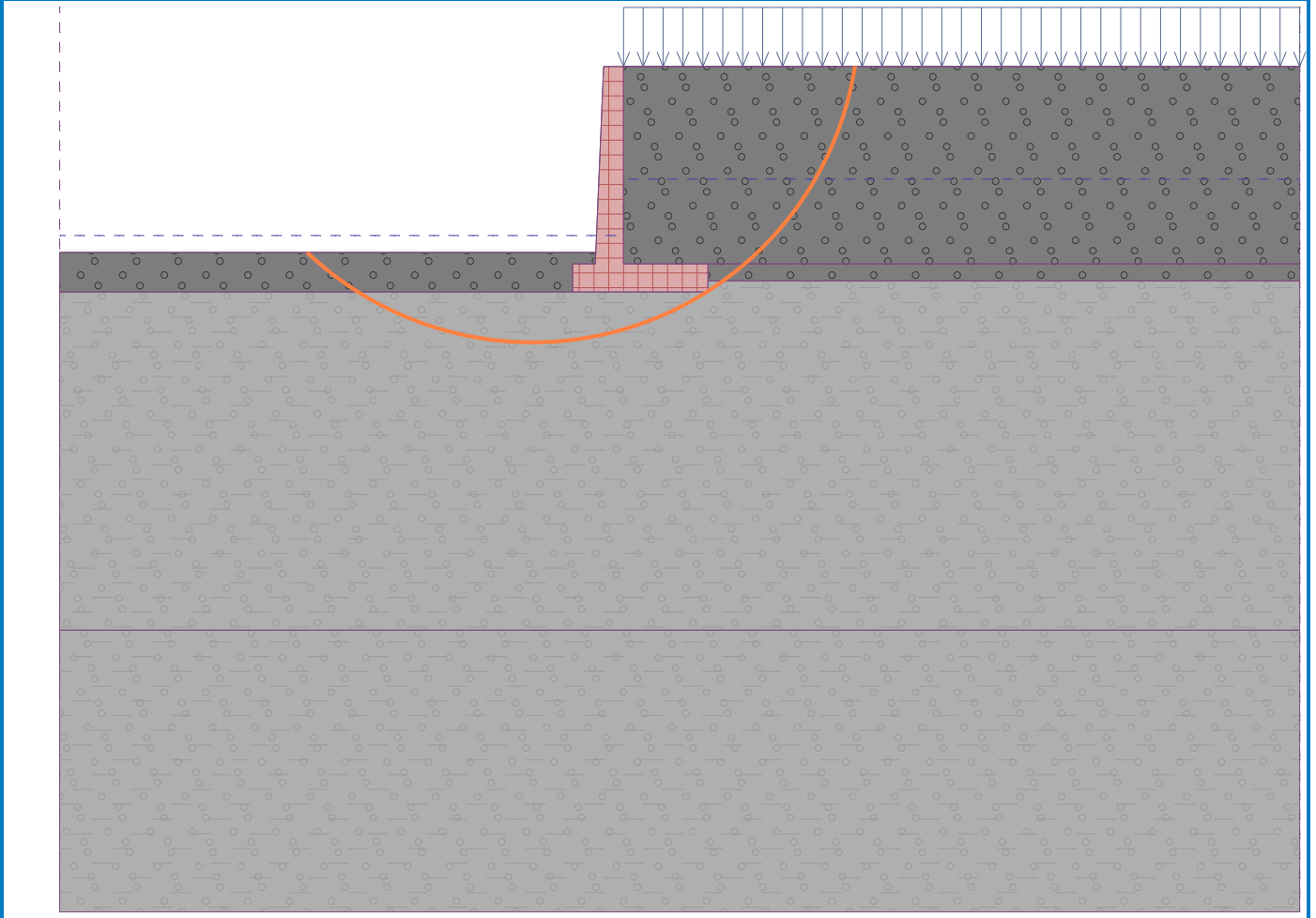
No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
854	-1.64	1.04	5.95	76.8 %	ACCEPTABLE
855	-1.58	0.98	5.88	76.2 %	ACCEPTABLE
856	-1.62	0.97	5.91	76.5 %	ACCEPTABLE
857	-1.62	0.92	5.81	25.3 %	ACCEPTABLE
858	-1.71	1.06	5.92	10.7 %	ACCEPTABLE
859	-1.64	0.99	5.85	15.1 %	ACCEPTABLE
860	-1.68	0.98	5.88	15.1 %	ACCEPTABLE
861	-1.61	0.85	5.79	76.5 %	ACCEPTABLE
862	-1.58	0.81	5.76	76.3 %	ACCEPTABLE
863	-1.67	0.95	5.87	25.2 %	ACCEPTABLE
864	-1.61	0.89	5.79	77.4 %	ACCEPTABLE
865	-1.57	0.92	5.80	26.7 %	ACCEPTABLE
866	-1.62	0.89	5.75	11.7 %	ACCEPTABLE
867	-1.66	1.06	5.91	10.8 %	ACCEPTABLE
868	-1.59	0.98	5.84	25.1 %	ACCEPTABLE
869	-1.63	0.98	5.87	25.2 %	ACCEPTABLE
870	-1.53	0.81	5.75	75.4 %	ACCEPTABLE
871	-1.62	0.95	5.86	77.1 %	ACCEPTABLE
872	-1.56	0.89	5.79	76.3 %	ACCEPTABLE
873	-1.60	0.88	5.82	76.5 %	ACCEPTABLE
874	-1.60	0.83	5.72	25.3 %	ACCEPTABLE
875	-1.69	0.97	5.83	10.8 %	ACCEPTABLE
876	-1.62	0.90	5.76	10.8 %	ACCEPTABLE
877	-1.66	0.89	5.79	25.2 %	ACCEPTABLE
878	-1.59	0.76	5.71	76.4 %	ACCEPTABLE
879	-1.56	0.73	5.67	76.5 %	ACCEPTABLE
880	-1.65	0.86	5.78	25.2 %	ACCEPTABLE
881	-1.59	0.80	5.71	27.0 %	ACCEPTABLE
882	-1.63	0.79	5.74	76.4 %	ACCEPTABLE
883	-1.66	0.88	5.78	25.2 %	ACCEPTABLE
884	-1.59	0.81	5.71	25.3 %	ACCEPTABLE
885	-1.63	0.97	5.87	26.9 %	ACCEPTABLE
886	-1.56	0.90	5.80	76.2 %	ACCEPTABLE
887	-46.10	134.20	143.30	0.5 %	ACCEPTABLE
888	-46.41	136.68	145.78	0.6 %	ACCEPTABLE
889	-46.05	134.20	143.30	0.5 %	ACCEPTABLE
890	-1.61	0.89	5.79	77.4 %	ACCEPTABLE
891	-1.58	0.91	5.80	25.1 %	ACCEPTABLE
892	-1.62	0.89	5.76	15.1 %	ACCEPTABLE
893	-1.64	1.00	5.87	15.1 %	ACCEPTABLE
894	-1.60	0.95	5.82	26.7 %	ACCEPTABLE
895	-1.62	0.95	5.85	25.2 %	ACCEPTABLE
896	-1.56	0.84	5.77	75.6 %	ACCEPTABLE
897	-1.62	0.93	5.84	26.9 %	ACCEPTABLE
898	-1.58	0.89	5.79	76.3 %	ACCEPTABLE

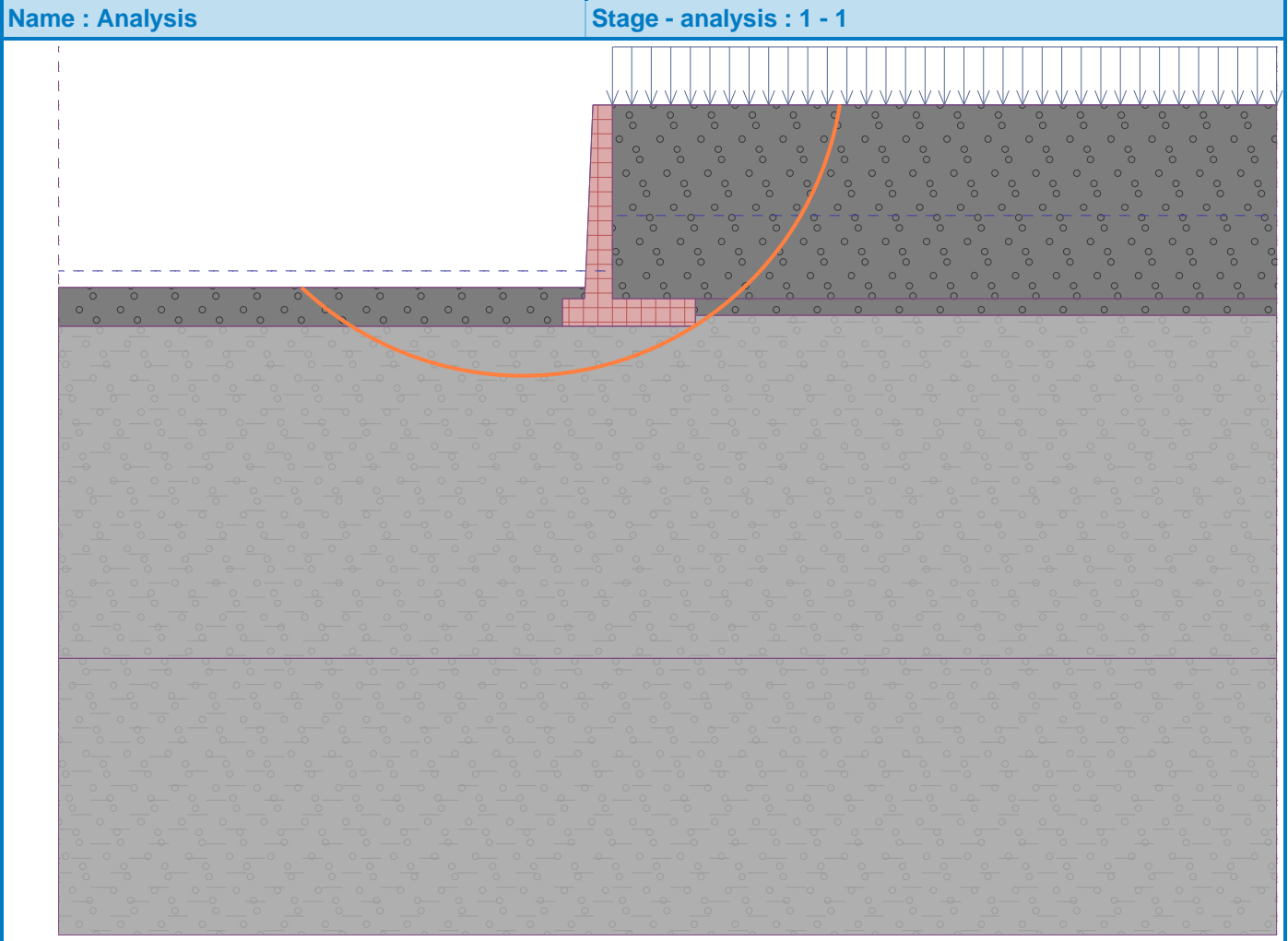
No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
899	-1.60	0.88	5.81	76.6 %	ACCEPTABLE
900	-1.60	0.85	5.74	27.0 %	ACCEPTABLE
901	-1.66	0.94	5.82	15.1 %	ACCEPTABLE
902	-1.62	0.90	5.77	16.3 %	ACCEPTABLE
903	-1.64	0.89	5.79	25.2 %	ACCEPTABLE
904	-1.60	0.80	5.73	76.8 %	ACCEPTABLE
905	-1.58	0.78	5.71	76.5 %	ACCEPTABLE
906	-1.64	0.87	5.78	25.2 %	ACCEPTABLE
907	-1.60	0.83	5.73	77.4 %	ACCEPTABLE
908	-1.62	0.82	5.76	76.7 %	ACCEPTABLE
909	-1.64	0.88	5.79	26.9 %	ACCEPTABLE
910	-1.60	0.84	5.74	26.9 %	ACCEPTABLE
911	-1.62	0.94	5.84	25.2 %	ACCEPTABLE
912	-1.58	0.90	5.79	76.4 %	ACCEPTABLE
913	-45.33	129.13	138.26	0.6 %	ACCEPTABLE
914	-45.54	130.75	139.87	0.6 %	ACCEPTABLE
915	-45.30	129.13	138.26	0.6 %	ACCEPTABLE
916	-1.61	0.89	5.79	77.4 %	ACCEPTABLE
917	-1.59	0.90	5.80	76.4 %	ACCEPTABLE
918	-1.61	0.89	5.77	15.1 %	ACCEPTABLE
919	-1.63	0.96	5.84	16.3 %	ACCEPTABLE
920	-1.60	0.93	5.81	25.1 %	ACCEPTABLE
921	-1.62	0.93	5.83	25.2 %	ACCEPTABLE
922	-1.58	0.86	5.77	76.2 %	ACCEPTABLE
923	-1.62	0.92	5.82	26.9 %	ACCEPTABLE
924	-1.59	0.89	5.79	76.4 %	ACCEPTABLE
925	-1.60	0.88	5.81	76.6 %	ACCEPTABLE
926	-1.60	0.86	5.76	77.4 %	ACCEPTABLE
927	-1.64	0.92	5.81	15.1 %	ACCEPTABLE
928	-1.62	0.90	5.77	16.3 %	ACCEPTABLE
929	-1.63	0.89	5.79	26.9 %	ACCEPTABLE
930	-1.60	0.83	5.75	76.9 %	ACCEPTABLE
931	-1.59	0.82	5.74	76.9 %	ACCEPTABLE
932	-1.63	0.88	5.78	25.3 %	ACCEPTABLE
933	-1.60	0.85	5.75	25.3 %	ACCEPTABLE
934	-1.62	0.84	5.77	76.8 %	ACCEPTABLE
935	-1.63	0.88	5.79	77.3 %	ACCEPTABLE
936	-1.60	0.86	5.76	77.4 %	ACCEPTABLE
937	-1.62	0.92	5.82	26.9 %	ACCEPTABLE
938	-1.59	0.90	5.79	25.1 %	ACCEPTABLE
939	-45.37	129.40	138.53	0.6 %	ACCEPTABLE
940	-45.51	130.48	139.61	0.6 %	ACCEPTABLE
941	-45.34	129.40	138.53	0.6 %	ACCEPTABLE
942	-1.61	0.89	5.79	77.4 %	ACCEPTABLE
943	-1.60	0.90	5.79	25.3 %	ACCEPTABLE

No.	Center		Radius R [m]	Utilization	Verification
	x [m]	z [m]			
944	-1.61	0.89	5.78	25.3 %	ACCEPTABLE
945	-1.62	0.94	5.83	26.9 %	ACCEPTABLE
946	-1.60	0.92	5.80	16.2 %	ACCEPTABLE
947	-1.62	0.92	5.82	26.9 %	ACCEPTABLE
948	-1.59	0.87	5.78	77.1 %	ACCEPTABLE
949	-1.61	0.91	5.81	77.3 %	ACCEPTABLE
950	-1.60	0.89	5.79	77.3 %	ACCEPTABLE
951	-1.61	0.89	5.80	77.2 %	ACCEPTABLE
952	-1.61	0.87	5.77	26.9 %	ACCEPTABLE
953	-1.63	0.91	5.80	15.1 %	ACCEPTABLE
954	-1.61	0.89	5.78	25.3 %	ACCEPTABLE
955	-1.62	0.89	5.79	26.9 %	ACCEPTABLE
956	-1.61	0.85	5.76	25.3 %	ACCEPTABLE
957	-1.60	0.84	5.75	77.0 %	ACCEPTABLE
958	-1.62	0.88	5.79	77.2 %	ACCEPTABLE
959	-1.60	0.86	5.77	77.1 %	ACCEPTABLE
960	-1.61	0.86	5.78	25.2 %	ACCEPTABLE
961	-1.62	0.89	5.79	26.9 %	ACCEPTABLE
962	-1.60	0.87	5.77	26.9 %	ACCEPTABLE
963	-1.62	0.91	5.81	77.4 %	ACCEPTABLE
964	-1.60	0.89	5.79	77.3 %	ACCEPTABLE
965	-45.39	129.58	138.71	0.6 %	ACCEPTABLE
966	-45.48	130.30	139.43	0.6 %	ACCEPTABLE
967	-45.38	129.58	138.71	0.6 %	ACCEPTABLE
968	-1.61	0.89	5.79	77.4 %	ACCEPTABLE

Name : Analysis

Stage - analysis : 1 - 1





Input data (Stage of construction 2)

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	3.80	0.00 .. 3.80	Mbushje Rrugore	
2	6.20	3.80 .. 10.00	Shtresa 1	
3	-	10.00 .. ∞	Shtresa 1	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

GWT behind the structure lies at a depth of 3.00 m

GWT in front of the structure lies at a depth of 3.50 m

Subgrade at the heel is not permeable.

Uplift in foot. bottom due to different pressures is not considered.

Input surface surcharges

No.	Surcharge		Action	Mag.1 [kN/m ²]	Mag.2 [kN/m ²]	Ord.x x [m]	Length l [m]	Depth z [m]
	new	change						
1	No	Yes	variable	4.00				on terrain

No.	Name
1	Traffic

Resistance on front face of the structure

Resistance on front face of the structure: at rest

Soil on front face of the structure - Mbushje Rrugore

Soil thickness in front of structure $h = 0.70$ m

Terrain in front of structure is flat.

Earthquake

Factor of horizontal acceleration $K_h = 0.2000$

Factor of vertical acceleration $K_v = 0.1000$

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : seismic

The wall is free to move. Active earth pressure is therefore assumed.

Verification No. 1 (Stage of construction 2)

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	35.00	0.00	19.00	0.426	
2	0.00	89.81(80.00)	35.00	0.00	10.00	0.426	MODIFIED
3	0.50	0.00	35.00	0.00	10.00	0.426	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	3.80	0.00	1.63	1.62	0.16
2	0.20	3.80	0.00	3.75	0.28	3.74
	0.20	3.81	0.00	3.77	0.28	3.76
3	0.20	3.81	0.00	1.63	1.63	0.00
	0.70	8.80	0.00	3.75	3.75	0.00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0.62	0.00	35.00	0.00	19.00	23.00	0.244	
2	2.38	27.50	35.00	0.00	19.00	35.00	0.587	
3	0.50	27.50	35.00	0.00	10.00	35.00	0.587	
4	0.30	0.00	35.00	0.00	10.00	23.00	0.244	
5	0.20	0.00	35.00	5.00	11.00	23.00	0.244	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.62	11.76	0.00	2.87	2.64	1.12
2	0.62	11.76	0.00	6.90	3.19	6.12
	3.00	57.00	0.00	33.45	15.45	29.67
3	3.00	57.00	0.00	33.45	15.45	29.67
	3.50	62.00	5.00	36.39	16.80	32.27
4	3.50	62.00	5.00	15.15	13.95	5.92
	3.80	65.00	5.00	15.89	14.62	6.21
5	3.80	65.00	5.00	11.46	10.54	4.48
	4.00	67.20	5.00	11.99	11.04	4.69

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [m]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	$K_{ae}-K_a$	Comment
1	0.62	35.00	0.00	12.53	0.244	0.404	0.160	
2	2.38	35.00	0.00	12.53	0.587	0.986	0.399	
3	0.50	35.00	0.00	23.96	0.587	2.619	2.032	
4	0.30	35.00	0.00	23.96	0.244	0.698	0.453	
5	0.20	35.00	0.00	22.99	0.244	0.661	0.417	

Earthquake effects (active earth pressure)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_D [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vertical comp. [kPa]
1	0.00	0.00	60.48	9.65	8.88	3.77
	0.62	10.58	49.90	7.96	7.33	3.11
2	0.62	10.58	49.90	19.92	9.20	17.67
	3.00	51.30	9.18	3.66	1.69	3.25
3	3.00	51.30	9.18	18.65	8.61	16.55
	3.50	55.80	4.68	9.51	4.39	8.44
4	3.50	55.80	4.68	2.12	1.95	0.83
	3.80	58.50	1.98	0.90	0.83	0.35
5	3.80	58.50	1.98	0.83	0.76	0.32
	4.00	60.48	0.00	0.00	0.00	0.00

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00
2	0.62	0.00	0.00
3	3.00	0.00	0.00
4	3.50	5.00	0.00
5	3.80	5.00	0.00
6	4.00	5.00	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.90	0.38
2	0.62	0.90	0.38
3	0.62	1.08	2.08
4	3.00	1.08	2.08
5	3.50	1.08	2.08
6	3.50	0.90	0.38
7	3.80	0.90	0.38
8	4.00	0.90	0.38

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0.00	-1.55	49.62	0.84	1.000	1.000	1.000

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
Earthq.- constr.	12.32	-1.30	-6.16	0.91	1.000	1.000	1.000
FF resistance	-1.50	-0.25	0.02	0.35	1.000	1.000	1.000
Weight - earth wedge	0.00	-1.59	34.89	1.36	1.000	1.000	1.000
Earthquake - soil wedge	8.21	-1.46	-4.11	1.40	1.000	1.000	1.000
Active pressure	37.51	-1.43	61.18	1.84	1.000	1.000	1.000
Water pressure	3.75	-0.39	0.00	0.90	1.000	1.000	1.000
Uplift pressure	0.00	-4.00	0.00	0.90	1.000	1.000	1.000
Earthq.- act.pressure	21.73	-2.45	33.49	1.51	1.000	1.000	1.000
Dyn. water pressure at the front	0.29	-0.20	0.00	0.90	1.000	1.000	1.000
Traffic	4.13	-1.99	6.43	1.64	0.700	0.000	0.700

Verification of complete wall

Check for overturning stability

Resisting moment $M_{res} = 248.52$ kNm/m

Overturning moment $M_{ovr} = 141.57$ kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 124.53$ kN/m

Active horizontal force $H_{act} = 82.30$ kN/m

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 140.64 kPa

Bearing capacity of foundation soil (Stage of construction 2)

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	100.82	173.44	85.19	0.243	140.64
2	100.82	173.44	82.30	0.243	140.64

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	102.44	175.37	86.43
2	102.44	175.37	82.30

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0.243$

Maximum allowable eccentricity $e_{alw} = 0.333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Max. stress at footing bottom $\sigma = 140.64$ kPa

Bearing capacity of foundation soil $R_d = 250.00$ kPa

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1 (Stage of construction 2)

Wall stem check - front reinf.

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	35.00	0.00	19.00	0.426	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	3.78	0.00	1.62	1.61	0.16

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	3.00	0.00	35.00	0.00	19.00	0.426	
2	0.50	0.00	35.00	0.00	10.00	0.426	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	3.00	57.00	0.00	24.31	24.31	0.00
2	3.00	57.00	0.00	24.31	24.31	0.00
	3.50	61.99	4.99	26.43	26.43	0.00

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00
2	3.00	0.00	0.00
3	3.50	4.99	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	1.71	0.00
2	3.00	1.71	0.00
3	3.50	1.71	0.00

Forces acting on construction

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0.00	-1.65	34.03	0.28	1.000	1.000	1.000
Earthq.- constr.	6.81	-1.65	-3.40	0.28	1.000	1.000	1.000
FF resistance	-0.16	-0.07	0.02	0.00	1.000	1.000	1.000
Pressure at rest	49.11	-1.18	0.00	0.50	1.000	1.000	1.000
Water pressure	1.24	-0.17	0.00	0.50	1.000	1.000	1.000
Uplift pressure	0.00	-3.50	0.00	0.50	1.000	1.000	1.000
Earthquake - pressure at rest	39.04	-1.75	0.00	0.50	1.000	1.000	1.000
Traffic	5.97	-1.75	0.00	0.50	0.700	0.000	0.700

Wall stem check - front reinf.

Front reinforcement is not required.

Wall stem check - back reinf.

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	35.00	0.00	19.00	0.426	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	3.78	0.00	1.62	1.61	0.16

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	3.00	0.00	35.00	0.00	19.00	0.426	
2	0.50	0.00	35.00	0.00	10.00	0.426	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	3.00	57.00	0.00	24.31	24.31	0.00
2	3.00	57.00	0.00	24.31	24.31	0.00
	3.50	61.99	4.99	26.43	26.43	0.00

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00
2	3.00	0.00	0.00
3	3.50	4.99	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	1.71	0.00
2	3.00	1.71	0.00
3	3.50	1.71	0.00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0.00	-1.65	34.03	0.28	1.000	1.000	1.000
Earthq.- constr.	6.81	-1.65	-3.40	0.28	1.000	1.000	1.000
FF resistance	-0.16	-0.07	0.02	0.00	1.000	1.000	1.000
Pressure at rest	49.11	-1.18	0.00	0.50	1.000	1.000	1.000
Water pressure	1.24	-0.17	0.00	0.50	1.000	1.000	1.000
Uplift pressure	0.00	-3.50	0.00	0.50	1.000	1.000	1.000
Earthquake - pressure at rest	39.04	-1.75	0.00	0.50	1.000	1.000	1.000
Traffic	5.97	-1.75	0.00	0.50	0.700	0.000	0.700

Wall stem check - back reinf.

Wall check at the construction joint 3.50 m from the wall crest

Reinforcement and dimensions of the cross-section

7 prof. 14.0 mm, cover 50.0 mm

Inputted reinforcement area = 1077.6 mm²

Required reinforcement area = 768.0 mm²

Cross-section width = 1.00 m

Cross-section height = 0.50 m

Reinforcement ratio $\rho = 0.25 \% > 0.15 \% = \rho_{\min}$

Position of neutral axis $x = 0.04 \text{ m} < 0.27 \text{ m} = x_{\max}$

Ultimate shear force $V_{Rd} = 182.37 \text{ kN} > 100.22 \text{ kN} = V_{Ed}$

Ultimate moment $M_{Rd} = 205.48 \text{ kNm} > 143.73 \text{ kNm} = M_{Ed}$

Cross-section is SATISFACTORY.

Wall jump check

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	35.00	0.00	19.00	0.426	
2	0.00	89.81(80.00)	35.00	0.00	10.00	0.426	MODIFIED
3	0.50	0.00	35.00	0.00	10.00	0.426	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	3.80	0.00	1.63	1.62	0.16
2	0.20	3.80	0.00	3.75	0.28	3.74
	0.20	3.81	0.00	3.77	0.28	3.76
3	0.20	3.81	0.00	1.63	1.63	0.00
	0.70	8.80	0.00	3.75	3.75	0.00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0.62	0.00	35.00	0.00	19.00	23.00	0.244	
2	2.38	27.50	35.00	0.00	19.00	35.00	0.587	
3	0.50	27.50	35.00	0.00	10.00	35.00	0.587	
4	0.30	0.00	35.00	0.00	10.00	23.00	0.244	
5	0.20	0.00	35.00	5.00	11.00	23.00	0.244	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.62	11.76	0.00	2.87	2.64	1.12
2	0.62	11.76	0.00	6.90	3.19	6.12
	3.00	57.00	0.00	33.45	15.45	29.67
3	3.00	57.00	0.00	33.45	15.45	29.67
	3.50	62.00	5.00	36.39	16.80	32.27
4	3.50	62.00	5.00	15.15	13.95	5.92
	3.80	65.00	5.00	15.89	14.62	6.21
5	3.80	65.00	5.00	11.46	10.54	4.48
	4.00	67.20	5.00	11.99	11.04	4.69

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [m]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	$K_{ae}-K_a$	Comment
1	0.62	35.00	0.00	12.53	0.244	0.404	0.160	
2	2.38	35.00	0.00	12.53	0.587	0.986	0.399	
3	0.50	35.00	0.00	23.96	0.587	2.619	2.032	
4	0.30	35.00	0.00	23.96	0.244	0.698	0.453	
5	0.20	35.00	0.00	22.99	0.244	0.661	0.417	

Earthquake effects (active earth pressure)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_D [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vertical comp. [kPa]
1	0.00	0.00	60.48	9.65	8.88	3.77
	0.62	10.58	49.90	7.96	7.33	3.11
2	0.62	10.58	49.90	19.92	9.20	17.67
	3.00	51.30	9.18	3.66	1.69	3.25
3	3.00	51.30	9.18	18.65	8.61	16.55
	3.50	55.80	4.68	9.51	4.39	8.44
4	3.50	55.80	4.68	2.12	1.95	0.83
	3.80	58.50	1.98	0.90	0.83	0.35
5	3.80	58.50	1.98	0.83	0.76	0.32
	4.00	60.48	0.00	0.00	0.00	0.00

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
2	0.62	0.00	0.00
3	3.00	0.00	0.00
4	3.50	5.00	0.00
5	3.80	5.00	0.00
6	4.00	5.00	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.90	0.38
2	0.62	0.90	0.38
3	0.62	1.08	2.08
4	3.00	1.08	2.08
5	3.50	1.08	2.08
6	3.50	0.90	0.38
7	3.80	0.90	0.38
8	4.00	0.90	0.38

Forces acting on construction

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0.00	-1.55	49.62	0.84	1.000
Earthq.- constr.	12.32	-1.30	-6.16	0.91	1.000
FF resistance	-1.50	-0.25	0.02	0.35	1.000
Weight - earth wedge	0.00	-1.59	34.89	1.36	1.000
Earthquake - soil wedge	8.21	-1.46	-4.11	1.40	1.000
Active pressure	37.51	-1.43	61.18	1.84	1.000
Water pressure	3.75	-0.39	0.00	0.90	1.000
Uplift pressure	0.00	-4.00	0.00	0.90	1.000
Earthq.- act.pressure	21.73	-2.45	33.49	1.51	1.000
Dyn. water pressure at the front	0.29	-0.20	0.00	0.90	1.000
Traffic	4.13	-1.99	6.43	1.64	0.700

Wall jump check

Reinforcement and dimensions of the cross-section

7 prof. 12.0 mm, cover 50.0 mm

Inputted reinforcement area = 791.7 mm²

Required reinforcement area = 669.6 mm²

Cross-section width = 1.00 m

Cross-section height = 0.50 m

Reinforcement ratio $\rho = 0.18 \% > 0.15 \% = \rho_{\min}$
 Position of neutral axis $x = 0.02 \text{ m} < 0.27 \text{ m} = x_{\max}$
 Ultimate shear force $V_{Rd} = 183.88 \text{ kN} > 62.30 \text{ kN} = V_{Ed}$
 Ultimate moment $M_{Rd} = 149.87 \text{ kNm} > 21.12 \text{ kNm} = M_{Ed}$

Cross-section is SATISFACTORY.

Wall heel check

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0.20	2.39	35.00	0.00	19.00	0.426	
2	0.00	89.81(80.00)	35.00	0.00	10.00	0.426	MODIFIED
3	0.50	0.00	35.00	0.00	10.00	0.426	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.20	3.80	0.00	1.63	1.62	0.16
2	0.20	3.80	0.00	3.75	0.28	3.74
	0.20	3.81	0.00	3.77	0.28	3.76
3	0.20	3.81	0.00	1.63	1.63	0.00
	0.70	8.80	0.00	3.75	3.75	0.00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0.62	0.00	35.00	0.00	19.00	23.00	0.244	
2	2.38	27.50	35.00	0.00	19.00	35.00	0.587	
3	0.50	27.50	35.00	0.00	10.00	35.00	0.587	
4	0.30	0.00	35.00	0.00	10.00	23.00	0.244	
5	0.20	0.00	35.00	5.00	11.00	23.00	0.244	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00	0.00	0.00	0.00
	0.62	11.76	0.00	2.87	2.64	1.12

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
2	0.62	11.76	0.00	6.90	3.19	6.12
	3.00	57.00	0.00	33.45	15.45	29.67
3	3.00	57.00	0.00	33.45	15.45	29.67
	3.50	62.00	5.00	36.39	16.80	32.27
4	3.50	62.00	5.00	15.15	13.95	5.92
	3.80	65.00	5.00	15.89	14.62	6.21
5	3.80	65.00	5.00	11.46	10.54	4.48
	4.00	67.20	5.00	11.99	11.04	4.69

Earthquake effects (active earth pressure) - partial results

Layer No.	Thickness [m]	φ_d [°]	β [°]	ψ [°]	K_a	K_{ae}	$K_{ae}-K_a$	Comment
1	0.62	35.00	0.00	12.53	0.244	0.404	0.160	
2	2.38	35.00	0.00	12.53	0.587	0.986	0.399	
3	0.50	35.00	0.00	23.96	0.587	2.619	2.032	
4	0.30	35.00	0.00	23.96	0.244	0.698	0.453	
5	0.20	35.00	0.00	22.99	0.244	0.661	0.417	

Earthquake effects (active earth pressure)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_D [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vertical comp. [kPa]
1	0.00	0.00	60.48	9.65	8.88	3.77
	0.62	10.58	49.90	7.96	7.33	3.11
2	0.62	10.58	49.90	19.92	9.20	17.67
	3.00	51.30	9.18	3.66	1.69	3.25
3	3.00	51.30	9.18	18.65	8.61	16.55
	3.50	55.80	4.68	9.51	4.39	8.44
4	3.50	55.80	4.68	2.12	1.95	0.83
	3.80	58.50	1.98	0.90	0.83	0.35
5	3.80	58.50	1.98	0.83	0.76	0.32
	4.00	60.48	0.00	0.00	0.00	0.00

Water pressure distribution

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.00	0.00
2	0.62	0.00	0.00
3	3.00	0.00	0.00

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
4	3.50	5.00	0.00
5	3.80	5.00	0.00
6	4.00	5.00	0.00

Pressure profile due to surcharge - Traffic

Point No.	Depth [m]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0.00	0.90	0.38
2	0.62	0.90	0.38
3	0.62	1.08	2.08
4	3.00	1.08	2.08
5	3.50	1.08	2.08
6	3.50	0.90	0.38
7	3.80	0.90	0.38
8	4.00	0.90	0.38

Forces acting on construction

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0.00	-0.25	17.25	1.65	1.000
Weight - earth wedge	0.00	-1.59	34.89	1.36	1.000
Active pressure	37.51	-1.43	61.18	1.84	1.000
Dyn. water pressure at the front	0.29	-0.20	0.00	0.90	1.000
Traffic	4.13	-1.99	6.43	1.64	0.700
Contact stress	0.00	0.00	-46.13	1.21	1.000

Wall heel check

Reinforcement and dimensions of the cross-section

7 prof. 14.0 mm, cover 50.0 mm

Inputted reinforcement area = 1077.6 mm²

Required reinforcement area = 668.0 mm²

Cross-section width = 1.00 m

Cross-section height = 0.50 m

Reinforcement ratio $\rho = 0.24 \% > 0.15 \% = \rho_{min}$

Position of neutral axis $x = 0.03 \text{ m} < 0.27 \text{ m} = x_{max}$

Ultimate shear force $V_{Rd} = 183.59 \text{ kN} > 71.70 \text{ kN} = V_{Ed}$

Ultimate moment $M_{Rd} = 202.06 \text{ kNm} > 122.61 \text{ kNm} = M_{Ed}$

Cross-section is SATISFACTORY.

Slope stability analysis

Input data

Project

Settings

(input for current task)

Stability analysis

Earthquake analysis : Standard

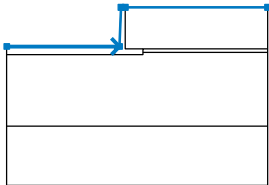
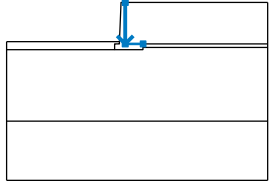
Verification methodology : according to EN 1997

Design approach : 3 - reduction of actions (GEO, STR) and soil parameters

Partial factors on actions (A)						
Seismic design situation						
		State STR			State GEO	
		Unfavourable	Favourable	Unfavourable	Favourable	
Permanent actions :	$\gamma_G =$	1.00 [-]	1.00 [-]	1.00 [-]	1.00 [-]	
Variable actions :	$\gamma_Q =$	1.00 [-]	0.00 [-]	1.00 [-]	0.00 [-]	
Water load :	$\gamma_w =$			1.00 [-]		

Partial factors for soil parameters (M)			
Seismic design situation			
Partial factor on internal friction :	$\gamma_\phi =$	1.00 [-]	
Partial factor on effective cohesion :	$\gamma_c =$	1.00 [-]	
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1.00 [-]	

Interface

No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		-10.00	-3.30	-0.49	-3.30	-0.35	0.00
		0.00	0.00	12.00	0.00		
2		0.00	0.00	0.00	-3.50	1.50	-3.50

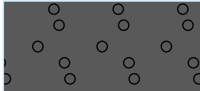
No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
3		-10.00	-4.00	-0.90	-4.00	-0.90	-3.50
		-0.50	-3.50	-0.49	-3.30		
4		-0.90	-4.00	1.50	-4.00	1.50	-3.80
		1.50	-3.50	12.00	-3.50		
5		1.50	-3.80	12.00	-3.80		
6		-10.00	-10.00	12.00	-10.00		

Soil parameters - effective stress state

No.	Name	Pattern	ϕ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]
1	Shtresa 1		35.00	5.00	20.00
2	Mbushje Rrugore		35.00	0.00	19.00

Soil parameters - uplift

No.	Name	Pattern	γ_{sat} [kN/m ³]	γ_s [kN/m ³]	n [-]
1	Shtresa 1		21.00		

No.	Name	Pattern	γ_{sat} [kN/m ³]	γ_s [kN/m ³]	n [-]
2	Mbushje Rrugore		20.00		

Soil parameters

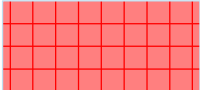
Shtresa 1

Unit weight : $\gamma = 20.00$ kN/m³
 Stress-state : effective
 Angle of internal friction : $\varphi_{ef} = 35.00$ °
 Cohesion of soil : $c_{ef} = 5.00$ kPa
 Saturated unit weight : $\gamma_{sat} = 21.00$ kN/m³

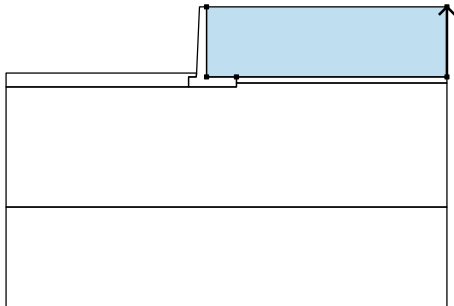
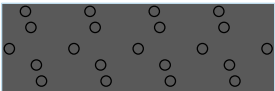
Mbushje Rrugore

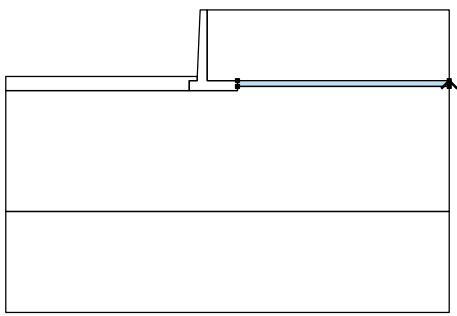
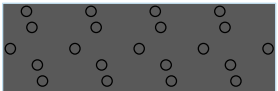
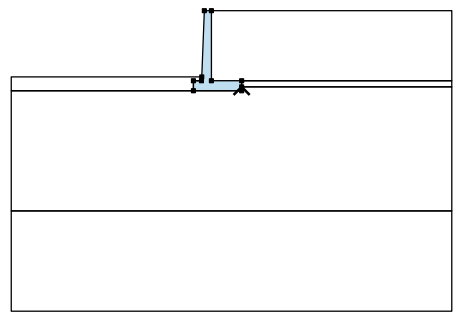

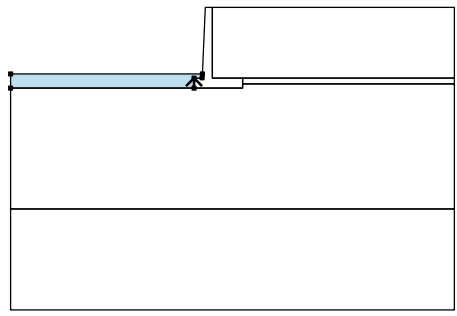
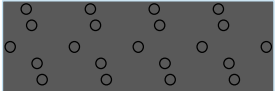
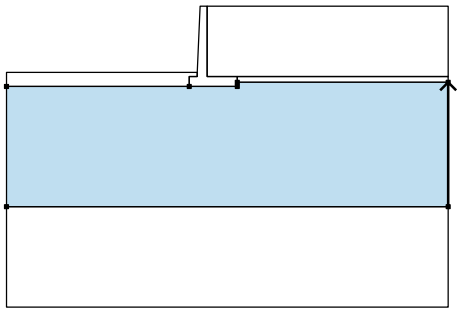

Unit weight : $\gamma = 19.00$ kN/m³
 Stress-state : effective
 Angle of internal friction : $\varphi_{ef} = 35.00$ °
 Cohesion of soil : $c_{ef} = 0.00$ kPa
 Saturated unit weight : $\gamma_{sat} = 20.00$ kN/m³

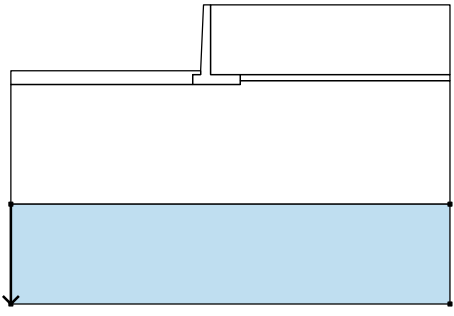
Rigid bodies

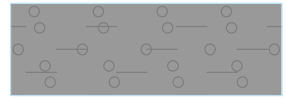
No.	Name	Sample	γ [kN/m ³]
1	Material of structure		23.00

Assigning and surfaces

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		12.00	-3.50	12.00	0.00	Mbushje Rrugore 
		0.00	0.00	0.00	-3.50	
		1.50	-3.50			

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
2		12.00	-3.80	12.00	-3.50	Mbushje Rrugore 
		1.50	-3.50	1.50	-3.80	
3		1.50	-4.00	1.50	-3.80	Material of structure 
		1.50	-3.50	0.00	-3.50	
		0.00	0.00	-0.35	0.00	
		-0.49	-3.30	-0.50	-3.50	
		-0.90	-3.50	-0.90	-4.00	
4		-0.90	-4.00	-0.90	-3.50	Mbushje Rrugore 
		-0.50	-3.50	-0.49	-3.30	
		-10.00	-3.30	-10.00	-4.00	
5		12.00	-10.00	12.00	-3.80	Shtresa 1 
		1.50	-3.80	1.50	-4.00	
		-0.90	-4.00	-10.00	-4.00	
		-10.00	-10.00			

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
6		-10.00	-10.00	-10.00	-15.00	Shtresa 1
		12.00	-15.00	12.00	-10.00	



Surcharge

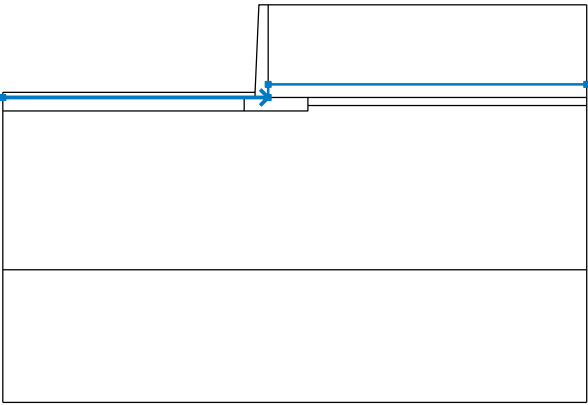
No.	Type	Type of action	Location z [m]	Origin x [m]	Length l [m]	Width b [m]	Slope α [°]	Magnitude		
								q, q ₁ , f, F	q ₂	unit
1	strip	variable	on terrain	x = 0.00	l = 12.00		0.00	4.00		kN/m ²

Surcharges

No.	Name
1	Traffic

Water

Water type : GWT

No.	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1		-10.00	-3.50	0.00	-3.50	0.00	-3.00
		12.00	-3.00				

Tensile crack

Tensile crack not input.

EarthquakeHorizontal seismic coefficient : $K_h = 0.2000$ Vertical seismic coefficient : $K_v = 0.1000$ **Settings of the stage of construction**

Design situation : seismic

Results (Stage of construction 1)**Analysis 1****Circular slip surface**

Slip surface parameters					
Center :	x =	-2.22 [m]	Angles :	$\alpha_1 =$	-37.11 [°]
	z =	3.04 [m]		$\alpha_2 =$	67.52 [°]
Radius :	R =	7.95 [m]			
The slip surface after optimization.					

Slope stability verification (Bishop)Sum of active forces : $F_a = 217.51$ kN/mSum of passive forces : $F_p = 293.97$ kN/mSliding moment : $M_a = 1729.23$ kNm/mResisting moment : $M_p = 2337.04$ kNm/m

Utilization : 74.0 %

Slope stability ACCEPTABLE