

Geotechnical Engineering Report Albert Street - Future Over Station Development Brisbane, QLD



Prepared for:
Albert Street Trust

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I Project Background

The CRR Albert Street Pty Ltd (CAN 660 319 693) as trustee for CRR Albert Street Trust (Albert Street Trust) has been awarded the development rights for the Cross River Rail (CRR) precincts, including the proposed development at Albert Street in the Brisbane CBD.

The Albert Street development will consist of a commercial tower, which will be in the order of 200m tall with approximately 45 above ground levels. The building will include a multi-level basement, which must be designed to satisfy the requirements of the Cross River Rail Delivery Authority (CRRDA), due to the presence of CRR assets below.

RCP Australia Pty Ltd (RCP) has, on behalf of Albert Street Trust, engaged EDG Consulting Pty Ltd (EDG) to provide geotechnical services for the project in three stages:

- Stage 1 – Geotechnical advice to help inform the Development Application (DA).
- Stage 2 – Geotechnical design as part of the detailed design of the building.
- Stage 3 – Geotechnical investigation and reporting to verify the basis of the design.

This report presents our preliminary assessment of the geotechnical conditions at the site and geotechnical design advice relating to the temporary retention system and permanent building foundations as part of the Stage 1 deliverables. Geotechnical advice relating to assessment of building foundation loads on the cavern lining will be reported in a separate document, issued prior to lodgement of the DA.

2 Site Description

The site is located in Brisbane's CBD and is approximately 40m width and 62m length in plan dimensions. The site was referred to as 'Albert Street Lot 2' during the CRR project, and currently contains a temporary acoustic structure above ground and an access shaft and two mined adits below ground, that provide temporary construction access for the CRR project.

The site is bounded by Albert Street to the south west, including the Albert Street Station cavern that runs parallel to Albert Street, approximately 17m below ground. The site is bounded by the Sebel Brisbane Hotel to the north west, the buildings located at 110 Mary Street and 119 Charlotte Street to the north east and Mary Street to the south-east. The site layout and adjacent properties are shown on Diagram 1.

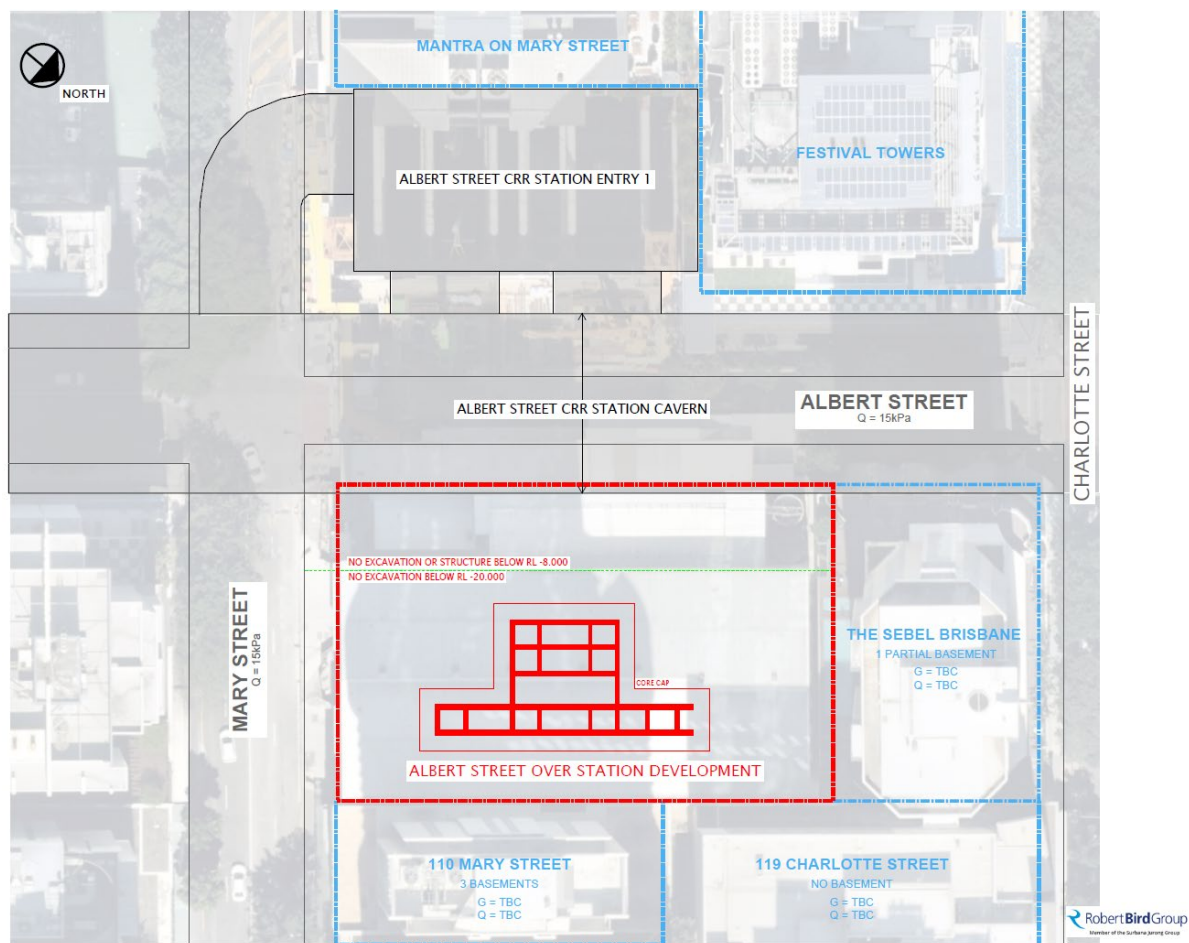


Diagram I – Site Layout

3 Ground Conditions

3.1 Overview of Geological History and General Stratigraphy

From the Devonian period to the Carboniferous period (about 360 million years ago), the sediments of the Neranleigh Fernvale Group were deposited off the edge of a broad continental shelf. Over tens of millions of years, these materials were lithified, then folded, faulted, recrystallised and uplifted to form much of the coastal land surface of south-east Queensland. Subsequently, a significant thickness of the deeply and variably weathered land surface was removed through erosion to form the irregular bedrock surface of the present.

Up to about 200 million years ago, various stress fields developed within the rocks underlying Brisbane through episodic volcanism and mild compression, leading to the formation of a foliation as the distinct fabric within the rock, and well developed sets of joints. Natural processes of weathering at surface level and along structures within the rock mass have resulted in residual soils near the old ground surface and a weathering profile with depth in the rock.

During the past 10,000 or so years Holocene aged alluvial materials have been deposited as a result of sea level rise, including within the broad west to east trending valley through Brisbane city, which according to published geological maps, is about 160m wide at the Albert Street site.

More recently, fill materials have been placed over the ground surface, and may be present to a depth of up to about 3m within the vicinity of the site. Table 1 provides a summary of the major geological units.

Table I – Summary of Geological Units

Age	Formation or Origin	Lithology or Soil Type and Fabric
Recent	Fill	Mixed fine and coarse grained soils, may be controlled or uncontrolled.
Holocene (Recent <10,000 years)	Alluvium	Fine and coarse grained soils.
Carboniferous to Devonian 330 to 360 MA	Neranleigh Fernvale Group	Argillite, greywacke, greenstone, phyllite. Undulating foliation dipping variably towards the north-east.

3.2 Published Information

Based on a review of the 1:100,000 series Brisbane geological map (2015), the site is underlain by Holocene Alluvium, in turn, underlain by weathered rock of the Devonian age, Neranleigh-Fernvale Beds.

Fill may be present from previous development of the site and general regrading associated with the alluvial areas predating the early development. The published geological information is reproduced in Diagram 2.

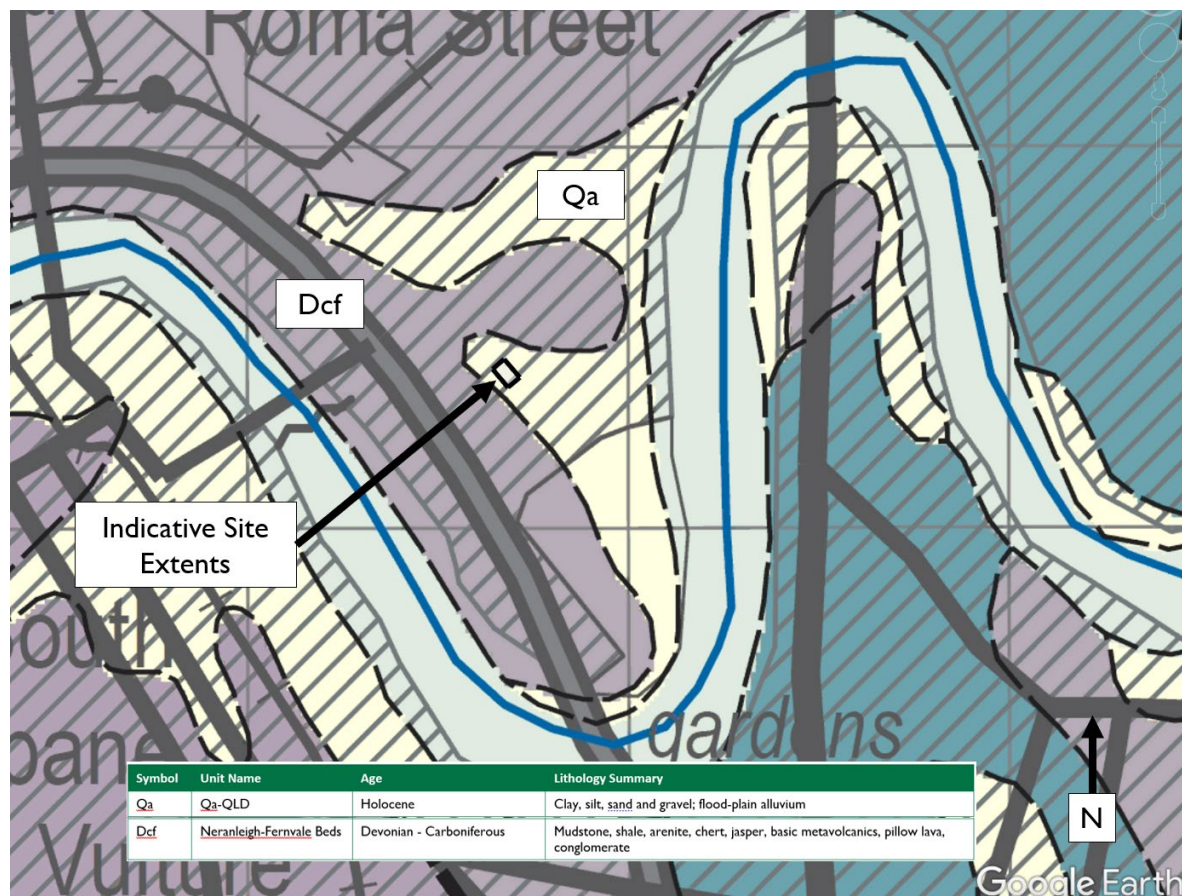


Diagram 2 – Published Geological Information

3.3 Site Investigation Information

Several geotechnical ground investigations have been carried out at or near to the site, for the CRR project as well as the development of adjacent buildings. The available geotechnical investigation data mainly comprises boreholes, with a limited number of piezocones. The boreholes used in the assessment are summarised in Table A1 in Appendix A and engineering logs are also included in Appendix A.

3.4 Stratigraphy

The available geotechnical investigation data has been relied upon and interpreted to develop a series of geological cross sections which are shown on drawings B01493-01-B2 to B5 presented in Appendix B. The cross sections depict the interpreted distribution of the geotechnical units along each boundary of the site. The general geological stratigraphy and engineering description relating to each of the geotechnical units is presented in Table 2.

Several defect sets are present within rock, with the dominant set being a generally well developed foliation, sub-parallel to bedding which in the project area dips variably to the north-east at angles between 30° and 60°.

Table 2 – Interpreted Geotechnical Units

Material Unit	General Description
Fill (FL)	Sand / Sandy Clay: medium plasticity, brown, fine to coarse sand and sub-rounded gravel, stiff / medium dense. Fill is uncontrolled and is variable in nature
Holocene Alluvium (AL)	Clay: soft to firm, high plasticity, dark grey, with some sand
Residual Soil (RS F)	Clay: high plasticity, red-brown motley grey, some/trace sand and gravel, very stiff to hard
Extremely Weathered Material (NFG5)	Sandy Gravelly Clay: low to medium plasticity, brown and grey, fine to coarse angular gravel and sand, hard with visible rock structure
NFG4	Phyllite: fine grained, grey and orange brown, indistinct laminations, dipping at 60° to 65°, very low to low strength, highly weathered to moderately weathered.
NFG3	Phyllite: fine grained, grey and pale brown, distinct laminations, dipping at 60° to 65°, medium strength, moderately weathered.
NFG1 / NFG2	Phyllite: fine grained, pale grey-blue, distinctly laminated, high strength, fresh.

3.5 Groundwater

Several groundwater monitoring instruments comprising standpipe piezometers and vibrating wire piezometers have been installed in boreholes located within proximity of the site. The available groundwater monitoring readings are summarised on the plan attached in Appendix C.

Based on a review of the available data (CRR202 and CRR712) and considering the interpretation of measured groundwater heads presented in the CRR Hydrogeological Interpretive Report (HIR), the existing groundwater level is expected to be approximately between RL -5m to RL -10m.

It is highlighted however, that there is limited groundwater monitoring data available and that the data that does exist does not provide continuous monitoring through a long enough period to establish long term groundwater levels. Therefore, at this stage we recommend that the design of the retention system considers groundwater conditions based on the hydrogeological modelling carried out by PSM as reported in the CRR HIR. The outcomes of the hydrogeological modelling are attached in

Appendix C. On that basis, a groundwater level of RL -4m AHD should be considered, representing typical long term (or non-flood) conditions.

We understand that the design of the building will also consider a flood level of RL 4.6m AHD. Should this flood case occur during construction, it would result in flooding of the basement excavation as the excavation is completely open, therefore balancing water pressures on either side of the retaining wall.

During construction the least favourable condition arising from temporary elevated water levels due to flooding would be where the flood level is approximately at RL 4m whereby there is additional load on the retaining system due to water pressure, however there is no balancing water pressure within the excavation. This would be a temporary case applicable for the duration of the elevated water condition. Considering the low permeability of the alluvium we do not anticipate that elevated water pressures associated with the flood condition would permeate into the alluvial clay over the time of the elevated water condition. Elevated water pressures could exist within the fill and therefore design of the retention system during construction should allow for the fill becoming fully saturated, as well as the long term groundwater level of RL -4m AHD as described above.

Following completion of construction, it may be possible during a flood event that elevated water pressures could exist outside of the building, however be prevented from entering the basement due to flooding prevention measures. Therefore, a reasonable approach could be to design the long term retention system to consider full hydrostatic load associated with a flood level of RL 4.6m.

The various groundwater conditions that apply to different design cases are summarised in Table 3.

Table 3 – Groundwater Cases

Groundwater Case	Applicable Design Scenarios	Details
1	Design of retention system for construction phase loading	Groundwater level of RL -4m AHD
2	Design of retention system for construction phase loading, and flood loading	Groundwater level of RL -4m AHD, combined with an additional water force equal to hydrostatic pressures within the fill.
3	Design of retention system for permanent load cases	Hydrostatic pressures based on a flood groundwater level of RL 4.6m AHD.

We have been advised by the CRRDA that additional groundwater information and hydrogeological interpretation has been carried out during the CRR project, which may suggest groundwater scenarios other than those shown in Table 3. We are currently seeking that information and will incorporate in the detailed design where applicable.

4 Geotechnical Engineering Parameters

Geotechnical parameters have been developed adopting a 'moderately conservative' basis for the materials units present at the site based on the results of field and laboratory testing, supplemented with published data, correlations and previous experience. The basis of parameter selection is presented in Table 4. The recommended material parameters are summarised in Table D1 in Appendix D.

Table 4 – Basis of Geotechnical Parameter Interpretation

Parameter	Basis of Interpretation
Unit weight of soil	Previous experience with similar soils and rock, along with engineering judgement.
At rest earth pressure coefficient (K_0)	Previous experience with similar soils and rock, along with engineering judgement.
Undrained shear strength parameters (S_u)	Interpretation of results of in-situ testing including hand shear vane and pocket penetrometer testing.
Drained shear strength parameters (c' , ϕ')	Results of available triaxial shear strength testing along with previous experience with similar soils and rock, and engineering judgement. Assessment using RocLab based on rock mass characterisation to assess equivalent Mohr-Coulomb parameters.
Unconfined Compressive Strength of Rock Units	Interpretation of available point load and UCS test data.
Soil and Rock Elastic Modulus	Previous experience with similar soils and rock, along with engineering judgement.
Rock Mass Elastic Modulus	Assessment of the rock mass GSI and use of the Generalised Hoek and Diederichs equation (2006).
Poisson's Ratio	Previous experience with similar soils and rock, along with engineering judgement.

5 Retention System

5.1 Concept Arrangement

The proposed development comprises a two-level underground basement that will be constructed following a bottom-up methodology. Therefore, a temporary retention system will be required to support the excavation, control wall deformations and control groundwater infiltration until the loads are transferred onto the permanent structure.

Based on previous discussions with RBG, the retention system would likely comprise an internally braced retaining wall. At this stage RBG has suggested that the retaining wall would generally comprise 900mm diameter reinforced concrete bored soldier piles, except along the boundary with the Brisbane Sebel, where 600mm diameter bored piles would be adopted due to space constraints. Shotcrete reinforced with either steel fibres or steel mesh would be applied in between the soldier piles to prevent loss of material and control groundwater inflows.

The concrete piles would be connected at existing ground level by a reinforced concrete capping beam, and would be laterally supported by a series of steel props and waler beams installed at two elevations, (i.e. an upper and lower row). The concept level arrangement of the retention system is presented on the marked-up sketches in Appendix E.

Construction of the retention system is expected to be carried out in line with the following process:

- Installation of bored piles and construction of capping beam.
- Excavation of first lift of material. Based on the variable nature of the fill and the relatively low strength of the alluvium, it is expected that lift heights would be limited to approximately 1.5m. This would be further assessed at detailed design and modified (if required) during construction.
- Application of shotcrete and reinforcement.

- Further excavation to below upper row of props, followed by installation of props and application of shotcrete.
- Repeat process of excavation, installation of props and application of shotcrete in vertical lift heights of approximately 1.5m.

5.2 Retaining Wall Analysis

Preliminary analysis of the temporary retention system has been carried out using the commercially available software package WALLAP. The software carries out 2D analysis based on the plane-strain assumption, and calculates wall structural actions and deflections. Note that WALLAP is not able to calculate ground settlements behind the retaining wall, and therefore such ground settlements will be assessed during the detailed design stage. Several analysis sections have been selected to investigate the impacts of pile diameter, pile spacing, ground conditions, pile toe level and surface surcharge. The locations of the analysis sections are shown on Diagram 3.

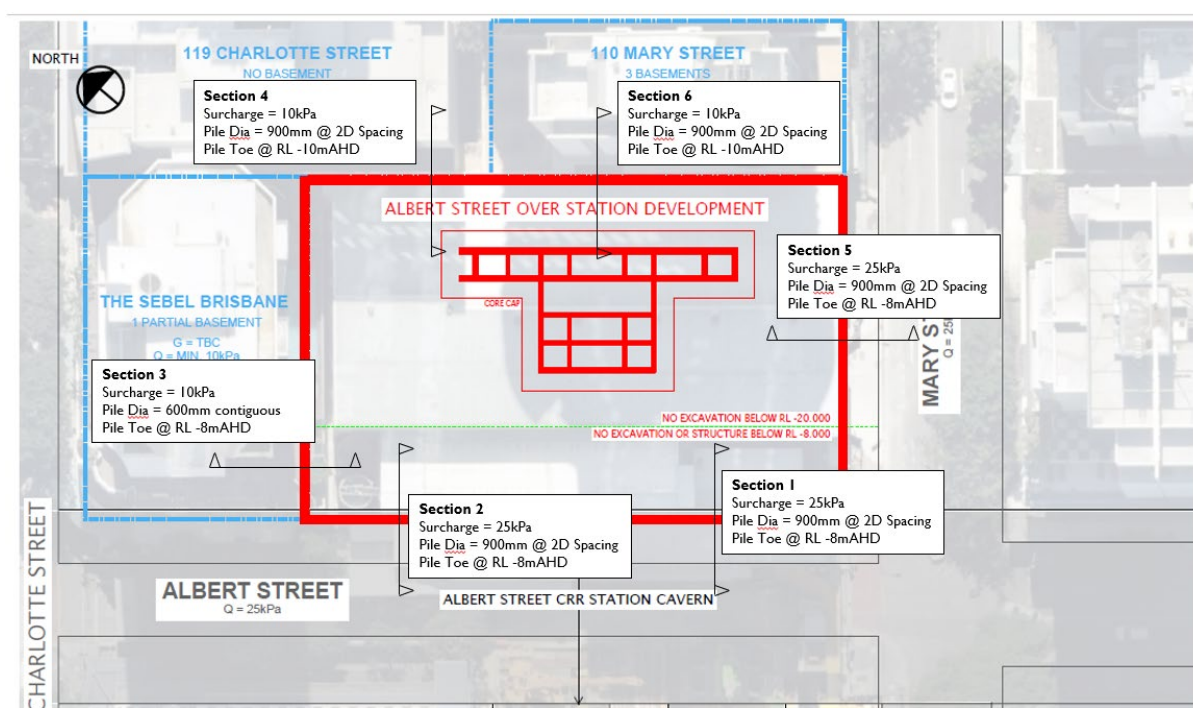


Diagram 3 – Retaining Wall Analysis Sections

The retaining wall analysis has considered the geotechnical parameters summarised in Table D1 in Appendix D, and has followed the construction sequence summarised in Table 5.

Table 5 – Retaining Wall Analysis Construction Sequence

Stage	Action
0	Groundwater is at RL -4m AHD
1	Apply ground surcharge
2	Excavate to RL 2m AHD
3	Install upper row of props at RL 2m AHD
4	Excavate to RL -1.5m AHD

Stage	Action
5	Install lower row of props at RL -1.3m AHD
6	Excavate to RL to RL -4m AHD
7	Lower groundwater level on excavation side to RL -5m AHD
8	Excavate to RL to RL -5m AHD
9	Include additional water force equal to hydrostatic pressures within the fill (as per Groundwater Case 2 in Table 3), to allow for flood conditions.
10	Remove additional flood load (as applied in Stage 9)
11	Construct Basement B2 slab
12	Construct Basement B1 slab
13	Remove lower row of props (RL -1.3m AHD)
14	Construct Basement EOT slab (where applicable)
15	Construct Ground slab (where applicable)
16	Remove upper row of props (RL 2m AHD)
17	Increase water pressures (as per Groundwater Case 3 in Table 3), to allow for flood conditions
18	Reduce wall bending stiffness to 70% to account for long term effects

The retaining wall arrangements considered in the analysis are summarised in Diagram 3 and are presented in Table 6. Note that pre-stress was not applied in any of the analysis cases.

Table 6 – Retaining Wall Arrangements

Analysis Section	Pile Diameter (mm)	Pile C2C Spacing (mm)	Ground Surcharge (kPa)	Pile Toe Elevation (mAHD)	Prop Details	Reference Borehole
1	900	1,800	25	-8	914x19CHS GR350LO @ 7.5m C2C horizontal spacing. No pre-stress.	CRR 1028
2	900	1,800	25	-8		CRR 1030
3	600	600	10	-8		S29 BH2
4	900	1,800	10	-10		BPP BH2
5	900	1,800	25	-8		ASM Bore 3
6	900	1,800	10	-10		ASM Bore 1

The outcomes of the analysis relating to the retaining wall and temporary props are summarised in Table 7, whereas the analysis outcomes relating to the permanent basement slabs are summarised in Table 8, and are provided in detailed format in Appendix F. Please note that all results presented in Tables 7 and 8 are unfactored. All prop forces are perpendicular to the wall and therefore should be converted to reflect the orientation of the prop relative to the wall.

Table 7 – Retaining Wall Analysis Preliminary Outcomes

Analysis Section	Construction Stages (As per Table 5)	Groundwater Case (As per Table 3)	Max Wall Deflection (mm)	Max Bending Moment (kN.m/m)	Max Shear Force (kN/m)	Max Temp Prop Force Upper Row (kN/m)	Max Temp Prop Force Lower Row (kN/m)
1	Up to Stage 8	1	14	271	146	105	181
	Stage 9	2	15	262	150	138	190
	Stage 18	3	15	213	180	-	-
2	Up to Stage 8	1	17	285	156	121	191
	Stage 9	2	17	282	158	114	191
	Stage 18	3	18	184	197	-	-
3	Up to Stage 8	1	15	222	145	103	189
	Stage 9	2	15	217	147	115	193
	Stage 18	3	17	155	201	-	-
4	Up to Stage 8	1	18	316	165	117	199
	Stage 9	2	18	306	168	137	207
	Stage 18	3	19	186	207	-	-
5	Up to Stage 8	1	18	290	162	118	200
	Stage 9	2	18	281	166	131	208
	Stage 18	3	19	182	173	-	-
6	Up to Stage 8	1	21	413	195	127	225
	Stage 9	2	21	404	198	142	236
	Stage 18	3	22	263	196	-	-

Table 8 – Basement Slab Axial Forces Preliminary Outcomes

Analysis Section	Construction Stages (As per Table 5)	Groundwater Case (As per Table 3)	Max Permanent Prop Force (kN/m)			
			Level B2 (RL -5m)	Level B1 (RL -2m)	Level B MEZ (RL 1m)	Ground Floor (RL 4 m)
1	Up to Stage 16	1	-2	164	85	38
	Stage 18	3	138	295	128	33
2	Up to Stage 16	1	-16	238	-	71
	Stage 18	3	171	382	-	83
3	Up to Stage 16	1	-20	234	-	59
	Stage 18	3	140	385	-	74
4	Up to Stage 16	1	-15	243	-	70
	Stage 18	3	176	391	-	81
5	Up to Stage 16	1	-5	181	81	36
	Stage 18	3	209	288	120	34
6	Up to Stage 16	1	-5	164	167	-
	Stage 18	3	238	266	197	-

The analysis has considered 2D plane-strain conditions and a uniform horizontal spacing for the props. It is noted that RBG is considering two separate options for the prop arrangement, with Option 1 comprising props typically horizontally spaced at 7.5m, with a larger horizontal span of 15m between the central props. In comparison, Option 2, comprises a typical prop horizontal spacing of 7.5m along the full perimeter of the retention system.

Based on our analysis, increasing the horizontal prop spacing to 15m is expected to result in unacceptable lateral deflections and therefore our recommendation is to adopt a prop arrangement similar to that shown in Option 2 as per the marked-up sketches in Appendix E.

It is also understood that as an alternative to a soldier pile or contiguous pile wall, a diaphragm wall (D-Wall) may be considered. From a geotechnical perspective we have no objection to adopting a D-Wall wall and are confident that the stiffness of the wall could be designed to control wall deflections within required limits. Further assessment of the retention system would be carried out at detailed design stage.

5.3 Seepage Analysis

As discussed in Section 3.5, the typical groundwater level could range between approximately RL -4m AHD and RL -10m AHD. We have therefore carried out a preliminary assessment of groundwater inflow based on 2D steady state conditions comprising the following cases:

- **Typical case:** Groundwater level of RL -4m, and a sump elevation of RL -6m.
- **Sensitivity case:** As above, but also considering localised zones of more permeable material.

The preliminary outcomes from the analysis show that steady state inflow quantities are expected to range between zero to approximately 3m³/day for typical conditions, and up to approximately 20m³/day when considering the presence of more permeable zones as per the sensitivity case.

Should a drained basement be selected, design of the permanent building pumps should consider these flows. The assessed groundwater flows would be revisited at detailed design stage, where transient seepage analysis may be carried out.

6 Shallow Foundations

6.1 Bearing Capacity

It is proposed to adopt shallow footings along the Albert Street side of the development to support loads from podium and basement columns. The elevation of the base of those footings is not confirmed at this stage, however is expected to be approximately RL -6.5m AHD, but no deeper than RL -8m AHD to satisfy the CRR requirements.

The material at the proposed foundation level is expected to be extremely weathered material (NFG5), however based on the available geotechnical investigation information, there could be localised areas where the base of footing is situated within Residual Soil.

We have assessed bearing capacity and foundation requirements on either a residual soil foundation or an extremely weathered material foundation. The assessment has considered the working loads as per the marked-up sketch in Appendix E, along with the relative position of the loads. For clarity, the resultant working load is based on the summation of a podium column load of 15.5MN (G=11.5MN and Q=4MN), and a basement column load of 6.2MN (G=3.6MN and Q=2.6MN).

The outcomes of our assessment are summarised in Table 9. Note that the allowable bearing capacity has been calculated using a factor of safety of 2.5 applied to the ultimate bearing capacity.

Note that estimates of bearing capacity have not been provided for the Fill and Alluvium as we do not recommend that footings are founded in those materials.

This advice is based on the footing loading being applied gradually over the construction of the building. Should the critical load cases include a significant portion of the footing load applied instantly (such as wind and or seismic loads), resulting in undrained conditions within the foundation material, the bearing capacity may be reduced and the foundation requirements may change.

Should the assessed footing dimensions be unfeasible, alternative options could include increasing the thickness of the footing (and therefore reducing the base of footing level to RL -8m AHD), connecting several shallow footings together resulting in a larger footing, or replacing the individual shallow footings with a raft, that covers the entire area where excavation is limited to RL -8m.

Table 9 – Summary of Shallow Footing Assessment

Material	Ultimate Bearing Capacity (kPa)	Allowable Bearing Capacity (kPa)	Resultant Working Vertical Force (MN) ¹	Max Applied Pressure (kPa) ²	Minimum Required Foundation Dimensions
Residual Soil	1,653 ³	679 ³	21.7	676	6 x 8.7
NFG 5	2,419	988	21.7	974	5.2 x 6

Notes: ¹ Resultant vertical force applied 0.514m from centre of footing.

² Max applied pressure considers rigid footing.

³ Based on a gradual rate of loading. Not applicable to rapid loading or transient loading.

6.2 Foundation Stiffness

Estimates of vertical modulus of subgrade reaction have been assessed using the software FLEA. This software accounts for the size and shape of the footing, applied loading and layering of the soil profile.

The outcomes of our assessment are summarised in Table 10 and are applicable for the footing sizes provided in Table 8. We recommend that RBG consider the average values of modulus of subgrade reaction presented in Table 7, and carry out sensitivity analysis based on the recommended range.

Table 10 – Recommended Modulus of Subgrade Reaction

Material	Vertical Modulus of Subgrade Reaction Range (kPa/m)	Limiting Vertical Pressure (kPa)
Residual Soil	10,000 to 20,000	679
NFG 5	50,000 to 100,000	988

7 Piled Foundations

7.1 Pile Types

The piled foundations are to comprise reinforced concrete bored piles. At this stage the piles will be sleeved with permanent liners to help distribute pile loads to the ground below the zone of influence, as indicatively shown in Diagram 4. It may be possible to reduce or remove the permanent steel liners, however this would be further investigated during the detailed design of the building foundations.

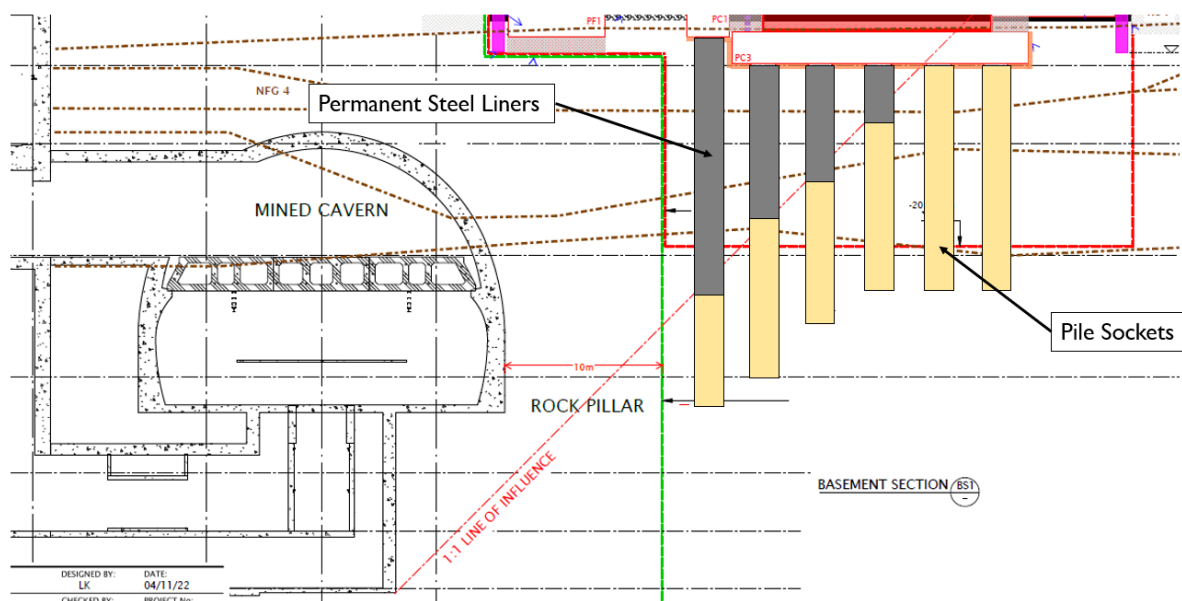


Diagram 4 – Indicative Arrangement of Permanent Steel Liners

7.2 Geotechnical Reduction Factor

A geotechnical strength reduction factor of $\phi_g = 0.5$ is recommended at this stage in accordance with the process in AS2159:2009 Piling, based on the quality and quantity of information available.

The geotechnical reduction factor considers that no pile load testing will be carried out during construction, however, it would be possible to increase the geotechnical strength reduction factor should pile load testing be carried out during construction, as well as additional geotechnical investigation and in-situ testing.

7.3 Pile Design Parameters

Design values of ultimate skin friction and ultimate end bearing have been assessed for all rock units. Ultimate skin friction and end bearing have been calculated based on the method proposed by Zhang and Einstein (1998)¹. Recommended values of ultimate skin friction and ultimate end bearing are summarised in Table 11.

Table 11 – Ultimate Pile Design Parameters

Material	F _s , Ultimate Skin Friction (kPa)	F _{bu} , Ultimate End Bearing (MPa)
Residual Soil	50	N/A
NFG 5	75	N/A
NFG 3	700	15
NFG 2/1	1300	25

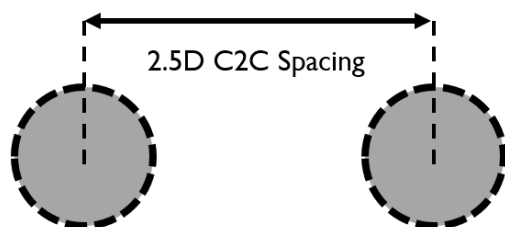
¹ Zhang, L. and Einstein, H. (1998). "End bearing capacity of drilled shafts in rock." ASCE Jnl. Geot. Eng., Vol. 124 (7), 574-584)

7.4 Pile Design

A preliminary estimate of pile socket lengths has been carried out based on the design method proposed by Pells (1999), that considers the sidewall slip based on the work done by Rowe and Armitage (1987). Estimates of socket length has been carried out for the podium and core piles considering selected load cases based on the pile loads shown on the marked-up sketches in Appendix E.

7.4.1 Podium Piles

Two pile arrangements have been considered as illustrated in Diagram 5. Pile arrangement A shows a pile group comprising two piles of 1.6m diameter, spaced horizontally at 2.5 pile diameters centre to centre (i.e. 4m C2C). Pile arrangement B shows a two pile group, also comprising two piles of 1.6m diameter, horizontally spaced at one pile diameter centre to centre (i.e. no horizontal gap between piles).



Pile Arrangement A

Distribution of pile load
around full shaft perimeter



Pile Arrangement B

Distribution of pile load
around effective combined
shaft perimeter

Diagram 5 – Podium Pile Arrangements

Based on our assessment of pile interaction, we consider that for pile sockets founded within the NFG1, NFG2 or NFG3 geotechnical units, piles spaced horizontally at 2.5D as per Pile Arrangement A will experience little interaction and therefore the axial pile capacity is unaffected by the adjacent pile. For more closely spaced piles such as Pile Arrangement B, the shaft is unable to distribute load around its full perimeter and therefore a reduced shaft capacity will be achieved. The reduction in shaft capacity is related to the reduced effective perimeter, which can be considered as a 20% reduction on the total shaft capacity.

The pile end bearing capacity will be unaffected even for closely spaced piles as recommended by the work of Meyerhof 1976².

The recommended minimum podium pile socket lengths are summarised in Table I2. Note that the actual pile toe levels may be controlled by the depth required to limit pile stresses to the Albert St cavern lining.

² Meyerhof, G.G. 1976. Bearing capacity and settlement of pile foundations. *Journal of Geotechnical Engineering Division, ASCE*, 102(GT3): 195–228.

Table 12 – Estimated Pile Socket Lengths – Podium Piles

Load Case	Ultimate Column Load (MN)	Ultimate Load Per Pile (MN)	Serviceability Column Load (MN)	Serviceability Load Per Pile (MN)	Minimum Socket Length (in NFG 2/I)	
					Pile Arrangement A	Pile Arrangement B
1	65	32.5	51.5	25.8	3.5	4
2	74.6	37.3	61.4	30.7	4	5
3	95	47.4	75	37.5	7	9
4	115.6	57.8	91.8	45.9	10.5	13

7.4.2 Core Piles

The core piles will be 1.2m in diameter and will be connected to a 2.4m thick core cap at the pile head. The piles will be horizontally spaced at approximately 3m centres and are therefore considered to be not significantly affected by interaction with adjacent piles.

The recommended minimum core pile socket lengths are summarised in Tables 13 and 14. Note that the actual pile toe levels may be controlled by the depth required to limit pile stresses to the Albert St cavern lining.

Table 13 – Estimated Core Pile Socket Lengths for Compression

Load Case	Ultimate Compressive Load Per Pile (MN)	Serviceability Compressive Load Per Pile (MN)	Minimum Socket Length (in NFG 2/I)
1	25	20	4
2	40	32	10.5
3	55	44	16.5

Table 14 – Estimated Core Pile Socket Lengths for Tension

Load Case	Ultimate Tension Load Per Pile (MN)	Serviceability Tension Load Per Pile (MN)	Minimum Socket Length (in NFG 2/I)
1	7	5.6	3
2	11	8.8	5
3	14	11.2	6

7.5 Pile Stiffnesses

An assessment of the axial and lateral pile stiffness of the proposed core and podium piles has been carried out for consideration by RBG in the structural modelling of the building. The assessment of foundation stiffnesses was carried out using published methods, presented in Poulos³, and was based on the ground stratigraphy shown on the interpreted geological sections included in Appendix B, and the geotechnical parameters presented in Appendix D.

The assessed values of foundation stiffness are summarised in Table 15 and are applicable for the pile diameters nominated. Single values are presented for vertical springs, which should be considered at the base of the pile. Lateral springs are provided at 1m increments along the pile length.

³ Poulos, H. G. (2018). Rational assessment of modulus of subgrade reaction. *Geotechnical Engineering Journal of the SEAGS & AGSSEA*, 49(1), 1-7.

We recommend that RBG consider the spring stiffnesses presented in Table 15, combined with a sensitivity range of 50% to 200% of the recommended values.

Table 15 – Pile Capacities and Stiffnesses

Material	Horizontal Spring (MN/m)	Limiting Lateral Force (MN)	Vertical Spring 0.9m Diameter Pile (MN/m)	Vertical Spring 1.2m Diameter Pile (MN/m)	Vertical Spring 1.6m Diameter Pile (MN/m)
Residual Soil	25	0.25	N/A	N/A	N/A
NFG 5	45	1.5	N/A	N/A	N/A
NFG 3	900	7	1,000	1,250	1,750
NFG 2/1	4,000	12	5,000	6,500	9,000

8 Temporary Batter Slope Angles

During excavation of the basement, temporary batter slopes may need to be excavated within Fill and Alluvium. Temporary batter slopes are not expected to be required for durations longer than 1 week. We therefore recommend that all temporary batter slopes are excavated no steeper than 1V:1H with a vertical height less than 2m.

Once the contractor confirms the proposed excavation geometry, a slope stability assessment should be carried out by the geotechnical temporary works engineer. Should batter slopes be required for durations longer than 1 week, the slope should be reduced to 1V:2H.

9 Earthquake Subsoil Class

Based on our interpretation of the ground conditions, the site sub-soil class is classified as Class C – Shallow Soil Site in accordance with Section 4 of AS 1170.4-2007.

10 Excavatability and Trafficability

The materials present within the proposed basement are expected to comprise surface fill, soft to firm alluvium, and residual soils overlying weathered argillite. Excavation of these materials is expected to be achievable using mechanical excavators.

Although not confirmed at this stage, it is likely that a lift core overrun pit will be included in the building design, that is expected to extend approximately 2m to 3m below the lowest basement slab. It is therefore possible that a relatively small volume of excavation could occur within low to medium strength rock. In such situations hard digging with a large mechanical excavator and/or use of a hydraulic rock hammer may be required. Advice relating to vibrations associated with rock hammers is presented in Section 11.

Most excavated materials will comprise alluvium, which is generally described as soft to firm in stiffness. It is therefore expected that poor trafficability conditions will be present, which would likely result in heavy rutting and/or heavy wheel mounted plant becoming bogged. Track mounted plant would be less affected, however further assessment of site trafficability conditions would be required following interpretation of additional geotechnical investigation data.

11 Ground Vibrations

Considering the proposed construction activities and methodologies as discussed with RBG, we anticipate that groundborne vibrations may arise from piling works and excavation within rock units, if there is rock strength material within the basement excavation and/or the lift core overrun pit.

Initial estimates of peak particle velocities arising from the anticipated construction activities are provided in the following sections, which are all based on a review of historical data from various sources.

11.1 Vibrations from Rotary Pile Drilling

A preliminary assessment of ground vibrations associated with rotary pile drilling has been carried out based on the information presented in TRL Report 429⁴. The report summarises empirical data of vibrations due to construction activities recorded from several construction projects.

Due to the lack of published data for bored piling techniques, this assessment considers available data for other similar activities. It is considered that the most comparable activity for which data is readily available is for mechanised tunnelling.

Figure F-1 in Appendix F provides the assessed relationship between ground peak particle velocity and distance from the source of vibration, which relates to mechanical tunnelling as published in TRL429. Based on our interpretation of the empirical data, we estimate peak particle velocities of approximately 0.2mm/s at a distance of 40m away from the vibration source.

11.2 Vibrations from Vibro-Driving of Steel Liners

The assessment of ground vibrations due to installation of pile liners is based on empirical data presented in CIRIA 142⁵. Figure F-1 in Appendix F provides the assessed relationship between ground peak particle velocity and distance from the source of vibration, which relates to vibro-driving of steel casing. Based on our interpretation of the empirical data, we estimate peak particle velocities of approximately 2mm/s at a distance of 40m away from the vibration source.

11.3 Vibrations from Rock Hammers

The assessment of ground vibrations due to installation of pile liners is based on empirical data presented in Hackney (2002)⁶. Figure F-1 in Appendix F provides the assessed relationship between ground peak particle velocity and distance from the source of vibration, which relates to excavation using rock hammer techniques. Based on our interpretation of the empirical data, we estimate peak particle velocities of approximately 1mm/s at a distance of 40m away from the vibration source.

11.4 Discussion

Note that due to the complexity and uncertainty of the variables involved, including attenuation properties of soils, distance from source, the variability of the energy applied to the ground when boring through different materials, the predictions of ground-borne vibration reported in the previous sections are estimates only.

Should any of the vibration estimates presented above exceed the nominated limits, we would recommend that specialist advice is sought on ground-borne vibrations. We expect that this would include advice to account for the specific site characteristics and proposed construction equipment during the detailed design stage. Construction stage monitoring of vibrations on-site associated with

⁴ Hiller, D. M., & Crabb, G. I. (2000). Groundborne vibration caused by mechanised construction works.

⁵ Head, J. M., & Jardine, F. M. (1992). Ground-borne vibrations arising from piling (No. 142).

⁶ Hackney G.A. (2002). Excavation induced vibrations in Sydney sandstones, Proceedings 5th Australian New Zealand Young Geotechnical Professional Conference, Ed. Davies, T., Rotorua, Australian Geomechanics Society, New Zealand, March 13.

bored piling and rock excavation activities, coupled with review of construction methods will be required.

Dilapidation surveys of sensitive structures should be carried out prior to construction.

12 Erosion and Sediment Control

12.1 Pre-Development Phase

Prior to construction commencing, the following erosion and sediment control measures will need to be installed around the subject site to minimise disturbance and ensure the quality of runoff discharging from the site is of an acceptable standard:

- Sediment barriers to be installed on all entrances to downstream stormwater infrastructure (i.e. gully pits).
- Install construction entry and exit shakedown areas.
- Sediment fences are to be installed on the downstream boundaries of the subject site and install dust control measures as required.
- All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

12.2 Construction Phase

During the construction phase of the development, there is a risk of sedimentation transport due to large areas of disturbed land. The following erosion and sediment control measures will need to be installed in addition to the measures described in the section above:

- Construction of temporary diversion drains to divert water to sediment basins.
- Construction of temporary diversion drains to divert water to protect bioretention and treatment devices as required.
- Sediment barriers to be installed on all entrances to newly constructed stormwater infrastructure (i.e. gully pits).
- Sediment fences to be installed on the downstream side of any stockpiles and batters.

All erosion and sediment control measures are to be designed and installed in accordance with IECA Guidelines. Further details regarding the proposed erosion and sediment control measures will be provided during the detailed design phase of the development.

12.3 Maintenance

All erosion and sediment control devices are to be maintained through the entire phase of the development leading up to the operational phase. Erosion and sediment control devices will need to be monitored closely throughout the entire project to ensure they are operating correctly and efficiently. No erosion and sediment control devices are to be removed unless otherwise authorized by a suitably qualified engineer or the site superintendent.

13 Backfilling of Temporary Shaft and Adits

The project site currently comprises a 14m diameter circular access shaft that extends approximately 35 metres below ground, and two temporary adits that provide construction access from the shaft to the Albert St cavern. Both the shaft and adits are temporary and therefore are required to be

backfilled upon completion of the CRR works. All are also required to be disconnected from the Albert St cavern as part of the CRR works.

We recommend that the adits and shaft be backfilled with a cementitious material of similar stiffness to the adjacent ground for materials located below the base of excavation (i.e. below RL -5m AHD) and engineered fill for materials above RL -5m AHD. A summary of recommended backfill material properties is presented in Table 16. Note that care would be required during backfilling to ensure all voids are filled.

Table 16 – Backfill Recommendations

Elevation Range	Expected Geotechnical Unit	Recommended Young's Modulus Range (MPa)
RL -5m to RL 4m	AL	10 to 20
RL -10m to RL -5m	RS / NFG 5	30 to 50
RL -15m to RL -10m	NFG 3	500 to 1,500
RL -30m to RL -15m	NFG 2 / 1	5,000 to 10,000

14 Construction Comments

The geotechnical aspects of the works are expected to encounter several challenges during construction. A commentary on construction issues / requirements identified at this stage is provided in the following sections.

14.1 Piling

Piles associated with the retention system are expected to be drilled through fill, alluvium, residual soil and extremely weathered material. It has been indicated by RBG that the retention piles will be reinforced concrete bored piles. Considering the relatively low strength and stiffness of the fill and alluvium, it is likely that the pile holes may collapse unless supported by pile liners, which could be either temporary or sacrificial. As an alternative to bored piles, it may be feasible to install the retention piles using Continuous Flight Auger (CFA) methods, that would mitigate the risk of pile hole collapse due to the method of installation. Building foundation piles are expected to be bored piles and will require (either temporary or permanent) liners.

All piles should be logged during construction to verify that the encountered materials satisfy the design requirements, and particularly for the permanent foundation piles that the required pile axial capacity has been achieved. Pile logging must be carried out by a suitably qualified and experienced geotechnical professional. We expect that video cameras would be required to confirm socket materials and cleanliness.

We recommend that pile load testing is carried out during the works to confirm the axial capacity of the piles. Specialist advice from a pile testing contractor should be sought to confirm the requirements associated with carrying out pile testing on site.

We anticipate that piling would be carried out from either the existing ground level or from the base of excavation level. Should piling be carried out from existing ground level, it may be possible to use the existing acoustic shed slab to support the piling rig track pressures, subject to assessment and approval by the temporary works engineer. If piling is carried out from the base of excavation level, an assessment of the subgrade must be carried out by the temporary works engineer and if required a temporary piling platform would need to be designed and constructed.

The project site contains several buried structures associated with CRR temporary works. These structures include a 14m diameter, approximately 30m deep circular access shaft, two temporary

construction adits that provide access between the temporary shaft and the Albert St cavern, and several reinforced concrete piles that currently support the temporary acoustic shed.

It is possible that some proposed building foundation piles may clash with this existing buried infrastructure. Specialist advice from a piling contractor should be sought to assess the ability of typical piling equipment to penetrate through those obstructions, however, we highlight the following key points based on our understanding of the CRR construction details:

- The arrangement of building foundations should aim to (where possible) avoid buried infrastructure.
- As discussed in Section 13, backfilling of the temporary shaft and adits should use backfill materials of similar stiffness to the adjacent ground, however the strength of the backfill should be limited (if possible) to reduce drilling resistance.
- Piling through unreinforced cementitious materials is expected to be achievable with conventional piling equipment, however the penetration rates may be reduced compared to drilling through natural rock units.
- Piling through concrete reinforced with steel or polypropylene fibres is expected to be achievable with conventional piling equipment as for unreinforced concrete.
- Piling through concrete reinforced with steel bars or steel mesh is expected to be difficult and specialist advice from a piling contractor must be sought.

Diagram 6 shows the primary support details for the temporary adits. Two support classes are shown which comprise either, a relatively thin layer of shotcrete combined with steel rock bolts (Support Type 1&2), or a thicker layer of shotcrete without any rock bolts (Support Type 3A and 3B).

As mentioned above, piling through the shotcrete (as per Support Type 3A and 3B) is expected to be achievable, however it is expected that it will be difficult to achieve penetration should the piling rig clash with the steel rock bolts included in Support Type 1 and 2.

Nomination of tunnel face support types to be installed was based on the results of construction phase mapping of the tunnel face. We recommend that the construction mapping records are requested from CBGU so that we can confirm what support type was constructed along the length of the temporary adits. Specialist advice from a piling contractor must be sought to understand the ability of the piling equipment to penetrate a zone reinforced with steel rock bolts.

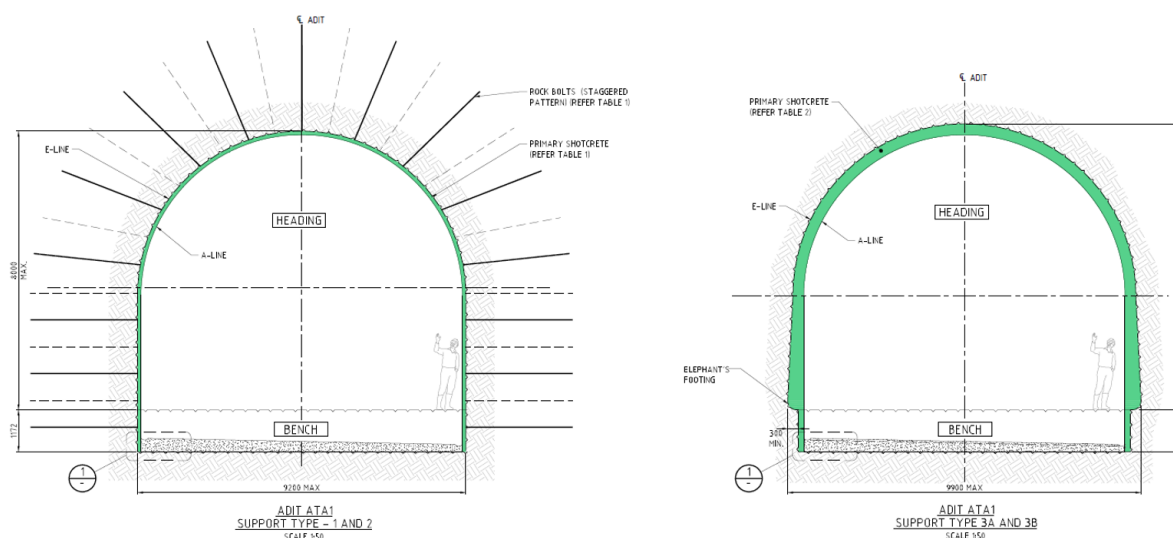


Diagram 6 – Adit Support Details

14.2 Shotcreting

Shotcrete is to be sprayed between the soldier piles that form the walls of the retention system. Excavation of the basement would be carried out in stages, such that each excavation stage is followed by application of shotcrete. The vertical height of each excavation stage must be limited such that materials in between the soldier piles do not become unstable. At this stage we anticipate that the excavation heights would be limited to approximately 1.5 metres. However, it may be possible to increase the excavation height, depending on the observed performance of the materials between the soldier piles during construction.

14.3 Shallow Footings

Several shallow footings are to be constructed to support the permanent building loads. Following excavation of the footings, geotechnical assessment must be carried out by an experienced geotechnical professional to verify that the design requirements have been achieved. The assessment process would likely comprise visual and tactile assessment along with in-situ testing.

14.4 Basement Slab

The finished level for the basement slab will be at RL -5m AHD, whereas the base of excavation is expected to be approximately RL -6m AHD. As discussed in Section 3.5, at this stage we estimate that the groundwater level would be approximately between RL -5m AHD to RL -10m AHD. Should the groundwater level be above or close to the base of excavation level, local dewatering measures may be required. Further assessment of groundwater levels will be carried out during detailed design and following completion of the additional geotechnical investigation.

15 Contaminated Land

Several of the available historical geotechnical investigation reports have included acid sulphate soil testing and have provided a commentary and interpretation of the results. Those reports are summarised in Table 17.

Table 17 – Backfill Recommendations

Report	Date	Summary of Acid Sulphate Soil Assessment
Geotechnical Investigation, River City Apartments, 79 Albert Street (Golder Associates Pty Ltd)	April 2001	Dark grey alluvial clay is potentially acid forming. Testing indicates a total potential acid of 25 to 30 mole/tonne. QASSIT Guidelines (1998) suggest a maximum total potential acid of 18 mole/tonne for soil quantities in excess of 1000 tonnes. Removal of dark grey alluvial clay will require an earthworks management plan and disposal off site to a controlled landfill.
Geotechnical Investigation, Festival Towers Development, Corner of Charlotte and Albert Streets (Butler Partners Pty Ltd)	April 2004	Field screening tests for acid sulphate soil were carried out on 25 Fill and Alluvial soil samples. The results of the screening tests indicate that the Fill samples tested do not appear to be acid sulphate soils, however, the screening tests strongly indicate that the underlying Alluvial dark grey Silty/Sandy Clays may be acid sulphate soil. Three samples of Alluvial Soil were selected and submitted to a laboratory for Total Acid Acidity and Chromium Reducible Sulfur analyses. Based on the results of the laboratory tests, the Alluvial Soil are considered to be acid sulfate soils and will require treatment to neutralize the acid generating potential.

Based on the information presented above we anticipate that the fill may contain potentially acid forming material, whereas it is likely that the alluvium will contain acid forming material. Construction phase sampling and testing will be required during excavation.

EDG has been advised that Contaminated Land (CL) and Acid Sulfate Soils (ASS) have been assessed during the Albert Street Station works for Cross River Rail Project as documented in:

- Cross River Rail Albert Street Stations: Soil Investigation and Waste Classification Status Update – AoPC_06B dated March 2020 by EMM;
- Cross River Rail Assessment of Overburden in Albert Street Station, AoPC_06B dated August 2020 by EMM.

EDG should be provided confidentiality clearance to review these, and any other available relevant documents.

16 Geotechnical Investigations

The advice presented in this document has considered the available geotechnical investigation data which predominantly is located outside of the boundary of the proposed development site. Additional geotechnical investigations will therefore be required to verify the geotechnical conditions considered in the building design, and will be carried out following completion of the CRR works and removal of the acoustic shed.

The actual scope of the additional geotechnical investigation will be confirmed during the detailed design phase, however is expected to comprise approximately five to ten rotary cored boreholes and in-situ and laboratory testing to provide information on soil and rock strength and stiffness parameters, groundwater levels and confirm properties of the adit and shaft backfill material.

17 Risks and Limitations

There are several key geotechnical risks that are identified at this stage and will be investigated further in the detailed design stage. A commentary on key geotechnical risks and limitations associated with this stage of geotechnical assessment is provided In Table 18.

Table 18 – Risks and Limitations

Issue	Discussion
Interpretation of ground conditions	The majority of the available geotechnical investigation data is from outside of the site extents and therefore we have assessed the ground conditions within the site based an interpretation of the nearby data. To help reduce uncertainty and risk associated with the interpretation of ground conditions, an additional geotechnical investigation will be carried out once the CRR works are complete and the site is handed over to Albert Street Trust.
Groundwater levels	At this stage, we have been provided with limited information relating to site groundwater levels. During subsequent design stages, it is required to gain a better understanding of the local groundwater conditions to develop the retention system design, B2 basement slab design and better understand temporary and permanent groundwater control measures. Definition of site groundwater levels would be a key requirement of the additional geotechnical investigation. We are also currently seeking additional site groundwater information associated with the CRR project and will incorporate relevant information in the detailed design.

Issue	Discussion
Surface settlements behind retention system	Note that the retaining wall analysis carried out at this stage is limited to calculation of wall movements only, and therefore ground surface settlements outside of the retention system have not been assessed at this stage. Ground surface settlements will be assessed during the detailed design stage for assessment of the performance of any sensitive buried infrastructure.
Ground-borne vibrations affecting Cavern	This assessment has provided preliminary estimates of ground-borne vibrations associated with the anticipated construction activities, which are based on published empirical data. Note that due to the complexity and uncertainty of the variables involved, including attenuation properties of soils, distance from source, the variability of the energy applied to the ground when boring through different materials, the estimates of ground-borne vibration are imprecise. Should any of the vibration profiles presented above be in excess of the nominated limits, we would recommend that specialist advice is sought on ground-borne vibrations relating to the specific site details and proposed construction equipment be sought during the detailed design stage. Construction stage work may include monitoring of vibrations on-site associated with bored piling and rock excavation activities and re-calibrating the vibration levels for the observed measurements.
Piling obstructions	As discussed in Section 14, it is possible that there are steel buried rock bolts beneath the site associated with the primary support for the temporary adits. The presence of steel rock bolts in pile locations is expected to create difficulties associated with drilling to the nominated pile toe depths. We recommend that Albert Street Trust seeks advice from a specialist piling contractor regarding piling through the buried CRR temporary infrastructure and also obtains construction records that confirm the type of primary support installed within the temporary adits.
Bearing capacity and stiffness of shallow footings	The available geotechnical investigation data suggests some variability in soil strength and stiffness at the proposed elevation of the base of the shallow footings along the Albert St side of the site. We will therefore further investigate parameters affecting the capacity and stiffness for shallow footings during the additional geotechnical investigation.
ASS in Alluvium	Interpretation of the available geotechnical investigation data suggests that the alluvium is PASS. We therefore recommend that Albert Street Trust obtains records of the construction phase environmental sampling and testing associated with excavation of the CRR Albert St Lot 2 temporary shaft.

For and on behalf of EDG Consulting Pty Ltd



David Cunliffe
Principal

Ground conditions and the natural environment often present the highest potential risks to project construction and operation. Helping our clients manage their geotechnical risk is fundamental to the role of EDG. We have prepared these notes to assist our clients to understand the information we provide and to help them to manage their risk. Where there is uncertainty about the site, project or geotechnical conditions, contact EDG for assistance.

Scope of Services

The information provided in this document is based on the scope of services defined in the client's agreement with EDG Consulting Pty Ltd (EDG). In undertaking the work, EDG has relied on information provided by the client and other individuals and organisations. Unless stated in the document, EDG has not verified the accuracy of that information and does not accept responsibility for the conclusions, recommendations or designs developed based on that information should it be incorrect, misrepresented or withheld.

Unless specifically stated to the contrary, this document does not cover geo-environmental issues, which require significantly different equipment, techniques and personnel. A geo-environmental specialist should be engaged to provide such advice.

The document is based on specific project details

The information provided in this document is relevant to the subject site and project only. The document has been prepared based on the specific details and requirements of your project and may not be relevant if any changes to the project occur. Should changes occur, must review the report to identify if and how such changes will affect the conclusions, recommendations or designs provided. EDG accepts no responsibility if the client elects not to consult in the event of changes to the project.

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Should you choose to engage an alternative party for advice based on the information in the document, it must be understood that the alternative party will be less familiar with the site conditions and basis of information provided, and there is a potential for misinterpretation. EDG will not be held liable in any way from such misinterpretation.

EDG will not be liable to update or revise the document to take into account information any events or circumstances or facts occurring or becoming apparent after the date of the report.

All site conditions cannot be identified

The scope of work undertaken represents a professional assessment of the information cited to develop a basic geotechnical model of the site based on EDG's understanding of the client's risk profile. In some cases, increasing the frequency of investigations and/or sampling, or considering alternative investigation techniques may improve the interpretation, but may not identify all relevant subsurface conditions at the site.

The document presents an interpretation

Geotechnical information is an interpretation of conditions evident based on a limited number of facts established during a site investigation. Engineering logs are an interpretation of observations of samples and test results at discrete locations in the subsurface profile. A geotechnical model is an interpretation of site conditions, developed using information from discrete locations on the site and an understanding of geological processes. Interpreted conditions at and between investigation locations may be different to those inferred on the engineering logs and geotechnical model. The client must consider how variations in conditions could affect the project and seek advice to reduce risk if it is unacceptable to the client.

Conditions can change

The geotechnical information provided is based on the conditions observed at the time of the investigation. Such conditions may be time dependent and subject to external influences. Many things could influence the site conditions, including geological processes, variation in groundwater or surface water levels, other natural cycles and influence from human activities (on this site or nearby sites). Specific advice should be sought if conditions on site change from those observed at the time the report was prepared.

How to deal with different site conditions

The sub-surface conditions on the site may not be as inferred in this report. Geotechnical uncertainties can be managed throughout the project life cycle, but particularly during construction.

Knowledge of site conditions must be further developed as the ground is exposed during construction and/or operation. It is essential that the client implements the nominated design and construction requirements, including observation, interpretation and assessment of the exposed conditions during construction and operation using skilled staff familiar with the design assumptions and assumed geotechnical conditions, or engaging EDG to undertake this role on your behalf. EDG will not be held liable in any way from such misinterpretation.

Appendix A

Available Geotechnical Investigation Data

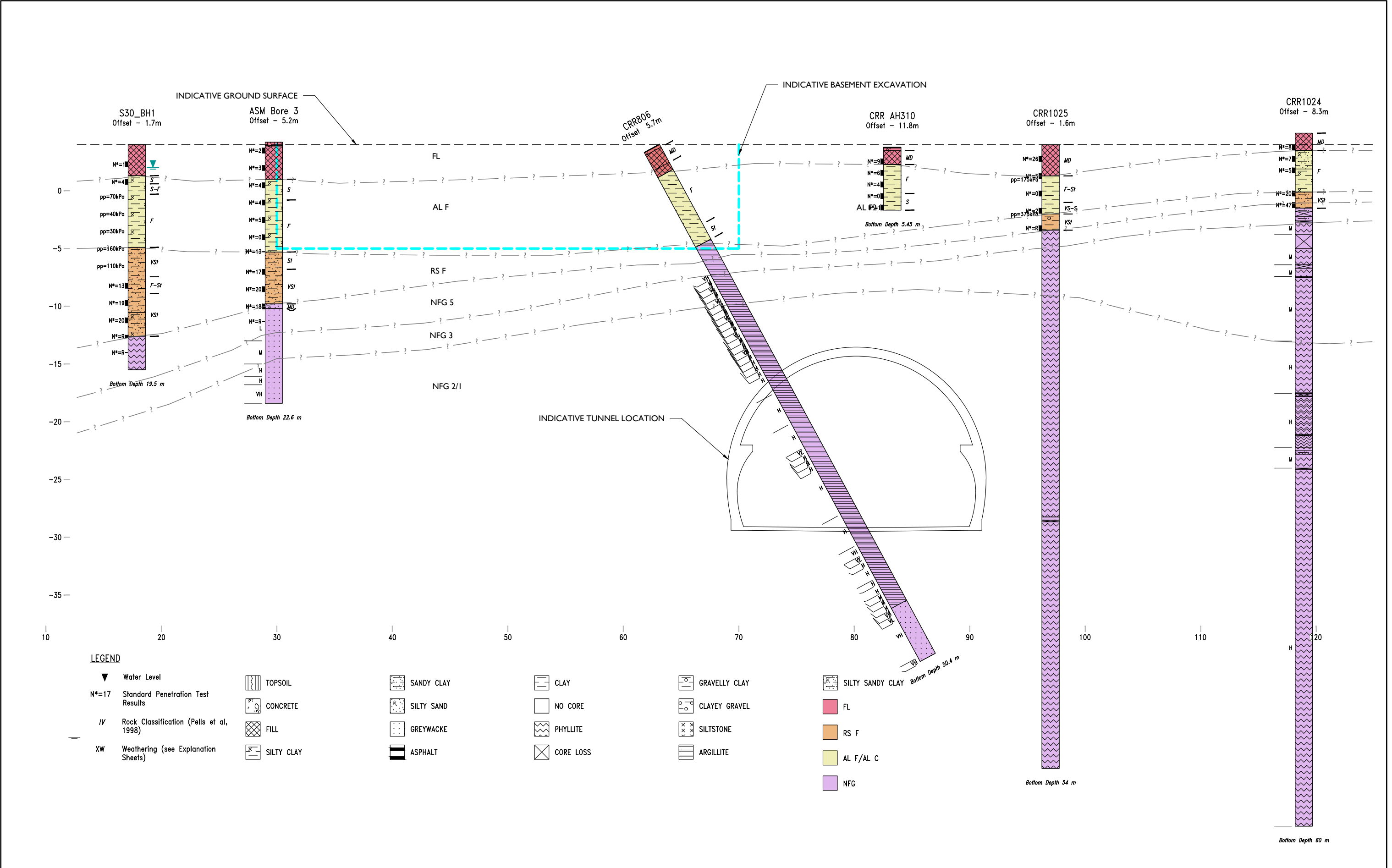
Table A1 – Summary of Borehole Logs

Borehole ID	Borehole Top RL (mAHD)	Total Depth (m)	Date Drilled
ASM Bore 1	4.4	22.7	November 2006
ASM Bore 2	4.4	3.5	November 2006
ASM Bore 3	4.2	22.6	November 2006
ASM Bore 4	4.2	12	November 2006
ASM Bore 5	4.2	3.5	November 2006
ASM Bore 6	4.2	12	November 2006
ASM Bore MC2	4.3	13	September 1999
ASM Bore MC3	4.3	15	September 1999
BPP BH1	3.76	18.25	January 1997
BPP BH1A	4	15	April 1986
BPP BH2	3.95	19	January 1997
BPP BH2A	4	12	April 1986
BPP BH3A	4	0.8	April 1986
BPP BH4A	4	4.5	April 1986
CRR AH309	3.742	5.45	September 2020
CRR AH310	3.766	5.45	May 2020
CRR1023	3.849	40.4	May 2020
CRR1024	5.045	60	February 2020
CRR1025	3.985	54	May 2020
CRR1027	3.891	88.1	April 2020
CRR1028	3.759	44.2	April 2020
CRR1029	2.62	59	April 2020
CRR1030	3.7	44	February 2020
CRR1031	2.95	44.4	January 2020
CRR1033	3.728	40.44	January 2020
CRR1082	5.264	55.45	March 2020
CRR1083	3.796	57.5	April 2020
CRR202	4	45.07	October 2010
CRR712	3.9	39.14	October 2017
CRR806	3.69	50.4	May 2018
CRR807	3.76	51.3	April 2018
GA1	4.5	15.07	January 2001
GA2	4.3	22.2	January 2001
GA3	4.1	16.03	February 2001

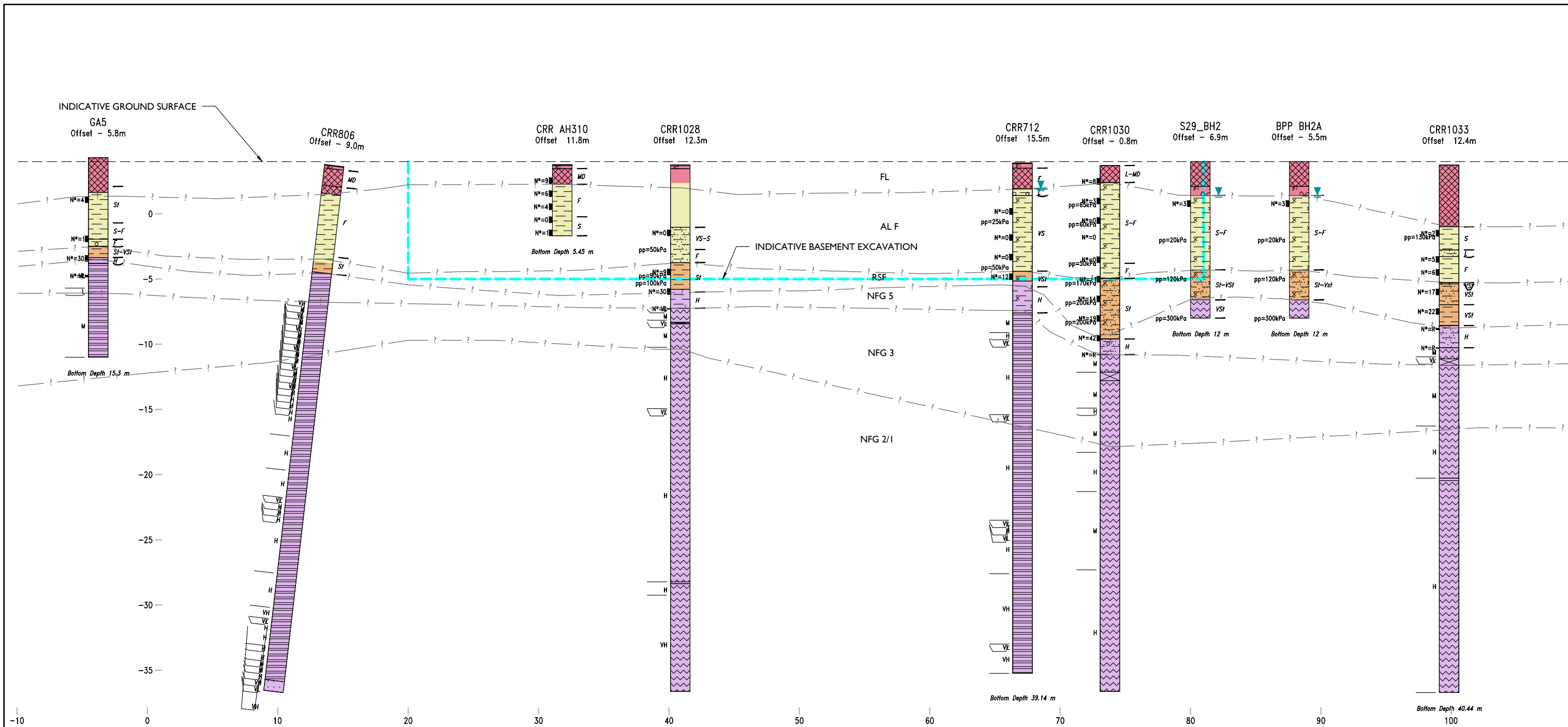
Borehole ID	Borehole Top RL (mAHD)	Total Depth (m)	Date Drilled
GA4	4	18.5	February 2001
GA5	4.3	15.3	February 2001
MC Bore 1	4.5	10.05	September 1999
MC Bore 2	4.3	13	September 1999
MC Bore 3	4.2	15.02	September 1999
MC Bore 4	4.2	13	September 1999
MM BH1	4.3	24.5	June 2004
MM BH2	4.7	17	July 2004
MM BH3	6.1	22.2	July 2004
MM BH4	3.6	15.6	June 2004
S29_BH1	4	15	Unknown
S29_BH2	4	12	Unknown
S30_BH1	4	19.5	Unknown
S30_BH2	4	16.6	Unknown
S30_BH3	4	17.3	Unknown

Appendix B

Interpreted Geological Sections



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LEGEND

- ▼ Water Level

N*=17 Standard Penetration Test Results

IV Rock Classification (Pells et al, 1998)

XW Weathering (see Explanation Sheets)
- ASPHALT

CONCRETE

FILL

CLAY
- NO CORE

SANDY CLAY

PHYLLITE

CORE LOSS
- GRAVELLY CLAY

SILTY CLAY

SANDY SILTY CLAY

GRAVELLY SANDY CLAY
- CLAYEY GRAVEL

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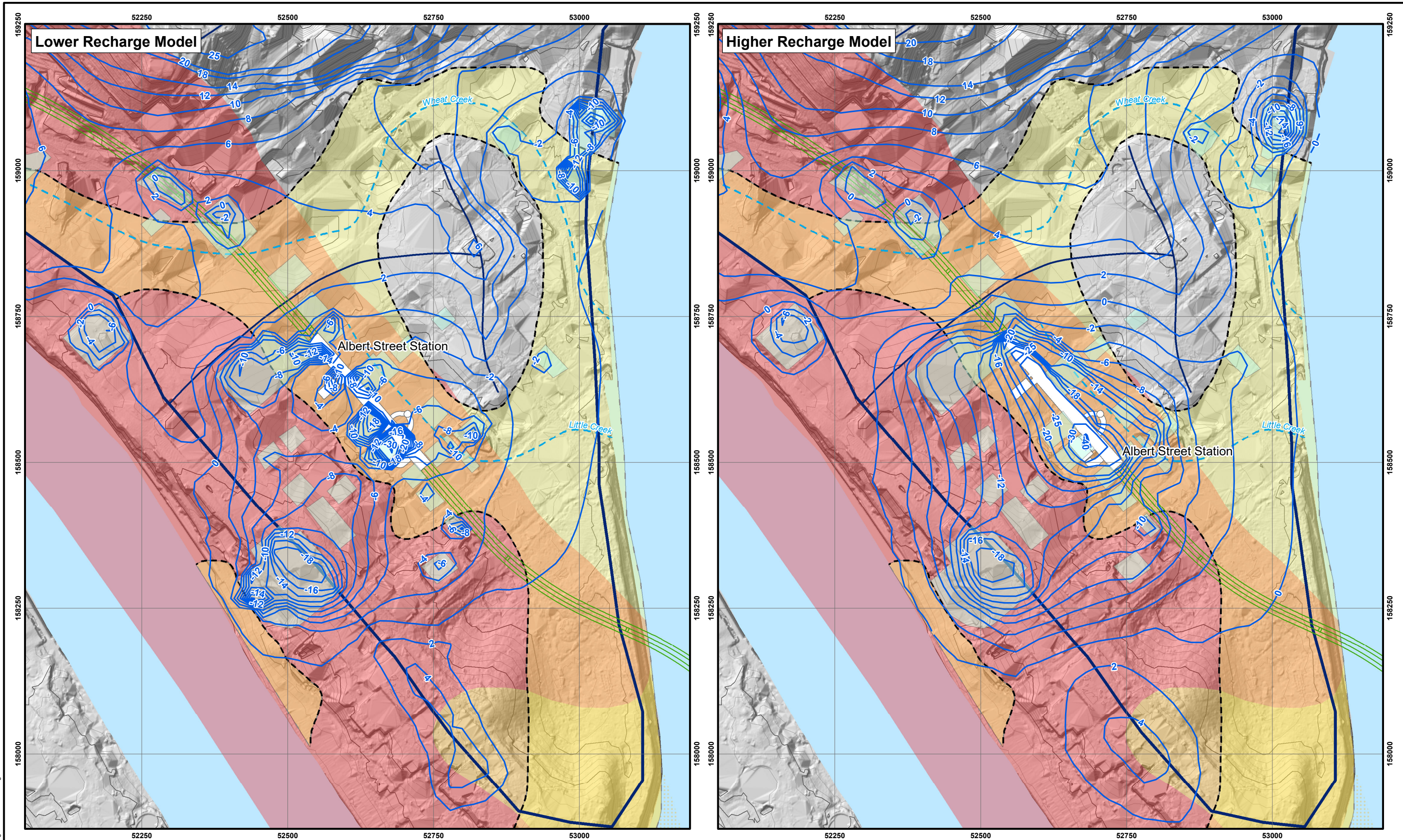
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Appendix C

Groundwater Monitoring and Modelling Summary

X:\ArcGIS_Working\PSM3700_CRR\03_Figures\HR_Figures\Revision B2\Figure A146 Predicted Water Table at 100 Years at Albert St Station.mxd



Legend

- Project Alignment
- Cavern and Shaft Excavation
- Inferred Original Drainage
- Catchment Divide
- Sub-catchment Divide
- Topography Contours
- Water Table (m AHD)
- Alluvium
- Unconformity Zones
- Inferred Normanby Fault Zone - Outcrop in NFG
- Southeast Projection of Normanby Fault Zone - Subcrop beneath Alluvium, Brisbane Tuff and Aspley Formation
- River Crossing - Subcrop beneath Aspley Formation
- Basements

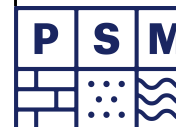
After:
QLD Geology and Structural Framework (V02)
2012. State of Queensland (Department of Natural Resources and Mines).



Scale 1:6,000

0 0.1 0.2 0.3 Km

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 BCSG02



Created By: MB
Date: 11 Mar 2020

Revision: B2
Paper Size: A3

CPB Ghella Bam UGL
Hydrogeological Interpretive Report
Cross River Rail
PREDICTED WATER TABLE
AT 100 YEARS
AT ALBERT ST STATION

CRRSD-000-0354-
DPK-PSMQ-1120-000100

Figure A146

Appendix D

Geotechnical Parameters

Table D1 – Summary of Material Parameters

Geological Age	Unit	Sub Unit	Materials	Unit Weight	Undrained Shear Strength	Drained Cohesion	Drained Friction Angle	Tensile Strength	Drained Young's Modulus	Drained Poisson's Ratio	Secant Stiffness in Standard Drained Triaxial Test ¹	Tangent Stiffness for Primary Oedometer Loading ¹	Unloading / Reloading Stiffness ¹	Over Consolidation Ratio	At Rest Earth Pressure Coefficient ²	Vertical Coefficient of Permeability	Horizontal Coefficient of Permeability
				(kN/m ³)	s _u (kPa)	c' (kPa)	θ' (degrees)	σ _t (kPa)	E' (MPa)	ν'	E ₅₀ ^{ref} (MPa)	E _{oed} ^{ref} (MPa)	E _{ur} ^{ref} (MPa)	OCR	K ₀	k _v (m/s)	k _h (m/s)
Holocene	Fill	Fill (FL)	Various material including concrete, bricks, granular and fine grained fill	17	N/A	0	25	N/A	10	0.3	N/A	N/A	N/A	N/A	0.7	1E-06	1E-06
	Holocene Alluvium	Holocene Clay (AL F)	Mainly clay (soft to firm)	17	25 + 2z	4	26	N/A	5 + 0.4z	0.3	3.0	2.0	20	1.5	0.7	1E-08	1E-08
Devonian	Neranleigh Fernvale Beds	Residual Soil (RS F)	Mainly clay (stiff to hard)	20	100	10	30	N/A	25	0.3	N/A	N/A	N/A	3.0	1	1E-08	1E-08
		Extremely Weathered Material to Very Low Strength Rock (NFG 5)	Silt and sand sized sedimentary rocks; slightly metamorphosed (typically called greywacke, phyllite, argillite)	23	N/A	20	30	N/A	50	0.3	N/A	N/A	N/A	N/A	1	1E-07	1E-07
		Medium Strength Rock (NFG 3)		27	N/A	250	45	15	1,000	0.2	N/A	N/A	N/A	N/A	1	1E-08	1E-08
		High to Very High Strength Rock (NFG 2/1)		27	N/A	400	55	70	5,000	0.2	N/A	N/A	N/A	N/A	1	1E-08	1E-08

Notes:

¹ All stiffness parameters associated with the Hardening Soil Model are presented based on a reference pressure equal to 100 kPa.
² Based on $K_0 = (1 - \sin(\phi))(\text{OCR})^{\sin(\theta')}$. (Mayne P.W. and Kulhawy F.H., 1982)
³ The permeability values shown for the rock units do not consider the presence of fault and/or sheared zones.

Appendix E

Retention System and Building Foundation Arrangement

NORTH



119 CHARLOTTE STREET

NO BASEMENT

G = TBC

Q = MIN. 10kPa

110 MARY STREET

3 BASEMENTS

G = TBC

Q = TBC

THE SEBEL BRISBANE

1 PARTIAL BASEMENT

G = TBC

Q = MIN. 10kPa

ALBERT STREET OVER STATION DEVELOPMENT



CORE CAP

NO EXCAVATION BELOW RL -20.000

NO EXCAVATION OR STRUCTURE BELOW RL -8.000

MARY STREET

Q = 25kPa

CHARLOTTE STREET

ALBERT STREET

Q = 25kPa

ALBERT STREET CRR STATION CAVERN

ALBERT STREET CRR STATION ENTRY 1

FESTIVAL TOWERS

MANTRA ON MARY STREET

SITE PLAN

SCALE: 1:400 @ A3
DESIGNER: MJ/LK

119 CHARLOTTE STREET
NO BASEMENT

110 MARY STREET
3 BASEMENTS

architectus

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Nominated Architect
Ray Brown, NSWARB 6359

Do not scale drawings. Verify all dimensions on site

issue	amendment	date

LEGEND:

- S DENOTES TEMPORARY STRUT. ASSUME 914x19CHS GR350LO
- WB DENOTES TEMPORARY TWIN WHALER BEAMS. ASSUME EACH WHALER 1200WB455 GR400
- WB DENOTES TEMPORARY TWIN WHALER BEAMS. ASSUME EACH WHALER FAB I SECTION 1300Dx500Wx60tx20tw GR400
- VB DENOTES TEMPORARY VERTICAL BRACING.
- TPC DENOTES TEMPORARY PLUNGE COLUMN
- TC DENOTES TOWER COLUMN
- PBC DENOTES PODIUM COLUMN
- BC DENOTES BASEMENT COLUMN

NOTES:

- INTERNAL STRUTS AND WHALER BEAMS ARE PROPOSED FOR THE TEMPORARY SHORING CONCEPT DUE TO THE SITE CONSTRAINTS AND ADJACENT EXISTING STRUCTURES.
- FINAL SETOUT OF WHALER BEAMS AND STRUTS SUBJECT TO JUMPFORM AND FORMWORK EXTENT/BUILD REQUIREMENTS.

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ABN 90 131 245 684

project
Albert Street Cross River Rail

phase
Schematic Deign

drawing

LEVEL B2 - CARPARK

drawn
drawing no. short
DA1000

checked
drawing no. long
ALB-ARC-DRW-DA1000

sheet issue date

scale
1 : 100@A1

project no
200048.00

issue

TEMPORARY SHORING PLAN - OPTION 1

SCALE: 1:200 @ A3
DESIGNER: MJ

119 CHARLOTTE STREET
NO BASEMENT

110 MARY STREET
3 BASEMENTS

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Nominated Architect
Ray Brown, NSWARB 6359

Do not scale drawings. Verify all dimensions on site

issue	amendment	date

LEGEND:

- S DENOTES TEMPORARY STRUT. ASSUME 914x19CHS GR350LO
- WB DENOTES TEMPORARY TWIN WHALER BEAMS. ASSUME EACH WHALER 1200WB455 GR400
- VB DENOTES TEMPORARY VERTICAL BRACING.
- TPC DENOTES TEMPORARY PLUNGE COLUMN
- TC DENOTES TOWER COLUMN
- PBC DENOTES PODIUM COLUMN
- BC DENOTES BASEMENT COLUMN

NOTES:

- INTERNAL STRUTS AND WHALER BEAMS ARE PROPOSED FOR THE TEMPORARY SHORING CONCEPT DUE TO THE SITE CONSTRAINTS AND ADJACENT EXISTING STRUCTURES.
- FINAL SETOUT OF WHALER BEAMS AND STRUTS SUBJECT TO JUMPFORM AND FORMWORK EXTENT/BUILD REQUIREMENTS.

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project
Albert Street Cross River Rail

phase
Schematic Deign

drawing

LEVEL B2 - CARPARK

drawn
drawing no. short
DA1000

checked
drawing no. long
ALB-ARC-DRW-DA1000

sheet issue date

scale
1 : 100@A1

project no
200048.00

issue

TEMPORARY SHORING PLAN - OPTION 2

SCALE: 1:200 @ A3
DESIGNER: MJ

119 CHARLOTTE STREET
NO BASEMENT

110 MARY STREET
3 BASEMENTS

THE FOLLOWING INFORMATION IS BASED UPON A PARTIALLY HYDROSTATIC BASEMENT STRATEGY WITH HYDROSTATIC WALLS AND DRAINED BASEMENT B2 SLAB. TO BE CONFIRMED BY GEOTECHNICAL ENGINEER. REFER **SCHEMATIC REPORT 22131S-RBG-ZZ-XX-RP-ST-00003** FOR MORE DETAILS.

LEGEND:

- SWH DENOTES SHORING WALL WITH A THICKNESS PROVISION OF 1200mm TO ALLOW FOR OUT OF POSITION, VERTICALITY, GUIDE WALL, CAPPING BEAM AND PILE DIAMETER/WALL THICKNESS. ALLOW 900mm DIAMETER SOLDIERS AT 1.8m CENTRES WITH SHOTCRETE INFILL PANELS (THK TBC).
- TC DENOTES TOWER COLUMN
- PC DENOTES PODIUM COLUMN
- BC DENOTES BASEMENT COLUMN
- CB DENOTES COREBOX WALL
- PF DENOTES PAD FOOTING
- PC DENOTES PILE CAP
- BP DENOTES BORED PIER

NOTES:

- PILE CAPS TO BE POURED ON COMPRESSIBLE MATERIAL RMAX GEOFOAM OR SIMILAR OUTSIDE OF THE BORED PIER EXTENTS TO CONTROL LOAD DISTRIBUTION INTO THE BORED PIERS.
- BORED PIERS TO BE SOCKETED INTO VERY HIGH STRENGTH ROCK NFG1. STEEL ISOLATION SLEEVES TO EXTEND 1m BELOW THE 1:1 CRR INFLUENCE LINE.
- BORED PIER SIZES AND SOCKET LENGTHS INTO NFG2/NFG1, AS FOLLOWS:
CORE BOX (REFER GA) - 1200DIA + 8m SOCKET
TOWER COLUMNS - 1200DIA + 10m SOCKET
- NOT ALL EXISTING IN-GROUND STRUCTURE HAS BEEN SHOWN FOR CLARITY. FURTHER COORDINATION REQUIRED TO RESOLVE CLASHES BETWEEN NEW AND EXISTING IN-GROUND STRUCTURE.
- CONFIRMATION REQUIRED ON METHODOLOGY AND MATERIAL TO BE USED TO FILL ADITS AND ACCESS SHAFT.
- SHEET PILLING MAY BE REQUIRED SUBJECT TO GEOTECHNICAL ENGINEER REVIEW.
- THE FOOTING DESIGN CONSIDERS PERMANENT CONDITION ONLY WITH NO ALLOWANCE CURRENTLY MADE FOR TEMPORARY WORKS LOADS, TOP-DOWN CONSTRUCTION METHODOLOGY, STAGED CONSTRUCTION ETC. ADDITIONAL PROVISION TO BE MADE BY CONTRACTOR.
- BORED PIERS TO COLUMNS AND COREBOX MAY BE INSTALLED FROM GROUND LEVEL PROVIDED ADDITIONAL PROVISIONS ARE MADE AS PER NOTE 7. THE CURRENT DESIGN DOES NOT ALLOW FOR BORED PIER OUT OF POSITION ASSOCIATED WITH THE PRIOR AND THIS WOULD NEED TO BE REVIEWED AS PART OF THE TEMPORARY WORKS PACKAGE. ALLOW FOR A PILING MAT AS PER GEOTECHNICAL REQUIREMENTS.
- ALLOW FOR COST ASSOCIATED WITH TEMPERATURE MONITORING AND CONTROL TO PILE CAPS DEEPER THAN 1m. THIS MIGHT INCLUDE THERMOCOUPERS, INSULATION, ICE TO THE CONCRETE MIX ETC.
- PAD FOOTINGS TO BE FOUND ON LOW STRENGTH ROCK WITH MINIMUM 1MPa ALLOWABLE END BEARING CAPACITY. PROVIDE MASS CONCRETE BELOW FOOTING AS REQUIRED TO REACH LOW STRENGTH ROCK TO MAXIMUM DEPTH OF RL-8.
- EXTENT OF NEW INGROUND SERVICES TO BE CONFIRMED. PAD FOOTINGS TO BE DEEPENED AS REQUIRED TO EXTEND BELOW INFLUENCE ZONE. REFER TO COVER NOTES ON PAGE 1.
- ALLOW FOR 1500mm THK RAFT TO EXTENT OF MAXIMUM EXCAVATION DEPTH RL -8.0m INCASE ADDITIONAL DISTRIBUTION OF VERTICAL LOAD FROM THE PODIUM AND BASEMENT COLUMNS IS REQUIRED TO ACHIEVE CRR CAVERN DESIGN CRITERIA. SUBJECT TO GEOTECHNICAL ANALYSIS.

BASEMENT SURFACE DRAINAGE SYSTEM PERIMETER SPOON DRAIN (TO BE COORDINATED WITH STRUCTURE)

THE SEBEL BRISBANE
1 PARTIAL BASEMENT

1
DA2000

1
DA2000

1
DA2000

1
DA2000

1
DA2000

1
DA2000

1
DA2000

1
DA2000

1
DA2000

RL -5.400 DENOTES APPROXIMATE TOP OF FOOTING
RL -5.700 DENOTES BULK EXCAVATION

SCALE: 1:200 @ A3

Robert Bird Group
BRISBANE OFFICE:
Robert Bird Group Pty Ltd
Level 1, 480 St Pauls Terrace
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Ph: (07) 3319 2777
ACN 010 580 248

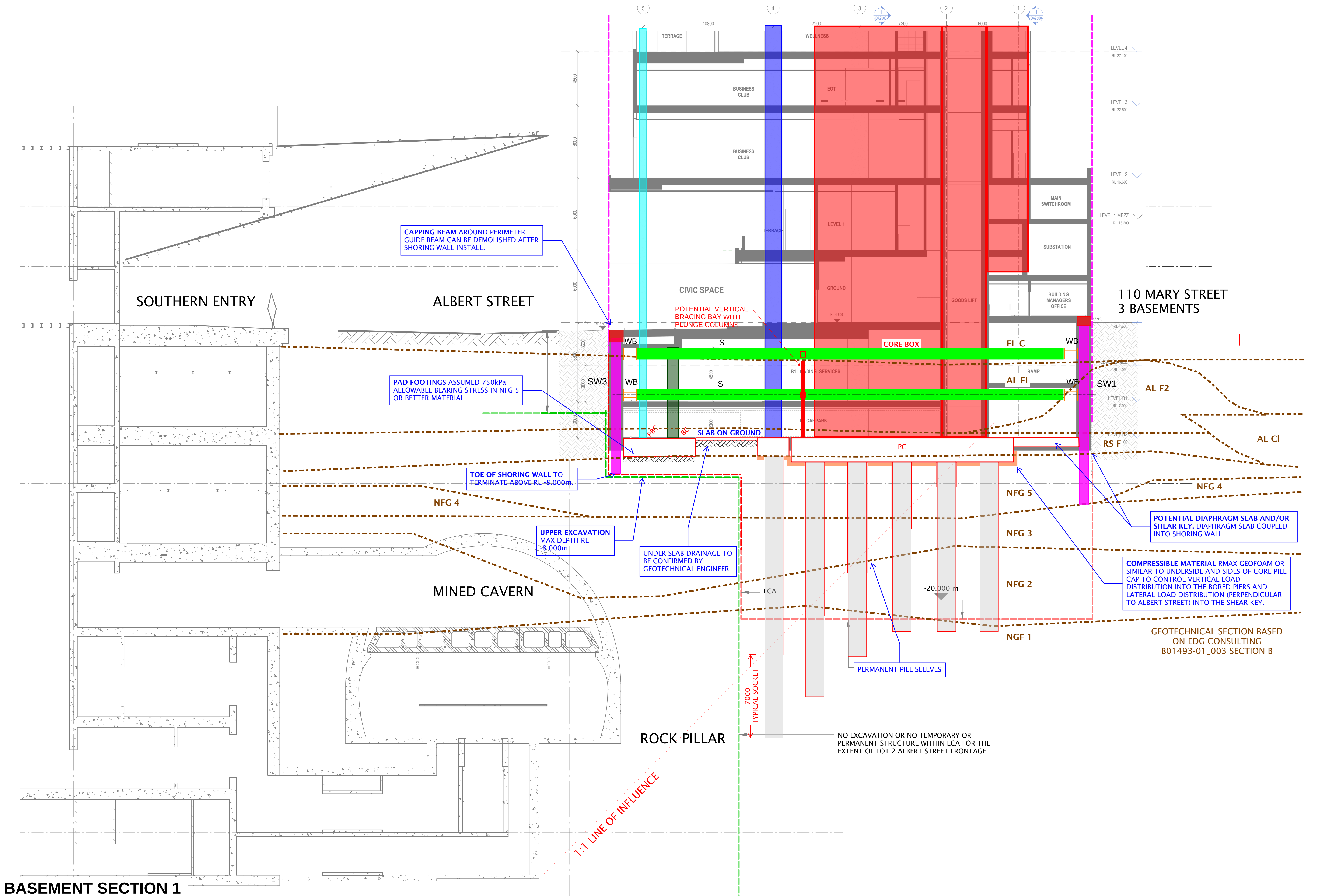
DRAWING TITLE:
FOUNDATION PLAN
DESIGNED BY:
MJ
DATE:
30/11/22
PROJECT:
ALBERT ST OSD
CHECKED BY:
-
PROJECT NO:
22131
CLIENT:
QIC
DRAWING NO
S01-01
REVISION:
P04

TYPICAL BP1 AND PBC1
LOADS U.N.O

ALBERT STREET

FOOTING SCHEDULE

MARK	WIDTH	LENGTH	DEPTH	f'c
	mm	mm	mm	(MPa)
PC1	2000	4500	2500	80
PC2	1500	2000	1200	50
PC3	REFER GA		3000	80
PF1	5200	6000	1500	50
PF2	24400	6000	1500	50



BASEMENT SECTION 1

SCALE: 1:5:200 @ A3
DESIGNER: MJ/LK

Appendix F

Calculation Outputs

Pile Calculations

client: QIC

project: Albert Street Development

location: Brisbane

job no: B01493-1

date: 1/11/2022

by: DL



title: *Single Pile Capacity - Rowe and Armitage Method*

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.2	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	10	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1300	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	20000	kN	Serviceability Load
S^*	25000	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	3.77	m	Pile Perimeter
Area	1.13	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	5.10	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	4.25	-	
P_b	6786	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	27.1	%	where P_t = Strength Limit State Load S^*
I_δ	0.50	-	Settlement Influence Factor as per design chart
L/D	3.10	-	Required pile length to diameter ratio as per design chart
L	3.72	m	Required pile length
δ_v	2.22	mm	Predicted Settlement under Serviceability Load
R_{ug}	50.33	MN	Ultimate Geotechnical Strength of Pile
R_g^*	25.16	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

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Inputs

Term		Units	Description
D	1.2	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	10	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1300	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	32000	kN	Serviceability Load
S^*	40000	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	3.77	m	Pile Perimeter
Area	1.13	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	8.16	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	6.80	-	
P_b	6786	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	17.0	%	where P_t = Strength Limit State Load S^*
I_δ	0.70	-	Settlement Influence Factor as per design chart
L/D	8.80	-	Required pile length to diameter ratio as per design chart
L	10.56	m	Required pile length
δ_v	4.98	mm	Predicted Settlement under Serviceability Load
R_{ug}	80.03	MN	Ultimate Geotechnical Strength of Pile
R_g^*	40.01	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC

project: Albert Street Development

location: Brisbane

job no: B01493-1

date: 1/11/2022

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title: *Single Pile Capacity - Rowe and Armitage Method*

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.2	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	10	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1300	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	44000	kN	Serviceability Load
S^*	55000	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	3.77	m	Pile Perimeter
Area	1.13	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	11.22	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	9.35	-	
P_b	6786	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	12.3	%	where P_t = Strength Limit State Load S^*
I_δ	0.70	-	Settlement Influence Factor as per design chart
L/D	13.90	-	Required pile length to diameter ratio as per design chart
L	16.68	m	Required pile length
δ_v	6.84	mm	Predicted Settlement under Serviceability Load
R_{ug}	110.02	MN	Ultimate Geotechnical Strength of Pile
R_g^*	55.01	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1300	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	25800	kN	Serviceability Load
S^*	32500	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	4.97	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	3.11	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	37.1	%	where P_t = Strength Limit State Load S^*
I_δ	0.54	-	Settlement Influence Factor as per design chart
L/D	1.95	-	Required pile length to diameter ratio as per design chart
L	3.13	m	Required pile length
δ_v	2.32	mm	Predicted Settlement under Serviceability Load
R_{ug}	70.70	MN	Ultimate Geotechnical Strength of Pile
R_g^*	35.35	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1040	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	25800	kN	Serviceability Load
S^*	32500	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	6.22	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	3.89	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	37.1	%	where P_t = Strength Limit State Load S^*
I_δ	0.55	-	Settlement Influence Factor as per design chart
L/D	2.44	-	Required pile length to diameter ratio as per design chart
L	3.91	m	Required pile length
δ_v	2.37	mm	Predicted Settlement under Serviceability Load
R_{ug}	70.70	MN	Ultimate Geotechnical Strength of Pile
R_g^*	35.35	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1300	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	30700	kN	Serviceability Load
S^*	37300	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	5.71	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	3.57	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	32.3	%	where P_t = Strength Limit State Load S^*
I_δ	0.53	-	Settlement Influence Factor as per design chart
L/D	2.41	-	Required pile length to diameter ratio as per design chart
L	3.86	m	Required pile length
δ_v	2.71	mm	Predicted Settlement under Serviceability Load
R_{ug}	75.50	MN	Ultimate Geotechnical Strength of Pile
R_g^*	37.75	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1040	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	30700	kN	Serviceability Load
S^*	37300	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	7.14	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	4.46	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	32.3	%	where P_t = Strength Limit State Load S^*
I_δ	0.55	-	Settlement Influence Factor as per design chart
L/D	3.02	-	Required pile length to diameter ratio as per design chart
L	4.83	m	Required pile length
δ_v	2.81	mm	Predicted Settlement under Serviceability Load
R_{ug}	75.50	MN	Ultimate Geotechnical Strength of Pile
R_g^*	37.75	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1300	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	37500	kN	Serviceability Load
S^*	47400	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	7.25	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	4.53	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	25.5	%	where P_t = Strength Limit State Load S^*
I_δ	0.58	-	Settlement Influence Factor as per design chart
L/D	4.30	-	Required pile length to diameter ratio as per design chart
L	6.88	m	Required pile length
δ_v	3.63	mm	Predicted Settlement under Serviceability Load
R_{ug}	95.22	MN	Ultimate Geotechnical Strength of Pile
R_g^*	47.61	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method



This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1040	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	37500	kN	Serviceability Load
S^*	47400	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	9.07	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	5.67	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	25.5	%	where P_t = Strength Limit State Load S^*
I_δ	0.58	-	Settlement Influence Factor as per design chart
L/D	5.40	-	Required pile length to diameter ratio as per design chart
L	8.64	m	Required pile length
δ_v	3.63	mm	Predicted Settlement under Serviceability Load
R_{ug}	95.43	MN	Ultimate Geotechnical Strength of Pile
R_g^*	47.72	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1300	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	45900	kN	Serviceability Load
S^*	57800	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	8.85	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	5.53	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	20.9	%	where P_t = Strength Limit State Load S^*
I_δ	0.53	-	Settlement Influence Factor as per design chart
L/D	6.30	-	Required pile length to diameter ratio as per design chart
L	10.08	m	Required pile length
δ_v	4.05	mm	Predicted Settlement under Serviceability Load
R_{ug}	116.13	MN	Ultimate Geotechnical Strength of Pile
R_g^*	58.07	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

client: QIC job no: B01493-1

project: Albert Street Development date: 1/11/2022

location: Brisbane by: DL

title: Single Pile Capacity - Rowe and Armitage Method

This page summarises the required inputs and the outputs using the design method proposed by Pells (1999) that considers the sidewall slip based on the work done by Rowe and Armitage (1987) [Refer to References]

Inputs

Term		Units	Description
D	1.6	m	Pile Diameter
ϕ_g	0.50	-	Geotechnical Reduction Factor
δ_v (Serv.)	5	mm	Serviceability Settlement Limit
$\tau_{avg, Peak}$	1040	kPa	Ultimate Side Shear Stress
q_{be}	6	MPa	Serviceability End Bearing Stress (Linear Elastic Behaviour)
$q_{b ult}$	25	MPa	Ultimate End Bearing Stress
E_b	5000	MPa	Young's modulus of rock beneath the pile base
E_p	35000	MPa	Young's modulus of pile
E_r	5000	MPa	Young's modulus of rock around pile shaft
Serv. Load	45900	kN	Serviceability Load
S^*	57800	kN	Strength Limit State Load
ϕ_m	0.75	-	Modulus Reduction Factor for long term serviceability
Perimeter	5.03	m	Pile Perimeter
Area	2.01	m ²	Area of Pile Base
E_b/E_r	1	-	Ratio of Base to Surrounding Rock Young's Modulus
E_p/E_r	7	-	Ratio of Pile to Rock Young's Modulus
L_{MAX}	11.06	m	Maximum length of pile required for strength limit state load taken in side shear
L_{MAX} / D	6.91	-	
P_b	12064	kN	Maximum base load at limit of linearly elastic behaviour

Outputs

Term		Units	Description
Pile Response	Side Slip	-	As per Pells, P.J.N. (1999) and Rowe, R.K. and Armitage, H.H. (1984).
Design Chart	A2	-	Relevant design chart as referenced per Pells, P.J.N. (1999)
P_b / P_t	20.9	%	where P_t = Strength Limit State Load S^*
I_δ	0.53	-	Settlement Influence Factor as per design chart
L/D	7.90	-	Required pile length to diameter ratio as per design chart
L	12.64	m	Required pile length
δ_v	4.05	mm	Predicted Settlement under Serviceability Load
R_{ug}	116.34	MN	Ultimate Geotechnical Strength of Pile
R_g^*	58.17	MN	Design Geotechnical Strength of Pile

References:

Pells, P.J.N. (1999). State of Practice for the Design of Socketed Piles in Rock. 8th ANZ Geomechanics Conference, Hobart

Rowe, R.K. and Armitage, H.H. (1984). The Design of Piles Socketed into Weak Rock. Research Report GEOT_11_84.

Rowe, R.K. and Armitage, H.H. (1987). A design method for drilled piers in soft rock.

Footing Calculations

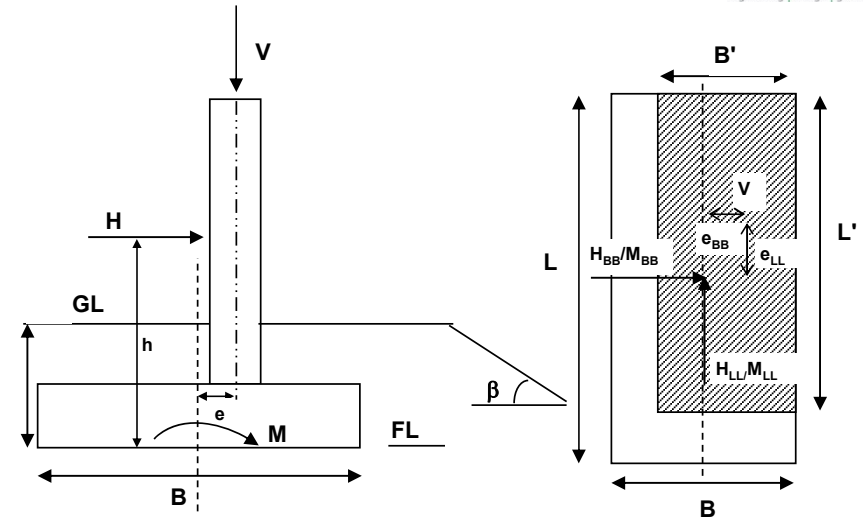
Bearing Capacity

client: RCP job no: B01493-I
 project: Albert Street Development date: 28/10/2022
 location: Brisbane by: YL
 title: Bearing Capacity for Shallow Footings checked: DL

GL= -5.000 m, Datum
 FL= -6.500 m, Datum
 GWL= -6.500 m, Datum

Water level within B' of founding level? **Yes**
 Horizontal force acting along B or L axis? **L**
 Include additional over-burden stress at footing? **Yes**

Drained: $q_{ult} = cN_c s_c d_c i_c b_c g_c + p_0 N_q s_q d_q i_q b_q g_q + \frac{1}{2} \gamma' B' N_\gamma s_\gamma d_\gamma i_\gamma b_\gamma g_\gamma$
 Undrained: $q_{ult} = c_u N_c s_c d_c i_c b_c + p_0 N_q s_q d_q i_q b_q - 2 \beta c_u$



D (m)	B (m)	L (m)	e _B (m)	e _L (m)	B' (m)	L' (m)	φ' (deg)	c'/c _u (kPa)	γ (kN/m ³)	γ _w (kN/m ³)	h _w (m)	γ' (kN/m ³)	φ' (rad)
1.50	5.20	6.00	0.000	0.514	4.97	5.20	30	20	23	9.807	0	13.193	0.52

H (kN)	h (m)	V (kN)	N _c	N _q	N _γ	d _q	d _c	s _c	s _q	s _γ	p' _o	FoS
0	0.00	21700	30.14	18.40	15.07	1.09	1.09	1.58	1.55	0.62	34.50	2.5

M (kNm)	β (deg)	β (rad)	g _c	g _q	g _γ	i _c	i _q	i _γ	m
0	0.00	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.489

q_{ultimate} = **2419 kPa** Resultant force is within middle 1/3
 q_{max} = **974 kPa**
 q_{allowable} = **988 kPa** Bearing capacity is satisfactory

Notes:

- All equations, bearing factors and relationships have been obtained from:
 - GE Barnes *Soil Mechanics - Principles and Practice* 2nd Edition (2000)
 - MJ Tomlinson *Foundation Design and Construction* 6th Edition (1995)
- Additional over-burden stress is the existing stress at the footing level prior to excavation (i.e. p'_o is added to the Net Bearing Capacity)

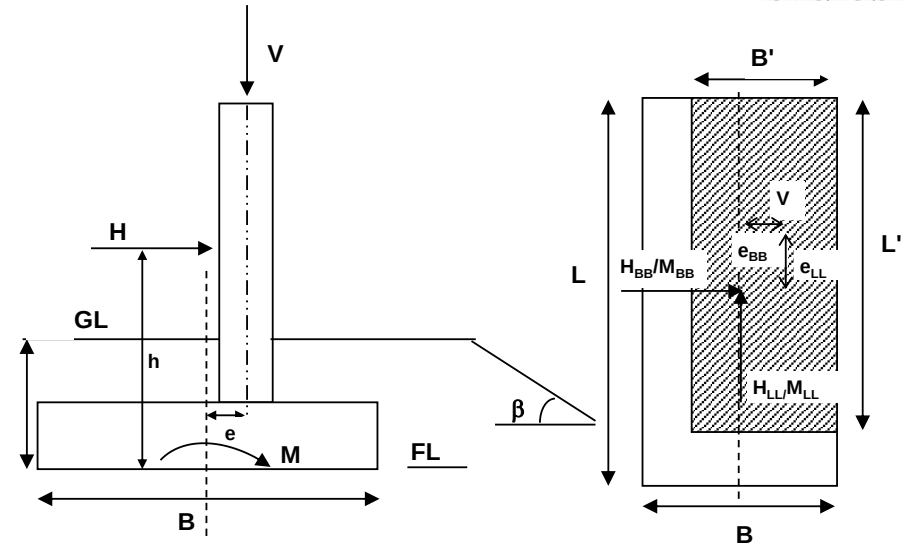
Bearing Capacity

client: RCP job no: B01493-I
 project: Albert Street Development date: 28/10/2022
 location: Brisbane by: YL
 title: Bearing Capacity for Shallow Footings checked: DL

GL= -5.000 m, Datum
 FL= -6.500 m, Datum
 GWL= -6.500 m, Datum

Water level within B' of founding level? Yes
 Horizontal force acting along B or L axis? B
 Include additional over-burden stress at footing? Yes

Drained: $q_{ult} = cN_c s_c d_c i_c b_c g_c + p_0 N_q s_q d_q i_q b_q g_q + \frac{1}{2} \gamma' B' N_\gamma s_\gamma d_\gamma i_\gamma b_\gamma g_\gamma$
 Undrained: $q_{ult} = c_u N_c s_c d_c i_c b_c + p_0 N_q s_q d_q i_q b_q - 2 \beta c_u$



D (m)	B (m)	L (m)	e _B (m)	e _L (m)	B' (m)	L' (m)	φ' (deg)	c'/c _u (kPa)	γ (kN/m ³)	γ _w (kN/m ³)	h _w (m)	γ' (kN/m ³)	φ' (rad)
1.50	6.00	8.70	0.514	0.000	4.97	8.70	30	10	20	9.807	0	10.193	0.52

H (kN)	h (m)	V (kN)	N _c	N _q	N _γ	d _q	d _c	s _c	s _q	s _γ	p' _o	FoS
0	0.00	21700	30.14	18.40	15.07	1.09	1.09	1.35	1.33	0.77	30.00	2.5

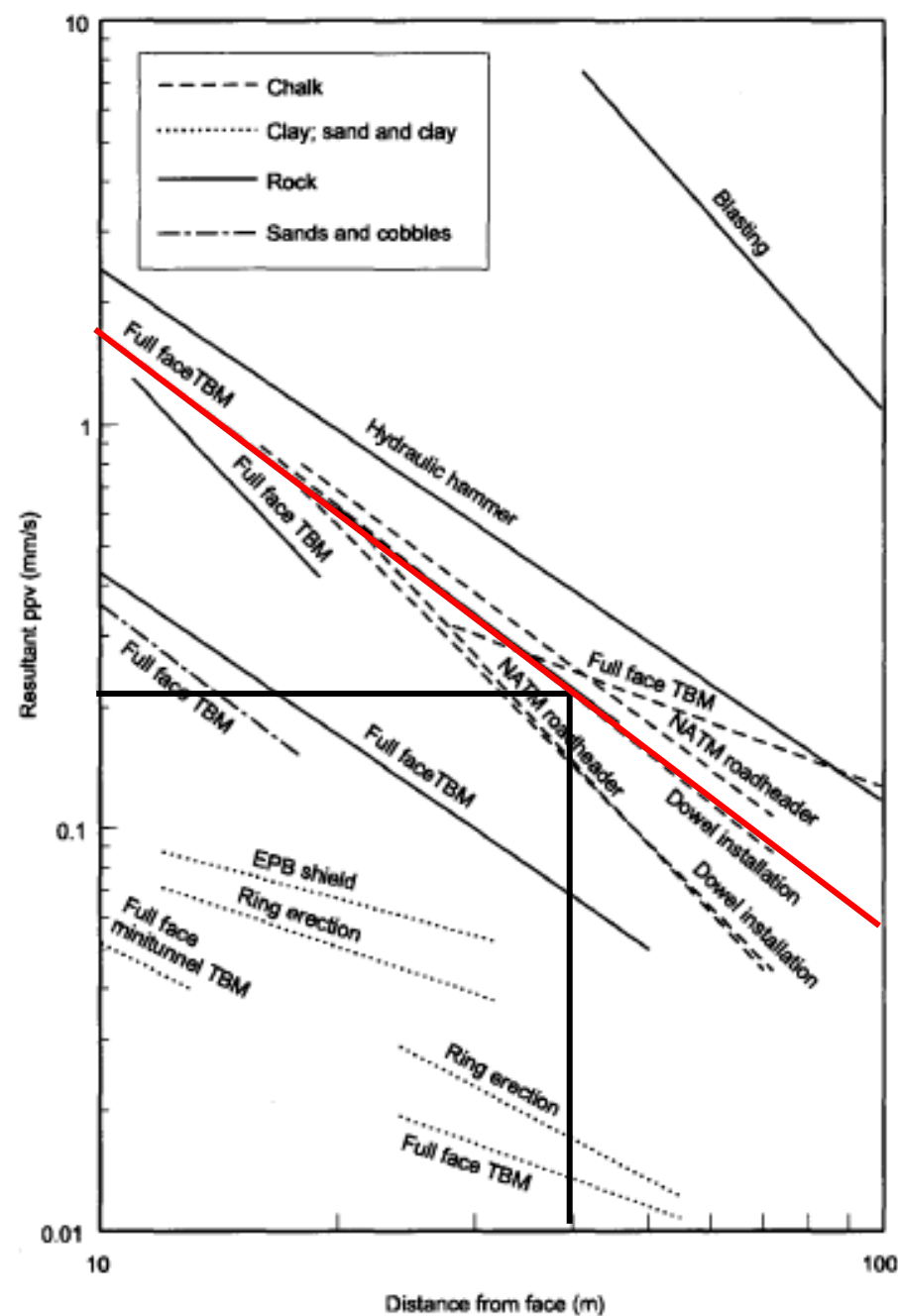
M (kNm)	β (deg)	β (rad)	g _c	g _q	g _γ	i _c	i _q	i _γ	m
0	0.00	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.636

Notes:

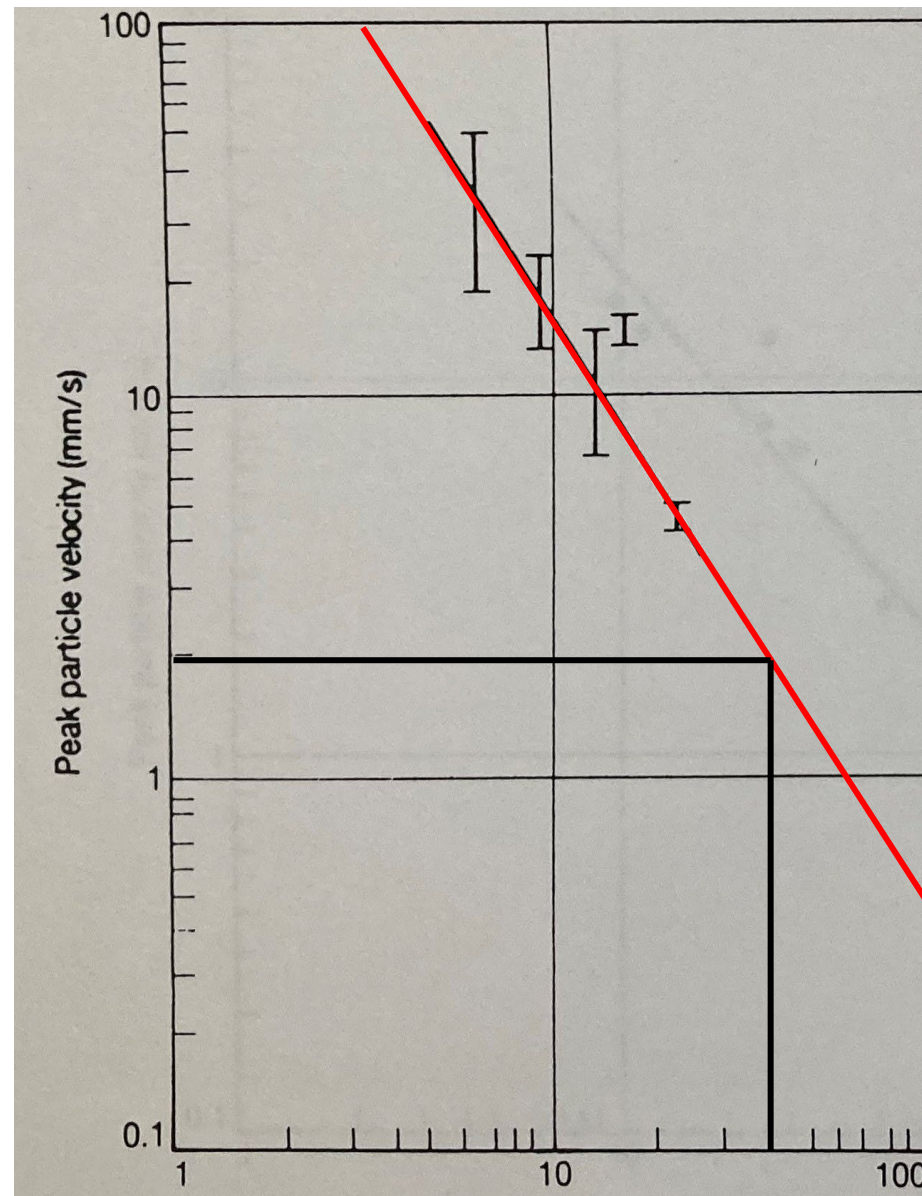
- All equations, bearing factors and relationships have been obtained from:
 - GE Barnes *Soil Mechanics - Principles and Practice* 2nd Edition (2000)
 - MJ Tomlinson *Foundation Design and Construction* 6th Edition (1995)
- Additional over-burden stress is the existing stress at the footing level prior to excavation (i.e. p'_o is added to the Net Bearing Capacity)

q_{ultimate} = 1537 kPa Resultant force is within middle 1/3
 q_{allowable} = 633 kPa Bearing capacity is satisfactory

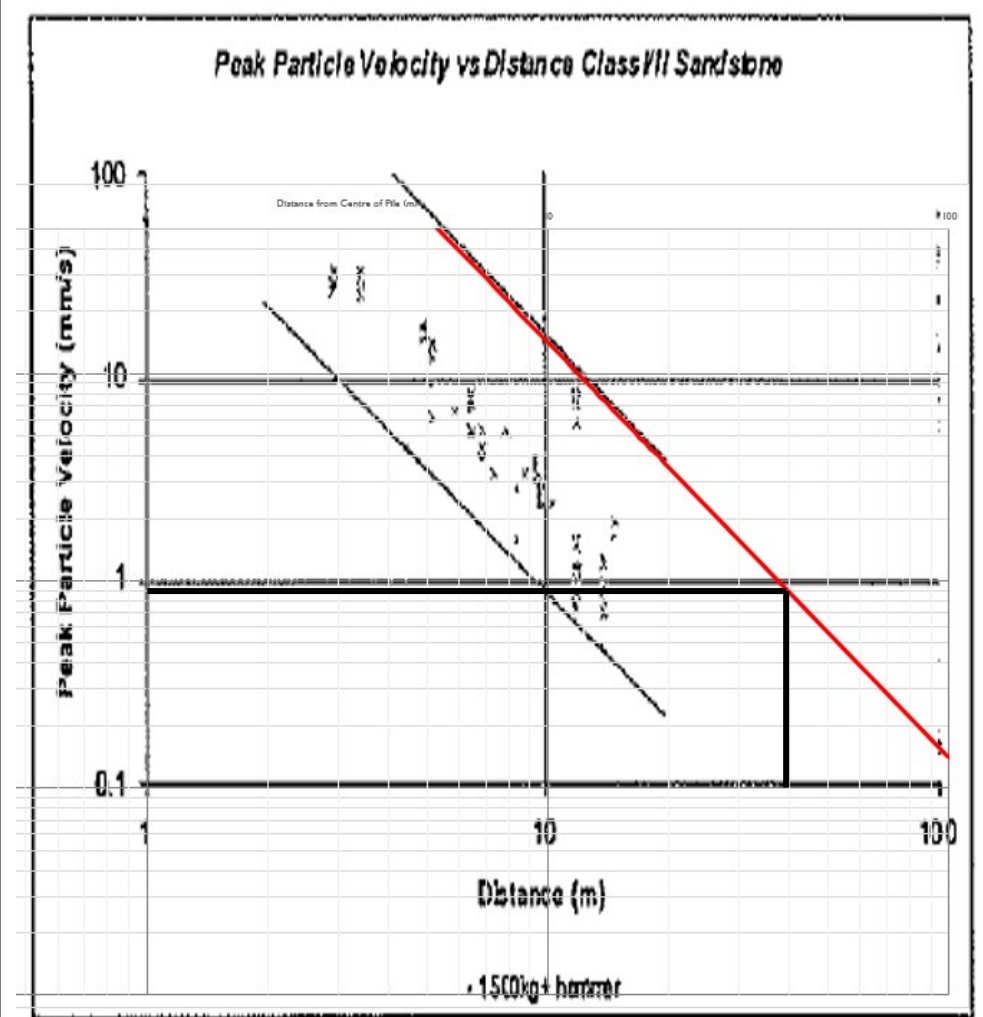
Groundborne Vibrations



Log peak particle velocity vs log distance for mechanised tunnelling (Ref. Hiller, D. M., & Crabb, G. I. (2000).



Log peak particle velocity vs log distance for vibro-driving of pile liners (Ref. Head, J. M., & Jardine, F. M. 1992).



Log peak particle velocity vs log distance for rock excavation using large rock hammers (Ref. Hackney G.A. 2002).

by:	DJC	client:	QIC	 EDG consulting engineering design geosciences
date:	16/11/22	project:	Albert Street – Future Over Station Development	
approved:	DJC	location:	Brisbane CBD	
scale:	NTS	title:	Peak particle velocities from empirical data	
		job no:	B01493-01	
				figure: F-1

WALLAP Analyses

EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DJC
Data filename/Run ID: Section_1	
Albert Street Development	Date:16-11-2022
Section 1	Checked :

Units: kN,m

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	----- Left side	Soil types ----- Right side
1	4.00	1 FL	1 FL
2	1.00	2 AL F	2 AL F
3	-3.50	4 RS F	4 RS F
4	-5.75	5 NFG 5	5 NFG 5
5	-8.50	6 NFG 3	6 NFG 3

SOIL PROPERTIES

-- Soil type --	Bulk density	Young's Modulus	At rest coeff.	Consol state.	Active limit	Passive limit	Cohesion
No. Description (Datum elev.)	kN/m3	Eh, kN/m2 (dEh/dy)	Ko (dKo/dy)	NC/OC (Nu)	Ka (Kac)	Kp (Kpc)	kN/m2 (dc/dy)
1 FL	17.00	10000	0.700	OC (0.300)	0.309 (0.000)	3.868 (0.000)	
2 AL F (1.00)	17.00	5000 (500.0)	0.700	OC (0.300)	0.351 (1.391)	3.442 (5.007)	4.000d
3 Not defined							
4 RS F	20.00	30000	1.000	OC (0.300)	0.283 (1.241)	4.369 (5.836)	10.00d
5 NFG 5	23.00	50000	1.000	OC (0.300)	0.292 (1.226)	4.369 (5.836)	20.00d
6 NFG 3	27.00	1000000	1.000	OC (0.200)	0.146 (0.854)	13.89 (12.886)	250.0d

Additional soil parameters associated with Ka and Kp

----- Soil type -----	--- parameters for Ka ---	--- parameters for Kp ---
No. Description	Soil friction angle	Soil friction angle
1 FL	28.00	28.00
2 AL F	25.00	26.00
3 Not defined		
4 RS F	30.00	30.00
5 NFG 5	30.00	30.00
6 NFG 3	45.00	45.00

GROUND WATER CONDITIONS

Density of water = 10.00 kN/m3

	Left side	Right side
Initial water table elevation	-4.00	-4.00

Automatic water pressure balancing at toe of wall : No

Water press.	----- Left side	----- Right side
profile Point no.	Point no. Elev. m Piezo elev. m Water press. kN/m2	Point no. Elev. m Piezo elev. m Water press. kN/m2
1	1 4.00 4.00 0.0	1 -5.00 -5.00 0.0
2	1 -4.00 -4.00 0.0	1 -5.00 -5.00 0.0

WALL PROPERTIES

Type of structure = Soldier Pile Wall
 Soldier Pile width = 0.90 m
 Soldier Pile spacing = 1.80 m
 Passive mobilisation factor = 3.00
 Elevation of toe of wall = -8.00
 Maximum finite element length = 0.60 m
 Youngs modulus of wall E = 3.2000E+07 kN/m2
 Moment of inertia of wall I = 0.017889 m4/m run
 = 0.032200 m4 per pile
 E.I = 572444 kN.m2/m run
 Yield Moment of wall = Not defined

STRUTS and ANCHORS

Prop no.	Elev.	Prop spacing m	Cross- section area sq.m	Youngs modulus kN/m2	Free length m	Inclin -ation (degs)	Pre- stress /prop kN	Strut or Anchor	Allow tension ?	L/R
1	2.00	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
2	-1.30	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
3	-5.00	1.00	0.150000	3.280E+07	20.00	0.00	0	Strut	Yes	R
4	-2.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
5	1.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
6	4.00	1.00	0.400000	3.280E+07	20.00	0.00	0	Strut	Yes	R

HORIZONTAL and MOMENT LOADS/RESTRAINTS

Load no.	Elevation	Horizontal load kN/m run	Moment load kN.m/m run	Moment restraint kN.m/m/rad	Partial factor (Category)
1	2.10	45.00	0	0	N/A
2	2.10	-45.00	0	0	N/A

SURCHARGE LOADS

Surch -arge no.	Elev.	Distance from wall	Length parallel to wall	Width perpend. to wall	Surcharge ----- kN/m2	----- Near edge	Far edge	Equiv. soil type	Partial factor/ Category
1	4.00	2.00 (L)	100.00	100.00	25.00	=		N/A	N/A

Note: L = Left side, R = Right side

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Apply surcharge no.1 at elevation 4.00
2	Excavate to elevation 2.00 on RIGHT side
3	Install strut or anchor no.1 at elevation 2.00
4	Excavate to elevation -1.50 on RIGHT side
5	Install strut or anchor no.2 at elevation -1.30
6	Apply water pressure profile no.2
7	Excavate to elevation -5.00 on RIGHT side
8	Apply load no.1 at elevation 2.10
9	Apply load no.2 at elevation 2.10
10	Install strut or anchor no.3 at elevation -5.00
11	Install strut or anchor no.4 at elevation -2.00
12	Remove strut or anchor no.2 at elevation -1.30
13	Install strut or anchor no.5 at elevation 1.00
14	Install strut or anchor no.6 at elevation 4.00
15	Remove strut or anchor no.1 at elevation 2.00
16	Change EI of wall to 400711 kN.m2/m run Allow wall to relax with new modulus value
17	Apply water pressure profile no.1

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:

Method of analysis - Burland-Potts

Factor on passive for calculating wall depth = 1.50

Parameters for undrained strata:

Minimum equivalent fluid density = 5.00 kN/m³

Maximum depth of water filled tension crack = 0.00 m

Bending moment and displacement calculation:

Method - 2-D finite element model

Open Tension Crack analysis? - No

Active limit arching modelled? - Yes

Non-linear Modulus Parameter (L) = 9.000 m

Boundary conditions:

Length of wall (normal to plane of analysis) = 60.00 m

Width of excavation on Left side of wall = 40.00 m

Width of excavation on Right side of wall = 40.00 m

Distance to rigid boundary on Left side = 30.00 m

Distance to rigid boundary on Right side = 20.00 m

Elevation of rigid lower boundary = -20.00

Lower rigid boundary at elevation -20.00 - Rough

Rigid boundary on Left side - Rough

Rigid boundary on Right side - Smooth

Wall / soil interface - Rough

OUTPUT OPTIONS

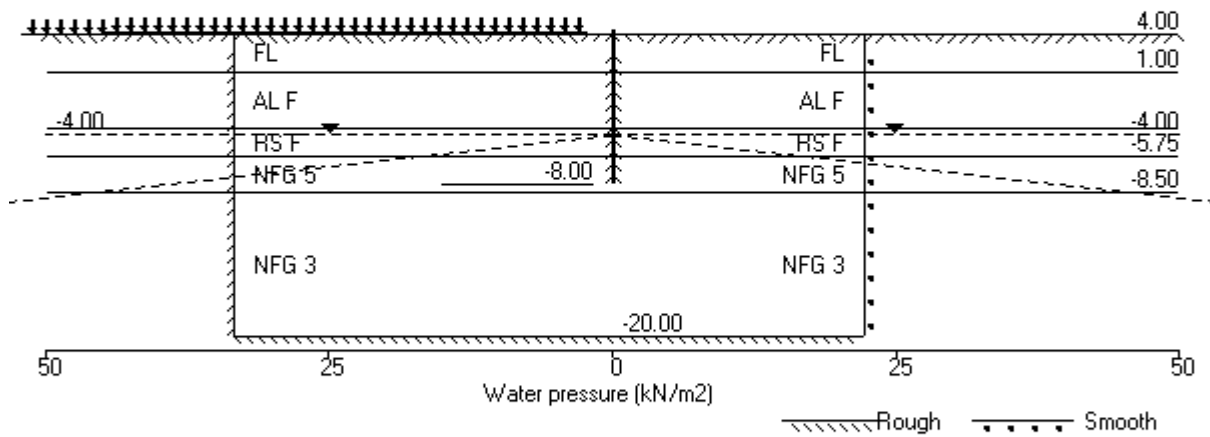
Stage no.	Stage description	Displacement Bending mom. Shear force	Active, Passive pressures	Graph. output
1	Apply surcharge no.1 at elev. 4.00	Yes	Yes	Yes
2	Excav. to elev. 2.00 on RIGHT side	Yes	Yes	Yes
3	Install prop no.1 at elev. 2.00	Yes	Yes	Yes
4	Excav. to elev. -1.50 on RIGHT side	Yes	Yes	Yes
5	Install prop no.2 at elev. -1.30	Yes	Yes	Yes
6	Apply water pressure profile no.2	Yes	Yes	Yes
7	Excav. to elev. -5.00 on RIGHT side	Yes	Yes	Yes
8	Apply load no.1 at elev. 2.10	Yes	Yes	Yes
9	Apply load no.2 at elev. 2.10	Yes	Yes	Yes
10	Install prop no.3 at elev. -5.00	Yes	Yes	Yes
11	Install prop no.4 at elev. -2.00	Yes	Yes	Yes
12	Remove prop no.2 at elev. -1.30	Yes	Yes	Yes
13	Install prop no.5 at elev. 1.00	Yes	Yes	Yes
14	Install prop no.6 at elev. 4.00	Yes	Yes	Yes
15	Remove prop no.1 at elev. 2.00	Yes	Yes	Yes
16	Change EI of wall to 400711kN.m ² /m run	Yes	Yes	Yes
17	Apply water pressure profile no.1	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

EDG CONSULTING PTY LTD
Program: WALLAP Version 6.07 Revision A55.B74.R58
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Data filename/Run ID: Section_1
Albert Street Development
Section 1

| Sheet No.
| Job No. B01493
| Made by : DJC
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Units: kN,m

Stage No. 1 Apply surcharge no.1 at elevation 4.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe		Toe elev. for				
			elev. = -8.00		FoS = 1.500				
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>		
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	<u>of</u>	
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>	
1	4.00	4.00	---	<u>Conditions not suitable for FoS calc.</u>					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.001	1.90E-05	0.0	-0.0		572444
2	3.50	-4.16	0.001	1.89E-05	-1.0	0.0		572444
3	3.00	-3.19	0.001	1.94E-05	-2.9	-1.0		572444
4	2.55	-2.42	0.001	2.08E-05	-4.1	-2.6		572444
5	2.10	-1.61	0.001	2.37E-05	-5.0	-4.7		572444
6	2.00	-1.37	0.001	2.46E-05	-5.2	-5.2		572444
7	1.50	-0.41	0.001	3.03E-05	-5.6	-8.0		572444
8	1.00	0.51	0.001	3.85E-05	-5.6	-10.8		572444
		2.03	0.001	3.85E-05	-5.6	-10.8		
9	0.50	2.21	0.001	4.90E-05	-4.6	-13.3		572444
10	0.00	2.57	0.001	6.15E-05	-3.4	-15.3		572444
11	-0.60	3.01	0.001	7.84E-05	-1.7	-16.8		572444
12	-0.95	3.18	0.001	8.88E-05	-0.6	-17.2		572444
13	-1.30	3.37	0.001	9.93E-05	0.5	-17.2		572444
14	-1.50	3.40	0.001	1.05E-04	1.2	-17.1		572444
15	-2.00	3.63	0.001	1.19E-04	3.0	-16.0		572444
16	-2.38	3.69	0.001	1.29E-04	4.3	-14.6		572444
17	-2.75	3.70	0.001	1.38E-04	5.7	-12.7		572444
18	-3.13	3.48	0.001	1.46E-04	7.1	-10.3		572444
19	-3.50	3.07	0.001	1.52E-04	8.3	-7.4		572444
		-9.96	0.001	1.52E-04	8.3	-7.4		
20	-4.00	-4.02	0.001	1.57E-04	4.8	-4.5		572444
21	-4.50	-1.92	0.001	1.60E-04	3.3	-2.6		572444
22	-5.00	-0.91	0.001	1.62E-04	2.6	-1.2		572444
23	-5.38	-0.57	0.001	1.62E-04	2.3	-0.3		572444
24	-5.75	-0.80	0.001	1.62E-04	2.1	0.6		572444
		-6.63	0.001	1.62E-04	2.1	0.6		
25	-6.18	-2.72	0.000	1.62E-04	0.1	0.9		572444
26	-6.60	-0.67	0.000	1.61E-04	-0.6	0.7		572444
27	-7.20	0.67	0.000	1.60E-04	-0.6	0.2		572444
28	-7.60	1.23	0.000	1.60E-04	-0.2	-0.0		572444
29	-8.00	-0.03	0.000	1.60E-04	0.0	0.0		0

(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
30	-8.15	-0.01	0.000	0	-0.0	0.0		0
31	-8.50	8.17	0.000	0	1.4	0.0		0
		-1.67	0.000	0	1.4	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	-0.00	0.000	0	-0.0	0.0		0
34	-14.40	0.01	0.000	0	-0.0	0.0		0
35	-16.80	0.01	0.000	0	-0.0	0.0		0
36	-18.40	0.00	0.000	0	-0.0	0.0		0
37	-20.00	0.00	0.000	0	0.0	0.0		---

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	3.94	3.94	9974
3	3.00	0.00	18.01	5.57	69.68	10.56	10.56	9974
4	2.55	0.00	27.07	8.37	104.72	16.60	16.60	9974
5	2.10	0.00	36.44	11.26	140.98	22.73	22.73	9974
6	2.00	0.00	38.54	11.91	149.09	24.12	24.12	9974
7	1.50	0.00	49.00	15.14	189.53	30.97	30.97	9974
8	1.00	0.00	59.29	18.32	229.36	37.77	37.77	9974
		0.00	59.29	15.26	224.13	38.51	38.51	4987
9	0.50	0.00	69.38	18.81	258.84	44.89	44.89	5236
10	0.00	0.00	79.25	22.27	292.82	51.31	51.31	5486
11	-0.60	0.00	90.84	26.35	332.74	58.97	58.97	5785
12	-0.95	0.00	97.50	28.68	355.65	63.37	63.37	5960
13	-1.30	0.00	104.09	31.00	378.32	67.77	67.77	6134
14	-1.50	0.00	107.82	32.31	391.18	70.23	70.23	6234
15	-2.00	0.00	117.09	35.56	423.07	76.46	76.46	6483
16	-2.38	0.00	123.97	37.98	446.76	81.07	81.07	6670
17	-2.75	0.00	130.80	40.38	470.29	85.63	85.63	6857
18	-3.13	0.00	137.60	42.77	493.67	90.08	90.08	7044
19	-3.50	0.00	144.35	45.14	516.93	94.40	94.40	7231
		0.00	144.35	28.49	689.10	126.14	126.14	29922
20	-4.00	0.00	154.81	31.45	734.80	139.24	139.24	29922
21	-4.50	5.00	160.22	32.99	758.43	145.37	150.37	29922
22	-5.00	10.00	165.59	34.51	781.88	150.96	160.96	29922
23	-5.38	13.75	169.59	35.64	799.36	154.93	168.68	29922
24	-5.75	17.50	173.57	36.77	816.76	158.59	176.09	29922
		17.50	173.57	26.21	875.12	155.68	173.18	49871
25	-6.18	21.75	179.34	27.89	900.31	163.24	184.99	49871
26	-6.60	26.00	185.08	29.57	925.43	169.83	195.83	49871
27	-7.20	32.00	193.17	31.94	960.75	178.36	210.36	49871
28	-7.60	36.00	198.54	33.51	984.22	183.88	219.88	49871
29	-8.00	40.00	203.90	35.07	1007.64	188.47	228.47	49871
30	-8.15	41.50	205.91	35.66	1016.41	190.39	231.89	49871
31	-8.50	45.00	210.59	37.03	1036.85	199.09	244.09	49871
		45.00	210.59	0.00	6145.66	192.54	237.54	997417
32	-10.25	62.50	240.86	0.00	6566.09	223.19	285.69	997417
33	-12.00	80.00	271.00	0.00	6984.53	252.98	332.98	997417
34	-14.40	104.00	312.15	0.00	7556.03	293.81	397.81	997417
35	-16.80	128.00	353.16	0.00	8125.48	334.61	462.61	997417
36	-18.40	144.00	380.44	0.00	8504.23	361.80	505.80	997417
37	-20.00	160.00	407.67	0.00	8882.38	389.53	549.53	997417

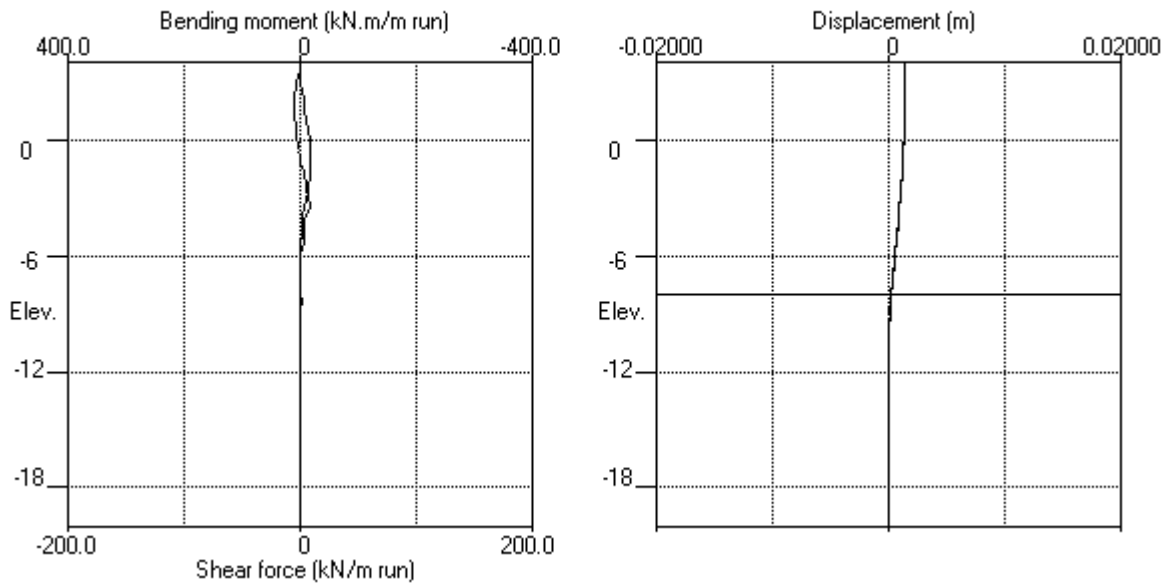
(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

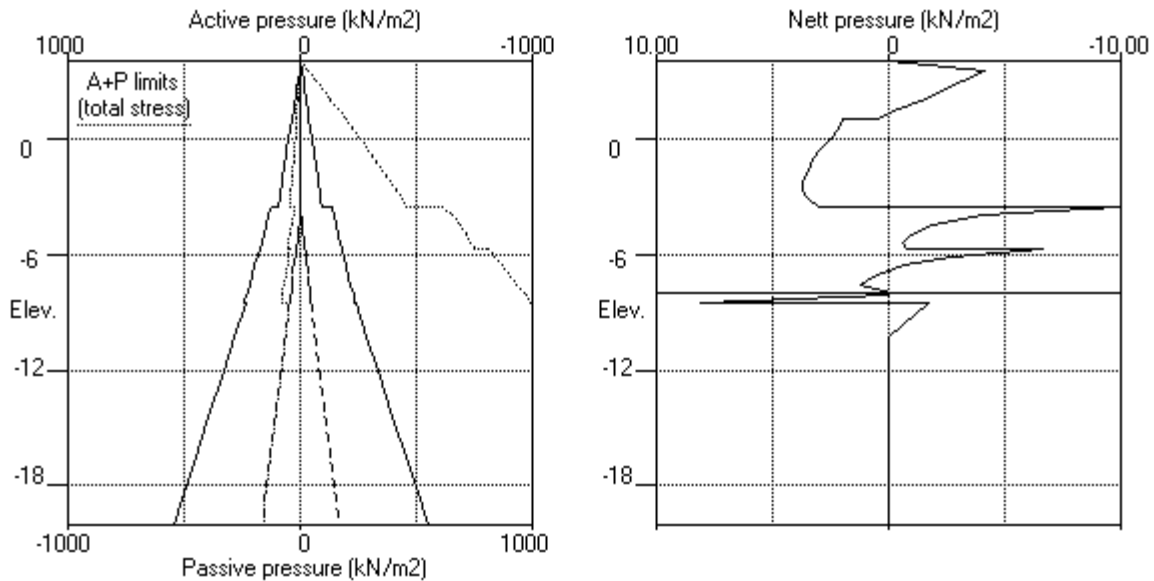
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9951
2	3.50	0.00	8.50	2.63	32.88	8.10	8.10	9951
3	3.00	0.00	17.00	5.25	65.76	13.75	13.75	9951
4	2.55	0.00	24.65	7.62	95.35	19.02	19.02	9951
5	2.10	0.00	32.30	9.98	124.95	24.34	24.34	9951
6	2.00	0.00	34.00	10.51	131.52	25.49	25.49	9951
7	1.50	0.00	42.50	13.13	164.40	31.38	31.38	9951
8	1.00	0.00	51.00	15.76	197.28	37.26	37.26	9951
		0.00	51.00	12.35	195.58	36.48	36.48	4976
9	0.50	0.00	59.50	15.34	224.84	42.68	42.68	5225
10	0.00	0.00	68.00	18.32	254.10	48.74	48.74	5473
11	-0.60	0.00	78.20	21.91	289.21	55.96	55.96	5772
12	-0.95	0.00	84.15	24.00	309.69	60.19	60.19	5946
13	-1.30	0.00	90.10	26.09	330.17	64.40	64.40	6120
14	-1.50	0.00	93.50	27.28	341.88	66.84	66.84	6220
15	-2.00	0.00	102.00	30.27	371.14	72.83	72.83	6468
16	-2.38	0.00	108.37	32.50	393.08	77.37	77.37	6655
17	-2.75	0.00	114.75	34.74	415.03	81.93	81.93	6842
18	-3.13	0.00	121.12	36.98	436.97	86.60	86.60	7028
19	-3.50	0.00	127.50	39.22	458.91	91.33	91.33	7215
		0.00	127.50	23.71	615.46	136.09	136.09	29854
20	-4.00	0.00	137.50	26.55	659.15	143.26	143.26	29854
21	-4.50	5.00	142.50	27.96	681.00	147.29	152.29	29854
22	-5.00	10.00	147.50	29.38	702.84	151.86	161.86	29854
23	-5.38	13.75	151.25	30.44	719.23	155.50	169.25	29854
24	-5.75	17.50	155.00	31.51	735.61	159.38	176.88	29854
		17.50	155.00	20.78	793.97	162.31	179.81	49757
25	-6.18	21.75	160.53	22.40	818.11	165.96	187.71	49757
26	-6.60	26.00	166.05	24.01	842.26	170.50	196.50	49757
27	-7.20	32.00	173.85	26.29	876.34	177.69	209.69	49757
28	-7.60	36.00	179.05	27.81	899.06	182.64	218.64	49757
29	-8.00	40.00	184.25	29.33	921.78	188.49	228.49	49757
30	-8.15	41.50	186.20	29.90	930.30	190.40	231.90	49757
31	-8.50	45.00	190.75	31.23	950.18	190.92	235.92	49757
		45.00	190.75	0.00	5870.23	194.21	239.21	995147
32	-10.25	62.50	220.50	0.00	6283.34	223.19	285.69	995147
33	-12.00	80.00	250.25	0.00	6696.44	252.99	332.99	995147
34	-14.40	104.00	291.05	0.00	7262.99	293.81	397.81	995147
35	-16.80	128.00	331.85	0.00	7829.54	334.60	462.60	995147
36	-18.40	144.00	359.05	0.00	8207.23	361.79	505.79	995147
37	-20.00	160.00	386.25	0.00	8584.93	389.52	549.52	995147

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Stage No.1 Apply surcharge no.1 at elev. 4.00

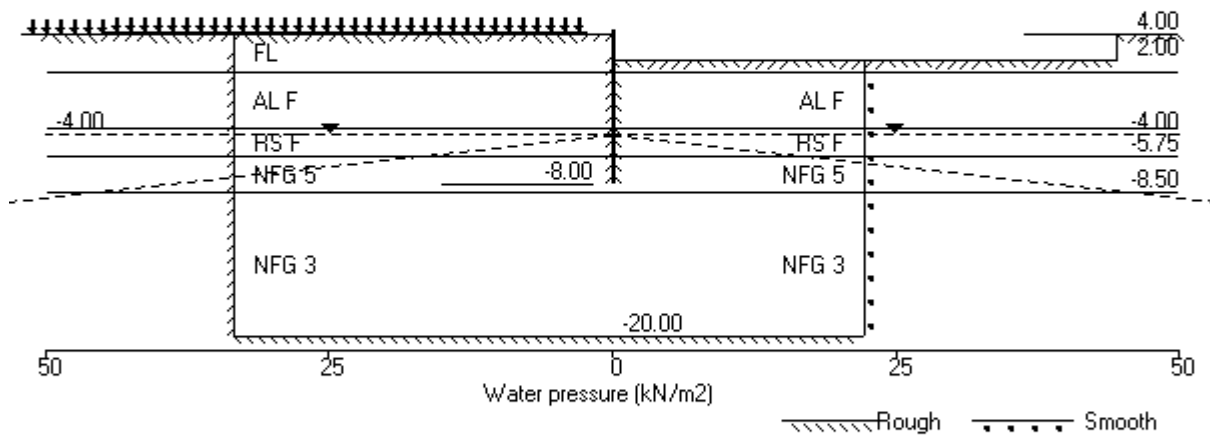


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_1
 Albert Street Development
 Section 1

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Units: kN,m

Stage No. 2 Excavate to elevation 2.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
2	4.00	2.00	Cant.	11.788	-6.50	-0.18	2.18	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.016	1.65E-03	0.0	-0.0		572444
2	3.50	2.67	0.015	1.65E-03	0.7	0.3		572444
3	3.00	5.57	0.014	1.65E-03	2.7	1.3		572444
4	2.55	8.37	0.014	1.65E-03	5.9	3.2		572444
5	2.10	11.26	0.013	1.64E-03	10.3	6.9		572444
6	2.00	11.91	0.013	1.64E-03	11.4	8.0		572444
7	1.50	-13.47	0.012	1.63E-03	11.0	14.8		572444
8	1.00	-7.36	0.011	1.62E-03	5.8	18.7		572444
		5.38	0.011	1.62E-03	5.8	18.7		
9	0.50	3.30	0.010	1.60E-03	8.0	22.3		572444
10	0.00	3.60	0.010	1.58E-03	9.7	26.8		572444
11	-0.60	4.47	0.009	1.55E-03	12.2	33.3		572444
12	-0.95	4.93	0.008	1.53E-03	13.8	37.8		572444
13	-1.30	5.38	0.008	1.50E-03	15.6	42.9		572444
14	-1.50	5.51	0.007	1.49E-03	16.7	46.2		572444
15	-2.00	5.92	0.007	1.44E-03	19.6	55.2		572444
16	-2.38	5.83	0.006	1.40E-03	21.8	63.0		572444
17	-2.75	5.29	0.005	1.36E-03	23.8	71.6		572444
18	-3.13	3.36	0.005	1.31E-03	25.5	80.9		572444
19	-3.50	-0.09	0.005	1.25E-03	26.1	90.7		572444
		-68.70	0.005	1.25E-03	26.1	90.7		
20	-4.00	-31.45	0.004	1.17E-03	1.0	95.1		572444
21	-4.50	-17.13	0.003	1.09E-03	-11.1	91.7		572444
22	-5.00	-10.56	0.003	1.01E-03	-18.0	84.0		572444
23	-5.38	-7.99	0.002	9.65E-04	-21.5	76.5		572444
24	-5.75	-8.87	0.002	9.17E-04	-24.7	67.9		572444
		-29.77	0.002	9.17E-04	-24.7	67.9		
25	-6.18	-10.47	0.002	8.72E-04	-33.2	54.7		572444
26	-6.60	1.57	0.001	8.37E-04	-35.1	39.7		572444
27	-7.20	11.67	0.001	8.06E-04	-31.1	18.9		572444
28	-7.60	25.93	0.001	7.97E-04	-23.6	7.4		572444
29	-8.00	67.02	0.000	7.94E-04	-5.0	0.0		0

(continued)

Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
30	-8.15	-0.01	0.000	0	-0.0	0.0		0
31	-8.50	22.08	0.000	0	3.9	0.0		0
		-4.45	0.000	0	3.9	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.00	0.000	0	-0.0	0.0		0
34	-14.40	0.01	0.000	0	0.0	0.0		0
35	-16.80	-0.00	0.000	0	0.0	0.0		0
36	-18.40	0.00	0.000	0	0.0	0.0		0
37	-20.00	-0.02	0.000	0	0.0	0.0		---

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>			<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	2.67	2.67a	9974
3	3.00	0.00	18.01	5.57	69.68	5.57	5.57a	9974
4	2.55	0.00	27.07	8.37	104.72	8.37	8.37a	9974
5	2.10	0.00	36.44	11.26	140.98	11.26	11.26a	9974
6	2.00	0.00	38.54	11.91	149.09	11.91	11.91a	9974
7	1.50	0.00	49.00	15.14	189.53	19.41	19.41	9974
8	1.00	0.00	59.29	18.32	229.36	29.31	29.31	9974
		0.00	59.29	15.26	224.13	34.28	34.28	4987
9	0.50	0.00	69.38	18.81	258.84	39.16	39.16	5236
10	0.00	0.00	79.25	22.27	292.82	45.29	45.29	5486
11	-0.60	0.00	90.84	26.35	332.74	52.99	52.99	5785
12	-0.95	0.00	97.50	28.68	355.65	57.43	57.43	5960
13	-1.30	0.00	104.09	31.00	378.32	61.89	61.89	6134
14	-1.50	0.00	107.82	32.31	391.18	64.36	64.36	6234
15	-2.00	0.00	117.09	35.56	423.07	70.61	70.61	6483
16	-2.38	0.00	123.97	37.98	446.76	75.09	75.09	6670
17	-2.75	0.00	130.80	40.38	470.29	79.35	79.35	6857
18	-3.13	0.00	137.60	42.77	493.67	82.94	82.94	7044
19	-3.50	0.00	144.35	45.14	516.93	85.61	85.61	7231
		0.00	144.35	28.49	689.10	89.78	89.78	29922
20	-4.00	0.00	154.81	31.45	734.80	118.67	118.67	29922
21	-4.50	5.00	160.22	32.99	758.43	130.84	135.84	29922
22	-5.00	10.00	165.59	34.51	781.88	139.15	149.15	29922
23	-5.38	13.75	169.59	35.64	799.36	144.21	157.96	29922
24	-5.75	17.50	173.57	36.77	816.76	147.41	164.91	29922
		17.50	173.57	26.21	875.12	137.04	154.54	49871
25	-6.18	21.75	179.34	27.89	900.31	152.39	174.14	49871
26	-6.60	26.00	185.08	29.57	925.43	163.91	189.91	49871
27	-7.20	32.00	193.17	31.94	960.75	176.77	208.77	49871
28	-7.60	36.00	198.54	33.51	984.22	189.00	225.00	49871
29	-8.00	40.00	203.90	35.07	1007.64	215.97	255.97	49871
30	-8.15	41.50	205.91	35.66	1016.41	182.24	223.74	49871
31	-8.50	45.00	210.59	37.03	1036.85	198.84	243.84	49871
		45.00	210.59	0.00	6145.66	187.49	232.49	997417
32	-10.25	62.50	240.86	0.00	6566.09	219.56	282.06	997417
33	-12.00	80.00	271.00	0.00	6984.53	249.32	329.32	997417
34	-14.40	104.00	312.15	0.00	7556.03	290.09	394.09	997417
35	-16.80	128.00	353.16	0.00	8125.48	330.82	458.82	997417
36	-18.40	144.00	380.44	0.00	8504.23	357.94	501.94	997417
37	-20.00	160.00	407.67	0.00	8882.38	386.46	546.46	997417

(continued)

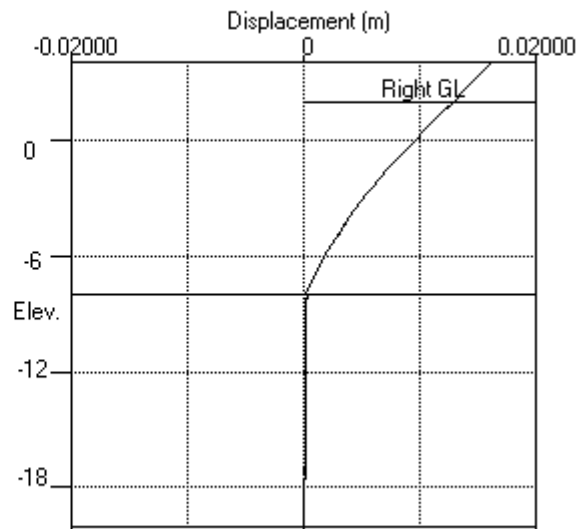
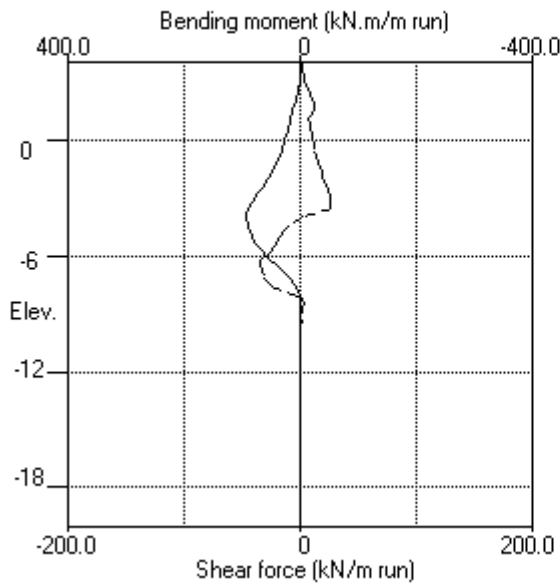
Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>kn/m2</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>kn/m2</u>
		<u>Water</u> <u>press.</u> <u>kn/m2</u>	<u>Vertic</u> <u>-al</u> <u>kn/m2</u>	<u>Active</u> <u>limit</u> <u>kn/m2</u>	<u>Passive</u> <u>limit</u> <u>kn/m2</u>	<u>Earth</u> <u>pressure</u> <u>kn/m2</u>		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	0.00	0.00	0.00	9957
7	1.50	0.00	8.50	2.63	32.88	32.88	32.88p	9957
8	1.00	0.00	17.00	5.25	65.76	36.67	36.67	9957
		0.00	17.00	0.41	78.55	28.90	28.90	4979
9	0.50	0.00	25.50	3.39	107.81	35.86	35.86	5227
10	0.00	0.00	34.00	6.38	137.07	41.70	41.70	5476
11	-0.60	0.00	44.20	9.96	172.19	48.53	48.53	5775
12	-0.95	0.00	50.16	12.05	192.68	52.50	52.50	5949
13	-1.30	0.00	56.11	14.14	213.17	56.52	56.52	6124
14	-1.50	0.00	59.51	15.34	224.88	58.84	58.84	6223
15	-2.00	0.00	68.01	18.33	254.15	64.70	64.70	6472
16	-2.38	0.00	74.39	20.57	276.11	69.26	69.26	6659
17	-2.75	0.00	80.77	22.81	298.07	74.06	74.06	6846
18	-3.13	0.00	87.15	25.05	320.04	79.57	79.57	7032
19	-3.50	0.00	93.54	27.29	342.00	85.70	85.70	7219
		0.00	93.54	14.09	467.06	158.48	158.48	29871
20	-4.00	0.00	103.55	16.93	510.80	150.12	150.12	29871
21	-4.50	5.00	108.56	18.35	532.70	147.97	152.97	29871
22	-5.00	10.00	113.57	19.77	554.61	149.71	159.71	29871
23	-5.38	13.75	117.34	20.83	571.05	152.21	165.96	29871
24	-5.75	17.50	121.10	21.90	587.49	156.28	173.78	29871
		17.50	121.10	10.87	645.85	166.81	184.31	49786
25	-6.18	21.75	126.64	12.49	670.07	162.85	184.60	49786
26	-6.60	26.00	132.19	14.11	694.29	162.35	188.35	49786
27	-7.20	32.00	140.02	16.40	728.50	165.10	197.10	49786
28	-7.60	36.00	145.24	17.93	751.31	163.07	199.07	49786
29	-8.00	40.00	150.46	19.45	774.14	148.94	188.94	49786
30	-8.15	41.50	152.42	20.03	782.70	182.25	223.75	49786
31	-8.50	45.00	156.99	21.36	802.67	176.76	221.76	49786
		45.00	156.99	0.00	5401.45	191.94	236.94	995713
32	-10.25	62.50	186.87	0.00	5816.38	219.55	282.05	995713
33	-12.00	80.00	216.79	0.00	6231.80	249.32	329.32	995713
34	-14.40	104.00	257.87	0.00	6802.32	290.08	394.08	995713
35	-16.80	128.00	299.03	0.00	7373.76	330.82	458.82	995713
36	-18.40	144.00	326.50	0.00	7755.22	357.94	501.94	995713
37	-20.00	160.00	353.99	0.00	8137.03	386.48	546.48	995713

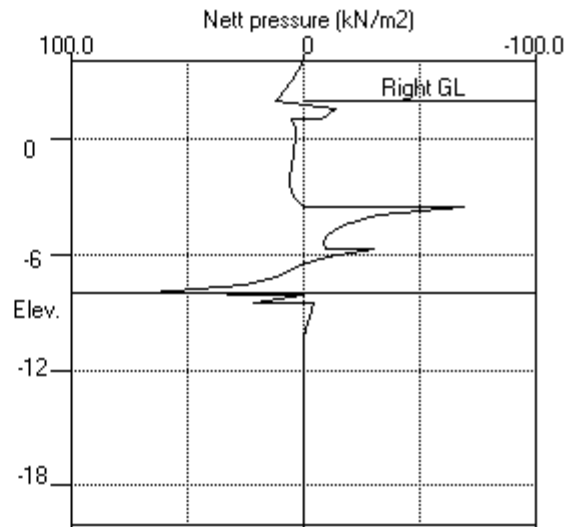
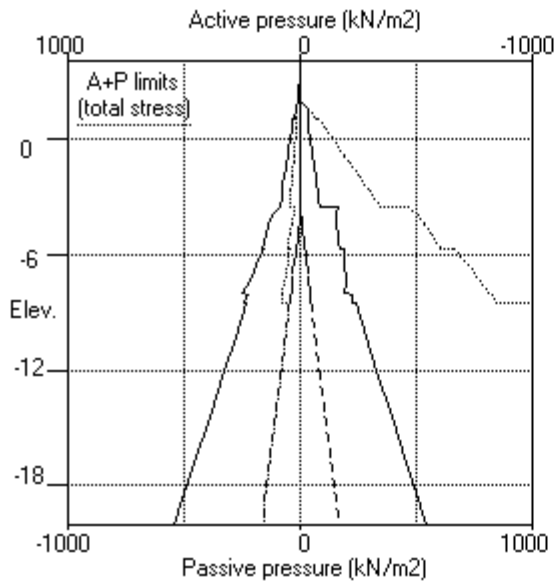
Note: 11.91 a Soil pressure at active limit
 32.88 p Soil pressure at passive limit

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Stage No.2 Excav. to elev. 2.00 on RIGHT side

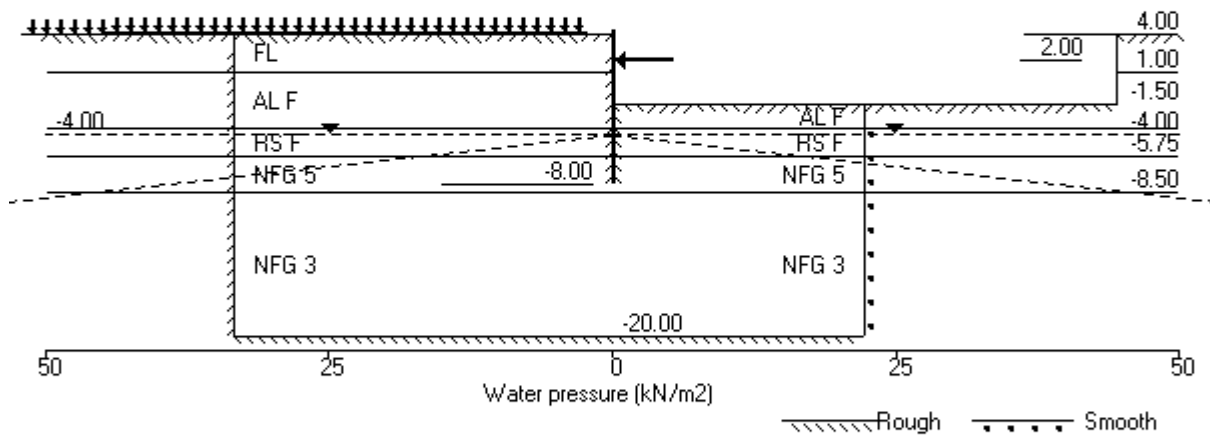


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_1
 Albert Street Development
 Section 1

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Units: kN,m

Stage No. 4 Excavate to elevation -1.50 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
4	4.00	-1.50	2.00	8.853	n/a	-3.48	1.98	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.016	8.06E-04	0.0	0.0		572444
2	3.50	6.05	0.016	8.06E-04	1.5	0.3		572444
3	3.00	7.28	0.015	8.04E-04	4.8	2.1		572444
4	2.55	8.75	0.015	8.02E-04	8.5	5.2		572444
5	2.10	10.72	0.014	7.96E-04	12.8	10.1		572444
6	2.00	10.39	0.014	7.94E-04	13.9	11.5	-104.8	572444
		10.39	0.014	7.94E-04	-90.9	11.5		
7	1.50	16.75	0.014	8.03E-04	-84.2	-31.8		572444
8	1.00	25.00	0.013	8.48E-04	-73.7	-71.6		572444
		32.13	0.013	8.48E-04	-73.7	-71.6		
9	0.50	36.31	0.013	9.24E-04	-56.6	-104.1		572444
10	0.00	41.82	0.013	1.02E-03	-37.1	-127.6		572444
11	-0.60	48.98	0.012	1.16E-03	-9.8	-141.9		572444
12	-0.95	52.95	0.011	1.25E-03	8.0	-142.2		572444
13	-1.30	57.15	0.011	1.33E-03	27.3	-136.1		572444
14	-1.50	59.30	0.011	1.38E-03	38.9	-129.5		572444
		39.27	0.011	1.38E-03	38.9	-129.5		
15	-2.00	20.70	0.010	1.48E-03	53.9	-105.7		572444
16	-2.38	20.31	0.009	1.55E-03	61.6	-84.0		572444
17	-2.75	19.11	0.009	1.59E-03	69.0	-59.5		572444
18	-3.13	15.91	0.008	1.62E-03	75.5	-32.2		572444
19	-3.50	10.72	0.008	1.63E-03	80.5	-2.8		572444
		-104.04	0.008	1.63E-03	80.5	-2.8		
20	-4.00	-48.81	0.007	1.62E-03	42.3	24.5		572444
21	-4.50	-28.46	0.006	1.60E-03	23.0	39.5		572444
22	-5.00	-18.91	0.005	1.56E-03	11.2	47.5		572444
23	-5.38	-15.36	0.005	1.53E-03	4.7	50.4		572444
24	-5.75	-17.12	0.004	1.49E-03	-1.3	51.1		572444
		-60.54	0.004	1.49E-03	-1.3	51.1		
25	-6.18	-26.92	0.003	1.46E-03	-19.9	45.0		572444
26	-6.60	-7.24	0.003	1.43E-03	-27.2	34.1		572444
27	-7.20	7.84	0.002	1.40E-03	-27.0	16.5		572444

(continued)

Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-7.60	23.98	0.001	1.39E-03	-20.6	6.3		572444
29	-8.00	57.65	0.001	1.39E-03	-4.3	0.0		0
30	-8.15	-0.01	0.001	0	-0.0	0.0		0
31	-8.50	46.60	0.000	0	8.2	0.0		0
		-9.35	0.000	0	8.2	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	0.0	0.0		0
34	-14.40	0.01	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	104.8 kN/m run			

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>		<u>Earth pressure</u> kN/m2	<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	6.05	6.05	9974
3	3.00	0.00	18.01	5.57	69.68	7.28	7.28	9974
4	2.55	0.00	27.07	8.37	104.72	8.75	8.75	9974
5	2.10	0.00	36.44	11.26	140.98	10.72	10.72A	9974
6	2.00	0.00	38.54	11.91	149.09	10.39	10.39A	9974
7	1.50	0.00	49.00	15.14	189.53	16.75	16.75	9974
8	1.00	0.00	59.29	18.32	229.36	25.00	25.00	9974
		0.00	59.29	15.26	224.13	32.13	32.13	4987
9	0.50	0.00	69.38	18.81	258.84	36.31	36.31	5236
10	0.00	0.00	79.25	22.27	292.82	41.82	41.82	5486
11	-0.60	0.00	90.84	26.35	332.74	48.98	48.98	5785
12	-0.95	0.00	97.50	28.68	355.65	52.95	52.95	5960
13	-1.30	0.00	104.09	31.00	378.32	57.15	57.15	6134
14	-1.50	0.00	107.82	32.31	391.18	59.30	59.30	6234
15	-2.00	0.00	117.09	35.56	423.07	65.33	65.33	6483
16	-2.38	0.00	123.97	37.98	446.76	69.50	69.50	6670
17	-2.75	0.00	130.80	40.38	470.29	73.43	73.43	6857
18	-3.13	0.00	137.60	42.77	493.67	76.42	76.42	7044
19	-3.50	0.00	144.35	45.14	516.93	78.29	78.29	7231
		0.00	144.35	28.49	689.10	59.49	59.49	29922
20	-4.00	0.00	154.81	31.45	734.80	97.34	97.34	29922
21	-4.50	5.00	160.22	32.99	758.43	112.50	117.50	29922
22	-5.00	10.00	165.59	34.51	781.88	122.30	132.30	29922
23	-5.38	13.75	169.59	35.64	799.36	127.88	141.63	29922
24	-5.75	17.50	173.57	36.77	816.76	130.56	148.06	29922
		17.50	173.57	26.21	875.12	108.95	126.45	49871
25	-6.18	21.75	179.34	27.89	900.31	131.54	153.29	49871
26	-6.60	26.00	185.08	29.57	925.43	146.87	172.87	49871
27	-7.20	32.00	193.17	31.94	960.75	162.20	194.20	49871
28	-7.60	36.00	198.54	33.51	984.22	175.38	211.38	49871
29	-8.00	40.00	203.90	35.07	1007.64	198.45	238.45	49871
30	-8.15	41.50	205.91	35.66	1016.41	169.53	211.03	49871
31	-8.50	45.00	210.59	37.03	1036.85	198.37	243.37	49871
		45.00	210.59	0.00	6145.66	178.08	223.08	997417
32	-10.25	62.50	240.86	0.00	6566.09	212.57	275.07	997417
33	-12.00	80.00	271.00	0.00	6984.53	242.34	322.34	997417
34	-14.40	104.00	312.15	0.00	7556.03	283.08	387.08	997417
35	-16.80	128.00	353.16	0.00	8125.48	323.76	451.76	997417

(continued)

Stage No.4 Excavate to elevation -1.50 on RIGHT side

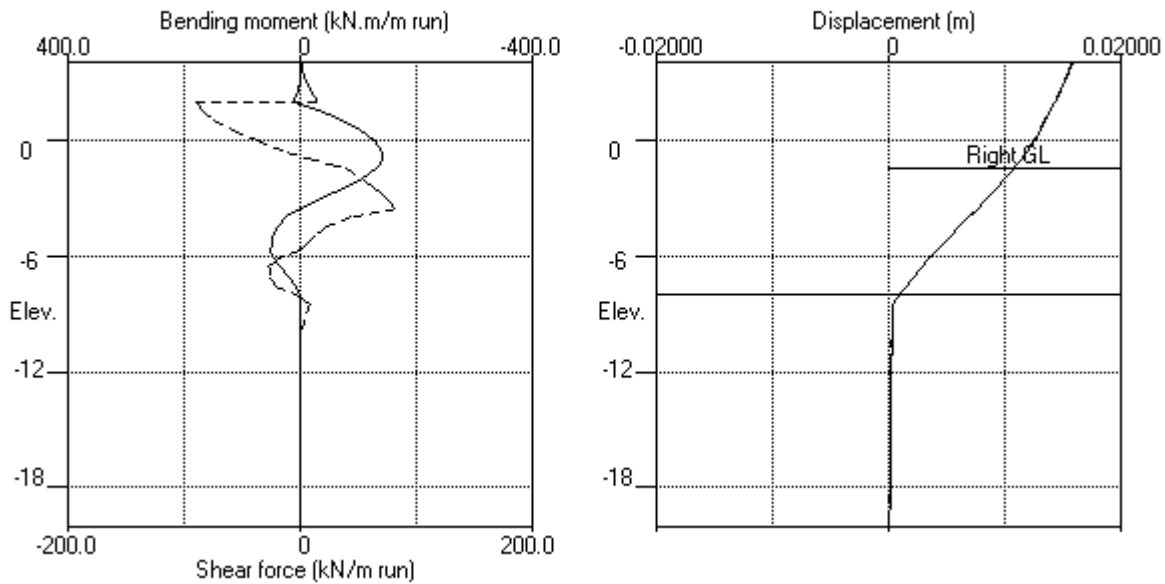
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
36	-18.40	144.00	380.44	0.00	8504.23	350.85	494.85	997417
37	-20.00	160.00	407.67	0.00	8882.38	380.84	540.84	997417

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	8.50	0.00	20.03	20.03	20.03p	6230
16	-2.38	0.00	14.88	0.00	49.29	44.62	44.62	6479
17	-2.75	0.00	21.25	1.90	71.23	49.19	49.19	6666
18	-3.13	0.00	27.63	4.14	93.18	54.32	54.32	6852
19	-3.50	0.00	34.00	6.38	115.13	60.51	60.51	7039
20	-4.00	0.00	34.00	0.00	137.08	67.57	67.57	7226
21	-4.50	5.00	44.01	0.06	206.94	163.54	163.54	29902
22	-5.00	10.00	44.01	1.48	250.65	146.15	146.15	29902
23	-5.38	13.75	49.02	2.90	272.53	140.96	145.96	29902
24	-5.75	17.50	54.03	3.96	294.42	143.24	151.21	29902
25	-6.18	21.75	57.79	5.03	310.85	147.67	156.99	29902
26	-6.60	26.00	61.55	0.00	327.28	169.49	165.17	29902
27	-7.20	32.00	61.55	0.00	385.64	158.46	186.99	49836
28	-7.60	36.00	67.09	0.00	409.85	154.11	180.21	49836
29	-8.00	40.00	72.63	0.00	434.07	154.36	180.11	49836
30	-8.15	41.50	80.46	0.52	468.29	151.40	186.36	49836
31	-8.50	45.00	85.69	2.05	491.12	140.80	187.40	49836
32	-10.25	62.50	90.92	2.63	513.96	169.53	180.80	49836
33	-12.00	80.00	92.88	3.96	522.53	151.77	211.03	49836
34	-14.40	104.00	97.46	0.00	542.54	187.42	196.77	49836
35	-16.80	128.00	97.46	0.00	4574.74	212.57	232.42	996727
36	-18.40	144.00	127.39	0.00	4990.45	242.33	275.07	996727
37	-20.00	160.00	157.41	0.00	5407.31	283.07	322.33	996727
			198.73	0.00	5981.06	323.76	387.07	996727
			240.23	0.00	6557.36	350.85	451.76	996727
			268.01	0.00	6942.99	380.89	494.85	996727
			295.86	0.00	7329.74		540.89	996727

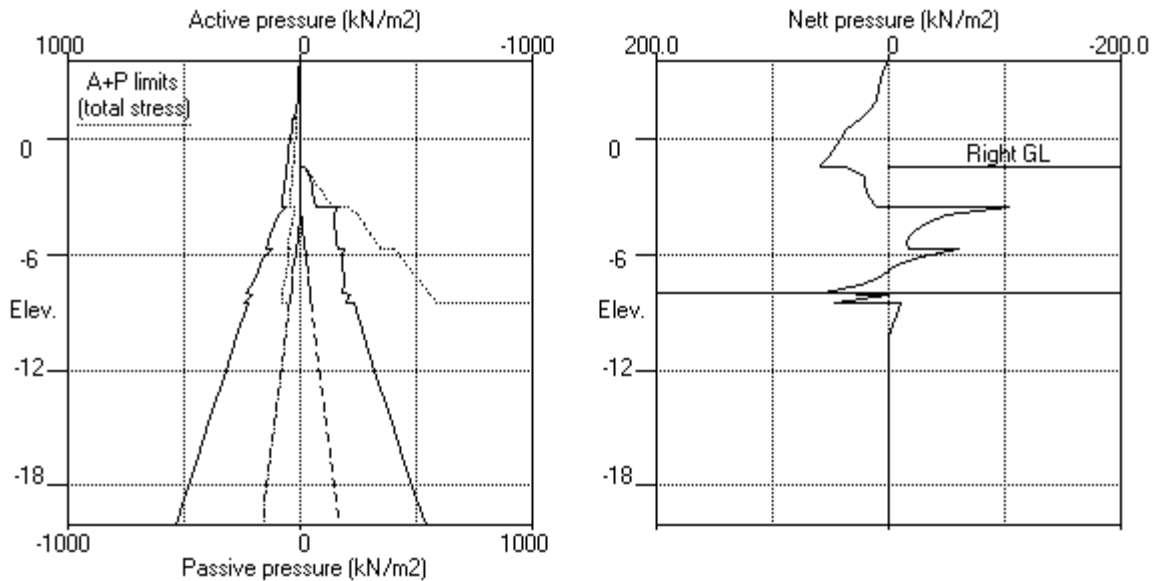
Note: 12.34 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit
 10.39A Arching - soil pressure below active limit

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Stage No.4 Excav. to elev. -1.50 on RIGHT side

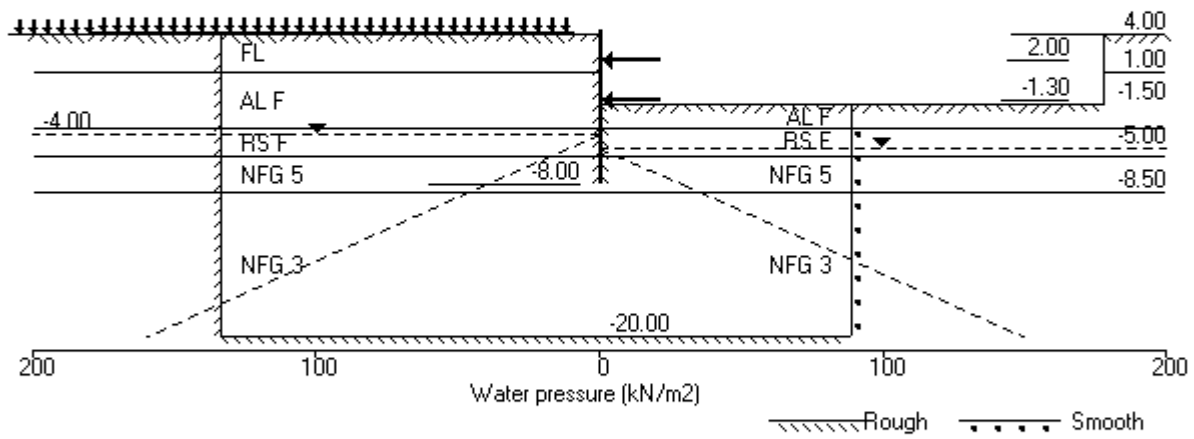


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_1
 Albert Street Development
 Section 1

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Units: kN,m

Stage No. 6 Apply water pressure profile no.2

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u>
				<u>Factor</u> <u>of</u>	<u>Moment</u> <u>equilib.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u>	
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
6	4.00	-1.50		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.016	7.91E-04	0.0	0.0		572444
2	3.50	6.16	0.015	7.91E-04	1.5	0.3		572444
3	3.00	7.37	0.015	7.90E-04	4.9	2.1		572444
4	2.55	8.83	0.015	7.87E-04	8.6	5.3		572444
5	2.10	10.79	0.014	7.81E-04	13.0	10.2		572444
6	2.00	10.45	0.014	7.79E-04	14.0	11.6	-104.0	572444
		10.45	0.014	7.79E-04	-90.0	11.6		
7	1.50	16.80	0.014	7.88E-04	-83.2	-31.1		572444
8	1.00	25.04	0.013	8.32E-04	-72.7	-70.4		572444
		32.15	0.013	8.32E-04	-72.7	-70.4		
9	0.50	36.33	0.013	9.08E-04	-55.6	-102.5		572444
10	0.00	41.83	0.013	1.00E-03	-36.1	-125.5		572444
11	-0.60	48.99	0.012	1.14E-03	-8.8	-139.1		572444
12	-0.95	52.96	0.012	1.23E-03	9.0	-139.1		572444
13	-1.30	57.15	0.011	1.31E-03	28.3	-132.6	-3.5	572444
		57.15	0.011	1.31E-03	24.8	-132.6		
14	-1.50	59.29	0.011	1.35E-03	36.5	-126.5		572444
		39.30	0.011	1.35E-03	36.5	-126.5		
15	-2.00	20.71	0.010	1.46E-03	51.5	-103.9		572444
16	-2.38	20.27	0.010	1.52E-03	59.2	-83.1		572444
17	-2.75	19.02	0.009	1.56E-03	66.5	-59.5		572444
18	-3.13	15.76	0.008	1.59E-03	73.0	-33.2		572444
19	-3.50	10.50	0.008	1.61E-03	78.0	-4.7		572444
		-104.94	0.008	1.61E-03	78.0	-4.7		
20	-4.00	-49.84	0.007	1.60E-03	39.3	21.2		572444
21	-4.50	-27.00	0.006	1.57E-03	20.1	34.7		572444
22	-5.00	-14.91	0.005	1.54E-03	9.6	41.5		572444
23	-5.38	-11.65	0.005	1.51E-03	4.6	44.0		572444
24	-5.75	-13.69	0.004	1.48E-03	-0.1	45.0		572444
		-58.64	0.004	1.48E-03	-0.1	45.0		
25	-6.18	-24.99	0.004	1.45E-03	-17.9	39.6		572444
26	-6.60	-5.81	0.003	1.43E-03	-24.5	29.7		572444

(continued)

Stage No.6 Apply water pressure profile no.2

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-7.20	8.42	0.002	1.40E-03	-23.7	14.0		572444
28	-7.60	22.29	0.002	1.40E-03	-17.5	5.2		572444
29	-8.00	47.54	0.001	1.40E-03	-3.6	0.0		0
30	-8.15	-0.01	0.001	0	-0.0	0.0		0
31	-8.50	51.89	0.000	0	9.1	0.0		0
		-10.40	0.000	0	9.1	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	0.0	0.0		0
34	-14.40	0.01	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force =	104.0 kN/m run		
At elev. -1.30					Prop force =	3.5 kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	6.16	6.16	9974
3	3.00	0.00	18.01	5.57	69.68	7.37	7.37	9974
4	2.55	0.00	27.07	8.37	104.72	8.83	8.83	9974
5	2.10	0.00	36.44	11.26	140.98	10.79	10.79A	9974
6	2.00	0.00	38.54	11.91	149.09	10.45	10.45A	9974
7	1.50	0.00	49.00	15.14	189.53	16.80	16.80	9974
8	1.00	0.00	59.29	18.32	229.36	25.04	25.04	9974
		0.00	59.29	15.26	224.13	32.15	32.15	4987
9	0.50	0.00	69.38	18.81	258.84	36.33	36.33	5236
10	0.00	0.00	79.25	22.27	292.82	41.83	41.83	5486
11	-0.60	0.00	90.84	26.35	332.74	48.99	48.99	5785
12	-0.95	0.00	97.50	28.68	355.65	52.96	52.96	5960
13	-1.30	0.00	104.09	31.00	378.32	57.15	57.15	6134
14	-1.50	0.00	107.82	32.31	391.18	59.29	59.29	6234
15	-2.00	0.00	117.09	35.56	423.07	65.30	65.30	6483
16	-2.38	0.00	123.97	37.98	446.76	69.45	69.45	6670
17	-2.75	0.00	130.80	40.38	470.29	73.36	73.36	6857
18	-3.13	0.00	137.60	42.77	493.67	76.33	76.33	7044
19	-3.50	0.00	144.35	45.14	516.93	78.18	78.18	7231
		0.00	144.35	28.49	689.10	59.03	59.03	29922
20	-4.00	0.00	154.81	31.45	734.80	96.81	96.81	29922
21	-4.50	5.00	160.22	32.99	758.43	111.79	116.79	29922
22	-5.00	10.00	165.59	34.51	781.88	121.43	131.43	29922
23	-5.38	13.75	169.59	35.64	799.36	126.87	140.62	29922
24	-5.75	17.50	173.57	36.77	816.76	129.41	146.91	29922
		17.50	173.57	26.21	875.12	107.04	124.54	49871
25	-6.18	21.75	179.34	27.89	900.31	129.64	151.39	49871
26	-6.60	26.00	185.08	29.57	925.43	144.73	170.73	49871
27	-7.20	32.00	193.17	31.94	960.75	159.64	191.64	49871
28	-7.60	36.00	198.54	33.51	984.22	171.71	207.71	49871
29	-8.00	40.00	203.90	35.07	1007.64	190.37	230.37	49871
30	-8.15	41.50	205.91	35.66	1016.41	166.79	208.29	49871
31	-8.50	45.00	210.59	37.03	1036.85	198.16	243.16	49871
		45.00	210.59	0.00	6145.66	173.91	218.91	997417
32	-10.25	62.50	240.86	0.00	6566.09	208.91	271.41	997417
33	-12.00	80.00	271.00	0.00	6984.53	238.67	318.67	997417

(continued)

Stage No.6 Apply water pressure profile no.2

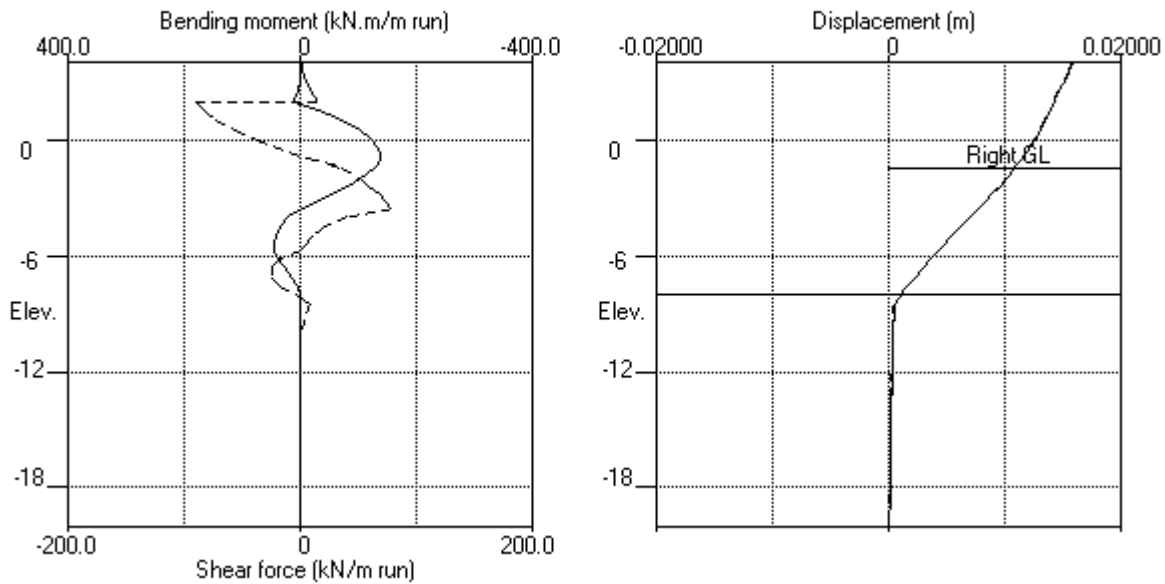
LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses			Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2			
34	-14.40	104.00	312.15	0.00	7556.03	279.41	383.41	997417
35	-16.80	128.00	353.16	0.00	8125.48	320.06	448.06	997417
36	-18.40	144.00	380.44	0.00	8504.23	347.16	491.16	997417
37	-20.00	160.00	407.67	0.00	8882.38	377.89	537.89	997417

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses			Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.98	19.98	6230
15	-2.00	0.00	8.50	0.00	49.29	44.59	44.59	6479
16	-2.38	0.00	14.88	0.00	71.23	49.18	49.18	6666
17	-2.75	0.00	21.25	1.90	93.18	54.34	54.34	6852
18	-3.13	0.00	27.63	4.14	115.13	60.57	60.57	7039
19	-3.50	0.00	34.00	6.38	137.08	67.68	67.68	7226
		0.00	34.00	0.00	206.94	163.97	163.97	29902
20	-4.00	0.00	44.01	0.06	250.65	146.65	146.65	29902
21	-4.50	0.00	54.02	2.89	294.38	143.79	143.79	29902
22	-5.00	0.00	64.03	5.73	338.12	146.34	146.34	29902
23	-5.38	3.75	67.79	6.79	354.54	148.52	152.27	29902
24	-5.75	7.50	71.55	7.86	370.98	153.10	160.60	29902
		7.50	71.55	0.00	429.34	175.68	183.18	49836
25	-6.18	11.75	77.09	0.00	453.54	164.63	176.38	49836
26	-6.60	16.00	82.63	0.00	477.76	160.53	176.53	49836
27	-7.20	22.00	90.46	1.92	511.98	161.22	183.22	49836
28	-7.60	26.00	95.69	3.45	534.81	159.42	185.42	49836
29	-8.00	30.00	100.92	4.97	557.66	152.83	182.83	49836
30	-8.15	31.50	102.88	5.55	566.23	176.79	208.29	49836
31	-8.50	35.00	107.46	6.89	586.23	156.27	191.27	49836
		35.00	107.46	0.00	4713.60	194.31	229.31	996727
32	-10.25	52.50	137.39	0.00	5129.31	218.90	271.40	996727
33	-12.00	70.00	167.41	0.00	5546.17	248.66	318.66	996727
34	-14.40	94.00	208.73	0.00	6119.92	289.40	383.40	996727
35	-16.80	118.00	250.23	0.00	6696.22	330.07	448.07	996727
36	-18.40	134.00	278.01	0.00	7081.85	357.15	491.15	996727
37	-20.00	150.00	305.86	0.00	7468.60	387.94	537.94	996727

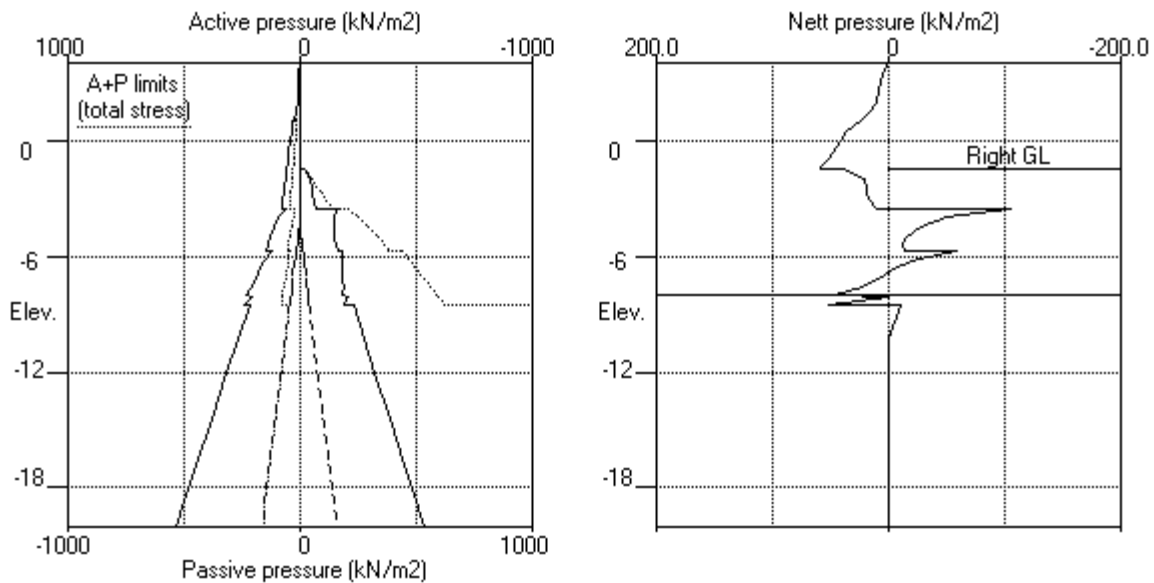
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 10.45A Arching - soil pressure below active limit

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Stage No.6 Apply water pressure profile no.2

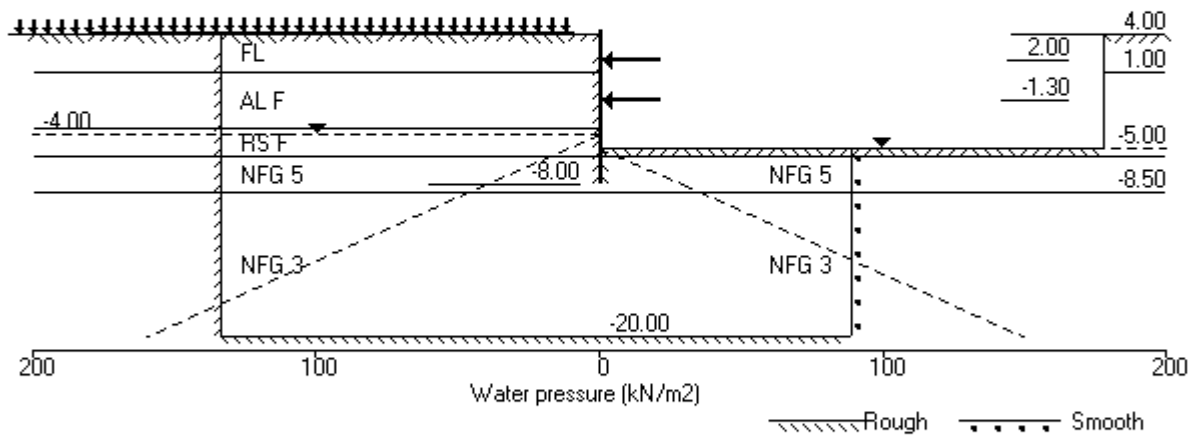


EDG CONSULTING PTY LTD
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 Data filename/Run ID: Section_1
 Albert Street Development
 Section 1

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Units: kN,m

Stage No. 7 Excavate to elevation -5.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>of</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
7	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	7.78E-05	0.0	0.0		572444
2	3.50	10.94	0.014	7.76E-05	2.7	0.3		572444
3	3.00	10.76	0.014	7.60E-05	8.2	3.3		572444
4	2.55	11.25	0.014	7.15E-05	13.1	8.3		572444
5	2.10	12.55	0.014	6.21E-05	18.5	15.5		572444
6	2.00	11.56	0.014	5.92E-05	19.7	17.4	-100.8	572444
		11.56	0.014	5.92E-05	-81.1	17.4		
7	1.50	17.19	0.014	6.07E-05	-73.9	-20.7		572444
8	1.00	24.41	0.014	9.39E-05	-63.5	-55.3		572444
		31.83	0.014	9.39E-05	-63.5	-55.3		
9	0.50	35.78	0.014	1.54E-04	-46.6	-82.8		572444
10	0.00	40.93	0.014	2.34E-04	-27.4	-101.4		572444
11	-0.60	47.67	0.014	3.45E-04	-0.9	-110.0		572444
12	-0.95	51.14	0.014	4.11E-04	16.4	-107.3		572444
13	-1.30	54.90	0.014	4.74E-04	35.0	-98.3	-181.2	572444
		54.90	0.014	4.74E-04	-146.2	-98.3		
14	-1.50	56.36	0.013	5.14E-04	-135.1	-126.5		572444
15	-2.00	61.59	0.013	6.50E-04	-105.6	-186.5		572444
16	-2.38	64.74	0.013	7.84E-04	-81.9	-221.7		572444
17	-2.75	67.69	0.013	9.38E-04	-57.1	-247.7		572444
18	-3.13	69.58	0.012	1.10E-03	-31.4	-264.2		572444
19	-3.50	70.45	0.012	1.28E-03	-5.1	-270.9		572444
		27.05	0.012	1.28E-03	-5.1	-270.9		
20	-4.00	67.73	0.011	1.51E-03	18.6	-270.8		572444
21	-4.50	86.65	0.010	1.74E-03	57.2	-253.0		572444
22	-5.00	100.88	0.009	1.95E-03	104.1	-213.4		572444
		42.52	0.009	1.95E-03	104.1	-213.4		
23	-5.38	31.18	0.009	2.07E-03	117.9	-171.7		572444
24	-5.75	16.34	0.008	2.17E-03	126.8	-125.6		572444
		-85.68	0.008	2.17E-03	126.8	-125.6		
25	-6.18	-76.69	0.007	2.24E-03	92.3	-79.4		572444
26	-6.60	-56.39	0.006	2.29E-03	64.0	-47.1		572444

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-7.20	-35.77	0.004	2.33E-03	36.4	-18.8		572444
28	-7.60	-28.33	0.004	2.34E-03	23.5	-7.2		572444
29	-8.00	-65.01	0.003	2.34E-03	4.9	-0.0		0
30	-8.15	-0.01	0.002	0	-0.0	0.0		0
31	-8.50	78.32	0.001	0	13.7	0.0		0
		-15.70	0.001	0	13.7	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	-0.0	0.0		0
34	-14.40	0.02	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.06	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force =	100.8 kN/m run		
At elev. -1.30					Prop force =	181.2 kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	10.94	10.94	9974
3	3.00	0.00	18.01	5.57	69.68	10.76	10.76	9974
4	2.55	0.00	27.07	8.37	104.72	11.25	11.25	9974
5	2.10	0.00	36.44	11.26	140.98	12.55	12.55	9974
6	2.00	0.00	38.54	11.91	149.09	11.56	11.56A	9974
7	1.50	0.00	49.00	15.14	189.53	17.19	17.19	9974
8	1.00	0.00	59.29	18.32	229.36	24.41	24.41	9974
		0.00	59.29	15.26	224.13	31.83	31.83	4987
9	0.50	0.00	69.38	18.81	258.84	35.78	35.78	5236
10	0.00	0.00	79.25	22.27	292.82	40.93	40.93	5486
11	-0.60	0.00	90.84	26.35	332.74	47.67	47.67	5785
12	-0.95	0.00	97.50	28.68	355.65	51.14	51.14	5960
13	-1.30	0.00	104.09	31.00	378.32	54.90	54.90	6134
14	-1.50	0.00	107.82	32.31	391.18	56.36	56.36	6234
15	-2.00	0.00	117.09	35.56	423.07	61.59	61.59	6483
16	-2.38	0.00	123.97	37.98	446.76	64.74	64.74	6670
17	-2.75	0.00	130.80	40.38	470.29	67.69	67.69	6857
18	-3.13	0.00	137.60	42.77	493.67	69.58	69.58	7044
19	-3.50	0.00	144.35	45.14	516.93	70.45	70.45	7231
		0.00	144.35	28.49	689.10	27.05	27.05A	29922
20	-4.00	0.00	154.81	31.45	734.80	67.73	67.73	29922
21	-4.50	5.00	160.22	32.99	758.43	81.65	86.65	29922
22	-5.00	10.00	165.59	34.51	781.88	90.88	100.88	29922
23	-5.38	13.75	169.59	35.64	799.36	95.92	109.67	29922
24	-5.75	17.50	173.57	36.77	816.76	97.47	114.97	29922
		17.50	173.57	26.21	875.12	53.81	71.31	49871
25	-6.18	21.75	179.34	27.89	900.31	86.94	108.69	49871
26	-6.60	26.00	185.08	29.57	925.43	107.27	133.27	49871
27	-7.20	32.00	193.17	31.94	960.75	124.92	156.92	49871
28	-7.60	36.00	198.54	33.51	984.22	133.62	169.62	49871
29	-8.00	40.00	203.90	35.07	1007.64	119.24	159.24	49871
30	-8.15	41.50	205.91	35.66	1016.41	154.80	196.30	49871
31	-8.50	45.00	210.59	37.03	1036.85	197.72	242.72	49871
		45.00	210.59	0.00	6145.66	165.06	210.06	997417
32	-10.25	62.50	240.86	0.00	6566.09	202.31	264.81	997417
33	-12.00	80.00	271.00	0.00	6984.53	231.67	311.67	997417

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

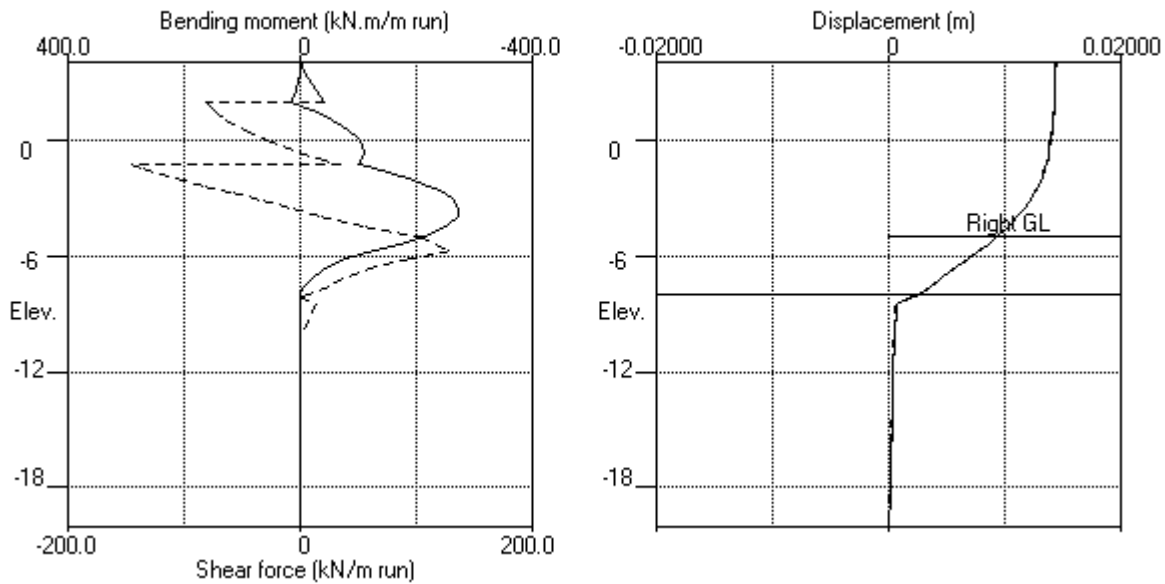
LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
34	-14.40	104.00	312.15	0.00	7556.03	272.10	376.10	997417
35	-16.80	128.00	353.16	0.00	8125.48	312.52	440.52	997417
36	-18.40	144.00	380.44	0.00	8504.23	339.47	483.47	997417
37	-20.00	160.00	407.67	0.00	8882.38	371.80	531.80	997417

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	29934
23	-5.38	3.75	3.75	0.00	74.74	74.74	78.49p	29934
24	-5.75	7.50	7.50	0.00	91.13	91.13	98.63p	29934
		7.50	7.50	0.00	149.49	149.49	156.99p	49890
25	-6.18	11.75	13.03	0.00	173.64	173.64	185.39p	49890
26	-6.60	16.00	18.55	0.00	197.79	173.66	189.66	49890
27	-7.20	22.00	26.36	0.00	231.90	170.69	192.69	49890
28	-7.60	26.00	31.57	0.00	254.65	171.95	197.95	49890
29	-8.00	30.00	36.78	0.00	277.42	194.25	224.25	49890
30	-8.15	31.50	38.73	0.00	285.96	164.81	196.31	49890
31	-8.50	35.00	43.29	0.00	305.89	129.40	164.40	49890
		35.00	43.29	0.00	3822.67	190.76	225.76	997795
32	-10.25	52.50	73.15	0.00	4237.22	212.30	264.80	997795
33	-12.00	70.00	103.10	0.00	4653.06	241.66	311.66	997795
34	-14.40	94.00	144.36	0.00	5226.11	282.08	376.08	997795
35	-16.80	118.00	185.90	0.00	5802.91	322.53	440.53	997795
36	-18.40	134.00	213.76	0.00	6189.76	349.46	483.46	997795
37	-20.00	150.00	241.76	0.00	6578.53	381.86	531.86	997795

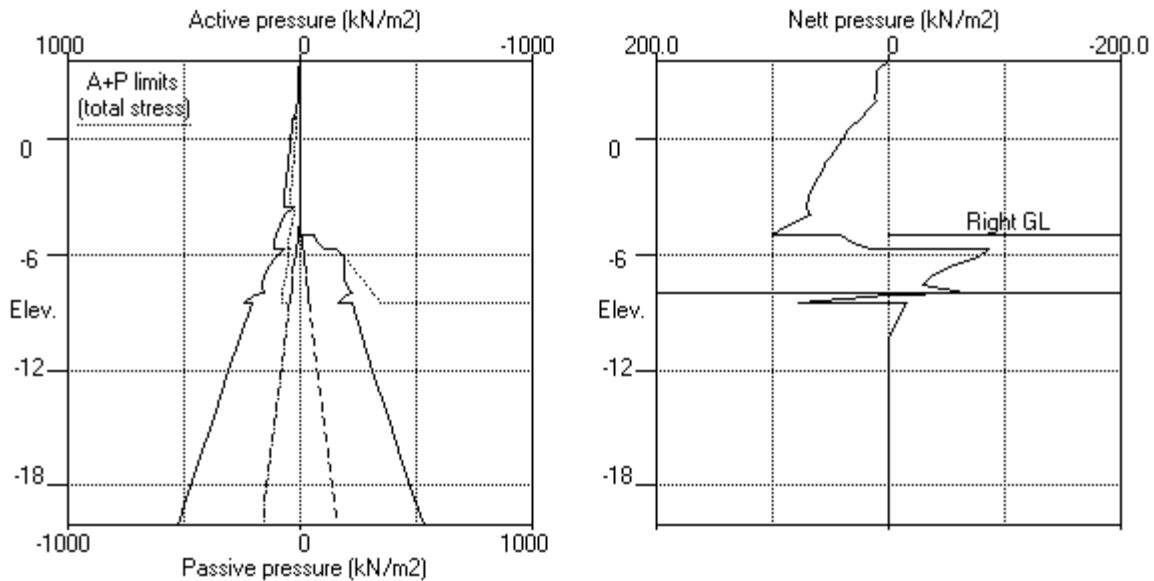
Note: 12.34 a Soil pressure at active limit
 185.39 p Soil pressure at passive limit
 27.05A Arching - soil pressure below active limit

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Stage No.7 Excav. to elev. -5.00 on RIGHT side

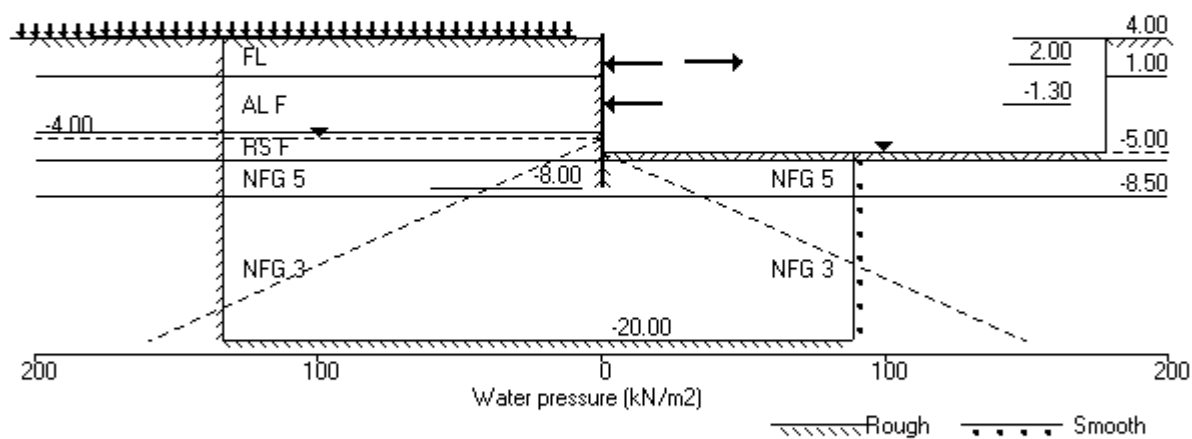


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_1
 Albert Street Development
 Section 1

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.10



Units: kN,m

Stage No. 8 Apply load no.1 at elevation 2.10

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
8	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	2.22E-04	0.0	0.0		572444
2	3.50	9.27	0.015	2.21E-04	2.3	0.3		572444
3	3.00	9.52	0.015	2.20E-04	7.0	2.9		572444
4	2.55	10.27	0.015	2.16E-04	11.5	7.2		572444
5	2.10	11.74	0.015	2.08E-04	16.4	13.6	45.0	572444
		11.74	0.015	2.08E-04	61.4	13.6		
6	2.00	10.92	0.015	2.05E-04	62.6	19.8	-138.3	572444
		10.92	0.015	2.05E-04	-75.7	19.8		
7	1.50	16.75	0.015	2.03E-04	-68.8	-15.7		572444
8	1.00	24.25	0.015	2.31E-04	-58.6	-47.8		572444
		31.75	0.015	2.31E-04	-58.6	-47.8		
9	0.50	35.66	0.014	2.84E-04	-41.7	-72.8		572444
10	0.00	40.85	0.014	3.54E-04	-22.6	-89.0		572444
11	-0.60	47.63	0.014	4.51E-04	4.0	-94.7		572444
12	-0.95	51.13	0.014	5.07E-04	21.2	-90.3		572444
13	-1.30	54.92	0.014	5.59E-04	39.8	-79.7	-189.6	572444
		54.92	0.014	5.59E-04	-149.8	-79.7		
14	-1.50	56.40	0.014	5.92E-04	-138.7	-108.5		572444
15	-2.00	61.64	0.013	7.14E-04	-109.2	-170.3		572444
16	-2.38	64.79	0.013	8.37E-04	-85.5	-206.8		572444
17	-2.75	67.75	0.013	9.82E-04	-60.6	-234.2		572444
18	-3.13	69.62	0.012	1.14E-03	-34.9	-252.0		572444
19	-3.50	70.46	0.012	1.30E-03	-8.6	-260.1		572444
		27.07	0.012	1.30E-03	-8.6	-260.1		
20	-4.00	67.98	0.011	1.53E-03	15.2	-261.7		572444
21	-4.50	86.98	0.010	1.75E-03	53.9	-245.6		572444
22	-5.00	101.24	0.009	1.95E-03	100.9	-207.6		572444
		43.12	0.009	1.95E-03	100.9	-207.6		
23	-5.38	31.76	0.009	2.07E-03	115.0	-167.0		572444
24	-5.75	16.95	0.008	2.17E-03	124.1	-121.9		572444
		-84.67	0.008	2.17E-03	124.1	-121.9		
25	-6.18	-75.77	0.007	2.24E-03	90.0	-76.8		572444

(continued)

Stage No.8 Apply load no.1 at elevation 2.10

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
26	-6.60	-55.50	0.006	2.29E-03	62.1	-45.4		572444
27	-7.20	-34.86	0.004	2.32E-03	35.0	-18.1		572444
28	-7.60	-27.17	0.004	2.33E-03	22.6	-6.9		572444
29	-8.00	-62.48	0.003	2.33E-03	4.7	-0.0		0
30	-8.15	-0.01	0.002	0	-0.0	0.0		0
31	-8.50	78.32	0.001	0	13.7	0.0		0
		-15.70	0.001	0	13.7	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	-0.0	0.0		0
34	-14.40	0.02	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.06	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force =	138.3 kN/m run		
At elev. -1.30					Prop force =	189.6 kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	9.27	9.27	9974
3	3.00	0.00	18.01	5.57	69.68	9.52	9.52	9974
4	2.55	0.00	27.07	8.37	104.72	10.27	10.27	9974
5	2.10	0.00	36.44	11.26	140.98	11.74	11.74	9974
6	2.00	0.00	38.54	11.91	149.09	10.92	10.92A	9974
7	1.50	0.00	49.00	15.14	189.53	16.75	16.75	9974
8	1.00	0.00	59.29	18.32	229.36	24.25	24.25	9974
		0.00	59.29	15.26	224.13	31.75	31.75	4987
9	0.50	0.00	69.38	18.81	258.84	35.66	35.66	5236
10	0.00	0.00	79.25	22.27	292.82	40.85	40.85	5486
11	-0.60	0.00	90.84	26.35	332.74	47.63	47.63	5785
12	-0.95	0.00	97.50	28.68	355.65	51.13	51.13	5960
13	-1.30	0.00	104.09	31.00	378.32	54.92	54.92	6134
14	-1.50	0.00	107.82	32.31	391.18	56.40	56.40	6234
15	-2.00	0.00	117.09	35.56	423.07	61.64	61.64	6483
16	-2.38	0.00	123.97	37.98	446.76	64.79	64.79	6670
17	-2.75	0.00	130.80	40.38	470.29	67.75	67.75	6857
18	-3.13	0.00	137.60	42.77	493.67	69.62	69.62	7044
19	-3.50	0.00	144.35	45.14	516.93	70.46	70.46	7231
		0.00	144.35	28.49	689.10	27.07	27.07A	29922
20	-4.00	0.00	154.81	31.45	734.80	67.98	67.98	29922
21	-4.50	5.00	160.22	32.99	758.43	81.98	86.98	29922
22	-5.00	10.00	165.59	34.51	781.88	91.24	101.24	29922
23	-5.38	13.75	169.59	35.64	799.36	96.28	110.03	29922
24	-5.75	17.50	173.57	36.77	816.76	97.81	115.31	29922
		17.50	173.57	26.21	875.12	54.38	71.88	49871
25	-6.18	21.75	179.34	27.89	900.31	87.45	109.20	49871
26	-6.60	26.00	185.08	29.57	925.43	107.75	133.75	49871
27	-7.20	32.00	193.17	31.94	960.75	125.40	157.40	49871
28	-7.60	36.00	198.54	33.51	984.22	134.21	170.21	49871
29	-8.00	40.00	203.90	35.07	1007.64	120.55	160.55	49871
30	-8.15	41.50	205.91	35.66	1016.41	154.77	196.27	49871
31	-8.50	45.00	210.59	37.03	1036.85	197.72	242.72	49871
		45.00	210.59	0.00	6145.66	165.10	210.10	997417
32	-10.25	62.50	240.86	0.00	6566.09	202.34	264.84	997417

(continued)

Stage No.8 Apply load no.1 at elevation 2.10

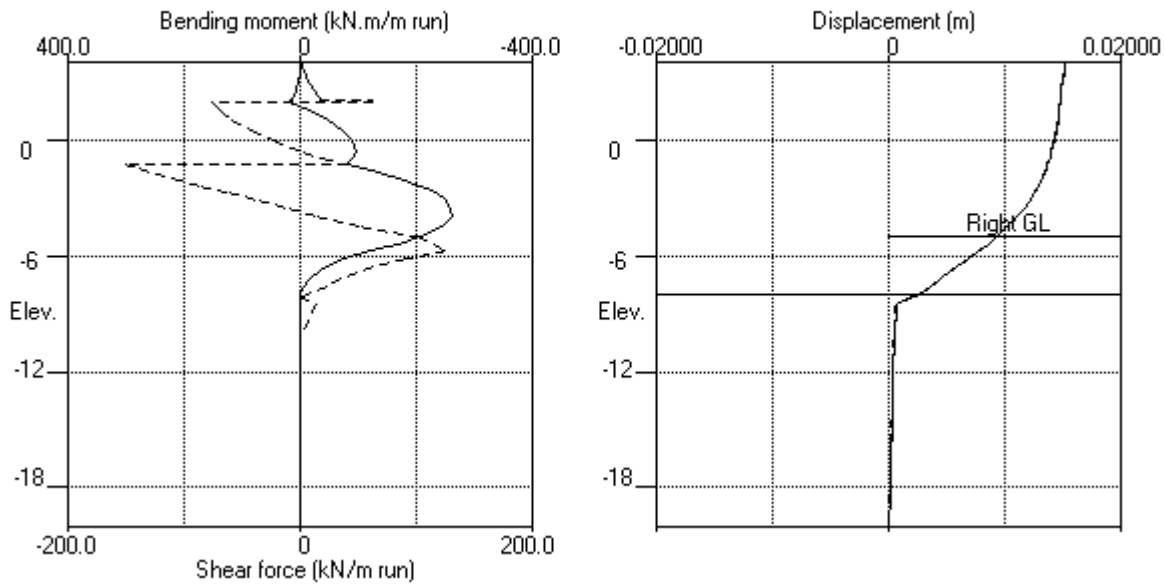
LEFT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
33	-12.00	80.00	271.00	0.00	6984.53	231.68	311.68	997417
34	-14.40	104.00	312.15	0.00	7556.03	272.11	376.11	997417
35	-16.80	128.00	353.16	0.00	8125.48	312.53	440.53	997417
36	-18.40	144.00	380.44	0.00	8504.23	339.47	483.47	997417
37	-20.00	160.00	407.67	0.00	8882.38	371.79	531.79	997417

RIGHT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.11	58.11	29934
23	-5.38	3.75	3.75	0.00	74.74	74.51	78.26	29934
24	-5.75	7.50	7.50	0.00	91.13	90.86	98.36	29934
		7.50	7.50	0.00	149.49	149.04	156.54	49890
25	-6.18	11.75	13.03	0.00	173.64	173.22	184.97	49890
26	-6.60	16.00	18.55	0.00	197.79	173.25	189.25	49890
27	-7.20	22.00	26.36	0.00	231.90	170.26	192.26	49890
28	-7.60	26.00	31.57	0.00	254.65	171.38	197.38	49890
29	-8.00	30.00	36.78	0.00	277.42	193.03	223.03	49890
30	-8.15	31.50	38.73	0.00	285.96	164.78	196.28	49890
31	-8.50	35.00	43.29	0.00	305.89	129.40	164.40	49890
		35.00	43.29	0.00	3822.67	190.80	225.80	997795
32	-10.25	52.50	73.15	0.00	4237.22	212.33	264.83	997795
33	-12.00	70.00	103.10	0.00	4653.06	241.67	311.67	997795
34	-14.40	94.00	144.36	0.00	5226.11	282.09	376.09	997795
35	-16.80	118.00	185.90	0.00	5802.91	322.53	440.53	997795
36	-18.40	134.00	213.76	0.00	6189.76	349.46	483.46	997795
37	-20.00	150.00	241.76	0.00	6578.53	381.86	531.86	997795

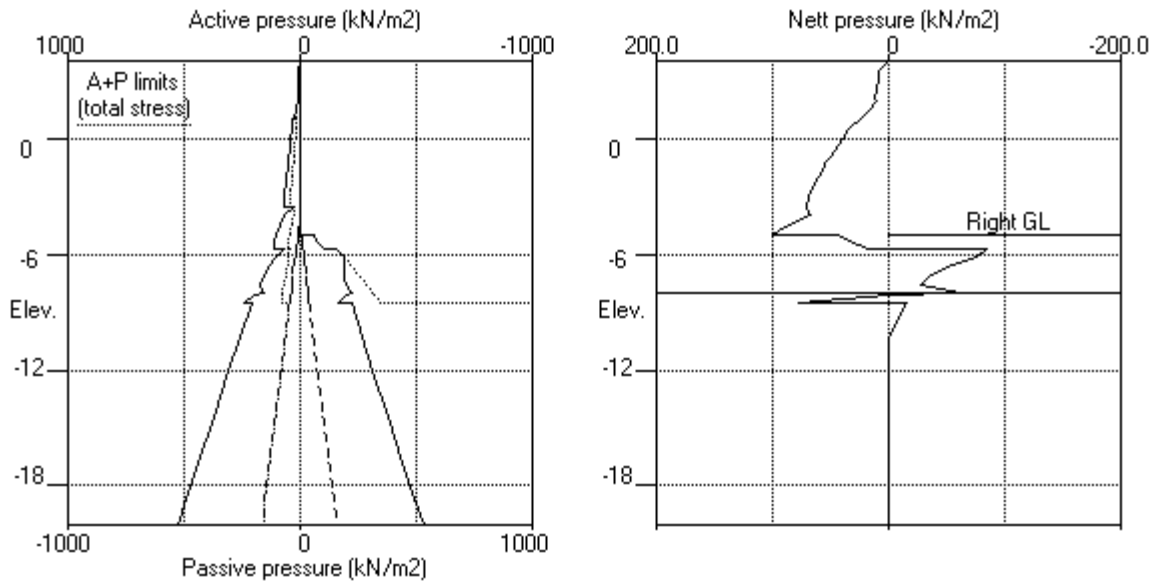
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 27.07A Arching - soil pressure below active limit

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.10



Stage No.8 Apply load no.1 at elev. 2.10



Units: kN,m

Stage No. 9 Apply load no.2 at elevation 2.10

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>of</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
9	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.014	7.78E-05	0.0	0.0		572444
2	3.50	10.94	0.014	7.76E-05	2.7	0.3		572444
3	3.00	10.76	0.014	7.60E-05	8.2	3.3		572444
4	2.55	11.25	0.014	7.15E-05	13.1	8.3		572444
5	2.10	12.55	0.014	6.21E-05	18.5	15.5		572444
6	2.00	11.56	0.014	5.92E-05	19.7	17.4	-100.8	572444
		11.56	0.014	5.92E-05	-81.1	17.4		
7	1.50	17.19	0.014	6.07E-05	-73.9	-20.7		572444
8	1.00	24.41	0.014	9.39E-05	-63.5	-55.3		572444
		31.83	0.014	9.39E-05	-63.5	-55.3		
9	0.50	35.78	0.014	1.54E-04	-46.6	-82.8		572444
10	0.00	40.93	0.014	2.34E-04	-27.4	-101.4		572444
11	-0.60	47.67	0.014	3.45E-04	-0.9	-110.0		572444
12	-0.95	51.14	0.014	4.11E-04	16.4	-107.3		572444
13	-1.30	54.90	0.014	4.74E-04	35.0	-98.3	-181.2	572444
		54.90	0.014	4.74E-04	-146.2	-98.3		
14	-1.50	56.36	0.013	5.14E-04	-135.1	-126.5		572444
15	-2.00	61.59	0.013	6.50E-04	-105.6	-186.5		572444
16	-2.38	64.74	0.013	7.84E-04	-81.9	-221.7		572444
17	-2.75	67.69	0.013	9.38E-04	-57.1	-247.7		572444
18	-3.13	69.58	0.012	1.10E-03	-31.4	-264.2		572444
19	-3.50	70.45	0.012	1.28E-03	-5.1	-270.9		572444
		27.05	0.012	1.28E-03	-5.1	-270.9		
20	-4.00	67.73	0.011	1.51E-03	18.6	-270.8		572444
21	-4.50	86.65	0.010	1.74E-03	57.2	-253.0		572444
22	-5.00	100.88	0.009	1.95E-03	104.1	-213.4		572444
		42.52	0.009	1.95E-03	104.1	-213.4		
23	-5.38	31.18	0.009	2.07E-03	117.9	-171.7		572444
24	-5.75	16.34	0.008	2.17E-03	126.8	-125.6		572444
		-85.68	0.008	2.17E-03	126.8	-125.6		
25	-6.18	-76.69	0.007	2.24E-03	92.3	-79.4		572444
26	-6.60	-56.39	0.006	2.29E-03	64.0	-47.1		572444

(continued)

Stage No.9 Apply load no.2 at elevation 2.10

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
27	-7.20	-35.77	0.004	2.33E-03	36.4	-18.8		572444
28	-7.60	-28.33	0.004	2.34E-03	23.5	-7.2		572444
29	-8.00	-65.01	0.003	2.34E-03	4.9	-0.0		0
30	-8.15	-0.01	0.002	0	-0.0	0.0		0
31	-8.50	78.32	0.001	0	13.7	0.0		0
		-15.70	0.001	0	13.7	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	-0.0	0.0		0
34	-14.40	0.02	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.06	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	100.8 kN/m run			
At elev. -1.30				Prop force =	181.2 kN/m run			

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	10.94	10.94	9974
3	3.00	0.00	18.01	5.57	69.68	10.76	10.76	9974
4	2.55	0.00	27.07	8.37	104.72	11.25	11.25	9974
5	2.10	0.00	36.44	11.26	140.98	12.55	12.55	9974
6	2.00	0.00	38.54	11.91	149.09	11.56	11.56A	9974
7	1.50	0.00	49.00	15.14	189.53	17.19	17.19	9974
8	1.00	0.00	59.29	18.32	229.36	24.41	24.41	9974
		0.00	59.29	15.26	224.13	31.83	31.83	4987
9	0.50	0.00	69.38	18.81	258.84	35.78	35.78	5236
10	0.00	0.00	79.25	22.27	292.82	40.93	40.93	5486
11	-0.60	0.00	90.84	26.35	332.74	47.67	47.67	5785
12	-0.95	0.00	97.50	28.68	355.65	51.14	51.14	5960
13	-1.30	0.00	104.09	31.00	378.32	54.90	54.90	6134
14	-1.50	0.00	107.82	32.31	391.18	56.36	56.36	6234
15	-2.00	0.00	117.09	35.56	423.07	61.59	61.59	6483
16	-2.38	0.00	123.97	37.98	446.76	64.74	64.74	6670
17	-2.75	0.00	130.80	40.38	470.29	67.69	67.69	6857
18	-3.13	0.00	137.60	42.77	493.67	69.58	69.58	7044
19	-3.50	0.00	144.35	45.14	516.93	70.45	70.45	7231
		0.00	144.35	28.49	689.10	27.05	27.05A	29922
20	-4.00	0.00	154.81	31.45	734.80	67.73	67.73	29922
21	-4.50	5.00	160.22	32.99	758.43	81.65	86.65	29922
22	-5.00	10.00	165.59	34.51	781.88	90.88	100.88	29922
23	-5.38	13.75	169.59	35.64	799.36	95.92	109.67	29922
24	-5.75	17.50	173.57	36.77	816.76	97.47	114.97	29922
		17.50	173.57	26.21	875.12	53.81	71.31	49871
25	-6.18	21.75	179.34	27.89	900.31	86.94	108.69	49871
26	-6.60	26.00	185.08	29.57	925.43	107.27	133.27	49871
27	-7.20	32.00	193.17	31.94	960.75	124.92	156.92	49871
28	-7.60	36.00	198.54	33.51	984.22	133.62	169.62	49871
29	-8.00	40.00	203.90	35.07	1007.64	119.24	159.24	49871
30	-8.15	41.50	205.91	35.66	1016.41	154.80	196.30	49871
31	-8.50	45.00	210.59	37.03	1036.85	197.72	242.72	49871
		45.00	210.59	0.00	6145.66	165.06	210.06	997417
32	-10.25	62.50	240.86	0.00	6566.09	202.31	264.81	997417
33	-12.00	80.00	271.00	0.00	6984.53	231.67	311.67	997417

(continued)

Stage No.9 Apply load no.2 at elevation 2.10

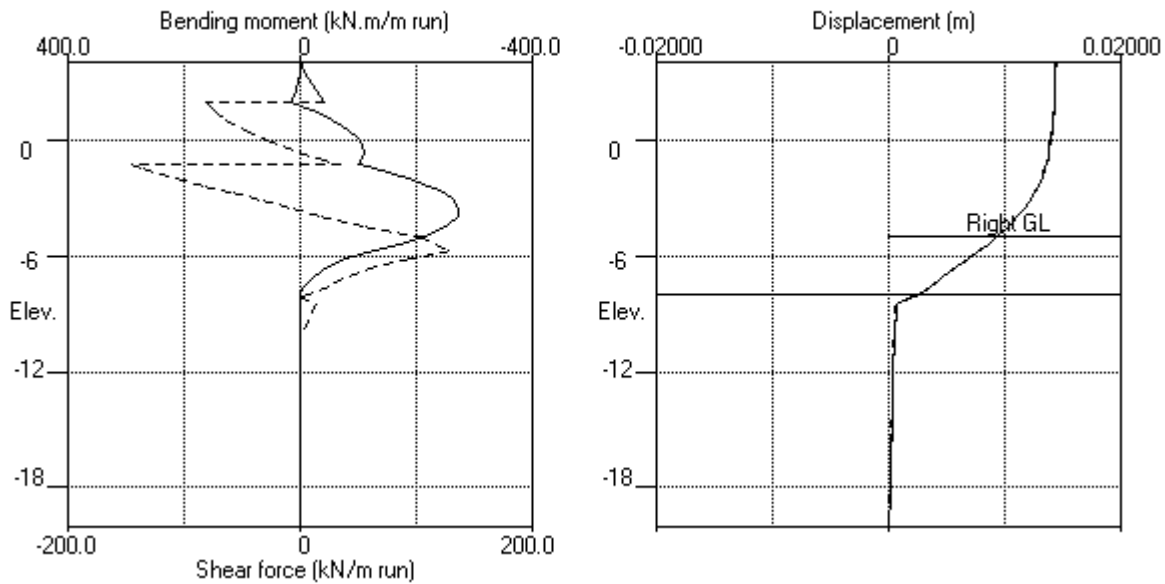
LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses			Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2			
34	-14.40	104.00	312.15	0.00	7556.03	272.10	376.10	997417
35	-16.80	128.00	353.16	0.00	8125.48	312.52	440.52	997417
36	-18.40	144.00	380.44	0.00	8504.23	339.47	483.47	997417
37	-20.00	160.00	407.67	0.00	8882.38	371.80	531.80	997417

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses			Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
23	-5.38	3.75	3.75	0.00	58.36	58.36	58.36p	29934
24	-5.75	7.50	7.50	0.00	74.74	74.74	78.49p	29934
25	-6.18	11.75	13.03	0.00	91.13	91.13	98.63p	29934
26	-6.60	16.00	18.55	0.00	149.49	149.49	156.99p	49890
27	-7.20	22.00	26.36	0.00	173.64	173.64	185.39p	49890
28	-7.60	26.00	31.57	0.00	197.79	170.69	192.69	49890
29	-8.00	30.00	36.78	0.00	231.90	171.95	197.95	49890
30	-8.15	31.50	38.73	0.00	277.42	194.25	224.25	49890
31	-8.50	35.00	43.29	0.00	285.96	164.81	196.31	49890
32	-10.25	52.50	73.15	0.00	305.89	129.40	164.40	49890
33	-12.00	70.00	103.10	0.00	3822.67	190.76	225.76	997795
34	-14.40	94.00	144.36	0.00	4237.22	212.30	264.80	997795
35	-16.80	118.00	185.90	0.00	4653.06	241.66	311.66	997795
36	-18.40	134.00	213.76	0.00	5226.11	282.08	376.08	997795
37	-20.00	150.00	241.76	0.00	5802.91	322.53	440.53	997795
					6189.76	349.46	483.46	997795
					6578.53	381.86	531.86	997795

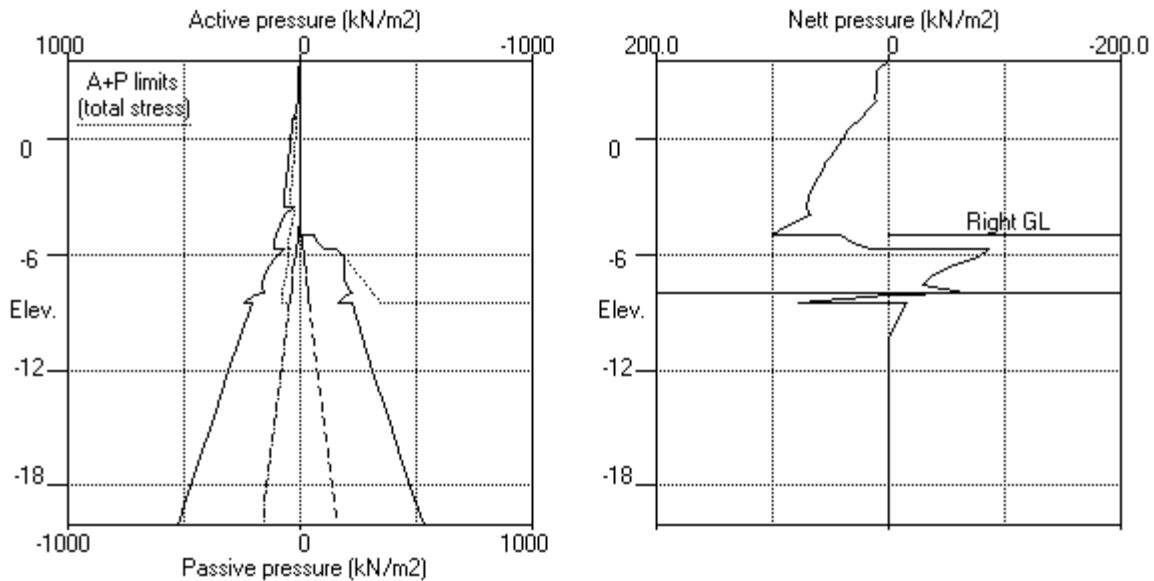
Note: 12.34 a Soil pressure at active limit
 185.39 p Soil pressure at passive limit
 27.05A Arching - soil pressure below active limit

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.10



Stage No.9 Apply load no.2 at elev. 2.10



Units: kN,m

Stage No. 12 Remove strut or anchor no.2 at elevation -1.30

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
12	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.76E-05	0.0	0.0		572444
2	3.50	11.08	0.015	-1.77E-05	2.8	0.3		572444
3	3.00	10.70	0.015	-1.93E-05	8.2	3.4		572444
4	2.55	11.02	0.015	-2.39E-05	13.1	8.3		572444
5	2.10	12.19	0.015	-3.33E-05	18.3	15.6		572444
6	2.00	11.07	0.015	-3.62E-05	19.5	17.5	-123.5	572444
		11.07	0.015	-3.62E-05	-104.0	17.5		
7	1.50	16.54	0.015	-2.98E-05	-97.1	-32.2		572444
8	1.00	23.50	0.015	1.85E-05	-87.1	-78.5		572444
		31.38	0.015	1.85E-05	-87.1	-78.5		
9	0.50	35.19	0.015	1.04E-04	-70.4	-117.8		572444
10	0.00	40.24	0.014	2.20E-04	-51.6	-148.3		572444
11	-0.60	46.90	0.014	3.88E-04	-25.4	-171.6		572444
12	-0.95	50.35	0.014	4.94E-04	-8.4	-177.5		572444
13	-1.30	54.14	0.014	6.03E-04	9.9	-177.3		572444
14	-1.50	55.74	0.014	6.64E-04	20.9	-174.2		572444
15	-2.00	61.16	0.013	8.08E-04	50.1	-156.3	-160.5	572444
		61.16	0.013	8.08E-04	-110.4	-156.3		
16	-2.38	64.44	0.013	9.23E-04	-86.8	-193.3		572444
17	-2.75	67.45	0.013	1.05E-03	-62.1	-221.2		572444
18	-3.13	69.34	0.012	1.21E-03	-36.5	-239.6		572444
19	-3.50	70.13	0.012	1.36E-03	-10.3	-248.2		572444
		25.73	0.012	1.36E-03	-10.3	-248.2		
20	-4.00	67.40	0.011	1.58E-03	13.0	-250.9		572444
21	-4.50	86.74	0.010	1.80E-03	51.5	-235.9		572444
22	-5.00	101.15	0.009	1.99E-03	98.5	-199.1	-0.6	572444
		42.80	0.009	1.99E-03	97.9	-199.1		
23	-5.38	31.53	0.009	2.10E-03	111.8	-159.7		572444
24	-5.75	16.77	0.008	2.19E-03	120.9	-115.9		572444
		-84.97	0.008	2.19E-03	120.9	-115.9		
25	-6.18	-75.55	0.007	2.26E-03	86.8	-72.2		572444
26	-6.60	-54.84	0.006	2.31E-03	59.0	-42.1		572444

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-7.20	-33.76	0.004	2.34E-03	32.5	-16.6		572444
28	-7.60	-25.14	0.003	2.34E-03	20.7	-6.3		572444
29	-8.00	-56.95	0.003	2.35E-03	4.3	-0.0		0
30	-8.15	-0.01	0.002	0	-0.0	0.0		0
31	-8.50	78.32	0.001	0	13.7	0.0		0
		-15.70	0.001	0	13.7	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	-0.0	0.0		0
34	-14.40	0.02	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.06	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	123.5 kN/m run			
At elev. -2.00				Prop force =	160.5 kN/m run			
At elev. -5.00				Prop force =	0.6 kN/m run			

LEFT side								
Effective stresses							Total	Adjusted
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2	<u>earth pressure</u> kN/m2	<u>soil modulus</u> kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	11.08	11.08	9974
3	3.00	0.00	18.01	5.57	69.68	10.70	10.70	9974
4	2.55	0.00	27.07	8.37	104.72	11.02	11.02	9974
5	2.10	0.00	36.44	11.26	140.98	12.19	12.19	9974
6	2.00	0.00	38.54	11.91	149.09	11.07	11.07A	9974
7	1.50	0.00	49.00	15.14	189.53	16.54	16.54	9974
8	1.00	0.00	59.29	18.32	229.36	23.50	23.50	9974
		0.00	59.29	15.26	224.13	31.38	31.38	4987
9	0.50	0.00	69.38	18.81	258.84	35.19	35.19	5236
10	0.00	0.00	79.25	22.27	292.82	40.24	40.24	5486
11	-0.60	0.00	90.84	26.35	332.74	46.90	46.90	5785
12	-0.95	0.00	97.50	28.68	355.65	50.35	50.35	5960
13	-1.30	0.00	104.09	31.00	378.32	54.14	54.14	6134
14	-1.50	0.00	107.82	32.31	391.18	55.74	55.74	6234
15	-2.00	0.00	117.09	35.56	423.07	61.16	61.16	6483
16	-2.38	0.00	123.97	37.98	446.76	64.44	64.44	6670
17	-2.75	0.00	130.80	40.38	470.29	67.45	67.45	6857
18	-3.13	0.00	137.60	42.77	493.67	69.34	69.34	7044
19	-3.50	0.00	144.35	45.14	516.93	70.13	70.13	7231
		0.00	144.35	28.49	689.10	25.73	25.73A	29922
20	-4.00	0.00	154.81	31.45	734.80	67.40	67.40	29922
21	-4.50	5.00	160.22	32.99	758.43	81.74	86.74	29922
22	-5.00	10.00	165.59	34.51	781.88	91.15	101.15	29922
23	-5.38	13.75	169.59	35.64	799.36	96.27	110.02	29922
24	-5.75	17.50	173.57	36.77	816.76	97.82	115.32	29922
		17.50	173.57	26.21	875.12	54.40	71.90	49871
25	-6.18	21.75	179.34	27.89	900.31	87.68	109.43	49871
26	-6.60	26.00	185.08	29.57	925.43	108.15	134.15	49871
27	-7.20	32.00	193.17	31.94	960.75	125.99	157.99	49871
28	-7.60	36.00	198.54	33.51	984.22	135.25	171.25	49871
29	-8.00	40.00	203.90	35.07	1007.64	123.43	163.43	49871
30	-8.15	41.50	205.91	35.66	1016.41	154.71	196.21	49871
31	-8.50	45.00	210.59	37.03	1036.85	197.72	242.72	49871
		45.00	210.59	0.00	6145.66	165.14	210.14	997417
32	-10.25	62.50	240.86	0.00	6566.09	202.36	264.86	997417

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

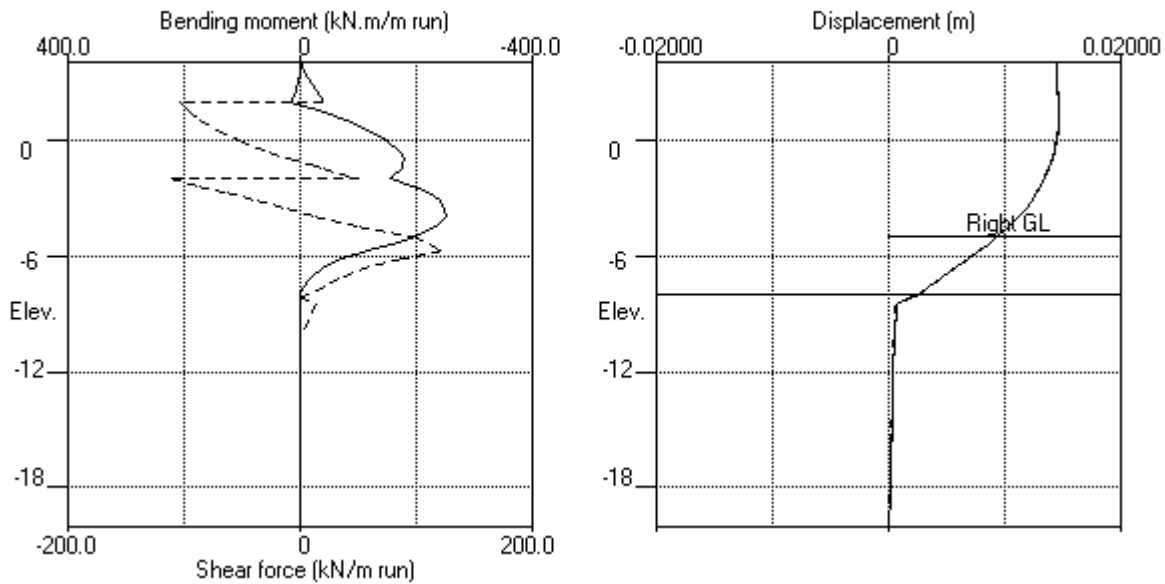
LEFT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
33	-12.00	80.00	271.00	0.00	6984.53	231.69	311.69	997417
34	-14.40	104.00	312.15	0.00	7556.03	272.11	376.11	997417
35	-16.80	128.00	353.16	0.00	8125.48	312.53	440.53	997417
36	-18.40	144.00	380.44	0.00	8504.23	339.47	483.47	997417
37	-20.00	160.00	407.67	0.00	8882.38	371.79	531.79	997417

RIGHT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	29934
23	-5.38	3.75	3.75	0.00	74.74	74.74	78.49p	29934
24	-5.75	7.50	7.50	0.00	91.13	91.06	98.56	29934
		7.50	7.50	0.00	149.49	149.37	156.87	49890
25	-6.18	11.75	13.03	0.00	173.64	173.23	184.98	49890
26	-6.60	16.00	18.55	0.00	197.79	172.99	188.99	49890
27	-7.20	22.00	26.36	0.00	231.90	169.75	191.75	49890
28	-7.60	26.00	31.57	0.00	254.65	170.38	196.38	49890
29	-8.00	30.00	36.78	0.00	277.42	190.37	220.37	49890
30	-8.15	31.50	38.73	0.00	285.96	164.72	196.22	49890
31	-8.50	35.00	43.29	0.00	305.89	129.40	164.40	49890
		35.00	43.29	0.00	3822.67	190.83	225.83	997795
32	-10.25	52.50	73.15	0.00	4237.22	212.35	264.85	997795
33	-12.00	70.00	103.10	0.00	4653.06	241.68	311.68	997795
34	-14.40	94.00	144.36	0.00	5226.11	282.09	376.09	997795
35	-16.80	118.00	185.90	0.00	5802.91	322.53	440.53	997795
36	-18.40	134.00	213.76	0.00	6189.76	349.46	483.46	997795
37	-20.00	150.00	241.76	0.00	6578.53	381.86	531.86	997795

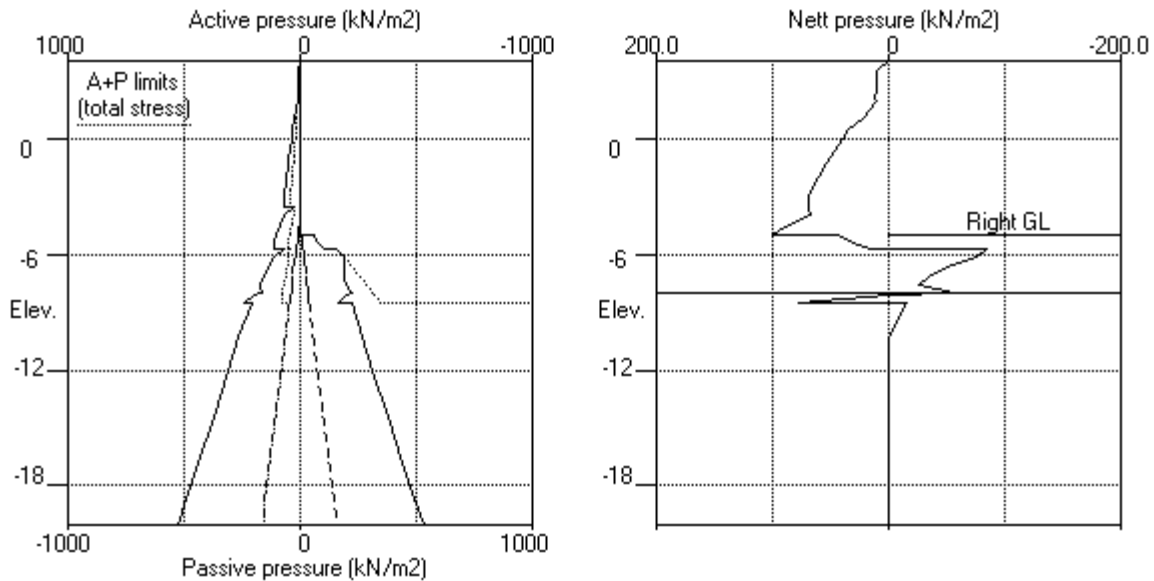
Note: 12.34 a Soil pressure at active limit
 78.49 p Soil pressure at passive limit
 25.73A Arching - soil pressure below active limit

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Stage No.12 Remove prop no.2 at elev. -1.30

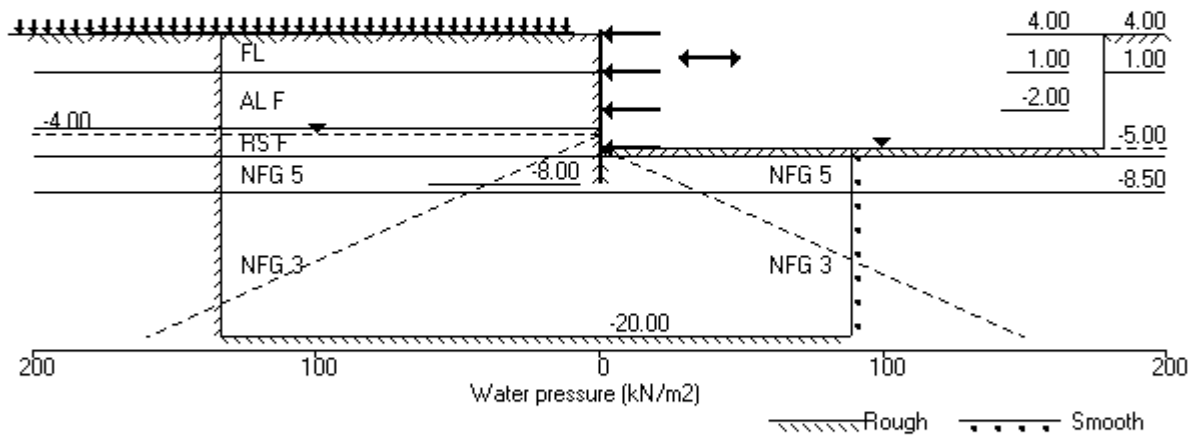


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_1
 Albert Street Development
 Section 1

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.15 Remove prop no.1 at elev. 2.00



Units: kN,m

Stage No. 15 Remove strut or anchor no.1 at elevation 2.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
15	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.34E-04	-37.6	0.0	-37.6	572444
2	3.50	11.12	0.015	-1.26E-04	-34.8	-18.5		572444
3	3.00	10.34	0.015	-1.03E-04	-29.4	-34.2		572444
4	2.55	10.42	0.015	-7.17E-05	-24.8	-46.2		572444
5	2.10	11.50	0.015	-3.15E-05	-19.8	-56.1		572444
6	2.00	10.42	0.015	-2.16E-05	-18.7	-58.0		572444
7	1.50	16.07	0.015	3.21E-05	-12.1	-65.1		572444
8	1.00	23.35	0.015	9.07E-05	-2.3	-69.0	-84.7	572444
		31.30	0.015	9.07E-05	-87.0	-69.0		
9	0.50	35.14	0.015	1.68E-04	-70.4	-108.3		572444
10	0.00	40.22	0.015	2.76E-04	-51.5	-138.8		572444
11	-0.60	46.92	0.014	4.33E-04	-25.4	-162.0		572444
12	-0.95	50.38	0.014	5.34E-04	-8.4	-167.9		572444
13	-1.30	54.19	0.014	6.37E-04	9.9	-167.7		572444
14	-1.50	55.80	0.014	6.95E-04	20.9	-164.6		572444
15	-2.00	61.23	0.013	8.31E-04	50.2	-146.7	-163.8	572444
		61.23	0.013	8.31E-04	-113.6	-146.7		
16	-2.38	64.51	0.013	9.39E-04	-90.1	-184.9		572444
17	-2.75	67.52	0.013	1.07E-03	-65.3	-214.0		572444
18	-3.13	69.40	0.012	1.21E-03	-39.6	-233.6		572444
19	-3.50	70.18	0.012	1.37E-03	-13.5	-243.4		572444
		25.92	0.012	1.37E-03	-13.5	-243.4		
20	-4.00	67.58	0.011	1.58E-03	9.9	-247.6		572444
21	-4.50	86.89	0.010	1.79E-03	48.5	-234.2		572444
22	-5.00	101.28	0.009	1.98E-03	95.6	-198.9	1.9	572444
		43.12	0.009	1.98E-03	97.5	-198.9		
23	-5.38	31.75	0.009	2.10E-03	111.5	-159.6		572444
24	-5.75	16.95	0.008	2.19E-03	120.7	-115.8		572444
		-84.66	0.008	2.19E-03	120.7	-115.8		
25	-6.18	-75.34	0.007	2.26E-03	86.7	-72.2		572444
26	-6.60	-54.71	0.006	2.30E-03	59.0	-42.2		572444
27	-7.20	-33.69	0.004	2.33E-03	32.5	-16.6		572444

(continued)

Stage No.15 Remove strut or anchor no.1 at elevation 2.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-7.60	-25.14	0.003	2.34E-03	20.7	-6.3		572444
29	-8.00	-57.12	0.003	2.34E-03	4.3	-0.0		0
30	-8.15	-0.01	0.002	0	-0.0	0.0		0
31	-8.50	78.32	0.001	0	13.7	0.0		0
		-15.70	0.001	0	13.7	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	-0.0	0.0		0
34	-14.40	0.02	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.06	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	37.6	kN/m run		
At elev. 1.00				Prop force =	84.7	kN/m run		
At elev. -2.00				Prop force =	163.8	kN/m run		
At elev. -5.00				Prop force =	-1.9	kN/m run		

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	11.12	11.12	9974
3	3.00	0.00	18.01	5.57	69.68	10.34	10.34	9974
4	2.55	0.00	27.07	8.37	104.72	10.42	10.42	9974
5	2.10	0.00	36.44	11.26	140.98	11.50	11.50	9974
6	2.00	0.00	38.54	11.91	149.09	10.42	10.42A	9974
7	1.50	0.00	49.00	15.14	189.53	16.07	16.07	9974
8	1.00	0.00	59.29	18.32	229.36	23.35	23.35	9974
		0.00	59.29	15.26	224.13	31.30	31.30	4987
9	0.50	0.00	69.38	18.81	258.84	35.14	35.14	5236
10	0.00	0.00	79.25	22.27	292.82	40.22	40.22	5486
11	-0.60	0.00	90.84	26.35	332.74	46.92	46.92	5785
12	-0.95	0.00	97.50	28.68	355.65	50.38	50.38	5960
13	-1.30	0.00	104.09	31.00	378.32	54.19	54.19	6134
14	-1.50	0.00	107.82	32.31	391.18	55.80	55.80	6234
15	-2.00	0.00	117.09	35.56	423.07	61.23	61.23	6483
16	-2.38	0.00	123.97	37.98	446.76	64.51	64.51	6670
17	-2.75	0.00	130.80	40.38	470.29	67.52	67.52	6857
18	-3.13	0.00	137.60	42.77	493.67	69.40	69.40	7044
19	-3.50	0.00	144.35	45.14	516.93	70.18	70.18	7231
		0.00	144.35	28.49	689.10	25.92	25.92A	29922
20	-4.00	0.00	154.81	31.45	734.80	67.58	67.58	29922
21	-4.50	5.00	160.22	32.99	758.43	81.89	86.89	29922
22	-5.00	10.00	165.59	34.51	781.88	91.28	101.28	29922
23	-5.38	13.75	169.59	35.64	799.36	96.38	110.13	29922
24	-5.75	17.50	173.57	36.77	816.76	97.92	115.42	29922
		17.50	173.57	26.21	875.12	54.55	72.05	49871
25	-6.18	21.75	179.34	27.89	900.31	87.78	109.53	49871
26	-6.60	26.00	185.08	29.57	925.43	108.22	134.22	49871
27	-7.20	32.00	193.17	31.94	960.75	126.03	158.03	49871
28	-7.60	36.00	198.54	33.51	984.22	135.25	171.25	49871
29	-8.00	40.00	203.90	35.07	1007.64	123.34	163.34	49871
30	-8.15	41.50	205.91	35.66	1016.41	154.72	196.22	49871
31	-8.50	45.00	210.59	37.03	1036.85	197.72	242.72	49871
		45.00	210.59	0.00	6145.66	165.14	210.14	997417
32	-10.25	62.50	240.86	0.00	6566.09	202.37	264.87	997417

(continued)

Stage No.15 Remove strut or anchor no.1 at elevation 2.00

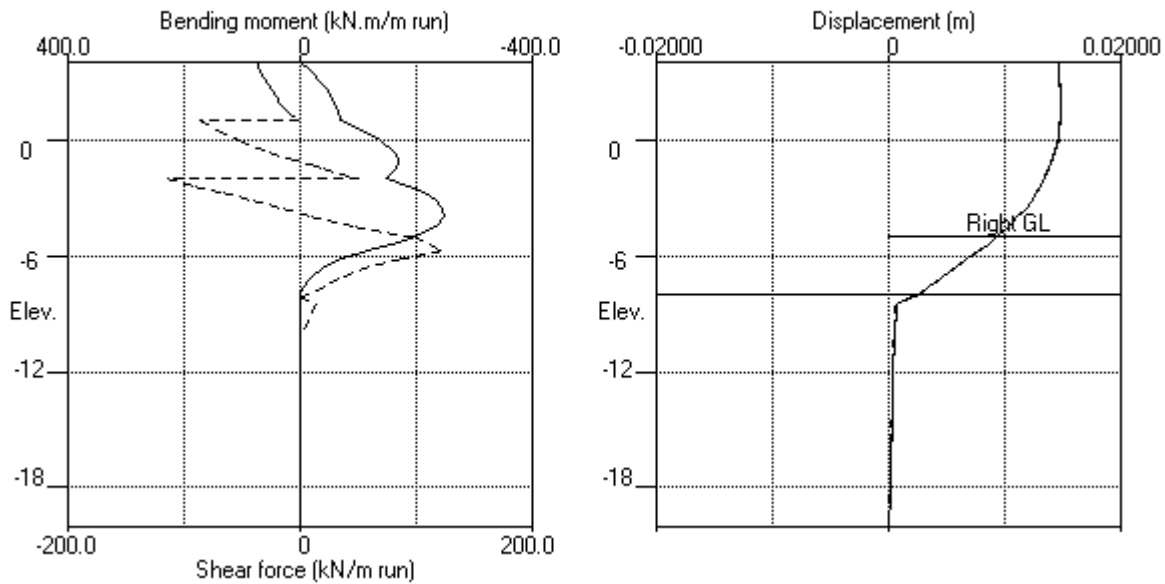
LEFT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
33	-12.00	80.00	271.00	0.00	6984.53	231.69	311.69	997417
34	-14.40	104.00	312.15	0.00	7556.03	272.11	376.11	997417
35	-16.80	128.00	353.16	0.00	8125.48	312.53	440.53	997417
36	-18.40	144.00	380.44	0.00	8504.23	339.47	483.47	997417
37	-20.00	160.00	407.67	0.00	8882.38	371.79	531.79	997417

RIGHT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.16	58.16	29934
23	-5.38	3.75	3.75	0.00	74.74	74.63	78.38	29934
24	-5.75	7.50	7.50	0.00	91.13	90.96	98.46	29934
		7.50	7.50	0.00	149.49	149.21	156.71	49890
25	-6.18	11.75	13.03	0.00	173.64	173.12	184.87	49890
26	-6.60	16.00	18.55	0.00	197.79	172.93	188.93	49890
27	-7.20	22.00	26.36	0.00	231.90	169.72	191.72	49890
28	-7.60	26.00	31.57	0.00	254.65	170.39	196.39	49890
29	-8.00	30.00	36.78	0.00	277.42	190.46	220.46	49890
30	-8.15	31.50	38.73	0.00	285.96	164.73	196.23	49890
31	-8.50	35.00	43.29	0.00	305.89	129.40	164.40	49890
		35.00	43.29	0.00	3822.67	190.84	225.84	997795
32	-10.25	52.50	73.15	0.00	4237.22	212.36	264.86	997795
33	-12.00	70.00	103.10	0.00	4653.06	241.68	311.68	997795
34	-14.40	94.00	144.36	0.00	5226.11	282.10	376.10	997795
35	-16.80	118.00	185.90	0.00	5802.91	322.54	440.54	997795
36	-18.40	134.00	213.76	0.00	6189.76	349.46	483.46	997795
37	-20.00	150.00	241.76	0.00	6578.53	381.86	531.86	997795

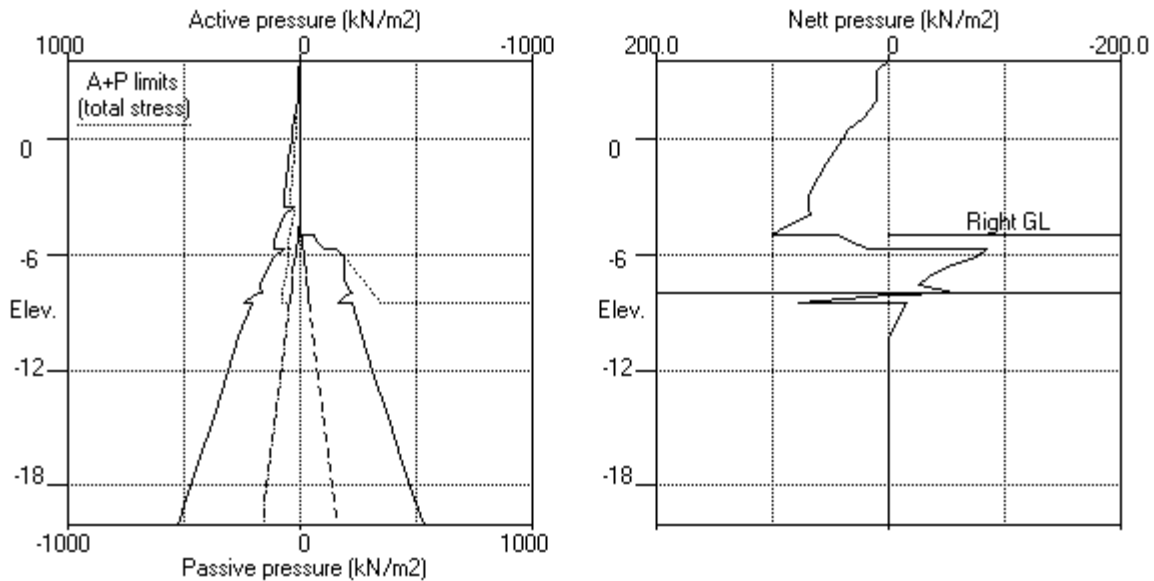
Note: 12.34 a Soil pressure at active limit
123.45 p Soil pressure at passive limit
25.92A Arching - soil pressure below active limit

Units: kN,m

Stage No.15 Remove prop no.1 at elev. 2.00



Stage No.15 Remove prop no.1 at elev. 2.00



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DJC
Data filename/Run ID: Section_1	
Albert Street Development	Date:16-11-2022
Section 1	Checked :

Units: kN,m

Stage No. 16 Change EI of wall to 400711 kN.m2/m run
Allow wall to relax with new modulus value

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method
Factor of safety on nett available passive

			FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		
<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Elev.</u>	<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	<u>Direction</u> <u>of</u> <u>failure</u>
16	4.00	-5.00	More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.015	-1.38E-04	-28.6	0.0	-28.6	400711
2	3.50	11.15	0.015	-1.30E-04	-25.8	-15.0		400711
3	3.00	10.36	0.015	-1.05E-04	-20.4	-27.3		400711
4	2.55	10.44	0.015	-7.30E-05	-15.7	-36.2		400711
5	2.10	11.53	0.015	-3.25E-05	-10.8	-42.9		400711
6	2.00	10.45	0.015	-2.26E-05	-9.7	-44.2		400711
7	1.50	16.11	0.015	2.88E-05	-3.1	-47.8		400711
8	1.00	23.38	0.015	8.15E-05	6.8	-48.2	-82.0	400711
		31.32	0.015	8.15E-05	-75.2	-48.2		
9	0.50	35.14	0.015	1.54E-04	-58.6	-82.9		400711
10	0.00	40.21	0.015	2.63E-04	-39.8	-108.9		400711
11	-0.60	46.90	0.014	4.25E-04	-13.6	-126.7		400711
12	-0.95	50.37	0.014	5.27E-04	3.4	-129.4		400711
13	-1.30	54.19	0.014	6.28E-04	21.7	-126.0		400711
14	-1.50	55.81	0.014	6.84E-04	32.7	-121.1		400711
15	-2.00	61.23	0.013	8.04E-04	62.0	-98.7	-180.9	400711
		61.23	0.013	8.04E-04	-118.9	-98.7		
16	-2.38	64.46	0.013	9.01E-04	-95.4	-138.4		400711
17	-2.75	67.38	0.013	1.03E-03	-70.6	-169.0		400711
18	-3.13	69.19	0.012	1.18E-03	-45.0	-190.2		400711
19	-3.50	69.92	0.012	1.35E-03	-18.9	-201.6		400711
		24.86	0.012	1.35E-03	-18.9	-201.6		
20	-4.00	66.34	0.011	1.60E-03	3.9	-208.0		400711
21	-4.50	85.69	0.010	1.83E-03	41.9	-197.0		400711
22	-5.00	100.35	0.009	2.05E-03	88.4	-164.3	-7.5	400711
		41.99	0.009	2.05E-03	80.9	-164.3		
23	-5.38	31.03	0.009	2.17E-03	94.6	-129.9		400711
24	-5.75	16.49	0.008	2.27E-03	103.5	-91.1		400711
		-85.42	0.008	2.27E-03	103.5	-91.1		
25	-6.18	-74.62	0.007	2.34E-03	69.5	-53.1		400711
26	-6.60	-51.61	0.006	2.38E-03	42.7	-28.6		400711

(continued)

Stage No.16 Change EI of wall to 400711 kN.m²/m run
Allow wall to relax with new modulus value

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m ²	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m ² /m
27	-7.20	-27.97	0.004	2.40E-03	18.8	-10.2		400711
28	-7.60	-14.22	0.003	2.41E-03	10.3	-3.8		400711
29	-8.00	-27.28	0.002	2.41E-03	2.0	-0.0		0
30	-8.15	-0.01	0.002	0	-0.0	0.0		0
31	-8.50	78.32	0.001	0	13.7	0.0		0
		-15.70	0.001	0	13.7	0.0		
32	-10.25	0.01	0.000	0	-0.0	0.0		0
33	-12.00	0.01	0.000	0	-0.0	0.0		0
34	-14.40	0.02	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.06	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	28.6	kN/m run		
At elev. 1.00				Prop force =	82.0	kN/m run		
At elev. -2.00				Prop force =	180.9	kN/m run		
At elev. -5.00				Prop force =	7.5	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m ²	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m ²
		<u>Water</u> <u>press.</u> kN/m ²	<u>Vertic</u> <u>-al</u> kN/m ²	<u>Active</u> <u>limit</u> kN/m ²	<u>Passive</u> <u>limit</u> kN/m ²	<u>Earth</u> <u>pressure</u> kN/m ²		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	0.00	8.65	2.67	33.48	11.15	11.15	9974
3	3.00	0.00	18.01	5.57	69.68	10.36	10.36	9974
4	2.55	0.00	27.07	8.37	104.72	10.44	10.44	9974
5	2.10	0.00	36.44	11.26	140.98	11.53	11.53	9974
6	2.00	0.00	38.54	11.91	149.09	10.45	10.45A	9974
7	1.50	0.00	49.00	15.14	189.53	16.11	16.11	9974
8	1.00	0.00	59.29	18.32	229.36	23.38	23.38	9974
		0.00	59.29	15.26	224.13	31.32	31.32	4987
9	0.50	0.00	69.38	18.81	258.84	35.14	35.14	5236
10	0.00	0.00	79.25	22.27	292.82	40.21	40.21	5486
11	-0.60	0.00	90.84	26.35	332.74	46.90	46.90	5785
12	-0.95	0.00	97.50	28.68	355.65	50.37	50.37	5960
13	-1.30	0.00	104.09	31.00	378.32	54.19	54.19	6134
14	-1.50	0.00	107.82	32.31	391.18	55.81	55.81	6234
15	-2.00	0.00	117.09	35.56	423.07	61.23	61.23	6483
16	-2.38	0.00	123.97	37.98	446.76	64.46	64.46	6670
17	-2.75	0.00	130.80	40.38	470.29	67.38	67.38	6857
18	-3.13	0.00	137.60	42.77	493.67	69.19	69.19	7044
19	-3.50	0.00	144.35	45.14	516.93	69.92	69.92	7231
		0.00	144.35	28.49	689.10	24.86	24.86A	29922
20	-4.00	0.00	154.81	31.45	734.80	66.34	66.34	29922
21	-4.50	5.00	160.22	32.99	758.43	80.69	85.69	29922
22	-5.00	10.00	165.59	34.51	781.88	90.35	100.35	29922
23	-5.38	13.75	169.59	35.64	799.36	95.78	109.53	29922
24	-5.75	17.50	173.57	36.77	816.76	97.63	115.13	29922
		17.50	173.57	26.21	875.12	54.07	71.57	49871
25	-6.18	21.75	179.34	27.89	900.31	88.34	110.09	49871
26	-6.60	26.00	185.08	29.57	925.43	109.90	135.90	49871
27	-7.20	32.00	193.17	31.94	960.75	128.97	160.97	49871
28	-7.60	36.00	198.54	33.51	984.22	140.71	176.71	49871
29	-8.00	40.00	203.90	35.07	1007.64	138.77	178.77	49871
30	-8.15	41.50	205.91	35.66	1016.41	154.34	195.84	49871
31	-8.50	45.00	210.59	37.03	1036.85	197.72	242.72	49871
		45.00	210.59	0.00	6145.66	165.16	210.16	997417

(continued)

Stage No.16 Change EI of wall to 400711 kN.m2/m run
 Allow wall to relax with new modulus value

LEFT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
32	-10.25	62.50	240.86	0.00	6566.09	202.39	264.89	997417
33	-12.00	80.00	271.00	0.00	6984.53	231.70	311.70	997417
34	-14.40	104.00	312.15	0.00	7556.03	272.11	376.11	997417
35	-16.80	128.00	353.16	0.00	8125.48	312.52	440.52	997417
36	-18.40	144.00	380.44	0.00	8504.23	339.47	483.47	997417
37	-20.00	160.00	407.67	0.00	8882.38	371.78	531.78	997417

RIGHT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	29934
23	-5.38	3.75	3.75	0.00	74.74	74.74	78.49p	29934
24	-5.75	7.50	7.50	0.00	91.13	91.13	98.63p	29934
		7.50	7.50	0.00	149.49	149.49	156.99p	49890
25	-6.18	11.75	13.03	0.00	173.64	172.96	184.71	49890
26	-6.60	16.00	18.55	0.00	197.79	171.51	187.51	49890
27	-7.20	22.00	26.36	0.00	231.90	166.94	188.94	49890
28	-7.60	26.00	31.57	0.00	254.65	164.93	190.93	49890
29	-8.00	30.00	36.78	0.00	277.42	176.05	206.05	49890
30	-8.15	31.50	38.73	0.00	285.96	164.35	195.85	49890
31	-8.50	35.00	43.29	0.00	305.89	129.40	164.40	49890
		35.00	43.29	0.00	3822.67	190.86	225.86	997795
32	-10.25	52.50	73.15	0.00	4237.22	212.38	264.88	997795
33	-12.00	70.00	103.10	0.00	4653.06	241.68	311.68	997795
34	-14.40	94.00	144.36	0.00	5226.11	282.09	376.09	997795
35	-16.80	118.00	185.90	0.00	5802.91	322.53	440.53	997795
36	-18.40	134.00	213.76	0.00	6189.76	349.46	483.46	997795
37	-20.00	150.00	241.76	0.00	6578.53	381.85	531.85	997795

Run ID. Section_1
Albert Street Development
Section 1

| Sheet No.
| Date:16-11-2022
Checked :

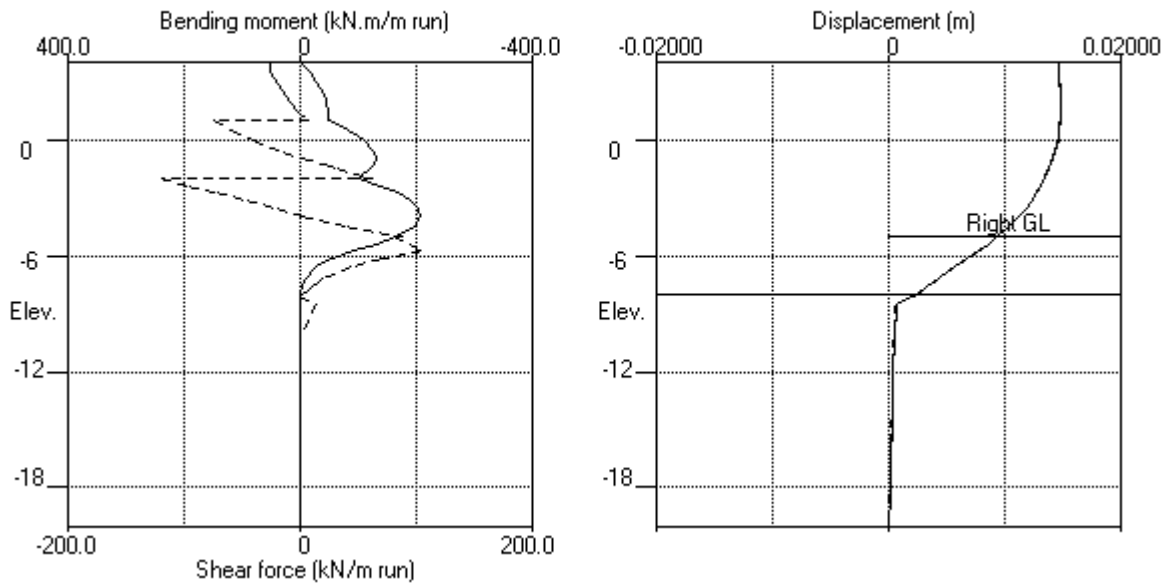
(continued)

Stage No.16 Change EI of wall to 400711 kN.m²/m run
Allow wall to relax with new modulus value

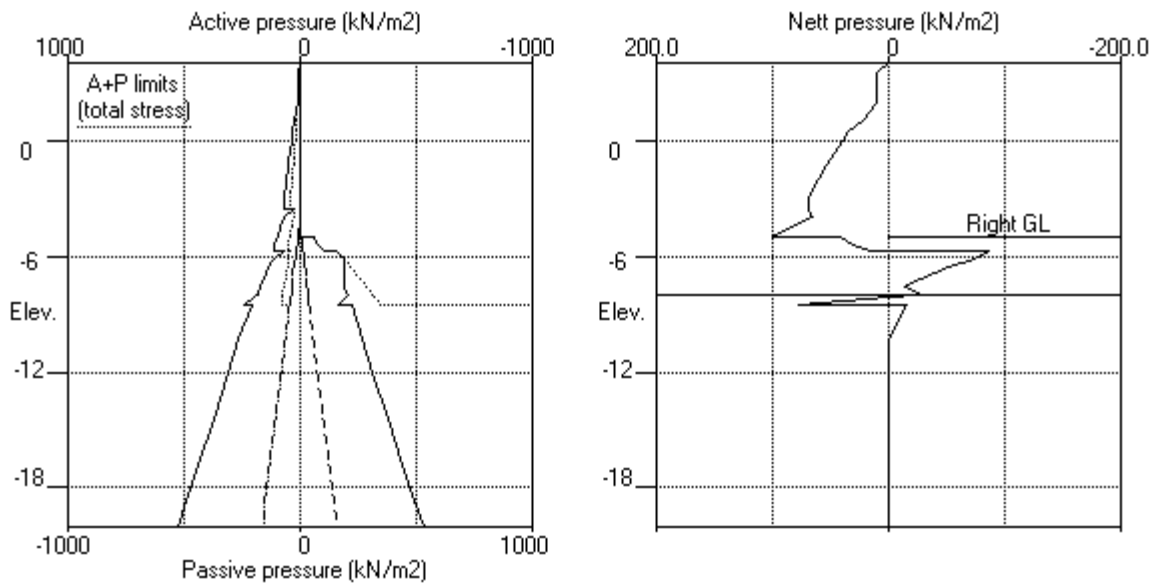
Note: 12.34 a Soil pressure at active limit
156.99 p Soil pressure at passive limit
24.86A Arching - soil pressure below active limit

Units: kN,m

Stage No.16 Change EI of wall to 400711kN.m2/m run



Stage No.16 Change EI of wall to 400711kN.m2/m run

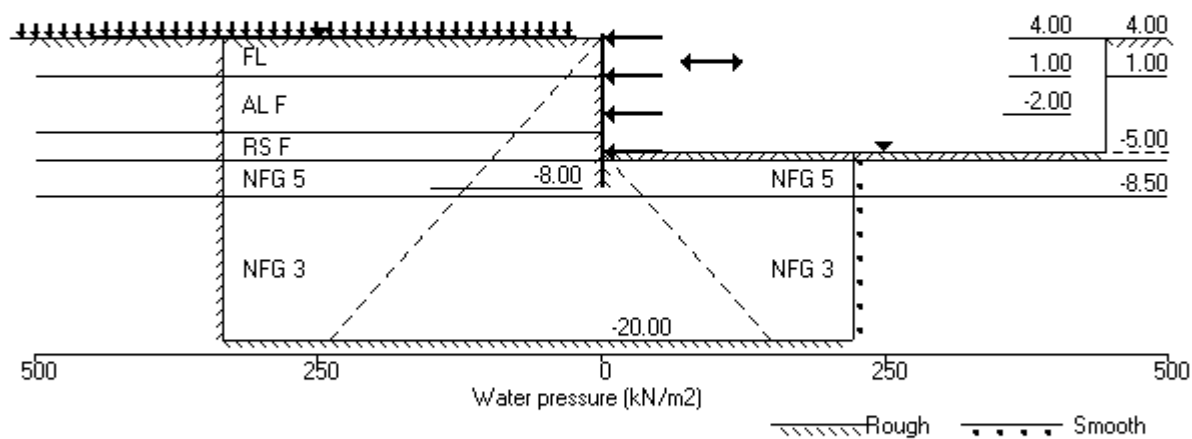


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 Data filename/Run ID: Section_1
 Albert Street Development
 Section 1

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.17 Apply water pressure profile no.1



Units: kN,m

Stage No. 17 Apply water pressure profile no.1

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>-ation</u>	
17	4.00	-5.00		More than one prop.	No FoS calc.	

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.70E-04	-33.3	0.0	-33.3	400711
2	3.50	14.11	0.015	-1.60E-04	-29.8	-17.3		400711
3	3.00	16.16	0.015	-1.32E-04	-22.2	-31.1		400711
4	2.55	18.81	0.015	-9.55E-05	-14.4	-40.1		400711
5	2.10	22.47	0.015	-5.15E-05	-5.1	-45.3		400711
6	2.00	21.98	0.015	-4.11E-05	-2.9	-45.9		400711
7	1.50	30.54	0.015	9.44E-06	10.3	-44.6		400711
8	1.00	40.70	0.015	5.27E-05	28.1	-36.4	-128.2	400711
		48.55	0.015	5.27E-05	-100.2	-36.4		
9	0.50	55.20	0.015	1.17E-04	-74.2	-81.3		400711
10	0.00	63.11	0.015	2.28E-04	-44.7	-112.5		400711
11	-0.60	73.24	0.014	3.94E-04	-3.8	-128.9		400711
12	-0.95	78.74	0.014	4.96E-04	22.8	-126.6		400711
13	-1.30	84.60	0.014	5.90E-04	51.4	-114.6		400711
14	-1.50	87.40	0.014	6.38E-04	68.6	-103.1		400711
15	-2.00	95.70	0.014	7.22E-04	114.4	-58.6	-294.5	400711
		95.70	0.014	7.22E-04	-180.1	-58.6		
16	-2.38	101.00	0.013	7.92E-04	-143.2	-118.8		400711
17	-2.75	105.96	0.013	9.12E-04	-104.4	-164.8		400711
18	-3.13	109.81	0.013	1.06E-03	-63.9	-195.8		400711
19	-3.50	112.61	0.012	1.24E-03	-22.2	-211.4		400711
		75.00	0.012	1.24E-03	-22.2	-211.4		
20	-4.00	111.26	0.012	1.49E-03	24.3	-213.4		400711
21	-4.50	130.35	0.011	1.73E-03	84.7	-186.5		400711
22	-5.00	144.62	0.010	1.91E-03	153.5	-126.9	-138.4	400711
		86.26	0.010	1.91E-03	15.1	-126.9		
23	-5.38	74.44	0.009	2.01E-03	45.2	-114.0		400711
24	-5.75	58.88	0.008	2.10E-03	70.2	-90.6		400711
		-45.26	0.008	2.10E-03	70.2	-90.6		
25	-6.18	-36.87	0.007	2.18E-03	52.8	-63.1		400711
26	-6.60	-25.88	0.007	2.23E-03	39.5	-42.4		400711
27	-7.20	-10.10	0.005	2.27E-03	28.7	-21.2		400711

(continued)

Stage No.17 Apply water pressure profile no.1

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-7.60	-12.73	0.004	2.28E-03	24.1	-9.4		400711
29	-8.00	-78.36	0.003	2.29E-03	5.9	-0.0		0
30	-8.15	-0.01	0.003	0	-0.0	0.0		0
31	-8.50	120.61	0.001	0	21.1	0.0		0
		-24.15	0.001	0	21.1	0.0		
32	-10.25	0.01	0.001	0	-0.0	0.0		0
33	-12.00	0.01	0.001	0	-0.0	0.0		0
34	-14.40	0.02	0.000	0	0.0	0.0		0
35	-16.80	-0.01	0.000	0	0.0	0.0		0
36	-18.40	0.01	0.000	0	0.0	0.0		0
37	-20.00	-0.06	0.000	0	0.0	0.0		---
At elev. 4.00					Prop force = 33.3 kN/m run			
At elev. 1.00					Prop force = 128.2 kN/m run			
At elev. -2.00					Prop force = 294.5 kN/m run			
At elev. -5.00					Prop force = 138.4 kN/m run			

LEFT side								
Effective stresses							Total	Adjusted
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2	<u>earth pressure</u> kN/m2	<u>soil modulus</u> kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.50	5.00	3.65	1.13	14.14	9.11	14.11	9974
3	3.00	10.00	8.01	2.48	31.00	6.16	16.16	9974
4	2.55	14.50	12.57	3.88	48.63	4.31	18.81	9974
5	2.10	19.00	17.44	5.39	67.48	3.47	22.47A	9974
6	2.00	20.00	18.54	5.73	71.72	1.98	21.98A	9974
7	1.50	25.00	24.00	7.42	92.82	5.54	30.54A	9974
8	1.00	30.00	29.29	9.05	113.32	10.70	40.70	9974
		30.00	29.29	4.73	120.86	18.55	48.55	4987
9	0.50	35.00	34.38	6.51	138.37	20.20	55.20	5236
10	0.00	40.00	39.25	8.22	155.13	23.11	63.11	5486
11	-0.60	46.00	44.84	10.19	174.39	27.24	73.24	5785
12	-0.95	49.50	48.00	11.30	185.26	29.24	78.74	5960
13	-1.30	53.00	51.09	12.38	195.88	31.60	84.60	6134
14	-1.50	55.00	52.82	12.99	201.86	32.40	87.40	6234
15	-2.00	60.00	57.09	14.49	216.53	35.70	95.70	6483
16	-2.38	63.75	60.22	15.59	227.32	37.25	101.00	6670
17	-2.75	67.50	63.30	16.67	237.94	38.46	105.96	6857
18	-3.13	71.25	66.35	17.74	248.41	38.56	109.81	7044
19	-3.50	75.00	69.35	18.80	258.76	37.61	112.61	7231
		75.00	69.35	7.24	361.40	0.00	75.00A	29922
20	-4.00	80.00	74.81	8.79	385.25	31.26	111.26	29922
21	-4.50	85.00	80.22	10.32	408.88	45.35	130.35	29922
22	-5.00	90.00	85.59	11.84	432.33	54.62	144.62	29922
23	-5.38	93.75	89.59	12.97	449.81	59.19	152.94	29922
24	-5.75	97.50	93.57	14.10	467.21	60.01	157.51	29922
		97.50	93.57	2.83	525.56	14.23	111.73	49871
25	-6.18	101.75	99.34	4.51	550.76	46.77	148.52	49871
26	-6.60	106.00	105.08	6.19	575.87	65.38	171.38	49871
27	-7.20	112.00	113.17	8.56	611.20	80.63	192.63	49871
28	-7.60	116.00	118.54	10.13	634.67	84.39	200.39	49871
29	-8.00	120.00	123.90	11.69	658.09	55.09	175.09	49871
30	-8.15	121.50	125.91	12.28	666.86	97.66	219.16	49871
31	-8.50	125.00	130.59	13.65	687.30	161.77	286.77	49871
		125.00	130.59	0.00	5034.78	111.74	236.74	997417
32	-10.25	142.50	160.86	0.00	5455.21	153.03	295.53	997417

(continued)

Stage No.17 Apply water pressure profile no.1

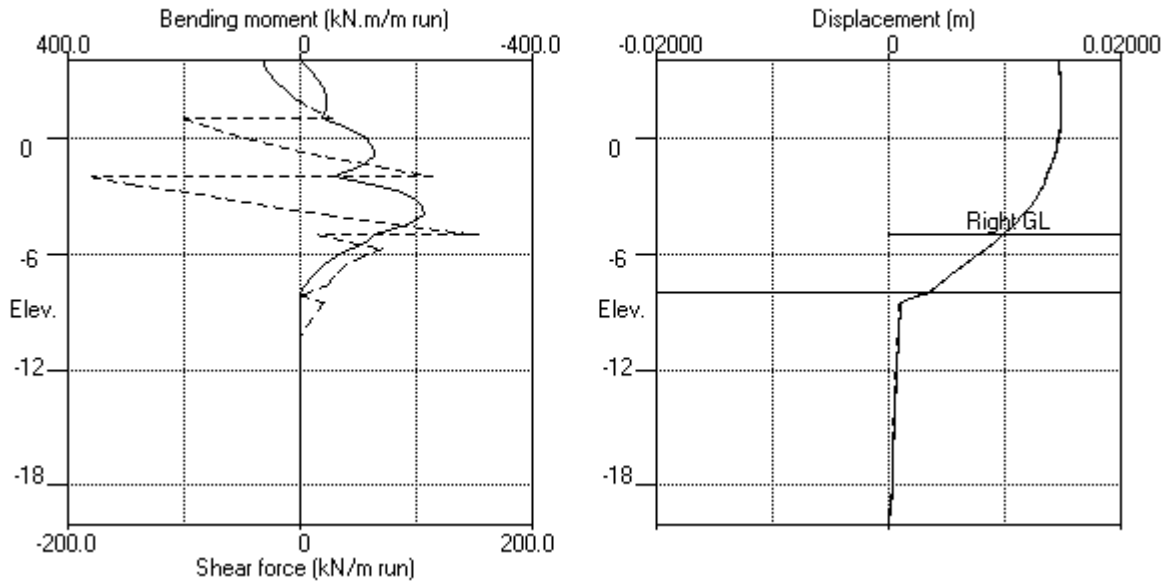
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
33	-12.00	160.00	191.00	0.00	5873.66	182.34	342.34	997417
34	-14.40	184.00	232.15	0.00	6445.16	222.69	406.69	997417
35	-16.80	208.00	273.16	0.00	7014.61	262.97	470.97	997417
36	-18.40	224.00	300.44	0.00	7393.35	289.90	513.90	997417
37	-20.00	240.00	327.67	0.00	7771.51	328.13	568.13	997417

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
23	-5.38	0.00	0.00	0.00	58.36	58.36	58.36p	29934
24	-5.75	3.75	3.75	0.00	74.74	74.74	78.49p	29934
25	-6.18	7.50	7.50	0.00	91.13	91.13	98.63p	29934
26	-6.60	11.75	13.03	0.00	149.49	149.49	156.99p	49890
27	-7.20	16.00	18.55	0.00	173.64	173.64	185.39p	49890
28	-7.60	22.00	26.36	0.00	197.79	181.26	197.26	49890
29	-8.00	26.00	31.57	0.00	231.90	180.73	202.73	49890
30	-8.15	30.00	36.78	0.00	254.65	187.11	213.11	49890
31	-8.50	35.00	43.29	0.00	277.42	223.44	253.44	49890
32	-10.25	35.00	43.29	0.00	285.96	187.66	219.16	49890
33	-12.00	52.50	73.15	0.00	305.89	131.16	166.16	49890
34	-14.40	70.00	103.10	0.00	3822.67	225.90	260.90	997795
35	-16.80	94.00	144.36	0.00	4237.22	243.02	295.52	997795
36	-18.40	118.00	185.90	0.00	4653.06	272.33	342.33	997795
37	-20.00	134.00	213.76	0.00	5226.11	312.68	406.68	997795
		150.00	241.76	0.00	5802.91	352.98	470.98	997795
					6189.76	379.89	513.89	997795
					6578.53	418.19	568.19	997795

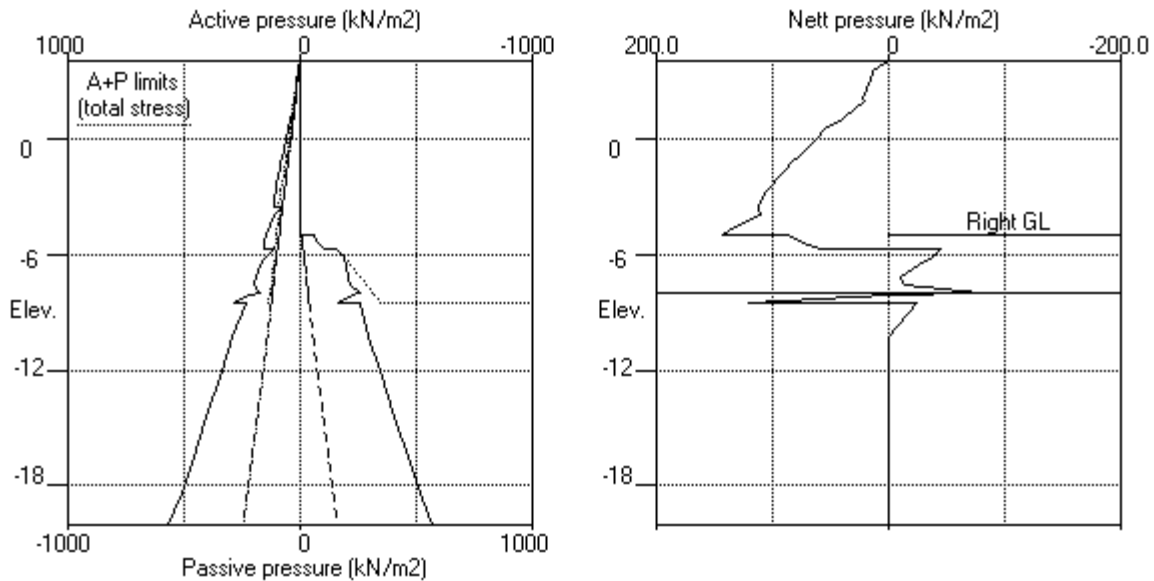
Note: 12.34 a Soil pressure at active limit
 185.39 p Soil pressure at passive limit
 75.00A Arching - soil pressure below active limit

Units: kN,m

Stage No.17 Apply water pressure profile no.1



Stage No.17 Apply water pressure profile no.1



| Checked :

Stage No.	Ground level		Prop Elev.	FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		Direction of failure
	Act.	Pass.		Factor of Safety	Moment equilib. at elev.	Toe elev.	Wall Penetr -ation	
1	4.00	4.00	---	Conditions not suitable for FoS calc.				
2	4.00	2.00	Cant.	11.788	-6.50	-0.18	2.18	L to R
3	4.00	2.00		No analysis at this stage				
4	4.00	-1.50	2.00	8.853	n/a	-3.48	1.98	L to R
5	4.00	-1.50		No analysis at this stage				
All remaining stages have more than one prop - FoS calculation n/a								

Units: kN,m

Summary of results

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries:	Left side 30.00 from wall	Rough boundary
	Right side 20.00 from wall	Smooth boundary
Lower rigid boundary at elevation -20.00		Rough boundary

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement		Bending moment		Shear force	
		maximum	minimum	maximum	minimum	maximum	minimum
		m	m	kN.m/m	kN.m/m	kN/m	kN/m
1	4.00	0.016	0.000	0.0	-0.0	0.0	-37.6
2	3.50	0.016	0.000	0.3	-18.5	2.8	-34.8
3	3.00	0.015	0.000	3.4	-34.2	8.2	-29.4
4	2.55	0.015	0.000	8.3	-46.2	13.1	-24.8
5	2.10	0.015	0.000	15.6	-56.1	61.4	-19.8
6	2.00	0.015	0.000	19.8	-58.0	62.6	-104.0
7	1.50	0.015	0.000	14.8	-65.1	11.0	-97.1
8	1.00	0.015	0.000	18.7	-78.5	28.1	-100.2
9	0.50	0.015	0.000	22.3	-117.8	8.0	-74.2
10	0.00	0.015	0.000	26.8	-148.3	9.7	-51.6
11	-0.60	0.014	0.000	33.3	-171.6	12.2	-25.4
12	-0.95	0.014	0.000	37.8	-177.5	22.8	-8.4
13	-1.30	0.014	0.000	42.9	-177.3	51.4	-149.8
14	-1.50	0.014	0.000	46.2	-174.2	68.6	-138.7
15	-2.00	0.014	0.000	55.2	-186.5	114.4	-180.1
16	-2.38	0.013	0.000	63.0	-221.7	61.6	-143.2
17	-2.75	0.013	0.000	71.6	-247.7	69.0	-104.4
18	-3.13	0.013	0.000	80.9	-264.2	75.5	-63.9
19	-3.50	0.012	0.000	90.7	-270.9	80.5	-22.2
20	-4.00	0.012	0.000	95.1	-270.8	42.3	0.0
21	-4.50	0.011	0.000	91.7	-253.0	84.7	-11.1
22	-5.00	0.010	0.000	84.0	-213.4	153.5	-18.0
23	-5.38	0.009	0.000	76.5	-171.7	117.9	-21.5
24	-5.75	0.008	0.000	67.9	-125.6	126.8	-24.7
25	-6.18	0.007	0.000	54.7	-79.4	92.3	-33.2
26	-6.60	0.007	0.000	39.7	-47.1	64.0	-35.1
27	-7.20	0.005	0.000	18.9	-21.2	36.4	-31.1
28	-7.60	0.004	0.000	7.4	-9.4	24.1	-23.6
29	-8.00	0.003	0.000	0.0	-0.0	5.9	-5.0
30	-8.15	0.003	0.000	0.0	0.0	0.0	-0.0
31	-8.50	0.001	0.000	0.0	0.0	21.1	0.0
32	-10.25	0.001	0.000	0.0	0.0	0.0	-0.0
33	-12.00	0.001	0.000	0.0	0.0	0.0	-0.0
34	-14.40	0.000	0.000	0.0	0.0	0.0	-0.0
35	-16.80	0.000	0.000	0.0	0.0	0.0	-0.0
36	-18.40	0.000	0.000	0.0	0.0	0.0	-0.0
37	-20.00	0.000	0.000	0.0	0.0	0.0	0.0

Summary of results (continued)

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment				Shear force			
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>
	kN.m/m		kN.m/m		kN/m		kN/m	
1	0.9	-6.18	-17.2	-1.30	8.3	-3.50	-5.6	1.50
2	95.1	-4.00	-0.0	4.00	26.1	-3.50	-35.1	-6.60
3	No calculation at this stage							
4	51.1	-5.75	-142.2	-0.95	80.5	-3.50	-90.9	2.00
5	No calculation at this stage							
6	45.0	-5.75	-139.1	-0.60	78.0	-3.50	-90.0	2.00
7	17.4	2.00	-270.9	-3.50	126.8	-5.75	-146.2	-1.30
8	19.8	2.00	-261.7	-4.00	124.1	-5.75	-149.8	-1.30
9	17.4	2.00	-270.9	-3.50	126.8	-5.75	-146.2	-1.30
10	No calculation at this stage							
11	No calculation at this stage							
12	17.5	2.00	-250.9	-4.00	120.9	-5.75	-110.4	-2.00
13	No calculation at this stage							
14	No calculation at this stage							
15	0.0	4.00	-247.6	-4.00	120.7	-5.75	-113.6	-2.00
16	0.0	4.00	-208.0	-4.00	103.5	-5.75	-118.9	-2.00
17	0.0	4.00	-213.4	-4.00	153.5	-5.00	-180.1	-2.00

Maximum and minimum displacement at each stage

Stage no.	Displacement				<u>Stage description</u>
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	
	m		m		
1	0.001	4.00	0.000	4.00	Apply surcharge no.1 at elev. 4.00
2	0.016	4.00	0.000	4.00	Excav. to elev. 2.00 on RIGHT side
3	No calculation at this stage				Install prop no.1 at elev. 2.00
4	0.016	4.00	0.000	4.00	Excav. to elev. -1.50 on RIGHT side
5	No calculation at this stage				Install prop no.2 at elev. -1.30
6	0.016	4.00	0.000	4.00	Apply water pressure profile no.2
7	0.014	4.00	0.000	4.00	Excav. to elev. -5.00 on RIGHT side
8	0.015	4.00	0.000	4.00	Apply load no.1 at elev. 2.10
9	0.014	4.00	0.000	4.00	Apply load no.2 at elev. 2.10
10	No calculation at this stage				Install prop no.3 at elev. -5.00
11	No calculation at this stage				Install prop no.4 at elev. -2.00
12	0.015	1.00	0.000	4.00	Remove prop no.2 at elev. -1.30
13	No calculation at this stage				Install prop no.5 at elev. 1.00
14	No calculation at this stage				Install prop no.6 at elev. 4.00
15	0.015	2.00	0.000	4.00	Remove prop no.1 at elev. 2.00
16	0.015	2.00	0.000	4.00	Change EI of wall to 400711kN.m ² /m run
17	0.015	1.50	0.000	4.00	Apply water pressure profile no.1

Summary of results (continued)

Prop forces at each stage (horizontal components)

Stage no.	--- Strut no. 1 --- at elev. 2.00		--- Strut no. 2 --- at elev.-1.30		--- Strut no. 3 --- at elev.-5.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
4	104.83	786.22	---	---	---	---
6	104.03	780.25	3.47	26.00	---	---
7	100.77	755.81	181.22	1359.18	---	---
8	138.29	1037.14	189.62	1422.17	---	---
9	100.77	755.81	181.22	1359.18	---	---
12	123.46	925.97	---	---	0.61	0.61
15	---	---	---	---	-1.92	-1.92
16	---	---	---	---	7.48	7.48
17	---	---	---	---	138.36	138.36

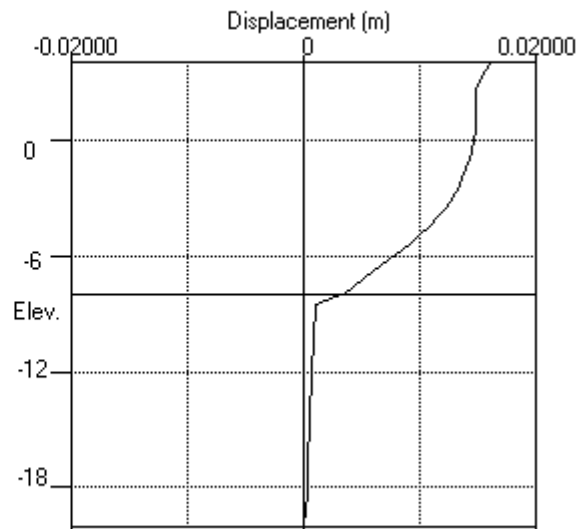
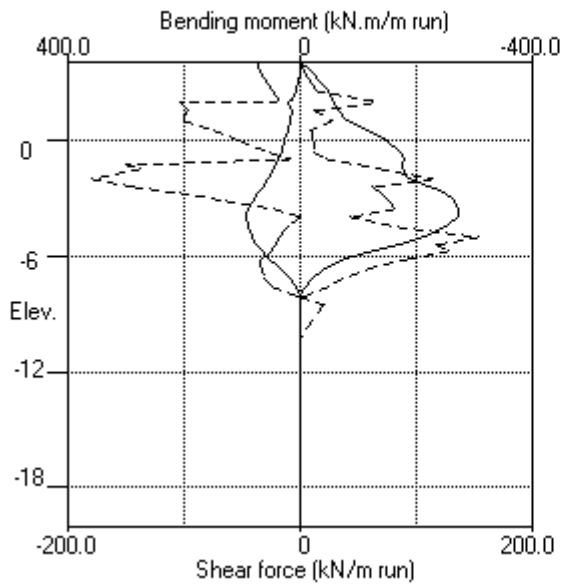
Stage no.	--- Strut no. 4 --- at elev.-2.00		--- Strut no. 5 --- at elev. 1.00		--- Strut no. 6 --- at elev. 4.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
12	160.48	160.48	---	---	---	---
15	163.83	163.83	84.73	84.73	37.58	37.58
16	180.89	180.89	82.02	82.02	28.58	28.58
17	294.49	294.49	128.24	128.24	33.34	33.34

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Albert Street Development
Section 1

| Sheet No.
| Job No. B01493
| Made by : DJC
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| Date:16-11-2022
| Checked :

Units: kN,m

Bending moment, shear force, displacement envelopes



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
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Data filename/Run ID: Section_2	
Albert Street Development	Date:16-11-2022
Section 2	Checked :

Units: kN,m

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	Soil types	
		Left side	Right side
1	4.00	1 FL	1 FL
2	2.40	2 AL F	2 AL F
3	-5.00	4 RS F	4 RS F
4	-9.60	5 NFG 5	5 NFG 5
5	-10.80	6 NFG 3	6 NFG 3

SOIL PROPERTIES

-- Soil type --	Bulk density	Young's Modulus	At rest coeff.	Consol state.	Active limit	Passive limit	Cohesion
No. Description (Datum elev.)	kN/m3	Eh, kN/m2 (dEh/dy)	Ko (dKo/dy)	NC/OC (Nu)	Ka (Kac)	Kp (Kpc)	kN/m2 (dc/dy)
1 FL	17.00	10000	0.700	OC (0.300)	0.309 (0.000)	3.868 (0.000)	
2 AL F (2.40)	17.00	5000 (500.0)	0.700	OC (0.300)	0.351 (1.391)	3.442 (5.007)	4.000d
3 Not defined							
4 RS F	20.00	30000	1.000	OC (0.300)	0.283 (1.241)	4.369 (5.836)	10.00d
5 NFG 5	23.00	50000	1.000	OC (0.300)	0.292 (1.226)	4.369 (5.836)	20.00d
6 NFG 3	27.00	1000000	1.000	OC (0.200)	0.146 (0.854)	13.89 (12.886)	250.0d

Additional soil parameters associated with Ka and Kp

----- Soil type -----	--- parameters for Ka ---			--- parameters for Kp ---		
	Soil friction	Wall adhesion	Back-fill	Soil friction	Wall adhesion	Back-fill
No. Description	angle	coeff.	angle	angle	coeff.	angle
1 FL	28.00	0.670	0.00	28.00	0.500	0.00
2 AL F	25.00	0.670	0.00	26.00	0.500	0.00
3 Not defined						
4 RS F	30.00	0.670	0.00	30.00	0.500	0.00
5 NFG 5	30.00	0.500	0.00	30.00	0.500	0.00
6 NFG 3	45.00	0.500	0.00	45.00	0.500	0.00

GROUND WATER CONDITIONS

Density of water = 10.00 kN/m3

	Left side	Right side
Initial water table elevation	-4.00	-4.00

Automatic water pressure balancing at toe of wall : No

Water press.	Left side				Right side			
profile	Point no.	Elev. m	Piezo elev. m	Water press. kN/m2	Point no.	Elev. m	Piezo elev. m	Water press. kN/m2
	1	4.00	4.00	0.0	1	-5.00	-5.00	0.0
	2	-4.00	-4.00	0.0	1	-5.00	-5.00	0.0

WALL PROPERTIES

Type of structure = Soldier Pile Wall
 Soldier Pile width = 0.90 m
 Soldier Pile spacing = 1.80 m
 Passive mobilisation factor = 3.00
 Elevation of toe of wall = -8.00
 Maximum finite element length = 0.60 m
 Youngs modulus of wall E = 3.2000E+07 kN/m2
 Moment of inertia of wall I = 0.017889 m4/m run
 = 0.032200 m4 per pile
 E.I = 572444 kN.m2/m run
 Yield Moment of wall = Not defined

STRUTS and ANCHORS

Prop no.	Prop Elev.	Prop spacing m	Cross- section area sq.m	Youngs modulus kN/m2	Free length m	Inclin -ation (degs)	Pre- stress /prop kN	Strut or Anchor	Allow tension ?	L/R
1	2.00	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
2	-1.30	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
3	-5.00	1.00	0.150000	3.280E+07	20.00	0.00	0	Strut	Yes	R
4	-2.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
5	4.00	1.00	0.400000	3.280E+07	20.00	0.00	0	Strut	Yes	R

HORIZONTAL and MOMENT LOADS/RESTRAINTS

Load no.	Elevation	Horizontal load kN/m run	Moment load kN.m/m run	Moment restraint kN.m/m/rad	Partial factor (Category)
1	2.90	13.00	0	0	N/A
2	2.90	-13.00	0	0	N/A

SURCHARGE LOADS

Surch -arge no.	Distance from wall	Length parallel to wall	Width perpend. to wall	Surcharge ----- kN/m2 -----		Equiv. soil type	Partial factor/ Category
	Elev.			Near edge	Far edge		
1	4.00	3.00(L)	100.00	100.00	25.00 =	N/A	N/A

Note: L = Left side, R = Right side

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Apply surcharge no.1 at elevation 4.00
2	Excavate to elevation 2.00 on RIGHT side
3	Install strut or anchor no.1 at elevation 2.00
4	Excavate to elevation -1.50 on RIGHT side
5	Install strut or anchor no.2 at elevation -1.30
6	Apply water pressure profile no.2
7	Excavate to elevation -5.00 on RIGHT side
8	Apply load no.1 at elevation 2.90
9	Apply load no.2 at elevation 2.90
10	Install strut or anchor no.3 at elevation -5.00
11	Install strut or anchor no.4 at elevation -2.00
12	Remove strut or anchor no.2 at elevation -1.30
13	Install strut or anchor no.5 at elevation 4.00
14	Remove strut or anchor no.1 at elevation 2.00
15	Change EI of wall to 400788 kN.m2/m run Allow wall to relax with new modulus value
16	Apply water pressure profile no.1

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:

Method of analysis - Burland-Potts

Factor on passive for calculating wall depth = 1.50

Parameters for undrained strata:

Minimum equivalent fluid density = 5.00 kN/m³

Maximum depth of water filled tension crack = 0.00 m

Bending moment and displacement calculation:

Method - 2-D finite element model

Open Tension Crack analysis? - No

Active limit arching modelled? - Yes

Non-linear Modulus Parameter (L) = 9.000 m

Boundary conditions:

Length of wall (normal to plane of analysis) = 60.00 m

Width of excavation on Left side of wall = 40.00 m

Width of excavation on Right side of wall = 40.00 m

Distance to rigid boundary on Left side = 30.00 m

Distance to rigid boundary on Right side = 20.00 m

Elevation of rigid lower boundary = -20.00

Lower rigid boundary at elevation -20.00 - Rough

Rigid boundary on Left side - Rough

Rigid boundary on Right side - Smooth

Wall / soil interface - Rough

OUTPUT OPTIONS

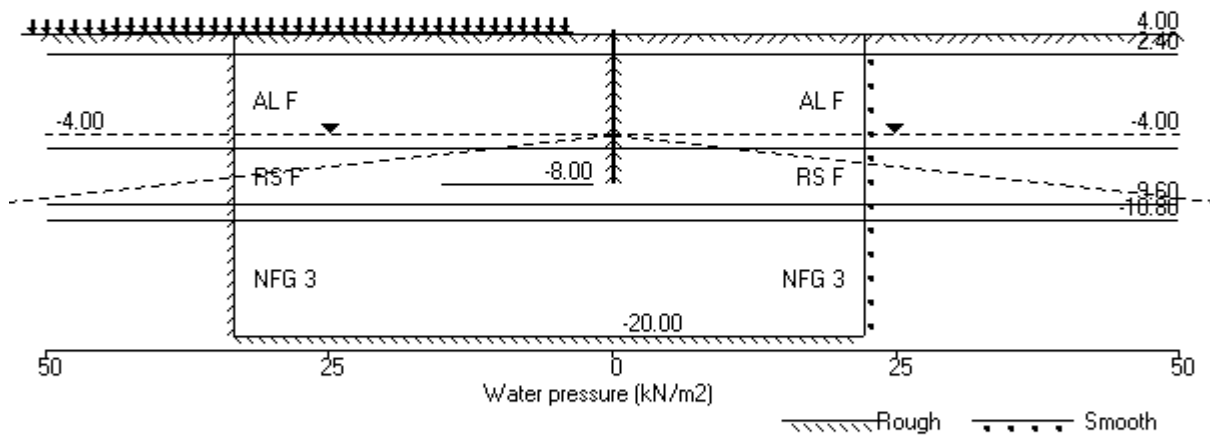
Stage no.	Stage description	Displacement Bending mom. Shear force	Active, Passive pressures	Graph. output
1	Apply surcharge no.1 at elev. 4.00	Yes	Yes	Yes
2	Excav. to elev. 2.00 on RIGHT side	Yes	Yes	Yes
3	Install prop no.1 at elev. 2.00	Yes	Yes	Yes
4	Excav. to elev. -1.50 on RIGHT side	Yes	Yes	Yes
5	Install prop no.2 at elev. -1.30	Yes	Yes	Yes
6	Apply water pressure profile no.2	Yes	Yes	Yes
7	Excav. to elev. -5.00 on RIGHT side	Yes	Yes	Yes
8	Apply load no.1 at elev. 2.90	Yes	Yes	Yes
9	Apply load no.2 at elev. 2.90	Yes	Yes	Yes
10	Install prop no.3 at elev. -5.00	Yes	Yes	Yes
11	Install prop no.4 at elev. -2.00	Yes	Yes	Yes
12	Remove prop no.2 at elev. -1.30	Yes	Yes	Yes
13	Install prop no.5 at elev. 4.00	Yes	Yes	Yes
14	Remove prop no.1 at elev. 2.00	Yes	Yes	Yes
15	Change EI of wall to 400788kN.m ² /m run	Yes	Yes	Yes
16	Apply water pressure profile no.1	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

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Albert Street Development
Section 2

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Units: kN,m

Stage No. 1 Apply surcharge no.1 at elevation 4.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe		Toe elev. for			
			elev. = -8.00		FoS = 1.500			
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>	
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	
				<u>Safety</u>	<u>at elev.</u>	<u>-ation</u>	<u>of</u>	
				<u>Conditions not</u>	<u>suitable for</u>	<u>FoS calc.</u>	<u>failure</u>	
1	4.00	4.00	---					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.001	-2.86E-05	0.0	0.0		572444
2	3.45	-2.96	0.001	-2.86E-05	-0.8	0.0		572444
3	2.90	-2.32	0.001	-2.81E-05	-2.3	-0.9		572444
4	2.40	-1.75	0.001	-2.67E-05	-3.3	-2.3		572444
		-0.62	0.001	-2.67E-05	-3.3	-2.3		
5	2.00	-0.63	0.001	-2.47E-05	-3.5	-3.7		572444
6	1.60	-0.39	0.001	-2.16E-05	-3.7	-5.1		572444
7	1.20	-0.11	0.001	-1.75E-05	-3.8	-6.6		572444
8	0.60	0.40	0.001	-9.41E-06	-3.8	-8.9		572444
9	0.00	0.85	0.001	1.04E-06	-3.4	-11.0		572444
10	-0.60	1.29	0.001	1.35E-05	-2.7	-12.9		572444
11	-0.95	1.47	0.001	2.17E-05	-2.3	-13.8		572444
12	-1.30	1.68	0.001	3.03E-05	-1.7	-14.5		572444
13	-1.50	1.73	0.001	3.54E-05	-1.4	-14.8		572444
14	-2.00	2.02	0.001	4.85E-05	-0.4	-15.2		572444
15	-2.50	2.23	0.001	6.18E-05	0.6	-15.2		572444
16	-3.00	2.42	0.001	7.47E-05	1.8	-14.6		572444
17	-3.50	2.57	0.001	8.69E-05	3.0	-13.3		572444
18	-4.00	2.66	0.001	9.78E-05	4.4	-11.5		572444
19	-4.50	2.53	0.001	1.06E-04	5.7	-9.0		572444
20	-5.00	2.17	0.001	1.13E-04	6.8	-5.8		572444
		-8.29	0.001	1.13E-04	6.8	-5.8		
21	-5.50	-3.80	0.001	1.17E-04	3.8	-3.4		572444
22	-6.00	-2.17	0.001	1.19E-04	2.3	-2.0		572444
23	-6.60	-1.21	0.001	1.21E-04	1.3	-1.0		572444
24	-7.20	-0.63	0.001	1.21E-04	0.7	-0.4		572444
25	-7.60	-0.55	0.001	1.22E-04	0.5	-0.2		572444
26	-8.00	-1.46	0.001	1.22E-04	0.1	-0.0		0
27	-8.15	-0.09	0.001	0	-0.0	0.0		0
28	-9.60	1.81	0.000	0	1.2	0.0		0
		-2.13	0.000	0	1.2	0.0		
29	-10.80	7.44	0.000	0	4.4	0.0		0
		-4.96	0.000	0	4.4	0.0		

(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	-0.00	0.000	0	-0.0	0.0		0
32	-16.80	0.01	0.000	0	-0.0	0.0		0
33	-18.40	0.00	0.000	0	-0.0	0.0		0
34	-20.00	0.01	0.000	0	-0.0	0.0		---

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u>	<u>Adjusted soil modulus</u>
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2	<u>pressure</u> kN/m2	<u>soil modulus</u> kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	5.12	5.12	9974
3	2.90	0.00	19.15	5.92	74.07	12.07	12.07	9974
4	2.40	0.00	28.39	8.77	109.82	18.46	18.46	9974
		0.00	28.39	4.41	117.75	19.01	19.01	4987
5	2.00	0.00	36.01	7.09	143.99	23.94	23.94	5187
6	1.60	0.00	43.77	9.81	170.71	29.03	29.03	5386
7	1.20	0.00	51.61	12.56	197.69	34.15	34.15	5586
8	0.60	0.00	63.39	16.70	238.25	41.88	41.88	5885
9	0.00	0.00	75.11	20.82	278.59	49.57	49.57	6184
10	-0.60	0.00	86.71	24.90	318.51	57.23	57.23	6483
11	-0.95	0.00	93.41	27.25	341.58	61.65	61.65	6658
12	-1.30	0.00	100.07	29.59	364.48	66.07	66.07	6832
13	-1.50	0.00	103.85	30.91	377.50	68.56	68.56	6932
14	-2.00	0.00	113.24	34.21	409.82	74.84	74.84	7181
15	-2.50	0.00	122.54	37.48	441.84	81.07	81.07	7431
16	-3.00	0.00	131.77	40.72	473.60	87.27	87.27	7680
17	-3.50	0.00	140.92	43.94	505.11	93.43	93.43	7929
18	-4.00	0.00	150.02	47.13	536.42	99.55	99.55	8179
19	-4.50	5.00	154.05	48.55	550.32	102.06	107.06	8428
20	-5.00	10.00	158.05	49.95	564.06	104.42	114.42	8678
		10.00	158.05	32.37	748.92	142.11	152.11	29922
21	-5.50	15.00	163.49	33.91	772.72	149.46	164.46	29922
22	-6.00	20.00	168.90	35.44	796.35	155.37	175.37	29922
23	-6.60	26.00	175.34	37.27	824.51	161.94	187.94	29922
24	-7.20	32.00	181.75	39.08	852.48	168.31	200.31	29922
25	-7.60	36.00	185.99	40.29	871.02	172.41	208.41	29922
26	-8.00	40.00	190.22	41.49	889.50	175.98	215.98	29922
27	-8.15	41.50	191.80	41.93	896.42	178.20	219.70	29922
28	-9.60	56.00	207.00	46.24	962.83	193.78	249.78	29922
		56.00	207.00	35.98	1021.19	191.82	247.82	49871
29	-10.80	68.00	223.07	40.67	1091.40	212.28	280.28	49871
		68.00	223.07	0.00	6319.03	204.54	272.54	997417
30	-12.60	86.00	254.23	0.00	6751.68	237.69	323.69	997417
31	-14.40	104.00	285.25	0.00	7182.41	268.33	372.33	997417
32	-16.80	128.00	326.44	0.00	7754.42	309.16	437.16	997417
33	-18.40	144.00	353.82	0.00	8134.61	336.36	480.36	997417
34	-20.00	160.00	381.14	0.00	8514.03	364.09	524.09	997417

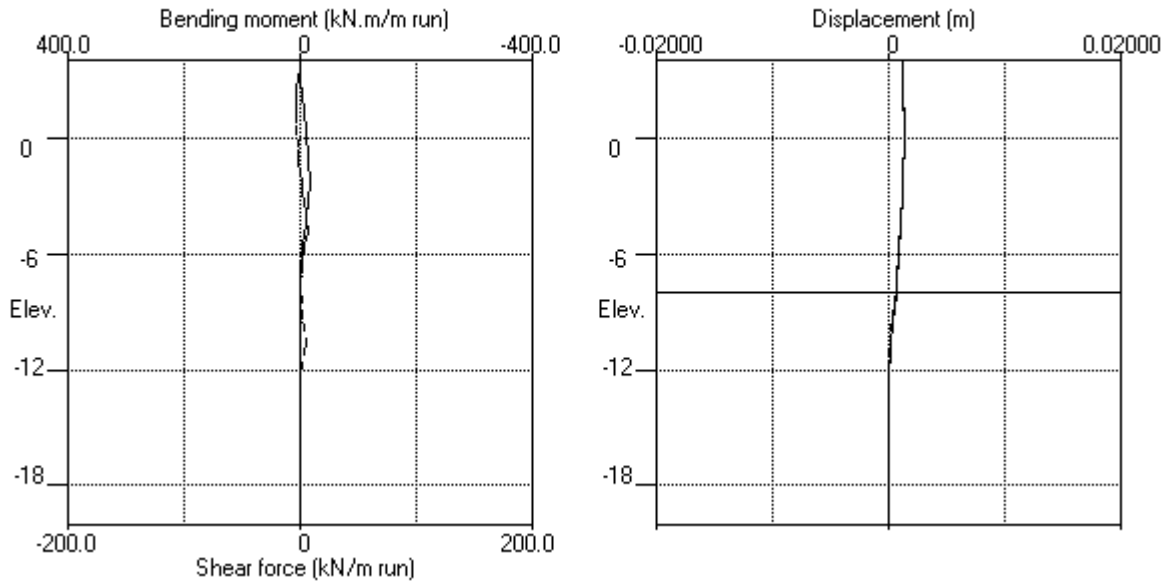
(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

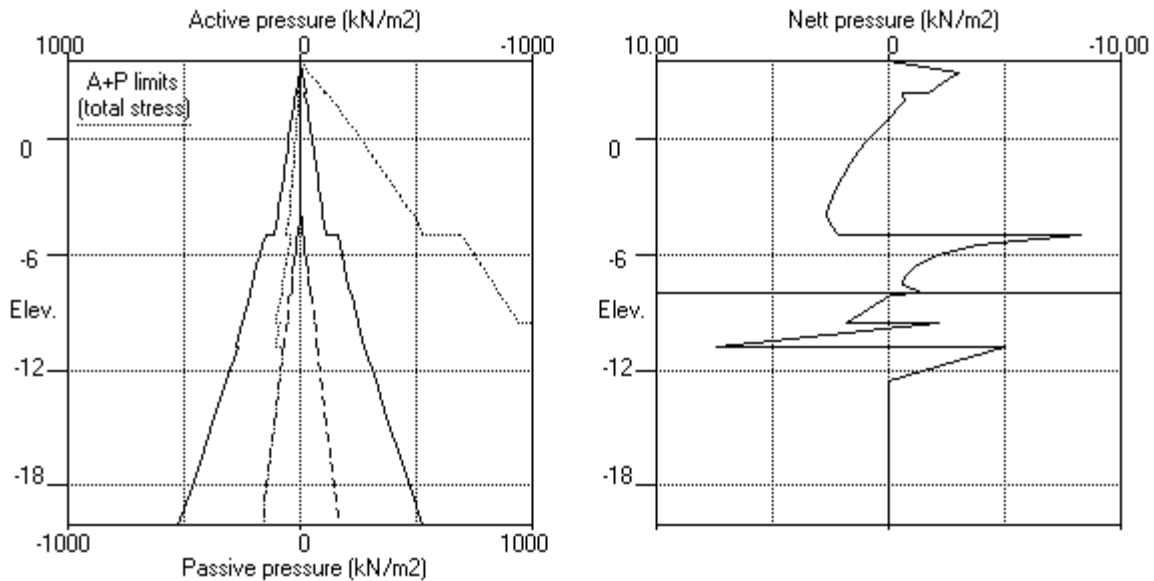
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective stresses</u>		<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9951
2	3.45	0.00	9.35	2.89	36.17	8.09	8.09	9951
3	2.90	0.00	18.70	5.78	72.34	14.39	14.39	9951
4	2.40	0.00	27.20	8.41	105.22	20.21	20.21	9951
		0.00	27.20	3.99	113.66	19.63	19.63	4976
5	2.00	0.00	34.00	6.38	137.07	24.57	24.57	5175
6	1.60	0.00	40.80	8.77	160.47	29.41	29.41	5374
7	1.20	0.00	47.60	11.16	183.88	34.26	34.26	5573
8	0.60	0.00	57.80	14.74	218.99	41.48	41.48	5871
9	0.00	0.00	68.00	18.32	254.10	48.72	48.72	6170
10	-0.60	0.00	78.20	21.91	289.21	55.94	55.94	6468
11	-0.95	0.00	84.15	24.00	309.69	60.18	60.18	6643
12	-1.30	0.00	90.10	26.09	330.17	64.39	64.39	6817
13	-1.50	0.00	93.50	27.28	341.88	66.82	66.82	6916
14	-2.00	0.00	102.00	30.27	371.14	72.82	72.82	7165
15	-2.50	0.00	110.50	33.25	400.40	78.84	78.84	7414
16	-3.00	0.00	119.00	36.24	429.66	84.85	84.85	7663
17	-3.50	0.00	127.50	39.22	458.91	90.86	90.86	7911
18	-4.00	0.00	136.00	42.21	488.17	96.90	96.90	8160
19	-4.50	5.00	139.50	43.44	500.22	99.53	104.53	8409
20	-5.00	10.00	143.00	44.67	512.27	102.24	112.24	8658
		10.00	143.00	28.11	683.18	150.40	160.40	29854
21	-5.50	15.00	148.00	29.52	705.03	153.27	168.27	29854
22	-6.00	20.00	153.00	30.94	726.88	157.54	177.54	29854
23	-6.60	26.00	159.00	32.64	753.09	163.15	189.15	29854
24	-7.20	32.00	165.00	34.34	779.31	168.94	200.94	29854
25	-7.60	36.00	169.00	35.47	796.79	172.96	208.96	29854
26	-8.00	40.00	173.00	36.61	814.26	177.43	217.43	29854
27	-8.15	41.50	174.50	37.03	820.82	178.29	219.79	29854
28	-9.60	56.00	189.00	41.14	884.17	191.97	247.97	29854
		56.00	189.00	30.72	942.53	193.95	249.95	49757
29	-10.80	68.00	204.60	35.28	1010.70	204.84	272.84	49757
		68.00	204.60	0.00	6062.55	209.50	277.50	995147
30	-12.60	86.00	235.20	0.00	6487.46	237.68	323.68	995147
31	-14.40	104.00	265.80	0.00	6912.37	268.33	372.33	995147
32	-16.80	128.00	306.60	0.00	7478.92	309.15	437.15	995147
33	-18.40	144.00	333.80	0.00	7856.61	336.36	480.36	995147
34	-20.00	160.00	361.00	0.00	8234.31	364.08	524.08	995147

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Stage No.1 Apply surcharge no.1 at elev. 4.00

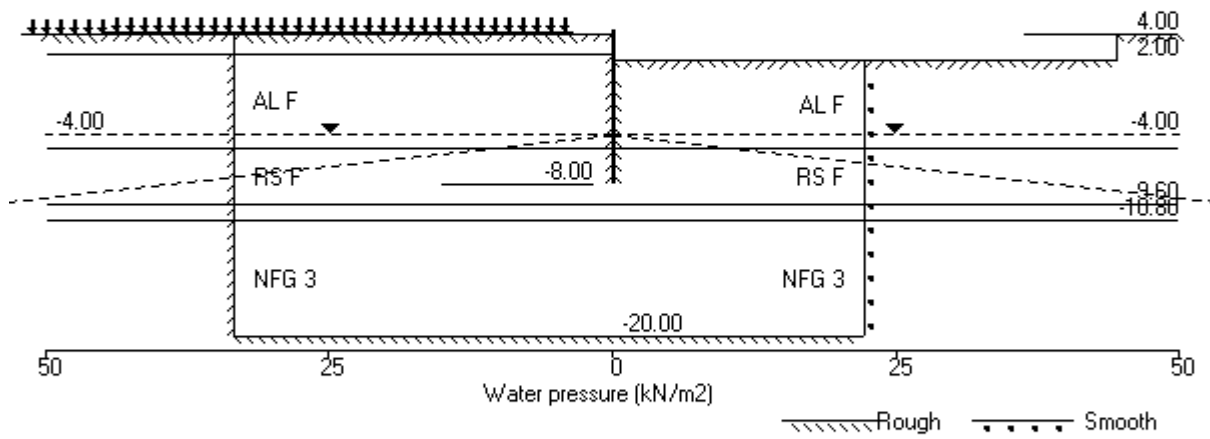


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_2
 Albert Street Development
 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DJC
Data filename/Run ID: Section_2	
Albert Street Development	Date:16-11-2022
Section 2	Checked :

Units: kN,m

Stage No. 2 Excavate to elevation 2.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
2	4.00	2.00	Cant.	11.615	-6.43	0.43	1.57	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.016	1.43E-03	0.0	-0.0		572444
2	3.45	2.91	0.016	1.43E-03	0.8	0.4		572444
3	2.90	5.92	0.015	1.42E-03	3.2	1.6		572444
4	2.40	8.77	0.014	1.42E-03	6.9	4.2		572444
		12.27	0.014	1.42E-03	6.9	4.2		
5	2.00	15.81	0.014	1.42E-03	12.5	8.1		572444
		-4.22	0.014	1.42E-03	12.5	8.1		
6	1.60	-8.87	0.013	1.41E-03	9.9	12.8		572444
7	1.20	-5.76	0.012	1.40E-03	7.0	16.0		572444
8	0.60	-3.63	0.012	1.38E-03	4.2	19.2		572444
9	0.00	-1.93	0.011	1.36E-03	2.5	21.1		572444
10	-0.60	-0.55	0.010	1.34E-03	1.7	22.3		572444
11	-0.95	0.24	0.009	1.32E-03	1.7	22.9		572444
12	-1.30	0.90	0.009	1.31E-03	1.9	23.5		572444
13	-1.50	1.32	0.009	1.30E-03	2.1	23.9		572444
14	-2.00	2.16	0.008	1.28E-03	3.0	25.1		572444
15	-2.50	2.92	0.007	1.26E-03	4.3	26.9		572444
16	-3.00	3.53	0.007	1.23E-03	5.9	29.4		572444
17	-3.50	3.91	0.006	1.21E-03	7.7	32.8		572444
18	-4.00	3.85	0.006	1.17E-03	9.7	37.2		572444
19	-4.50	2.47	0.005	1.14E-03	11.2	42.5		572444
20	-5.00	-0.80	0.004	1.10E-03	11.7	48.4		572444
		-54.14	0.004	1.10E-03	11.7	48.4		
21	-5.50	-25.33	0.004	1.06E-03	-8.2	47.5		572444
22	-6.00	-12.19	0.003	1.02E-03	-17.6	40.2		572444
23	-6.60	-2.96	0.003	9.89E-04	-22.1	27.5		572444
24	-7.20	5.24	0.002	9.67E-04	-21.4	13.7		572444
25	-7.60	16.19	0.002	9.61E-04	-17.2	5.6		572444
26	-8.00	50.59	0.001	9.59E-04	-3.8	-0.0		0
27	-8.15	-0.08	0.002	0	-0.0	0.0		0
28	-9.60	5.15	0.001	0	3.7	0.0		0
		-6.18	0.001	0	3.7	0.0		

(continued)

Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-10.80	20.96 -13.97	0.000	0	12.5	0.0		0
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.01	0.000	0	-0.0	0.0		0
32	-16.80	0.01	0.000	0	0.0	0.0		0
33	-18.40	0.00	0.000	0	0.0	0.0		0
34	-20.00	-0.01	0.000	0	0.0	0.0		---

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	2.91	2.91a	9974
3	2.90	0.00	19.15	5.92	74.07	5.92	5.92a	9974
4	2.40	0.00	28.39	8.77	109.82	8.77	8.77a	9974
		0.00	28.39	4.41	117.75	12.27	12.27	4987
5	2.00	0.00	36.01	7.09	143.99	15.81	15.81	5187
6	1.60	0.00	43.77	9.81	170.71	20.70	20.70	5386
7	1.20	0.00	51.61	12.56	197.69	25.90	25.90	5586
8	0.60	0.00	63.39	16.70	238.25	33.85	33.85	5885
9	0.00	0.00	75.11	20.82	278.59	41.81	41.81	6184
10	-0.60	0.00	86.71	24.90	318.51	49.75	49.75	6483
11	-0.95	0.00	93.41	27.25	341.58	54.36	54.36	6658
12	-1.30	0.00	100.07	29.59	364.48	58.95	58.95	6832
13	-1.50	0.00	103.85	30.91	377.50	61.56	61.56	6932
14	-2.00	0.00	113.24	34.21	409.82	68.06	68.06	7181
15	-2.50	0.00	122.54	37.48	441.84	74.50	74.50	7431
16	-3.00	0.00	131.77	40.72	473.60	80.86	80.86	7680
17	-3.50	0.00	140.92	43.94	505.11	87.09	87.09	7929
18	-4.00	0.00	150.02	47.13	536.42	93.11	93.11	8179
19	-4.50	5.00	154.05	48.55	550.32	94.97	99.97	8428
20	-5.00	10.00	158.05	49.95	564.06	95.76	105.76	8678
		10.00	158.05	32.37	748.92	112.24	122.24	29922
21	-5.50	15.00	163.49	33.91	772.72	131.85	146.85	29922
22	-6.00	20.00	168.90	35.44	796.35	143.46	163.46	29922
23	-6.60	26.00	175.34	37.27	824.51	154.12	180.12	29922
24	-7.20	32.00	181.75	39.08	852.48	164.25	196.25	29922
25	-7.60	36.00	185.99	40.29	871.02	173.67	209.67	29922
26	-8.00	40.00	190.22	41.49	889.50	195.83	235.83	29922
27	-8.15	41.50	191.80	41.93	896.42	170.92	212.42	29922
28	-9.60	56.00	207.00	46.24	962.83	188.34	244.34	29922
		56.00	207.00	35.98	1021.19	182.75	238.75	49871
29	-10.80	68.00	223.07	40.67	1091.40	211.87	279.87	49871
		68.00	223.07	0.00	6319.03	196.27	264.27	997417
30	-12.60	86.00	254.23	0.00	6751.68	233.96	319.96	997417
31	-14.40	104.00	285.25	0.00	7182.41	264.58	368.58	997417
32	-16.80	128.00	326.44	0.00	7754.42	305.36	433.36	997417
33	-18.40	144.00	353.82	0.00	8134.61	332.50	476.50	997417
34	-20.00	160.00	381.14	0.00	8514.03	361.05	521.05	997417

(continued)

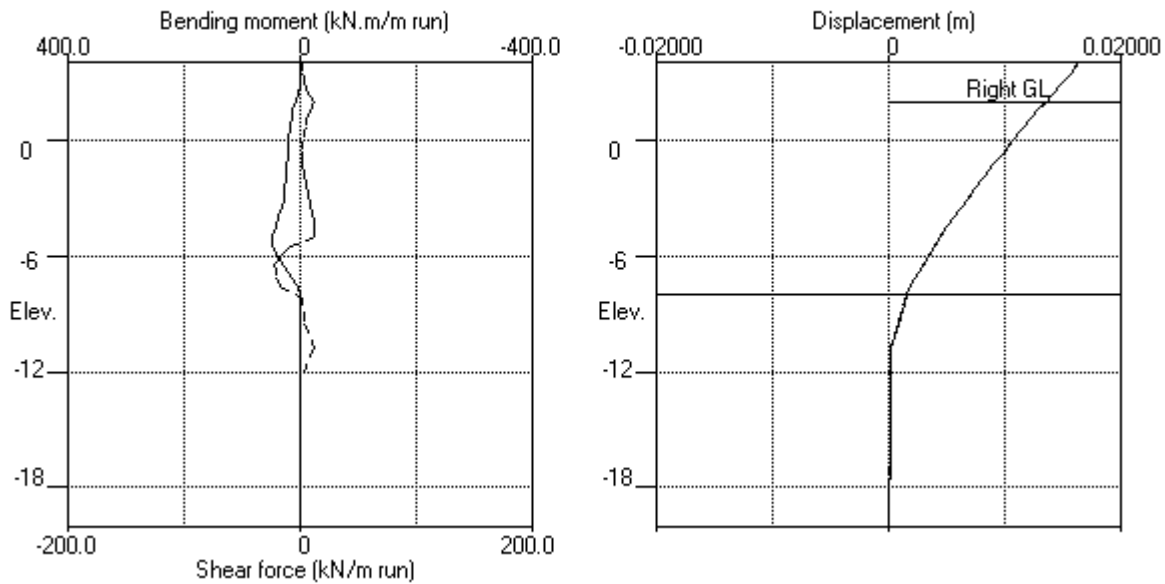
Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	5178
6	1.60	0.00	6.80	0.00	43.44	29.57	29.57	5377
7	1.20	0.00	13.60	0.00	66.84	31.66	31.66	5576
8	0.60	0.00	23.80	2.80	101.96	37.48	37.48	5875
9	0.00	0.00	34.00	6.38	137.07	43.74	43.74	6173
10	-0.60	0.00	44.20	9.96	172.19	50.30	50.30	6472
11	-0.95	0.00	50.16	12.05	192.68	54.13	54.13	6646
12	-1.30	0.00	56.11	14.14	213.17	58.05	58.05	6821
13	-1.50	0.00	59.51	15.34	224.88	60.24	60.24	6920
14	-2.00	0.00	68.01	18.33	254.15	65.90	65.90	7169
15	-2.50	0.00	76.52	21.31	283.43	71.58	71.58	7418
16	-3.00	0.00	85.03	24.30	312.71	77.33	77.33	7667
17	-3.50	0.00	93.54	27.29	342.00	83.18	83.18	7916
18	-4.00	0.00	102.05	30.28	371.30	89.25	89.25	8165
19	-4.50	5.00	105.56	31.52	383.39	92.50	97.50	8414
20	-5.00	10.00	109.07	32.75	395.49	96.56	106.56	8663
		10.00	109.07	18.49	534.95	166.38	176.38	29871
21	-5.50	15.00	114.09	19.91	556.87	157.18	172.18	29871
22	-6.00	20.00	119.11	21.34	578.80	155.65	175.65	29871
23	-6.60	26.00	125.14	23.04	605.13	157.07	183.07	29871
24	-7.20	32.00	131.17	24.75	631.47	159.01	191.01	29871
25	-7.60	36.00	135.19	25.89	649.04	157.47	193.47	29871
26	-8.00	40.00	139.21	27.03	666.62	145.24	185.24	29871
27	-8.15	41.50	140.72	27.46	673.21	170.99	212.49	29871
28	-9.60	56.00	155.32	31.60	737.01	183.18	239.18	29871
		56.00	155.32	20.87	795.37	188.93	244.93	49786
29	-10.80	68.00	171.02	25.46	863.97	190.91	258.91	49786
		68.00	171.02	0.00	5596.27	210.24	278.24	995713
30	-12.60	86.00	201.80	0.00	6023.72	233.95	319.95	995713
31	-14.40	104.00	232.62	0.00	6451.70	264.57	368.57	995713
32	-16.80	128.00	273.78	0.00	7023.14	305.35	433.35	995713
33	-18.40	144.00	301.25	0.00	7404.60	332.50	476.50	995713
34	-20.00	160.00	328.74	0.00	7786.41	361.07	521.07	995713

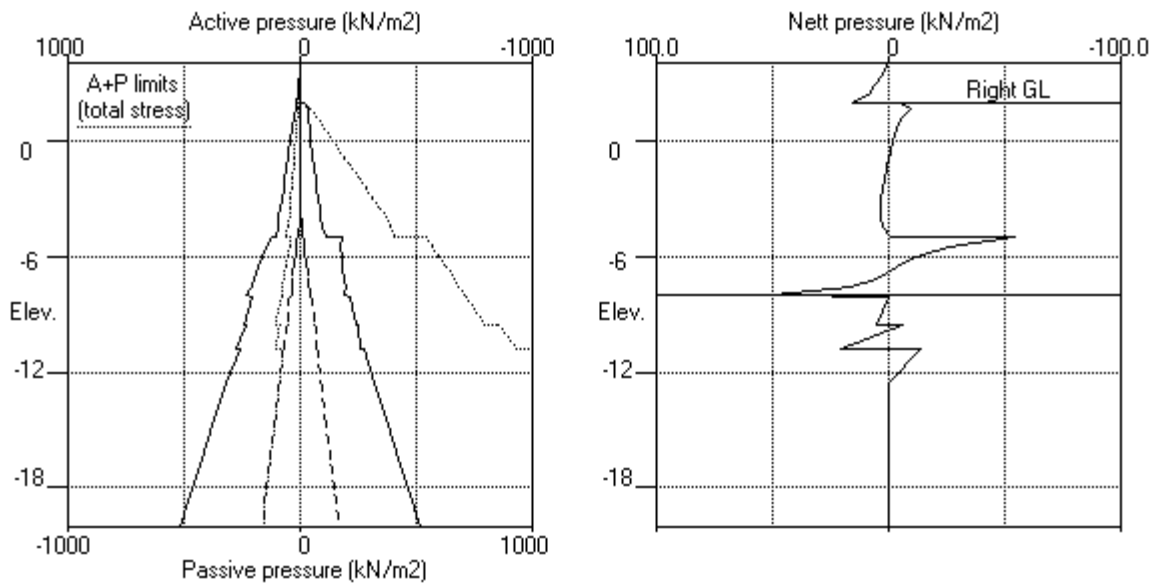
Note: 8.77 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Stage No.2 Excav. to elev. 2.00 on RIGHT side

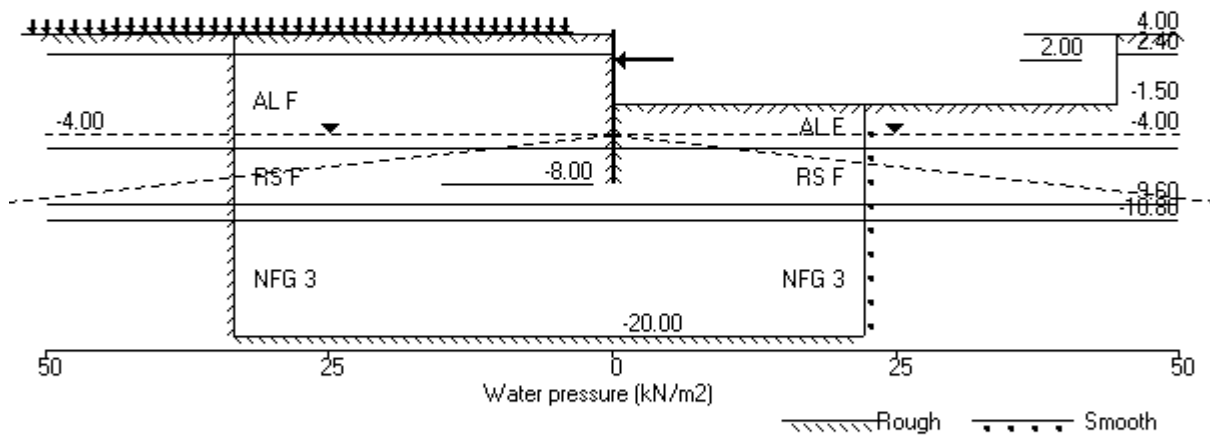


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 Albert Street Development
 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Units: kN,m

Stage No. 4 Excavate to elevation -1.50 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
4	4.00	-1.50	2.00	6.952	n/a	-3.40	1.90	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.016	2.21E-04	0.0	-0.0		572444
2	3.45	7.85	0.016	2.21E-04	2.2	0.4		572444
3	2.90	8.17	0.015	2.19E-04	6.6	3.1		572444
4	2.40	8.92	0.015	2.14E-04	10.8	7.7		572444
		12.35	0.015	2.14E-04	10.8	7.7		
5	2.00	15.34	0.015	2.07E-04	16.4	13.1	-121.1	572444
		15.34	0.015	2.07E-04	-104.7	13.1		
6	1.60	19.61	0.015	2.12E-04	-97.7	-27.3		572444
7	1.20	23.94	0.015	2.44E-04	-89.0	-64.7		572444
8	0.60	30.85	0.015	3.37E-04	-72.6	-113.4		572444
9	0.00	37.66	0.015	4.76E-04	-52.0	-151.0		572444
10	-0.60	44.69	0.014	6.47E-04	-27.3	-175.0		572444
11	-0.95	48.59	0.014	7.56E-04	-11.0	-181.7		572444
12	-1.30	52.76	0.014	8.67E-04	6.7	-182.5		572444
13	-1.50	54.92	0.014	9.31E-04	17.5	-180.1		572444
		34.89	0.014	9.31E-04	17.5	-180.1		
14	-2.00	14.00	0.013	1.08E-03	29.7	-167.6		572444
15	-2.50	14.12	0.013	1.22E-03	36.8	-150.9		572444
16	-3.00	13.98	0.012	1.34E-03	43.8	-130.8		572444
17	-3.50	13.70	0.011	1.44E-03	50.7	-107.1		572444
18	-4.00	12.92	0.010	1.53E-03	57.4	-80.0		572444
19	-4.50	10.04	0.010	1.58E-03	63.1	-49.7		572444
20	-5.00	4.34	0.009	1.61E-03	66.7	-16.9		572444
		-98.91	0.009	1.61E-03	66.7	-16.9		
21	-5.50	-50.05	0.008	1.62E-03	29.5	4.1		572444
22	-6.00	-29.46	0.007	1.61E-03	9.6	12.6		572444
23	-6.60	-15.69	0.006	1.60E-03	-4.0	13.0		572444
24	-7.20	-4.71	0.005	1.59E-03	-10.1	7.8		572444
25	-7.60	6.24	0.005	1.58E-03	-9.8	3.4		572444
26	-8.00	31.01	0.004	1.58E-03	-2.3	-0.0		0
27	-8.15	-0.07	0.004	0	-0.0	0.0		0
28	-9.60	11.07	0.002	0	8.0	0.0		0
		-13.32	0.002	0	8.0	0.0		

(continued)

Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-10.80	44.90	0.000	0	26.9	0.0		0
		-29.92	0.000	0	26.9	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.04	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	121.1	kN/m run		

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	7.85	7.85	9974
3	2.90	0.00	19.15	5.92	74.07	8.17	8.17	9974
4	2.40	0.00	28.39	8.77	109.82	8.92	8.92	9974
		0.00	28.39	4.41	117.75	12.35	12.35	4987
5	2.00	0.00	36.01	7.09	143.99	15.34	15.34	5187
6	1.60	0.00	43.77	9.81	170.71	19.61	19.61	5386
7	1.20	0.00	51.61	12.56	197.69	23.94	23.94	5586
8	0.60	0.00	63.39	16.70	238.25	30.85	30.85	5885
9	0.00	0.00	75.11	20.82	278.59	37.66	37.66	6184
10	-0.60	0.00	86.71	24.90	318.51	44.69	44.69	6483
11	-0.95	0.00	93.41	27.25	341.58	48.59	48.59	6658
12	-1.30	0.00	100.07	29.59	364.48	52.76	52.76	6832
13	-1.50	0.00	103.85	30.91	377.50	54.92	54.92	6932
14	-2.00	0.00	113.24	34.21	409.82	61.03	61.03	7181
15	-2.50	0.00	122.54	37.48	441.84	67.06	67.06	7431
16	-3.00	0.00	131.77	40.72	473.60	73.09	73.09	7680
17	-3.50	0.00	140.92	43.94	505.11	79.05	79.05	7929
18	-4.00	0.00	150.02	47.13	536.42	84.75	84.75	8179
19	-4.50	5.00	154.05	48.55	550.32	85.93	90.93	8428
20	-5.00	10.00	158.05	49.95	564.06	85.58	95.58	8678
		10.00	158.05	32.37	748.92	77.15	87.15	29922
21	-5.50	15.00	163.49	33.91	772.72	106.81	121.81	29922
22	-6.00	20.00	168.90	35.44	796.35	122.13	142.13	29922
23	-6.60	26.00	175.34	37.27	824.51	135.05	161.05	29922
24	-7.20	32.00	181.75	39.08	852.48	146.59	178.59	29922
25	-7.60	36.00	185.99	40.29	871.02	156.04	192.04	29922
26	-8.00	40.00	190.22	41.49	889.50	173.08	213.08	29922
27	-8.15	41.50	191.80	41.93	896.42	158.30	199.80	29922
28	-9.60	56.00	207.00	46.24	962.83	178.58	234.58	29922
		56.00	207.00	35.98	1021.19	166.49	222.49	49871
29	-10.80	68.00	223.07	40.67	1091.40	211.12	279.12	49871
		68.00	223.07	0.00	6319.03	181.26	249.26	997417
30	-12.60	86.00	254.23	0.00	6751.68	226.93	312.93	997417
31	-14.40	104.00	285.25	0.00	7182.41	257.55	361.55	997417
32	-16.80	128.00	326.44	0.00	7754.42	298.29	426.29	997417
33	-18.40	144.00	353.82	0.00	8134.61	325.42	469.42	997417
34	-20.00	160.00	381.14	0.00	8514.03	355.50	515.50	997417

(continued)

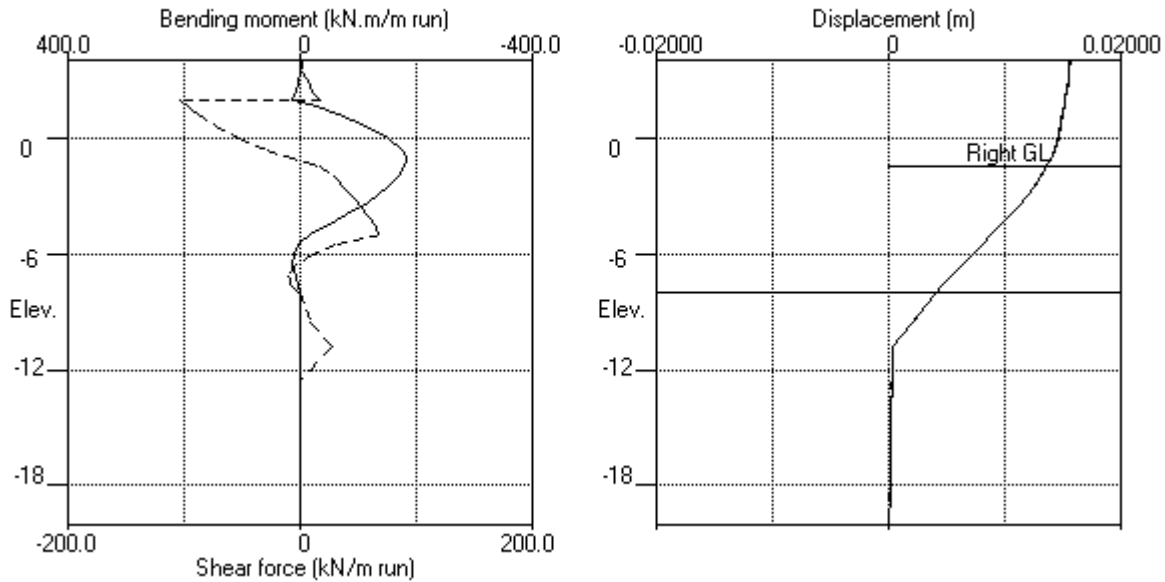
Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>modulus</u>
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	6927
14	-2.00	0.00	8.50	0.00	49.29	47.03	47.03	7176
15	-2.50	0.00	17.00	0.41	78.55	52.94	52.94	7426
16	-3.00	0.00	25.50	3.39	107.81	59.12	59.12	7675
17	-3.50	0.00	34.00	6.38	137.08	65.35	65.35	7924
18	-4.00	0.00	42.51	9.37	166.36	71.83	71.83	8173
19	-4.50	5.00	46.02	10.60	178.43	75.90	80.90	8422
20	-5.00	10.00	49.53	11.83	190.51	81.25	91.25	8672
		10.00	49.53	1.62	274.76	176.06	186.06	29902
21	-5.50	15.00	54.54	3.04	296.66	156.86	171.86	29902
22	-6.00	20.00	59.56	4.46	318.58	151.59	171.59	29902
23	-6.60	26.00	65.58	6.17	344.91	150.74	176.74	29902
24	-7.20	32.00	71.61	7.88	371.26	151.30	183.30	29902
25	-7.60	36.00	75.64	9.02	388.85	149.80	185.80	29902
26	-8.00	40.00	79.67	10.16	406.45	142.07	182.07	29902
27	-8.15	41.50	81.18	10.59	413.05	158.37	199.87	29902
28	-9.60	56.00	95.81	14.74	477.01	167.52	223.52	29902
		56.00	95.81	3.48	535.37	179.82	235.82	49836
29	-10.80	68.00	111.57	8.09	604.20	166.22	234.22	49836
		68.00	111.57	0.00	4770.72	211.18	279.18	996727
30	-12.60	86.00	142.48	0.00	5199.89	226.92	312.92	996727
31	-14.40	104.00	173.48	0.00	5630.44	257.53	361.53	996727
32	-16.80	128.00	214.98	0.00	6206.74	298.29	426.29	996727
33	-18.40	144.00	242.76	0.00	6592.37	325.41	469.41	996727
34	-20.00	160.00	270.61	0.00	6979.12	355.54	515.54	996727

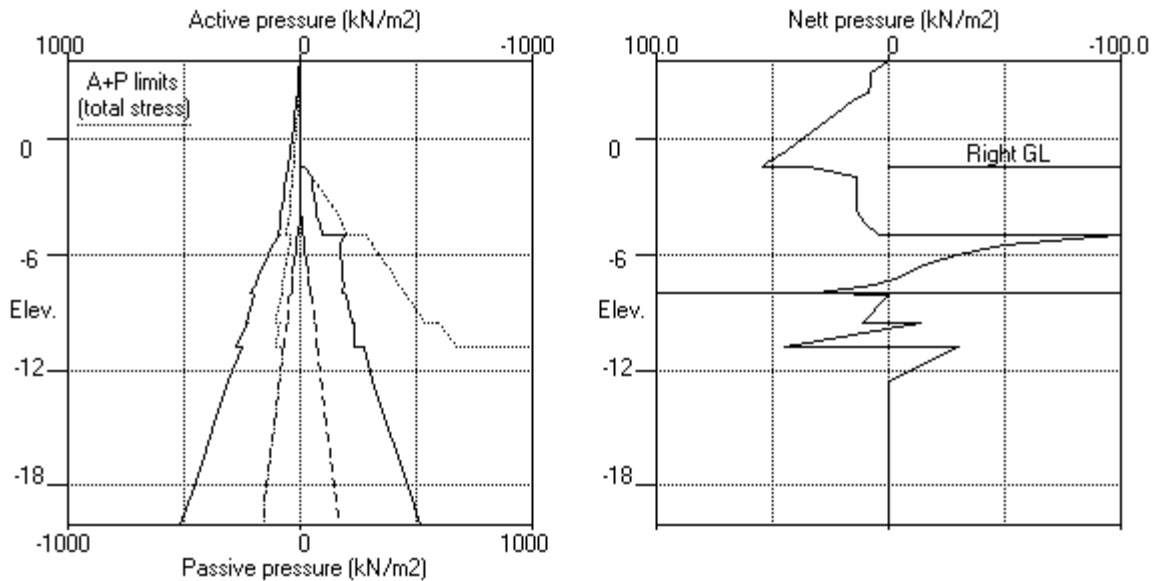
Note: 12.34 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Stage No.4 Excav. to elev. -1.50 on RIGHT side

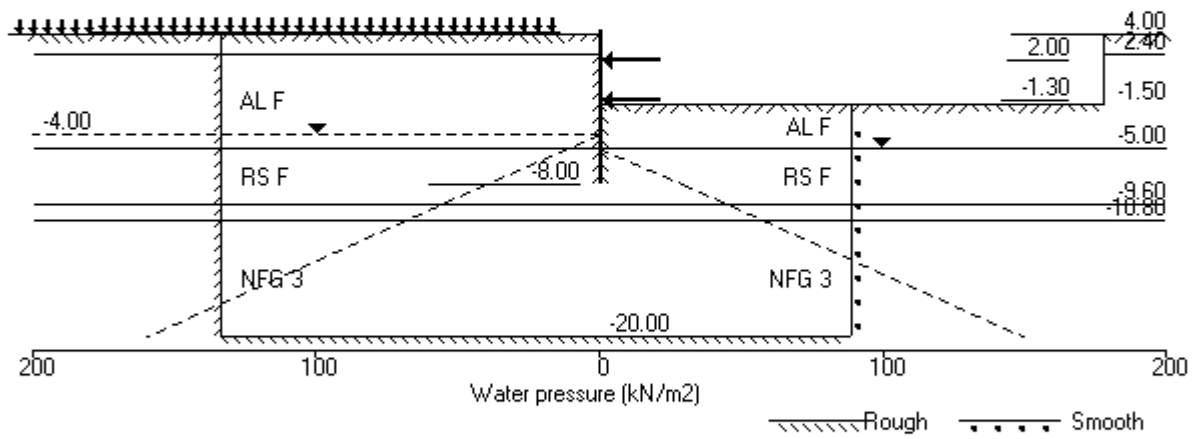


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 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Units: kN,m

Stage No. 6 Apply water pressure profile no.2

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>Penetr</u> <u>-ation</u>	
6	4.00	-1.50		More than one prop. No FoS calc.		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.016	1.96E-04	0.0	-0.0		572444
2	3.45	8.06	0.015	1.96E-04	2.2	0.4		572444
3	2.90	8.33	0.015	1.94E-04	6.7	3.2		572444
4	2.40	9.07	0.015	1.90E-04	11.1	7.8		572444
		12.42	0.015	1.90E-04	11.1	7.8		
5	2.00	15.42	0.015	1.82E-04	16.6	13.4	-119.2	572444
		15.42	0.015	1.82E-04	-102.6	13.4		
6	1.60	19.68	0.015	1.87E-04	-95.6	-26.1		572444
7	1.20	24.02	0.015	2.18E-04	-86.8	-62.7		572444
8	0.60	30.93	0.015	3.08E-04	-70.3	-110.1		572444
9	0.00	37.74	0.015	4.43E-04	-49.7	-146.3		572444
10	-0.60	44.75	0.014	6.08E-04	-25.0	-168.9		572444
11	-0.95	48.64	0.014	7.13E-04	-8.6	-174.9		572444
12	-1.30	52.81	0.014	8.20E-04	9.1	-174.8	-5.8	572444
		52.81	0.014	8.20E-04	3.3	-174.8		
13	-1.50	54.94	0.014	8.81E-04	14.0	-173.1		572444
		35.05	0.014	8.81E-04	14.0	-173.1		
14	-2.00	14.10	0.013	1.02E-03	26.3	-162.3		572444
15	-2.50	14.11	0.013	1.16E-03	33.4	-147.3		572444
16	-3.00	13.84	0.012	1.28E-03	40.4	-128.9		572444
17	-3.50	13.41	0.011	1.38E-03	47.2	-106.9		572444
18	-4.00	12.48	0.011	1.46E-03	53.7	-81.7		572444
19	-4.50	12.28	0.010	1.52E-03	59.8	-53.2		572444
20	-5.00	9.26	0.009	1.56E-03	65.2	-21.6		572444
		-95.91	0.009	1.56E-03	65.2	-21.6		
21	-5.50	-47.20	0.008	1.57E-03	29.5	-0.9		572444
22	-6.00	-27.32	0.008	1.56E-03	10.8	7.9		572444
23	-6.60	-14.42	0.007	1.55E-03	-1.7	9.5		572444
24	-7.20	-4.51	0.006	1.54E-03	-7.4	5.9		572444
25	-7.60	4.58	0.005	1.54E-03	-7.4	2.6		572444
26	-8.00	23.44	0.004	1.54E-03	-1.8	-0.0		0
27	-8.15	-0.07	0.004	0	-0.0	0.0		0

(continued)

Stage No.6 Apply water pressure profile no.2

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-9.60	12.39	0.002	0	8.9	0.0		0
		-14.92	0.002	0	8.9	0.0		
29	-10.80	50.06	0.000	0	30.0	0.0		0
		-33.37	0.000	0	30.0	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.04	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force =	119.2 kN/m run		
At elev. -1.30					Prop force =	5.8 kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	8.06	8.06	9974
3	2.90	0.00	19.15	5.92	74.07	8.33	8.33	9974
4	2.40	0.00	28.39	8.77	109.82	9.07	9.07	9974
		0.00	28.39	4.41	117.75	12.42	12.42	4987
5	2.00	0.00	36.01	7.09	143.99	15.42	15.42	5187
6	1.60	0.00	43.77	9.81	170.71	19.68	19.68	5386
7	1.20	0.00	51.61	12.56	197.69	24.02	24.02	5586
8	0.60	0.00	63.39	16.70	238.25	30.93	30.93	5885
9	0.00	0.00	75.11	20.82	278.59	37.74	37.74	6184
10	-0.60	0.00	86.71	24.90	318.51	44.75	44.75	6483
11	-0.95	0.00	93.41	27.25	341.58	48.64	48.64	6658
12	-1.30	0.00	100.07	29.59	364.48	52.81	52.81	6832
13	-1.50	0.00	103.85	30.91	377.50	54.94	54.94	6932
14	-2.00	0.00	113.24	34.21	409.82	61.02	61.02	7181
15	-2.50	0.00	122.54	37.48	441.84	67.00	67.00	7431
16	-3.00	0.00	131.77	40.72	473.60	72.98	72.98	7680
17	-3.50	0.00	140.92	43.94	505.11	78.87	78.87	7929
18	-4.00	0.00	150.02	47.13	536.42	84.50	84.50	8179
19	-4.50	5.00	154.05	48.55	550.32	85.61	90.61	8428
20	-5.00	10.00	158.05	49.95	564.06	85.19	95.19	8678
		10.00	158.05	32.37	748.92	75.78	85.78	29922
21	-5.50	15.00	163.49	33.91	772.72	105.36	120.36	29922
22	-6.00	20.00	168.90	35.44	796.35	120.32	140.32	29922
23	-6.60	26.00	175.34	37.27	824.51	132.82	158.82	29922
24	-7.20	32.00	181.75	39.08	852.48	143.83	175.83	29922
25	-7.60	36.00	185.99	40.29	871.02	152.36	188.36	29922
26	-8.00	40.00	190.22	41.49	889.50	166.31	206.31	29922
27	-8.15	41.50	191.80	41.93	896.42	155.47	196.97	29922
28	-9.60	56.00	207.00	46.24	962.83	176.39	232.39	29922
		56.00	207.00	35.98	1021.19	162.84	218.84	49871
29	-10.80	68.00	223.07	40.67	1091.40	210.85	278.85	49871
		68.00	223.07	0.00	6319.03	175.87	243.87	997417
30	-12.60	86.00	254.23	0.00	6751.68	223.25	309.25	997417
31	-14.40	104.00	285.25	0.00	7182.41	253.86	357.86	997417
32	-16.80	128.00	326.44	0.00	7754.42	294.59	422.59	997417
33	-18.40	144.00	353.82	0.00	8134.61	321.71	465.71	997417
34	-20.00	160.00	381.14	0.00	8514.03	352.55	512.55	997417

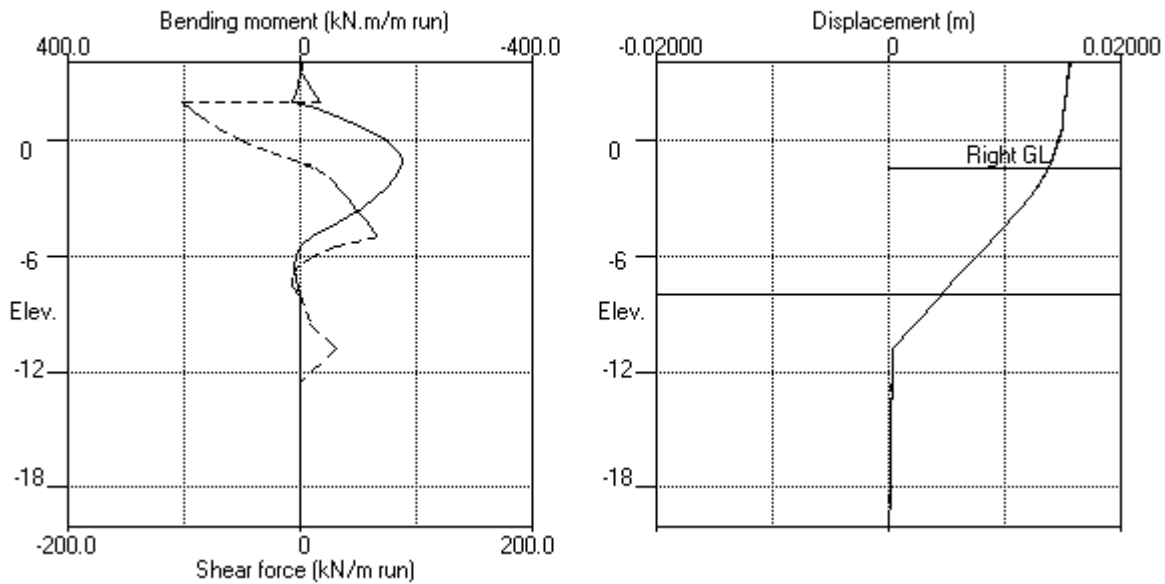
(continued)

Stage No.6 Apply water pressure profile no.2

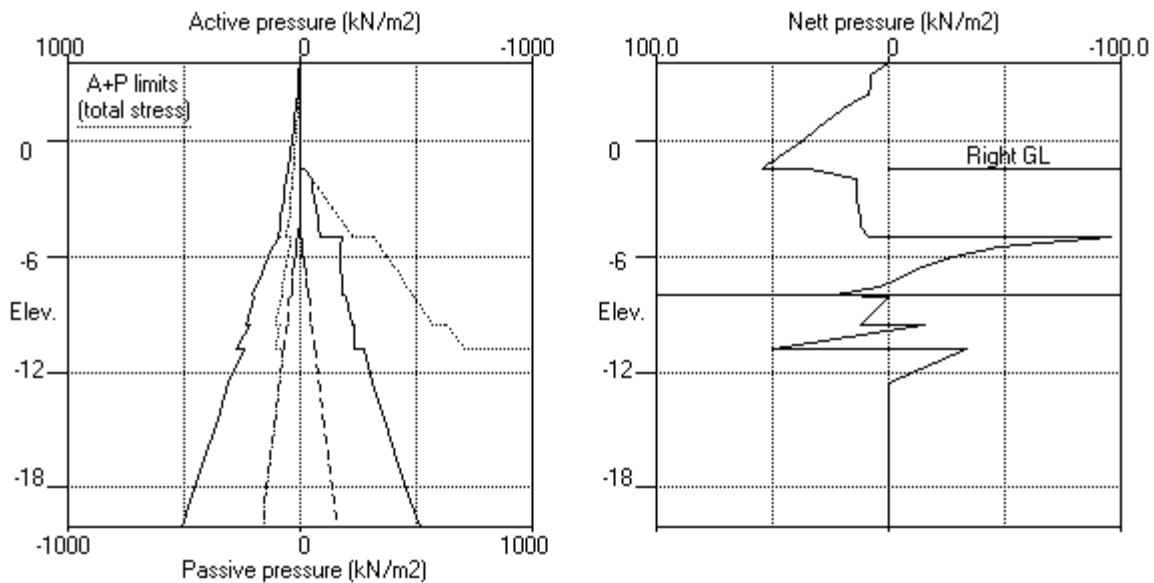
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.89	19.89	6927
14	-2.00	0.00	8.50	0.00	49.29	46.93	46.93	7176
15	-2.50	0.00	17.00	0.41	78.55	52.89	52.89	7426
16	-3.00	0.00	25.50	3.39	107.81	59.14	59.14	7675
17	-3.50	0.00	34.00	6.38	137.08	65.46	65.46	7924
18	-4.00	0.00	42.51	9.37	166.36	72.02	72.02	8173
19	-4.50	0.00	51.02	12.36	195.64	78.32	78.32	8422
20	-5.00	0.00	59.53	15.35	224.93	85.92	85.92	8672
		0.00	59.53	4.45	318.45	181.70	181.70	29902
21	-5.50	5.00	64.54	5.87	340.36	162.56	167.56	29902
22	-6.00	10.00	69.56	7.30	362.27	157.65	167.65	29902
23	-6.60	16.00	75.58	9.00	388.60	157.24	173.24	29902
24	-7.20	22.00	81.61	10.71	414.95	158.33	180.33	29902
25	-7.60	26.00	85.64	11.85	432.54	157.78	183.78	29902
26	-8.00	30.00	89.67	12.99	450.14	152.87	182.87	29902
27	-8.15	31.50	91.18	13.42	456.74	165.54	197.04	29902
28	-9.60	46.00	105.81	17.57	520.70	174.00	220.00	29902
		46.00	105.81	6.41	579.06	187.76	233.76	49836
29	-10.80	58.00	121.57	11.01	647.90	170.78	228.78	49836
		58.00	121.57	0.00	4909.57	219.23	277.23	996727
30	-12.60	76.00	152.48	0.00	5338.75	233.24	309.24	996727
31	-14.40	94.00	183.48	0.00	5769.30	263.84	357.84	996727
32	-16.80	118.00	224.98	0.00	6345.60	304.59	422.59	996727
33	-18.40	134.00	252.76	0.00	6731.23	331.71	465.71	996727
34	-20.00	150.00	280.61	0.00	7117.98	362.59	512.59	996727

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Stage No.6 Apply water pressure profile no.2



Units: kN,m

Stage No. 7 Excavate to elevation -5.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		
<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	<u>Direction</u> <u>of</u> <u>failure</u>
7	4.00 -5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.014	-5.59E-04	0.0	-0.0		572444
2	3.45	13.24	0.014	-5.60E-04	3.6	0.4		572444
3	2.90	12.00	0.014	-5.62E-04	10.6	4.7		572444
4	2.40	11.74	0.015	-5.69E-04	16.5	11.8		572444
		13.76	0.015	-5.69E-04	16.5	11.8		
5	2.00	16.68	0.015	-5.80E-04	22.6	19.6	-100.3	572444
		16.68	0.015	-5.80E-04	-77.7	19.6		
6	1.60	20.79	0.015	-5.84E-04	-70.2	-9.8		572444
7	1.20	24.89	0.015	-5.68E-04	-61.0	-36.2		572444
8	0.60	31.50	0.016	-5.13E-04	-44.1	-67.9		572444
9	0.00	37.87	0.016	-4.31E-04	-23.3	-88.3		572444
10	-0.60	44.40	0.016	-3.35E-04	1.4	-95.0		572444
11	-0.95	47.76	0.016	-2.78E-04	17.5	-91.7		572444
12	-1.30	51.46	0.016	-2.25E-04	34.9	-82.6	-190.8	572444
		51.46	0.016	-2.25E-04	-155.9	-82.6		
13	-1.50	52.86	0.016	-1.91E-04	-145.5	-112.7		572444
14	-2.00	57.95	0.017	-6.40E-05	-117.8	-178.3		572444
15	-2.50	62.60	0.017	1.14E-04	-87.6	-229.7		572444
16	-3.00	67.20	0.016	3.30E-04	-55.2	-265.4		572444
17	-3.50	71.75	0.016	5.70E-04	-20.4	-284.3		572444
18	-4.00	76.07	0.016	8.19E-04	16.5	-285.3		572444
19	-4.50	80.76	0.015	1.06E-03	55.7	-267.1		572444
20	-5.00	84.06	0.015	1.27E-03	96.9	-228.7		572444
		-10.93	0.015	1.27E-03	96.9	-228.7		
21	-5.50	1.51	0.014	1.45E-03	94.6	-183.3		572444
22	-6.00	-6.24	0.013	1.59E-03	93.4	-136.9		572444
23	-6.60	-21.84	0.012	1.71E-03	85.0	-83.6		572444
24	-7.20	-40.72	0.011	1.77E-03	66.2	-36.7		572444
25	-7.60	-60.90	0.011	1.79E-03	45.9	-13.5		572444
26	-8.00	-122.58	0.010	1.79E-03	9.2	0.0		0
27	-8.15	-0.08	0.009	0	-0.0	0.0		0
28	-9.60	18.33	0.004	0	13.2	0.0		0
		-22.09	0.004	0	13.2	0.0		

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
29	-10.80	74.13	0.001	0	44.4	0.0		0
		-49.41	0.001	0	44.4	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	100.3	kN/m run		
At elev. -1.30				Prop force =	190.8	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Effective</u> <u>stresses</u> <u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2	<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	13.24	13.24	9974
3	2.90	0.00	19.15	5.92	74.07	12.00	12.00	9974
4	2.40	0.00	28.39	8.77	109.82	11.74	11.74	9974
		0.00	28.39	4.41	117.75	13.76	13.76	4987
5	2.00	0.00	36.01	7.09	143.99	16.68	16.68	5187
6	1.60	0.00	43.77	9.81	170.71	20.79	20.79	5386
7	1.20	0.00	51.61	12.56	197.69	24.89	24.89	5586
8	0.60	0.00	63.39	16.70	238.25	31.50	31.50	5885
9	0.00	0.00	75.11	20.82	278.59	37.87	37.87	6184
10	-0.60	0.00	86.71	24.90	318.51	44.40	44.40	6483
11	-0.95	0.00	93.41	27.25	341.58	47.76	47.76	6658
12	-1.30	0.00	100.07	29.59	364.48	51.46	51.46	6832
13	-1.50	0.00	103.85	30.91	377.50	52.86	52.86	6932
14	-2.00	0.00	113.24	34.21	409.82	57.95	57.95	7181
15	-2.50	0.00	122.54	37.48	441.84	62.60	62.60	7431
16	-3.00	0.00	131.77	40.72	473.60	67.20	67.20	7680
17	-3.50	0.00	140.92	43.94	505.11	71.75	71.75	7929
18	-4.00	0.00	150.02	47.13	536.42	76.07	76.07	8179
19	-4.50	5.00	154.05	48.55	550.32	75.76	80.76	8428
20	-5.00	10.00	158.05	49.95	564.06	74.06	84.06	8678
		10.00	158.05	32.37	748.92	37.43	47.43	29922
21	-5.50	15.00	163.49	33.91	772.72	71.71	86.71	29922
22	-6.00	20.00	168.90	35.44	796.35	85.82	105.82	29922
23	-6.60	26.00	175.34	37.27	824.51	96.44	122.44	29922
24	-7.20	32.00	181.75	39.08	852.48	103.81	135.81	29922
25	-7.60	36.00	185.99	40.29	871.02	101.14	137.14	29922
26	-8.00	40.00	190.22	41.49	889.50	56.98	96.98	29922
27	-8.15	41.50	191.80	41.93	896.42	143.47	184.97	29922
28	-9.60	56.00	207.00	46.24	962.83	166.57	222.57	29922
		56.00	207.00	35.98	1021.19	146.47	202.47	49871
29	-10.80	68.00	223.07	40.67	1091.40	210.10	278.10	49871
		68.00	223.07	0.00	6319.03	160.97	228.97	997417
30	-12.60	86.00	254.23	0.00	6751.68	216.29	302.29	997417
31	-14.40	104.00	285.25	0.00	7182.41	246.85	350.85	997417
32	-16.80	128.00	326.44	0.00	7754.42	287.49	415.49	997417
33	-18.40	144.00	353.82	0.00	8134.61	314.52	458.52	997417
34	-20.00	160.00	381.14	0.00	8514.03	346.95	506.95	997417

(continued)

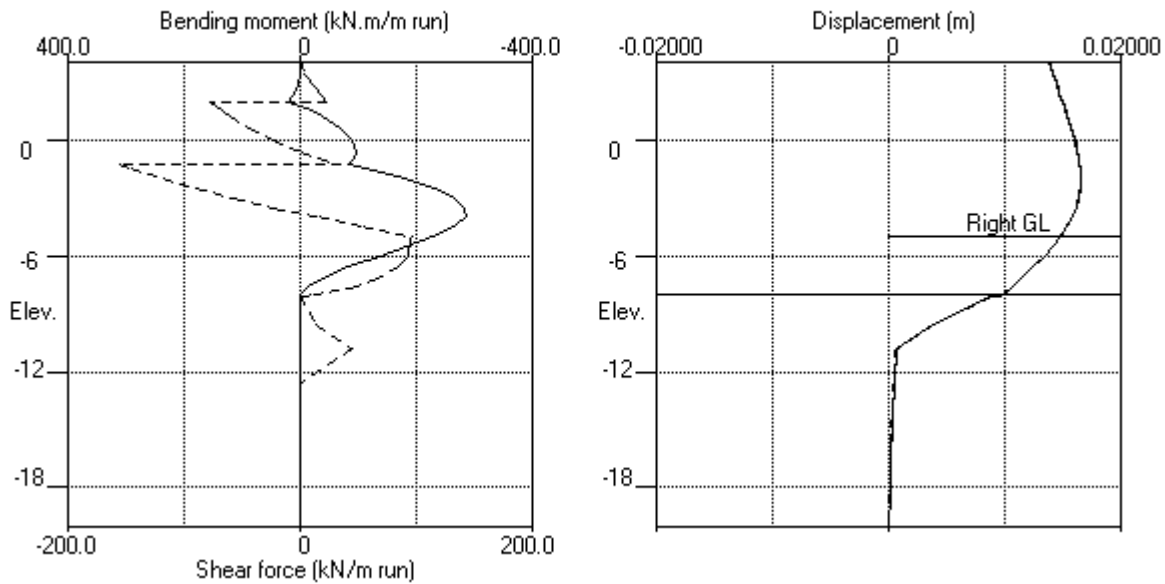
Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>modulus</u>
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.50	5.00	5.00	0.00	80.21	80.21	85.21p	29934
22	-6.00	10.00	10.00	0.00	102.06	102.06	112.06p	29934
23	-6.60	16.00	16.00	0.00	128.29	128.29	144.29p	29934
24	-7.20	22.00	22.01	0.00	154.53	154.53	176.53p	29934
25	-7.60	26.00	26.02	0.00	172.04	172.04	198.04p	29934
26	-8.00	30.00	30.03	0.00	189.56	189.56	219.56p	29934
27	-8.15	31.50	31.53	0.00	196.13	153.55	185.05	29934
28	-9.60	46.00	46.10	0.65	259.78	158.24	204.24	29934
29	-10.80	58.00	61.79	0.00	386.72	178.56	224.56	49890
30	-12.60	76.00	92.63	0.00	4507.70	145.97	203.97	49890
31	-14.40	94.00	123.59	0.00	4937.65	220.38	278.38	997795
32	-16.80	118.00	165.11	0.00	5514.16	226.28	302.28	997795
33	-18.40	134.00	192.95	0.00	5900.75	256.84	350.84	997795
34	-20.00	150.00	220.92	0.00	6289.20	297.49	415.49	997795
						324.51	458.51	997795
						357.01	507.01	997795

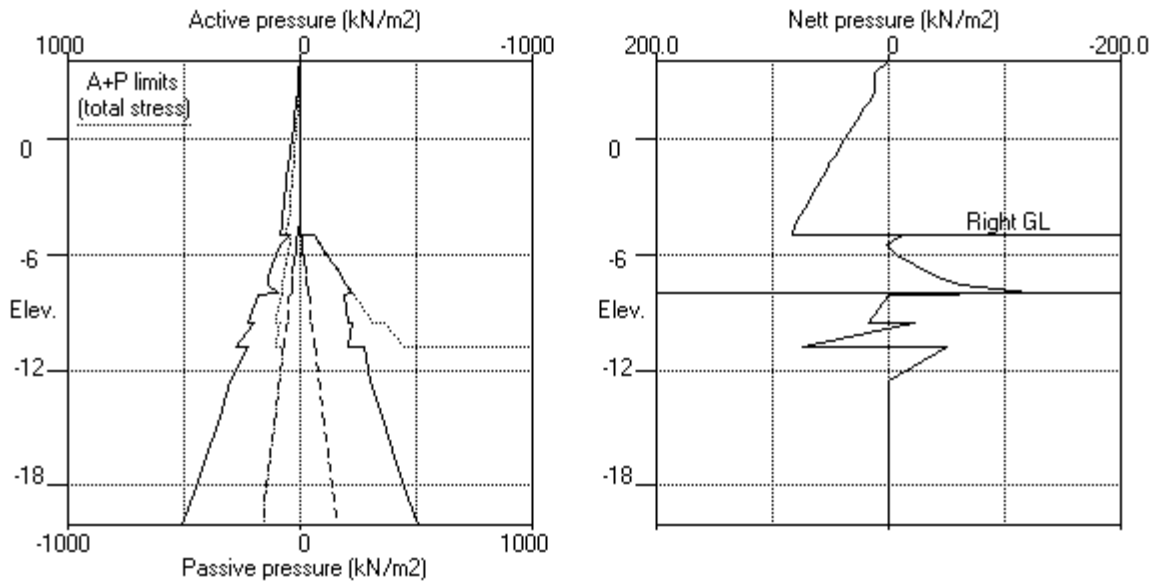
Note: 12.34 a Soil pressure at active limit
 219.56 p Soil pressure at passive limit

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Stage No.7 Excav. to elev. -5.00 on RIGHT side

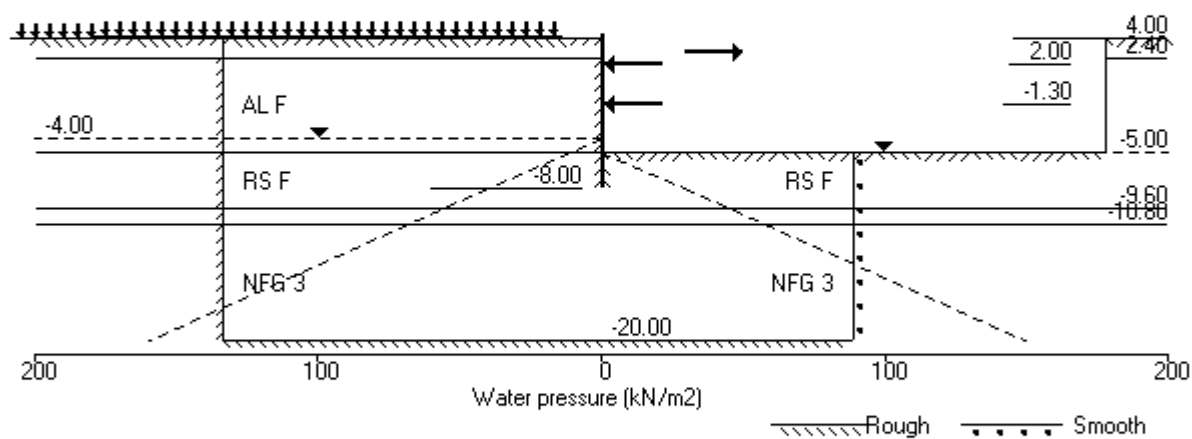


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_2
 Albert Street Development
 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.90



Units: kN,m

Stage No. 8 Apply load no.1 at elevation 2.90

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>More than one prop. No FoS calc.</u>			
8	4.00	-5.00					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-4.70E-04	0.0	-0.0		572444
2	3.45	12.50	0.014	-4.70E-04	3.4	0.4		572444
3	2.90	11.56	0.015	-4.72E-04	10.1	4.5	13.0	572444
		11.56	0.015	-4.72E-04	23.1	4.5		
4	2.40	11.53	0.015	-4.82E-04	28.8	17.7		572444
		13.65	0.015	-4.82E-04	28.8	17.7		
5	2.00	16.58	0.015	-4.99E-04	34.9	30.5	-113.5	572444
		16.58	0.015	-4.99E-04	-78.6	30.5		
6	1.60	20.71	0.015	-5.10E-04	-71.2	0.6		572444
7	1.20	24.85	0.016	-5.01E-04	-62.1	-26.1		572444
8	0.60	31.48	0.016	-4.56E-04	-45.2	-58.5		572444
9	0.00	37.88	0.016	-3.84E-04	-24.4	-79.5		572444
10	-0.60	44.44	0.016	-2.97E-04	0.3	-86.9		572444
11	-0.95	47.82	0.016	-2.45E-04	16.5	-83.9		572444
12	-1.30	51.52	0.016	-1.96E-04	33.9	-75.1	-191.4	572444
		51.52	0.016	-1.96E-04	-157.5	-75.1		
13	-1.50	52.93	0.016	-1.65E-04	-147.1	-105.6		572444
14	-2.00	58.03	0.017	-4.38E-05	-119.3	-172.0		572444
15	-2.50	62.68	0.017	1.29E-04	-89.2	-224.1		572444
16	-3.00	67.29	0.016	3.40E-04	-56.7	-260.6		572444
17	-3.50	71.84	0.016	5.77E-04	-21.9	-280.3		572444
18	-4.00	76.16	0.016	8.22E-04	15.1	-281.9		572444
19	-4.50	80.85	0.015	1.06E-03	54.4	-264.4		572444
20	-5.00	84.15	0.015	1.27E-03	95.6	-226.7		572444
		-10.30	0.015	1.27E-03	95.6	-226.7		
21	-5.50	1.96	0.014	1.45E-03	93.5	-181.9		572444
22	-6.00	-5.84	0.013	1.59E-03	92.6	-136.0		572444
23	-6.60	-21.49	0.012	1.70E-03	84.4	-83.1		572444
24	-7.20	-40.39	0.011	1.77E-03	65.8	-36.5		572444
25	-7.60	-60.54	0.011	1.78E-03	45.6	-13.4		572444
26	-8.00	-121.88	0.010	1.79E-03	9.1	0.0		0
27	-8.15	-0.08	0.009	0	-0.0	0.0		0

(continued)

Stage No.8 Apply load no.1 at elevation 2.90

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-9.60	18.33	0.004	0	13.2	0.0		0
		-22.09	0.004	0	13.2	0.0		
29	-10.80	74.13	0.001	0	44.4	0.0		0
		-49.41	0.001	0	44.4	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	113.5	kN/m run		
At elev. -1.30				Prop force =	191.4	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	12.50	12.50	9974
3	2.90	0.00	19.15	5.92	74.07	11.56	11.56	9974
4	2.40	0.00	28.39	8.77	109.82	11.53	11.53	9974
		0.00	28.39	4.41	117.75	13.65	13.65	4987
5	2.00	0.00	36.01	7.09	143.99	16.58	16.58	5187
6	1.60	0.00	43.77	9.81	170.71	20.71	20.71	5386
7	1.20	0.00	51.61	12.56	197.69	24.85	24.85	5586
8	0.60	0.00	63.39	16.70	238.25	31.48	31.48	5885
9	0.00	0.00	75.11	20.82	278.59	37.88	37.88	6184
10	-0.60	0.00	86.71	24.90	318.51	44.44	44.44	6483
11	-0.95	0.00	93.41	27.25	341.58	47.82	47.82	6658
12	-1.30	0.00	100.07	29.59	364.48	51.52	51.52	6832
13	-1.50	0.00	103.85	30.91	377.50	52.93	52.93	6932
14	-2.00	0.00	113.24	34.21	409.82	58.03	58.03	7181
15	-2.50	0.00	122.54	37.48	441.84	62.68	62.68	7431
16	-3.00	0.00	131.77	40.72	473.60	67.29	67.29	7680
17	-3.50	0.00	140.92	43.94	505.11	71.84	71.84	7929
18	-4.00	0.00	150.02	47.13	536.42	76.16	76.16	8179
19	-4.50	5.00	154.05	48.55	550.32	75.85	80.85	8428
20	-5.00	10.00	158.05	49.95	564.06	74.15	84.15	8678
		10.00	158.05	32.37	748.92	37.73	47.73	29922
21	-5.50	15.00	163.49	33.91	772.72	71.95	86.95	29922
22	-6.00	20.00	168.90	35.44	796.35	86.03	106.03	29922
23	-6.60	26.00	175.34	37.27	824.51	96.63	122.63	29922
24	-7.20	32.00	181.75	39.08	852.48	103.98	135.98	29922
25	-7.60	36.00	185.99	40.29	871.02	101.32	137.32	29922
26	-8.00	40.00	190.22	41.49	889.50	57.34	97.34	29922
27	-8.15	41.50	191.80	41.93	896.42	143.47	184.97	29922
28	-9.60	56.00	207.00	46.24	962.83	166.57	222.57	29922
		56.00	207.00	35.98	1021.19	146.47	202.47	49871
29	-10.80	68.00	223.07	40.67	1091.40	210.10	278.10	49871
		68.00	223.07	0.00	6319.03	160.97	228.97	997417
30	-12.60	86.00	254.23	0.00	6751.68	216.29	302.29	997417
31	-14.40	104.00	285.25	0.00	7182.41	246.85	350.85	997417
32	-16.80	128.00	326.44	0.00	7754.42	287.49	415.49	997417
33	-18.40	144.00	353.82	0.00	8134.61	314.52	458.52	997417
34	-20.00	160.00	381.14	0.00	8514.03	346.95	506.95	997417

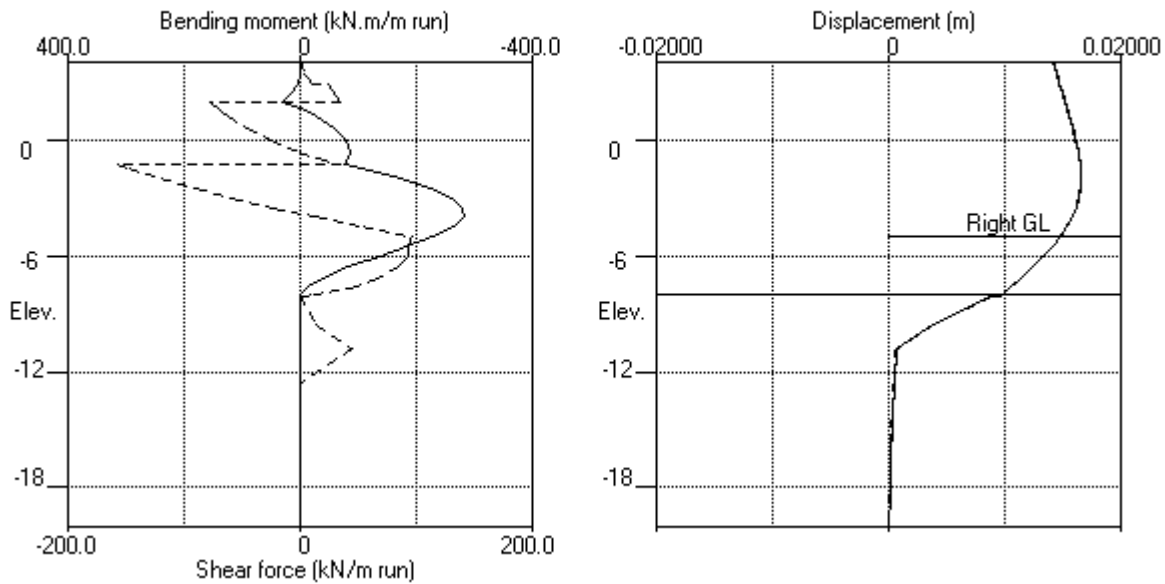
(continued)

Stage No.8 Apply load no.1 at elevation 2.90

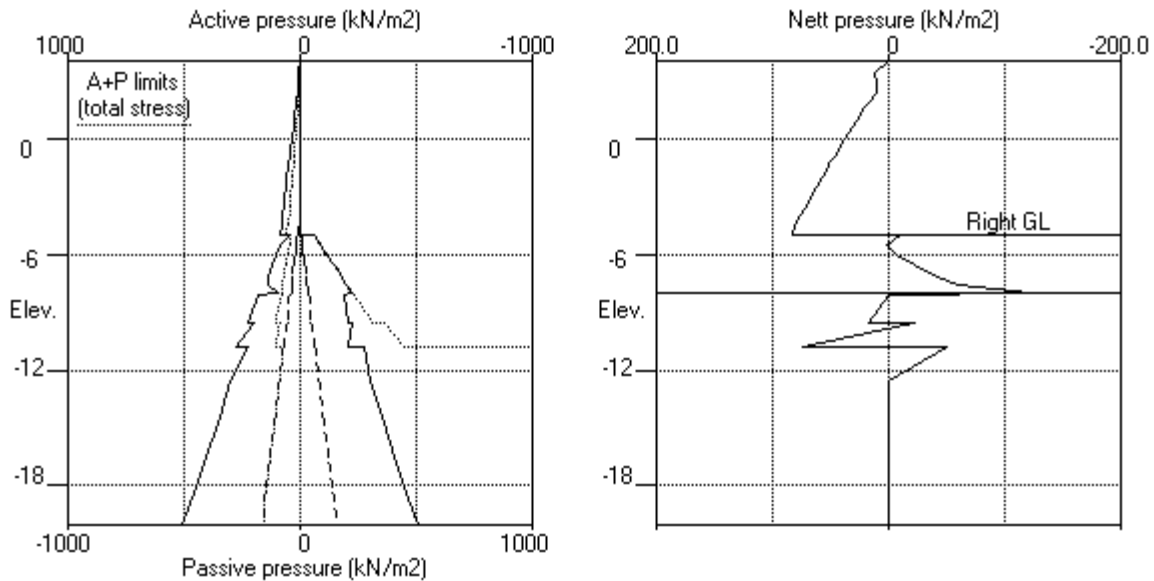
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.04	58.04	29934
21	-5.50	5.00	5.00	0.00	80.21	79.99	84.99	29934
22	-6.00	10.00	10.00	0.00	102.06	101.87	111.87	29934
23	-6.60	16.00	16.00	0.00	128.29	128.12	144.12	29934
24	-7.20	22.00	22.01	0.00	154.53	154.37	176.37	29934
25	-7.60	26.00	26.02	0.00	172.04	171.86	197.86	29934
26	-8.00	30.00	30.03	0.00	189.56	189.22	219.22	29934
27	-8.15	31.50	31.53	0.00	196.13	153.55	185.05	29934
28	-9.60	46.00	46.10	0.65	259.78	158.24	204.24	29934
		46.00	46.10	0.00	318.14	178.56	224.56	49890
29	-10.80	58.00	61.79	0.00	386.72	145.97	203.97	49890
		58.00	61.79	0.00	4079.54	220.39	278.39	997795
30	-12.60	76.00	92.63	0.00	4507.70	226.28	302.28	997795
31	-14.40	94.00	123.59	0.00	4937.65	256.84	350.84	997795
32	-16.80	118.00	165.11	0.00	5514.16	297.49	415.49	997795
33	-18.40	134.00	192.95	0.00	5900.75	324.51	458.51	997795
34	-20.00	150.00	220.92	0.00	6289.20	357.00	507.00	997795

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.90



Stage No.8 Apply load no.1 at elev. 2.90

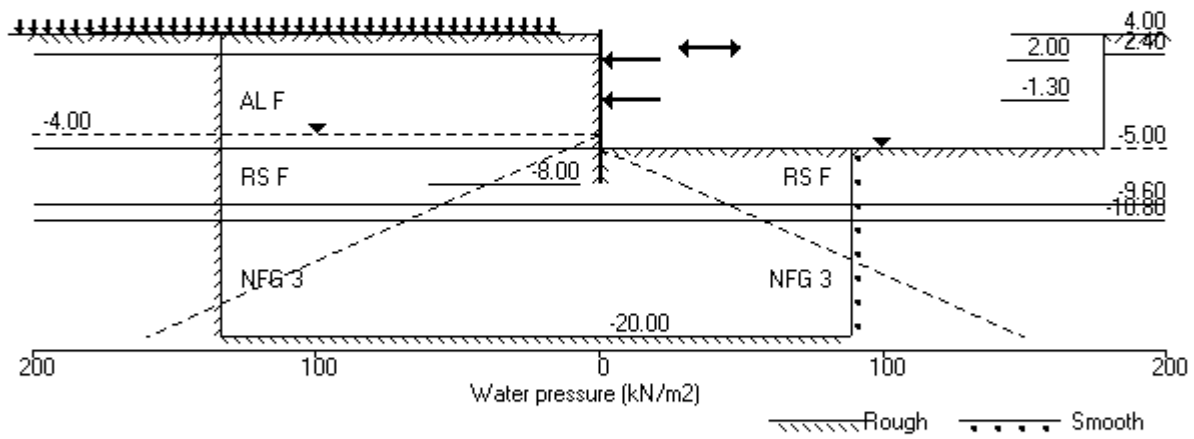


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 Data filename/Run ID: Section_2
 Albert Street Development
 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.90



Units: kN,m

Stage No. 9 Apply load no.2 at elevation 2.90

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>-ation</u>	
9	4.00	-5.00		<u>Moment</u> <u>at elev.</u> <u>More than one prop. No FoS calc.</u>	<u>Wall</u> <u>Penetr</u>	

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-5.59E-04	0.0	-0.0		572444
2	3.45	13.24	0.014	-5.60E-04	3.6	0.4		572444
3	2.90	12.00	0.014	-5.62E-04	10.6	4.7		572444
4	2.40	11.74	0.015	-5.69E-04	16.5	11.8		572444
		13.76	0.015	-5.69E-04	16.5	11.8		
5	2.00	16.68	0.015	-5.80E-04	22.6	19.6	-100.3	572444
		16.68	0.015	-5.80E-04	-77.7	19.6		
6	1.60	20.79	0.015	-5.84E-04	-70.2	-9.8		572444
7	1.20	24.89	0.015	-5.68E-04	-61.0	-36.2		572444
8	0.60	31.50	0.016	-5.13E-04	-44.1	-67.9		572444
9	0.00	37.87	0.016	-4.31E-04	-23.3	-88.3		572444
10	-0.60	44.40	0.016	-3.35E-04	1.4	-95.0		572444
11	-0.95	47.76	0.016	-2.78E-04	17.5	-91.7		572444
12	-1.30	51.46	0.016	-2.25E-04	34.9	-82.6	-190.8	572444
		51.46	0.016	-2.25E-04	-155.9	-82.6		
13	-1.50	52.86	0.016	-1.91E-04	-145.5	-112.7		572444
14	-2.00	57.95	0.017	-6.40E-05	-117.8	-178.3		572444
15	-2.50	62.60	0.017	1.14E-04	-87.6	-229.7		572444
16	-3.00	67.20	0.016	3.30E-04	-55.2	-265.4		572444
17	-3.50	71.75	0.016	5.70E-04	-20.4	-284.3		572444
18	-4.00	76.07	0.016	8.19E-04	16.5	-285.3		572444
19	-4.50	80.76	0.015	1.06E-03	55.7	-267.1		572444
20	-5.00	84.06	0.015	1.27E-03	96.9	-228.7		572444
		-10.93	0.015	1.27E-03	96.9	-228.7		
21	-5.50	1.51	0.014	1.45E-03	94.6	-183.3		572444
22	-6.00	-6.24	0.013	1.59E-03	93.4	-136.9		572444
23	-6.60	-21.84	0.012	1.71E-03	85.0	-83.6		572444
24	-7.20	-40.72	0.011	1.77E-03	66.2	-36.7		572444
25	-7.60	-60.90	0.011	1.79E-03	45.9	-13.5		572444
26	-8.00	-122.58	0.010	1.79E-03	9.2	0.0		0
27	-8.15	-0.08	0.009	0	-0.0	0.0		0
28	-9.60	18.33	0.004	0	13.2	0.0		0
		-22.09	0.004	0	13.2	0.0		

(continued)

Stage No.9 Apply load no.2 at elevation 2.90

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
29	-10.80	74.13	0.001	0	44.4	0.0		0
		-49.41	0.001	0	44.4	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	100.3	kN/m run		
At elev. -1.30				Prop force =	190.8	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	13.24	13.24	9974
3	2.90	0.00	19.15	5.92	74.07	12.00	12.00	9974
4	2.40	0.00	28.39	8.77	109.82	11.74	11.74	9974
		0.00	28.39	4.41	117.75	13.76	13.76	4987
5	2.00	0.00	36.01	7.09	143.99	16.68	16.68	5187
6	1.60	0.00	43.77	9.81	170.71	20.79	20.79	5386
7	1.20	0.00	51.61	12.56	197.69	24.89	24.89	5586
8	0.60	0.00	63.39	16.70	238.25	31.50	31.50	5885
9	0.00	0.00	75.11	20.82	278.59	37.87	37.87	6184
10	-0.60	0.00	86.71	24.90	318.51	44.40	44.40	6483
11	-0.95	0.00	93.41	27.25	341.58	47.76	47.76	6658
12	-1.30	0.00	100.07	29.59	364.48	51.46	51.46	6832
13	-1.50	0.00	103.85	30.91	377.50	52.86	52.86	6932
14	-2.00	0.00	113.24	34.21	409.82	57.95	57.95	7181
15	-2.50	0.00	122.54	37.48	441.84	62.60	62.60	7431
16	-3.00	0.00	131.77	40.72	473.60	67.20	67.20	7680
17	-3.50	0.00	140.92	43.94	505.11	71.75	71.75	7929
18	-4.00	0.00	150.02	47.13	536.42	76.07	76.07	8179
19	-4.50	5.00	154.05	48.55	550.32	75.76	80.76	8428
20	-5.00	10.00	158.05	49.95	564.06	74.06	84.06	8678
		10.00	158.05	32.37	748.92	37.43	47.43	29922
21	-5.50	15.00	163.49	33.91	772.72	71.71	86.71	29922
22	-6.00	20.00	168.90	35.44	796.35	85.82	105.82	29922
23	-6.60	26.00	175.34	37.27	824.51	96.44	122.44	29922
24	-7.20	32.00	181.75	39.08	852.48	103.81	135.81	29922
25	-7.60	36.00	185.99	40.29	871.02	101.14	137.14	29922
26	-8.00	40.00	190.22	41.49	889.50	56.98	96.98	29922
27	-8.15	41.50	191.80	41.93	896.42	143.47	184.97	29922
28	-9.60	56.00	207.00	46.24	962.83	166.57	222.57	29922
		56.00	207.00	35.98	1021.19	146.47	202.47	49871
29	-10.80	68.00	223.07	40.67	1091.40	210.10	278.10	49871
		68.00	223.07	0.00	6319.03	160.97	228.97	997417
30	-12.60	86.00	254.23	0.00	6751.68	216.29	302.29	997417
31	-14.40	104.00	285.25	0.00	7182.41	246.85	350.85	997417
32	-16.80	128.00	326.44	0.00	7754.42	287.49	415.49	997417
33	-18.40	144.00	353.82	0.00	8134.61	314.52	458.52	997417
34	-20.00	160.00	381.14	0.00	8514.03	346.95	506.95	997417

(continued)

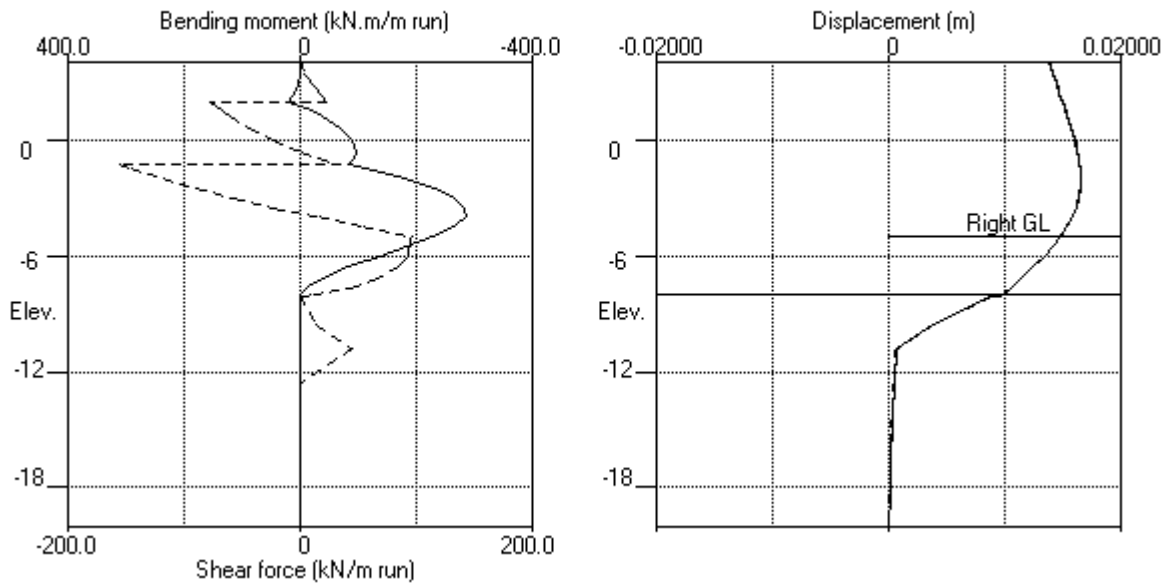
Stage No.9 Apply load no.2 at elevation 2.90

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	29934
21	-5.50	5.00	5.00	0.00	80.21	80.21	85.21p	29934
22	-6.00	10.00	10.00	0.00	102.06	102.06	112.06p	29934
23	-6.60	16.00	16.00	0.00	128.29	128.29	144.29p	29934
24	-7.20	22.00	22.01	0.00	154.53	154.53	176.53p	29934
25	-7.60	26.00	26.02	0.00	172.04	172.04	198.04p	29934
26	-8.00	30.00	30.03	0.00	189.56	189.56	219.56p	29934
27	-8.15	31.50	31.53	0.00	196.13	153.55	185.05	29934
28	-9.60	46.00	46.10	0.65	259.78	158.24	204.24	29934
		46.00	46.10	0.00	318.14	178.56	224.56	49890
29	-10.80	58.00	61.79	0.00	386.72	145.97	203.97	49890
		58.00	61.79	0.00	4079.54	220.38	278.38	997795
30	-12.60	76.00	92.63	0.00	4507.70	226.28	302.28	997795
31	-14.40	94.00	123.59	0.00	4937.65	256.84	350.84	997795
32	-16.80	118.00	165.11	0.00	5514.16	297.49	415.49	997795
33	-18.40	134.00	192.95	0.00	5900.75	324.51	458.51	997795
34	-20.00	150.00	220.92	0.00	6289.20	357.01	507.01	997795

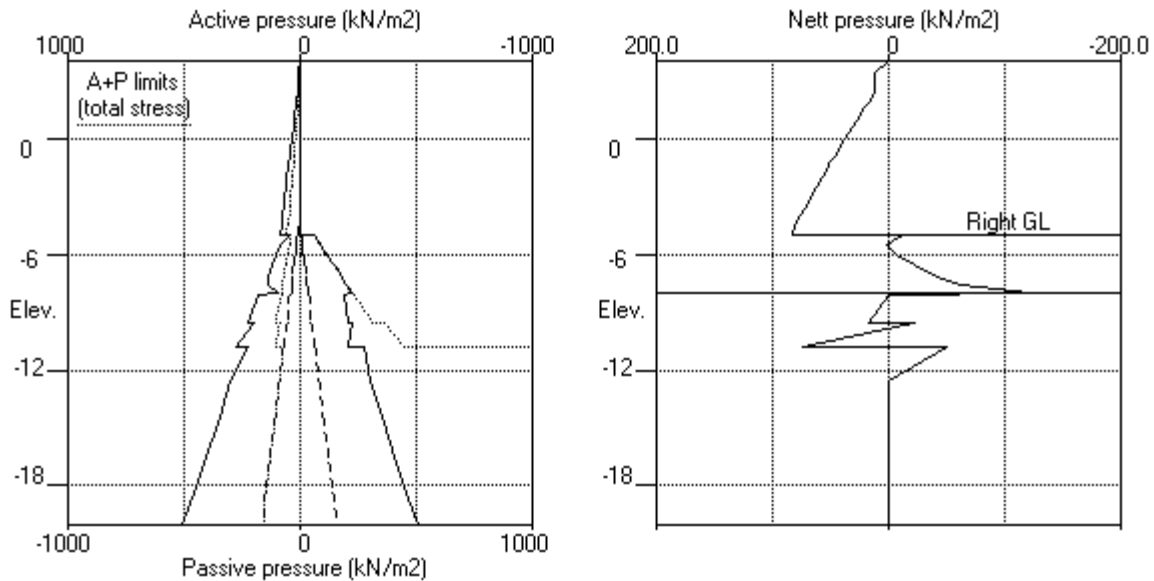
Note: 12.34 a Soil pressure at active limit
 219.56 p Soil pressure at passive limit

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.90



Stage No.9 Apply load no.2 at elev. 2.90

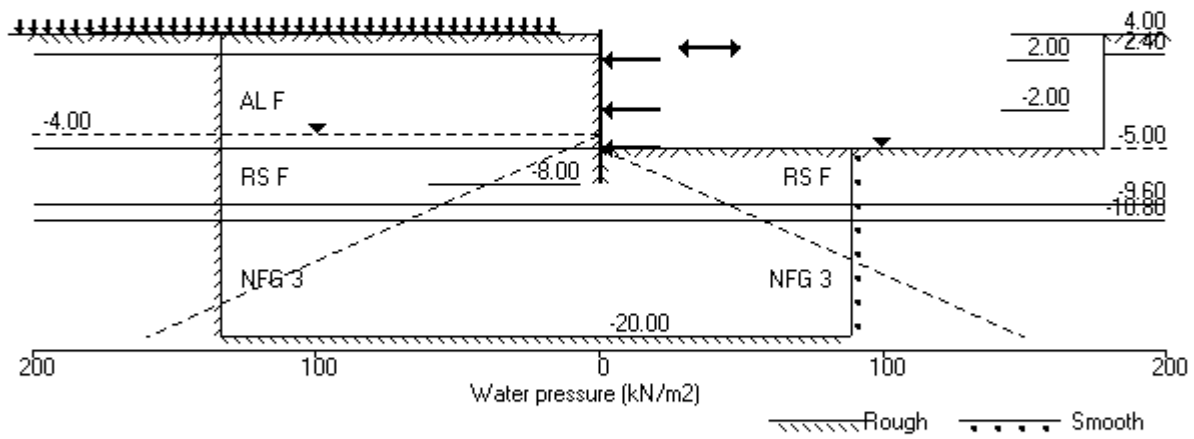


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 Albert Street Development
 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Units: kN,m

Stage No. 12 Remove strut or anchor no.2 at elevation -1.30

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
12	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-6.60E-04	0.0	-0.0		572444
2	3.45	13.34	0.014	-6.60E-04	3.7	0.4		572444
3	2.90	11.85	0.015	-6.63E-04	10.6	4.8		572444
4	2.40	11.36	0.015	-6.70E-04	16.4	11.8		572444
		13.57	0.015	-6.70E-04	16.4	11.8		
5	2.00	16.41	0.015	-6.81E-04	22.4	19.6	-124.3	572444
		16.41	0.015	-6.81E-04	-101.9	19.6		
6	1.60	20.42	0.016	-6.81E-04	-94.6	-19.6		572444
7	1.20	24.40	0.016	-6.55E-04	-85.6	-55.7		572444
8	0.60	30.86	0.016	-5.72E-04	-69.0	-102.3		572444
9	0.00	37.08	0.017	-4.46E-04	-48.6	-137.8		572444
10	-0.60	43.52	0.017	-2.90E-04	-24.5	-159.9		572444
11	-0.95	46.86	0.017	-1.91E-04	-8.7	-165.7		572444
12	-1.30	50.61	0.017	-8.97E-05	8.4	-165.7		572444
13	-1.50	52.19	0.017	-3.23E-05	18.7	-163.0		572444
14	-2.00	57.54	0.017	1.02E-04	46.1	-146.6	-170.2	572444
		57.54	0.017	1.02E-04	-124.1	-146.6		
15	-2.50	62.39	0.017	2.54E-04	-94.1	-201.2		572444
16	-3.00	67.11	0.017	4.47E-04	-61.7	-240.2		572444
17	-3.50	71.73	0.016	6.67E-04	-27.0	-262.4		572444
18	-4.00	76.09	0.016	8.98E-04	9.9	-266.6		572444
19	-4.50	80.78	0.015	1.12E-03	49.2	-251.8		572444
20	-5.00	84.03	0.015	1.32E-03	90.4	-216.6	1.5	572444
		-11.05	0.015	1.32E-03	91.9	-216.6		
21	-5.50	1.76	0.014	1.49E-03	89.6	-173.8		572444
22	-6.00	-5.52	0.013	1.63E-03	88.6	-129.9		572444
23	-6.60	-20.66	0.012	1.74E-03	80.8	-79.3		572444
24	-7.20	-39.03	0.011	1.80E-03	62.9	-34.7		572444
25	-7.60	-58.18	0.011	1.81E-03	43.4	-12.7		572444
26	-8.00	-115.59	0.010	1.82E-03	8.7	0.0		0
27	-8.15	-0.08	0.009	0	-0.0	0.0		0
28	-9.60	18.33	0.004	0	13.2	0.0		0
		-22.09	0.004	0	13.2	0.0		

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-10.80	74.13	0.001	0	44.4	0.0		0
		-49.41	0.001	0	44.4	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	124.3	kN/m run		
At elev. -2.00				Prop force =	170.2	kN/m run		
At elev. -5.00				Prop force =	-1.5	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	13.34	13.34	9974
3	2.90	0.00	19.15	5.92	74.07	11.85	11.85	9974
4	2.40	0.00	28.39	8.77	109.82	11.36	11.36	9974
		0.00	28.39	4.41	117.75	13.57	13.57	4987
5	2.00	0.00	36.01	7.09	143.99	16.41	16.41	5187
6	1.60	0.00	43.77	9.81	170.71	20.42	20.42	5386
7	1.20	0.00	51.61	12.56	197.69	24.40	24.40	5586
8	0.60	0.00	63.39	16.70	238.25	30.86	30.86	5885
9	0.00	0.00	75.11	20.82	278.59	37.08	37.08	6184
10	-0.60	0.00	86.71	24.90	318.51	43.52	43.52	6483
11	-0.95	0.00	93.41	27.25	341.58	46.86	46.86	6658
12	-1.30	0.00	100.07	29.59	364.48	50.61	50.61	6832
13	-1.50	0.00	103.85	30.91	377.50	52.19	52.19	6932
14	-2.00	0.00	113.24	34.21	409.82	57.54	57.54	7181
15	-2.50	0.00	122.54	37.48	441.84	62.39	62.39	7431
16	-3.00	0.00	131.77	40.72	473.60	67.11	67.11	7680
17	-3.50	0.00	140.92	43.94	505.11	71.73	71.73	7929
18	-4.00	0.00	150.02	47.13	536.42	76.09	76.09	8179
19	-4.50	5.00	154.05	48.55	550.32	75.78	80.78	8428
20	-5.00	10.00	158.05	49.95	564.06	74.03	84.03	8678
		10.00	158.05	32.37	748.92	37.31	47.31	29922
21	-5.50	15.00	163.49	33.91	772.72	71.97	86.97	29922
22	-6.00	20.00	168.90	35.44	796.35	86.32	106.32	29922
23	-6.60	26.00	175.34	37.27	824.51	97.13	123.13	29922
24	-7.20	32.00	181.75	39.08	852.48	104.72	136.72	29922
25	-7.60	36.00	185.99	40.29	871.02	102.54	138.54	29922
26	-8.00	40.00	190.22	41.49	889.50	60.62	100.62	29922
27	-8.15	41.50	191.80	41.93	896.42	143.47	184.97	29922
28	-9.60	56.00	207.00	46.24	962.83	166.58	222.58	29922
		56.00	207.00	35.98	1021.19	146.49	202.49	49871
29	-10.80	68.00	223.07	40.67	1091.40	210.10	278.10	49871
		68.00	223.07	0.00	6319.03	161.00	229.00	997417
30	-12.60	86.00	254.23	0.00	6751.68	216.31	302.31	997417
31	-14.40	104.00	285.25	0.00	7182.41	246.86	350.86	997417
32	-16.80	128.00	326.44	0.00	7754.42	287.49	415.49	997417
33	-18.40	144.00	353.82	0.00	8134.61	314.52	458.52	997417
34	-20.00	160.00	381.14	0.00	8514.03	346.95	506.95	997417

(continued)

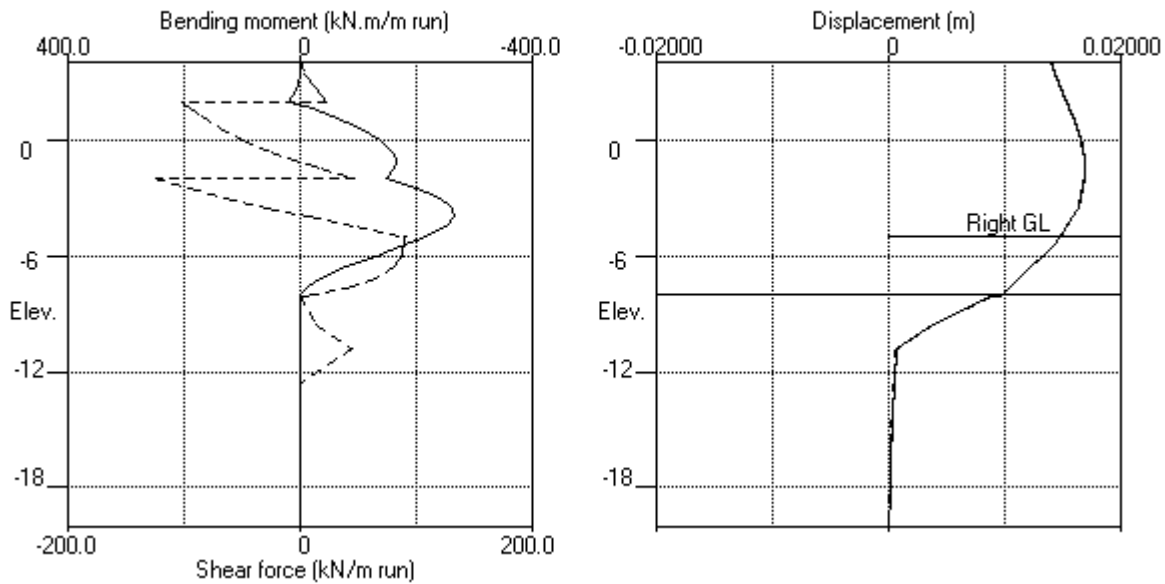
Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>RIGHT side</u> <u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	29934
21	-5.50	5.00	5.00	0.00	80.21	80.21	85.21p	29934
22	-6.00	10.00	10.00	0.00	102.06	101.84	111.84	29934
23	-6.60	16.00	16.00	0.00	128.29	127.79	143.79	29934
24	-7.20	22.00	22.01	0.00	154.53	153.75	175.75	29934
25	-7.60	26.00	26.02	0.00	172.04	170.72	196.72	29934
26	-8.00	30.00	30.03	0.00	189.56	186.22	216.22	29934
27	-8.15	31.50	31.53	0.00	196.13	153.55	185.05	29934
28	-9.60	46.00	46.10	0.65	259.78	158.25	204.25	29934
		46.00	46.10	0.00	318.14	178.58	224.58	49890
29	-10.80	58.00	61.79	0.00	386.72	145.97	203.97	49890
		58.00	61.79	0.00	4079.54	220.41	278.41	997795
30	-12.60	76.00	92.63	0.00	4507.70	226.30	302.30	997795
31	-14.40	94.00	123.59	0.00	4937.65	256.85	350.85	997795
32	-16.80	118.00	165.11	0.00	5514.16	297.49	415.49	997795
33	-18.40	134.00	192.95	0.00	5900.75	324.51	458.51	997795
34	-20.00	150.00	220.92	0.00	6289.20	357.00	507.00	997795

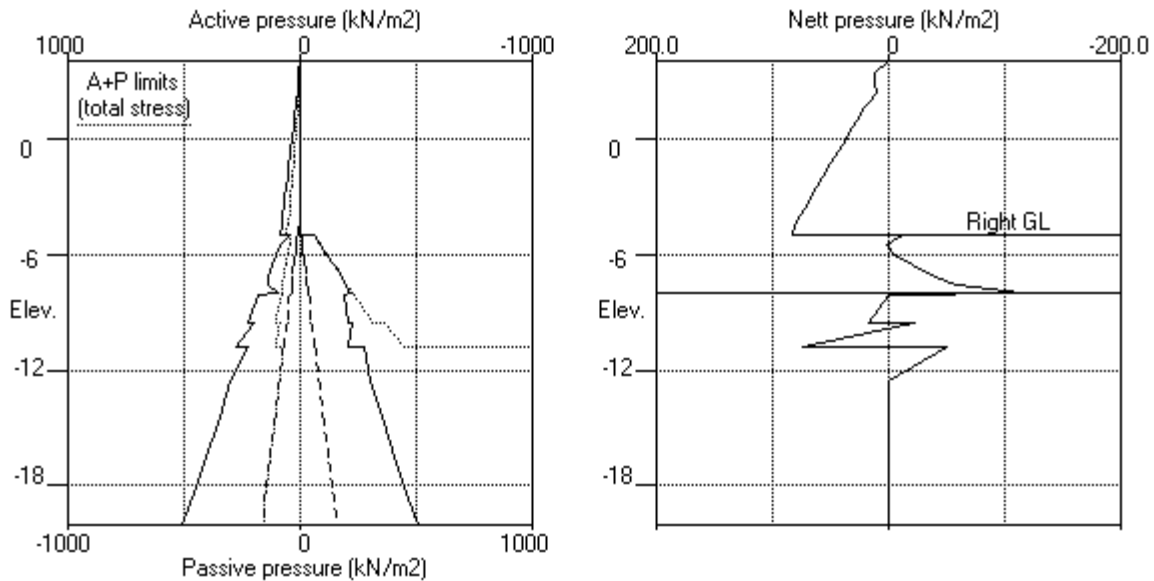
Note: 12.34 a Soil pressure at active limit
 85.21 p Soil pressure at passive limit

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Stage No.12 Remove prop no.2 at elev. -1.30

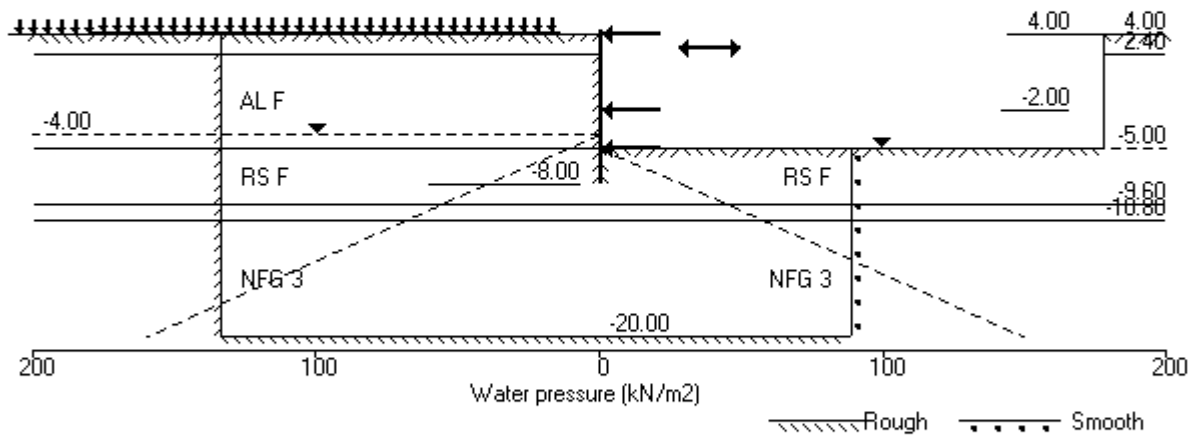


EDG CONSULTING PTY LTD
Program: WALLAP Version 6.07 Revision A55.B74.R58
Licensed from GEOSOLVE
Data filename/Run ID: Section_2
Albert Street Development
Section 2

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Units: kN,m

Stage No. 14 Remove strut or anchor no.1 at elevation 2.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		
<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	<u>Direction</u> <u>of</u> <u>failure</u>
14	4.00 -5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.014	-1.02E-03	-71.0	-0.0	-71.0	572444
2	3.45	13.63	0.015	-1.00E-03	-67.2	-38.6		572444
3	2.90	10.94	0.015	-9.55E-04	-60.5	-73.2		572444
4	2.40	9.65	0.016	-8.79E-04	-55.3	-101.8		572444
		12.71	0.016	-8.79E-04	-55.3	-101.8		
5	2.00	15.32	0.016	-8.01E-04	-49.7	-122.8		572444
6	1.60	19.26	0.016	-7.08E-04	-42.8	-141.2		572444
7	1.20	23.24	0.017	-6.04E-04	-34.3	-156.7		572444
8	0.60	29.81	0.017	-4.32E-04	-18.4	-172.7		572444
9	0.00	36.24	0.017	-2.48E-04	1.4	-178.0		572444
10	-0.60	42.94	0.017	-6.57E-05	25.2	-170.2		572444
11	-0.95	46.50	0.017	3.47E-05	40.8	-158.7		572444
12	-1.30	50.42	0.017	1.26E-04	57.8	-141.4		572444
13	-1.50	52.18	0.017	1.73E-04	68.0	-128.9		572444
14	-2.00	57.71	0.017	2.68E-04	95.5	-87.8	-238.1	572444
		57.71	0.017	2.68E-04	-142.6	-87.8		
15	-2.50	62.68	0.017	3.72E-04	-112.5	-151.6		572444
16	-3.00	67.46	0.017	5.26E-04	-79.9	-199.7		572444
17	-3.50	72.08	0.016	7.14E-04	-45.1	-231.0		572444
18	-4.00	76.41	0.016	9.22E-04	-7.9	-244.2		572444
19	-4.50	81.06	0.015	1.13E-03	31.4	-238.3		572444
20	-5.00	84.24	0.015	1.32E-03	72.8	-212.0	16.1	572444
		-9.76	0.015	1.32E-03	88.9	-212.0		
21	-5.50	2.76	0.014	1.49E-03	87.1	-170.4		572444
22	-6.00	-4.63	0.013	1.62E-03	86.7	-127.6		572444
23	-6.60	-19.85	0.012	1.73E-03	79.3	-78.1		572444
24	-7.20	-38.27	0.011	1.79E-03	61.9	-34.2		572444
25	-7.60	-57.32	0.010	1.80E-03	42.8	-12.5		572444
26	-8.00	-113.87	0.010	1.81E-03	8.5	0.0		0
27	-8.15	-0.08	0.009	0	-0.0	0.0		0
28	-9.60	18.33	0.004	0	13.2	0.0		0
		-22.09	0.004	0	13.2	0.0		

(continued)

Stage No.14 Remove strut or anchor no.1 at elevation 2.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-10.80	74.13	0.001	0	44.4	0.0		0
		-49.41	0.001	0	44.4	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	71.0	kN/m run		
At elev. -2.00				Prop force =	238.1	kN/m run		
At elev. -5.00				Prop force =	-16.1	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	13.63	13.63	9974
3	2.90	0.00	19.15	5.92	74.07	10.94	10.94	9974
4	2.40	0.00	28.39	8.77	109.82	9.65	9.65	9974
		0.00	28.39	4.41	117.75	12.71	12.71	4987
5	2.00	0.00	36.01	7.09	143.99	15.32	15.32	5187
6	1.60	0.00	43.77	9.81	170.71	19.26	19.26	5386
7	1.20	0.00	51.61	12.56	197.69	23.24	23.24	5586
8	0.60	0.00	63.39	16.70	238.25	29.81	29.81	5885
9	0.00	0.00	75.11	20.82	278.59	36.24	36.24	6184
10	-0.60	0.00	86.71	24.90	318.51	42.94	42.94	6483
11	-0.95	0.00	93.41	27.25	341.58	46.50	46.50	6658
12	-1.30	0.00	100.07	29.59	364.48	50.42	50.42	6832
13	-1.50	0.00	103.85	30.91	377.50	52.18	52.18	6932
14	-2.00	0.00	113.24	34.21	409.82	57.71	57.71	7181
15	-2.50	0.00	122.54	37.48	441.84	62.68	62.68	7431
16	-3.00	0.00	131.77	40.72	473.60	67.46	67.46	7680
17	-3.50	0.00	140.92	43.94	505.11	72.08	72.08	7929
18	-4.00	0.00	150.02	47.13	536.42	76.41	76.41	8179
19	-4.50	5.00	154.05	48.55	550.32	76.06	81.06	8428
20	-5.00	10.00	158.05	49.95	564.06	74.24	84.24	8678
		10.00	158.05	32.37	748.92	38.03	48.03	29922
21	-5.50	15.00	163.49	33.91	772.72	72.55	87.55	29922
22	-6.00	20.00	168.90	35.44	796.35	86.82	106.82	29922
23	-6.60	26.00	175.34	37.27	824.51	97.58	123.58	29922
24	-7.20	32.00	181.75	39.08	852.48	105.14	137.14	29922
25	-7.60	36.00	185.99	40.29	871.02	103.00	139.00	29922
26	-8.00	40.00	190.22	41.49	889.50	61.54	101.54	29922
27	-8.15	41.50	191.80	41.93	896.42	143.48	184.98	29922
28	-9.60	56.00	207.00	46.24	962.83	166.59	222.59	29922
		56.00	207.00	35.98	1021.19	146.51	202.51	49871
29	-10.80	68.00	223.07	40.67	1091.40	210.11	278.11	49871
		68.00	223.07	0.00	6319.03	161.01	229.01	997417
30	-12.60	86.00	254.23	0.00	6751.68	216.33	302.33	997417
31	-14.40	104.00	285.25	0.00	7182.41	246.87	350.87	997417
32	-16.80	128.00	326.44	0.00	7754.42	287.50	415.50	997417
33	-18.40	144.00	353.82	0.00	8134.61	314.52	458.52	997417
34	-20.00	160.00	381.14	0.00	8514.03	346.95	506.95	997417

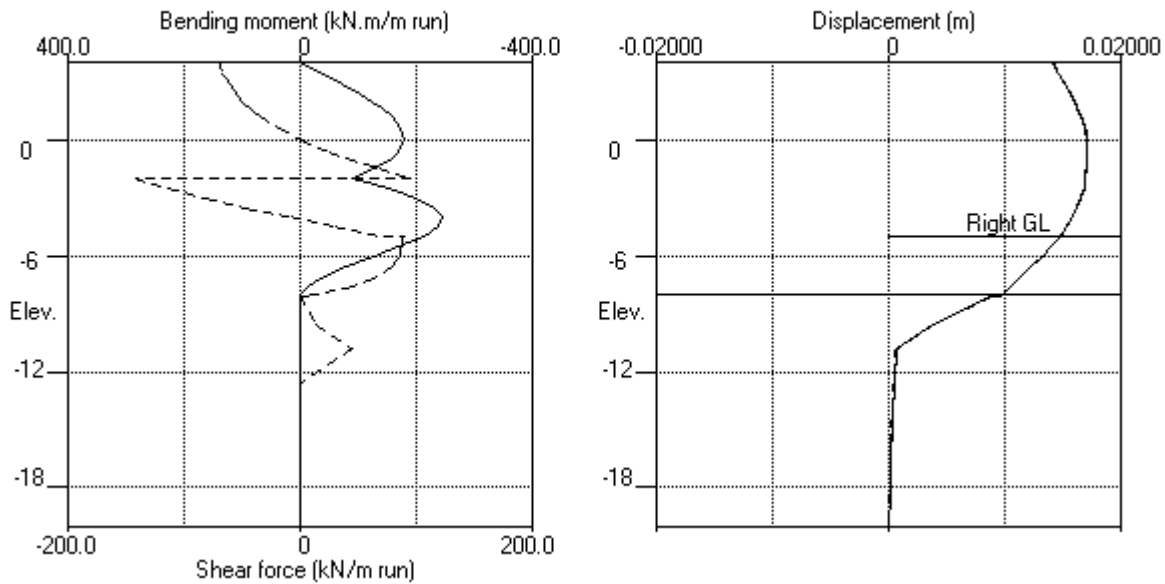
(continued)

Stage No.14 Remove strut or anchor no.1 at elevation 2.00

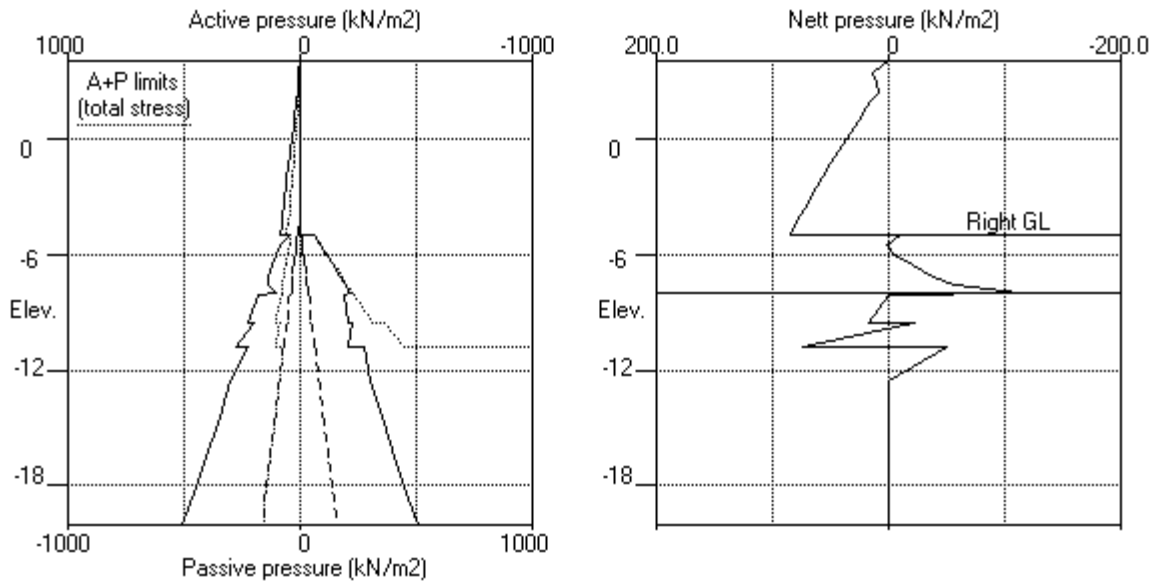
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	57.78	57.78	29934
21	-5.50	5.00	5.00	0.00	80.21	79.79	84.79	29934
22	-6.00	10.00	10.00	0.00	102.06	101.46	111.46	29934
23	-6.60	16.00	16.00	0.00	128.29	127.44	143.44	29934
24	-7.20	22.00	22.01	0.00	154.53	153.41	175.41	29934
25	-7.60	26.00	26.02	0.00	172.04	170.31	196.31	29934
26	-8.00	30.00	30.03	0.00	189.56	185.40	215.40	29934
27	-8.15	31.50	31.53	0.00	196.13	153.56	185.06	29934
28	-9.60	46.00	46.10	0.65	259.78	158.26	204.26	29934
		46.00	46.10	0.00	318.14	178.60	224.60	49890
29	-10.80	58.00	61.79	0.00	386.72	145.97	203.97	49890
		58.00	61.79	0.00	4079.54	220.43	278.43	997795
30	-12.60	76.00	92.63	0.00	4507.70	226.32	302.32	997795
31	-14.40	94.00	123.59	0.00	4937.65	256.86	350.86	997795
32	-16.80	118.00	165.11	0.00	5514.16	297.50	415.50	997795
33	-18.40	134.00	192.95	0.00	5900.75	324.52	458.52	997795
34	-20.00	150.00	220.92	0.00	6289.20	357.00	507.00	997795

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Stage No.14 Remove prop no.1 at elev. 2.00

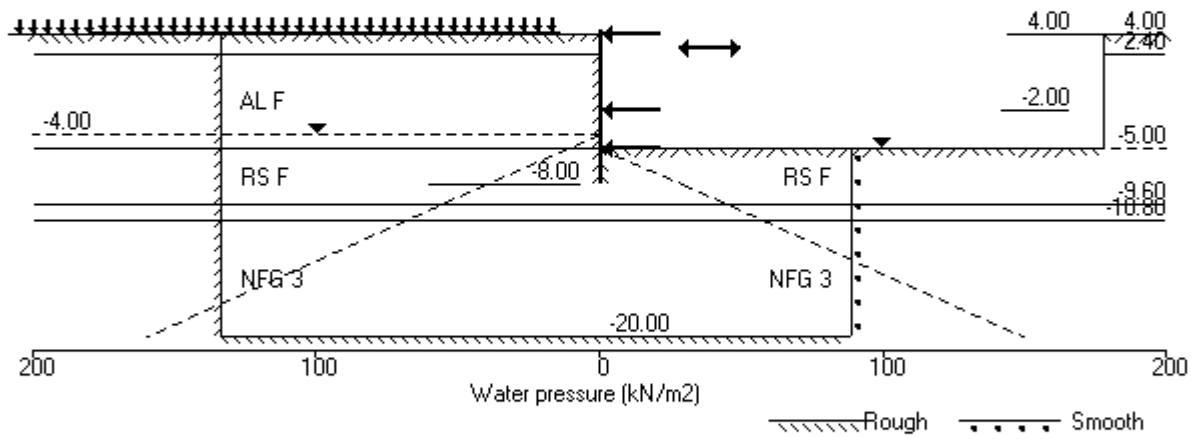


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 Albert Street Development
 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.15 Change EI of wall to 400788kN.m2/m run



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DJC
Data filename/Run ID: Section_2	
Albert Street Development	Date:16-11-2022
Section 2	Checked :

Units: kN,m

Stage No. 15 Change EI of wall to 400788 kN.m2/m run
Allow wall to relax with new modulus value

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method
Factor of safety on nett available passive

			FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500			
<u>Stage</u>	<u>Ground</u>	<u>level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	<u>of</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
15	4.00	-5.00		<u>More than one prop. No FoS calc.</u>				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.014	-1.11E-03	-60.3	-0.0	-60.3	400788
2	3.45	13.78	0.015	-1.08E-03	-56.5	-34.1		400788
3	2.90	10.81	0.015	-1.02E-03	-49.8	-64.2		400788
4	2.40	9.34	0.016	-9.32E-04	-44.7	-88.7		400788
		12.56	0.016	-9.32E-04	-44.7	-88.7		
5	2.00	15.12	0.016	-8.39E-04	-39.2	-106.4		400788
6	1.60	19.03	0.016	-7.31E-04	-32.4	-121.6		400788
7	1.20	22.99	0.017	-6.09E-04	-24.0	-133.9		400788
8	0.60	29.55	0.017	-4.12E-04	-8.2	-145.2		400788
9	0.00	36.03	0.017	-2.07E-04	11.5	-145.8		400788
10	-0.60	42.80	0.017	-1.43E-05	35.1	-133.4		400788
11	-0.95	46.44	0.017	8.59E-05	50.7	-119.2		400788
12	-1.30	50.43	0.017	1.70E-04	67.7	-99.3		400788
13	-1.50	52.24	0.017	2.10E-04	77.9	-85.2		400788
14	-2.00	57.80	0.017	2.71E-04	105.5	-40.3	-255.4	400788
		57.80	0.017	2.71E-04	-149.9	-40.3		
15	-2.50	62.68	0.017	3.46E-04	-119.8	-106.9		400788
16	-3.00	67.30	0.017	4.95E-04	-87.3	-157.9		400788
17	-3.50	71.76	0.016	6.98E-04	-52.6	-192.0		400788
18	-4.00	75.98	0.016	9.33E-04	-15.6	-208.2		400788
19	-4.50	80.56	0.015	1.17E-03	23.5	-205.2		400788
20	-5.00	83.72	0.015	1.40E-03	64.6	-182.0	11.0	400788
		-12.11	0.015	1.40E-03	75.6	-182.0		
21	-5.50	1.32	0.014	1.60E-03	72.9	-145.8		400788
22	-6.00	-5.15	0.013	1.75E-03	72.0	-108.6		400788
23	-6.60	-18.00	0.012	1.87E-03	65.0	-65.9		400788
24	-7.20	-33.55	0.011	1.94E-03	49.6	-28.4		400788
25	-7.60	-47.66	0.010	1.96E-03	33.3	-10.2		400788
26	-8.00	-86.46	0.009	1.96E-03	6.5	0.0		0
27	-8.15	-0.08	0.008	0	-0.0	0.0		0
28	-9.60	18.33	0.004	0	13.2	0.0		0
		-22.09	0.004	0	13.2	0.0		

(continued)

Stage No.15 Change EI of wall to 400788 kN.m²/m run
 Allow wall to relax with new modulus value

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m ²	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m ² /m
29	-10.80	74.13	0.001	0	44.4	0.0		0
		-49.41	0.001	0	44.4	0.0		
30	-12.60	0.01	0.000	0	-0.0	0.0		0
31	-14.40	0.02	0.000	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev.	4.00			Prop force =	60.3	kN/m run		
At elev.	-2.00			Prop force =	255.4	kN/m run		
At elev.	-5.00			Prop force =	-11.0	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m ²	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m ²
		<u>Water</u> <u>press.</u> kN/m ²	<u>Vertic</u> <u>-al</u> kN/m ²	<u>Active</u> <u>limit</u> kN/m ²	<u>Passive</u> <u>limit</u> kN/m ²	<u>Earth</u> <u>pressure</u> kN/m ²		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	0.00	9.41	2.91	36.41	13.78	13.78	9974
3	2.90	0.00	19.15	5.92	74.07	10.81	10.81	9974
4	2.40	0.00	28.39	8.77	109.82	9.34	9.34	9974
		0.00	28.39	4.41	117.75	12.56	12.56	4987
5	2.00	0.00	36.01	7.09	143.99	15.12	15.12	5187
6	1.60	0.00	43.77	9.81	170.71	19.03	19.03	5386
7	1.20	0.00	51.61	12.56	197.69	22.99	22.99	5586
8	0.60	0.00	63.39	16.70	238.25	29.55	29.55	5885
9	0.00	0.00	75.11	20.82	278.59	36.03	36.03	6184
10	-0.60	0.00	86.71	24.90	318.51	42.80	42.80	6483
11	-0.95	0.00	93.41	27.25	341.58	46.44	46.44	6658
12	-1.30	0.00	100.07	29.59	364.48	50.43	50.43	6832
13	-1.50	0.00	103.85	30.91	377.50	52.24	52.24	6932
14	-2.00	0.00	113.24	34.21	409.82	57.80	57.80	7181
15	-2.50	0.00	122.54	37.48	441.84	62.68	62.68	7431
16	-3.00	0.00	131.77	40.72	473.60	67.30	67.30	7680
17	-3.50	0.00	140.92	43.94	505.11	71.76	71.76	7929
18	-4.00	0.00	150.02	47.13	536.42	75.98	75.98	8179
19	-4.50	5.00	154.05	48.55	550.32	75.56	80.56	8428
20	-5.00	10.00	158.05	49.95	564.06	73.72	83.72	8678
		10.00	158.05	32.37	748.92	36.25	46.25	29922
21	-5.50	15.00	163.49	33.91	772.72	71.53	86.53	29922
22	-6.00	20.00	168.90	35.44	796.35	86.70	106.70	29922
23	-6.60	26.00	175.34	37.27	824.51	98.60	124.60	29922
24	-7.20	32.00	181.75	39.08	852.48	107.56	139.56	29922
25	-7.60	36.00	185.99	40.29	871.02	107.82	143.82	29922
26	-8.00	40.00	190.22	41.49	889.50	75.71	115.71	29922
27	-8.15	41.50	191.80	41.93	896.42	143.40	184.90	29922
28	-9.60	56.00	207.00	46.24	962.83	166.61	222.61	29922
		56.00	207.00	35.98	1021.19	146.53	202.53	49871
29	-10.80	68.00	223.07	40.67	1091.40	210.11	278.11	49871
		68.00	223.07	0.00	6319.03	161.01	229.01	997417
30	-12.60	86.00	254.23	0.00	6751.68	216.33	302.33	997417
31	-14.40	104.00	285.25	0.00	7182.41	246.87	350.87	997417
32	-16.80	128.00	326.44	0.00	7754.42	287.49	415.49	997417
33	-18.40	144.00	353.82	0.00	8134.61	314.52	458.52	997417
34	-20.00	160.00	381.14	0.00	8514.03	346.94	506.94	997417

(continued)

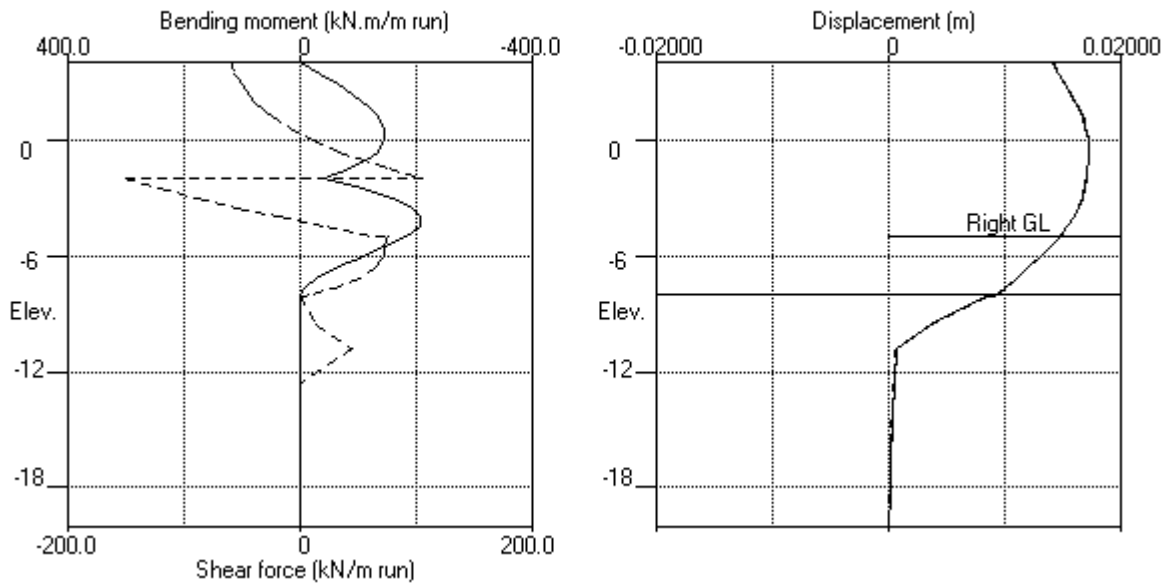
Stage No.15 Change EI of wall to 400788 kN.m2/m run
 Allow wall to relax with new modulus value

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	29934
21	-5.50	5.00	5.00	0.00	80.21	80.21	85.21p	29934
22	-6.00	10.00	10.00	0.00	102.06	101.85	111.85	29934
23	-6.60	16.00	16.00	0.00	128.29	126.60	142.60	29934
24	-7.20	22.00	22.01	0.00	154.53	151.11	173.11	29934
25	-7.60	26.00	26.02	0.00	172.04	165.48	191.48	29934
26	-8.00	30.00	30.03	0.00	189.56	172.17	202.17	29934
27	-8.15	31.50	31.53	0.00	196.13	153.48	184.98	29934
28	-9.60	46.00	46.10	0.65	259.78	158.28	204.28	29934
		46.00	46.10	0.00	318.14	178.63	224.63	49890
29	-10.80	58.00	61.79	0.00	386.72	145.97	203.97	49890
		58.00	61.79	0.00	4079.54	220.43	278.43	997795
30	-12.60	76.00	92.63	0.00	4507.70	226.32	302.32	997795
31	-14.40	94.00	123.59	0.00	4937.65	256.85	350.85	997795
32	-16.80	118.00	165.11	0.00	5514.16	297.49	415.49	997795
33	-18.40	134.00	192.95	0.00	5900.75	324.51	458.51	997795
34	-20.00	150.00	220.92	0.00	6289.20	356.99	506.99	997795

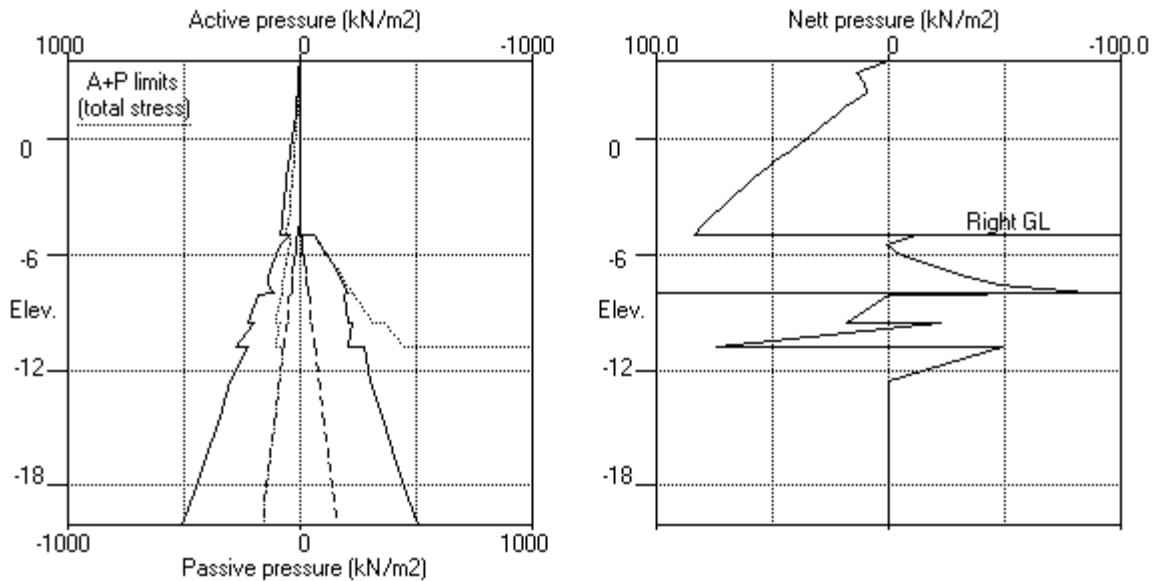
Note: 12.34 a Soil pressure at active limit
 85.21 p Soil pressure at passive limit

Units: kN,m

Stage No.15 Change EI of wall to 400788kN.m2/m run



Stage No.15 Change EI of wall to 400788kN.m2/m run

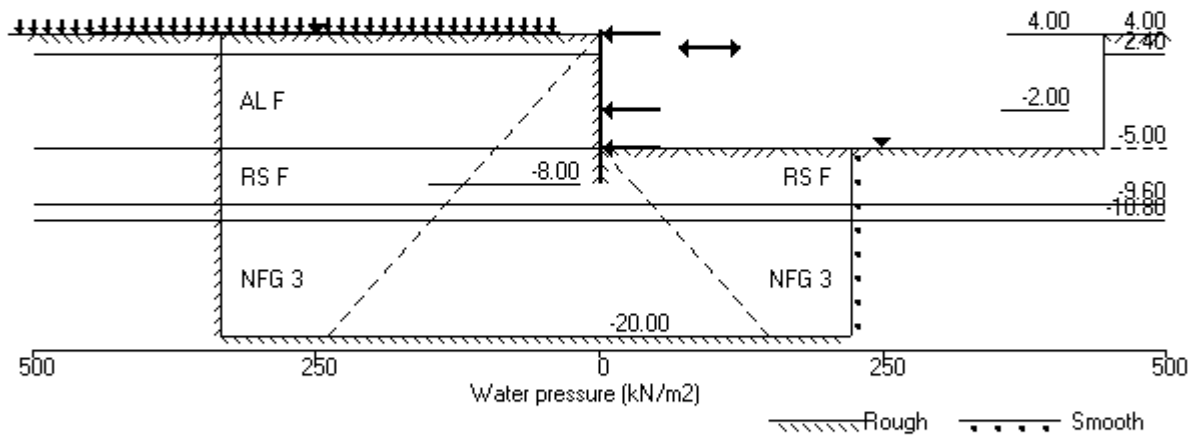


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 Albert Street Development
 Section 2

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.16 Apply water pressure profile no.1



Units: kN,m

Stage No. 16 Apply water pressure profile no.1

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>-ation</u>	
16	4.00	-5.00		<u>Moment</u> <u>of</u> <u>equilib.</u> <u>at elev.</u>	<u>Wall</u> <u>Penetr</u>	
				<u>More than one prop. No FoS calc.</u>		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-1.31E-03	-82.5	-0.0	-82.5	400788
2	3.45	17.27	0.015	-1.28E-03	-77.7	-46.2		400788
3	2.90	16.94	0.015	-1.20E-03	-68.3	-87.2		400788
4	2.40	18.01	0.016	-1.07E-03	-59.6	-120.1		400788
		21.47	0.016	-1.07E-03	-59.6	-120.1		
5	2.00	26.18	0.016	-9.48E-04	-50.1	-143.0		400788
6	1.60	32.30	0.017	-8.01E-04	-38.4	-161.6		400788
7	1.20	38.50	0.017	-6.39E-04	-24.2	-175.1		400788
8	0.60	48.52	0.017	-3.82E-04	1.9	-183.6		400788
9	0.00	58.55	0.018	-1.28E-04	34.0	-174.5		400788
10	-0.60	68.95	0.018	9.50E-05	72.3	-144.3		400788
11	-0.95	74.82	0.018	1.98E-04	97.4	-115.4		400788
12	-1.30	81.00	0.017	2.71E-04	124.7	-77.4		400788
13	-1.50	84.18	0.017	2.97E-04	141.2	-51.3		400788
14	-2.00	92.80	0.017	2.94E-04	185.5	29.3	-382.3	400788
		92.80	0.017	2.94E-04	-196.9	29.3		
15	-2.50	100.65	0.017	2.93E-04	-148.5	-56.3		400788
16	-3.00	108.15	0.017	3.85E-04	-96.3	-116.7		400788
17	-3.50	115.50	0.017	5.36E-04	-40.4	-150.1		400788
18	-4.00	122.62	0.016	7.12E-04	19.1	-154.6		400788
19	-4.50	127.27	0.016	8.76E-04	81.6	-128.4		400788
20	-5.00	130.39	0.016	9.88E-04	146.0	-70.3	-171.4	400788
		41.15	0.016	9.88E-04	-25.3	-70.3		
21	-5.50	49.89	0.015	1.07E-03	-2.6	-77.9		400788
22	-6.00	36.88	0.014	1.15E-03	19.1	-72.4		400788
23	-6.60	17.66	0.014	1.24E-03	35.5	-53.8		400788
24	-7.20	-4.99	0.013	1.30E-03	39.3	-27.7		400788
25	-7.60	-29.39	0.012	1.31E-03	32.4	-11.3		400788
26	-8.00	-96.45	0.012	1.32E-03	7.2	0.0		0
27	-8.15	-0.08	0.011	0	-0.0	0.0		0
28	-9.60	28.93	0.005	0	20.9	0.0		0
		-34.90	0.005	0	20.9	0.0		

(continued)

Stage No.16 Apply water pressure profile no.1

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-10.80	115.47	0.001	0	69.2	0.0		0
		-76.97	0.001	0	69.2	0.0		
30	-12.60	0.01	0.001	0	-0.0	0.0		0
31	-14.40	0.02	0.001	0	0.0	0.0		0
32	-16.80	-0.00	0.000	0	0.0	0.0		0
33	-18.40	0.01	0.000	0	0.0	0.0		0
34	-20.00	-0.05	0.000	0	0.0	0.0		---
At elev.	4.00			Prop force =	82.5	kN/m run		
At elev.	-2.00			Prop force =	382.3	kN/m run		
At elev.	-5.00			Prop force =	171.4	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9974
2	3.45	5.50	3.91	1.21	15.14	11.77	17.27	9974
3	2.90	11.00	8.15	2.52	31.52	5.94	16.94	9974
4	2.40	16.00	12.39	3.83	47.92	2.01	18.01A	9974
		16.00	12.39	0.00	62.68	5.47	21.47	4987
5	2.00	20.00	16.01	0.06	75.15	6.18	26.18	5187
6	1.60	24.00	19.77	1.38	88.10	8.30	32.30	5386
7	1.20	28.00	23.61	2.73	101.30	10.50	38.50	5586
8	0.60	34.00	29.39	4.76	121.21	14.52	48.52	5885
9	0.00	40.00	35.11	6.77	140.90	18.55	58.55	6184
10	-0.60	46.00	40.71	8.74	160.17	22.95	68.95	6483
11	-0.95	49.50	43.91	9.86	171.19	25.32	74.82	6658
12	-1.30	53.00	47.07	10.97	182.05	28.00	81.00	6832
13	-1.50	55.00	48.85	11.59	188.18	29.18	84.18	6932
14	-2.00	60.00	53.24	13.14	203.28	32.80	92.80	7181
15	-2.50	65.00	57.54	14.65	218.09	35.65	100.65	7431
16	-3.00	70.00	61.77	16.13	232.64	38.15	108.15	7680
17	-3.50	75.00	65.92	17.59	246.95	40.50	115.50	7929
18	-4.00	80.00	70.02	19.03	261.04	42.62	122.62	8179
19	-4.50	85.00	74.05	20.45	274.94	42.27	127.27	8428
20	-5.00	90.00	78.05	21.85	288.68	40.39	130.39	8678
		90.00	78.05	9.70	399.37	5.24	95.24A	29922
21	-5.50	95.00	83.49	11.24	423.17	37.90	132.90	29922
22	-6.00	100.00	88.90	12.78	446.80	48.94	148.94	29922
23	-6.60	106.00	95.34	14.60	474.96	55.95	161.95	29922
24	-7.20	112.00	101.75	16.42	502.92	59.54	171.54	29922
25	-7.60	116.00	105.99	17.62	521.47	52.65	168.65	29922
26	-8.00	120.00	110.22	18.82	539.95	3.11	123.11A	29922
27	-8.15	121.50	111.80	19.27	546.87	86.25	207.75	29922
28	-9.60	136.00	127.00	23.57	613.28	114.71	250.71	29922
		136.00	127.00	12.60	671.64	82.90	218.90	49871
29	-10.80	148.00	143.07	17.29	741.85	173.66	321.66	49871
		148.00	143.07	0.00	5208.16	97.78	245.78	997417
30	-12.60	166.00	174.23	0.00	5640.80	166.76	332.76	997417
31	-14.40	184.00	205.25	0.00	6071.53	197.29	381.29	997417
32	-16.80	208.00	246.44	0.00	6643.55	237.83	445.83	997417
33	-18.40	224.00	273.82	0.00	7023.73	264.88	488.88	997417
34	-20.00	240.00	301.14	0.00	7403.16	303.29	543.29	997417

(continued)

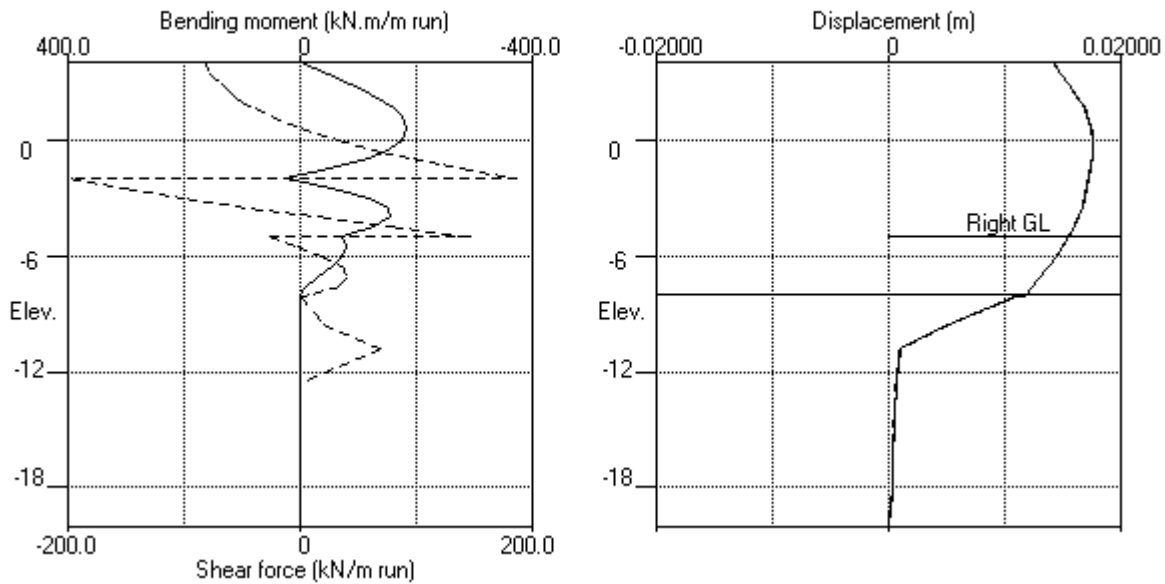
Stage No.16 Apply water pressure profile no.1

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	54.09	54.09	29934
21	-5.50	5.00	5.00	0.00	80.21	78.01	83.01	29934
22	-6.00	10.00	10.00	0.00	102.06	102.06	112.06p	29934
23	-6.60	16.00	16.00	0.00	128.29	128.29	144.29p	29934
24	-7.20	22.00	22.01	0.00	154.53	154.53	176.53p	29934
25	-7.60	26.00	26.02	0.00	172.04	172.04	198.04p	29934
26	-8.00	30.00	30.03	0.00	189.56	189.56	219.56p	29934
27	-8.15	31.50	31.53	0.00	196.13	176.33	207.83	29934
28	-9.60	46.00	46.10	0.65	259.78	175.78	221.78	29934
		46.00	46.10	0.00	318.14	207.80	253.80	49890
29	-10.80	58.00	61.79	0.00	386.72	148.19	206.19	49890
		58.00	61.79	0.00	4079.54	264.75	322.75	997795
30	-12.60	76.00	92.63	0.00	4507.70	256.75	332.75	997795
31	-14.40	94.00	123.59	0.00	4937.65	287.27	381.27	997795
32	-16.80	118.00	165.11	0.00	5514.16	327.83	445.83	997795
33	-18.40	134.00	192.95	0.00	5900.75	354.87	488.87	997795
34	-20.00	150.00	220.92	0.00	6289.20	393.34	543.34	997795

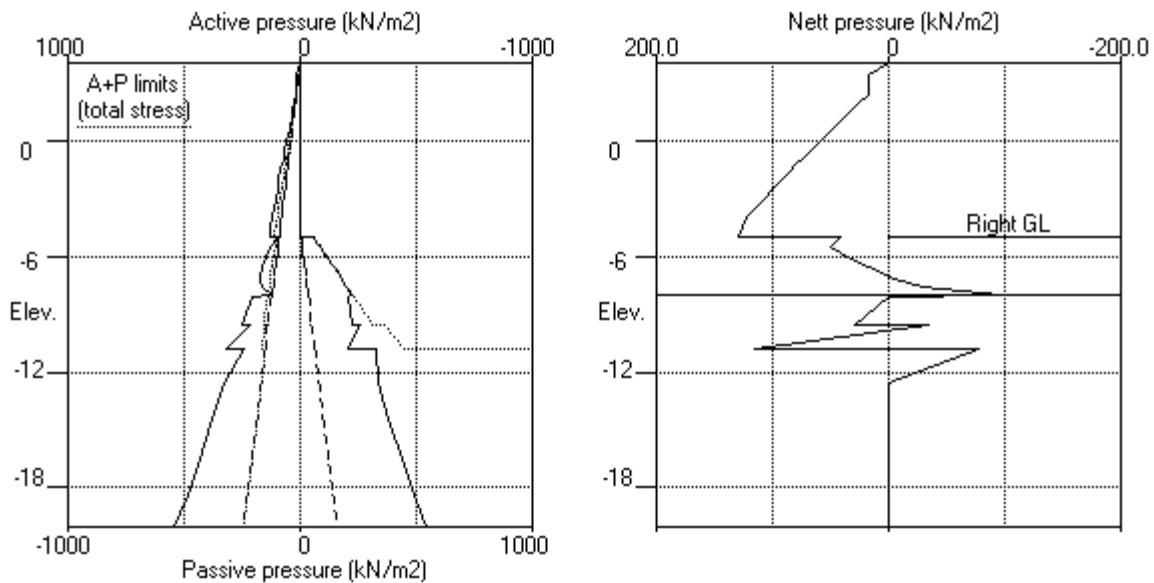
Note: 12.34 a Soil pressure at active limit
 219.56 p Soil pressure at passive limit
 123.11A Arching - soil pressure below active limit

Units: kN,m

Stage No.16 Apply water pressure profile no.1



Stage No.16 Apply water pressure profile no.1



| Checked :

Stage No.	Ground level		Prop Elev.	FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		Direction of failure
	Act.	Pass.		Factor of Safety	Moment equilib. at elev.	Toe elev.	Wall Penetr -ation	
1	4.00	4.00	---	Conditions not suitable for FoS calc.				
2	4.00	2.00	Cant.	11.615	-6.43	0.43	1.57	L to R
3	4.00	2.00		No analysis at this stage				
4	4.00	-1.50	2.00	6.952	n/a	-3.40	1.90	L to R
5	4.00	-1.50		No analysis at this stage				
All remaining stages have more than one prop - FoS calculation n/a								

Units: kN,m

Summary of results

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries:	Left side 30.00 from wall	Rough boundary
	Right side 20.00 from wall	Smooth boundary
Lower rigid boundary at elevation -20.00		Rough boundary

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement		Bending moment		Shear force	
		maximum	minimum	maximum	minimum	maximum	minimum
		m	m	kN.m/m	kN.m/m	kN/m	kN/m
1	4.00	0.016	0.000	0.0	-0.0	0.0	-82.5
2	3.45	0.016	0.000	0.4	-46.2	3.7	-77.7
3	2.90	0.015	0.000	4.8	-87.2	23.1	-68.3
4	2.40	0.016	0.000	17.7	-120.1	28.8	-59.6
5	2.00	0.016	0.000	30.5	-143.0	34.9	-104.7
6	1.60	0.017	0.000	12.8	-161.6	9.9	-97.7
7	1.20	0.017	0.000	16.0	-175.1	7.0	-89.0
8	0.60	0.017	0.000	19.2	-183.6	4.2	-72.6
9	0.00	0.018	0.000	21.1	-178.0	34.0	-52.0
10	-0.60	0.018	0.000	22.3	-175.0	72.3	-27.3
11	-0.95	0.018	0.000	22.9	-181.7	97.4	-11.0
12	-1.30	0.017	0.000	23.5	-182.5	124.7	-157.5
13	-1.50	0.017	0.000	23.9	-180.1	141.2	-147.1
14	-2.00	0.017	0.000	29.3	-178.3	185.5	-196.9
15	-2.50	0.017	0.000	26.9	-229.7	36.8	-148.5
16	-3.00	0.017	0.000	29.4	-265.4	43.8	-96.3
17	-3.50	0.017	0.000	32.8	-284.3	50.7	-52.6
18	-4.00	0.016	0.000	37.2	-285.3	57.4	-15.6
19	-4.50	0.016	0.000	42.5	-267.1	81.6	0.0
20	-5.00	0.016	0.000	48.4	-228.7	146.0	-25.3
21	-5.50	0.015	0.000	47.5	-183.3	94.6	-8.2
22	-6.00	0.014	0.000	40.2	-136.9	93.4	-17.6
23	-6.60	0.014	0.000	27.5	-83.6	85.0	-22.1
24	-7.20	0.013	0.000	13.7	-36.7	66.2	-21.4
25	-7.60	0.012	0.000	5.6	-13.5	45.9	-17.2
26	-8.00	0.012	0.000	0.0	-0.0	9.2	-3.8
27	-8.15	0.011	0.000	0.0	0.0	0.0	-0.0
28	-9.60	0.005	0.000	0.0	0.0	20.9	0.0
29	-10.80	0.001	0.000	0.0	0.0	69.2	0.0
30	-12.60	0.001	0.000	0.0	0.0	0.0	-0.0
31	-14.40	0.001	0.000	0.0	0.0	0.0	-0.0
32	-16.80	0.000	0.000	0.0	0.0	0.0	-0.0
33	-18.40	0.000	0.000	0.0	0.0	0.0	-0.0
34	-20.00	0.000	0.000	0.0	0.0	0.0	-0.0

Summary of results (continued)

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment				Shear force			
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>
	kN.m/m		kN.m/m		kN/m		kN/m	
1	0.0	3.45	-15.2	-2.00	6.8	-5.00	-3.8	1.20
2	48.4	-5.00	-0.0	4.00	12.5	-10.80	-22.1	-6.60
3	No calculation at this stage							
4	13.1	2.00	-182.5	-1.30	66.7	-5.00	-104.7	2.00
5	No calculation at this stage							
6	13.4	2.00	-174.9	-0.95	65.2	-5.00	-102.6	2.00
7	19.6	2.00	-285.3	-4.00	96.9	-5.00	-155.9	-1.30
8	30.5	2.00	-281.9	-4.00	95.6	-5.00	-157.5	-1.30
9	19.6	2.00	-285.3	-4.00	96.9	-5.00	-155.9	-1.30
10	No calculation at this stage							
11	No calculation at this stage							
12	19.6	2.00	-266.6	-4.00	91.9	-5.00	-124.1	-2.00
13	No calculation at this stage							
14	0.0	-8.00	-244.2	-4.00	95.5	-2.00	-142.6	-2.00
15	0.0	-8.00	-208.2	-4.00	105.5	-2.00	-149.9	-2.00
16	29.3	-2.00	-183.6	0.60	185.5	-2.00	-196.9	-2.00

Maximum and minimum displacement at each stage

Stage no.	Displacement				Stage description
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	
	m		m		
1	0.001	0.00	0.000	4.00	Apply surcharge no.1 at elev. 4.00
2	0.016	4.00	0.000	4.00	Excav. to elev. 2.00 on RIGHT side
3	No calculation at this stage				Install prop no.1 at elev. 2.00
4	0.016	4.00	0.000	4.00	Excav. to elev. -1.50 on RIGHT side
5	No calculation at this stage				Install prop no.2 at elev. -1.30
6	0.016	4.00	0.000	4.00	Apply water pressure profile no.2
7	0.017	-2.00	0.000	4.00	Excav. to elev. -5.00 on RIGHT side
8	0.017	-2.00	0.000	4.00	Apply load no.1 at elev. 2.90
9	0.017	-2.00	0.000	4.00	Apply load no.2 at elev. 2.90
10	No calculation at this stage				Install prop no.3 at elev. -5.00
11	No calculation at this stage				Install prop no.4 at elev. -2.00
12	0.017	-1.50	0.000	4.00	Remove prop no.2 at elev. -1.30
13	No calculation at this stage				Install prop no.5 at elev. 4.00
14	0.017	-0.95	0.000	4.00	Remove prop no.1 at elev. 2.00
15	0.017	-0.60	0.000	4.00	Change EI of wall to 400788kN.m2/m run
16	0.018	-0.60	0.000	4.00	Apply water pressure profile no.1

Summary of results (continued)

Prop forces at each stage (horizontal components)

Stage no.	--- Strut no. 1 --- at elev. 2.00		--- Strut no. 2 --- at elev.-1.30		--- Strut no. 3 --- at elev.-5.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
4	121.09	908.15	---	---	---	---
6	119.22	894.17	5.84	43.77	---	---
7	100.26	751.94	190.76	1430.68	---	---
8	113.51	851.29	191.39	1435.45	---	---
9	100.26	751.94	190.76	1430.68	---	---
12	124.33	932.50	---	---	-1.53	-1.53
14	---	---	---	---	-16.14	-16.14
15	---	---	---	---	-11.03	-11.03
16	---	---	---	---	171.36	171.36

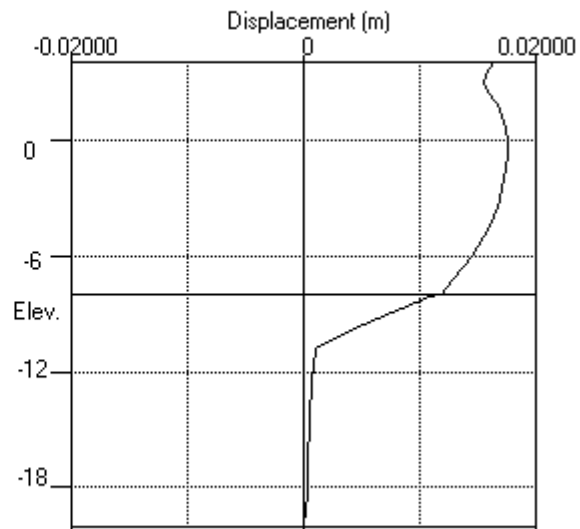
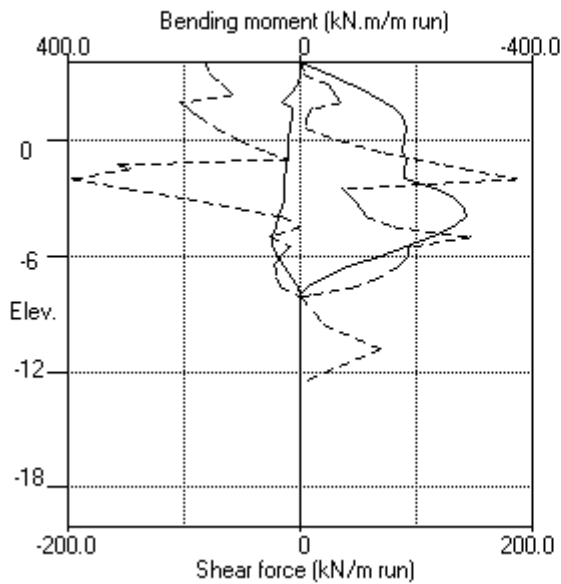
Stage no.	--- Strut no. 4 --- at elev.-2.00		--- Strut no. 5 --- at elev. 4.00	
	kN/m run	kN/prop	kN/m run	kN/prop
12	170.20	170.20	---	---
14	238.10	238.10	70.98	70.98
15	255.38	255.38	60.33	60.33
16	382.33	382.33	82.49	82.49

EDG CONSULTING PTY LTD
Program: WALLAP Version 6.07 Revision A55.B74.R58
Licensed from GEOSOLVE
Data filename/Run ID: Section_2
Albert Street Development
Section 2

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
| Checked :

Units: kN,m

Bending moment, shear force, displacement envelopes



Units: kN,m

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	----- Left side	Soil types ----- Right side
1	4.00	1 FL	1 FL
2	1.40	2 AL F	2 AL F
3	-4.30	4 RS F	4 RS F
4	-6.60	5 NFG 5	5 NFG 5
5	-11.00	6 NFG 3	6 NFG 3

SOIL PROPERTIES

-- Soil type --	Bulk density	Young's Modulus	At rest coeff.	Consol state.	Active limit	Passive limit	Cohesion
No. Description (Datum elev.)	kN/m3	Eh, kN/m2 (dEh/dy)	Ko (dKo/dy)	NC/OC (Nu)	Ka (Kac)	Kp (Kpc)	kN/m2 (dc/dy)
1 FL	17.00	10000	0.700	OC (0.300)	0.309 (0.000)	3.868 (0.000)	
2 AL F (1.40)	17.00	5000 (500.0)	0.700	OC (0.300)	0.351 (1.391)	3.442 (5.007)	4.000d
3 Not defined							
4 RS F	20.00	30000	1.000	OC (0.300)	0.283 (1.241)	4.369 (5.836)	10.00d
5 NFG 5	23.00	50000	1.000	OC (0.300)	0.292 (1.226)	4.369 (5.836)	20.00d
6 NFG 3	27.00	1000000	1.000	OC (0.200)	0.146 (0.854)	13.89 (12.886)	250.0d

Additional soil parameters associated with Ka and Kp

----- Soil type -----	--- parameters for Ka ---	--- parameters for Kp ---
No. Description	Soil friction angle	Soil friction angle
1 FL	28.00	28.00
2 AL F	25.00	26.00
3 Not defined		
4 RS F	30.00	30.00
5 NFG 5	30.00	30.00
6 NFG 3	45.00	45.00

GROUND WATER CONDITIONS

Density of water = 10.00 kN/m3

	Left side	Right side
Initial water table elevation	-4.00	-4.00

Automatic water pressure balancing at toe of wall : No

Water press.	----- Left side	----- Right side
profile Point no.	Elev. Piezo elev. Water press.	Point Elev. Piezo elev. Water press.
	m m kN/m2	m m kN/m2
1 1	4.00 4.00 0.0	1 -5.00 -5.00 0.0
2 1	-4.00 -4.00 0.0	1 -5.00 -5.00 0.0

WALL PROPERTIES

Type of structure = Fully Embedded Wall
 Elevation of toe of wall = -8.00
 Maximum finite element length = 0.60 m
 Youngs modulus of wall E = 3.2800E+07 kN/m2
 Moment of inertia of wall I = 0.010742 m4/m run
 E.I = 352338 kN.m2/m run
 Yield Moment of wall = Not defined

STRUTS and ANCHORS

Prop no.	Elev.	Prop spacing m	Cross- section area sq.m	Youngs modulus kN/m2	Free length m	Inclin -ation (degs)	Pre- stress /prop kN	Strut or Anchor	Allow tension ?	L/R
1	2.00	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
2	-1.30	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
3	-5.00	1.00	0.150000	3.280E+07	20.00	0.00	0	Strut	Yes	R
4	-2.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
5	4.00	1.00	0.400000	3.280E+07	20.00	0.00	0	Strut	Yes	R

HORIZONTAL and MOMENT LOADS/RESTRAINTS

Load no.	Elevation	Horizontal load kN/m run	Moment load kN.m/m run	Moment restraint kN.m/m/rad	Partial factor (Category)
1	2.30	34.00	0	0	N/A
2	2.30	-34.00	0	0	N/A

SURCHARGE LOADS

Surch -arge no.	Elev.	Distance from wall	Length parallel to wall	Width perpend. to wall	Surcharge ----- Near edge	Surcharge ----- Far edge	Equiv. soil type	Partial factor/ Category
1	4.00	3.00 (L)	100.00	100.00	10.00	=	N/A	N/A

Note: L = Left side, R = Right side

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Apply surcharge no.1 at elevation 4.00
2	Excavate to elevation 2.00 on RIGHT side
3	Install strut or anchor no.1 at elevation 2.00
4	Excavate to elevation -1.50 on RIGHT side
5	Install strut or anchor no.2 at elevation -1.30
6	Apply water pressure profile no.2
7	Excavate to elevation -5.00 on RIGHT side
8	Apply load no.1 at elevation 2.30
9	Apply load no.2 at elevation 2.30
10	Install strut or anchor no.3 at elevation -5.00
11	Install strut or anchor no.4 at elevation -2.00
12	Remove strut or anchor no.2 at elevation -1.30
13	Install strut or anchor no.5 at elevation 4.00
14	Remove strut or anchor no.1 at elevation 2.00
15	Change EI of wall to 246637 kN.m2/m run Allow wall to relax with new modulus value
16	Apply water pressure profile no.1

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:

Method of analysis - Burland-Potts

Factor on passive for calculating wall depth = 1.50

Parameters for undrained strata:

Minimum equivalent fluid density = 5.00 kN/m³

Maximum depth of water filled tension crack = 0.00 m

Bending moment and displacement calculation:

Method - 2-D finite element model

Open Tension Crack analysis? - No

Active limit arching modelled? - Yes

Non-linear Modulus Parameter (L) = 9.000 m

Boundary conditions:

Length of wall (normal to plane of analysis) = 40.00 m

Width of excavation on Left side of wall = 60.00 m

Width of excavation on Right side of wall = 60.00 m

Distance to rigid boundary on Left side = 20.00 m

Distance to rigid boundary on Right side = 30.00 m

Elevation of rigid lower boundary = -20.00

Lower rigid boundary at elevation -20.00 - Rough

Rigid boundary on Left side - Rough

Rigid boundary on Right side - Smooth

Wall / soil interface - Rough

OUTPUT OPTIONS

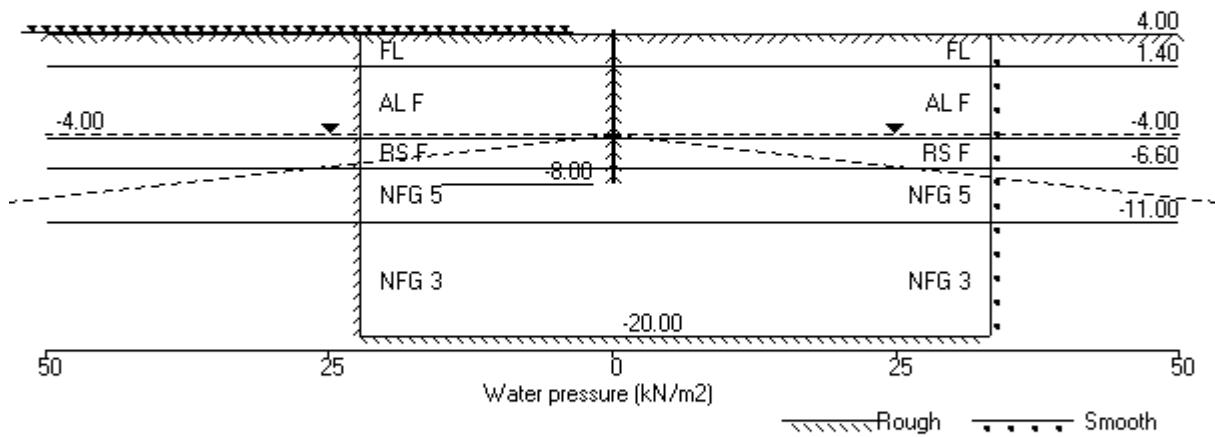
Stage no.	Stage description	Displacement Bending mom. Shear force	Active, Passive pressures	Graph. output
1	Apply surcharge no.1 at elev. 4.00	Yes	Yes	Yes
2	Excav. to elev. 2.00 on RIGHT side	Yes	Yes	Yes
3	Install prop no.1 at elev. 2.00	Yes	Yes	Yes
4	Excav. to elev. -1.50 on RIGHT side	Yes	Yes	Yes
5	Install prop no.2 at elev. -1.30	Yes	Yes	Yes
6	Apply water pressure profile no.2	Yes	Yes	Yes
7	Excav. to elev. -5.00 on RIGHT side	Yes	Yes	Yes
8	Apply load no.1 at elev. 2.30	Yes	Yes	Yes
9	Apply load no.2 at elev. 2.30	Yes	Yes	Yes
10	Install prop no.3 at elev. -5.00	Yes	Yes	Yes
11	Install prop no.4 at elev. -2.00	Yes	Yes	Yes
12	Remove prop no.2 at elev. -1.30	Yes	Yes	Yes
13	Install prop no.5 at elev. 4.00	Yes	Yes	Yes
14	Remove prop no.1 at elev. 2.00	Yes	Yes	Yes
15	Change EI of wall to 246637kN.m ² /m run	Yes	Yes	Yes
16	Apply water pressure profile no.1	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Units: kN,m

Stage No. 1 Apply surcharge no.1 at elevation 4.00

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe		Toe elev. for			
			elev. = -8.00		FoS = 1.500			
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>	
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	
				<u>Safety</u>	<u>at elev.</u>	<u>-ation</u>	<u>of</u>	
				<u>Conditions not</u>	<u>suitable for</u>	<u>FoS calc.</u>	<u>failure</u>	
1	4.00	4.00	---					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.000	-2.31E-05	0.0	-0.0		352338
2	3.50	-0.86	0.000	-2.31E-05	-0.2	0.0		352338
3	3.00	-0.75	0.000	-2.29E-05	-0.6	-0.2		352338
4	2.65	-0.70	0.000	-2.26E-05	-0.9	-0.5		352338
5	2.30	-0.63	0.000	-2.20E-05	-1.1	-0.8		352338
6	2.00	-0.54	0.000	-2.11E-05	-1.3	-1.2		352338
7	1.40	-0.31	0.000	-1.84E-05	-1.5	-2.0		352338
		0.14	0.000	-1.84E-05	-1.5	-2.0		
8	1.00	0.18	0.000	-1.57E-05	-1.5	-2.6		352338
9	0.60	0.27	0.000	-1.24E-05	-1.4	-3.2		352338
10	0.00	0.45	0.000	-6.39E-06	-1.2	-4.0		352338
11	-0.60	0.62	0.000	8.69E-07	-0.8	-4.6		352338
12	-0.95	0.69	0.000	5.53E-06	-0.6	-4.8		352338
13	-1.30	0.77	0.000	1.04E-05	-0.4	-5.0		352338
14	-1.50	0.79	0.000	1.32E-05	-0.2	-5.0		352338
15	-2.00	0.91	0.000	2.04E-05	0.2	-5.0		352338
16	-2.50	0.99	0.000	2.73E-05	0.7	-4.8		352338
17	-3.00	1.06	0.000	3.38E-05	1.2	-4.3		352338
18	-3.50	1.10	0.000	3.95E-05	1.8	-3.6		352338
19	-4.00	1.06	0.000	4.38E-05	2.3	-2.6		352338
20	-4.30	0.84	0.000	4.57E-05	2.6	-1.8		352338
		-3.72	0.000	4.57E-05	2.6	-1.8		
21	-4.65	-1.70	0.000	4.72E-05	1.6	-1.2		352338
22	-5.00	-0.98	0.000	4.81E-05	1.2	-0.7		352338
23	-5.50	-0.52	0.000	4.88E-05	0.8	-0.2		352338
24	-6.00	-0.24	0.000	4.89E-05	0.6	0.1		352338
25	-6.60	-0.09	0.000	4.84E-05	0.5	0.4		352338
		-2.02	0.000	4.84E-05	0.5	0.4		
26	-7.20	-0.69	0.000	4.78E-05	-0.3	0.3		352338
27	-7.60	0.12	0.000	4.75E-05	-0.4	0.2		352338
28	-8.00	1.49	0.000	4.74E-05	-0.1	0.0		0
29	-8.15	-0.04	0.000	0	-0.0	0.0		0
30	-9.57	0.00	0.000	0	-0.0	0.0		0

(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
31	-11.00	2.96	0.000	0	2.1	0.0		0
		-2.47	0.000	0	2.1	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	-0.00	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	-0.0	0.0		0
36	-20.00	0.00	0.000	0	0.0	0.0		---

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	5.51	5.51	9981
3	3.00	0.00	17.14	5.30	66.30	11.54	11.54	9981
4	2.65	0.00	23.26	7.19	89.97	15.77	15.77	9981
5	2.30	0.00	29.45	9.10	113.93	20.02	20.02	9981
6	2.00	0.00	34.80	10.76	134.63	23.69	23.69	9981
7	1.40	0.00	45.59	14.09	176.37	31.07	31.07	9981
		0.00	45.59	10.45	176.98	31.30	31.30	4991
8	1.00	0.00	52.82	12.99	201.83	36.17	36.17	5190
9	0.60	0.00	60.04	15.53	226.69	41.07	41.07	5390
10	0.00	0.00	70.85	19.32	263.90	48.43	48.43	5689
11	-0.60	0.00	81.60	23.10	300.93	55.77	55.77	5989
12	-0.95	0.00	87.86	25.30	322.45	60.04	60.04	6163
13	-1.30	0.00	94.09	27.49	343.90	64.30	64.30	6338
14	-1.50	0.00	97.64	28.73	356.13	66.73	66.73	6438
15	-2.00	0.00	106.49	31.84	386.61	72.81	72.81	6687
16	-2.50	0.00	115.32	34.94	416.97	78.87	78.87	6937
17	-3.00	0.00	124.11	38.03	447.23	84.92	84.92	7186
18	-3.50	0.00	132.87	41.11	477.39	90.94	90.94	7436
19	-4.00	0.00	141.61	44.18	507.47	96.92	96.92	7685
20	-4.30	3.00	143.84	44.96	515.15	98.32	101.32	7835
		3.00	143.84	28.34	686.84	137.48	140.48	29943
21	-4.65	6.50	147.48	29.38	702.77	142.00	148.50	29943
22	-5.00	10.00	151.12	30.41	718.65	145.89	155.89	29943
23	-5.50	15.00	156.30	31.87	741.28	151.15	166.15	29943
24	-6.00	20.00	161.46	33.34	763.84	156.33	176.33	29943
25	-6.60	26.00	167.64	35.09	790.83	162.45	188.45	29943
		26.00	167.64	24.47	849.19	161.48	187.48	49905
26	-7.20	32.00	175.60	26.80	883.98	169.97	201.97	49905
27	-7.60	36.00	180.90	28.35	907.12	175.60	211.60	49905
28	-8.00	40.00	186.19	29.90	930.25	181.48	221.48	49905
29	-8.15	41.50	188.17	30.48	938.91	182.71	224.21	49905
30	-9.57	55.75	206.97	35.97	1021.06	201.31	257.06	49905
31	-11.00	70.00	225.72	41.45	1102.96	221.37	291.37	49905
		70.00	225.72	0.00	6355.77	217.95	287.95	998109
32	-12.70	87.00	254.82	0.00	6759.93	248.11	335.11	998109
33	-14.40	104.00	283.88	0.00	7163.41	277.03	381.03	998109
34	-16.80	128.00	324.84	0.00	7732.14	317.86	445.86	998109
35	-18.40	144.00	352.11	0.00	8110.84	345.08	489.08	998109
36	-20.00	160.00	379.36	0.00	8489.23	372.08	532.08	998109

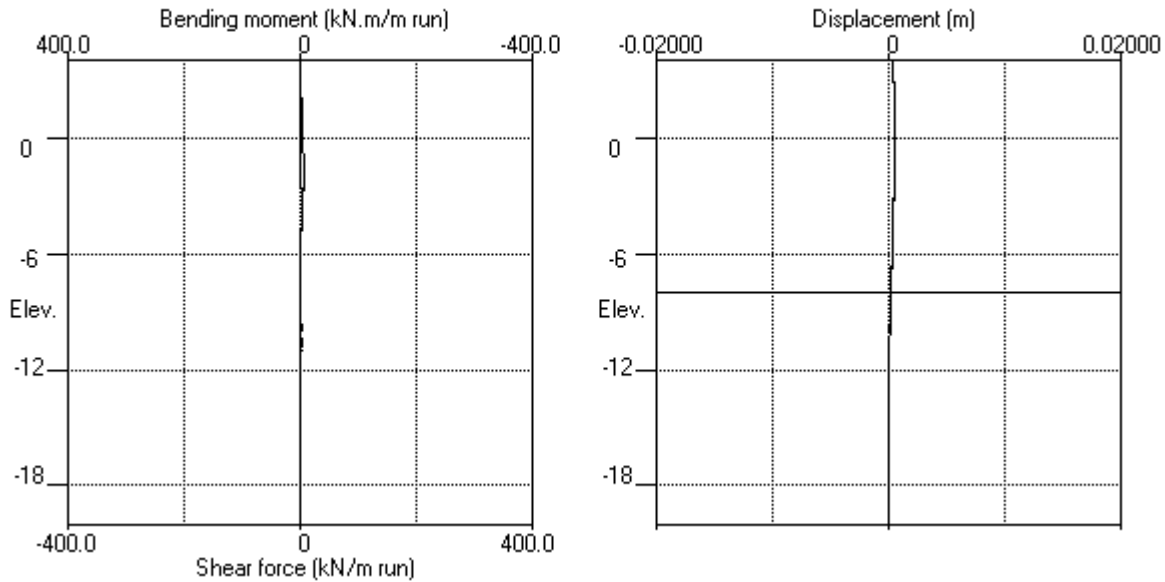
(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

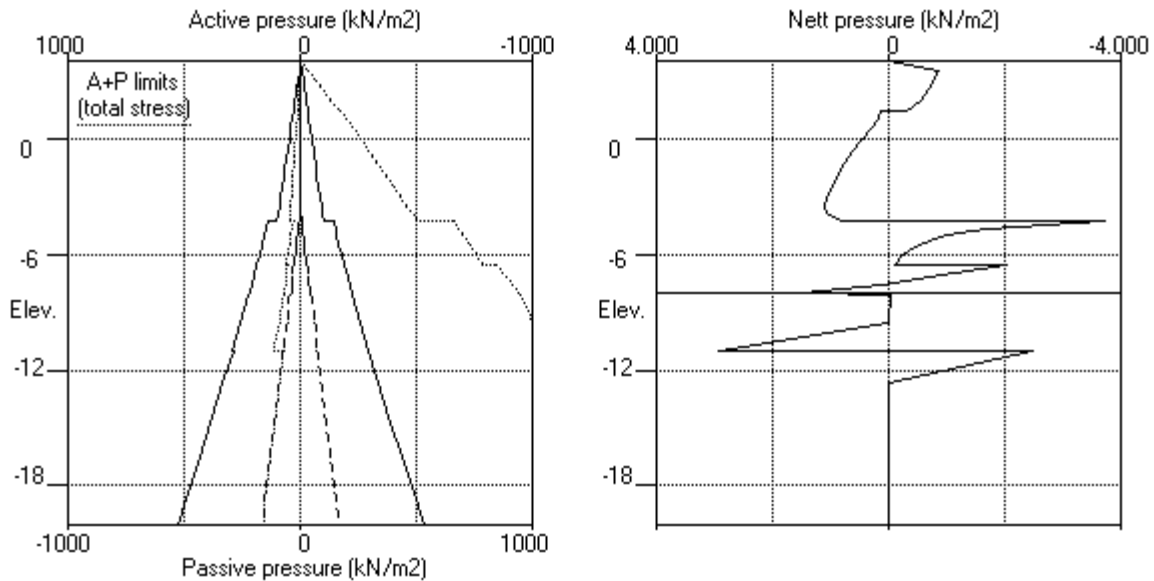
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	10053
2	3.50	0.00	8.50	2.63	32.88	6.37	6.37	10053
3	3.00	0.00	17.00	5.25	65.76	12.29	12.29	10053
4	2.65	0.00	22.95	7.09	88.78	16.47	16.47	10053
5	2.30	0.00	28.90	8.93	111.79	20.65	20.65	10053
6	2.00	0.00	34.00	10.51	131.52	24.23	24.23	10053
7	1.40	0.00	44.20	13.66	170.98	31.38	31.38	10053
		0.00	44.20	9.96	172.18	31.16	31.16	5027
8	1.00	0.00	51.00	12.35	195.58	35.99	35.99	5228
9	0.60	0.00	57.80	14.74	218.99	40.80	40.80	5429
10	0.00	0.00	68.00	18.32	254.10	47.98	47.98	5730
11	-0.60	0.00	78.20	21.91	289.21	55.15	55.15	6032
12	-0.95	0.00	84.15	24.00	309.69	59.35	59.35	6208
13	-1.30	0.00	90.10	26.09	330.17	63.53	63.53	6384
14	-1.50	0.00	93.50	27.28	341.88	65.93	65.93	6484
15	-2.00	0.00	102.00	30.27	371.14	71.90	71.90	6736
16	-2.50	0.00	110.50	33.25	400.40	77.88	77.88	6987
17	-3.00	0.00	119.00	36.24	429.66	83.86	83.86	7238
18	-3.50	0.00	127.50	39.22	458.91	89.85	89.85	7490
19	-4.00	0.00	136.00	42.21	488.17	95.87	95.87	7741
20	-4.30	3.00	138.10	42.95	495.40	97.48	100.48	7892
		3.00	138.10	26.72	661.77	141.20	144.20	30160
21	-4.65	6.50	141.60	27.71	677.06	143.70	150.20	30160
22	-5.00	10.00	145.10	28.70	692.36	146.87	156.87	30160
23	-5.50	15.00	150.10	30.12	714.20	151.68	166.68	30160
24	-6.00	20.00	155.10	31.53	736.05	156.57	176.57	30160
25	-6.60	26.00	161.10	33.23	762.27	162.54	188.54	30160
		26.00	161.10	22.56	820.63	163.50	189.50	50266
26	-7.20	32.00	168.90	24.84	854.71	170.67	202.67	50266
27	-7.60	36.00	174.10	26.36	877.43	175.48	211.48	50266
28	-8.00	40.00	179.30	27.88	900.15	179.99	219.99	50266
29	-8.15	41.50	181.25	28.45	908.67	182.74	224.24	50266
30	-9.57	55.75	199.78	33.87	989.61	201.31	257.06	50266
31	-11.00	70.00	218.30	39.28	1070.56	218.41	288.41	50266
		70.00	218.30	0.00	6252.79	220.42	290.42	1005321
32	-12.70	87.00	247.20	0.00	6654.09	248.11	335.11	1005321
33	-14.40	104.00	276.10	0.00	7055.40	277.03	381.03	1005321
34	-16.80	128.00	316.90	0.00	7621.94	317.86	445.86	1005321
35	-18.40	144.00	344.10	0.00	7999.64	345.08	489.08	1005321
36	-20.00	160.00	371.30	0.00	8377.34	372.08	532.08	1005321

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Stage No.1 Apply surcharge no.1 at elev. 4.00

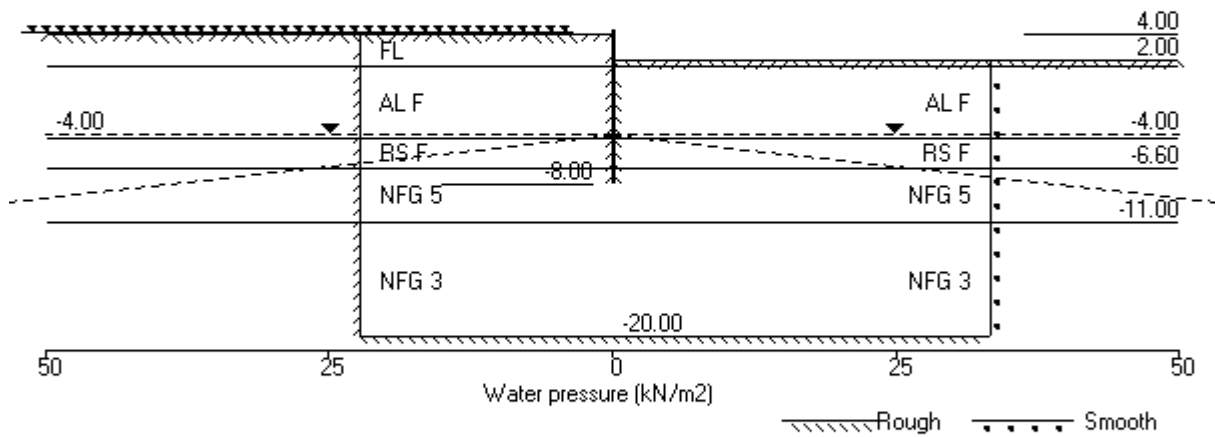


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Units: kN,m

Stage No. 2 Excavate to elevation 2.00 on RIGHT side

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
2	4.00	2.00	Cant.	12.309	-6.51	0.02	1.98	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.017	1.72E-03	0.0	-0.0		352338
2	3.50	2.63	0.016	1.72E-03	0.7	0.3		352338
3	3.00	5.30	0.015	1.71E-03	2.6	1.2		352338
4	2.65	7.19	0.014	1.71E-03	4.8	2.5		352338
5	2.30	9.10	0.014	1.71E-03	7.7	4.7		352338
6	2.00	10.76	0.013	1.70E-03	10.7	7.5		352338
7	1.40	-17.90	0.012	1.68E-03	8.5	15.3		352338
		-1.36	0.012	1.68E-03	8.5	15.3		
8	1.00	-1.99	0.011	1.67E-03	7.8	18.6		352338
9	0.60	-1.79	0.011	1.64E-03	7.1	21.5		352338
10	0.00	-0.80	0.010	1.60E-03	6.3	25.5		352338
11	-0.60	0.20	0.009	1.56E-03	6.1	29.1		352338
12	-0.95	0.87	0.008	1.53E-03	6.3	31.3		352338
13	-1.30	1.41	0.008	1.49E-03	6.7	33.6		352338
14	-1.50	1.82	0.008	1.47E-03	7.0	34.9		352338
15	-2.00	2.47	0.007	1.42E-03	8.1	38.7		352338
16	-2.50	3.04	0.006	1.36E-03	9.5	43.0		352338
17	-3.00	3.31	0.005	1.30E-03	11.1	48.2		352338
18	-3.50	2.93	0.005	1.23E-03	12.6	54.1		352338
19	-4.00	1.19	0.004	1.15E-03	13.7	60.8		352338
20	-4.30	-3.19	0.004	1.09E-03	13.4	65.0		352338
		-60.21	0.004	1.09E-03	13.4	65.0		
21	-4.65	-29.02	0.003	1.03E-03	-2.3	66.0		352338
22	-5.00	-16.57	0.003	9.67E-04	-10.2	63.4		352338
23	-5.50	-9.21	0.003	8.82E-04	-16.7	56.2		352338
24	-6.00	-4.57	0.002	8.09E-04	-20.1	46.7		352338
25	-6.60	-2.43	0.002	7.40E-04	-22.2	33.8		352338
		-15.62	0.002	7.40E-04	-22.2	33.8		
26	-7.20	1.95	0.001	6.97E-04	-26.3	17.7		352338
27	-7.60	19.13	0.001	6.82E-04	-22.1	7.3		352338
28	-8.00	66.48	0.001	6.78E-04	-5.0	-0.0		0
29	-8.15	-0.03	0.001	0	-0.0	0.0		0
30	-9.57	0.00	0.001	0	-0.0	0.0		0

(continued)

Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
31	-11.00	16.48	0.000	0	11.7	0.0		0
		-13.81	0.000	0	11.7	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.00	0.000	0	-0.0	0.0		0
34	-16.80	0.00	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---

LEFT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	2.63	2.63a	9981
3	3.00	0.00	17.14	5.30	66.30	5.30	5.30a	9981
4	2.65	0.00	23.26	7.19	89.97	7.19	7.19a	9981
5	2.30	0.00	29.45	9.10	113.93	9.10	9.10a	9981
6	2.00	0.00	34.80	10.76	134.63	10.76	10.76a	9981
7	1.40	0.00	45.59	14.09	176.37	19.68	19.68	9981
		0.00	45.59	10.45	176.98	25.61	25.61	4991
8	1.00	0.00	52.82	12.99	201.83	29.14	29.14	5190
9	0.60	0.00	60.04	15.53	226.69	33.76	33.76	5390
10	0.00	0.00	70.85	19.32	263.90	41.22	41.22	5689
11	-0.60	0.00	81.60	23.10	300.93	48.78	48.78	5989
12	-0.95	0.00	87.86	25.30	322.45	53.23	53.23	6163
13	-1.30	0.00	94.09	27.49	343.90	57.66	57.66	6338
14	-1.50	0.00	97.64	28.73	356.13	60.22	60.22	6438
15	-2.00	0.00	106.49	31.84	386.61	66.51	66.51	6687
16	-2.50	0.00	115.32	34.94	416.97	72.75	72.75	6937
17	-3.00	0.00	124.11	38.03	447.23	78.85	78.85	7186
18	-3.50	0.00	132.87	41.11	477.39	84.62	84.62	7436
19	-4.00	0.00	141.61	44.18	507.47	89.71	89.71	7685
20	-4.30	3.00	143.84	44.96	515.15	89.14	92.14	7835
		3.00	143.84	28.34	686.84	102.40	105.40	29943
21	-4.65	6.50	147.48	29.38	702.77	121.06	127.56	29943
22	-5.00	10.00	151.12	30.41	718.65	130.81	140.81	29943
23	-5.50	15.00	156.30	31.87	741.28	139.51	154.51	29943
24	-6.00	20.00	161.46	33.34	763.84	146.84	166.84	29943
25	-6.60	26.00	167.64	35.09	790.83	154.01	180.01	29943
		26.00	167.64	24.47	849.19	147.41	173.41	49905
26	-7.20	32.00	175.60	26.80	883.98	163.94	195.94	49905
27	-7.60	36.00	180.90	28.35	907.12	177.84	213.84	49905
28	-8.00	40.00	186.19	29.90	930.25	205.46	245.46	49905
29	-8.15	41.50	188.17	30.48	938.91	175.63	217.13	49905
30	-9.57	55.75	206.97	35.97	1021.06	193.97	249.72	49905
31	-11.00	70.00	225.72	41.45	1102.96	220.86	290.86	49905
		70.00	225.72	0.00	6355.77	207.77	277.77	998109
32	-12.70	87.00	254.82	0.00	6759.93	243.52	330.52	998109
33	-14.40	104.00	283.88	0.00	7163.41	272.45	376.45	998109
34	-16.80	128.00	324.84	0.00	7732.14	313.36	441.36	998109
35	-18.40	144.00	352.11	0.00	8110.84	340.68	484.68	998109
36	-20.00	160.00	379.36	0.00	8489.23	366.88	526.88	998109

(continued)

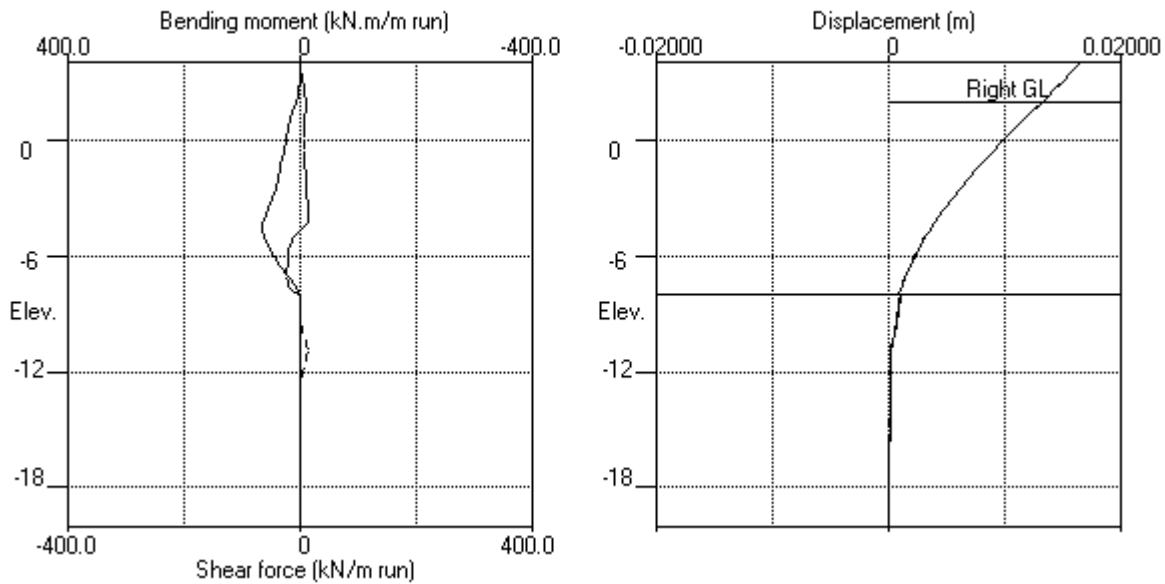
Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>kN/m2</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>kN/m2</u>
		<u>Water</u> <u>press.</u> <u>kN/m2</u>	<u>Vertic</u> <u>-al</u> <u>kN/m2</u>	<u>Active</u> <u>limit</u> <u>kN/m2</u>	<u>Passive</u> <u>limit</u> <u>kN/m2</u>	<u>Earth</u> <u>pressure</u> <u>kN/m2</u>		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	0.00	0.00	0.00	10048
7	1.40	0.00	10.20	3.15	39.46	37.58	37.58	10048
		0.00	10.20	0.00	55.14	26.97	26.97	5024
8	1.00	0.00	17.00	0.41	78.55	31.14	31.14	5225
9	0.60	0.00	23.80	2.80	101.96	35.55	35.55	5426
10	0.00	0.00	34.00	6.38	137.07	42.02	42.02	5727
11	-0.60	0.00	44.20	9.96	172.18	48.57	48.57	6029
12	-0.95	0.00	50.15	12.05	192.66	52.36	52.36	6205
13	-1.30	0.00	56.10	14.14	213.15	56.25	56.25	6381
14	-1.50	0.00	59.50	15.34	224.85	58.40	58.40	6481
15	-2.00	0.00	68.00	18.32	254.12	64.03	64.03	6732
16	-2.50	0.00	76.51	21.31	283.38	69.71	69.71	6984
17	-3.00	0.00	85.01	24.30	312.65	75.54	75.54	7235
18	-3.50	0.00	93.51	27.28	341.92	81.69	81.69	7486
19	-4.00	0.00	102.01	30.27	371.19	88.52	88.52	7737
20	-4.30	3.00	104.12	31.01	378.42	92.33	95.33	7888
		3.00	104.12	17.09	513.28	162.62	165.62	30145
21	-4.65	6.50	107.62	18.08	528.59	150.08	156.58	30145
22	-5.00	10.00	111.12	19.07	543.90	147.38	157.38	30145
23	-5.50	15.00	116.13	20.49	565.77	148.72	163.72	30145
24	-6.00	20.00	121.13	21.91	587.64	151.42	171.42	30145
25	-6.60	26.00	127.14	23.61	613.89	156.43	182.43	30145
		26.00	127.14	12.64	672.25	163.03	189.03	50241
26	-7.20	32.00	134.95	14.92	706.37	161.99	193.99	50241
27	-7.60	36.00	140.16	16.44	729.12	158.72	194.72	50241
28	-8.00	40.00	145.36	17.97	751.87	138.98	178.98	50241
29	-8.15	41.50	147.32	18.54	760.41	175.66	217.16	50241
30	-9.57	55.75	165.87	23.96	841.49	193.96	249.71	50241
31	-11.00	70.00	184.44	29.38	922.60	204.38	274.38	50241
		70.00	184.44	0.00	5782.59	221.58	291.58	1004823
32	-12.70	87.00	213.40	0.00	6184.72	243.52	330.52	1004823
33	-14.40	104.00	242.37	0.00	6587.03	272.45	376.45	1004823
34	-16.80	128.00	283.30	0.00	7155.33	313.36	441.36	1004823
35	-18.40	144.00	310.60	0.00	7534.42	340.67	484.67	1004823
36	-20.00	160.00	337.91	0.00	7913.70	366.89	526.89	1004823

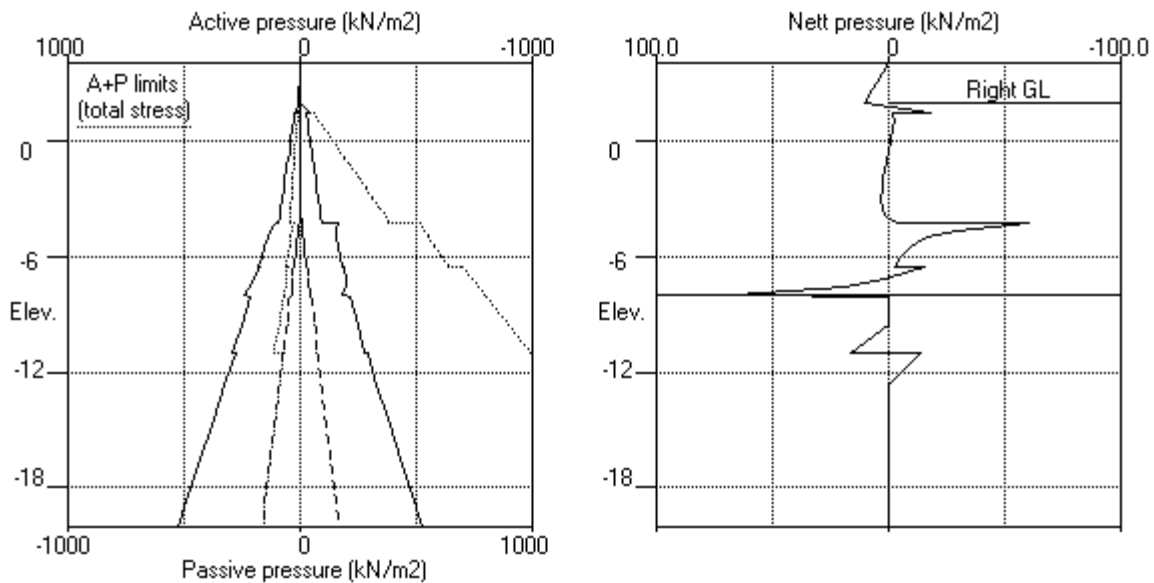
Note: 10.76 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Stage No.2 Excav. to elev. 2.00 on RIGHT side

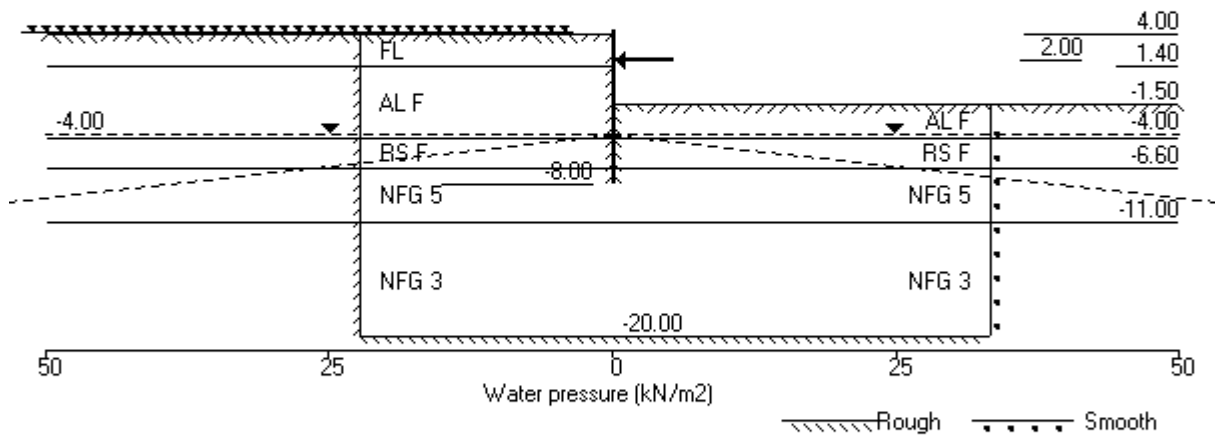


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Units: kN,m

Stage No. 4 Excavate to elevation -1.50 on RIGHT side

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

Stage No.	Ground level		Prop Elev.	FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		Direction of failure
	Act.	Pass.		Factor of Safety	Moment of equilib. at elev.	Toe elev.	Wall Penetr -ation	
4	4.00	-1.50	2.00	8.697	n/a	-3.28	1.78	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m ²	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m ² /m
1	4.00	0.00	0.015	3.32E-04	0.0	-0.0		352338
2	3.50	9.31	0.015	3.32E-04	2.3	0.3		352338
3	3.00	9.23	0.015	3.30E-04	7.0	2.8		352338
4	2.65	9.21	0.015	3.26E-04	10.2	5.9		352338
5	2.30	9.58	0.015	3.18E-04	13.5	10.2		352338
6	2.00	9.21	0.015	3.07E-04	16.3	14.7	-103.2	352338
		9.21	0.015	3.07E-04	-86.9	14.7		
7	1.40	15.68	0.014	3.24E-04	-79.4	-34.1		352338
		23.61	0.014	3.24E-04	-79.4	-34.1		
8	1.00	26.23	0.014	3.79E-04	-69.5	-63.9		352338
9	0.60	30.00	0.014	4.66E-04	-58.2	-89.4		352338
10	0.00	36.44	0.014	6.43E-04	-38.3	-118.5		352338
11	-0.60	43.09	0.013	8.59E-04	-14.4	-134.5		352338
12	-0.95	46.83	0.013	9.94E-04	1.3	-136.9		352338
13	-1.30	50.88	0.013	1.12E-03	18.4	-133.5		352338
14	-1.50	53.03	0.012	1.20E-03	28.8	-128.7		352338
		33.00	0.012	1.20E-03	28.8	-128.7		
15	-2.00	13.40	0.012	1.37E-03	40.4	-110.7		352338
16	-2.50	13.54	0.011	1.51E-03	47.2	-88.8		352338
17	-3.00	13.22	0.010	1.62E-03	53.8	-63.6		352338
18	-3.50	12.07	0.009	1.69E-03	60.2	-35.0		352338
19	-4.00	8.74	0.009	1.71E-03	65.4	-3.4		352338
20	-4.30	1.11	0.008	1.71E-03	66.8	16.6		352338
		-115.76	0.008	1.71E-03	66.8	16.6		
21	-4.65	-59.14	0.007	1.68E-03	36.2	32.9		352338
22	-5.00	-37.39	0.007	1.65E-03	19.3	42.0		352338
23	-5.50	-24.00	0.006	1.58E-03	4.0	47.0		352338
24	-6.00	-15.23	0.005	1.52E-03	-5.8	46.0		352338
25	-6.60	-10.82	0.004	1.45E-03	-13.6	39.7		352338
		-46.61	0.004	1.45E-03	-13.6	39.7		
26	-7.20	-10.64	0.004	1.39E-03	-30.8	23.2		352338
27	-7.60	19.77	0.003	1.37E-03	-29.0	10.0		352338
28	-8.00	91.00	0.002	1.37E-03	-6.8	-0.0		0

(continued)

Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
29	-8.15	-0.03	0.003	0	-0.0	0.0		0
30	-9.57	0.01	0.002	0	-0.0	0.0		0
31	-11.00	40.24	0.000	0	28.7	0.0		0
		-33.72	0.000	0	28.7	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.00	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 2.00		Prop force = 103.2 kN/m run						

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	9.31	9.31	9981
3	3.00	0.00	17.14	5.30	66.30	9.23	9.23	9981
4	2.65	0.00	23.26	7.19	89.97	9.21	9.21	9981
5	2.30	0.00	29.45	9.10	113.93	9.58	9.58	9981
6	2.00	0.00	34.80	10.76	134.63	9.21	9.21A	9981
7	1.40	0.00	45.59	14.09	176.37	15.68	15.68	9981
		0.00	45.59	10.45	176.98	23.61	23.61	4991
8	1.00	0.00	52.82	12.99	201.83	26.23	26.23	5190
9	0.60	0.00	60.04	15.53	226.69	30.00	30.00	5390
10	0.00	0.00	70.85	19.32	263.90	36.44	36.44	5689
11	-0.60	0.00	81.60	23.10	300.93	43.09	43.09	5989
12	-0.95	0.00	87.86	25.30	322.45	46.83	46.83	6163
13	-1.30	0.00	94.09	27.49	343.90	50.88	50.88	6338
14	-1.50	0.00	97.64	28.73	356.13	53.03	53.03	6438
15	-2.00	0.00	106.49	31.84	386.61	59.02	59.02	6687
16	-2.50	0.00	115.32	34.94	416.97	64.95	64.95	6937
17	-3.00	0.00	124.11	38.03	447.23	70.80	70.80	7186
18	-3.50	0.00	132.87	41.11	477.39	76.23	76.23	7436
19	-4.00	0.00	141.61	44.18	507.47	80.54	80.54	7685
20	-4.30	3.00	143.84	44.96	515.15	78.59	81.59	7835
		3.00	143.84	28.34	686.84	62.07	65.07	29943
21	-4.65	6.50	147.48	29.38	702.77	93.06	99.56	29943
22	-5.00	10.00	151.12	30.41	718.65	107.47	117.47	29943
23	-5.50	15.00	156.30	31.87	741.28	119.20	134.20	29943
24	-6.00	20.00	161.46	33.34	763.84	128.62	148.62	29943
25	-6.60	26.00	167.64	35.09	790.83	137.02	163.02	29943
		26.00	167.64	24.47	849.19	119.10	145.10	49905
26	-7.20	32.00	175.60	26.80	883.98	144.77	176.77	49905
27	-7.60	36.00	180.90	28.35	907.12	165.34	201.34	49905
28	-8.00	40.00	186.19	29.90	930.25	204.37	244.37	49905
29	-8.15	41.50	188.17	30.48	938.91	162.90	204.40	49905
30	-9.57	55.75	206.97	35.97	1021.06	181.15	236.90	49905
31	-11.00	70.00	225.72	41.45	1102.96	219.97	289.97	49905
		70.00	225.72	0.00	6355.77	190.00	260.00	998109
32	-12.70	87.00	254.82	0.00	6759.93	235.72	322.72	998109
33	-14.40	104.00	283.88	0.00	7163.41	264.70	368.70	998109
34	-16.80	128.00	324.84	0.00	7732.14	305.70	433.70	998109
35	-18.40	144.00	352.11	0.00	8110.84	333.09	477.09	998109
36	-20.00	160.00	379.36	0.00	8489.23	357.77	517.77	998109

(continued)

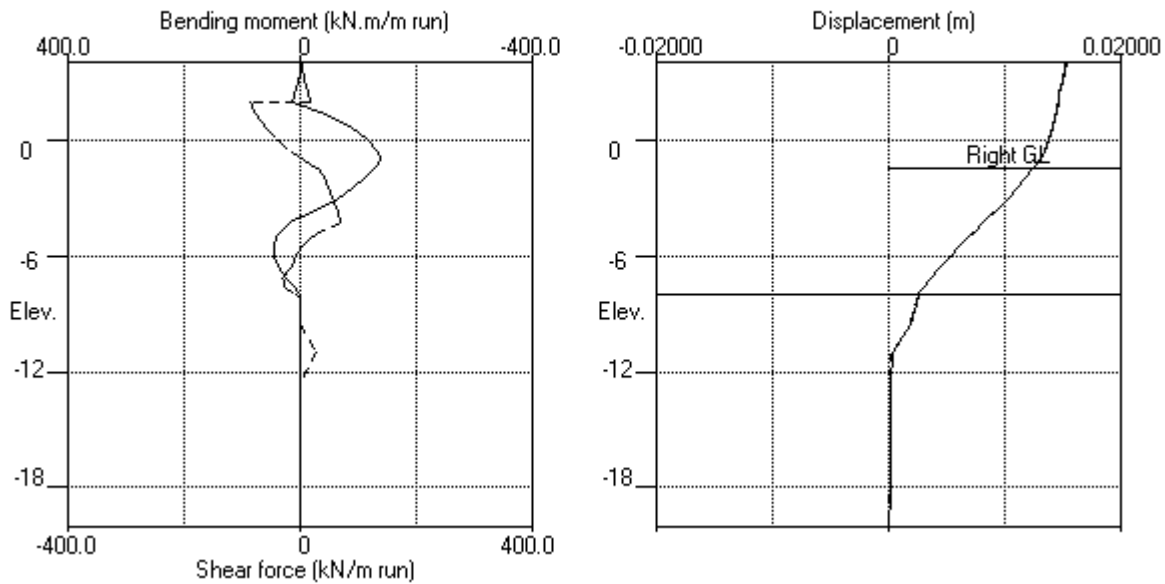
Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	6475
15	-2.00	0.00	8.50	0.00	49.29	45.62	45.62	6726
16	-2.50	0.00	17.00	0.41	78.55	51.41	51.41	6977
17	-3.00	0.00	25.50	3.39	107.81	57.58	57.58	7228
18	-3.50	0.00	34.00	6.38	137.07	64.16	64.16	7479
19	-4.00	0.00	42.50	9.37	166.33	71.79	71.79	7730
20	-4.30	3.00	44.60	10.10	173.57	77.48	80.48	7880
		3.00	44.60	0.23	253.25	177.83	180.83	30115
21	-4.65	6.50	48.11	1.22	268.55	152.21	158.71	30115
22	-5.00	10.00	51.61	2.21	283.85	144.86	154.86	30115
23	-5.50	15.00	56.61	3.63	305.72	143.20	158.20	30115
24	-6.00	20.00	61.62	5.05	327.59	143.85	163.85	30115
25	-6.60	26.00	67.62	6.75	353.84	147.84	173.84	30115
		26.00	67.62	0.00	412.20	165.71	191.71	50192
26	-7.20	32.00	75.43	0.00	446.32	155.41	187.41	50192
27	-7.60	36.00	80.64	0.00	469.07	145.57	181.57	50192
28	-8.00	40.00	85.85	0.57	491.83	113.37	153.37	50192
29	-8.15	41.50	87.80	1.14	500.37	162.93	204.43	50192
30	-9.57	55.75	106.37	6.57	581.49	181.15	236.90	50192
31	-11.00	70.00	124.95	12.00	662.69	179.73	249.73	50192
		70.00	124.95	0.00	4956.57	223.72	293.72	1003838
32	-12.70	87.00	153.95	0.00	5359.20	235.71	322.71	1003838
33	-14.40	104.00	182.97	0.00	5762.25	264.70	368.70	1003838
34	-16.80	128.00	224.01	0.00	6332.08	305.70	433.70	1003838
35	-18.40	144.00	251.41	0.00	6712.54	333.09	477.09	1003838
36	-20.00	160.00	278.84	0.00	7093.48	357.79	517.79	1003838

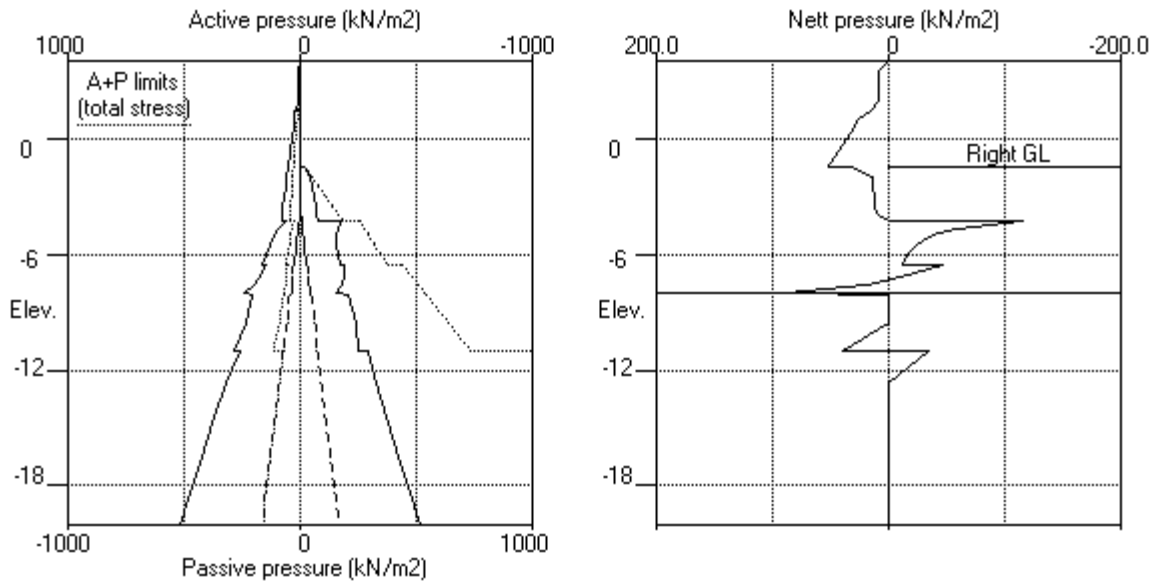
Note: 12.34 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit
 9.21A Arching - soil pressure below active limit

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side

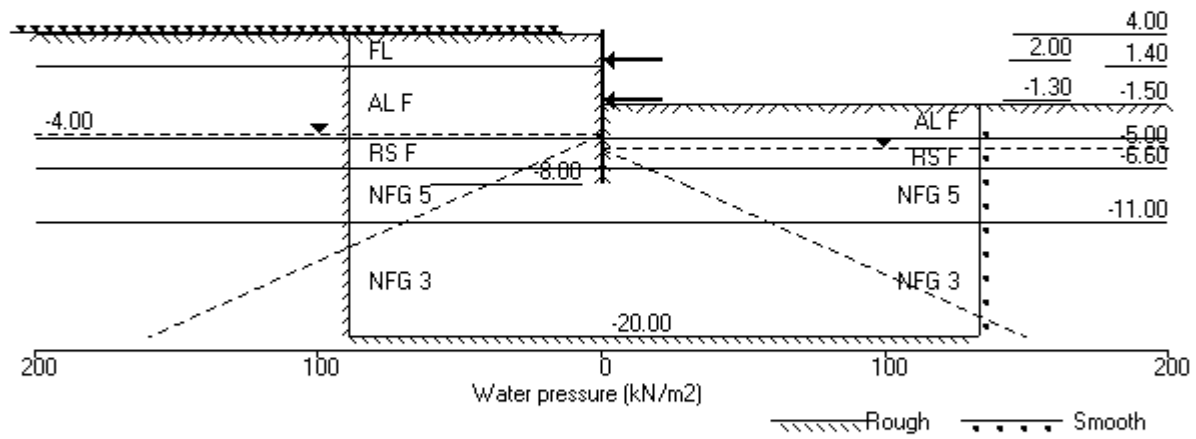


Stage No.4 Excav. to elev. -1.50 on RIGHT side



Units: kN,m

Stage No.6 Apply water pressure profile no.2



Units: kN,m

Stage No. 6 Apply water pressure profile no.2

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

Stage No.	Ground level Act.	Prop Pass.	Prop Elev.	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	Direction of failure
				Factor of Safety	Toe elev.	
6	4.00	-1.50		More than one prop.	No FoS calc.	

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.015	3.17E-04	0.0	-0.0		352338
2	3.50	9.43	0.015	3.17E-04	2.4	0.3		352338
3	3.00	9.34	0.015	3.14E-04	7.1	2.9		352338
4	2.65	9.31	0.015	3.10E-04	10.3	6.0		352338
5	2.30	9.68	0.015	3.02E-04	13.6	10.3		352338
6	2.00	9.31	0.015	2.91E-04	16.5	14.9	-102.0	352338
		9.31	0.015	2.91E-04	-85.5	14.9		
7	1.40	15.78	0.014	3.07E-04	-78.0	-33.1		352338
		23.66	0.014	3.07E-04	-78.0	-33.1		
8	1.00	26.28	0.014	3.61E-04	-68.0	-62.2		352338
9	0.60	30.05	0.014	4.46E-04	-56.7	-87.2		352338
10	0.00	36.50	0.014	6.18E-04	-36.7	-115.4		352338
11	-0.60	43.15	0.013	8.28E-04	-12.8	-130.5		352338
12	-0.95	46.89	0.013	9.58E-04	2.9	-132.2		352338
13	-1.30	50.93	0.013	1.08E-03	20.0	-128.3	-4.5	352338
		50.93	0.013	1.08E-03	15.5	-128.3		
14	-1.50	53.05	0.012	1.15E-03	25.9	-124.1		352338
		33.18	0.012	1.15E-03	25.9	-124.1		
15	-2.00	13.51	0.012	1.32E-03	37.6	-107.5		352338
16	-2.50	13.55	0.011	1.46E-03	44.4	-87.0		352338
17	-3.00	13.12	0.010	1.56E-03	51.0	-63.1		352338
18	-3.50	11.84	0.010	1.63E-03	57.3	-36.0		352338
19	-4.00	8.40	0.009	1.66E-03	62.3	-5.8		352338
20	-4.30	2.38	0.008	1.66E-03	64.0	13.3		352338
		-115.74	0.008	1.66E-03	64.0	13.3		
21	-4.65	-57.18	0.008	1.64E-03	33.7	28.6		352338
22	-5.00	-33.86	0.007	1.61E-03	17.8	36.9		352338
23	-5.50	-20.91	0.006	1.55E-03	4.1	41.6		352338
24	-6.00	-12.60	0.006	1.49E-03	-4.3	41.0		352338
25	-6.60	-8.65	0.005	1.43E-03	-10.7	36.2		352338
		-46.81	0.005	1.43E-03	-10.7	36.2		
26	-7.20	-11.14	0.004	1.38E-03	-28.1	21.4		352338
27	-7.60	17.89	0.003	1.36E-03	-26.7	9.3		352338

(continued)

Stage No.6 Apply water pressure profile no.2

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-8.00	84.12	0.003	1.36E-03	-6.3	-0.0		0
29	-8.15	-0.03	0.003	0	-0.0	0.0		0
30	-9.57	0.01	0.002	0	-0.0	0.0		0
31	-11.00	45.36	0.000	0	32.3	0.0		0
		-38.01	0.000	0	32.3	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.00	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	102.0 kN/m run			
At elev. -1.30				Prop force =	4.5 kN/m run			

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>		<u>Earth pressure</u> kN/m2	<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	9.43	9.43	9981
3	3.00	0.00	17.14	5.30	66.30	9.34	9.34	9981
4	2.65	0.00	23.26	7.19	89.97	9.31	9.31	9981
5	2.30	0.00	29.45	9.10	113.93	9.68	9.68	9981
6	2.00	0.00	34.80	10.76	134.63	9.31	9.31A	9981
7	1.40	0.00	45.59	14.09	176.37	15.78	15.78	9981
		0.00	45.59	10.45	176.98	23.66	23.66	4991
8	1.00	0.00	52.82	12.99	201.83	26.28	26.28	5190
9	0.60	0.00	60.04	15.53	226.69	30.05	30.05	5390
10	0.00	0.00	70.85	19.32	263.90	36.50	36.50	5689
11	-0.60	0.00	81.60	23.10	300.93	43.15	43.15	5989
12	-0.95	0.00	87.86	25.30	322.45	46.89	46.89	6163
13	-1.30	0.00	94.09	27.49	343.90	50.93	50.93	6338
14	-1.50	0.00	97.64	28.73	356.13	53.05	53.05	6438
15	-2.00	0.00	106.49	31.84	386.61	59.02	59.02	6687
16	-2.50	0.00	115.32	34.94	416.97	64.90	64.90	6937
17	-3.00	0.00	124.11	38.03	447.23	70.71	70.71	7186
18	-3.50	0.00	132.87	41.11	477.39	76.08	76.08	7436
19	-4.00	0.00	141.61	44.18	507.47	80.34	80.34	7685
20	-4.30	3.00	143.84	44.96	515.15	78.36	81.36	7835
		3.00	143.84	28.34	686.84	61.19	64.19	29943
21	-4.65	6.50	147.48	29.38	702.77	92.15	98.65	29943
22	-5.00	10.00	151.12	30.41	718.65	106.34	116.34	29943
23	-5.50	15.00	156.30	31.87	741.28	117.85	132.85	29943
24	-6.00	20.00	161.46	33.34	763.84	127.04	147.04	29943
25	-6.60	26.00	167.64	35.09	790.83	135.22	161.22	29943
		26.00	167.64	24.47	849.19	116.10	142.10	49905
26	-7.20	32.00	175.60	26.80	883.98	141.63	173.63	49905
27	-7.60	36.00	180.90	28.35	907.12	161.50	197.50	49905
28	-8.00	40.00	186.19	29.90	930.25	198.17	238.17	49905
29	-8.15	41.50	188.17	30.48	938.91	159.98	201.48	49905
30	-9.57	55.75	206.97	35.97	1021.06	178.28	234.03	49905
31	-11.00	70.00	225.72	41.45	1102.96	219.67	289.67	49905
		70.00	225.72	0.00	6355.77	184.04	254.04	998109
32	-12.70	87.00	254.82	0.00	6759.93	231.90	318.90	998109
33	-14.40	104.00	283.88	0.00	7163.41	260.89	364.89	998109
34	-16.80	128.00	324.84	0.00	7732.14	301.90	429.90	998109
35	-18.40	144.00	352.11	0.00	8110.84	329.30	473.30	998109

(continued)

Stage No.6 Apply water pressure profile no.2

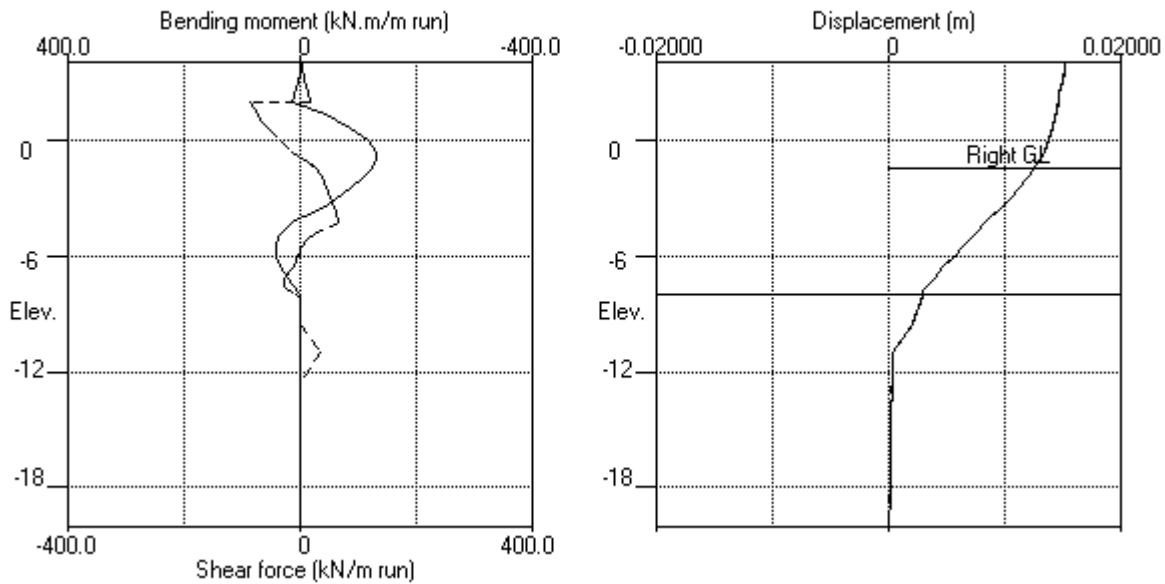
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
36	-20.00	160.00	379.36	0.00	8489.23	353.23	513.23	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	8.50	0.00	20.03	19.87	19.87	6475
16	-2.50	0.00	17.00	0.41	78.55	51.36	51.36	6726
17	-3.00	0.00	25.50	3.39	107.81	57.59	57.59	7228
18	-3.50	0.00	34.00	6.38	137.07	64.24	64.24	7479
19	-4.00	0.00	42.50	9.37	166.33	71.94	71.94	7730
20	-4.30	0.00	47.60	11.16	183.89	78.98	78.98	7880
21	-4.65	0.00	47.60	1.08	266.36	179.93	179.93	30115
22	-5.00	0.00	54.61	3.06	296.95	155.83	155.83	30115
23	-5.50	5.00	61.61	5.04	327.55	150.20	150.20	30115
24	-6.00	10.00	66.61	6.46	349.41	148.76	153.76	30115
25	-6.60	16.00	71.62	7.88	371.28	149.64	159.64	30115
26	-7.20	22.00	77.62	9.58	397.53	153.88	169.88	30115
27	-7.60	26.00	77.62	0.00	455.89	172.91	188.91	50192
28	-8.00	30.00	85.43	0.45	490.01	162.77	184.77	50192
29	-8.15	31.50	90.64	1.97	512.77	153.61	179.61	50192
30	-8.57	35.75	95.85	3.49	535.52	124.05	154.05	50192
31	-9.57	45.75	97.80	4.07	544.06	170.01	201.51	50192
32	-10.57	55.75	116.37	9.49	625.18	188.27	234.02	50192
33	-11.00	60.00	134.95	14.92	706.38	184.31	244.31	50192
34	-12.70	70.00	134.95	0.00	5095.43	232.05	292.05	1003838
35	-14.40	94.00	163.95	0.00	5498.05	241.89	318.89	1003838
36	-16.80	118.00	192.97	0.00	5901.11	270.88	364.88	1003838
37	-18.40	134.00	234.01	0.00	6470.94	311.90	429.90	1003838
38	-20.00	150.00	261.41	0.00	6851.40	339.30	473.30	1003838
39	-22.00	160.00	288.84	0.00	7232.34	363.24	513.24	1003838

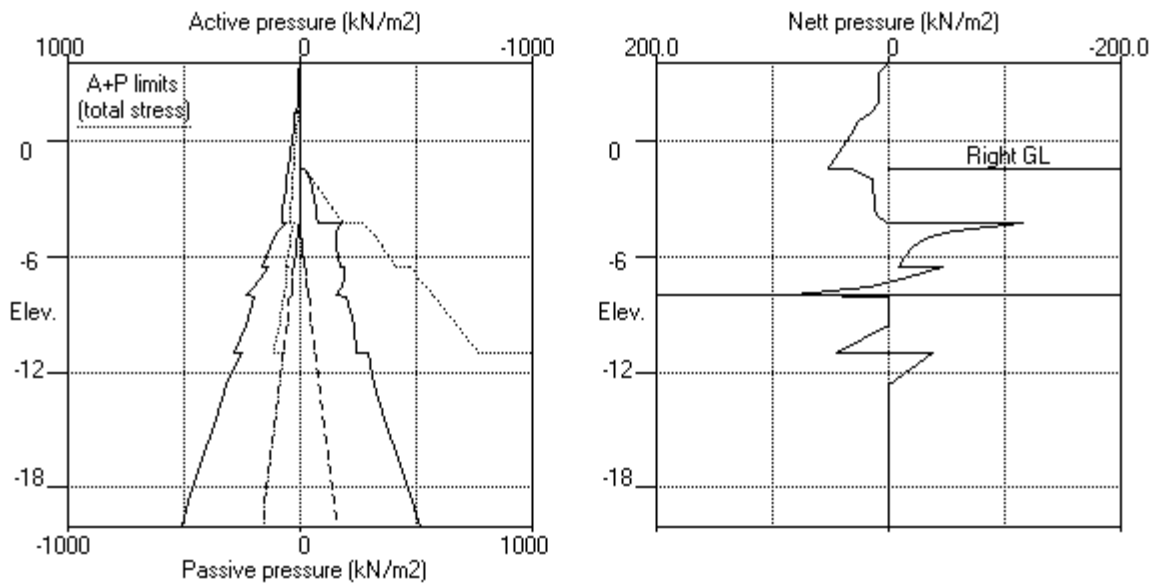
Note: 12.34 a Soil pressure at active limit
123.45 p Soil pressure at passive limit
9.31A Arching - soil pressure below active limit

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Stage No.6 Apply water pressure profile no.2

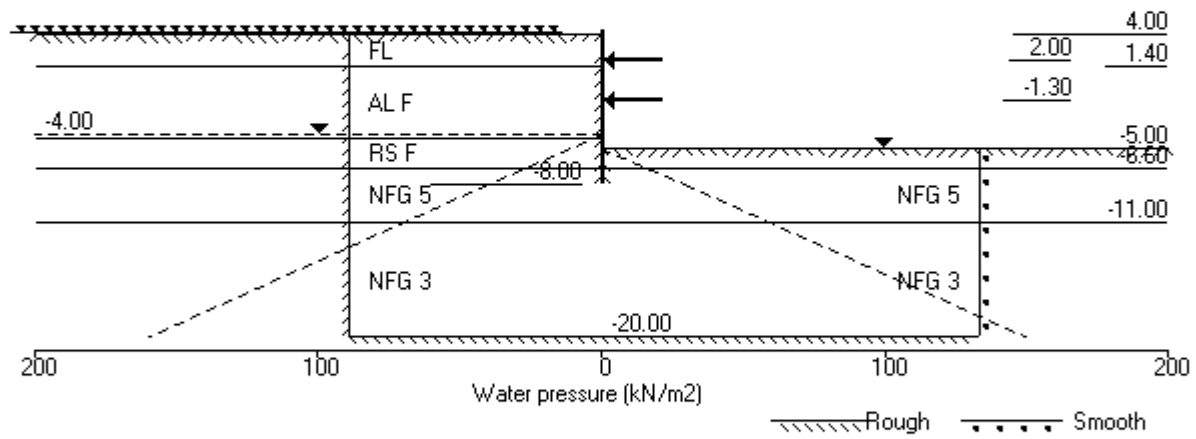


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 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Units: kN,m

Stage No. 7 Excavate to elevation -5.00 on RIGHT side

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>Penetr</u> <u>-ation</u>	
7	4.00	-5.00		More than one prop. No FoS calc.		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m ²	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m ² /m
1	4.00	0.00	0.014	-3.73E-04	0.0	0.0		352338
2	3.50	14.27	0.014	-3.73E-04	3.6	0.3		352338
3	3.00	13.03	0.014	-3.76E-04	10.4	4.1		352338
4	2.65	12.29	0.014	-3.83E-04	14.8	8.6		352338
5	2.30	12.09	0.014	-3.94E-04	19.1	14.6		352338
6	2.00	11.03	0.014	-4.09E-04	22.6	21.0	-83.9	352338
		11.03	0.014	-4.09E-04	-61.3	21.0		
7	1.40	16.85	0.015	-4.17E-04	-53.0	-12.2		352338
		24.19	0.015	-4.17E-04	-53.0	-12.2		
8	1.00	26.72	0.015	-3.92E-04	-42.8	-31.3		352338
9	0.60	30.35	0.015	-3.48E-04	-31.4	-46.2		352338
10	0.00	36.51	0.015	-2.59E-04	-11.3	-59.1		352338
11	-0.60	42.74	0.015	-1.58E-04	12.5	-58.9		352338
12	-0.95	45.95	0.015	-1.03E-04	28.0	-51.9		352338
13	-1.30	49.49	0.015	-5.84E-05	44.7	-39.2	-189.4	352338
		49.49	0.015	-5.84E-05	-144.7	-39.2		
14	-1.50	50.75	0.015	-2.83E-05	-134.7	-67.1		352338
15	-2.00	55.52	0.015	1.09E-04	-108.1	-127.6		352338
16	-2.50	59.77	0.015	3.24E-04	-79.3	-174.4		352338
17	-3.00	63.90	0.015	5.94E-04	-48.4	-206.3		352338
18	-3.50	67.61	0.015	8.98E-04	-15.5	-222.3		352338
19	-4.00	70.31	0.014	1.21E-03	19.0	-221.2		352338
20	-4.30	70.05	0.014	1.39E-03	40.0	-212.2		352338
		20.97	0.014	1.39E-03	40.0	-212.2		
21	-4.65	61.58	0.013	1.60E-03	54.5	-197.4		352338
22	-5.00	79.59	0.013	1.78E-03	79.2	-174.6		352338
		21.23	0.013	1.78E-03	79.2	-174.6		
23	-5.50	11.70	0.012	2.00E-03	87.4	-133.3		352338
24	-6.00	0.20	0.011	2.16E-03	90.4	-89.0		352338
25	-6.60	-16.41	0.009	2.26E-03	85.5	-36.0		352338
		-116.12	0.009	2.26E-03	85.5	-36.0		
26	-7.20	-73.00	0.008	2.30E-03	28.8	-5.6		352338
27	-7.60	-36.03	0.007	2.30E-03	7.0	0.1		352338

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-8.00	0.76	0.006	2.30E-03	-0.1	-0.0		0
29	-8.15	-0.03	0.006	0	-0.0	0.0		0
30	-9.57	0.01	0.004	0	-0.0	0.0		0
31	-11.00	70.00	0.001	0	49.9	0.0		0
		-58.66	0.001	0	49.9	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.01	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	83.9	kN/m run		
At elev. -1.30				Prop force =	189.4	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>		<u>Earth pressure</u> kN/m2	<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	14.27	14.27	9981
3	3.00	0.00	17.14	5.30	66.30	13.03	13.03	9981
4	2.65	0.00	23.26	7.19	89.97	12.29	12.29	9981
5	2.30	0.00	29.45	9.10	113.93	12.09	12.09	9981
6	2.00	0.00	34.80	10.76	134.63	11.03	11.03	9981
7	1.40	0.00	45.59	14.09	176.37	16.85	16.85	9981
		0.00	45.59	10.45	176.98	24.19	24.19	4991
8	1.00	0.00	52.82	12.99	201.83	26.72	26.72	5190
9	0.60	0.00	60.04	15.53	226.69	30.35	30.35	5390
10	0.00	0.00	70.85	19.32	263.90	36.51	36.51	5689
11	-0.60	0.00	81.60	23.10	300.93	42.74	42.74	5989
12	-0.95	0.00	87.86	25.30	322.45	45.95	45.95	6163
13	-1.30	0.00	94.09	27.49	343.90	49.49	49.49	6338
14	-1.50	0.00	97.64	28.73	356.13	50.75	50.75	6438
15	-2.00	0.00	106.49	31.84	386.61	55.52	55.52	6687
16	-2.50	0.00	115.32	34.94	416.97	59.77	59.77	6937
17	-3.00	0.00	124.11	38.03	447.23	63.90	63.90	7186
18	-3.50	0.00	132.87	41.11	477.39	67.61	67.61	7436
19	-4.00	0.00	141.61	44.18	507.47	70.31	70.31	7685
20	-4.30	3.00	143.84	44.96	515.15	67.05	70.05	7835
		3.00	143.84	28.34	686.84	17.97	20.97A	29943
21	-4.65	6.50	147.48	29.38	702.77	55.08	61.58	29943
22	-5.00	10.00	151.12	30.41	718.65	69.59	79.59	29943
23	-5.50	15.00	156.30	31.87	741.28	81.91	96.91	29943
24	-6.00	20.00	161.46	33.34	763.84	92.25	112.25	29943
25	-6.60	26.00	167.64	35.09	790.83	101.87	127.87	29943
		26.00	167.64	24.47	849.19	60.51	86.51	49905
26	-7.20	32.00	175.60	26.80	883.98	98.03	130.03	49905
27	-7.60	36.00	180.90	28.35	907.12	121.62	157.62	49905
28	-8.00	40.00	186.19	29.90	930.25	144.76	184.76	49905
29	-8.15	41.50	188.17	30.48	938.91	146.67	188.17	49905
30	-9.57	55.75	206.97	35.97	1021.06	165.18	220.93	49905
31	-11.00	70.00	225.72	41.45	1102.96	218.76	288.76	49905
		70.00	225.72	0.00	6355.77	165.86	235.86	998109
32	-12.70	87.00	254.82	0.00	6759.93	223.96	310.96	998109
33	-14.40	104.00	283.88	0.00	7163.41	252.91	356.91	998109
34	-16.80	128.00	324.84	0.00	7732.14	293.96	421.96	998109
35	-18.40	144.00	352.11	0.00	8110.84	321.40	465.40	998109

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

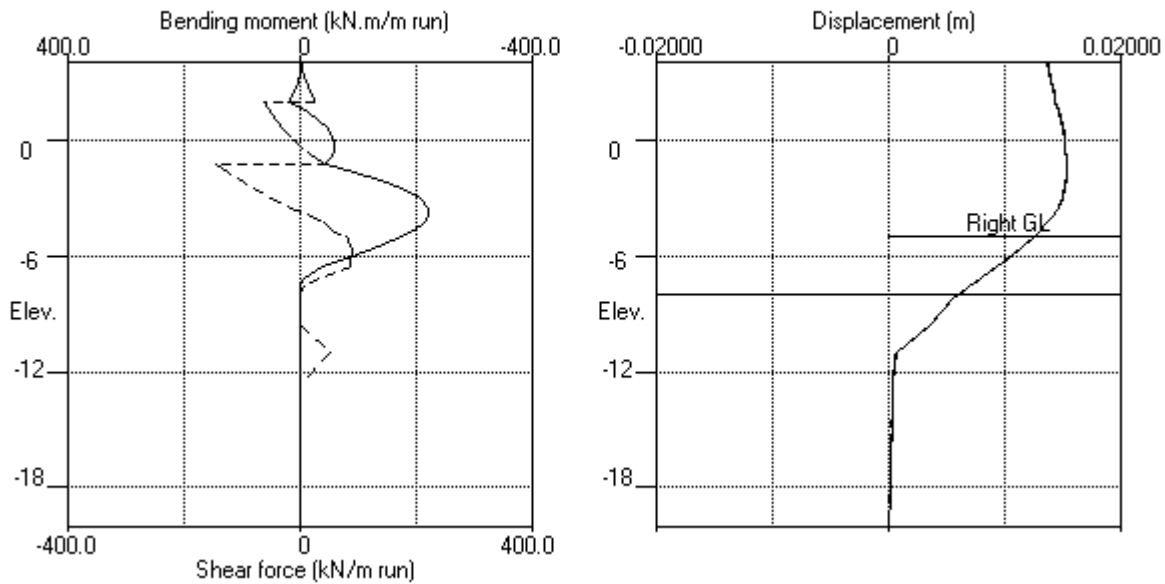
LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
36	-20.00	160.00	379.36	0.00	8489.23	343.66	503.66	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	30080
23	-5.50	5.00	5.00	0.00	80.21	80.21	85.21p	30080
24	-6.00	10.00	10.00	0.00	102.05	102.05	112.05p	30080
25	-6.60	16.00	16.00	0.00	128.28	128.28	144.28p	30080
		16.00	16.00	0.00	186.63	186.63	202.63p	50133
26	-7.20	22.00	23.80	0.00	220.72	181.03	203.03	50133
27	-7.60	26.00	29.01	0.00	243.45	167.64	193.64	50133
28	-8.00	30.00	34.21	0.00	266.19	154.00	184.00	50133
29	-8.15	31.50	36.16	0.00	274.71	156.71	188.21	50133
30	-9.57	45.75	54.70	0.00	355.74	175.17	220.92	50133
31	-11.00	60.00	73.27	0.00	436.84	158.77	218.77	50133
		60.00	73.27	0.00	4238.84	234.53	294.53	1002652
32	-12.70	77.00	102.24	0.00	4641.14	233.96	310.96	1002652
33	-14.40	94.00	131.25	0.00	5043.96	262.91	356.91	1002652
34	-16.80	118.00	172.28	0.00	5613.73	303.96	421.96	1002652
35	-18.40	134.00	199.69	0.00	5994.39	331.40	465.40	1002652
36	-20.00	150.00	227.16	0.00	6375.76	353.67	503.67	1002652

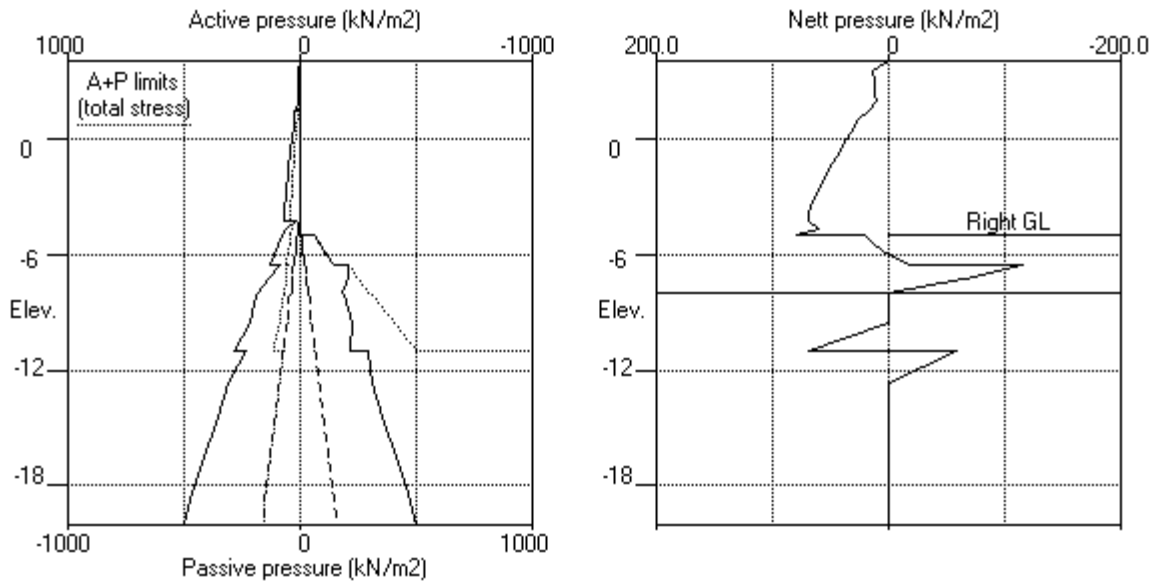
Note: 12.34 a Soil pressure at active limit
202.63 p Soil pressure at passive limit
20.97A Arching - soil pressure below active limit

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Stage No.7 Excav. to elev. -5.00 on RIGHT side

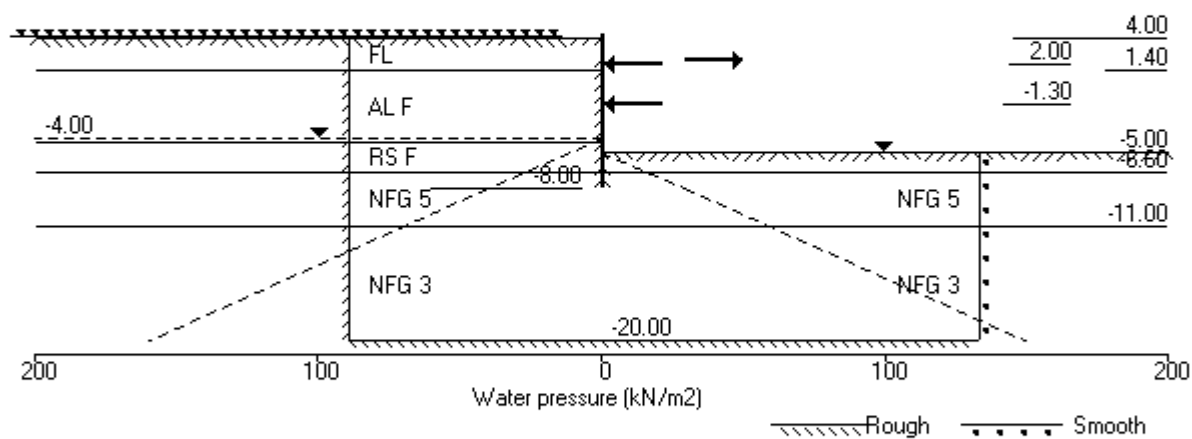


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 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.30



Stage No. 8 Apply load no.1 at elevation 2.30

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

				FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500			
<u>Stage</u>	<u>Ground</u>	<u>level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	<u>of</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
8	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall

Right side 30.00 from wall

Lower rigid boundary at elevation -20.00

Rough boundary

Smooth boundary

Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-2.13E-04	0.0	0.0		352338
2	3.50	12.65	0.014	-2.13E-04	3.2	0.3		352338
3	3.00	11.85	0.015	-2.16E-04	9.3	3.7		352338
4	2.65	11.37	0.015	-2.22E-04	13.3	7.7		352338
5	2.30	11.38	0.015	-2.32E-04	17.3	13.2	34.0	352338
		11.38	0.015	-2.32E-04	51.3	13.2		
6	2.00	10.60	0.015	-2.50E-04	54.6	29.2	-114.8	352338
		10.60	0.015	-2.50E-04	-60.2	29.2		
7	1.40	16.71	0.015	-2.72E-04	-52.0	-3.4		352338
		24.12	0.015	-2.72E-04	-52.0	-3.4		
8	1.00	26.65	0.015	-2.58E-04	-41.9	-22.1		352338
9	0.60	30.29	0.015	-2.25E-04	-30.5	-36.6		352338
10	0.00	36.50	0.015	-1.52E-04	-10.4	-49.0		352338
11	-0.60	42.78	0.015	-6.92E-05	13.4	-48.3		352338
12	-0.95	46.03	0.015	-2.49E-05	28.9	-40.9		352338
13	-1.30	49.59	0.015	9.22E-06	45.6	-27.9	-193.0	352338
		49.59	0.015	9.22E-06	-147.3	-27.9		
14	-1.50	50.87	0.015	3.31E-05	-137.3	-56.4		352338
15	-2.00	55.65	0.015	1.56E-04	-110.6	-118.1		352338
16	-2.50	59.92	0.015	3.58E-04	-81.7	-166.2		352338
17	-3.00	64.05	0.015	6.18E-04	-50.8	-199.3		352338
18	-3.50	67.75	0.015	9.13E-04	-17.8	-216.4		352338
19	-4.00	70.46	0.014	1.22E-03	16.7	-216.5		352338
20	-4.30	70.18	0.014	1.40E-03	37.8	-208.2		352338
		21.46	0.014	1.40E-03	37.8	-208.2		
21	-4.65	62.01	0.013	1.60E-03	52.4	-194.1		352338
22	-5.00	79.98	0.013	1.78E-03	77.3	-172.0		352338
		22.13	0.013	1.78E-03	77.3	-172.0		
23	-5.50	12.40	0.012	1.99E-03	85.9	-131.6		352338
24	-6.00	0.80	0.011	2.15E-03	89.2	-87.9		352338
25	-6.60	-15.88	0.009	2.25E-03	84.7	-35.5		352338
		-115.25	0.009	2.25E-03	84.7	-35.5		
26	-7.20	-72.41	0.008	2.29E-03	28.4	-5.4		352338

(continued)

Stage No.8 Apply load no.1 at elevation 2.30

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
27	-7.60	-35.61	0.007	2.29E-03	6.8	0.1		352338
28	-8.00	1.16	0.006	2.29E-03	-0.1	-0.0		0
29	-8.15	-0.03	0.006	0	-0.0	0.0		0
30	-9.57	0.01	0.004	0	-0.0	0.0		0
31	-11.00	70.00	0.001	0	49.9	0.0		0
		-58.66	0.001	0	49.9	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.01	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force =	114.8 kN/m run		
At elev. -1.30					Prop force =	193.0 kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	12.65	12.65	9981
3	3.00	0.00	17.14	5.30	66.30	11.85	11.85	9981
4	2.65	0.00	23.26	7.19	89.97	11.37	11.37	9981
5	2.30	0.00	29.45	9.10	113.93	11.38	11.38	9981
6	2.00	0.00	34.80	10.76	134.63	10.60	10.60A	9981
7	1.40	0.00	45.59	14.09	176.37	16.71	16.71	9981
		0.00	45.59	10.45	176.98	24.12	24.12	4991
8	1.00	0.00	52.82	12.99	201.83	26.65	26.65	5190
9	0.60	0.00	60.04	15.53	226.69	30.29	30.29	5390
10	0.00	0.00	70.85	19.32	263.90	36.50	36.50	5689
11	-0.60	0.00	81.60	23.10	300.93	42.78	42.78	5989
12	-0.95	0.00	87.86	25.30	322.45	46.03	46.03	6163
13	-1.30	0.00	94.09	27.49	343.90	49.59	49.59	6338
14	-1.50	0.00	97.64	28.73	356.13	50.87	50.87	6438
15	-2.00	0.00	106.49	31.84	386.61	55.65	55.65	6687
16	-2.50	0.00	115.32	34.94	416.97	59.92	59.92	6937
17	-3.00	0.00	124.11	38.03	447.23	64.05	64.05	7186
18	-3.50	0.00	132.87	41.11	477.39	67.75	67.75	7436
19	-4.00	0.00	141.61	44.18	507.47	70.46	70.46	7685
20	-4.30	3.00	143.84	44.96	515.15	67.18	70.18	7835
		3.00	143.84	28.34	686.84	18.46	21.46A	29943
21	-4.65	6.50	147.48	29.38	702.77	55.51	62.01	29943
22	-5.00	10.00	151.12	30.41	718.65	69.98	79.98	29943
23	-5.50	15.00	156.30	31.87	741.28	82.26	97.26	29943
24	-6.00	20.00	161.46	33.34	763.84	92.56	112.56	29943
25	-6.60	26.00	167.64	35.09	790.83	102.14	128.14	29943
		26.00	167.64	24.47	849.19	60.96	86.96	49905
26	-7.20	32.00	175.60	26.80	883.98	98.33	130.33	49905
27	-7.60	36.00	180.90	28.35	907.12	121.83	157.83	49905
28	-8.00	40.00	186.19	29.90	930.25	144.96	184.96	49905
29	-8.15	41.50	188.17	30.48	938.91	146.68	188.18	49905
30	-9.57	55.75	206.97	35.97	1021.06	165.18	220.93	49905
31	-11.00	70.00	225.72	41.45	1102.96	218.76	288.76	49905
		70.00	225.72	0.00	6355.77	165.87	235.87	998109
32	-12.70	87.00	254.82	0.00	6759.93	223.97	310.97	998109
33	-14.40	104.00	283.88	0.00	7163.41	252.91	356.91	998109
34	-16.80	128.00	324.84	0.00	7732.14	293.96	421.96	998109

(continued)

Stage No.8 Apply load no.1 at elevation 2.30

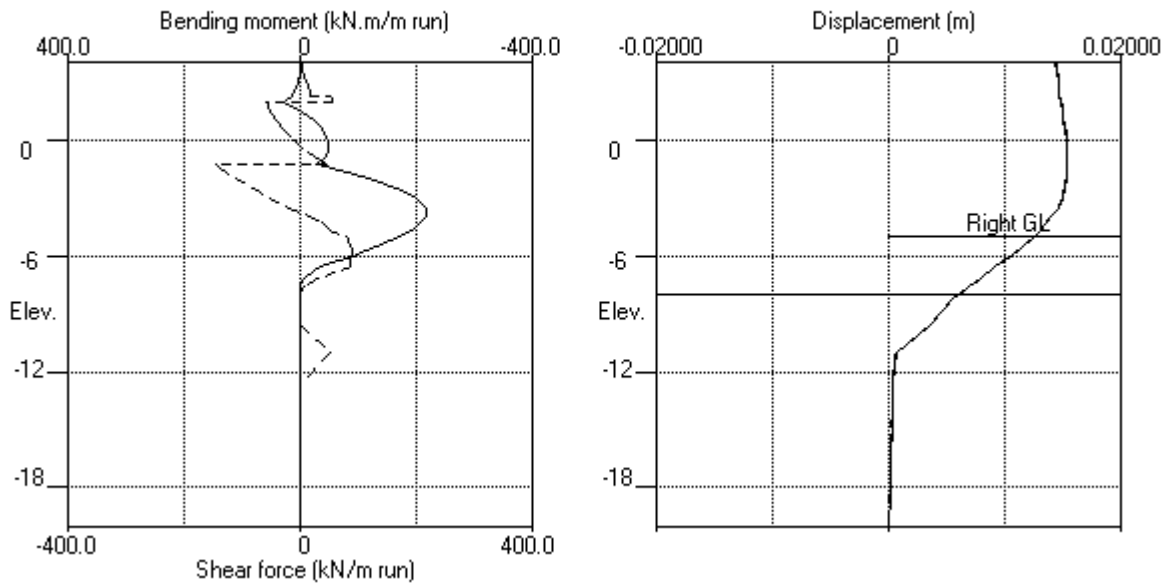
LEFT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
35	-18.40	144.00	352.11	0.00	8110.84	321.40	465.40	998109
36	-20.00	160.00	379.36	0.00	8489.23	343.66	503.66	998109

RIGHT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	57.85	57.85	30080
23	-5.50	5.00	5.00	0.00	80.21	79.86	84.86	30080
24	-6.00	10.00	10.00	0.00	102.05	101.76	111.76	30080
25	-6.60	16.00	16.00	0.00	128.28	128.02	144.02	30080
		16.00	16.00	0.00	186.63	186.21	202.21	50133
26	-7.20	22.00	23.80	0.00	220.72	180.74	202.74	50133
27	-7.60	26.00	29.01	0.00	243.45	167.44	193.44	50133
28	-8.00	30.00	34.21	0.00	266.19	153.80	183.80	50133
29	-8.15	31.50	36.16	0.00	274.71	156.71	188.21	50133
30	-9.57	45.75	54.70	0.00	355.74	175.17	220.92	50133
31	-11.00	60.00	73.27	0.00	436.84	158.77	218.77	50133
		60.00	73.27	0.00	4238.84	234.54	294.54	1002652
32	-12.70	77.00	102.24	0.00	4641.14	233.96	310.96	1002652
33	-14.40	94.00	131.25	0.00	5043.96	262.91	356.91	1002652
34	-16.80	118.00	172.28	0.00	5613.73	303.96	421.96	1002652
35	-18.40	134.00	199.69	0.00	5994.39	331.39	465.39	1002652
36	-20.00	150.00	227.16	0.00	6375.76	353.67	503.67	1002652

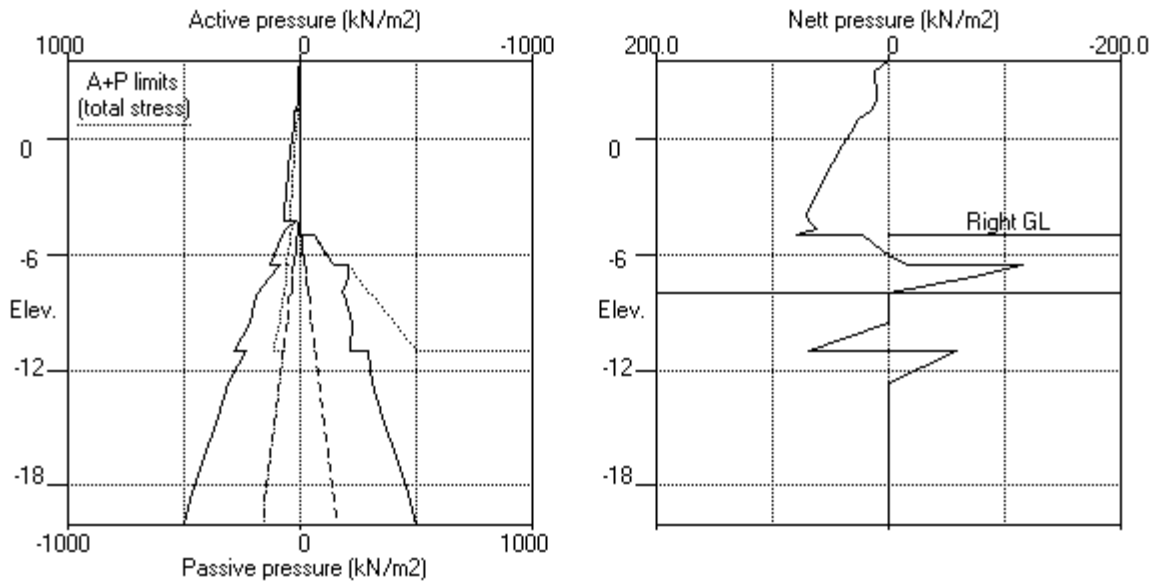
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 21.46A Arching - soil pressure below active limit

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.30



Stage No.8 Apply load no.1 at elev. 2.30

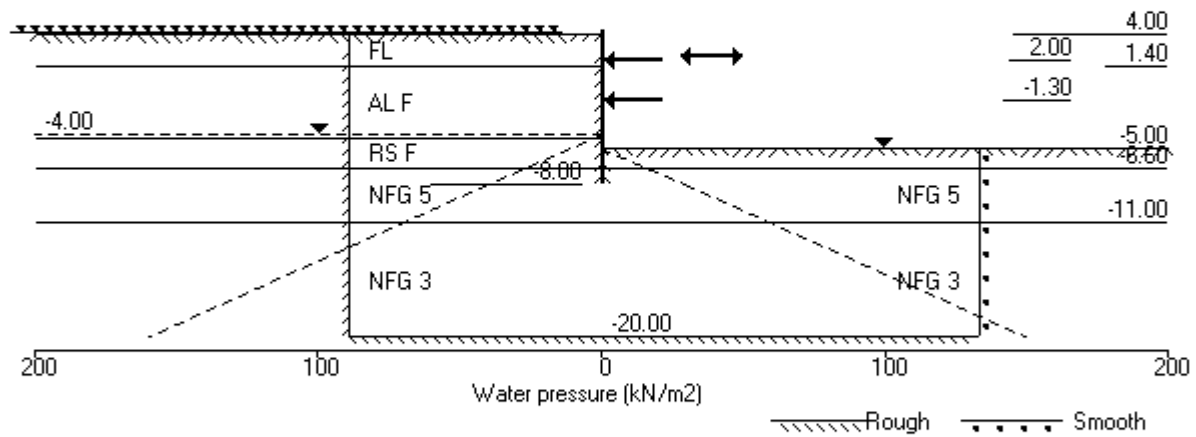


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.30



Units: kN,m

Stage No. 9 Apply load no.2 at elevation 2.30

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>Penetr</u> <u>-ation</u>	
9	4.00	-5.00		<u>Moment</u> <u>at elev.</u> <u>More than one prop. No FoS calc.</u>		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-3.73E-04	0.0	0.0		352338
2	3.50	14.27	0.014	-3.73E-04	3.6	0.3		352338
3	3.00	13.03	0.014	-3.76E-04	10.4	4.1		352338
4	2.65	12.29	0.014	-3.83E-04	14.8	8.6		352338
5	2.30	12.09	0.014	-3.94E-04	19.1	14.6		352338
6	2.00	11.03	0.014	-4.09E-04	22.6	21.0	-83.9	352338
		11.03	0.014	-4.09E-04	-61.3	21.0		
7	1.40	16.85	0.015	-4.17E-04	-53.0	-12.2		352338
		24.19	0.015	-4.17E-04	-53.0	-12.2		
8	1.00	26.72	0.015	-3.92E-04	-42.8	-31.3		352338
9	0.60	30.35	0.015	-3.48E-04	-31.4	-46.2		352338
10	0.00	36.51	0.015	-2.59E-04	-11.3	-59.1		352338
11	-0.60	42.74	0.015	-1.58E-04	12.5	-58.9		352338
12	-0.95	45.95	0.015	-1.03E-04	28.0	-51.9		352338
13	-1.30	49.49	0.015	-5.84E-05	44.7	-39.2	-189.4	352338
		49.49	0.015	-5.84E-05	-144.7	-39.2		
14	-1.50	50.75	0.015	-2.83E-05	-134.7	-67.1		352338
15	-2.00	55.52	0.015	1.09E-04	-108.1	-127.6		352338
16	-2.50	59.77	0.015	3.24E-04	-79.3	-174.4		352338
17	-3.00	63.90	0.015	5.94E-04	-48.4	-206.3		352338
18	-3.50	67.61	0.015	8.98E-04	-15.5	-222.3		352338
19	-4.00	70.31	0.014	1.21E-03	19.0	-221.2		352338
20	-4.30	70.05	0.014	1.39E-03	40.0	-212.2		352338
		20.97	0.014	1.39E-03	40.0	-212.2		
21	-4.65	61.58	0.013	1.60E-03	54.5	-197.4		352338
22	-5.00	79.59	0.013	1.78E-03	79.2	-174.6		352338
		21.23	0.013	1.78E-03	79.2	-174.6		
23	-5.50	11.70	0.012	2.00E-03	87.4	-133.3		352338
24	-6.00	0.20	0.011	2.16E-03	90.4	-89.0		352338
25	-6.60	-16.41	0.009	2.26E-03	85.5	-36.0		352338
		-116.12	0.009	2.26E-03	85.5	-36.0		
26	-7.20	-73.00	0.008	2.30E-03	28.8	-5.6		352338
27	-7.60	-36.03	0.007	2.30E-03	7.0	0.1		352338

(continued)

Stage No.9 Apply load no.2 at elevation 2.30

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-8.00	0.76	0.006	2.30E-03	-0.1	-0.0		0
29	-8.15	-0.03	0.006	0	-0.0	0.0		0
30	-9.57	0.01	0.004	0	-0.0	0.0		0
31	-11.00	70.00	0.001	0	49.9	0.0		0
		-58.66	0.001	0	49.9	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.01	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	83.9	kN/m run		
At elev. -1.30				Prop force =	189.4	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>		<u>Earth pressure</u> kN/m2	<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	14.27	14.27	9981
3	3.00	0.00	17.14	5.30	66.30	13.03	13.03	9981
4	2.65	0.00	23.26	7.19	89.97	12.29	12.29	9981
5	2.30	0.00	29.45	9.10	113.93	12.09	12.09	9981
6	2.00	0.00	34.80	10.76	134.63	11.03	11.03	9981
7	1.40	0.00	45.59	14.09	176.37	16.85	16.85	9981
		0.00	45.59	10.45	176.98	24.19	24.19	4991
8	1.00	0.00	52.82	12.99	201.83	26.72	26.72	5190
9	0.60	0.00	60.04	15.53	226.69	30.35	30.35	5390
10	0.00	0.00	70.85	19.32	263.90	36.51	36.51	5689
11	-0.60	0.00	81.60	23.10	300.93	42.74	42.74	5989
12	-0.95	0.00	87.86	25.30	322.45	45.95	45.95	6163
13	-1.30	0.00	94.09	27.49	343.90	49.49	49.49	6338
14	-1.50	0.00	97.64	28.73	356.13	50.75	50.75	6438
15	-2.00	0.00	106.49	31.84	386.61	55.52	55.52	6687
16	-2.50	0.00	115.32	34.94	416.97	59.77	59.77	6937
17	-3.00	0.00	124.11	38.03	447.23	63.90	63.90	7186
18	-3.50	0.00	132.87	41.11	477.39	67.61	67.61	7436
19	-4.00	0.00	141.61	44.18	507.47	70.31	70.31	7685
20	-4.30	3.00	143.84	44.96	515.15	67.05	70.05	7835
		3.00	143.84	28.34	686.84	17.97	20.97A	29943
21	-4.65	6.50	147.48	29.38	702.77	55.08	61.58	29943
22	-5.00	10.00	151.12	30.41	718.65	69.59	79.59	29943
23	-5.50	15.00	156.30	31.87	741.28	81.91	96.91	29943
24	-6.00	20.00	161.46	33.34	763.84	92.25	112.25	29943
25	-6.60	26.00	167.64	35.09	790.83	101.87	127.87	29943
		26.00	167.64	24.47	849.19	60.51	86.51	49905
26	-7.20	32.00	175.60	26.80	883.98	98.03	130.03	49905
27	-7.60	36.00	180.90	28.35	907.12	121.62	157.62	49905
28	-8.00	40.00	186.19	29.90	930.25	144.76	184.76	49905
29	-8.15	41.50	188.17	30.48	938.91	146.67	188.17	49905
30	-9.57	55.75	206.97	35.97	1021.06	165.18	220.93	49905
31	-11.00	70.00	225.72	41.45	1102.96	218.76	288.76	49905
		70.00	225.72	0.00	6355.77	165.86	235.86	998109
32	-12.70	87.00	254.82	0.00	6759.93	223.96	310.96	998109
33	-14.40	104.00	283.88	0.00	7163.41	252.91	356.91	998109
34	-16.80	128.00	324.84	0.00	7732.14	293.96	421.96	998109
35	-18.40	144.00	352.11	0.00	8110.84	321.40	465.40	998109

(continued)

Stage No.9 Apply load no.2 at elevation 2.30

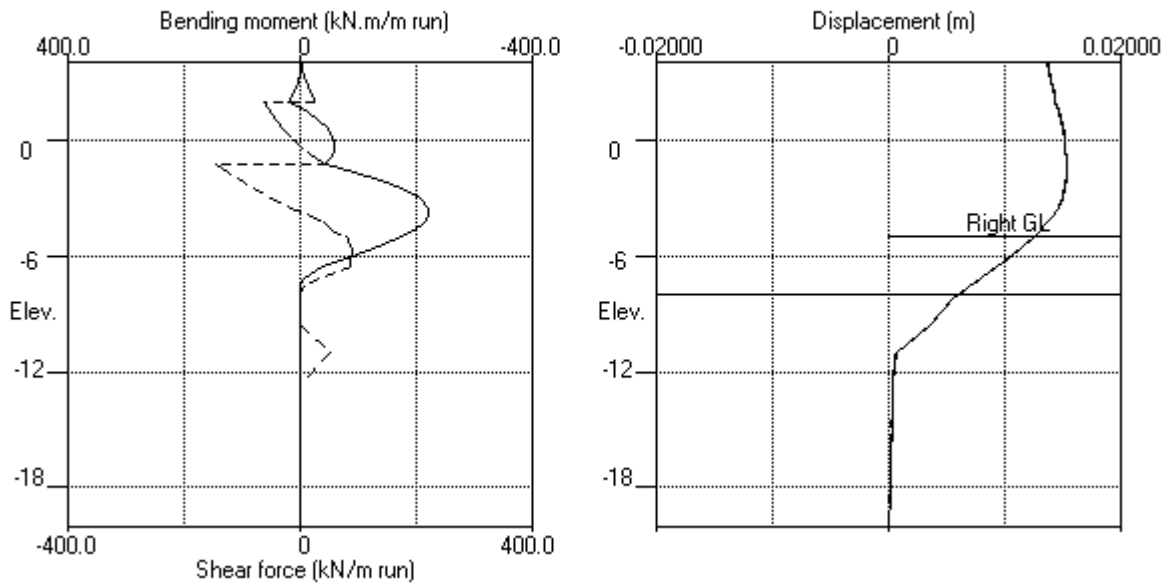
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses			Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
36	-20.00	160.00	379.36	0.00	8489.23	343.66	503.66	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses			Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
23	-5.50	5.00	5.00	0.00	58.36	58.36	58.36p	30080
24	-6.00	10.00	10.00	0.00	80.21	80.21	85.21p	30080
25	-6.60	16.00	16.00	0.00	102.05	102.05	112.05p	30080
26	-7.20	16.00	16.00	0.00	128.28	128.28	144.28p	30080
27	-7.60	22.00	23.80	0.00	186.63	186.63	202.63p	50133
28	-8.00	26.00	29.01	0.00	220.72	181.03	203.03	50133
29	-8.15	30.00	34.21	0.00	243.45	167.64	193.64	50133
30	-8.57	31.50	36.16	0.00	266.19	154.00	184.00	50133
31	-9.57	45.75	54.70	0.00	274.71	156.71	188.21	50133
32	-11.00	60.00	73.27	0.00	355.74	175.17	220.92	50133
33	-12.70	60.00	73.27	0.00	436.84	158.77	218.77	50133
34	-14.40	77.00	102.24	0.00	4238.84	234.53	294.53	1002652
35	-16.80	94.00	131.25	0.00	4641.14	233.96	310.96	1002652
36	-18.40	118.00	172.28	0.00	5043.96	262.91	356.91	1002652
37	-20.00	134.00	199.69	0.00	5613.73	303.96	421.96	1002652
38	-22.00	150.00	227.16	0.00	5994.39	331.40	465.40	1002652
39	-24.00	160.00	254.63	0.00	6375.76	353.67	503.67	1002652

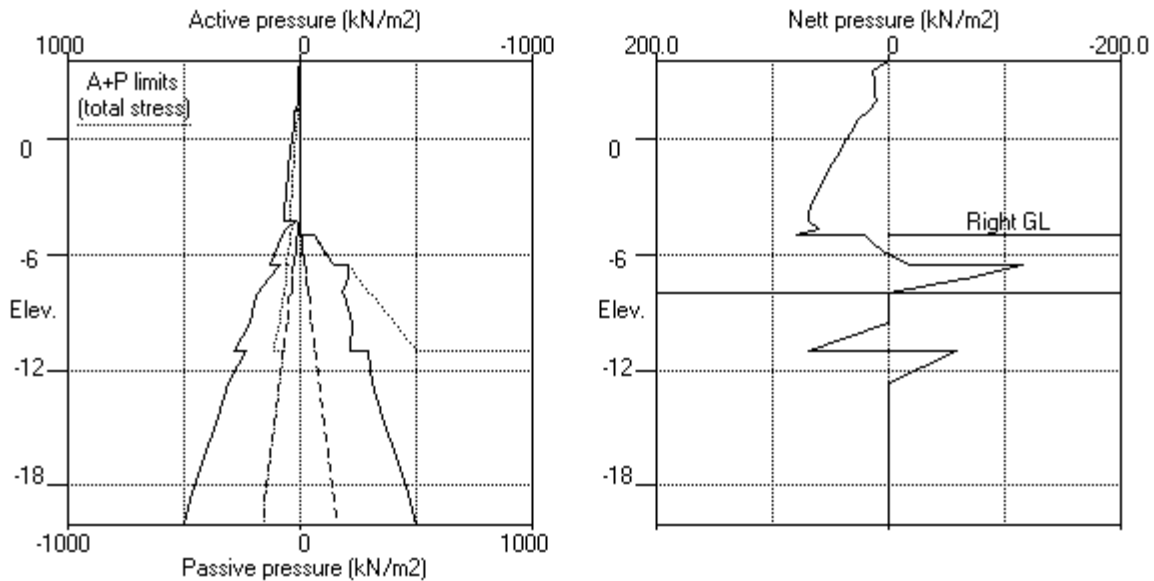
Note: 12.34 a Soil pressure at active limit
202.63 p Soil pressure at passive limit
20.97A Arching - soil pressure below active limit

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.30



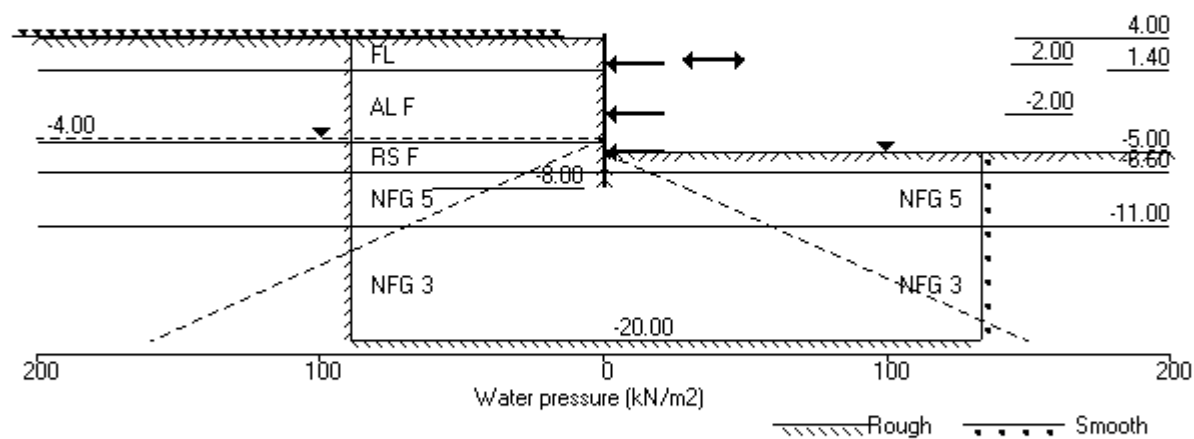
Stage No.9 Apply load no.2 at elev. 2.30



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| Sheet No.
| Job No.   B01493
| Made by :   DJC
|
| Date:16-11-2022
| Checked :
```

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| Date:16-11-2022
| Checked :
```

Stage No.12 Remove prop no.2 at elev. -1.30



Units: kN,m

Stage No. 12 Remove strut or anchor no.2 at elevation -1.30

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>Penetr</u> <u>-ation</u>	
12	4.00	-5.00		More than one prop. No FoS calc.		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m

2-D finite element model. Active limit arching modelled.

Soil deformations are elastic until the active or passive limit is reached

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.014	-5.33E-04	0.0	0.0		352338
2	3.50	14.81	0.014	-5.33E-04	3.7	0.3		352338
3	3.00	13.22	0.014	-5.36E-04	10.7	4.2		352338
4	2.65	12.21	0.014	-5.43E-04	15.2	8.9		352338
5	2.30	11.81	0.015	-5.55E-04	19.4	15.0		352338
6	2.00	10.46	0.015	-5.70E-04	22.7	21.4	-106.2	352338
7	1.40	10.46	0.015	-5.70E-04	-83.5	21.4		
		15.90	0.015	-5.67E-04	-75.6	-25.1		352338
8	1.00	23.72	0.015	-5.67E-04	-75.6	-25.1		
		26.08	0.015	-5.23E-04	-65.6	-53.3		352338
9	0.60	29.55	0.015	-4.48E-04	-54.5	-77.4		352338
10	0.00	35.54	0.016	-2.94E-04	-35.0	-104.3		352338
11	-0.60	41.66	0.016	-1.04E-04	-11.8	-118.5		352338
12	-0.95	44.85	0.016	1.40E-05	3.3	-120.0		352338
13	-1.30	48.47	0.016	1.31E-04	19.7	-116.0		352338
14	-1.50	49.99	0.016	1.95E-04	29.5	-111.1		352338
15	-2.00	55.13	0.016	3.38E-04	55.8	-89.5	-173.6	352338
16	-2.50	55.13	0.016	3.38E-04	-117.8	-89.5		
		59.66	0.015	5.01E-04	-89.1	-141.3		352338
17	-3.00	63.92	0.015	7.28E-04	-58.2	-178.1		352338
18	-3.50	67.68	0.015	9.96E-04	-25.3	-199.0		352338
19	-4.00	70.37	0.014	1.28E-03	9.2	-202.8		352338
20	-4.30	70.01	0.014	1.45E-03	30.3	-196.8		352338
21	-4.65	20.83	0.014	1.45E-03	30.3	-196.8		
		61.84	0.013	1.64E-03	44.7	-185.4		352338
22	-5.00	80.02	0.013	1.81E-03	69.6	-166.0	5.5	352338
23	-5.50	21.66	0.013	1.81E-03	75.0	-166.0		
		12.32	0.012	2.02E-03	83.5	-126.7		352338
24	-6.00	1.00	0.011	2.17E-03	86.9	-84.3		352338
25	-6.60	-15.55	0.009	2.27E-03	82.5	-33.3		352338
26	-7.20	-114.70	0.009	2.27E-03	82.5	-33.3		
		-71.54	0.008	2.30E-03	26.6	-4.4		352338
27	-7.60	-34.17	0.007	2.30E-03	5.5	0.5		352338

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-8.00	4.87	0.006	2.30E-03	-0.4	-0.0		0
29	-8.15	-0.03	0.006	0	-0.0	0.0		0
30	-9.57	0.01	0.004	0	-0.0	0.0		0
31	-11.00	70.00	0.001	0	49.9	0.0		0
		-58.66	0.001	0	49.9	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.01	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	106.2	kN/m run		
At elev. -2.00				Prop force =	173.6	kN/m run		
At elev. -5.00				Prop force =	-5.5	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	14.81	14.81	9981
3	3.00	0.00	17.14	5.30	66.30	13.22	13.22	9981
4	2.65	0.00	23.26	7.19	89.97	12.21	12.21	9981
5	2.30	0.00	29.45	9.10	113.93	11.81	11.81	9981
6	2.00	0.00	34.80	10.76	134.63	10.46	10.46A	9981
7	1.40	0.00	45.59	14.09	176.37	15.90	15.90	9981
		0.00	45.59	10.45	176.98	23.72	23.72	4991
8	1.00	0.00	52.82	12.99	201.83	26.08	26.08	5190
9	0.60	0.00	60.04	15.53	226.69	29.55	29.55	5390
10	0.00	0.00	70.85	19.32	263.90	35.54	35.54	5689
11	-0.60	0.00	81.60	23.10	300.93	41.66	41.66	5989
12	-0.95	0.00	87.86	25.30	322.45	44.85	44.85	6163
13	-1.30	0.00	94.09	27.49	343.90	48.47	48.47	6338
14	-1.50	0.00	97.64	28.73	356.13	49.99	49.99	6438
15	-2.00	0.00	106.49	31.84	386.61	55.13	55.13	6687
16	-2.50	0.00	115.32	34.94	416.97	59.66	59.66	6937
17	-3.00	0.00	124.11	38.03	447.23	63.92	63.92	7186
18	-3.50	0.00	132.87	41.11	477.39	67.68	67.68	7436
19	-4.00	0.00	141.61	44.18	507.47	70.37	70.37	7685
20	-4.30	3.00	143.84	44.96	515.15	67.01	70.01	7835
		3.00	143.84	28.34	686.84	17.83	20.83A	29943
21	-4.65	6.50	147.48	29.38	702.77	55.34	61.84	29943
22	-5.00	10.00	151.12	30.41	718.65	70.02	80.02	29943
23	-5.50	15.00	156.30	31.87	741.28	82.40	97.40	29943
24	-6.00	20.00	161.46	33.34	763.84	92.76	112.76	29943
25	-6.60	26.00	167.64	35.09	790.83	102.36	128.36	29943
		26.00	167.64	24.47	849.19	61.33	87.33	49905
26	-7.20	32.00	175.60	26.80	883.98	98.83	130.83	49905
27	-7.60	36.00	180.90	28.35	907.12	122.61	158.61	49905
28	-8.00	40.00	186.19	29.90	930.25	146.80	186.80	49905
29	-8.15	41.50	188.17	30.48	938.91	146.73	188.23	49905
30	-9.57	55.75	206.97	35.97	1021.06	165.20	220.95	49905
31	-11.00	70.00	225.72	41.45	1102.96	218.77	288.77	49905
		70.00	225.72	0.00	6355.77	165.89	235.89	998109
32	-12.70	87.00	254.82	0.00	6759.93	223.98	310.98	998109
33	-14.40	104.00	283.88	0.00	7163.41	252.92	356.92	998109
34	-16.80	128.00	324.84	0.00	7732.14	293.97	421.97	998109

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

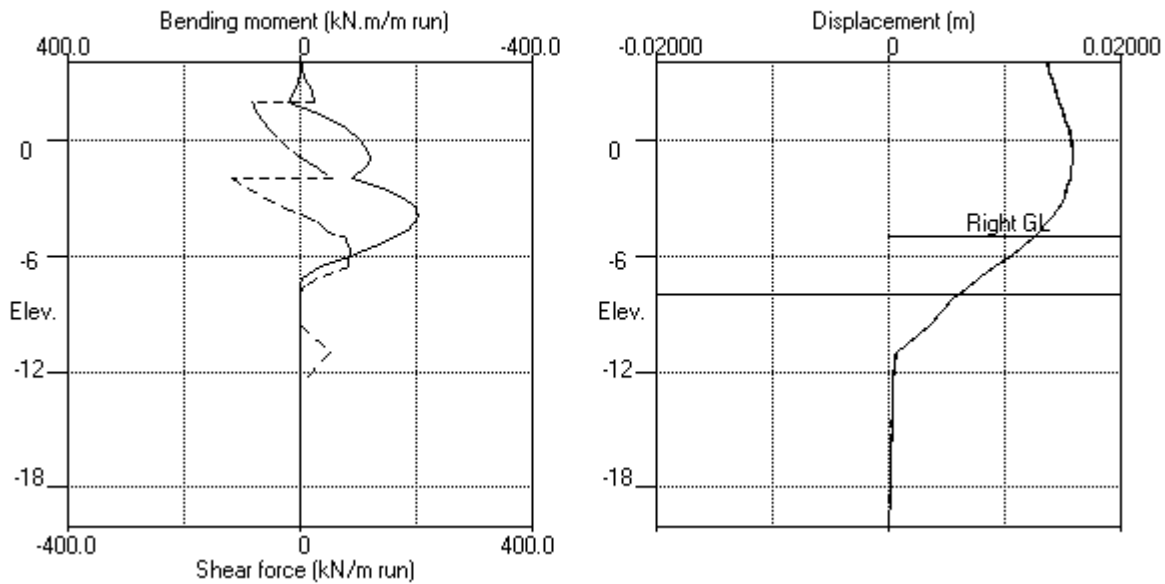
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
35	-18.40	144.00	352.11	0.00	8110.84	321.40	465.40	998109
36	-20.00	160.00	379.36	0.00	8489.23	343.66	503.66	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	58.36	58.36p	30080
23	-5.50	5.00	5.00	0.00	80.21	80.08	85.08	30080
24	-6.00	10.00	10.00	0.00	102.05	101.76	111.76	30080
25	-6.60	16.00	16.00	0.00	128.28	127.91	143.91	30080
		16.00	16.00	0.00	186.63	186.02	202.02	50133
26	-7.20	22.00	23.80	0.00	220.72	180.37	202.37	50133
27	-7.60	26.00	29.01	0.00	243.45	166.77	192.77	50133
28	-8.00	30.00	34.21	0.00	266.19	151.93	181.93	50133
29	-8.15	31.50	36.16	0.00	274.71	156.76	188.26	50133
30	-9.57	45.75	54.70	0.00	355.74	175.19	220.94	50133
31	-11.00	60.00	73.27	0.00	436.84	158.77	218.77	50133
		60.00	73.27	0.00	4238.84	234.55	294.55	1002652
32	-12.70	77.00	102.24	0.00	4641.14	233.98	310.98	1002652
33	-14.40	94.00	131.25	0.00	5043.96	262.92	356.92	1002652
34	-16.80	118.00	172.28	0.00	5613.73	303.97	421.97	1002652
35	-18.40	134.00	199.69	0.00	5994.39	331.40	465.40	1002652
36	-20.00	150.00	227.16	0.00	6375.76	353.68	503.68	1002652

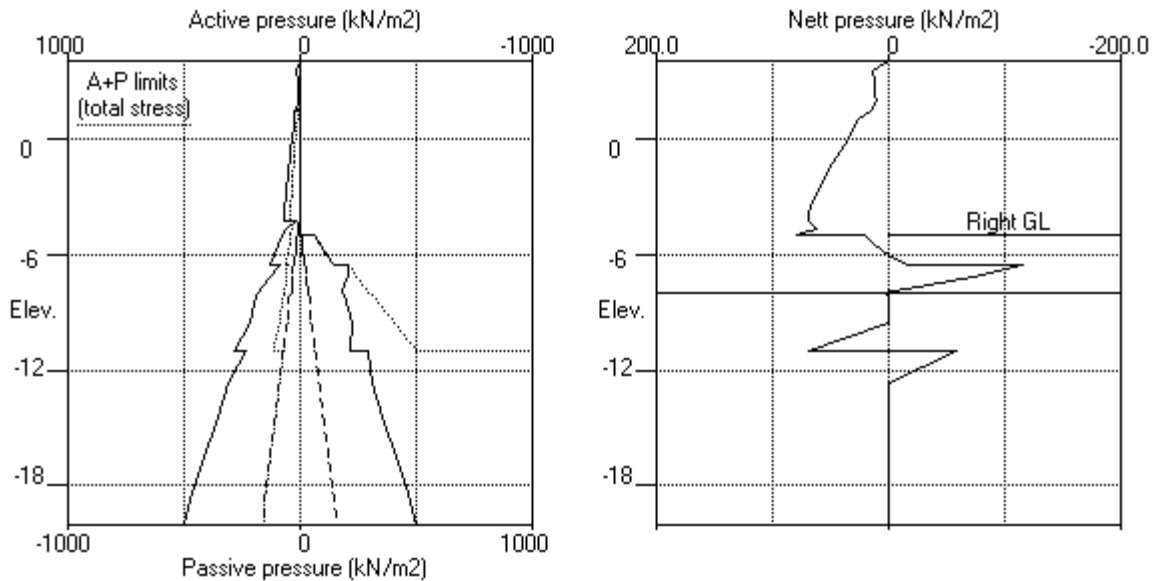
Note: 12.34 a Soil pressure at active limit
 58.36 p Soil pressure at passive limit
 20.83A Arching - soil pressure below active limit

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Stage No.12 Remove prop no.2 at elev. -1.30

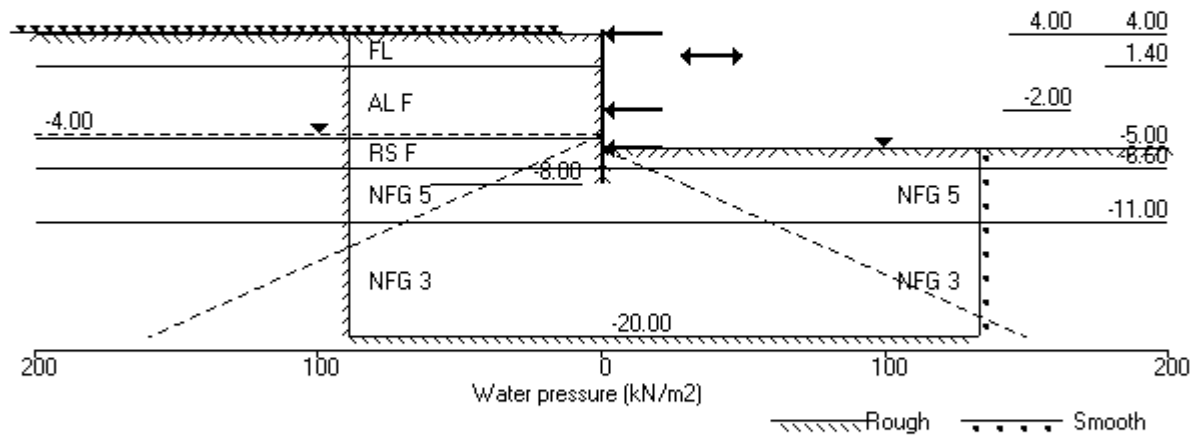


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Units: kN,m

Stage No. 14 Remove strut or anchor no.1 at elevation 2.00

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

Stage No.	Ground level Act.	Prop Elev.	Pass.	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	Direction of failure
				Factor of Safety at elev.	Toe Wall Penetration	
14	4.00	-5.00		More than one prop. No FoS calc.		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached
 Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.014	-1.02E-03	-59.1	0.0	-59.1	352338
2	3.50	15.58	0.014	-1.00E-03	-55.2	-29.3		352338
3	3.00	12.54	0.015	-9.43E-04	-48.2	-54.7		352338
4	2.65	10.63	0.015	-8.81E-04	-44.1	-70.7		352338
5	2.30	9.65	0.015	-8.03E-04	-40.6	-85.4		352338
6	2.00	7.98	0.016	-7.26E-04	-37.9	-97.1		352338
7	1.40	13.46	0.016	-5.44E-04	-31.5	-116.7		352338
		22.50	0.016	-5.44E-04	-31.5	-116.7		
8	1.00	24.79	0.016	-4.05E-04	-22.0	-127.4		352338
9	0.60	28.38	0.016	-2.57E-04	-11.4	-134.1		352338
10	0.00	34.62	0.016	-2.78E-05	7.5	-135.4		352338
11	-0.60	41.04	0.016	1.93E-04	30.2	-124.2		352338
12	-0.95	44.52	0.016	3.10E-04	45.2	-111.1		352338
13	-1.30	48.34	0.016	4.11E-04	61.4	-92.4		352338
14	-1.50	50.09	0.016	4.59E-04	71.3	-79.2		352338
15	-2.00	55.44	0.016	5.42E-04	97.7	-36.7	-233.6	352338
		55.44	0.016	5.42E-04	-135.9	-36.7		
16	-2.50	60.11	0.015	6.37E-04	-107.0	-97.5		352338
17	-3.00	64.41	0.015	8.08E-04	-75.9	-143.3		352338
18	-3.50	68.14	0.015	1.03E-03	-42.8	-172.9		352338
19	-4.00	70.78	0.014	1.28E-03	-8.0	-185.4		352338
20	-4.30	70.34	0.014	1.44E-03	13.1	-184.5		352338
		22.05	0.014	1.44E-03	13.1	-184.5		
21	-4.65	62.78	0.013	1.62E-03	28.0	-179.0		352338
22	-5.00	80.73	0.012	1.79E-03	53.1	-165.4	20.4	352338
		23.37	0.012	1.79E-03	73.5	-165.4		
23	-5.50	13.40	0.012	2.00E-03	82.6	-126.8		352338
24	-6.00	1.77	0.010	2.15E-03	86.4	-84.6		352338
25	-6.60	-15.00	0.009	2.25E-03	82.5	-33.7		352338
		-113.77	0.009	2.25E-03	82.5	-33.7		
26	-7.20	-71.16	0.008	2.28E-03	27.0	-4.7		352338
27	-7.60	-34.32	0.007	2.28E-03	5.9	0.4		352338
28	-8.00	3.54	0.006	2.28E-03	-0.3	-0.0		0

(continued)

Stage No.14 Remove strut or anchor no.1 at elevation 2.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-8.15	-0.03	0.006	0	-0.0	0.0		0
30	-9.57	0.01	0.003	0	-0.0	0.0		0
31	-11.00	70.00	0.001	0	49.9	0.0		0
		-58.66	0.001	0	49.9	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.01	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	59.1	kN/m run		
At elev. -2.00				Prop force =	233.6	kN/m run		
At elev. -5.00				Prop force =	-20.4	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>		<u>Earth pressure</u> kN/m2	<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	15.58	15.58	9981
3	3.00	0.00	17.14	5.30	66.30	12.54	12.54	9981
4	2.65	0.00	23.26	7.19	89.97	10.63	10.63	9981
5	2.30	0.00	29.45	9.10	113.93	9.65	9.65	9981
6	2.00	0.00	34.80	10.76	134.63	7.98	7.98A	9981
7	1.40	0.00	45.59	14.09	176.37	13.46	13.46A	9981
		0.00	45.59	10.45	176.98	22.50	22.50	4991
8	1.00	0.00	52.82	12.99	201.83	24.79	24.79	5190
9	0.60	0.00	60.04	15.53	226.69	28.38	28.38	5390
10	0.00	0.00	70.85	19.32	263.90	34.62	34.62	5689
11	-0.60	0.00	81.60	23.10	300.93	41.04	41.04	5989
12	-0.95	0.00	87.86	25.30	322.45	44.52	44.52	6163
13	-1.30	0.00	94.09	27.49	343.90	48.34	48.34	6338
14	-1.50	0.00	97.64	28.73	356.13	50.09	50.09	6438
15	-2.00	0.00	106.49	31.84	386.61	55.44	55.44	6687
16	-2.50	0.00	115.32	34.94	416.97	60.11	60.11	6937
17	-3.00	0.00	124.11	38.03	447.23	64.41	64.41	7186
18	-3.50	0.00	132.87	41.11	477.39	68.14	68.14	7436
19	-4.00	0.00	141.61	44.18	507.47	70.78	70.78	7685
20	-4.30	3.00	143.84	44.96	515.15	67.34	70.34	7835
		3.00	143.84	28.34	686.84	19.05	22.05A	29943
21	-4.65	6.50	147.48	29.38	702.77	56.28	62.78	29943
22	-5.00	10.00	151.12	30.41	718.65	70.73	80.73	29943
23	-5.50	15.00	156.30	31.87	741.28	82.94	97.94	29943
24	-6.00	20.00	161.46	33.34	763.84	93.17	113.17	29943
25	-6.60	26.00	167.64	35.09	790.83	102.65	128.65	29943
		26.00	167.64	24.47	849.19	61.81	87.81	49905
26	-7.20	32.00	175.60	26.80	883.98	99.05	131.05	49905
27	-7.60	36.00	180.90	28.35	907.12	122.55	158.55	49905
28	-8.00	40.00	186.19	29.90	930.25	146.18	186.18	49905
29	-8.15	41.50	188.17	30.48	938.91	146.74	188.24	49905
30	-9.57	55.75	206.97	35.97	1021.06	165.21	220.96	49905
31	-11.00	70.00	225.72	41.45	1102.96	218.77	288.77	49905
		70.00	225.72	0.00	6355.77	165.90	235.90	998109
32	-12.70	87.00	254.82	0.00	6759.93	223.99	310.99	998109
33	-14.40	104.00	283.88	0.00	7163.41	252.93	356.93	998109
34	-16.80	128.00	324.84	0.00	7732.14	293.97	421.97	998109
35	-18.40	144.00	352.11	0.00	8110.84	321.40	465.40	998109

(continued)

Stage No.14 Remove strut or anchor no.1 at elevation 2.00

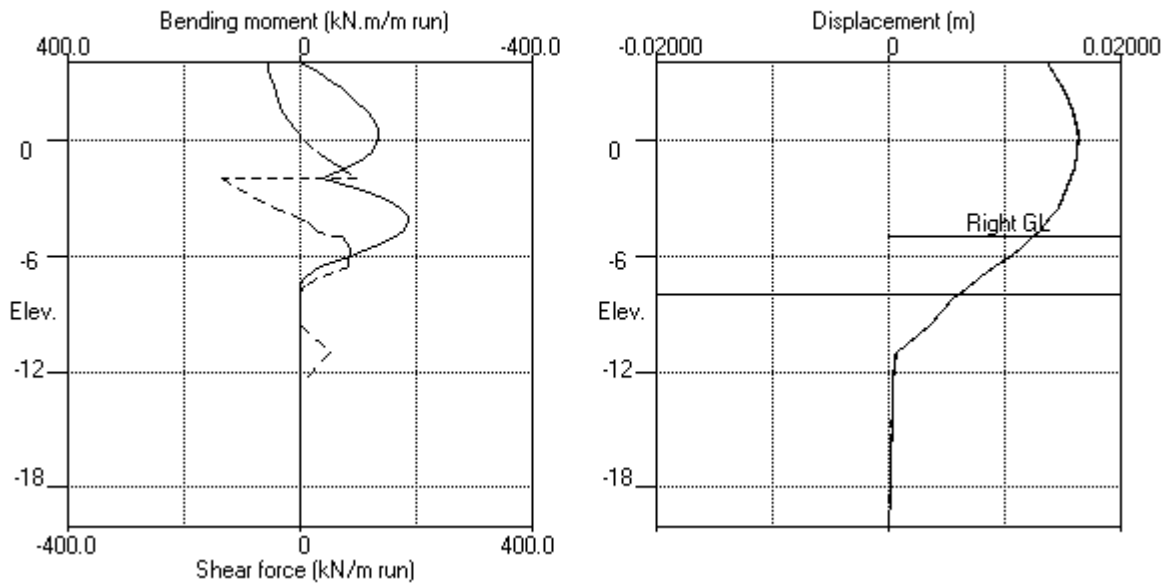
LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Effective stresses</u>		<u>Earth</u> <u>pressure</u> kN/m2	<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
				<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2			
36	-20.00	160.00	379.36	0.00	8489.23	343.66	503.66	998109

RIGHT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Effective stresses</u>		<u>Earth</u> <u>pressure</u> kN/m2	<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
				<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	57.36	57.36	30080
23	-5.50	5.00	5.00	0.00	80.21	79.54	84.54	30080
24	-6.00	10.00	10.00	0.00	102.05	101.40	111.40	30080
25	-6.60	16.00	16.00	0.00	128.28	127.65	143.65	30080
		16.00	16.00	0.00	186.63	185.59	201.59	50133
26	-7.20	22.00	23.80	0.00	220.72	180.21	202.21	50133
27	-7.60	26.00	29.01	0.00	243.45	166.87	192.87	50133
28	-8.00	30.00	34.21	0.00	266.19	152.64	182.64	50133
29	-8.15	31.50	36.16	0.00	274.71	156.77	188.27	50133
30	-9.57	45.75	54.70	0.00	355.74	175.20	220.95	50133
31	-11.00	60.00	73.27	0.00	436.84	158.77	218.77	50133
		60.00	73.27	0.00	4238.84	234.56	294.56	1002652
32	-12.70	77.00	102.24	0.00	4641.14	233.99	310.99	1002652
33	-14.40	94.00	131.25	0.00	5043.96	262.92	356.92	1002652
34	-16.80	118.00	172.28	0.00	5613.73	303.97	421.97	1002652
35	-18.40	134.00	199.69	0.00	5994.39	331.40	465.40	1002652
36	-20.00	150.00	227.16	0.00	6375.76	353.68	503.68	1002652

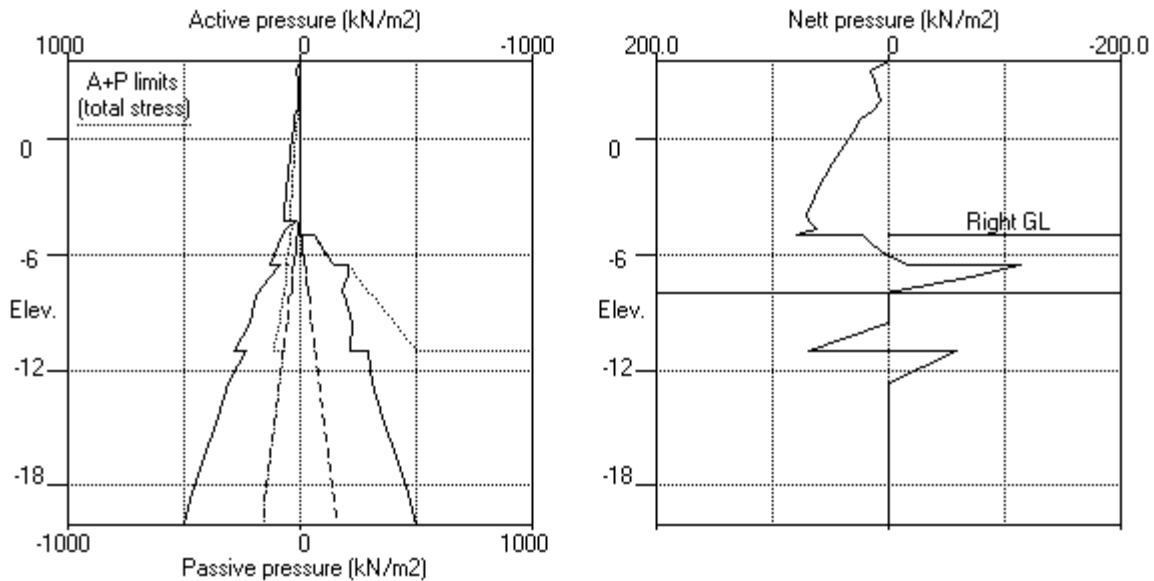
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 22.05A Arching - soil pressure below active limit

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Stage No.14 Remove prop no.1 at elev. 2.00

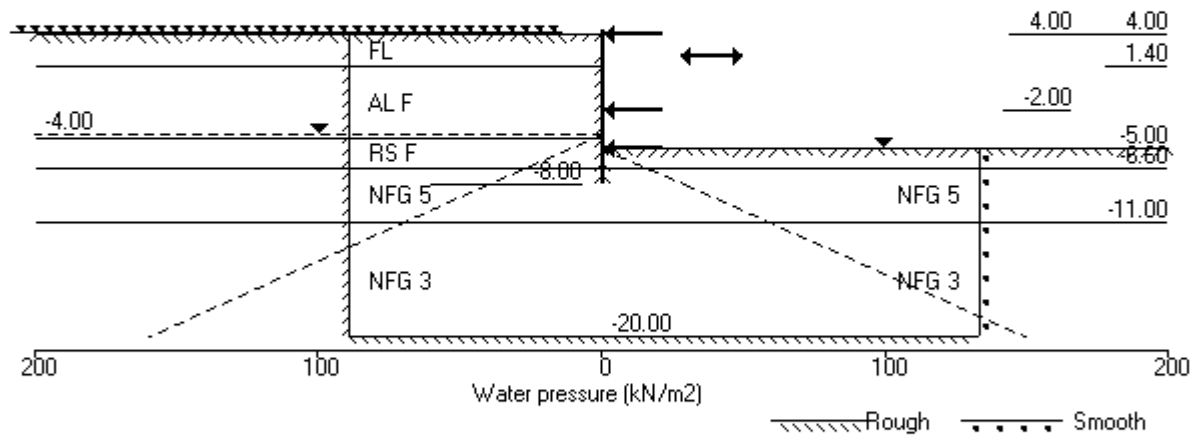


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.15 Change EI of wall to 246637kN.m2/m run



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DJC
Data filename/Run ID: Section_3	
Albert Street Development	Date:16-11-2022
Section 3	Checked :

Units: kN,m

Stage No. 15 Change EI of wall to 246637 kN.m2/m run
Allow wall to relax with new modulus value

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method
Factor of safety on nett available passive

				FoS for toe	Toe elev. for		
				elev. = -8.00	FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	<u>of</u>
			<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
15	4.00	-5.00	<u>More than one prop. No FoS calc.</u>				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached
Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u>	<u>Y</u>	<u>Nett</u>	<u>Wall</u>	<u>Wall</u>	<u>Shear</u>	<u>Bending</u>	<u>Prop</u>	<u>EI of</u>
<u>no.</u>	<u>coord</u>	<u>pressure</u>	<u>disp.</u>	<u>rotation</u>	<u>force</u>	<u>moment</u>	<u>forces</u>	<u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-1.13E-03	-51.3	0.0	-51.3	246637
2	3.50	15.82	0.014	-1.11E-03	-47.4	-26.3		246637
3	3.00	12.46	0.015	-1.03E-03	-40.3	-48.7		246637
4	2.65	10.35	0.015	-9.62E-04	-36.3	-62.5		246637
5	2.30	9.24	0.015	-8.68E-04	-32.9	-75.2		246637
6	2.00	7.47	0.016	-7.75E-04	-30.4	-85.1		246637
7	1.40	12.88	0.016	-5.58E-04	-24.3	-101.3		246637
		22.21	0.016	-5.58E-04	-24.3	-101.3		
8	1.00	24.47	0.016	-3.95E-04	-14.9	-109.8		246637
9	0.60	28.06	0.016	-2.23E-04	-4.4	-114.3		246637
10	0.00	34.36	0.016	3.70E-05	14.3	-112.4		246637
11	-0.60	40.88	0.016	2.75E-04	36.9	-98.2		246637
12	-0.95	44.48	0.016	3.92E-04	51.8	-83.2		246637
13	-1.30	48.40	0.016	4.84E-04	68.1	-62.8		246637
14	-1.50	50.23	0.016	5.21E-04	77.9	-48.6		246637
15	-2.00	55.64	0.016	5.55E-04	104.4	-3.5	-242.5	246637
		55.64	0.016	5.55E-04	-138.1	-3.5		
16	-2.50	60.21	0.015	6.05E-04	-109.1	-65.1		246637
17	-3.00	64.34	0.015	7.64E-04	-78.0	-111.7		246637
18	-3.50	67.89	0.015	1.00E-03	-44.9	-142.1		246637
19	-4.00	70.41	0.014	1.28E-03	-10.3	-155.5		246637
20	-4.30	69.91	0.014	1.46E-03	10.7	-155.1		246637
		20.41	0.014	1.46E-03	10.7	-155.1		
21	-4.65	61.33	0.013	1.66E-03	25.0	-150.3		246637
22	-5.00	79.55	0.013	1.86E-03	49.7	-137.6	11.5	246637
		21.19	0.013	1.86E-03	61.1	-137.6		
23	-5.50	12.03	0.012	2.09E-03	69.4	-103.9		246637
24	-6.00	1.32	0.010	2.25E-03	72.8	-67.0		246637
25	-6.60	-13.93	0.009	2.34E-03	69.0	-22.4		246637
		-111.99	0.009	2.34E-03	69.0	-22.4		
26	-7.20	-66.29	0.008	2.36E-03	15.5	0.6		246637
27	-7.60	-25.08	0.007	2.36E-03	-2.8	2.5		246637

(continued)

Stage No.15 Change EI of wall to 246637 kN.m2/m run
 Allow wall to relax with new modulus value

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
28	-8.00	28.28	0.006	2.36E-03	-2.1	-0.0		0
29	-8.15	-0.03	0.006	0	-0.0	0.0		0
30	-9.57	0.01	0.003	0	-0.0	0.0		0
31	-11.00	70.00	0.001	0	49.9	0.0		0
		-58.66	0.001	0	49.9	0.0		
32	-12.70	0.00	0.000	0	-0.0	0.0		0
33	-14.40	0.01	0.000	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	51.3	kN/m run		
At elev. -2.00				Prop force =	242.5	kN/m run		
At elev. -5.00				Prop force =	-11.5	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.52	2.63	32.95	15.82	15.82	9981
3	3.00	0.00	17.14	5.30	66.30	12.46	12.46	9981
4	2.65	0.00	23.26	7.19	89.97	10.35	10.35	9981
5	2.30	0.00	29.45	9.10	113.93	9.24	9.24	9981
6	2.00	0.00	34.80	10.76	134.63	7.47	7.47A	9981
7	1.40	0.00	45.59	14.09	176.37	12.88	12.88A	9981
		0.00	45.59	10.45	176.98	22.21	22.21	4991
8	1.00	0.00	52.82	12.99	201.83	24.47	24.47	5190
9	0.60	0.00	60.04	15.53	226.69	28.06	28.06	5390
10	0.00	0.00	70.85	19.32	263.90	34.36	34.36	5689
11	-0.60	0.00	81.60	23.10	300.93	40.88	40.88	5989
12	-0.95	0.00	87.86	25.30	322.45	44.48	44.48	6163
13	-1.30	0.00	94.09	27.49	343.90	48.40	48.40	6338
14	-1.50	0.00	97.64	28.73	356.13	50.23	50.23	6438
15	-2.00	0.00	106.49	31.84	386.61	55.64	55.64	6687
16	-2.50	0.00	115.32	34.94	416.97	60.21	60.21	6937
17	-3.00	0.00	124.11	38.03	447.23	64.34	64.34	7186
18	-3.50	0.00	132.87	41.11	477.39	67.89	67.89	7436
19	-4.00	0.00	141.61	44.18	507.47	70.41	70.41	7685
20	-4.30	3.00	143.84	44.96	515.15	66.91	69.91	7835
		3.00	143.84	28.34	686.84	17.41	20.41A	29943
21	-4.65	6.50	147.48	29.38	702.77	54.83	61.33	29943
22	-5.00	10.00	151.12	30.41	718.65	69.55	79.55	29943
23	-5.50	15.00	156.30	31.87	741.28	82.24	97.24	29943
24	-6.00	20.00	161.46	33.34	763.84	93.11	113.11	29943
25	-6.60	26.00	167.64	35.09	790.83	103.27	129.27	29943
		26.00	167.64	24.47	849.19	62.86	88.86	49905
26	-7.20	32.00	175.60	26.80	883.98	101.59	133.59	49905
27	-7.60	36.00	180.90	28.35	907.12	127.30	163.30	49905
28	-8.00	40.00	186.19	29.90	930.25	158.21	198.21	49905
29	-8.15	41.50	188.17	30.48	938.91	146.90	188.40	49905
30	-9.57	55.75	206.97	35.97	1021.06	165.24	220.99	49905
31	-11.00	70.00	225.72	41.45	1102.96	218.77	288.77	49905
		70.00	225.72	0.00	6355.77	165.93	235.93	998109
32	-12.70	87.00	254.82	0.00	6759.93	224.02	311.02	998109
33	-14.40	104.00	283.88	0.00	7163.41	252.95	356.95	998109

(continued)

Stage No.15 Change EI of wall to 246637 kN.m2/m run
Allow wall to relax with new modulus value

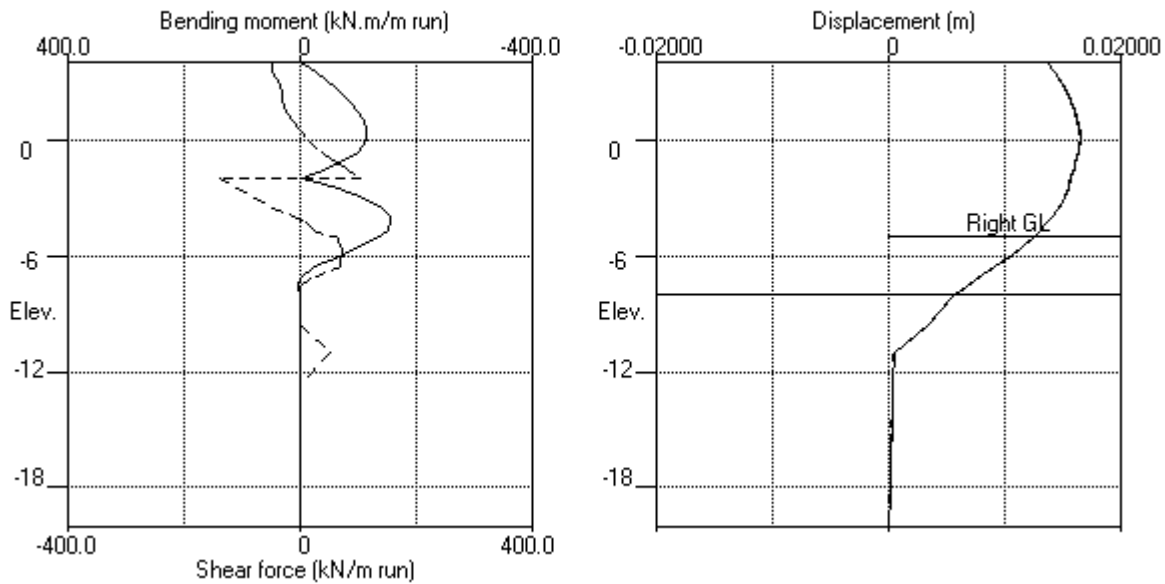
LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
34	-16.80	128.00	324.84	0.00	7732.14	293.98	421.98	998109
35	-18.40	144.00	352.11	0.00	8110.84	321.41	465.41	998109
36	-20.00	160.00	379.36	0.00	8489.23	343.67	503.67	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
23	-5.50	5.00	5.00	0.00	80.21	80.21	85.21p	30080
24	-6.00	10.00	10.00	0.00	102.05	101.79	111.79	30080
25	-6.60	16.00	16.00	0.00	128.28	127.20	143.20	30080
26	-7.20	22.00	23.80	0.00	186.63	184.85	200.85	50133
27	-7.60	26.00	29.01	0.00	243.45	162.38	188.38	50133
28	-8.00	30.00	34.21	0.00	266.19	139.94	169.94	50133
29	-8.15	31.50	36.16	0.00	274.71	156.93	188.43	50133
30	-9.57	45.75	54.70	0.00	355.74	175.24	220.99	50133
31	-11.00	60.00	73.27	0.00	436.84	158.77	218.77	50133
32	-12.70	77.00	102.24	0.00	4641.14	234.01	311.01	1002652
33	-14.40	94.00	131.25	0.00	5043.96	262.94	356.94	1002652
34	-16.80	118.00	172.28	0.00	5613.73	303.98	421.98	1002652
35	-18.40	134.00	199.69	0.00	5994.39	331.41	465.41	1002652
36	-20.00	150.00	227.16	0.00	6375.76	353.69	503.69	1002652

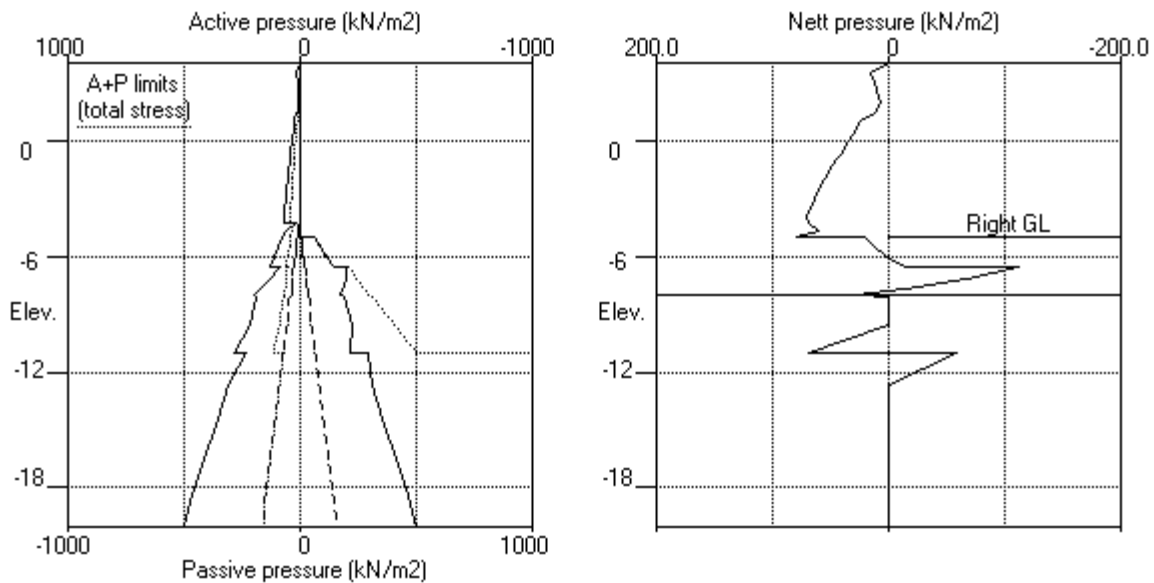
Note: 12.34 a Soil pressure at active limit
85.21 p Soil pressure at passive limit
20.41A Arching - soil pressure below active limit

Units: kN,m

Stage No.15 Change EI of wall to 246637kN.m2/m run



Stage No.15 Change EI of wall to 246637kN.m2/m run

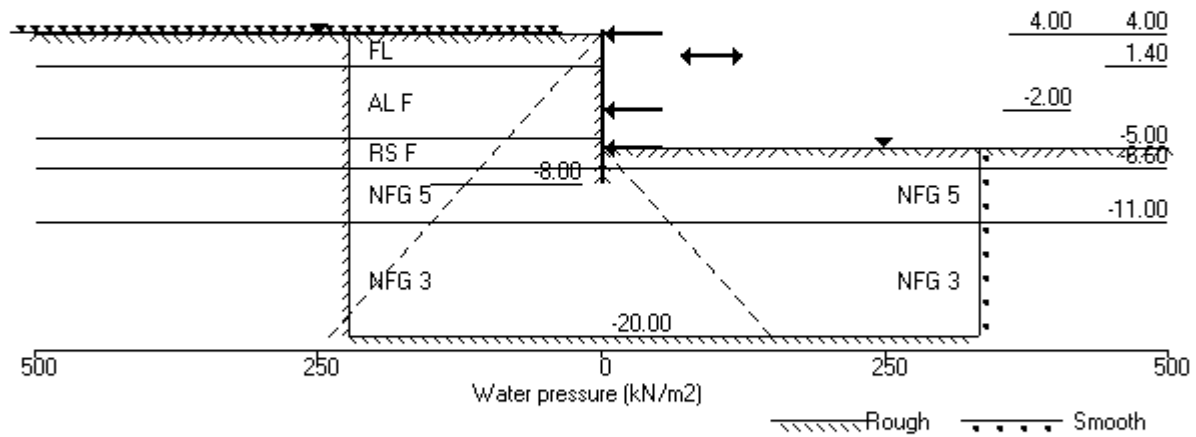


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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_3
 Albert Street Development
 Section 3

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.16 Apply water pressure profile no.1



Units: kN,m

Stage No. 16 Apply water pressure profile no.1

STABILITY ANALYSIS of Fully Embedded Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>Penetr</u> <u>-ation</u>	
16	4.00	-5.00		<u>Moment</u> <u>at elev.</u> <u>More than one prop. No FoS calc.</u>		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached
 Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.014	-1.47E-03	-74.2	0.0	-74.2	246637
2	3.50	18.61	0.014	-1.44E-03	-69.5	-37.6		246637
3	3.00	17.99	0.015	-1.33E-03	-60.4	-70.6		246637
4	2.65	17.33	0.016	-1.22E-03	-54.2	-91.1		246637
5	2.30	17.87	0.016	-1.08E-03	-48.0	-109.5		246637
6	2.00	20.02	0.016	-9.47E-04	-42.3	-123.5		246637
7	1.40	30.59	0.017	-6.31E-04	-27.1	-144.5		246637
		36.32	0.017	-6.31E-04	-27.1	-144.5		
8	1.00	40.73	0.017	-3.98E-04	-11.7	-152.9		246637
9	0.60	46.62	0.017	-1.57E-04	5.7	-154.8		246637
10	0.00	56.50	0.017	1.89E-04	36.7	-143.4		246637
11	-0.60	66.73	0.017	4.81E-04	73.6	-111.5		246637
12	-0.95	72.64	0.017	6.07E-04	98.0	-82.1		246637
13	-1.30	78.82	0.016	6.84E-04	124.5	-43.7		246637
14	-1.50	82.10	0.016	7.01E-04	140.6	-17.5		246637
15	-2.00	90.63	0.016	6.36E-04	183.8	62.9	-384.5	246637
		90.63	0.016	6.36E-04	-200.7	62.9		
16	-2.50	98.13	0.016	5.78E-04	-153.5	-25.5		246637
17	-3.00	105.04	0.015	6.75E-04	-102.7	-89.3		246637
18	-3.50	111.41	0.015	8.75E-04	-48.6	-126.9		246637
19	-4.00	116.79	0.014	1.12E-03	8.4	-136.6		246637
20	-4.30	116.28	0.014	1.27E-03	43.4	-128.5		246637
		85.54	0.014	1.27E-03	43.4	-128.5		
21	-4.65	109.69	0.014	1.43E-03	77.6	-108.7		246637
22	-5.00	127.22	0.013	1.54E-03	119.0	-74.6	-139.9	246637
		72.79	0.013	1.54E-03	-20.8	-74.6		
23	-5.50	59.69	0.012	1.68E-03	12.3	-75.4		246637
24	-6.00	43.89	0.011	1.81E-03	38.2	-61.1		246637
25	-6.60	24.97	0.010	1.91E-03	58.8	-29.7		246637
		-77.63	0.010	1.91E-03	58.8	-29.7		
26	-7.20	-49.32	0.009	1.94E-03	20.8	-6.6		246637
27	-7.60	-23.48	0.008	1.95E-03	6.2	-1.2		246637
28	-8.00	-5.45	0.008	1.95E-03	0.4	-0.0		0

(continued)

Stage No.16 Apply water pressure profile no.1

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-8.15	-0.03	0.007	0	-0.0	0.0		0
30	-9.57	0.01	0.005	0	-0.0	0.0		0
31	-11.00	110.99	0.001	0	79.1	0.0		0
		-93.03	0.001	0	79.1	0.0		
32	-12.70	0.00	0.001	0	-0.0	0.0		0
33	-14.40	0.01	0.001	0	0.0	0.0		0
34	-16.80	0.00	0.000	0	0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.02	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	74.2	kN/m run		
At elev. -2.00				Prop force =	384.5	kN/m run		
At elev. -5.00				Prop force =	139.9	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>		<u>Earth pressure</u> kN/m2	<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	5.00	3.52	1.09	13.61	13.61	18.61p	9981
3	3.00	10.00	7.14	2.21	27.61	7.99	17.99	9981
4	2.65	13.50	9.76	3.02	37.75	3.83	17.33	9981
5	2.30	17.00	12.45	3.85	48.16	0.87	17.87A	9981
6	2.00	20.00	14.80	4.57	57.27	0.02	20.02A	9981
7	1.40	26.00	19.59	6.06	75.80	4.59	30.59A	9981
		26.00	19.59	1.32	87.48	10.32	36.32	4991
8	1.00	30.00	22.82	2.45	98.57	10.73	40.73	5190
9	0.60	34.00	26.04	3.58	109.66	12.62	46.62	5390
10	0.00	40.00	30.85	5.27	126.21	16.50	56.50	5689
11	-0.60	46.00	35.60	6.94	142.59	20.73	66.73	5989
12	-0.95	49.50	38.36	7.91	152.06	23.14	72.64	6163
13	-1.30	53.00	41.09	8.87	161.46	25.82	78.82	6338
14	-1.50	55.00	42.64	9.41	166.80	27.10	82.10	6438
15	-2.00	60.00	46.49	10.77	180.07	30.63	90.63	6687
16	-2.50	65.00	50.32	12.11	193.23	33.13	98.13	6937
17	-3.00	70.00	54.11	13.44	206.28	35.04	105.04	7186
18	-3.50	75.00	57.87	14.76	219.23	36.41	111.41	7436
19	-4.00	80.00	61.61	16.08	232.09	36.79	116.79	7685
20	-4.30	83.00	63.84	16.86	239.78	33.28	116.28	7835
		83.00	63.84	5.68	337.29	2.54	85.54A	29943
21	-4.65	86.50	67.48	6.71	353.22	23.19	109.69	29943
22	-5.00	90.00	71.12	7.74	369.10	37.22	127.22	29943
23	-5.50	95.00	76.30	9.21	391.73	47.87	142.87	29943
24	-6.00	100.00	81.46	10.67	414.29	55.94	155.94	29943
25	-6.60	106.00	87.64	12.42	441.28	63.25	169.25	29943
		106.00	87.64	1.09	499.64	19.01	125.01	49905
26	-7.20	112.00	95.60	3.42	534.42	52.32	164.32	49905
27	-7.60	116.00	100.90	4.97	557.57	70.36	186.36	49905
28	-8.00	120.00	106.19	6.52	580.70	84.48	204.48	49905
29	-8.15	121.50	108.17	7.10	589.36	89.24	210.74	49905
30	-9.57	135.75	126.97	12.59	671.51	107.86	243.61	49905
31	-11.00	150.00	145.72	18.07	753.41	182.10	332.10	49905
		150.00	145.72	0.00	5244.89	98.23	248.23	998109
32	-12.70	167.00	174.82	0.00	5649.05	173.51	340.51	998109
33	-14.40	184.00	203.88	0.00	6052.54	202.51	386.51	998109
34	-16.80	208.00	244.84	0.00	6621.27	243.66	451.66	998109
35	-18.40	224.00	272.11	0.00	6999.96	271.09	495.09	998109

(continued)

Stage No.16 Apply water pressure profile no.1

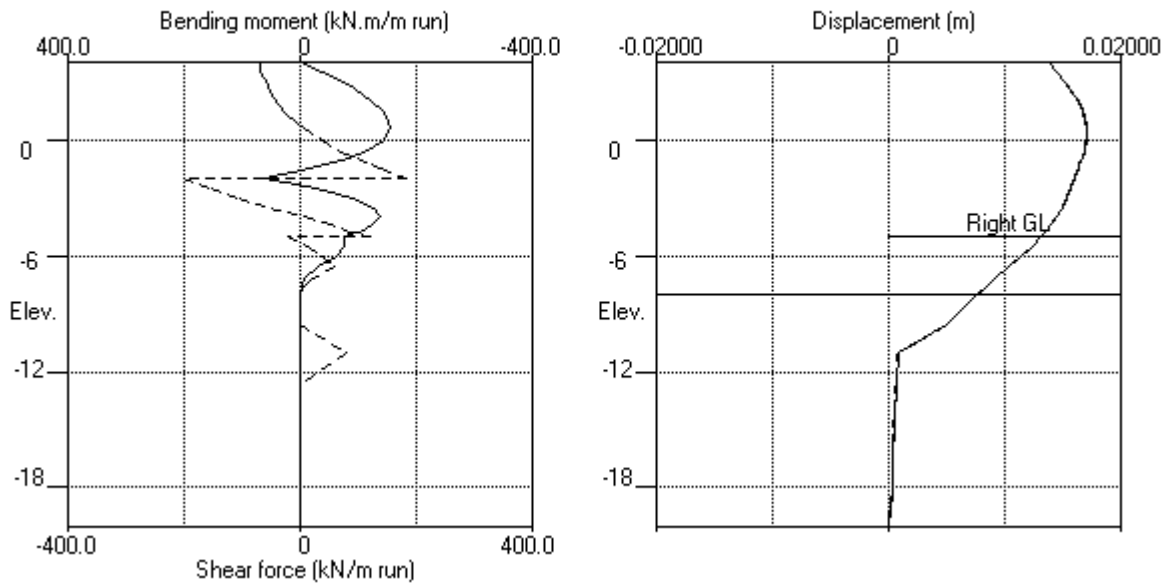
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses			Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
36	-20.00	240.00	299.36	0.00	7378.35	287.37	527.37	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses			Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	58.36	54.42	54.42	30080
23	-5.50	5.00	5.00	0.00	80.21	78.18	83.18	30080
24	-6.00	10.00	10.00	0.00	102.05	102.05	112.05p	30080
25	-6.60	16.00	16.00	0.00	128.28	128.28	144.28p	30080
		16.00	16.00	0.00	186.63	186.63	202.63p	50133
26	-7.20	22.00	23.80	0.00	220.72	191.64	213.64	50133
27	-7.60	26.00	29.01	0.00	243.45	183.84	209.84	50133
28	-8.00	30.00	34.21	0.00	266.19	179.93	209.93	50133
29	-8.15	31.50	36.16	0.00	274.71	179.27	210.77	50133
30	-9.57	45.75	54.70	0.00	355.74	197.86	243.61	50133
31	-11.00	60.00	73.27	0.00	436.84	161.10	221.10	50133
		60.00	73.27	0.00	4238.84	281.26	341.26	1002652
32	-12.70	77.00	102.24	0.00	4641.14	263.51	340.51	1002652
33	-14.40	94.00	131.25	0.00	5043.96	292.50	386.50	1002652
34	-16.80	118.00	172.28	0.00	5613.73	333.66	451.66	1002652
35	-18.40	134.00	199.69	0.00	5994.39	361.09	495.09	1002652
36	-20.00	150.00	227.16	0.00	6375.76	377.39	527.39	1002652

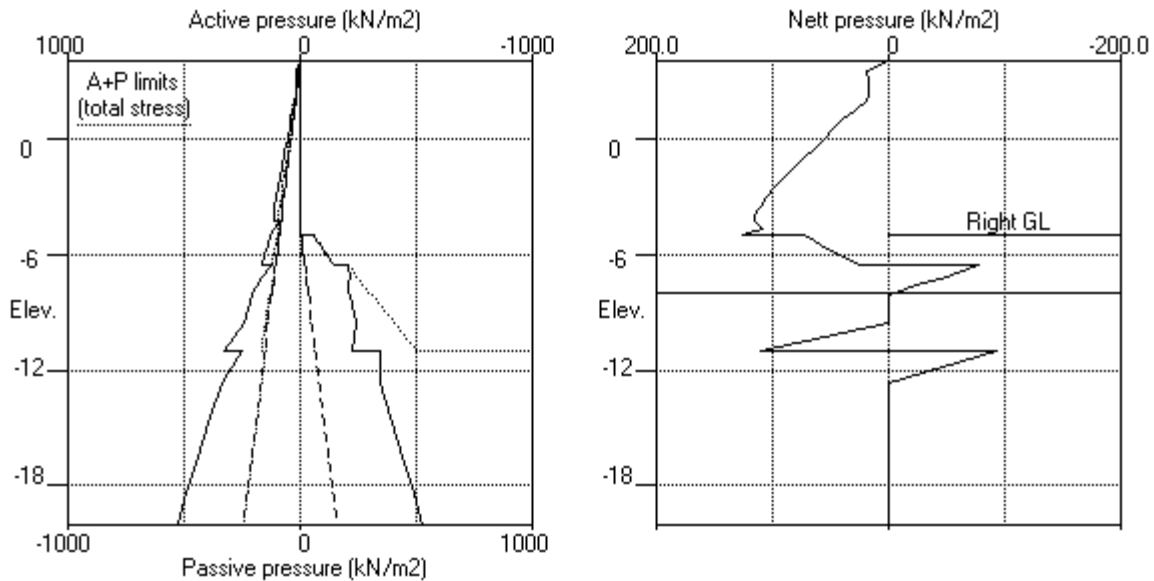
Note: 12.34 a Soil pressure at active limit
 202.63 p Soil pressure at passive limit
 85.54A Arching - soil pressure below active limit

Units: kN,m

Stage No.16 Apply water pressure profile no.1



Stage No.16 Apply water pressure profile no.1



| Checked :

Stage No.	Ground level		Prop Elev.	FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		Direction of failure
	Act.	Pass.		Factor of Safety	Moment equilib. at elev.	Toe elev.	Wall Penetr -ation	
1	4.00	4.00	---	Conditions not suitable for FoS calc.				
2	4.00	2.00	Cant.	12.309	-6.51	0.02	1.98	L to R
3	4.00	2.00		No analysis at this stage				
4	4.00	-1.50	2.00	8.697	n/a	-3.28	1.78	L to R
5	4.00	-1.50		No analysis at this stage				
All remaining stages have more than one prop - FoS calculation n/a								

Units: kN,m

Summary of results

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached
 Open Tension Crack analysis - No

Rigid boundaries:	Left side 20.00 from wall	Rough boundary
	Right side 30.00 from wall	Smooth boundary
Lower rigid boundary at elevation -20.00		Rough boundary

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement		Bending moment		Shear force	
		maximum	minimum	maximum	minimum	maximum	minimum
		m	m	kN.m/m	kN.m/m	kN/m	kN/m
1	4.00	0.017	0.000	0.0	-0.0	0.0	-74.2
2	3.50	0.016	0.000	0.3	-37.6	3.7	-69.5
3	3.00	0.015	0.000	4.2	-70.6	10.7	-60.4
4	2.65	0.016	0.000	8.9	-91.1	15.2	-54.2
5	2.30	0.016	0.000	15.0	-109.5	51.3	-48.0
6	2.00	0.016	0.000	29.2	-123.5	54.6	-86.9
7	1.40	0.017	0.000	15.3	-144.5	8.5	-79.4
8	1.00	0.017	0.000	18.6	-152.9	7.8	-69.5
9	0.60	0.017	0.000	21.5	-154.8	7.1	-58.2
10	0.00	0.017	0.000	25.5	-143.4	36.7	-38.3
11	-0.60	0.017	0.000	29.1	-134.5	73.6	-14.4
12	-0.95	0.017	0.000	31.3	-136.9	98.0	-0.6
13	-1.30	0.016	0.000	33.6	-133.5	124.5	-147.3
14	-1.50	0.016	0.000	34.9	-128.7	140.6	-137.3
15	-2.00	0.016	0.000	62.9	-127.6	183.8	-200.7
16	-2.50	0.016	0.000	43.0	-174.4	47.2	-153.5
17	-3.00	0.015	0.000	48.2	-206.3	53.8	-102.7
18	-3.50	0.015	0.000	54.1	-222.3	60.2	-48.6
19	-4.00	0.014	0.000	60.8	-221.2	65.4	-10.3
20	-4.30	0.014	0.000	65.0	-212.2	66.8	0.0
21	-4.65	0.014	0.000	66.0	-197.4	77.6	-2.3
22	-5.00	0.013	0.000	63.4	-174.6	119.0	-20.8
23	-5.50	0.012	0.000	56.2	-133.3	87.4	-16.7
24	-6.00	0.011	0.000	46.7	-89.0	90.4	-20.1
25	-6.60	0.010	0.000	39.7	-36.0	85.5	-22.2
26	-7.20	0.009	0.000	23.2	-6.6	28.8	-30.8
27	-7.60	0.008	0.000	10.0	-1.2	7.0	-29.0
28	-8.00	0.008	0.000	0.0	-0.0	0.4	-6.8
29	-8.15	0.007	0.000	0.0	0.0	0.0	-0.0
30	-9.57	0.005	0.000	0.0	0.0	0.0	-0.0
31	-11.00	0.001	0.000	0.0	0.0	79.1	0.0
32	-12.70	0.001	0.000	0.0	0.0	0.0	-0.0
33	-14.40	0.001	0.000	0.0	0.0	0.0	-0.0
34	-16.80	0.000	0.000	0.0	0.0	0.0	-0.0
35	-18.40	0.000	0.000	0.0	0.0	0.0	-0.0
36	-20.00	0.000	0.000	0.0	0.0	0.0	0.0

Summary of results (continued)

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment				Shear force			
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>
	kN.m/m		kN.m/m		kN/m		kN/m	
1	0.4	-6.60	-5.0	-1.50	2.6	-4.30	-1.5	1.40
2	66.0	-4.65	-0.0	-8.00	13.7	-4.00	-26.3	-7.20
3	No calculation at this stage							
4	47.0	-5.50	-136.9	-0.95	66.8	-4.30	-86.9	2.00
5	No calculation at this stage							
6	41.6	-5.50	-132.2	-0.95	64.0	-4.30	-85.5	2.00
7	21.0	2.00	-222.3	-3.50	90.4	-6.00	-144.7	-1.30
8	29.2	2.00	-216.5	-4.00	89.2	-6.00	-147.3	-1.30
9	21.0	2.00	-222.3	-3.50	90.4	-6.00	-144.7	-1.30
10	No calculation at this stage							
11	No calculation at this stage							
12	21.4	2.00	-202.8	-4.00	86.9	-6.00	-117.8	-2.00
13	No calculation at this stage							
14	0.4	-7.60	-185.4	-4.00	97.7	-2.00	-135.9	-2.00
15	2.5	-7.60	-155.5	-4.00	104.4	-2.00	-138.1	-2.00
16	62.9	-2.00	-154.8	0.60	183.8	-2.00	-200.7	-2.00

Maximum and minimum displacement at each stage

Stage no.	Displacement				<u>Stage description</u>
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	
	m		m		
1	0.000	-0.60	0.000	4.00	Apply surcharge no.1 at elev. 4.00
2	0.017	4.00	0.000	4.00	Excav. to elev. 2.00 on RIGHT side
3	No calculation at this stage				Install prop no.1 at elev. 2.00
4	0.015	4.00	0.000	4.00	Excav. to elev. -1.50 on RIGHT side
5	No calculation at this stage				Install prop no.2 at elev. -1.30
6	0.015	4.00	0.000	4.00	Apply water pressure profile no.2
7	0.015	-1.50	0.000	4.00	Excav. to elev. -5.00 on RIGHT side
8	0.015	-1.30	0.000	4.00	Apply load no.1 at elev. 2.30
9	0.015	-1.50	0.000	4.00	Apply load no.2 at elev. 2.30
10	No calculation at this stage				Install prop no.3 at elev. -5.00
11	No calculation at this stage				Install prop no.4 at elev. -2.00
12	0.016	-0.95	0.000	4.00	Remove prop no.2 at elev. -1.30
13	No calculation at this stage				Install prop no.5 at elev. 4.00
14	0.016	0.00	0.000	4.00	Remove prop no.1 at elev. 2.00
15	0.016	0.00	0.000	4.00	Change EI of wall to 246637kN.m2/m run
16	0.017	0.60	0.000	4.00	Apply water pressure profile no.1

Summary of results (continued)

Prop forces at each stage (horizontal components)

Stage no.	--- Strut no. 1 --- at elev. 2.00		--- Strut no. 2 --- at elev.-1.30		--- Strut no. 3 --- at elev.-5.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
4	103.19	773.90	---	---	---	---
6	101.97	764.76	4.49	33.67	---	---
7	83.90	629.23	189.38	1420.36	---	---
8	114.83	861.21	192.96	1447.17	---	---
9	83.90	629.23	189.38	1420.36	---	---
12	106.19	796.40	---	---	-5.49	-5.49
14	---	---	---	---	-20.36	-20.36
15	---	---	---	---	-11.46	-11.46
16	---	---	---	---	139.86	139.86

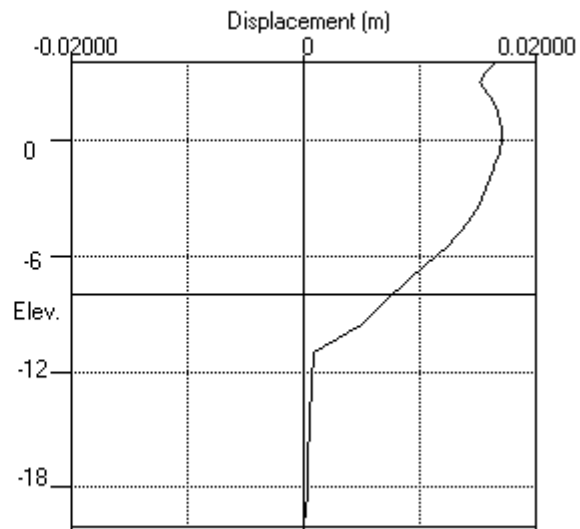
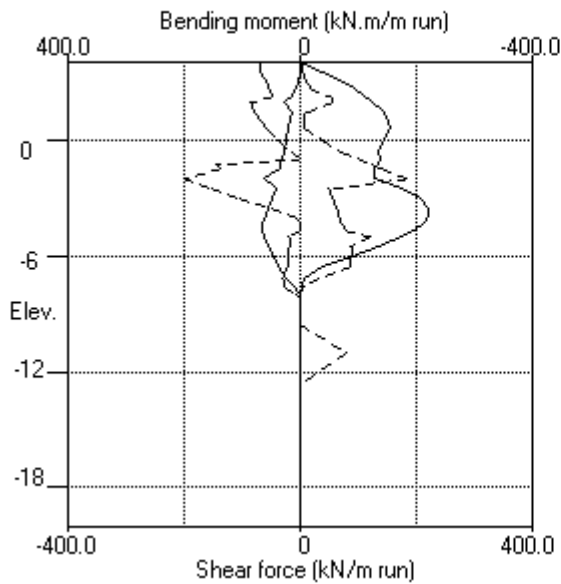
Stage no.	--- Strut no. 4 --- at elev.-2.00		--- Strut no. 5 --- at elev. 4.00	
	kN/m run	kN/prop	kN/m run	kN/prop
12	173.59	173.59	---	---
14	233.57	233.57	59.09	59.09
15	242.46	242.46	51.32	51.32
16	384.51	384.51	74.16	74.16

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Data filename/Run ID: Section_3
Albert Street Development
Section 3

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
| Checked :

Units: kN,m

Bending moment, shear force, displacement envelopes



Units: kN,m

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	Soil types	
		Left side	Right side
1	4.00	1 FL	1 FL
2	1.00	2 AL F	2 AL F
3	-5.20	4 RS F	4 RS F
4	-10.40	5 NFG 5	5 NFG 5
5	-11.70	6 NFG 3	6 NFG 3

SOIL PROPERTIES

-- Soil type --	Bulk density	Young's Modulus	At rest coeff.	Consol state.	Active limit	Passive limit	Cohesion
No. Description (Datum elev.)	kN/m3	Eh, kN/m2 (dEh/dy)	Ko (dKo/dy)	NC/OC (Nu)	Ka (Kac)	Kp (Kpc)	kN/m2 (dc/dy)
1 FL	17.00	10000	0.700	OC (0.300)	0.309 (0.000)	3.868 (0.000)	
2 AL F (1.00)	17.00	5000 (500.0)	0.700	OC (0.300)	0.351 (1.391)	3.442 (5.007)	4.000d
3 Not defined							
4 RS F	20.00	30000	1.000	OC (0.300)	0.283 (1.241)	4.369 (5.836)	10.00d
5 NFG 5	23.00	50000	1.000	OC (0.300)	0.292 (1.226)	4.369 (5.836)	20.00d
6 NFG 3	27.00	1000000	1.000	OC (0.200)	0.146 (0.854)	13.89 (12.886)	250.0d

Additional soil parameters associated with Ka and Kp

		--- parameters for Ka ---			--- parameters for Kp ---		
		Soil friction	Wall adhesion	Back-fill	Soil friction	Wall adhesion	Back-fill
----- Soil type -----	No. Description	angle	coeff.	angle	angle	coeff.	angle
	1 FL	28.00	0.670	0.00	28.00	0.500	0.00
	2 AL F	25.00	0.670	0.00	26.00	0.500	0.00
	3 Not defined						
	4 RS F	30.00	0.670	0.00	30.00	0.500	0.00
	5 NFG 5	30.00	0.500	0.00	30.00	0.500	0.00
	6 NFG 3	45.00	0.500	0.00	45.00	0.500	0.00

GROUND WATER CONDITIONS

Density of water = 10.00 kN/m3

	Left side	Right side
Initial water table elevation	-4.00	-4.00

Automatic water pressure balancing at toe of wall : No

		Left side			Right side			
Water press.	-----				-----			
profile Point no.	Point no.	Elev. m	Piezo elev. m	Water press. kN/m2	Point no.	Elev. m	Piezo elev. m	Water press. kN/m2
1	1	4.00	4.00	0.0	1	-5.00	-5.00	0.0
2	1	-4.00	-4.00	0.0	1	-5.00	-5.00	0.0

WALL PROPERTIES

Type of structure = Soldier Pile Wall
 Soldier Pile width = 0.90 m
 Soldier Pile spacing = 1.80 m
 Passive mobilisation factor = 3.00
 Elevation of toe of wall = -10.00
 Maximum finite element length = 0.80 m
 Youngs modulus of wall E = 3.2000E+07 kN/m2
 Moment of inertia of wall I = 0.017889 m4/m run
 = 0.032200 m4 per pile
 E.I = 572444 kN.m2/m run
 Yield Moment of wall = Not defined

STRUTS and ANCHORS

Prop no.	Prop Elev.	Prop spacing m	Cross- section area sq.m	Youngs modulus kN/m2	Free length m	Inclin -ation (degs)	Pre- stress /prop kN	Strut or Anchor	Allow tension ?	L/R
1	2.00	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
2	-1.30	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
3	-5.00	1.00	0.150000	3.280E+07	20.00	0.00	0	Strut	Yes	R
4	-2.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
5	4.00	1.00	0.400000	3.280E+07	20.00	0.00	0	Strut	Yes	R

HORIZONTAL and MOMENT LOADS/RESTRAINTS

Load no.	Elevation	Horizontal load kN/m run	Moment load kN.m/m run	Moment restraint kN.m/m/rad	Partial factor (Category)
1	2.10	45.00	0	0	N/A
2	2.10	-45.00	0	0	N/A

SURCHARGE LOADS

Surch -arge no.	Distance from wall	Length parallel to wall	Width perpend. to wall	Surcharge ----- kN/m2 -----		Equiv. Partial soil factor/ type Category
	Elev.			Near edge	Far edge	
1	4.00	1.00(L)	100.00	10.00	=	N/A N/A

Note: L = Left side, R = Right side

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Apply surcharge no.1 at elevation 4.00
2	Excavate to elevation 2.00 on RIGHT side
3	Install strut or anchor no.1 at elevation 2.00
4	Excavate to elevation -1.50 on RIGHT side
5	Install strut or anchor no.2 at elevation -1.30
6	Apply water pressure profile no.2
7	Excavate to elevation -5.00 on RIGHT side
8	Apply load no.1 at elevation 2.10
9	Apply load no.2 at elevation 2.10
10	Install strut or anchor no.3 at elevation -5.00
11	Install strut or anchor no.4 at elevation -2.00
12	Remove strut or anchor no.2 at elevation -1.30
13	Install strut or anchor no.5 at elevation 4.00
14	Remove strut or anchor no.1 at elevation 2.00
15	Change EI of wall to 400711 kN.m2/m run Allow wall to relax with new modulus value
16	Apply water pressure profile no.1

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:

Method of analysis - Burland-Potts

Factor on passive for calculating wall depth = 1.50

Parameters for undrained strata:

Minimum equivalent fluid density = 5.00 kN/m³

Maximum depth of water filled tension crack = 0.00 m

Bending moment and displacement calculation:

Method - 2-D finite element model

Open Tension Crack analysis? - No

Active limit arching modelled? - Yes

Non-linear Modulus Parameter (L) = 9.000 m

Boundary conditions:

Length of wall (normal to plane of analysis) = 60.00 m

Width of excavation on Left side of wall = 40.00 m

Width of excavation on Right side of wall = 40.00 m

Distance to rigid boundary on Left side = 30.00 m

Distance to rigid boundary on Right side = 20.00 m

Elevation of rigid lower boundary = -20.00

Lower rigid boundary at elevation -20.00 - Rough

Rigid boundary on Left side - Rough

Rigid boundary on Right side - Smooth

Wall / soil interface - Rough

OUTPUT OPTIONS

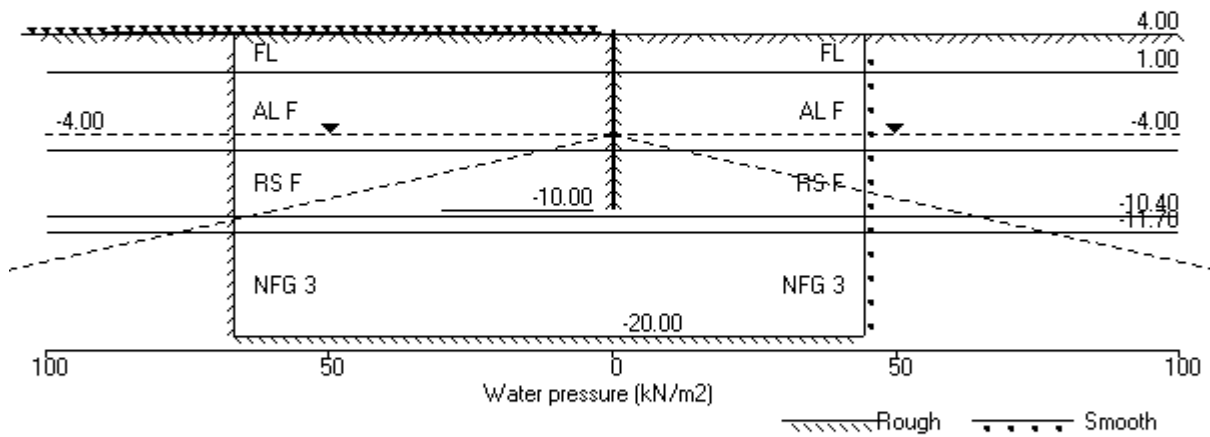
Stage no.	Stage description	Displacement Bending mom. Shear force	Active, Passive pressures	Graph. output
1	Apply surcharge no.1 at elev. 4.00	Yes	Yes	Yes
2	Excav. to elev. 2.00 on RIGHT side	Yes	Yes	Yes
3	Install prop no.1 at elev. 2.00	Yes	Yes	Yes
4	Excav. to elev. -1.50 on RIGHT side	Yes	Yes	Yes
5	Install prop no.2 at elev. -1.30	Yes	Yes	Yes
6	Apply water pressure profile no.2	Yes	Yes	Yes
7	Excav. to elev. -5.00 on RIGHT side	Yes	Yes	Yes
8	Apply load no.1 at elev. 2.10	Yes	Yes	Yes
9	Apply load no.2 at elev. 2.10	Yes	Yes	Yes
10	Install prop no.3 at elev. -5.00	Yes	Yes	Yes
11	Install prop no.4 at elev. -2.00	Yes	Yes	Yes
12	Remove prop no.2 at elev. -1.30	Yes	Yes	Yes
13	Install prop no.5 at elev. 4.00	Yes	Yes	Yes
14	Remove prop no.1 at elev. 2.00	Yes	Yes	Yes
15	Change EI of wall to 400711kN.m ² /m run	Yes	Yes	Yes
16	Apply water pressure profile no.1	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

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Program: WALLAP Version 6.07 Revision A55.B74.R58
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Data filename/Run ID: Section_4
Albert Street Development
Section 4

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Units: kN,m

Stage No. 1 Apply surcharge no.1 at elevation 4.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u>
				<u>Factor</u> <u>of</u>	<u>Moment</u> <u>equilib.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u>	
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
1	4.00	4.00	---	<u>Conditions not suitable for FoS calc.</u>				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.001	1.95E-05	0.0	-0.0		572444
2	3.20	-2.70	0.001	1.95E-05	-1.1	0.1		572444
3	2.65	-1.57	0.001	1.99E-05	-2.3	-0.9		572444
4	2.10	-0.88	0.001	2.14E-05	-2.9	-2.4		572444
5	2.00	-0.70	0.001	2.19E-05	-3.0	-2.7		572444
6	1.50	-0.21	0.001	2.49E-05	-3.2	-4.2		572444
7	1.00	0.23	0.001	2.93E-05	-3.2	-5.9		572444
		1.41	0.001	2.93E-05	-3.2	-5.9		
8	0.50	1.27	0.001	3.51E-05	-2.6	-7.3		572444
9	0.00	1.28	0.001	4.19E-05	-1.9	-8.4		572444
10	-0.65	1.33	0.001	5.20E-05	-1.1	-9.4		572444
11	-1.30	1.39	0.001	6.29E-05	-0.2	-9.8		572444
12	-1.50	1.34	0.001	6.63E-05	0.1	-9.8		572444
13	-2.00	1.37	0.001	7.48E-05	0.8	-9.6		572444
14	-2.60	1.39	0.001	8.45E-05	1.6	-8.9		572444
15	-3.20	1.38	0.001	9.32E-05	2.4	-7.7		572444
16	-4.00	1.39	0.001	1.02E-04	3.5	-5.3		572444
17	-4.50	1.26	0.001	1.06E-04	4.2	-3.4		572444
18	-5.00	1.05	0.001	1.08E-04	4.8	-1.1		572444
19	-5.20	0.83	0.001	1.08E-04	5.0	-0.1		572444
		-6.91	0.001	1.08E-04	5.0	-0.1		
20	-5.80	-3.22	0.001	1.07E-04	1.9	1.6		572444
21	-6.40	-1.73	0.001	1.05E-04	0.4	2.2		572444
22	-7.20	-0.78	0.000	1.02E-04	-0.6	2.0		572444
23	-8.00	-0.06	0.000	1.00E-04	-0.9	1.3		572444
24	-8.80	0.42	0.000	9.90E-05	-0.8	0.5		572444
25	-9.40	0.67	0.000	9.87E-05	-0.4	0.1		572444
26	-10.00	0.47	0.000	9.86E-05	-0.1	-0.0		0
27	-10.40	1.30	0.000	0	0.3	0.0		0
		-0.41	0.000	0	0.3	0.0		
28	-11.70	3.66	0.000	0	2.4	0.0		0
		-2.21	0.000	0	2.4	0.0		

(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-13.85	0.00	0.000	0	-0.0	0.0		0
30	-16.00	0.00	0.000	0	-0.0	0.0		0
31	-18.00	0.00	0.000	0	0.0	0.0		0
32	-20.00	-0.00	0.000	0	0.0	0.0		---

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	8.46	8.46	9971
3	2.65	0.00	25.85	7.99	99.98	15.93	15.93	9971
4	2.10	0.00	36.59	11.31	141.55	23.12	23.12	9971
5	2.00	0.00	38.50	11.90	148.93	24.44	24.44	9971
6	1.50	0.00	47.88	14.80	185.22	30.83	30.83	9971
7	1.00	0.00	57.04	17.63	220.65	37.14	37.14	9971
		0.00	57.04	14.47	216.38	37.71	37.71	4985
8	0.50	0.00	66.05	17.64	247.37	43.70	43.70	5235
9	0.00	0.00	74.94	20.76	277.99	49.74	49.74	5484
10	-0.65	0.00	86.39	24.78	317.40	57.59	57.59	5808
11	-1.30	0.00	97.75	28.77	356.50	65.42	65.42	6132
12	-1.50	0.00	101.23	29.99	368.48	67.79	67.79	6232
13	-2.00	0.00	109.91	33.04	398.36	73.79	73.79	6481
14	-2.60	0.00	120.29	36.69	434.09	80.98	80.98	6780
15	-3.20	0.00	130.64	40.33	469.73	88.15	88.15	7079
16	-4.00	0.00	144.41	45.16	517.11	97.71	97.71	7478
17	-4.50	5.00	147.99	46.42	529.46	100.11	105.11	7727
18	-5.00	10.00	151.57	47.68	541.78	102.46	112.46	7977
19	-5.20	12.00	153.00	48.18	546.69	103.35	115.35	8076
		12.00	153.00	30.94	726.88	142.83	154.83	29913
20	-5.80	18.00	159.08	32.66	753.43	150.67	168.67	29913
21	-6.40	24.00	165.15	34.38	779.94	157.43	181.43	29913
22	-7.20	32.00	173.22	36.67	815.23	165.92	197.92	29913
23	-8.00	40.00	181.29	38.95	850.47	174.29	214.29	29913
24	-8.80	48.00	189.34	41.24	885.66	182.54	230.54	29913
25	-9.40	54.00	195.38	42.95	912.03	188.67	242.67	29913
26	-10.00	60.00	201.40	44.65	938.38	194.58	254.58	29913
27	-10.40	64.00	205.42	45.79	955.93	198.99	262.99	29913
		64.00	205.42	35.52	1014.29	198.14	262.14	49855
28	-11.70	77.00	222.37	40.47	1088.33	217.08	294.08	49855
		77.00	222.37	0.00	6309.29	213.37	290.37	997093
29	-13.85	98.50	258.96	0.00	6817.44	251.05	349.55	997093
30	-16.00	120.00	295.53	0.00	7325.15	287.59	407.59	997093
31	-18.00	140.00	329.52	0.00	7797.13	321.57	461.57	997093
32	-20.00	160.00	363.49	0.00	8268.84	355.36	515.36	997093

RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9945
2	3.20	0.00	13.60	4.20	52.61	11.16	11.16	9945
3	2.65	0.00	22.95	7.09	88.78	17.50	17.50	9945
4	2.10	0.00	32.30	9.98	124.95	24.00	24.00	9945

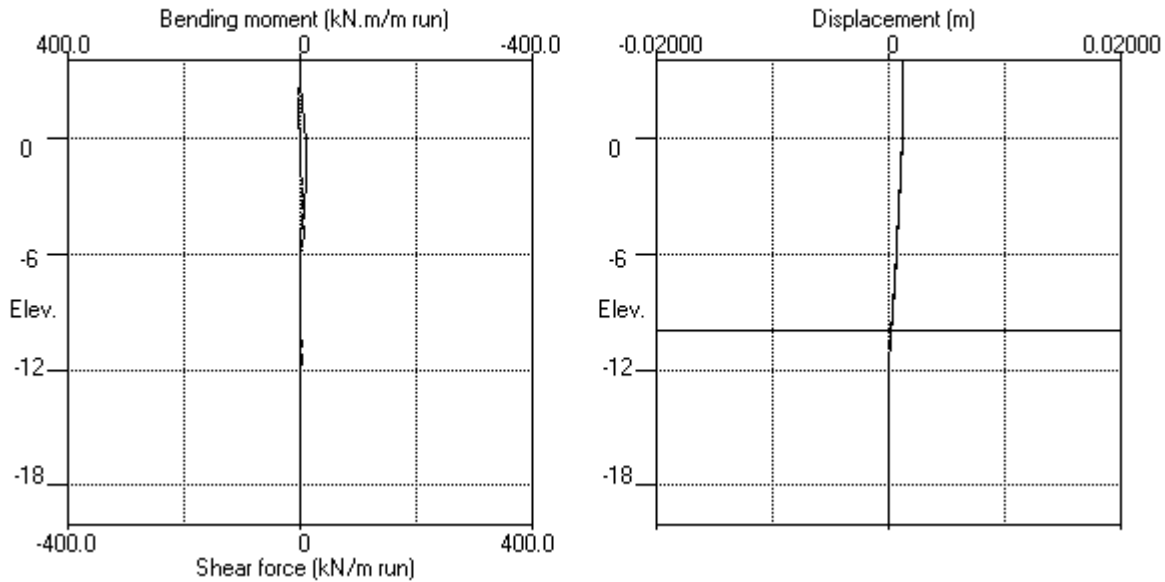
(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

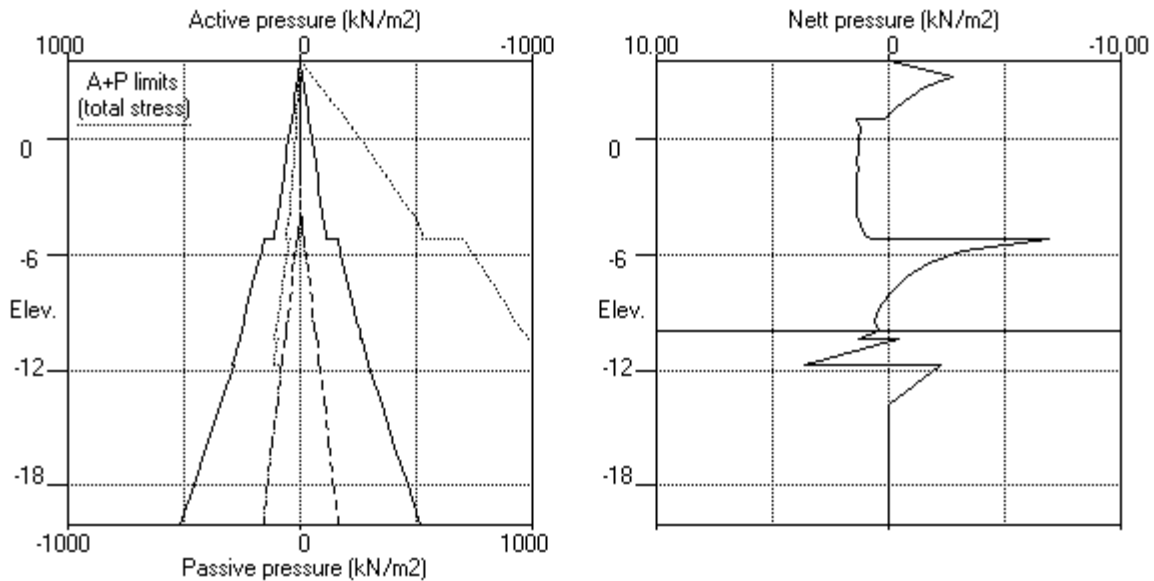
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
5	2.00	0.00	34.00	10.51	131.52	25.15	25.15	9945
6	1.50	0.00	42.50	13.13	164.40	31.04	31.04	9945
7	1.00	0.00	51.00	15.76	197.28	36.91	36.91	9945
		0.00	51.00	12.35	195.58	36.31	36.31	4973
8	0.50	0.00	59.50	15.34	224.84	42.43	42.43	5221
9	0.00	0.00	68.00	18.32	254.10	48.46	48.46	5470
10	-0.65	0.00	79.05	22.20	292.14	56.26	56.26	5793
11	-1.30	0.00	90.10	26.09	330.17	64.03	64.03	6116
12	-1.50	0.00	93.50	27.28	341.88	66.45	66.45	6216
13	-2.00	0.00	102.00	30.27	371.14	72.42	72.42	6464
14	-2.60	0.00	112.20	33.85	406.25	79.59	79.59	6763
15	-3.20	0.00	122.40	37.43	441.36	86.77	86.77	7061
16	-4.00	0.00	136.00	42.21	488.17	96.32	96.32	7459
17	-4.50	5.00	139.50	43.44	500.22	98.85	103.85	7708
18	-5.00	10.00	143.00	44.67	512.27	101.42	111.42	7956
19	-5.20	12.00	144.40	45.16	517.09	102.52	114.52	8056
		12.00	144.40	28.50	689.30	149.74	161.74	29836
20	-5.80	18.00	150.40	30.20	715.52	153.88	171.88	29836
21	-6.40	24.00	156.40	31.90	741.73	159.16	183.16	29836
22	-7.20	32.00	164.40	34.17	776.69	166.70	198.70	29836
23	-8.00	40.00	172.40	36.44	811.64	174.35	214.35	29836
24	-8.80	48.00	180.40	38.70	846.60	182.12	230.12	29836
25	-9.40	54.00	186.40	40.40	872.81	188.00	242.00	29836
26	-10.00	60.00	192.40	42.10	899.03	194.11	254.11	29836
27	-10.40	64.00	196.40	43.24	916.51	197.69	261.69	29836
		64.00	196.40	32.88	974.87	198.55	262.55	49726
28	-11.70	77.00	213.30	37.82	1048.71	213.41	290.41	49726
		77.00	213.30	0.00	6183.36	215.59	292.59	994529
29	-13.85	98.50	249.85	0.00	6690.89	251.04	349.54	994529
30	-16.00	120.00	286.40	0.00	7198.42	287.59	407.59	994529
31	-18.00	140.00	320.40	0.00	7670.54	321.57	461.57	994529
32	-20.00	160.00	354.40	0.00	8142.66	355.36	515.36	994529

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Stage No.1 Apply surcharge no.1 at elev. 4.00

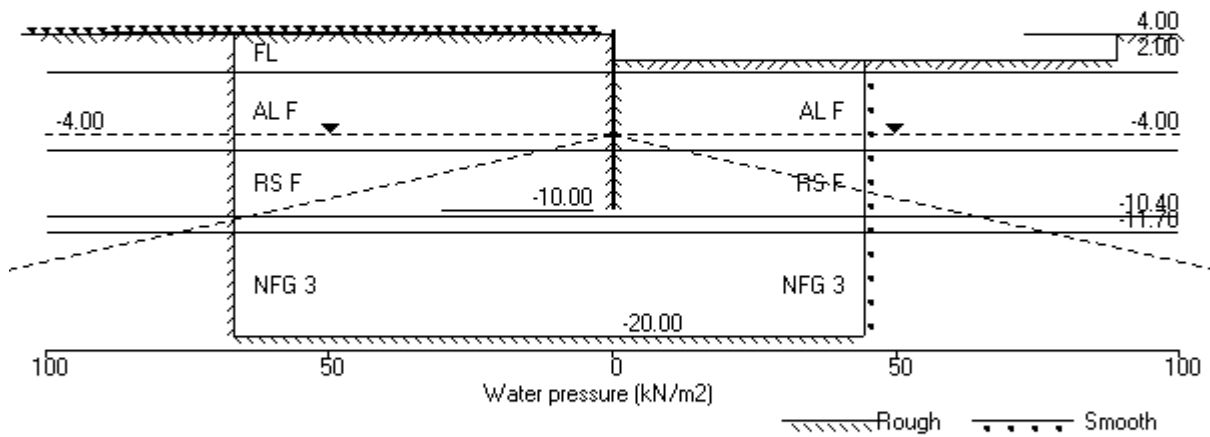


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Data filename/Run ID: Section_4
Albert Street Development
Section 4

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Units: kN,m

Stage No. 2 Excavate to elevation 2.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
2	4.00	2.00	Cant.	12.542	-7.69	-0.21	2.21	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.018	1.57E-03	0.0	-0.0		572444
2	3.20	4.57	0.017	1.57E-03	1.8	1.2		572444
3	2.65	7.99	0.016	1.57E-03	5.3	3.3		572444
4	2.10	11.31	0.015	1.57E-03	10.6	7.8		572444
5	2.00	11.90	0.015	1.56E-03	11.7	8.9		572444
6	1.50	-15.10	0.014	1.55E-03	10.9	15.8		572444
7	1.00	-10.43	0.013	1.54E-03	4.6	19.4		572444
		3.36	0.013	1.54E-03	4.6	19.4		
8	0.50	0.63	0.012	1.52E-03	5.6	22.1		572444
9	0.00	0.51	0.012	1.50E-03	5.8	25.0		572444
10	-0.65	1.03	0.011	1.47E-03	6.4	28.9		572444
11	-1.30	1.63	0.010	1.43E-03	7.2	33.3		572444
12	-1.50	1.86	0.009	1.42E-03	7.6	34.8		572444
13	-2.00	2.34	0.009	1.39E-03	8.6	38.8		572444
14	-2.60	2.88	0.008	1.35E-03	10.2	44.4		572444
15	-3.20	3.26	0.007	1.30E-03	12.0	51.0		572444
16	-4.00	3.42	0.006	1.22E-03	14.7	61.7		572444
17	-4.50	2.59	0.005	1.16E-03	16.2	69.4		572444
18	-5.00	0.75	0.005	1.10E-03	17.0	77.8		572444
19	-5.20	-1.29	0.005	1.07E-03	17.0	81.3		572444
		-54.06	0.005	1.07E-03	17.0	81.3		
20	-5.80	-24.10	0.004	9.87E-04	-6.5	81.7		572444
21	-6.40	-11.39	0.003	9.06E-04	-17.1	73.5		572444
22	-7.20	-3.73	0.003	8.15E-04	-23.2	56.2		572444
23	-8.00	2.05	0.002	7.51E-04	-23.8	36.4		572444
24	-8.80	6.45	0.002	7.13E-04	-20.4	18.0		572444
25	-9.40	11.69	0.001	7.00E-04	-15.0	6.9		572444
26	-10.00	23.00	0.001	6.96E-04	-4.6	0.0		0
27	-10.40	6.18	0.001	0	1.2	0.0		0
		-1.89	0.001	0	1.2	0.0		
28	-11.70	17.19	0.000	0	11.2	0.0		0
		-10.38	0.000	0	11.2	0.0		

Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
29	-13.85	0.00	0.000	0	0.0	0.0		0
30	-16.00	0.00	0.000	0	0.0	0.0		0
31	-18.00	0.00	0.000	0	0.0	0.0		0
32	-20.00	-0.03	0.000	0	0.0	0.0		---

		LEFT side						
		Effective stresses					Total	Adjusted
Node	Y	Water	Vertic	Active	Passive	Earth	earth	soil
no.	coord	press.	-al	limit	limit	pressure	pressure	modulus
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	4.57	4.57a	9971
3	2.65	0.00	25.85	7.99	99.98	7.99	7.99a	9971
4	2.10	0.00	36.59	11.31	141.55	11.31	11.31a	9971
5	2.00	0.00	38.50	11.90	148.93	11.90	11.90a	9971
6	1.50	0.00	47.88	14.80	185.22	17.78	17.78	9971
7	1.00	0.00	57.04	17.63	220.65	27.01	27.01	9971
		0.00	57.04	14.47	216.38	32.65	32.65	4985
8	0.50	0.00	66.05	17.64	247.37	37.11	37.11	5235
9	0.00	0.00	74.94	20.76	277.99	42.85	42.85	5484
10	-0.65	0.00	86.39	24.78	317.40	50.75	50.75	5808
11	-1.30	0.00	97.75	28.77	356.50	58.74	58.74	6132
12	-1.50	0.00	101.23	29.99	368.48	61.18	61.18	6232
13	-2.00	0.00	109.91	33.04	398.36	67.35	67.35	6481
14	-2.60	0.00	120.29	36.69	434.09	74.74	74.74	6780
15	-3.20	0.00	130.64	40.33	469.73	82.04	82.04	7079
16	-4.00	0.00	144.41	45.16	517.11	91.63	91.63	7478
17	-4.50	5.00	147.99	46.42	529.46	93.64	98.64	7727
18	-5.00	10.00	151.57	47.68	541.78	95.13	105.13	7977
19	-5.20	12.00	153.00	48.18	546.69	95.17	107.17	8076
		12.00	153.00	30.94	726.88	112.53	124.53	29913
20	-5.80	18.00	159.08	32.66	753.43	133.25	151.25	29913
21	-6.40	24.00	165.15	34.38	779.94	145.62	169.62	29913
22	-7.20	32.00	173.22	36.67	815.23	157.45	189.45	29913
23	-8.00	40.00	181.29	38.95	850.47	168.33	208.33	29913
24	-8.80	48.00	189.34	41.24	885.66	178.52	226.52	29913
25	-9.40	54.00	195.38	42.95	912.03	187.14	241.14	29913
26	-10.00	60.00	201.40	44.65	938.38	198.65	258.65	29913
27	-10.40	64.00	205.42	45.79	955.93	194.33	258.33	29913
		64.00	205.42	35.52	1014.29	190.38	254.38	49855
28	-11.70	77.00	222.37	40.47	1088.33	216.68	293.68	49855
		77.00	222.37	0.00	6309.29	205.48	282.48	997093
29	-13.85	98.50	258.96	0.00	6817.44	247.29	345.79	997093
30	-16.00	120.00	295.53	0.00	7325.15	283.80	403.80	997093
31	-18.00	140.00	329.52	0.00	7797.13	317.68	457.68	997093
32	-20.00	160.00	363.49	0.00	8268.84	350.72	510.72	997093

[illegible]

(continued)

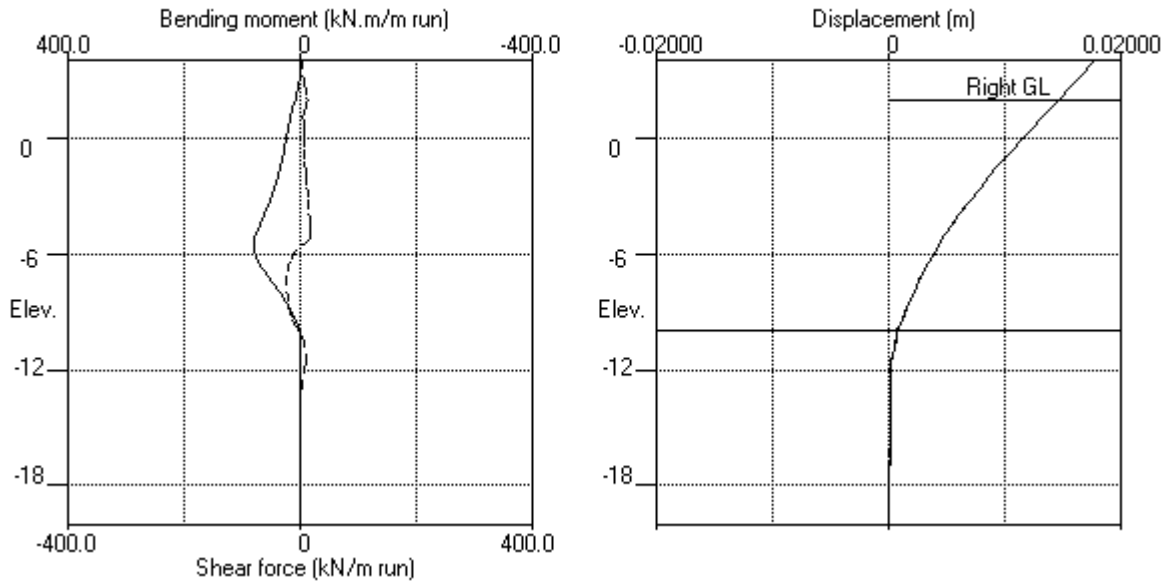
Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	0.00	0.00	0.00	9951
6	1.50	0.00	8.50	2.63	32.88	32.88	32.88p	9951
7	1.00	0.00	17.00	5.25	65.76	37.44	37.44	9951
		0.00	17.00	0.41	78.55	29.29	29.29	4976
8	0.50	0.00	25.50	3.39	107.81	36.48	36.48	5225
9	0.00	0.00	34.00	6.38	137.07	42.34	42.34	5473
10	-0.65	0.00	45.05	10.26	175.12	49.72	49.72	5797
11	-1.30	0.00	56.11	14.14	213.17	57.11	57.11	6120
12	-1.50	0.00	59.51	15.34	224.88	59.32	59.32	6220
13	-2.00	0.00	68.01	18.33	254.15	65.02	65.02	6468
14	-2.60	0.00	78.22	21.91	289.29	71.86	71.86	6767
15	-3.20	0.00	88.43	25.50	324.43	78.78	78.78	7066
16	-4.00	0.00	102.05	30.28	371.30	88.21	88.21	7464
17	-4.50	5.00	105.56	31.52	383.39	91.05	96.05	7712
18	-5.00	10.00	109.07	32.75	395.49	94.39	104.39	7961
19	-5.20	12.00	110.48	33.24	400.33	96.46	108.46	8061
		12.00	110.48	18.89	541.09	166.59	178.59	29854
20	-5.80	18.00	116.50	20.60	567.40	157.35	175.35	29854
21	-6.40	24.00	122.53	22.30	593.73	157.01	181.01	29854
22	-7.20	32.00	130.57	24.58	628.85	161.18	193.18	29854
23	-8.00	40.00	138.61	26.86	664.00	166.28	206.28	29854
24	-8.80	48.00	146.66	29.14	699.18	172.07	220.07	29854
25	-9.40	54.00	152.70	30.86	725.58	175.46	229.46	29854
26	-10.00	60.00	158.75	32.57	752.00	175.65	235.65	29854
27	-10.40	64.00	162.78	33.71	769.63	188.16	252.16	29854
		64.00	162.78	23.06	827.99	192.27	256.27	49757
28	-11.70	77.00	179.81	28.03	902.37	199.49	276.49	49757
		77.00	179.81	0.00	5718.28	215.86	292.86	995147
29	-13.85	98.50	216.60	0.00	6229.22	247.28	345.78	995147
30	-16.00	120.00	253.45	0.00	6740.92	283.80	403.80	995147
31	-18.00	140.00	287.78	0.00	7217.55	317.68	457.68	995147
32	-20.00	160.00	322.14	0.00	7694.76	350.76	510.76	995147

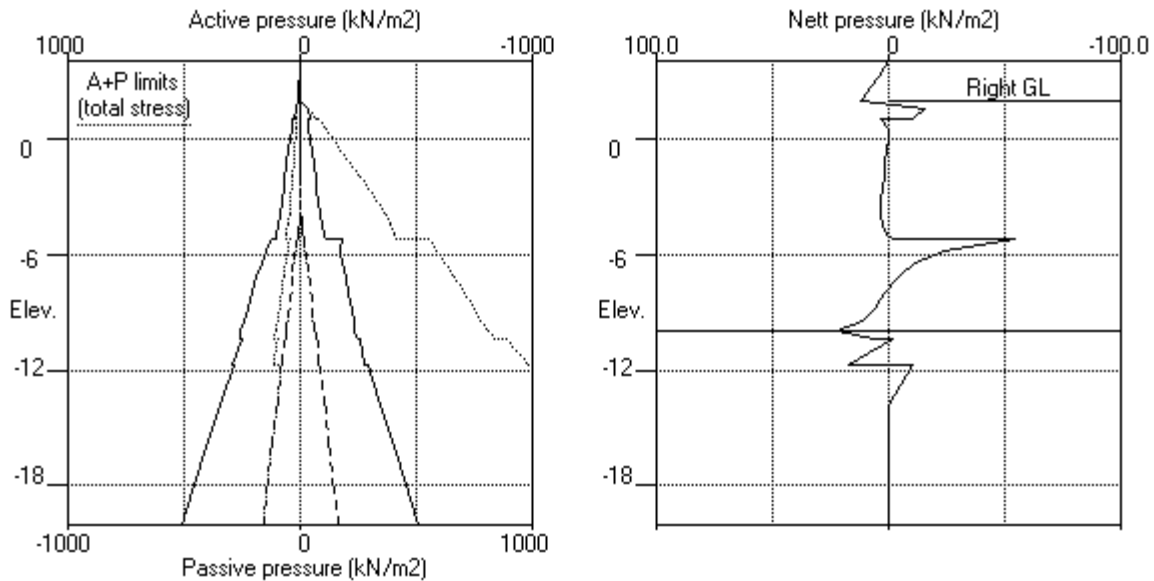
Note: 11.90 a Soil pressure at active limit
 32.88 p Soil pressure at passive limit

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Stage No.2 Excav. to elev. 2.00 on RIGHT side

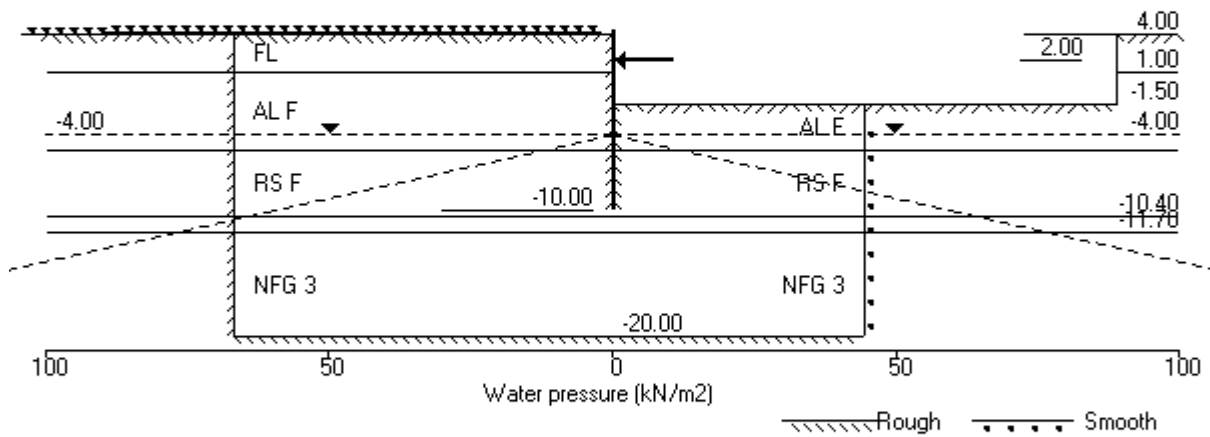


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Albert Street Development
Section 4

| Sheet No.
| Job No. B01493
| Made by : DJC
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Units: kN,m

Stage No. 4 Excavate to elevation -1.50 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
4	4.00	-1.50	2.00	9.383	n/a	-3.36	1.86	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.017	2.83E-04	0.0	-0.0		572444
2	3.20	9.49	0.017	2.82E-04	3.8	1.2		572444
3	2.65	10.05	0.016	2.79E-04	9.2	5.1		572444
4	2.10	11.79	0.016	2.71E-04	15.2	12.0		572444
5	2.00	10.87	0.016	2.69E-04	16.3	13.6	-117.4	572444
		10.87	0.016	2.69E-04	-101.1	13.6		
6	1.50	15.16	0.016	2.78E-04	-94.5	-34.6		572444
7	1.00	22.08	0.016	3.28E-04	-85.2	-79.8		572444
		30.18	0.016	3.28E-04	-85.2	-79.8		
8	0.50	33.84	0.016	4.14E-04	-69.2	-118.3		572444
9	0.00	38.75	0.016	5.31E-04	-51.1	-148.5		572444
10	-0.65	45.74	0.015	7.13E-04	-23.6	-172.9		572444
11	-1.30	53.06	0.015	9.12E-04	8.5	-178.1		572444
12	-1.50	54.90	0.014	9.74E-04	19.3	-175.3		572444
		34.87	0.014	9.74E-04	19.3	-175.3		
13	-2.00	15.15	0.014	1.12E-03	31.8	-161.9		572444
14	-2.60	14.84	0.013	1.28E-03	40.8	-140.1		572444
15	-3.20	14.15	0.012	1.41E-03	49.5	-113.0		572444
16	-4.00	13.57	0.011	1.53E-03	60.6	-68.8		572444
17	-4.50	11.54	0.010	1.58E-03	66.8	-36.9		572444
18	-5.00	8.13	0.010	1.60E-03	71.8	-2.0		572444
19	-5.20	4.75	0.009	1.60E-03	73.1	12.5		572444
		-100.68	0.009	1.60E-03	73.1	12.5		
20	-5.80	-48.75	0.008	1.57E-03	28.2	38.2		572444
21	-6.40	-27.27	0.007	1.53E-03	5.4	46.4		572444
22	-7.20	-13.52	0.006	1.46E-03	-10.9	42.0		572444
23	-8.00	-2.75	0.005	1.41E-03	-17.4	28.9		572444
24	-8.80	4.92	0.004	1.38E-03	-16.5	14.1		572444
25	-9.40	10.97	0.003	1.37E-03	-11.8	5.1		572444
26	-10.00	16.97	0.002	1.37E-03	-3.4	-0.0		0
27	-10.40	14.79	0.002		0	3.0	0.0	0
		-4.53	0.002		0	3.0	0.0	

(continued)

Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-11.70	41.18 -24.88	0.000	0	26.8	0.0		0
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.00	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.07	0.000	0	0.0	0.0		---
At elev. 2.00		Prop force = 117.4 kN/m run						

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	9.49	9.49	9971
3	2.65	0.00	25.85	7.99	99.98	10.05	10.05	9971
4	2.10	0.00	36.59	11.31	141.55	11.79	11.79	9971
5	2.00	0.00	38.50	11.90	148.93	10.87	10.87A	9971
6	1.50	0.00	47.88	14.80	185.22	15.16	15.16	9971
7	1.00	0.00	57.04	17.63	220.65	22.08	22.08	9971
		0.00	57.04	14.47	216.38	30.18	30.18	4985
8	0.50	0.00	66.05	17.64	247.37	33.84	33.84	5235
9	0.00	0.00	74.94	20.76	277.99	38.75	38.75	5484
10	-0.65	0.00	86.39	24.78	317.40	45.74	45.74	5808
11	-1.30	0.00	97.75	28.77	356.50	53.06	53.06	6132
12	-1.50	0.00	101.23	29.99	368.48	54.90	54.90	6232
13	-2.00	0.00	109.91	33.04	398.36	60.65	60.65	6481
14	-2.60	0.00	120.29	36.69	434.09	67.58	67.58	6780
15	-3.20	0.00	130.64	40.33	469.73	74.44	74.44	7079
16	-4.00	0.00	144.41	45.16	517.11	83.72	83.72	7478
17	-4.50	5.00	147.99	46.42	529.46	85.17	90.17	7727
18	-5.00	10.00	151.57	47.68	541.78	85.91	95.91	7977
19	-5.20	12.00	153.00	48.18	546.69	85.47	97.47	8076
		12.00	153.00	30.94	726.88	76.61	88.61	29913
20	-5.80	18.00	159.08	32.66	753.43	108.07	126.07	29913
21	-6.40	24.00	165.15	34.38	779.94	124.84	148.84	29913
22	-7.20	32.00	173.22	36.67	815.23	139.75	171.75	29913
23	-8.00	40.00	181.29	38.95	850.47	153.15	193.15	29913
24	-8.80	48.00	189.34	41.24	885.66	164.98	212.98	29913
25	-9.40	54.00	195.38	42.95	912.03	174.01	228.01	29913
26	-10.00	60.00	201.40	44.65	938.38	182.93	242.93	29913
27	-10.40	64.00	205.42	45.79	955.93	185.89	249.89	29913
		64.00	205.42	35.52	1014.29	176.30	240.30	49855
28	-11.70	77.00	222.37	40.47	1088.33	215.96	292.96	49855
		77.00	222.37	0.00	6309.29	191.06	268.06	997093
29	-13.85	98.50	258.96	0.00	6817.44	240.18	338.68	997093
30	-16.00	120.00	295.53	0.00	7325.15	276.70	396.70	997093
31	-18.00	140.00	329.52	0.00	7797.13	310.51	450.51	997093
32	-20.00	160.00	363.49	0.00	8268.84	342.30	502.30	997093

(continued)

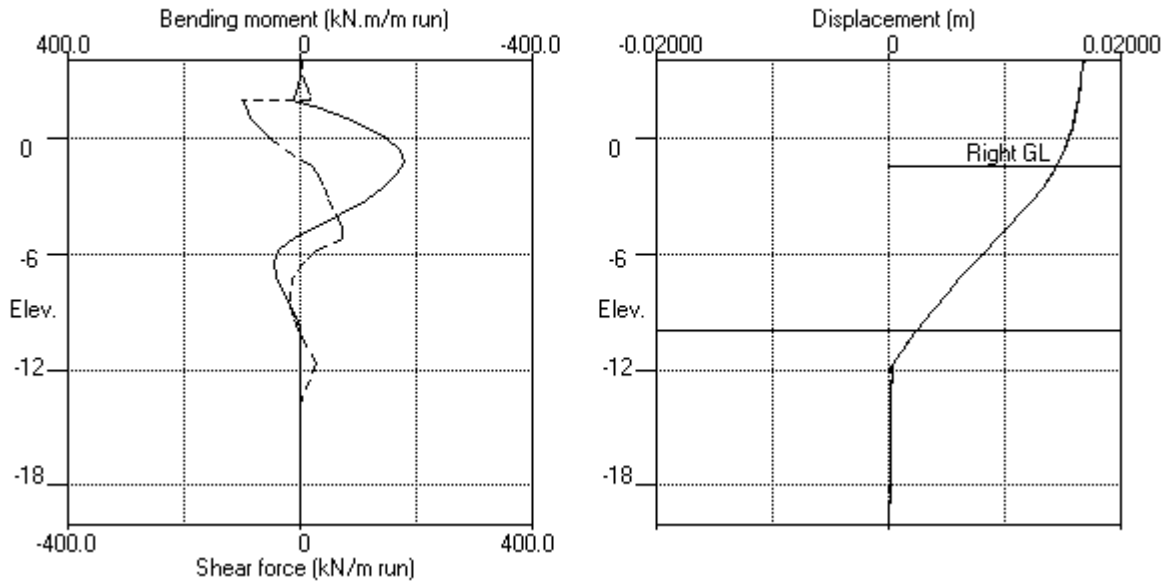
Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>modulus</u>
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	6226
13	-2.00	0.00	8.50	0.00	49.29	45.50	45.50	6475
14	-2.60	0.00	18.70	1.00	84.40	52.74	52.74	6774
15	-3.20	0.00	28.90	4.59	119.52	60.29	60.29	7073
16	-4.00	0.00	42.51	9.37	166.36	70.14	70.14	7471
17	-4.50	5.00	46.02	10.60	178.43	73.63	78.63	7720
18	-5.00	10.00	49.53	11.83	190.51	77.77	87.77	7969
19	-5.20	12.00	50.93	12.33	195.35	80.72	92.72	8069
		12.00	50.93	2.02	280.90	177.29	189.29	29884
20	-5.80	18.00	56.95	3.72	307.19	156.82	174.82	29884
21	-6.40	24.00	62.97	5.43	333.51	152.11	176.11	29884
22	-7.20	32.00	71.01	7.71	368.64	153.27	185.27	29884
23	-8.00	40.00	79.07	9.99	403.83	155.90	195.90	29884
24	-8.80	48.00	87.13	12.28	439.07	160.07	208.07	29884
25	-9.40	54.00	93.19	13.99	465.55	163.03	217.03	29884
26	-10.00	60.00	99.26	15.71	492.07	165.97	225.97	29884
27	-10.40	64.00	103.31	16.86	509.77	171.10	235.10	29884
		64.00	103.31	5.68	568.13	180.83	244.83	49807
28	-11.70	77.00	120.41	10.67	642.84	174.78	251.78	49807
		77.00	120.41	0.00	4893.49	215.94	292.94	996147
29	-13.85	98.50	157.40	0.00	5407.09	240.17	338.67	996147
30	-16.00	120.00	194.53	0.00	5922.71	276.70	396.70	996147
31	-18.00	140.00	229.20	0.00	6404.21	310.50	450.50	996147
32	-20.00	160.00	264.01	0.00	6887.47	342.37	502.37	996147

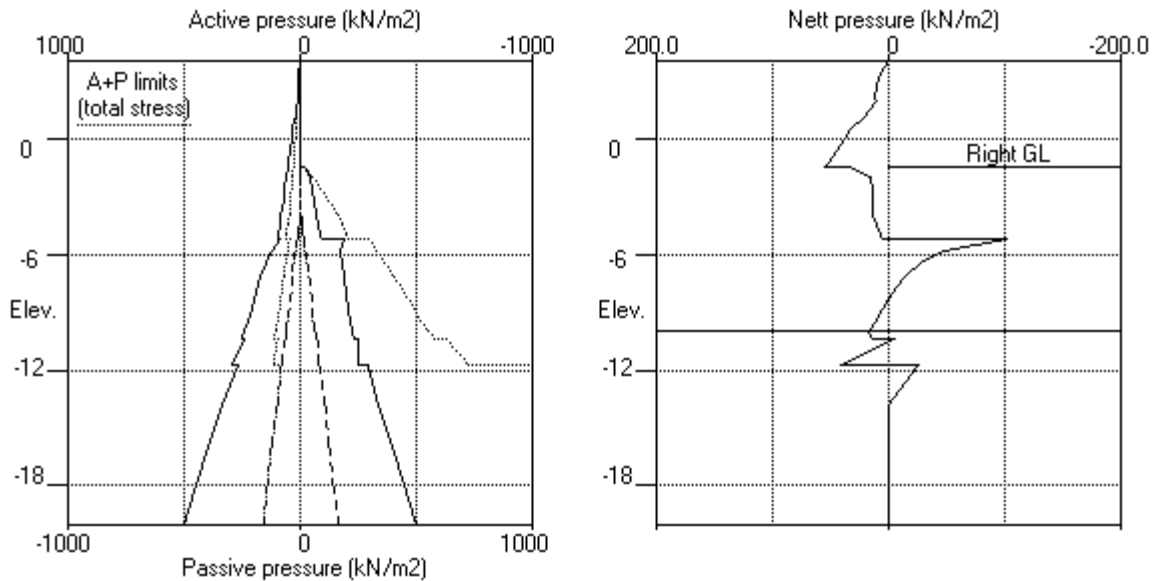
Note: 12.34 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit
 10.87A Arching - soil pressure below active limit

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Stage No.4 Excav. to elev. -1.50 on RIGHT side

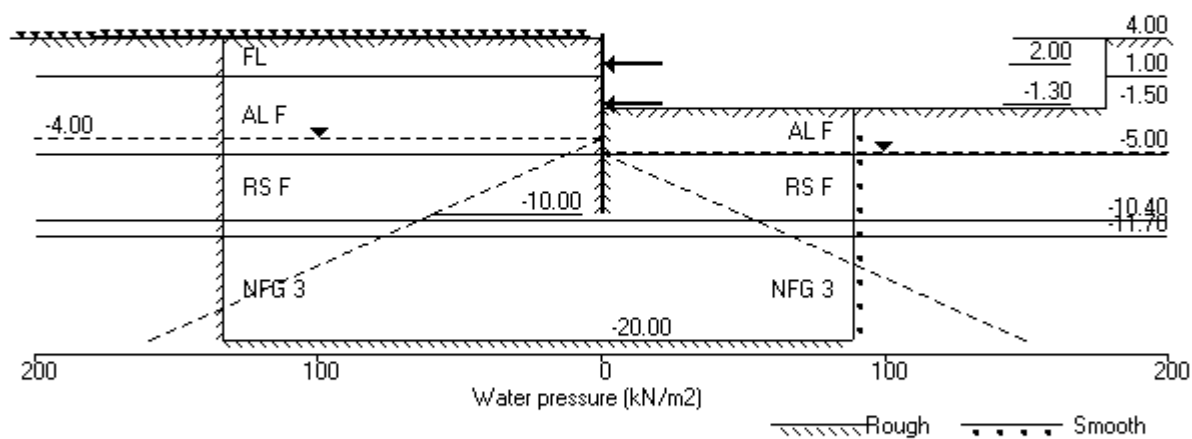


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 Section 4

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
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Units: kN,m

Stage No.6 Apply water pressure profile no.2



Units: kN,m

Stage No. 6 Apply water pressure profile no.2

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>failure</u>			
6	4.00	-1.50		More than one prop. No FoS calc.			

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.017	2.53E-04	0.0	-0.0		572444
2	3.20	9.71	0.017	2.52E-04	3.9	1.2		572444
3	2.65	10.22	0.016	2.49E-04	9.4	5.2		572444
4	2.10	11.94	0.016	2.41E-04	15.5	12.3		572444
5	2.00	11.00	0.016	2.39E-04	16.6	13.9	-115.5	572444
		11.00	0.016	2.39E-04	-98.9	13.9		
6	1.50	15.28	0.016	2.47E-04	-92.3	-33.3		572444
7	1.00	22.18	0.016	2.95E-04	-83.0	-77.3		572444
		30.24	0.016	2.95E-04	-83.0	-77.3		
8	0.50	33.89	0.016	3.79E-04	-66.9	-114.7		572444
9	0.00	38.80	0.016	4.92E-04	-48.8	-143.7		572444
10	-0.65	45.78	0.015	6.68E-04	-21.3	-166.6		572444
11	-1.30	53.08	0.015	8.60E-04	10.9	-170.3	-7.0	572444
		53.08	0.015	8.60E-04	3.8	-170.3		
12	-1.50	54.89	0.015	9.19E-04	14.6	-168.4		572444
		34.98	0.015	9.19E-04	14.6	-168.4		
13	-2.00	15.18	0.014	1.06E-03	27.2	-157.3		572444
14	-2.60	14.73	0.013	1.21E-03	36.1	-138.3		572444
15	-3.20	13.86	0.013	1.34E-03	44.7	-114.0		572444
16	-4.00	13.10	0.011	1.47E-03	55.5	-73.8		572444
17	-4.50	13.72	0.011	1.53E-03	62.2	-44.3		572444
18	-5.00	13.03	0.010	1.55E-03	68.9	-11.3		572444
19	-5.20	9.53	0.010	1.55E-03	71.1	2.7		572444
		-98.42	0.010	1.55E-03	71.1	2.7		
20	-5.80	-46.37	0.009	1.54E-03	27.7	27.7		572444
21	-6.40	-25.36	0.008	1.50E-03	6.2	36.0		572444
22	-7.20	-12.04	0.007	1.45E-03	-8.8	32.8		572444
23	-8.00	-1.72	0.005	1.42E-03	-14.3	21.9		572444
24	-8.80	5.32	0.004	1.39E-03	-12.8	10.0		572444
25	-9.40	9.80	0.003	1.39E-03	-8.3	3.2		572444
26	-10.00	10.72	0.003	1.39E-03	-2.1	-0.0		0
27	-10.40	16.72	0.002	0	3.3	0.0		0
		-5.12	0.002	0	3.3	0.0		

(continued)

Stage No.6 Apply water pressure profile no.2

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-11.70	46.36	0.000	0	30.1	0.0		0
		-28.01	0.000	0	30.1	0.0		
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.00	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.07	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	115.5	kN/m run		
At elev. -1.30				Prop force =	7.0	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	9.71	9.71	9971
3	2.65	0.00	25.85	7.99	99.98	10.22	10.22	9971
4	2.10	0.00	36.59	11.31	141.55	11.94	11.94	9971
5	2.00	0.00	38.50	11.90	148.93	11.00	11.00A	9971
6	1.50	0.00	47.88	14.80	185.22	15.28	15.28	9971
7	1.00	0.00	57.04	17.63	220.65	22.18	22.18	9971
		0.00	57.04	14.47	216.38	30.24	30.24	4985
8	0.50	0.00	66.05	17.64	247.37	33.89	33.89	5235
9	0.00	0.00	74.94	20.76	277.99	38.80	38.80	5484
10	-0.65	0.00	86.39	24.78	317.40	45.78	45.78	5808
11	-1.30	0.00	97.75	28.77	356.50	53.08	53.08	6132
12	-1.50	0.00	101.23	29.99	368.48	54.89	54.89	6232
13	-2.00	0.00	109.91	33.04	398.36	60.61	60.61	6481
14	-2.60	0.00	120.29	36.69	434.09	67.48	67.48	6780
15	-3.20	0.00	130.64	40.33	469.73	74.25	74.25	7079
16	-4.00	0.00	144.41	45.16	517.11	83.44	83.44	7478
17	-4.50	5.00	147.99	46.42	529.46	84.81	89.81	7727
18	-5.00	10.00	151.57	47.68	541.78	85.48	95.48	7977
19	-5.20	12.00	153.00	48.18	546.69	85.00	97.00	8076
		12.00	153.00	30.94	726.88	74.87	86.87	29913
20	-5.80	18.00	159.08	32.66	753.43	106.38	124.38	29913
21	-6.40	24.00	165.15	34.38	779.94	122.91	146.91	29913
22	-7.20	32.00	173.22	36.67	815.23	137.61	169.61	29913
23	-8.00	40.00	181.29	38.95	850.47	150.79	190.79	29913
24	-8.80	48.00	189.34	41.24	885.66	162.31	210.31	29913
25	-9.40	54.00	195.38	42.95	912.03	170.53	224.53	29913
26	-10.00	60.00	201.40	44.65	938.38	176.98	236.98	29913
27	-10.40	64.00	205.42	45.79	955.93	183.98	247.98	29913
		64.00	205.42	35.52	1014.29	173.11	237.11	49855
28	-11.70	77.00	222.37	40.47	1088.33	215.70	292.70	49855
		77.00	222.37	0.00	6309.29	185.78	262.78	997093
29	-13.85	98.50	258.96	0.00	6817.44	236.45	334.95	997093
30	-16.00	120.00	295.53	0.00	7325.15	272.98	392.98	997093
31	-18.00	140.00	329.52	0.00	7797.13	306.76	446.76	997093
32	-20.00	160.00	363.49	0.00	8268.84	337.99	497.99	997093

(continued)

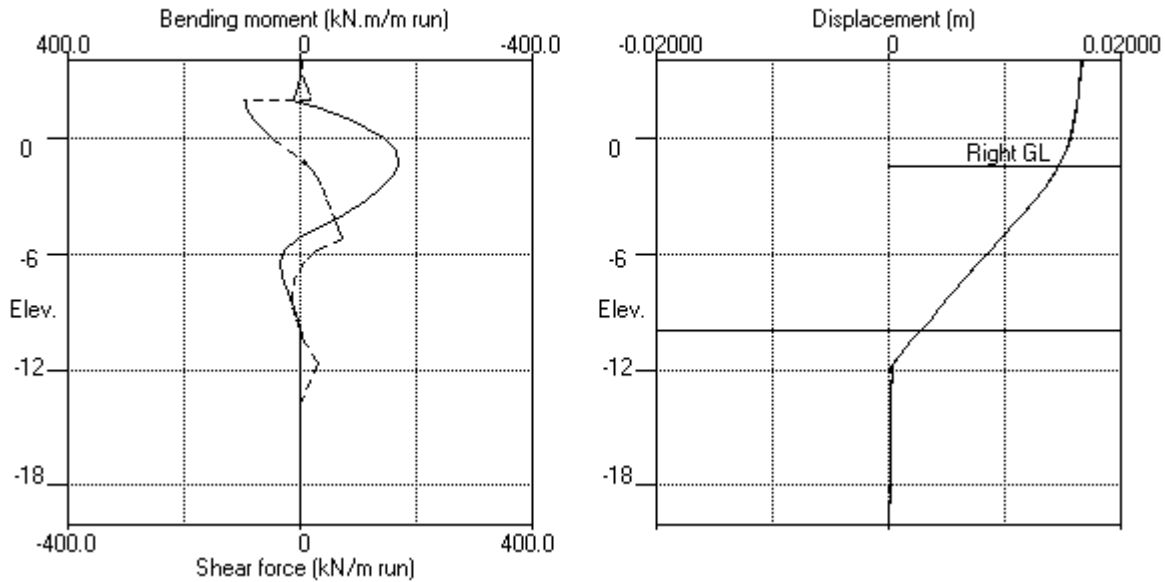
Stage No.6 Apply water pressure profile no.2

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective stresses</u>		<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.91	19.91	6226
13	-2.00	0.00	8.50	0.00	49.29	45.42	45.42	6475
14	-2.60	0.00	18.70	1.00	84.40	52.74	52.74	6774
15	-3.20	0.00	28.90	4.59	119.52	60.39	60.39	7073
16	-4.00	0.00	42.51	9.37	166.36	70.35	70.35	7471
17	-4.50	0.00	51.02	12.36	195.64	76.09	76.09	7720
18	-5.00	0.00	59.53	15.35	224.93	82.45	82.45	7969
19	-5.20	2.00	60.93	15.84	229.77	85.47	87.47	8069
		2.00	60.93	4.85	324.59	183.29	185.29	29884
20	-5.80	8.00	66.95	6.56	350.88	162.75	170.75	29884
21	-6.40	14.00	72.97	8.26	377.20	158.27	172.27	29884
22	-7.20	22.00	81.01	10.54	412.33	159.65	181.65	29884
23	-8.00	30.00	89.07	12.82	447.52	162.51	192.51	29884
24	-8.80	38.00	97.13	15.11	482.77	166.99	204.99	29884
25	-9.40	44.00	103.19	16.83	509.25	170.73	214.73	29884
26	-10.00	50.00	109.26	18.55	535.76	176.26	226.26	29884
27	-10.40	54.00	113.31	19.69	553.47	177.26	231.26	29884
		54.00	113.31	8.60	611.82	188.24	242.24	49807
28	-11.70	67.00	130.41	13.59	686.53	179.34	246.34	49807
		67.00	130.41	0.00	5032.35	223.79	290.79	996147
29	-13.85	88.50	167.40	0.00	5545.95	246.45	334.95	996147
30	-16.00	110.00	204.53	0.00	6061.57	282.98	392.98	996147
31	-18.00	130.00	239.20	0.00	6543.07	316.75	446.75	996147
32	-20.00	150.00	274.01	0.00	7026.33	348.06	498.06	996147

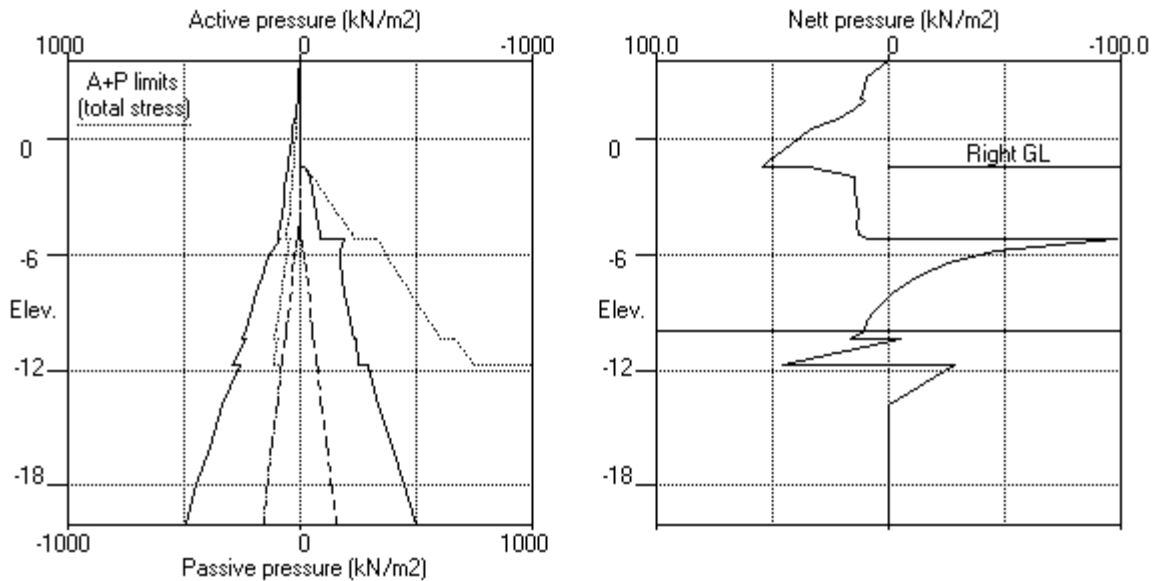
Note: 12.34 a Soil pressure at active limit
123.45 p Soil pressure at passive limit
11.00A Arching - soil pressure below active limit

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Stage No.6 Apply water pressure profile no.2

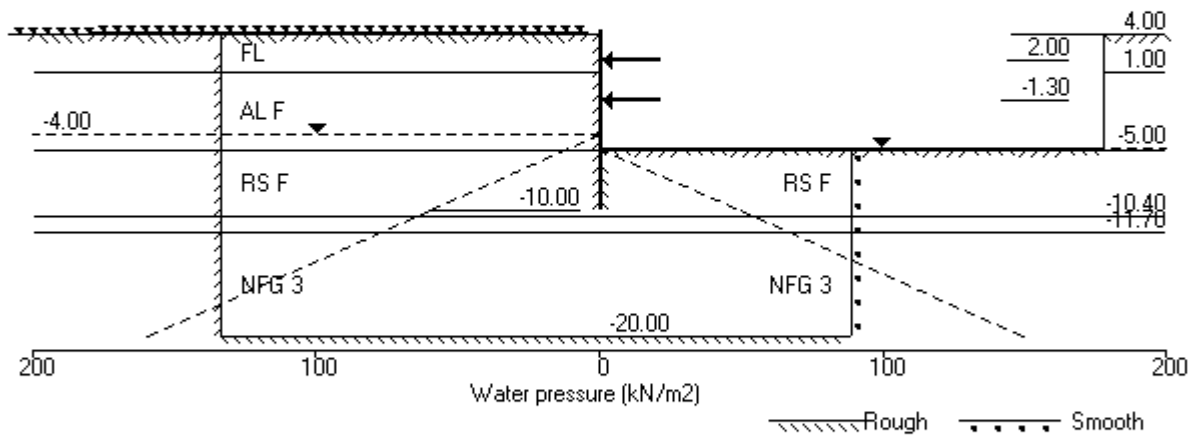


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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_4
 Albert Street Development
 Section 4

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Units: kN,m

Stage No. 7 Excavate to elevation -5.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>More than one prop. No FoS calc.</u>			
7	4.00	-5.00					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-5.34E-04	0.0	-0.0		572444
2	3.20	14.54	0.015	-5.35E-04	5.8	1.2		572444
3	2.65	13.55	0.016	-5.39E-04	13.5	7.0		572444
4	2.10	14.51	0.016	-5.50E-04	21.3	16.9		572444
5	2.00	12.87	0.016	-5.53E-04	22.6	19.1	-98.5	572444
		12.87	0.016	-5.53E-04	-75.9	19.1		
6	1.50	16.45	0.016	-5.54E-04	-68.6	-16.3		572444
7	1.00	22.44	0.017	-5.26E-04	-58.9	-48.4		572444
		30.36	0.017	-5.26E-04	-58.9	-48.4		
8	0.50	33.86	0.017	-4.73E-04	-42.8	-73.7		572444
9	0.00	38.46	0.017	-4.01E-04	-24.7	-90.6		572444
10	-0.65	44.93	0.017	-2.94E-04	2.4	-98.0		572444
11	-1.30	51.63	0.017	-1.89E-04	33.8	-86.5	-198.8	572444
		51.63	0.017	-1.89E-04	-165.0	-86.5		
12	-1.50	52.64	0.017	-1.53E-04	-154.6	-118.4		572444
13	-2.00	57.37	0.018	-1.98E-05	-127.1	-188.6		572444
14	-2.60	62.83	0.017	2.12E-04	-91.0	-254.1		572444
15	-3.20	67.92	0.017	5.01E-04	-51.8	-297.0		572444
16	-4.00	75.62	0.017	9.29E-04	5.6	-315.6		572444
17	-4.50	80.54	0.016	1.19E-03	44.6	-303.0		572444
18	-5.00	85.14	0.015	1.44E-03	86.1	-270.3		572444
		65.11	0.015	1.44E-03	86.1	-270.3		
19	-5.20	59.32	0.015	1.54E-03	98.5	-251.8		572444
		-19.70	0.015	1.54E-03	98.5	-251.8		
20	-5.80	-7.58	0.014	1.77E-03	90.3	-199.0		572444
21	-6.40	-14.96	0.013	1.95E-03	83.6	-148.0		572444
22	-7.20	-32.36	0.011	2.12E-03	64.6	-87.6		572444
23	-8.00	-25.72	0.010	2.21E-03	41.4	-46.3		572444
24	-8.80	-14.26	0.008	2.26E-03	25.4	-21.4		572444
25	-9.40	-10.98	0.007	2.28E-03	17.8	-8.7		572444
26	-10.00	-29.08	0.005	2.28E-03	5.8	0.0		0
27	-10.40	25.36	0.004	0	5.1	0.0		0
		-7.79	0.004	0	5.1	0.0		

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-11.70	70.52	0.001	0	45.8	0.0		0
		-42.62	0.001	0	45.8	0.0		
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	98.5	kN/m run		
At elev. -1.30				Prop force =	198.8	kN/m run		

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	14.54	14.54	9971
3	2.65	0.00	25.85	7.99	99.98	13.55	13.55	9971
4	2.10	0.00	36.59	11.31	141.55	14.51	14.51	9971
5	2.00	0.00	38.50	11.90	148.93	12.87	12.87	9971
6	1.50	0.00	47.88	14.80	185.22	16.45	16.45	9971
7	1.00	0.00	57.04	17.63	220.65	22.44	22.44	9971
		0.00	57.04	14.47	216.38	30.36	30.36	4985
8	0.50	0.00	66.05	17.64	247.37	33.86	33.86	5235
9	0.00	0.00	74.94	20.76	277.99	38.46	38.46	5484
10	-0.65	0.00	86.39	24.78	317.40	44.93	44.93	5808
11	-1.30	0.00	97.75	28.77	356.50	51.63	51.63	6132
12	-1.50	0.00	101.23	29.99	368.48	52.64	52.64	6232
13	-2.00	0.00	109.91	33.04	398.36	57.37	57.37	6481
14	-2.60	0.00	120.29	36.69	434.09	62.83	62.83	6780
15	-3.20	0.00	130.64	40.33	469.73	67.92	67.92	7079
16	-4.00	0.00	144.41	45.16	517.11	75.62	75.62	7478
17	-4.50	5.00	147.99	46.42	529.46	75.54	80.54	7727
18	-5.00	10.00	151.57	47.68	541.78	75.14	85.14	7977
19	-5.20	12.00	153.00	48.18	546.69	74.17	86.17	8076
		12.00	153.00	30.94	726.88	34.77	46.77	29913
20	-5.80	18.00	159.08	32.66	753.43	73.11	91.11	29913
21	-6.40	24.00	165.15	34.38	779.94	91.96	115.96	29913
22	-7.20	32.00	173.22	36.67	815.23	109.55	141.55	29913
23	-8.00	40.00	181.29	38.95	850.47	125.90	165.90	29913
24	-8.80	48.00	189.34	41.24	885.66	139.64	187.64	29913
25	-9.40	54.00	195.38	42.95	912.03	147.22	201.22	29913
26	-10.00	60.00	201.40	44.65	938.38	144.45	204.45	29913
27	-10.40	64.00	205.42	45.79	955.93	175.41	239.41	29913
		64.00	205.42	35.52	1014.29	158.84	222.84	49855
28	-11.70	77.00	222.37	40.47	1088.33	214.98	291.98	49855
		77.00	222.37	0.00	6309.29	171.38	248.38	997093
29	-13.85	98.50	258.96	0.00	6817.44	229.33	327.83	997093
30	-16.00	120.00	295.53	0.00	7325.15	265.81	385.81	997093
31	-18.00	140.00	329.52	0.00	7797.13	299.45	439.45	997093
32	-20.00	160.00	363.49	0.00	8268.84	329.32	489.32	997093

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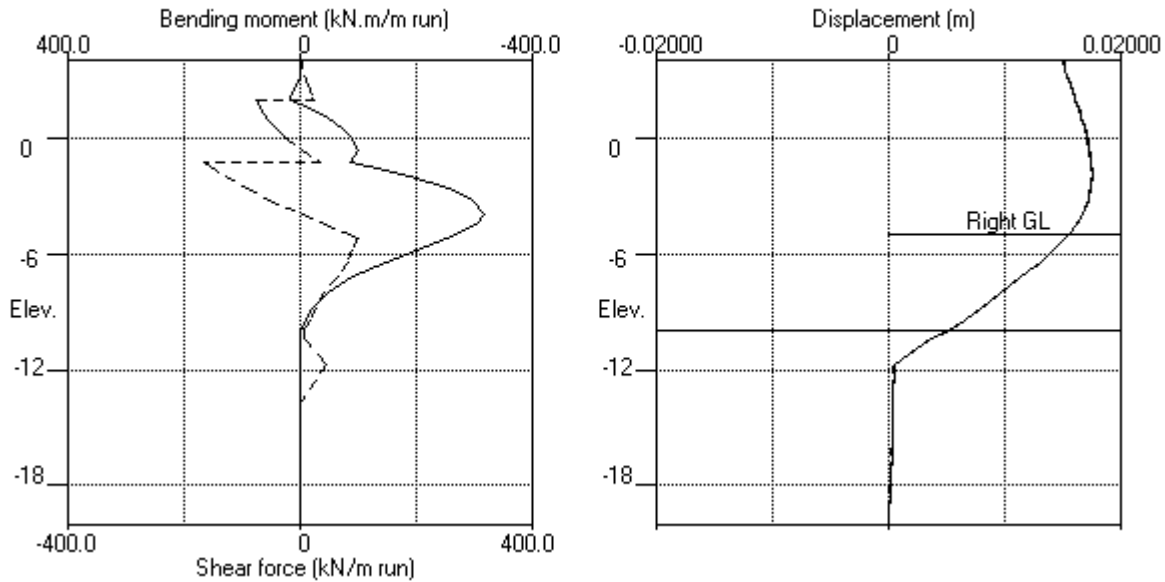
Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>modulus</u>
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-5.20	0.00	0.00	0.00	20.03	20.03	20.03p	7977
		2.00	1.40	0.00	24.85	24.85	26.85p	8077
		2.00	1.40	0.00	64.48	64.48	66.48p	29915
20	-5.80	8.00	7.40	0.00	90.70	90.70	98.70p	29915
21	-6.40	14.00	13.40	0.00	116.92	116.92	130.92p	29915
22	-7.20	22.00	21.41	0.00	151.91	151.91	173.91p	29915
23	-8.00	30.00	29.43	0.00	186.94	161.62	191.62	29915
24	-8.80	38.00	37.46	0.00	222.02	163.90	201.90	29915
25	-9.40	44.00	43.49	0.00	248.36	168.20	212.20	29915
26	-10.00	50.00	49.52	1.62	274.75	183.53	233.53	29915
27	-10.40	54.00	53.56	2.76	292.37	160.05	214.05	29915
28	-11.70	54.00	53.56	0.00	350.73	176.63	230.63	49858
		67.00	70.60	0.00	425.18	154.46	221.46	49858
		67.00	70.60	0.00	4201.77	224.00	291.00	997169
29	-13.85	88.50	107.51	0.00	4714.42	239.32	327.82	997169
30	-16.00	110.00	144.64	0.00	5229.91	275.80	385.80	997169
31	-18.00	130.00	179.38	0.00	5712.28	309.44	439.44	997169
32	-20.00	150.00	214.32	0.00	6197.55	339.40	489.40	997169

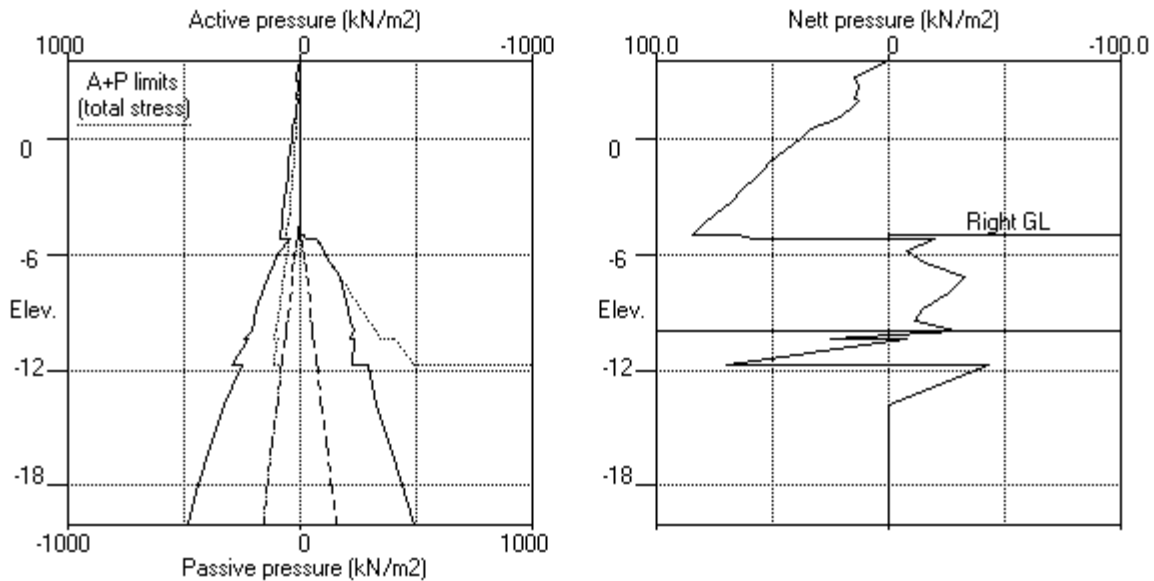
Note: 12.34 a Soil pressure at active limit
 173.91 p Soil pressure at passive limit

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Stage No.7 Excav. to elev. -5.00 on RIGHT side

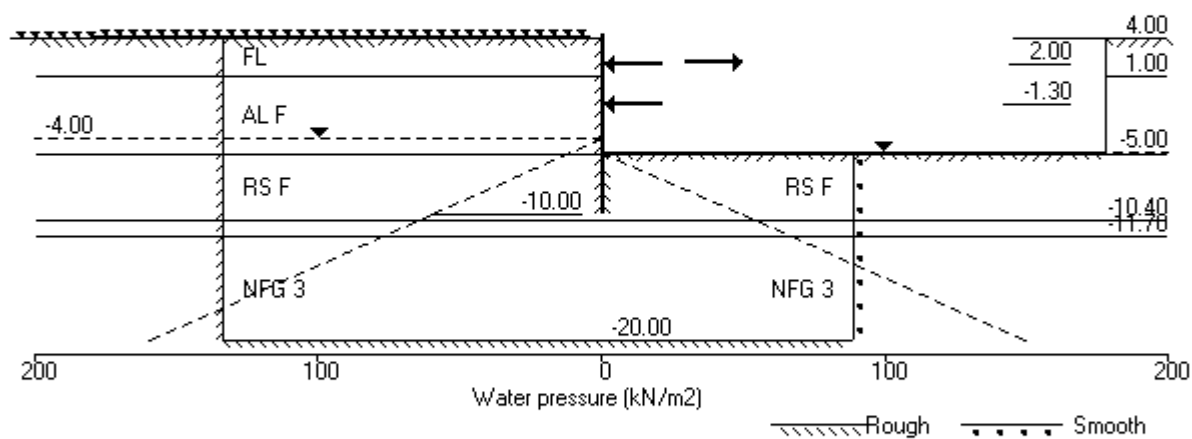


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 Data filename/Run ID: Section_4
 Albert Street Development
 Section 4

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.10



Units: kN,m

Stage No. 8 Apply load no.1 at elevation 2.10

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
8	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.016	-3.84E-04	0.0	-0.0		572444
2	3.20	13.09	0.016	-3.85E-04	5.2	1.2		572444
3	2.65	12.52	0.016	-3.89E-04	12.3	6.5		572444
4	2.10	13.68	0.017	-3.99E-04	19.5	15.5	45.0	572444
		13.68	0.017	-3.99E-04	64.5	15.5		
5	2.00	12.24	0.017	-4.02E-04	65.8	22.0	-136.6	572444
		12.24	0.017	-4.02E-04	-70.8	22.0		
6	1.50	16.03	0.017	-4.07E-04	-63.7	-10.9		572444
7	1.00	22.28	0.017	-3.85E-04	-54.2	-40.6		572444
		30.29	0.017	-3.85E-04	-54.2	-40.6		
8	0.50	33.75	0.017	-3.39E-04	-38.1	-63.6		572444
9	0.00	38.39	0.017	-2.77E-04	-20.1	-78.2		572444
10	-0.65	44.92	0.017	-1.86E-04	7.0	-82.6		572444
11	-1.30	51.68	0.018	-1.00E-04	38.4	-68.1	-206.8	572444
		51.68	0.018	-1.00E-04	-168.4	-68.1		
12	-1.50	52.72	0.018	-7.14E-05	-158.0	-100.7		572444
13	-2.00	57.47	0.018	4.79E-05	-130.4	-172.6		572444
14	-2.60	62.96	0.017	2.64E-04	-94.3	-240.1		572444
15	-3.20	68.07	0.017	5.39E-04	-55.0	-284.8		572444
16	-4.00	75.77	0.017	9.52E-04	2.6	-306.0		572444
17	-4.50	80.69	0.016	1.21E-03	41.7	-294.9		572444
18	-5.00	85.29	0.015	1.45E-03	83.2	-263.6		572444
		65.35	0.015	1.45E-03	83.2	-263.6		
19	-5.20	59.54	0.015	1.54E-03	95.7	-245.6		572444
		-18.91	0.015	1.54E-03	95.7	-245.6		
20	-5.80	-6.83	0.014	1.77E-03	87.9	-194.4		572444
21	-6.40	-14.24	0.013	1.95E-03	81.6	-144.7		572444
22	-7.20	-31.74	0.011	2.11E-03	63.2	-85.7		572444
23	-8.00	-25.21	0.010	2.20E-03	40.4	-45.3		572444
24	-8.80	-13.84	0.008	2.25E-03	24.8	-21.0		572444
25	-9.40	-10.61	0.006	2.27E-03	17.5	-8.6		572444
26	-10.00	-28.61	0.005	2.27E-03	5.7	0.0		0

(continued)

Stage No.8 Apply load no.1 at elevation 2.10

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-10.40	25.36	0.004	0	5.1	0.0		0
		-7.79	0.004	0	5.1	0.0		
28	-11.70	70.52	0.001	0	45.8	0.0		0
		-42.62	0.001	0	45.8	0.0		
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	136.6	kN/m run		
At elev. -1.30				Prop force =	206.8	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	13.09	13.09	9971
3	2.65	0.00	25.85	7.99	99.98	12.52	12.52	9971
4	2.10	0.00	36.59	11.31	141.55	13.68	13.68	9971
5	2.00	0.00	38.50	11.90	148.93	12.24	12.24	9971
6	1.50	0.00	47.88	14.80	185.22	16.03	16.03	9971
7	1.00	0.00	57.04	17.63	220.65	22.28	22.28	9971
		0.00	57.04	14.47	216.38	30.29	30.29	4985
8	0.50	0.00	66.05	17.64	247.37	33.75	33.75	5235
9	0.00	0.00	74.94	20.76	277.99	38.39	38.39	5484
10	-0.65	0.00	86.39	24.78	317.40	44.92	44.92	5808
11	-1.30	0.00	97.75	28.77	356.50	51.68	51.68	6132
12	-1.50	0.00	101.23	29.99	368.48	52.72	52.72	6232
13	-2.00	0.00	109.91	33.04	398.36	57.47	57.47	6481
14	-2.60	0.00	120.29	36.69	434.09	62.96	62.96	6780
15	-3.20	0.00	130.64	40.33	469.73	68.07	68.07	7079
16	-4.00	0.00	144.41	45.16	517.11	75.77	75.77	7478
17	-4.50	5.00	147.99	46.42	529.46	75.69	80.69	7727
18	-5.00	10.00	151.57	47.68	541.78	75.29	85.29	7977
19	-5.20	12.00	153.00	48.18	546.69	74.30	86.30	8076
		12.00	153.00	30.94	726.88	35.25	47.25	29913
20	-5.80	18.00	159.08	32.66	753.43	73.55	91.55	29913
21	-6.40	24.00	165.15	34.38	779.94	92.36	116.36	29913
22	-7.20	32.00	173.22	36.67	815.23	109.90	141.90	29913
23	-8.00	40.00	181.29	38.95	850.47	126.18	166.18	29913
24	-8.80	48.00	189.34	41.24	885.66	139.86	187.86	29913
25	-9.40	54.00	195.38	42.95	912.03	147.42	201.42	29913
26	-10.00	60.00	201.40	44.65	938.38	144.69	204.69	29913
27	-10.40	64.00	205.42	45.79	955.93	175.41	239.41	29913
		64.00	205.42	35.52	1014.29	158.84	222.84	49855
28	-11.70	77.00	222.37	40.47	1088.33	214.98	291.98	49855
		77.00	222.37	0.00	6309.29	171.39	248.39	997093
29	-13.85	98.50	258.96	0.00	6817.44	229.34	327.84	997093
30	-16.00	120.00	295.53	0.00	7325.15	265.81	385.81	997093
31	-18.00	140.00	329.52	0.00	7797.13	299.45	439.45	997093
32	-20.00	160.00	363.49	0.00	8268.84	329.32	489.32	997093

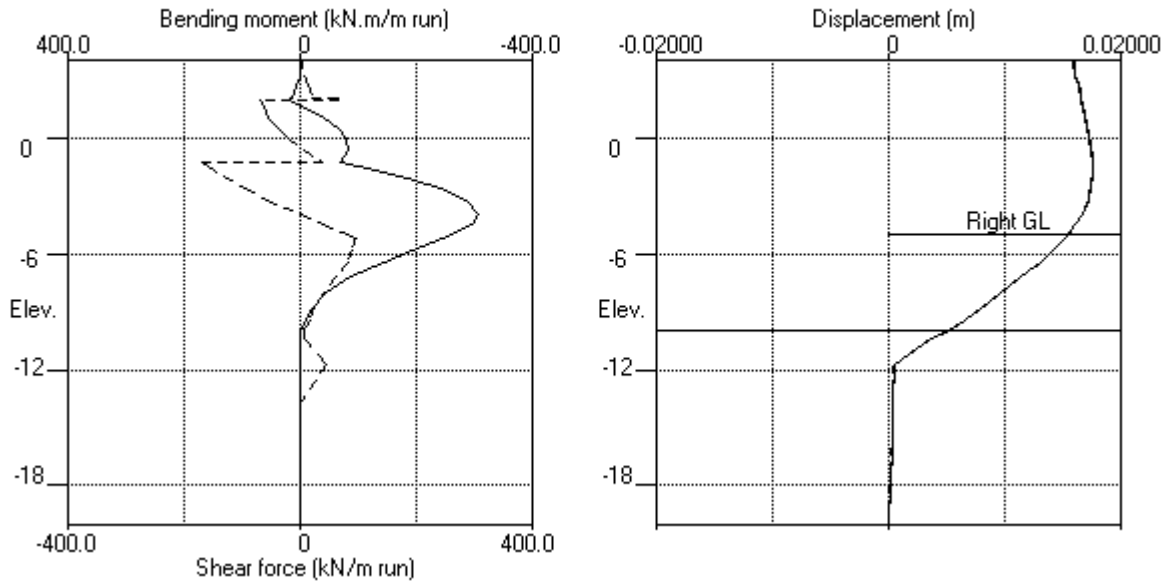
(continued)

Stage No.8 Apply load no.1 at elevation 2.10

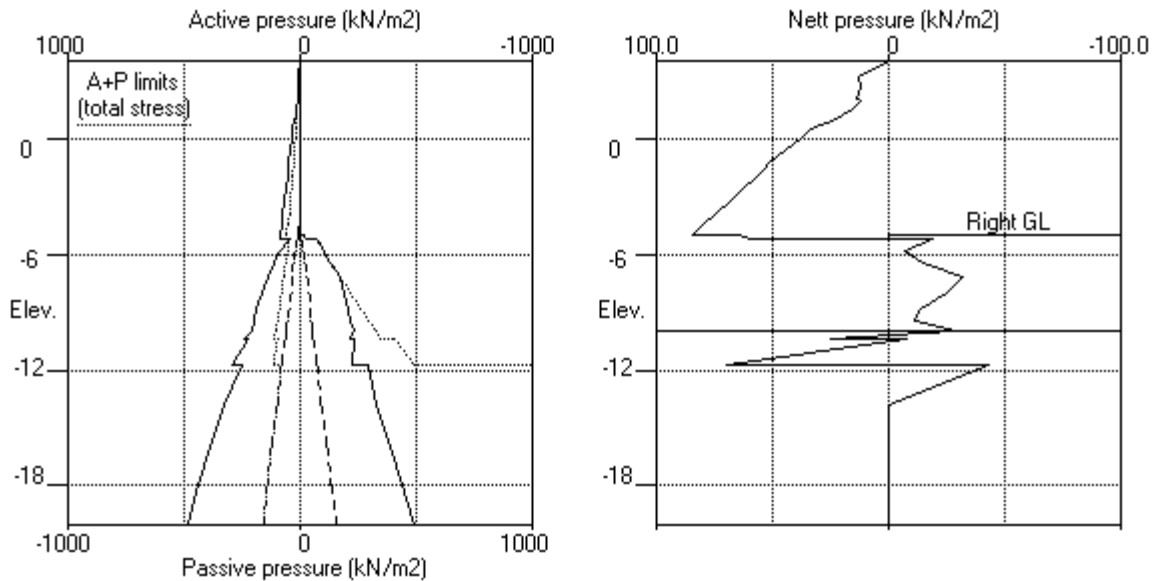
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-5.20	0.00	0.00	0.00	20.03	19.94	19.94	7977
		2.00	1.40	0.00	24.85	24.76	26.76	8077
		2.00	1.40	0.00	64.48	64.16	66.16	29915
20	-5.80	8.00	7.40	0.00	90.70	90.38	98.38	29915
21	-6.40	14.00	13.40	0.00	116.92	116.61	130.61	29915
22	-7.20	22.00	21.41	0.00	151.91	151.63	173.63	29915
23	-8.00	30.00	29.43	0.00	186.94	161.39	191.39	29915
24	-8.80	38.00	37.46	0.00	222.02	163.70	201.70	29915
25	-9.40	44.00	43.49	0.00	248.36	168.03	212.03	29915
26	-10.00	50.00	49.52	1.62	274.75	183.30	233.30	29915
27	-10.40	54.00	53.56	2.76	292.37	160.05	214.05	29915
28	-11.70	54.00	53.56	0.00	350.73	176.64	230.64	49858
		67.00	70.60	0.00	425.18	154.46	221.46	49858
		67.00	70.60	0.00	4201.77	224.01	291.01	997169
29	-13.85	88.50	107.51	0.00	4714.42	239.33	327.83	997169
30	-16.00	110.00	144.64	0.00	5229.91	275.81	385.81	997169
31	-18.00	130.00	179.38	0.00	5712.28	309.44	439.44	997169
32	-20.00	150.00	214.32	0.00	6197.55	339.40	489.40	997169

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.10



Stage No.8 Apply load no.1 at elev. 2.10



Units: kN,m

Stage No. 9 Apply load no.2 at elevation 2.10

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act. Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
			<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u> <u>More than one prop. No FoS calc.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
9	4.00 -5.00						

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.015	-5.34E-04	0.0	-0.0		572444
2	3.20	14.54	0.015	-5.35E-04	5.8	1.2		572444
3	2.65	13.55	0.016	-5.39E-04	13.5	7.0		572444
4	2.10	14.51	0.016	-5.50E-04	21.3	16.9		572444
5	2.00	12.87	0.016	-5.53E-04	22.6	19.1	-98.5	572444
		12.87	0.016	-5.53E-04	-75.9	19.1		
6	1.50	16.45	0.016	-5.54E-04	-68.6	-16.3		572444
7	1.00	22.44	0.017	-5.26E-04	-58.9	-48.4		572444
		30.36	0.017	-5.26E-04	-58.9	-48.4		
8	0.50	33.86	0.017	-4.73E-04	-42.8	-73.7		572444
9	0.00	38.46	0.017	-4.01E-04	-24.7	-90.6		572444
10	-0.65	44.93	0.017	-2.94E-04	2.4	-98.0		572444
11	-1.30	51.63	0.017	-1.89E-04	33.8	-86.5	-198.8	572444
		51.63	0.017	-1.89E-04	-165.0	-86.5		
12	-1.50	52.64	0.017	-1.53E-04	-154.6	-118.4		572444
13	-2.00	57.37	0.018	-1.98E-05	-127.1	-188.6		572444
14	-2.60	62.83	0.017	2.12E-04	-91.0	-254.1		572444
15	-3.20	67.92	0.017	5.01E-04	-51.8	-297.0		572444
16	-4.00	75.62	0.017	9.29E-04	5.6	-315.6		572444
17	-4.50	80.54	0.016	1.19E-03	44.6	-303.0		572444
18	-5.00	85.14	0.015	1.44E-03	86.1	-270.3		572444
		65.11	0.015	1.44E-03	86.1	-270.3		
19	-5.20	59.32	0.015	1.54E-03	98.5	-251.8		572444
		-19.70	0.015	1.54E-03	98.5	-251.8		
20	-5.80	-7.58	0.014	1.77E-03	90.3	-199.0		572444
21	-6.40	-14.96	0.013	1.95E-03	83.6	-148.0		572444
22	-7.20	-32.36	0.011	2.12E-03	64.6	-87.6		572444
23	-8.00	-25.72	0.010	2.21E-03	41.4	-46.3		572444
24	-8.80	-14.26	0.008	2.26E-03	25.4	-21.4		572444
25	-9.40	-10.98	0.007	2.28E-03	17.8	-8.7		572444
26	-10.00	-29.08	0.005	2.28E-03	5.8	0.0		0
27	-10.40	25.36	0.004	0	5.1	0.0		0
		-7.79	0.004	0	5.1	0.0		

(continued)

Stage No.9 Apply load no.2 at elevation 2.10

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
28	-11.70	70.52	0.001	0	45.8	0.0		0
		-42.62	0.001	0	45.8	0.0		
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force =	98.5 kN/m run		
At elev. -1.30					Prop force =	198.8 kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	14.54	14.54	9971
3	2.65	0.00	25.85	7.99	99.98	13.55	13.55	9971
4	2.10	0.00	36.59	11.31	141.55	14.51	14.51	9971
5	2.00	0.00	38.50	11.90	148.93	12.87	12.87	9971
6	1.50	0.00	47.88	14.80	185.22	16.45	16.45	9971
7	1.00	0.00	57.04	17.63	220.65	22.44	22.44	9971
		0.00	57.04	14.47	216.38	30.36	30.36	4985
8	0.50	0.00	66.05	17.64	247.37	33.86	33.86	5235
9	0.00	0.00	74.94	20.76	277.99	38.46	38.46	5484
10	-0.65	0.00	86.39	24.78	317.40	44.93	44.93	5808
11	-1.30	0.00	97.75	28.77	356.50	51.63	51.63	6132
12	-1.50	0.00	101.23	29.99	368.48	52.64	52.64	6232
13	-2.00	0.00	109.91	33.04	398.36	57.37	57.37	6481
14	-2.60	0.00	120.29	36.69	434.09	62.83	62.83	6780
15	-3.20	0.00	130.64	40.33	469.73	67.92	67.92	7079
16	-4.00	0.00	144.41	45.16	517.11	75.62	75.62	7478
17	-4.50	5.00	147.99	46.42	529.46	75.54	80.54	7727
18	-5.00	10.00	151.57	47.68	541.78	75.14	85.14	7977
19	-5.20	12.00	153.00	48.18	546.69	74.17	86.17	8076
		12.00	153.00	30.94	726.88	34.77	46.77	29913
20	-5.80	18.00	159.08	32.66	753.43	73.11	91.11	29913
21	-6.40	24.00	165.15	34.38	779.94	91.96	115.96	29913
22	-7.20	32.00	173.22	36.67	815.23	109.55	141.55	29913
23	-8.00	40.00	181.29	38.95	850.47	125.90	165.90	29913
24	-8.80	48.00	189.34	41.24	885.66	139.64	187.64	29913
25	-9.40	54.00	195.38	42.95	912.03	147.22	201.22	29913
26	-10.00	60.00	201.40	44.65	938.38	144.45	204.45	29913
27	-10.40	64.00	205.42	45.79	955.93	175.41	239.41	29913
		64.00	205.42	35.52	1014.29	158.84	222.84	49855
28	-11.70	77.00	222.37	40.47	1088.33	214.98	291.98	49855
		77.00	222.37	0.00	6309.29	171.38	248.38	997093
29	-13.85	98.50	258.96	0.00	6817.44	229.33	327.83	997093
30	-16.00	120.00	295.53	0.00	7325.15	265.81	385.81	997093
31	-18.00	140.00	329.52	0.00	7797.13	299.45	439.45	997093
32	-20.00	160.00	363.49	0.00	8268.84	329.32	489.32	997093

(continued)

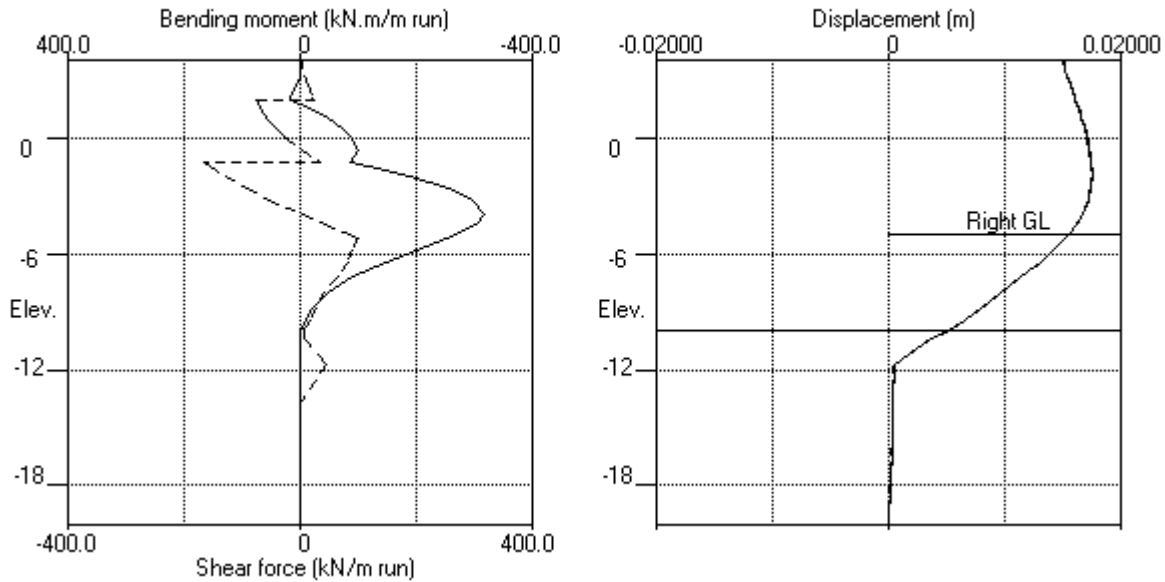
Stage No.9 Apply load no.2 at elevation 2.10

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>modulus</u>
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-5.20	0.00	0.00	0.00	20.03	20.03	20.03p	7977
		2.00	1.40	0.00	24.85	24.85	26.85p	8077
		2.00	1.40	0.00	64.48	64.48	66.48p	29915
20	-5.80	8.00	7.40	0.00	90.70	90.70	98.70p	29915
21	-6.40	14.00	13.40	0.00	116.92	116.92	130.92p	29915
22	-7.20	22.00	21.41	0.00	151.91	151.91	173.91p	29915
23	-8.00	30.00	29.43	0.00	186.94	161.62	191.62	29915
24	-8.80	38.00	37.46	0.00	222.02	163.90	201.90	29915
25	-9.40	44.00	43.49	0.00	248.36	168.20	212.20	29915
26	-10.00	50.00	49.52	1.62	274.75	183.53	233.53	29915
27	-10.40	54.00	53.56	2.76	292.37	160.05	214.05	29915
28	-11.70	54.00	53.56	0.00	350.73	176.63	230.63	49858
		67.00	70.60	0.00	425.18	154.46	221.46	49858
		67.00	70.60	0.00	4201.77	224.00	291.00	997169
29	-13.85	88.50	107.51	0.00	4714.42	239.32	327.82	997169
30	-16.00	110.00	144.64	0.00	5229.91	275.80	385.80	997169
31	-18.00	130.00	179.38	0.00	5712.28	309.44	439.44	997169
32	-20.00	150.00	214.32	0.00	6197.55	339.40	489.40	997169

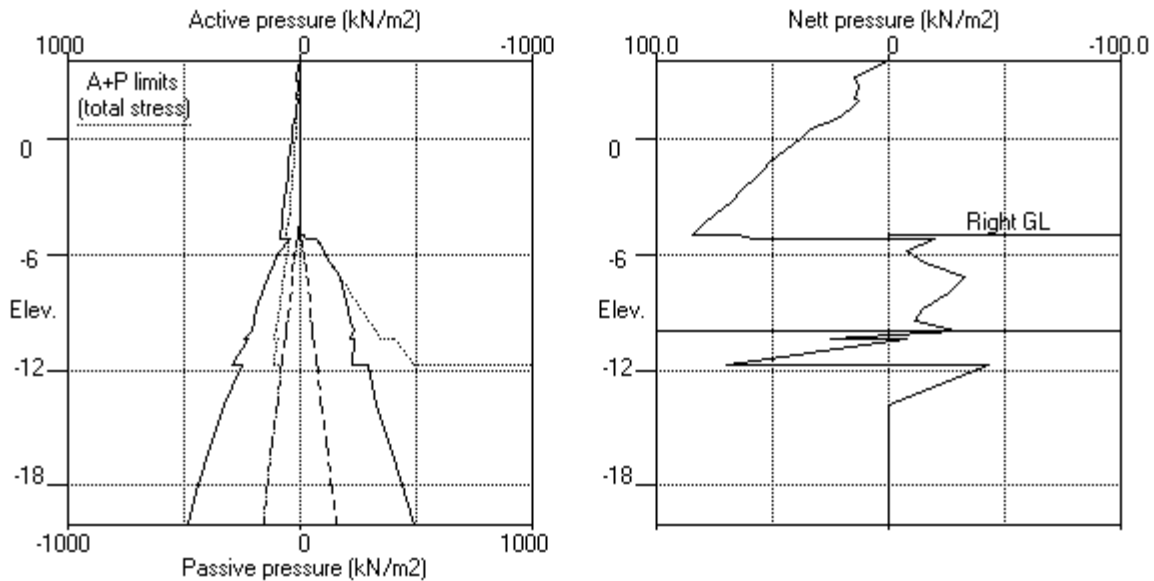
Note: 12.34 a Soil pressure at active limit
 173.91 p Soil pressure at passive limit

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.10



Stage No.9 Apply load no.2 at elev. 2.10

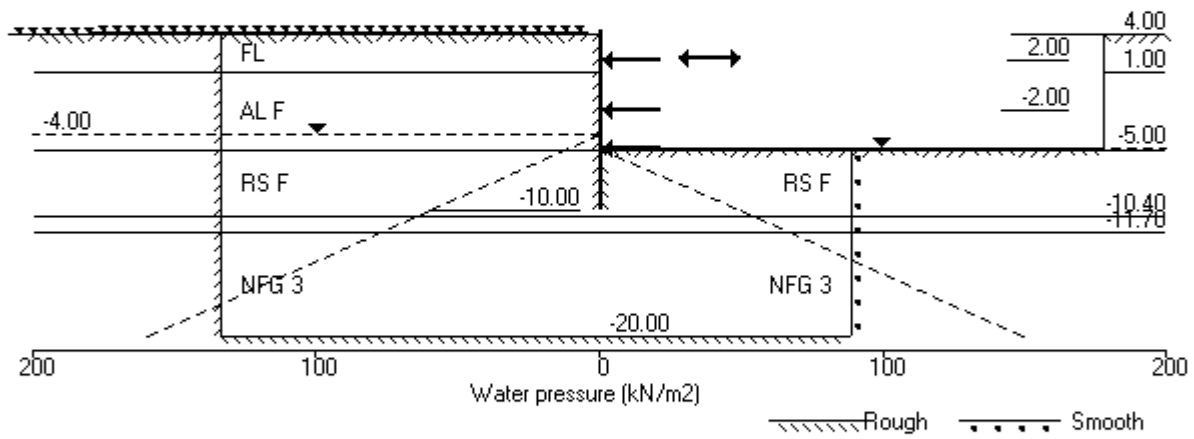


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_4
 Albert Street Development
 Section 4

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Units: kN,m

Stage No. 12 Remove strut or anchor no.2 at elevation -1.30

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>of</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	<u>Direction</u> <u>of</u> <u>failure</u>
12	4.00	-5.00	More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.015	-6.39E-04	0.0	-0.0		572444
2	3.20	14.62	0.016	-6.40E-04	5.8	1.2		572444
3	2.65	13.35	0.016	-6.44E-04	13.5	7.0		572444
4	2.10	14.15	0.016	-6.55E-04	21.1	16.8		572444
5	2.00	12.34	0.016	-6.58E-04	22.4	19.0	-123.5	572444
		12.34	0.016	-6.58E-04	-101.1	19.0		
6	1.50	15.75	0.017	-6.54E-04	-94.1	-29.0		572444
7	1.00	21.45	0.017	-6.09E-04	-84.8	-73.9		572444
		29.87	0.017	-6.09E-04	-84.8	-73.9		
8	0.50	33.23	0.017	-5.28E-04	-69.0	-112.2		572444
9	0.00	37.72	0.018	-4.17E-04	-51.3	-142.3		572444
10	-0.65	44.11	0.018	-2.41E-04	-24.7	-167.1		572444
11	-1.30	50.85	0.018	-4.81E-05	6.2	-173.3		572444
12	-1.50	52.02	0.018	1.20E-05	16.5	-171.1		572444
13	-2.00	57.00	0.018	1.54E-04	43.7	-155.8	-176.3	572444
		57.00	0.018	1.54E-04	-132.6	-155.8		
14	-2.60	62.67	0.018	3.54E-04	-96.7	-224.7		572444
15	-3.20	67.90	0.017	6.13E-04	-57.5	-271.0		572444
16	-4.00	75.67	0.017	1.00E-03	-0.1	-294.2		572444
17	-4.50	80.61	0.016	1.26E-03	39.0	-284.4		572444
18	-5.00	85.20	0.015	1.49E-03	80.4	-254.5	0.8	572444
		65.17	0.015	1.49E-03	81.2	-254.5		
19	-5.20	59.34	0.015	1.58E-03	93.7	-237.0		572444
		-19.63	0.015	1.58E-03	93.7	-237.0		
20	-5.80	-7.10	0.014	1.80E-03	85.7	-187.1		572444
21	-6.40	-14.11	0.013	1.97E-03	79.3	-138.8		572444
22	-7.20	-31.40	0.011	2.12E-03	61.1	-81.6		572444
23	-8.00	-24.76	0.010	2.21E-03	38.6	-42.7		572444
24	-8.80	-13.30	0.008	2.26E-03	23.4	-19.8		572444
25	-9.40	-9.84	0.006	2.27E-03	16.5	-8.1		572444
26	-10.00	-27.02	0.005	2.27E-03	5.4	0.0		0
27	-10.40	25.36	0.004	0	5.1	0.0		0
		-7.79	0.004	0	5.1	0.0		

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
28	-11.70	70.52	0.001	0	45.8	0.0		0
		-42.62	0.001	0	45.8	0.0		
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	123.5	kN/m run		
At elev. -2.00				Prop force =	176.3	kN/m run		
At elev. -5.00				Prop force =	-0.8	kN/m run		

<u>LEFT side</u>								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	14.62	14.62	9971
3	2.65	0.00	25.85	7.99	99.98	13.35	13.35	9971
4	2.10	0.00	36.59	11.31	141.55	14.15	14.15	9971
5	2.00	0.00	38.50	11.90	148.93	12.34	12.34	9971
6	1.50	0.00	47.88	14.80	185.22	15.75	15.75	9971
7	1.00	0.00	57.04	17.63	220.65	21.45	21.45	9971
		0.00	57.04	14.47	216.38	29.87	29.87	4985
8	0.50	0.00	66.05	17.64	247.37	33.23	33.23	5235
9	0.00	0.00	74.94	20.76	277.99	37.72	37.72	5484
10	-0.65	0.00	86.39	24.78	317.40	44.11	44.11	5808
11	-1.30	0.00	97.75	28.77	356.50	50.85	50.85	6132
12	-1.50	0.00	101.23	29.99	368.48	52.02	52.02	6232
13	-2.00	0.00	109.91	33.04	398.36	57.00	57.00	6481
14	-2.60	0.00	120.29	36.69	434.09	62.67	62.67	6780
15	-3.20	0.00	130.64	40.33	469.73	67.90	67.90	7079
16	-4.00	0.00	144.41	45.16	517.11	75.67	75.67	7478
17	-4.50	5.00	147.99	46.42	529.46	75.61	80.61	7727
18	-5.00	10.00	151.57	47.68	541.78	75.20	85.20	7977
19	-5.20	12.00	153.00	48.18	546.69	74.19	86.19	8076
		12.00	153.00	30.94	726.88	34.85	46.85	29913
20	-5.80	18.00	159.08	32.66	753.43	73.51	91.51	29913
21	-6.40	24.00	165.15	34.38	779.94	92.49	116.49	29913
22	-7.20	32.00	173.22	36.67	815.23	110.10	142.10	29913
23	-8.00	40.00	181.29	38.95	850.47	126.43	166.43	29913
24	-8.80	48.00	189.34	41.24	885.66	140.15	188.15	29913
25	-9.40	54.00	195.38	42.95	912.03	147.82	201.82	29913
26	-10.00	60.00	201.40	44.65	938.38	145.49	205.49	29913
27	-10.40	64.00	205.42	45.79	955.93	175.42	239.42	29913
		64.00	205.42	35.52	1014.29	158.86	222.86	49855
28	-11.70	77.00	222.37	40.47	1088.33	214.98	291.98	49855
		77.00	222.37	0.00	6309.29	171.40	248.40	997093
29	-13.85	98.50	258.96	0.00	6817.44	229.35	327.85	997093
30	-16.00	120.00	295.53	0.00	7325.15	265.82	385.82	997093
31	-18.00	140.00	329.52	0.00	7797.13	299.45	439.45	997093
32	-20.00	160.00	363.49	0.00	8268.84	329.32	489.32	997093

(continued)

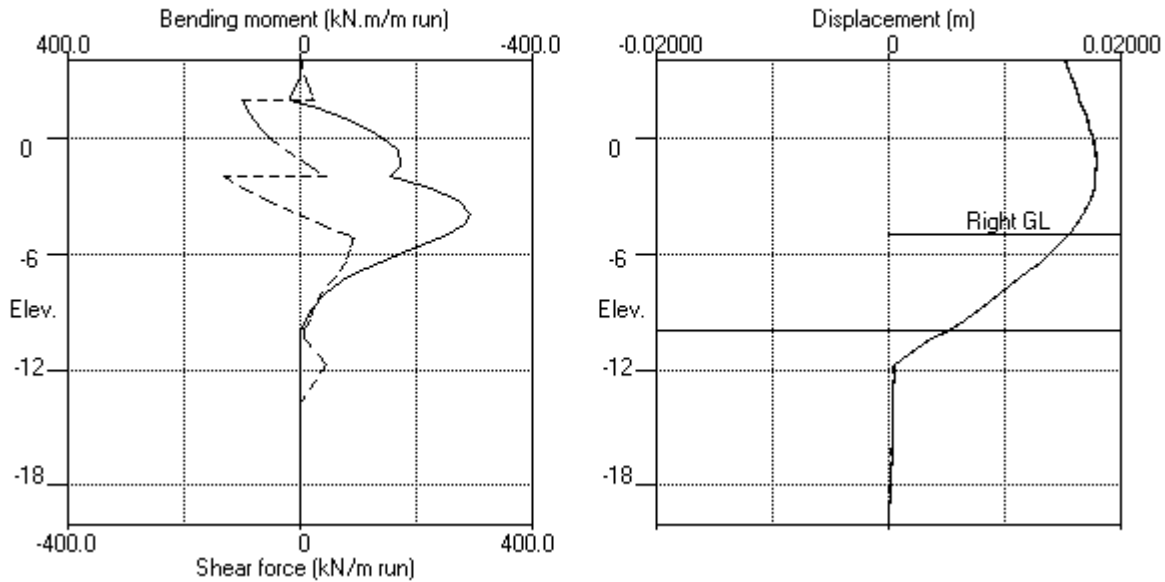
Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	7977
19	-5.20	2.00	1.40	0.00	24.85	24.85	26.85p	8077
		2.00	1.40	0.00	64.48	64.48	66.48p	29915
20	-5.80	8.00	7.40	0.00	90.70	90.61	98.61	29915
21	-6.40	14.00	13.40	0.00	116.92	116.60	130.60	29915
22	-7.20	22.00	21.41	0.00	151.91	151.50	173.50	29915
23	-8.00	30.00	29.43	0.00	186.94	161.19	191.19	29915
24	-8.80	38.00	37.46	0.00	222.02	163.45	201.45	29915
25	-9.40	44.00	43.49	0.00	248.36	167.66	211.66	29915
26	-10.00	50.00	49.52	1.62	274.75	182.51	232.51	29915
27	-10.40	54.00	53.56	2.76	292.37	160.06	214.06	29915
		54.00	53.56	0.00	350.73	176.65	230.65	49858
28	-11.70	67.00	70.60	0.00	425.18	154.46	221.46	49858
		67.00	70.60	0.00	4201.77	224.02	291.02	997169
29	-13.85	88.50	107.51	0.00	4714.42	239.34	327.84	997169
30	-16.00	110.00	144.64	0.00	5229.91	275.81	385.81	997169
31	-18.00	130.00	179.38	0.00	5712.28	309.45	439.45	997169
32	-20.00	150.00	214.32	0.00	6197.55	339.40	489.40	997169

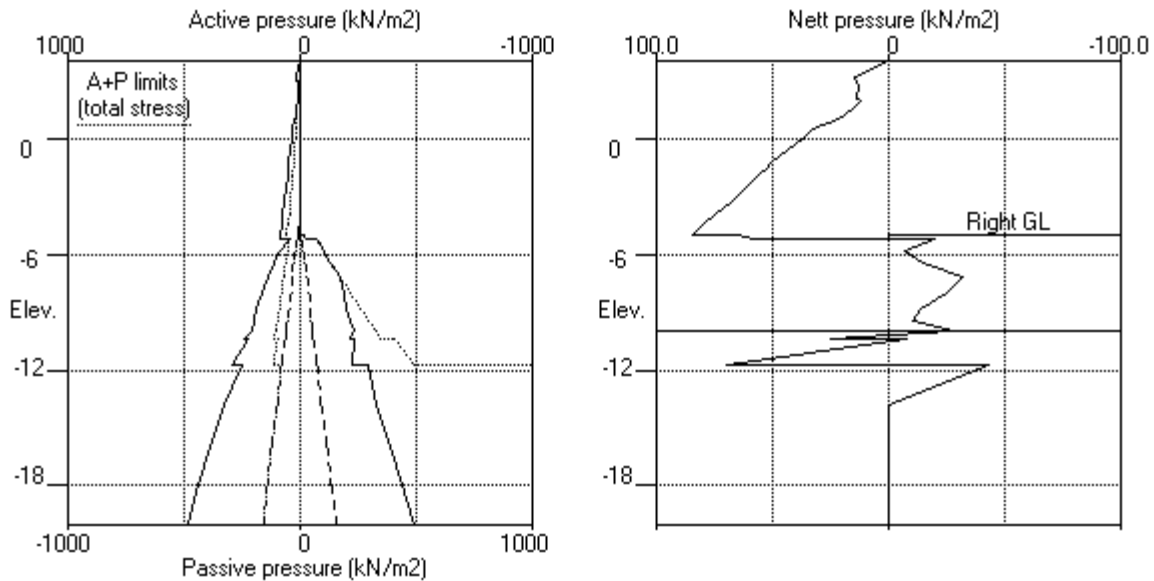
Note: 12.34 a Soil pressure at active limit
 66.48 p Soil pressure at passive limit

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Stage No.12 Remove prop no.2 at elev. -1.30

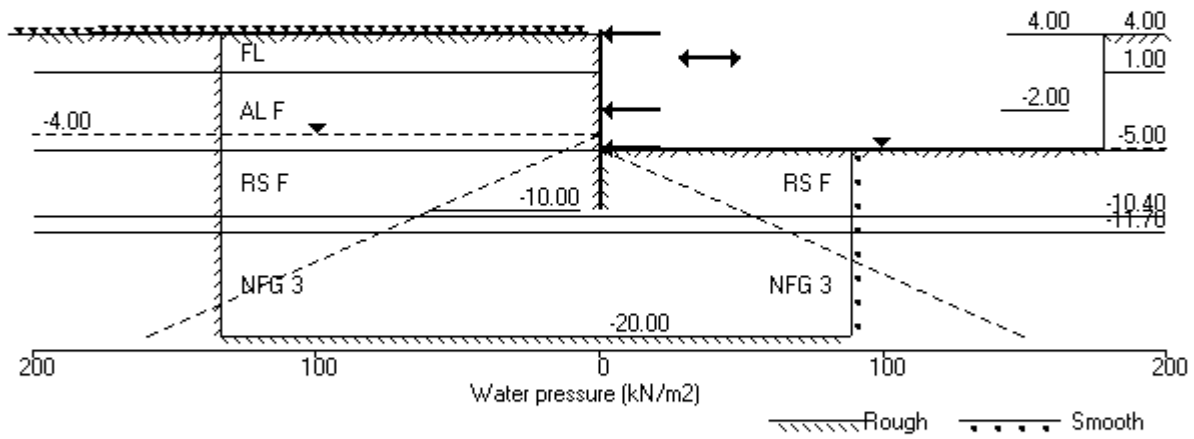


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 Data filename/Run ID: Section_4
 Albert Street Development
 Section 4

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Units: kN,m

Stage No. 14 Remove strut or anchor no.1 at elevation 2.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>failure</u>			
14	4.00	-5.00		More than one prop. No FoS calc.			

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.00E-03	-70.2	-0.0	-70.2	572444
2	3.20	14.64	0.016	-9.64E-04	-64.4	-54.9		572444
3	2.65	12.19	0.016	-8.96E-04	-57.0	-87.8		572444
4	2.10	12.49	0.017	-7.98E-04	-50.2	-116.9		572444
5	2.00	10.45	0.017	-7.77E-04	-49.0	-121.9		572444
6	1.50	13.89	0.017	-6.61E-04	-43.0	-144.1		572444
7	1.00	19.85	0.018	-5.26E-04	-34.5	-163.7		572444
		29.07	0.018	-5.26E-04	-34.5	-163.7		
8	0.50	32.42	0.018	-3.77E-04	-19.2	-177.0		572444
9	0.00	37.06	0.018	-2.20E-04	-1.8	-182.3		572444
10	-0.65	43.70	0.018	-1.80E-05	24.5	-175.1		572444
11	-1.30	50.67	0.018	1.66E-04	55.1	-149.4		572444
12	-1.50	52.04	0.018	2.16E-04	65.4	-137.3		572444
13	-2.00	57.19	0.018	3.18E-04	92.7	-97.6	-243.5	572444
		57.19	0.018	3.18E-04	-150.8	-97.6		
14	-2.60	62.98	0.018	4.62E-04	-114.7	-177.4		572444
15	-3.20	68.24	0.017	6.78E-04	-75.3	-234.4		572444
16	-4.00	75.99	0.017	1.03E-03	-17.7	-271.8		572444
17	-4.50	80.89	0.016	1.26E-03	21.6	-270.7		572444
18	-5.00	85.43	0.015	1.49E-03	63.1	-249.4	15.3	572444
		65.62	0.015	1.49E-03	78.4	-249.4		
19	-5.20	59.67	0.015	1.58E-03	91.0	-232.5		572444
		-18.43	0.015	1.58E-03	91.0	-232.5		
20	-5.80	-6.17	0.014	1.79E-03	83.6	-184.0		572444
21	-6.40	-13.33	0.013	1.96E-03	77.7	-136.8		572444
22	-7.20	-30.79	0.011	2.11E-03	60.1	-80.5		572444
23	-8.00	-24.31	0.010	2.20E-03	38.1	-42.3		572444
24	-8.80	-12.98	0.008	2.24E-03	23.1	-19.6		572444
25	-9.40	-9.64	0.006	2.26E-03	16.4	-8.1		572444
26	-10.00	-26.94	0.005	2.26E-03	5.4	0.0		0
27	-10.40	25.36	0.004	0	5.1	0.0		0
		-7.79	0.004	0	5.1	0.0		

(continued)

Stage No.14 Remove strut or anchor no.1 at elevation 2.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-11.70	70.52	0.001	0	45.8	0.0		0
		-42.62	0.001	0	45.8	0.0		
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	70.2	kN/m run		
At elev. -2.00				Prop force =	243.5	kN/m run		
At elev. -5.00				Prop force =	-15.3	kN/m run		

<u>LEFT side</u>								
<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	14.64	14.64	9971
3	2.65	0.00	25.85	7.99	99.98	12.19	12.19	9971
4	2.10	0.00	36.59	11.31	141.55	12.49	12.49	9971
5	2.00	0.00	38.50	11.90	148.93	10.45	10.45A	9971
6	1.50	0.00	47.88	14.80	185.22	13.89	13.89A	9971
7	1.00	0.00	57.04	17.63	220.65	19.85	19.85	9971
		0.00	57.04	14.47	216.38	29.07	29.07	4985
8	0.50	0.00	66.05	17.64	247.37	32.42	32.42	5235
9	0.00	0.00	74.94	20.76	277.99	37.06	37.06	5484
10	-0.65	0.00	86.39	24.78	317.40	43.70	43.70	5808
11	-1.30	0.00	97.75	28.77	356.50	50.67	50.67	6132
12	-1.50	0.00	101.23	29.99	368.48	52.04	52.04	6232
13	-2.00	0.00	109.91	33.04	398.36	57.19	57.19	6481
14	-2.60	0.00	120.29	36.69	434.09	62.98	62.98	6780
15	-3.20	0.00	130.64	40.33	469.73	68.24	68.24	7079
16	-4.00	0.00	144.41	45.16	517.11	75.99	75.99	7478
17	-4.50	5.00	147.99	46.42	529.46	75.89	80.89	7727
18	-5.00	10.00	151.57	47.68	541.78	75.43	85.43	7977
19	-5.20	12.00	153.00	48.18	546.69	74.37	86.37	8076
		12.00	153.00	30.94	726.88	35.52	47.52	29913
20	-5.80	18.00	159.08	32.66	753.43	74.05	92.05	29913
21	-6.40	24.00	165.15	34.38	779.94	92.94	116.94	29913
22	-7.20	32.00	173.22	36.67	815.23	110.45	142.45	29913
23	-8.00	40.00	181.29	38.95	850.47	126.69	166.69	29913
24	-8.80	48.00	189.34	41.24	885.66	140.33	188.33	29913
25	-9.40	54.00	195.38	42.95	912.03	147.94	201.94	29913
26	-10.00	60.00	201.40	44.65	938.38	145.54	205.54	29913
27	-10.40	64.00	205.42	45.79	955.93	175.43	239.43	29913
		64.00	205.42	35.52	1014.29	158.87	222.87	49855
28	-11.70	77.00	222.37	40.47	1088.33	214.98	291.98	49855
		77.00	222.37	0.00	6309.29	171.41	248.41	997093
29	-13.85	98.50	258.96	0.00	6817.44	229.36	327.86	997093
30	-16.00	120.00	295.53	0.00	7325.15	265.83	385.83	997093
31	-18.00	140.00	329.52	0.00	7797.13	299.46	439.46	997093
32	-20.00	160.00	363.49	0.00	8268.84	329.32	489.32	997093

(continued)

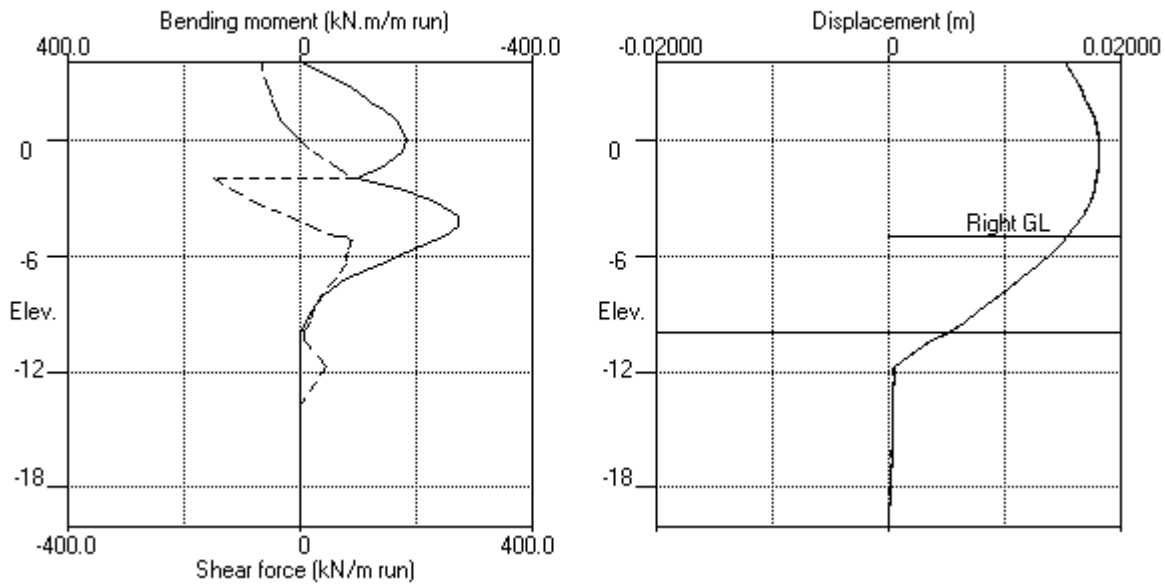
Stage No.14 Remove strut or anchor no.1 at elevation 2.00

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-5.20	0.00	0.00	0.00	20.03	19.81	19.81	7977
		2.00	1.40	0.00	24.85	24.71	26.71	8077
		2.00	1.40	0.00	64.48	63.95	65.95	29915
20	-5.80	8.00	7.40	0.00	90.70	90.21	98.21	29915
21	-6.40	14.00	13.40	0.00	116.92	116.27	130.27	29915
22	-7.20	22.00	21.41	0.00	151.91	151.24	173.24	29915
23	-8.00	30.00	29.43	0.00	186.94	161.00	191.00	29915
24	-8.80	38.00	37.46	0.00	222.02	163.32	201.32	29915
25	-9.40	44.00	43.49	0.00	248.36	167.57	211.57	29915
26	-10.00	50.00	49.52	1.62	274.75	182.48	232.48	29915
27	-10.40	54.00	53.56	2.76	292.37	160.07	214.07	29915
28	-11.70	54.00	53.56	0.00	350.73	176.66	230.66	49858
		67.00	70.60	0.00	425.18	154.46	221.46	49858
		67.00	70.60	0.00	4201.77	224.03	291.03	997169
29	-13.85	88.50	107.51	0.00	4714.42	239.35	327.85	997169
30	-16.00	110.00	144.64	0.00	5229.91	275.82	385.82	997169
31	-18.00	130.00	179.38	0.00	5712.28	309.45	439.45	997169
32	-20.00	150.00	214.32	0.00	6197.55	339.40	489.40	997169

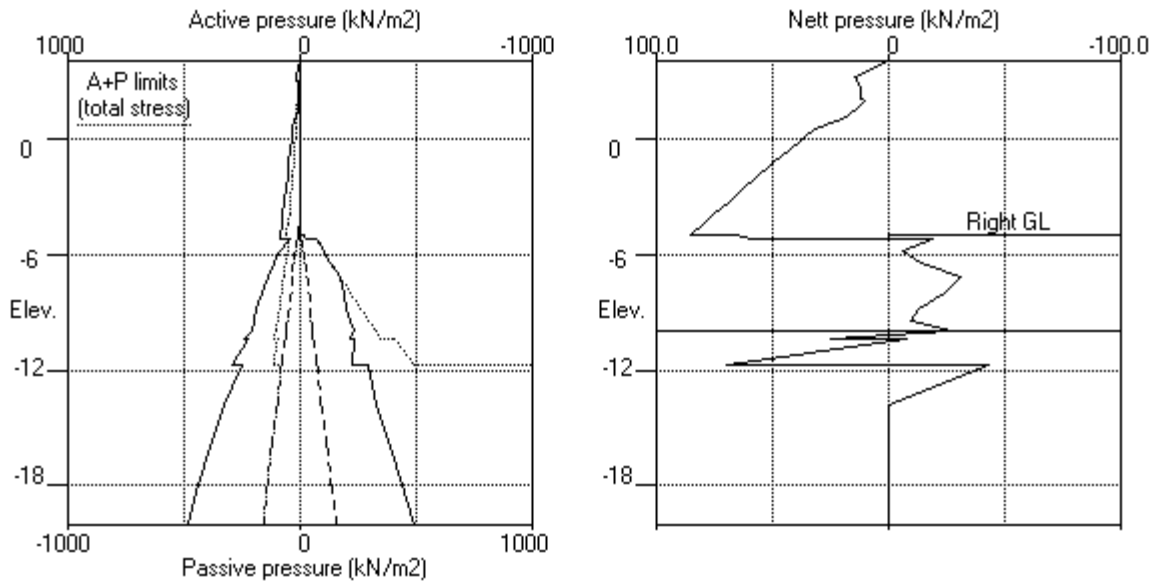
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 13.89A Arching - soil pressure below active limit

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Stage No.14 Remove prop no.1 at elev. 2.00

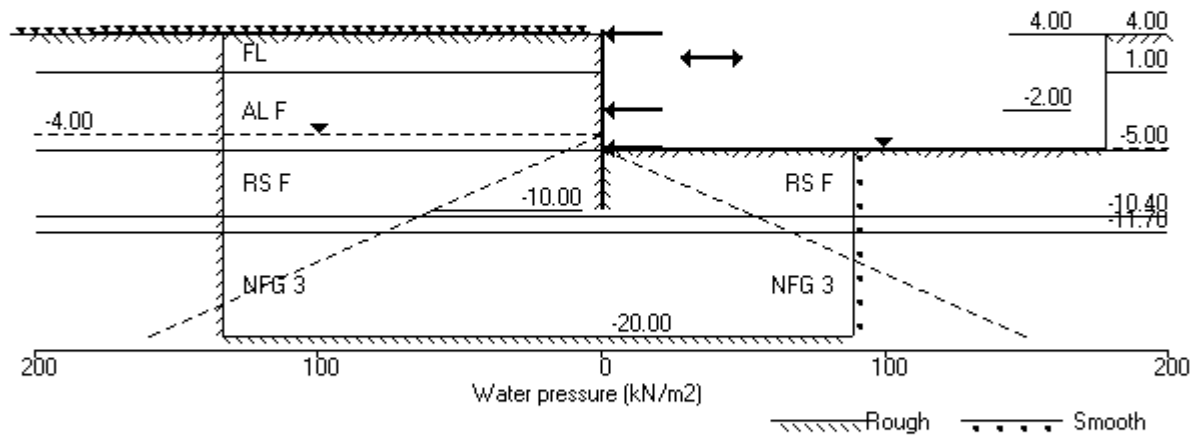


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 Albert Street Development
 Section 4

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.15 Change EI of wall to 400711kN.m2/m run



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
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Data filename/Run ID: Section_4	
Albert Street Development	Date:16-11-2022
Section 4	Checked :

Units: kN,m

Stage No. 15 Change EI of wall to 400711 kN.m2/m run
Allow wall to relax with new modulus value

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method
Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>	<u>-ation</u>	<u>of</u>
				<u>More than one prop.</u>	<u>No FoS calc.</u>		<u>failure</u>
15	4.00	-5.00					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.015	-1.08E-03	-59.2	-0.0	-59.2	400711
2	3.20	14.72	0.016	-1.03E-03	-53.3	-48.1		400711
3	2.65	12.03	0.017	-9.52E-04	-45.9	-76.3		400711
4	2.10	12.23	0.017	-8.36E-04	-39.2	-100.7		400711
5	2.00	10.12	0.017	-8.12E-04	-38.1	-104.8		400711
6	1.50	13.53	0.018	-6.77E-04	-32.2	-122.9		400711
7	1.00	19.49	0.018	-5.22E-04	-24.0	-138.4		400711
		28.89	0.018	-5.22E-04	-24.0	-138.4		
8	0.50	32.23	0.018	-3.54E-04	-8.7	-147.7		400711
9	0.00	36.90	0.018	-1.81E-04	8.6	-148.9		400711
10	-0.65	43.62	0.018	3.26E-05	34.8	-136.6		400711
11	-1.30	50.68	0.018	2.09E-04	65.4	-105.8		400711
12	-1.50	52.14	0.018	2.51E-04	75.7	-92.1		400711
13	-2.00	57.31	0.018	3.21E-04	103.1	-48.4	-255.1	400711
		57.31	0.018	3.21E-04	-152.1	-48.4		
14	-2.60	63.00	0.018	4.32E-04	-116.0	-128.8		400711
15	-3.20	68.10	0.017	6.46E-04	-76.7	-186.4		400711
16	-4.00	75.72	0.017	1.02E-03	-19.1	-224.6		400711
17	-4.50	80.56	0.016	1.29E-03	19.9	-224.1		400711
18	-5.00	85.09	0.015	1.54E-03	61.4	-203.5	4.2	400711
		65.06	0.015	1.54E-03	65.5	-203.5		
19	-5.20	59.21	0.015	1.63E-03	78.0	-188.5		400711
		-20.12	0.015	1.63E-03	78.0	-188.5		
20	-5.80	-7.26	0.014	1.86E-03	69.8	-146.3		400711
21	-6.40	-13.47	0.013	2.03E-03	63.5	-105.6		400711
22	-7.20	-29.69	0.011	2.18E-03	46.3	-58.1		400711
23	-8.00	-22.06	0.009	2.25E-03	25.6	-28.2		400711
24	-8.80	-9.64	0.008	2.29E-03	12.9	-12.6		400711
25	-9.40	-4.19	0.006	2.30E-03	8.8	-5.3		400711
26	-10.00	-14.99	0.005	2.30E-03	3.0	0.0		0
27	-10.40	25.36	0.004	0	5.1	0.0		0
		-7.79	0.004	0	5.1	0.0		

(continued)

Stage No.15 Change EI of wall to 400711 kN.m2/m run
Allow wall to relax with new modulus value

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
28	-11.70	70.52	0.001	0	45.8	0.0		0
		-42.62	0.001	0	45.8	0.0		
29	-13.85	0.01	0.000	0	0.0	0.0		0
30	-16.00	0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	59.2	kN/m run		
At elev. -2.00				Prop force =	255.1	kN/m run		
At elev. -5.00				Prop force =	-4.2	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	14.72	14.72	9971
3	2.65	0.00	25.85	7.99	99.98	12.03	12.03	9971
4	2.10	0.00	36.59	11.31	141.55	12.23	12.23	9971
5	2.00	0.00	38.50	11.90	148.93	10.12	10.12A	9971
6	1.50	0.00	47.88	14.80	185.22	13.53	13.53A	9971
7	1.00	0.00	57.04	17.63	220.65	19.49	19.49	9971
		0.00	57.04	14.47	216.38	28.89	28.89	4985
8	0.50	0.00	66.05	17.64	247.37	32.23	32.23	5235
9	0.00	0.00	74.94	20.76	277.99	36.90	36.90	5484
10	-0.65	0.00	86.39	24.78	317.40	43.62	43.62	5808
11	-1.30	0.00	97.75	28.77	356.50	50.68	50.68	6132
12	-1.50	0.00	101.23	29.99	368.48	52.14	52.14	6232
13	-2.00	0.00	109.91	33.04	398.36	57.31	57.31	6481
14	-2.60	0.00	120.29	36.69	434.09	63.00	63.00	6780
15	-3.20	0.00	130.64	40.33	469.73	68.10	68.10	7079
16	-4.00	0.00	144.41	45.16	517.11	75.72	75.72	7478
17	-4.50	5.00	147.99	46.42	529.46	75.56	80.56	7727
18	-5.00	10.00	151.57	47.68	541.78	75.09	85.09	7977
19	-5.20	12.00	153.00	48.18	546.69	74.06	86.06	8076
		12.00	153.00	30.94	726.88	34.35	46.35	29913
20	-5.80	18.00	159.08	32.66	753.43	73.43	91.43	29913
21	-6.40	24.00	165.15	34.38	779.94	92.93	116.93	29913
22	-7.20	32.00	173.22	36.67	815.23	111.05	143.05	29913
23	-8.00	40.00	181.29	38.95	850.47	127.85	167.85	29913
24	-8.80	48.00	189.34	41.24	885.66	142.04	190.04	29913
25	-9.40	54.00	195.38	42.95	912.03	150.70	204.70	29913
26	-10.00	60.00	201.40	44.65	938.38	151.47	211.47	29913
27	-10.40	64.00	205.42	45.79	955.93	175.46	239.46	29913
		64.00	205.42	35.52	1014.29	158.93	222.93	49855
28	-11.70	77.00	222.37	40.47	1088.33	214.98	291.98	49855
		77.00	222.37	0.00	6309.29	171.41	248.41	997093
29	-13.85	98.50	258.96	0.00	6817.44	229.36	327.86	997093
30	-16.00	120.00	295.53	0.00	7325.15	265.82	385.82	997093
31	-18.00	140.00	329.52	0.00	7797.13	299.46	439.46	997093
32	-20.00	160.00	363.49	0.00	8268.84	329.33	489.33	997093

(continued)

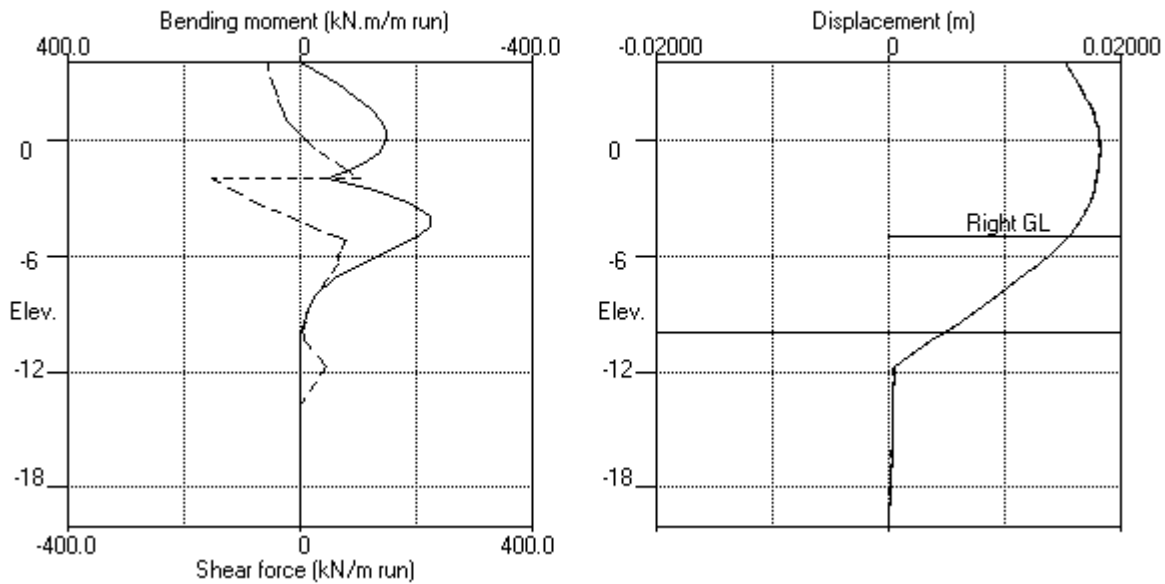
Stage No.15 Change EI of wall to 400711 kN.m2/m run
Allow wall to relax with new modulus value

Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	7977
19	-5.20	2.00	1.40	0.00	24.85	24.85	26.85p	8077
		2.00	1.40	0.00	64.48	64.48	66.48p	29915
20	-5.80	8.00	7.40	0.00	90.70	90.70	98.70p	29915
21	-6.40	14.00	13.40	0.00	116.92	116.40	130.40	29915
22	-7.20	22.00	21.41	0.00	151.91	150.74	172.74	29915
23	-8.00	30.00	29.43	0.00	186.94	159.91	189.91	29915
24	-8.80	38.00	37.46	0.00	222.02	161.68	199.68	29915
25	-9.40	44.00	43.49	0.00	248.36	164.89	208.89	29915
26	-10.00	50.00	49.52	1.62	274.75	176.46	226.46	29915
27	-10.40	54.00	53.56	2.76	292.37	160.10	214.10	29915
		54.00	53.56	0.00	350.73	176.72	230.72	49858
28	-11.70	67.00	70.60	0.00	425.18	154.46	221.46	49858
		67.00	70.60	0.00	4201.77	224.03	291.03	997169
29	-13.85	88.50	107.51	0.00	4714.42	239.35	327.85	997169
30	-16.00	110.00	144.64	0.00	5229.91	275.82	385.82	997169
31	-18.00	130.00	179.38	0.00	5712.28	309.45	439.45	997169
32	-20.00	150.00	214.32	0.00	6197.55	339.41	489.41	997169

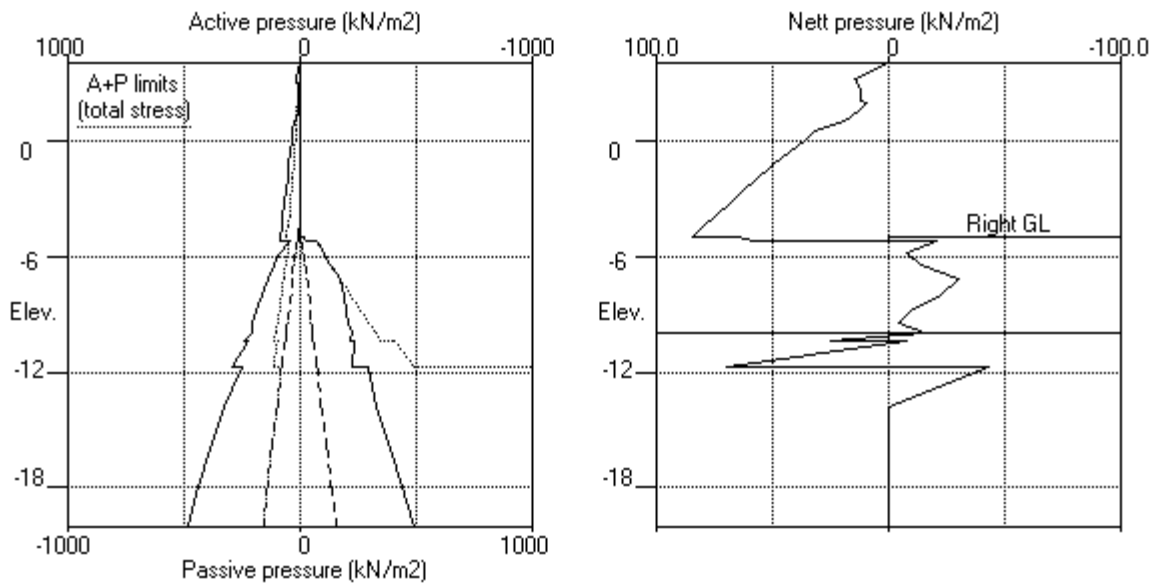
Note: 12.34 a Soil pressure at active limit
98.70 p Soil pressure at passive limit
13.53A Arching - soil pressure below active limit

Units: kN,m

Stage No.15 Change EI of wall to 400711kN.m2/m run



Stage No.15 Change EI of wall to 400711kN.m2/m run

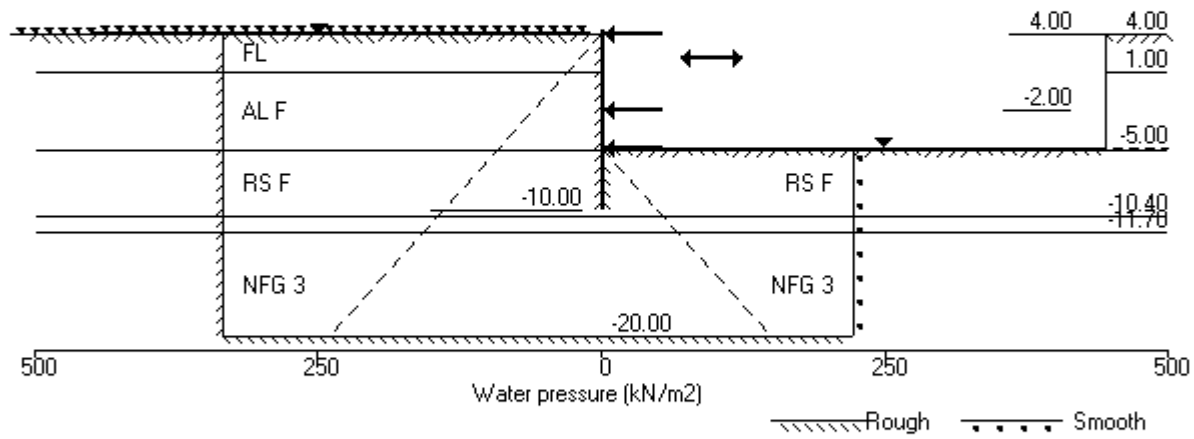


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_4
 Albert Street Development
 Section 4

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.16 Apply water pressure profile no.1



Units: kN,m

Stage No. 16 Apply water pressure profile no.1

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>failure</u>			
16	4.00	-5.00		More than one prop. No FoS calc.			

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.28E-03	-80.9	-0.0	-80.9	400711
2	3.20	19.50	0.016	-1.22E-03	-73.1	-65.0		400711
3	2.65	19.46	0.017	-1.11E-03	-62.4	-103.1		400711
4	2.10	22.59	0.017	-9.53E-04	-50.8	-135.4		400711
5	2.00	20.92	0.018	-9.20E-04	-48.6	-140.6		400711
6	1.50	27.16	0.018	-7.38E-04	-36.6	-162.5		400711
7	1.00	36.07	0.018	-5.34E-04	-20.8	-178.3		400711
		45.75	0.018	-5.34E-04	-20.8	-178.3		
8	0.50	51.90	0.018	-3.18E-04	3.6	-183.8		400711
9	0.00	59.51	0.019	-1.05E-04	31.5	-176.3		400711
10	-0.65	70.16	0.019	1.36E-04	73.6	-144.0		400711
11	-1.30	81.18	0.018	3.00E-04	122.8	-82.1		400711
12	-1.50	84.02	0.018	3.28E-04	139.3	-56.4		400711
13	-2.00	92.22	0.018	3.31E-04	183.4	23.2	-390.6	400711
		92.22	0.018	3.31E-04	-207.2	23.2		
14	-2.60	101.40	0.018	3.54E-04	-149.1	-83.7		400711
15	-3.20	109.91	0.018	5.10E-04	-85.7	-154.1		400711
16	-4.00	122.09	0.017	8.21E-04	7.1	-185.7		400711
17	-4.50	126.92	0.017	1.02E-03	69.3	-166.4		400711
18	-5.00	131.45	0.016	1.18E-03	133.9	-115.2	-176.1	400711
		112.25	0.016	1.18E-03	-42.2	-115.2		
19	-5.20	105.96	0.016	1.23E-03	-20.4	-120.8		400711
		29.44	0.016	1.23E-03	-20.4	-120.8		
20	-5.80	37.22	0.015	1.40E-03	-0.4	-128.7		400711
21	-6.40	26.46	0.014	1.57E-03	18.7	-122.1		400711
22	-7.20	5.62	0.013	1.77E-03	31.6	-97.7		400711
23	-8.00	-1.99	0.011	1.93E-03	33.0	-68.1		400711
24	-8.80	2.31	0.010	2.03E-03	33.2	-40.2		400711
25	-9.40	-6.98	0.009	2.07E-03	31.8	-18.6		400711
26	-10.00	-59.34	0.007	2.08E-03	11.9	0.0		0
27	-10.40	40.80	0.005	0	8.2	0.0		0
		-12.54	0.005	0	8.2	0.0		

(continued)

Stage No.16 Apply water pressure profile no.1

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
28	-11.70	111.98	0.001	0	72.8	0.0		0
		-67.69	0.001	0	72.8	0.0		
29	-13.85	0.01	0.001	0	0.0	0.0		0
30	-16.00	0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	80.9	kN/m run		
At elev. -2.00				Prop force =	390.6	kN/m run		
At elev. -5.00				Prop force =	176.1	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	8.00	6.79	2.10	26.27	11.50	19.50	9971
3	2.65	13.50	12.35	3.82	47.76	5.96	19.46	9971
4	2.10	19.00	17.59	5.44	68.05	3.59	22.59A	9971
5	2.00	20.00	18.50	5.72	71.57	0.92	20.92A	9971
6	1.50	25.00	22.88	7.07	88.51	2.16	27.16A	9971
7	1.00	30.00	27.04	8.36	104.60	6.07	36.07A	9971
		30.00	27.04	3.93	113.11	15.75	45.75	4985
8	0.50	35.00	31.05	5.34	126.89	16.90	51.90	5235
9	0.00	40.00	34.94	6.71	140.30	19.51	59.51	5484
10	-0.65	46.50	39.89	8.45	157.34	23.66	70.16	5808
11	-1.30	53.00	44.75	10.15	174.06	28.18	81.18	6132
12	-1.50	55.00	46.23	10.67	179.16	29.02	84.02	6232
13	-2.00	60.00	49.91	11.97	191.83	32.22	92.22	6481
14	-2.60	66.00	54.29	13.51	206.91	35.40	101.40	6780
15	-3.20	72.00	58.64	15.03	221.89	37.91	109.91	7079
16	-4.00	80.00	64.41	17.06	241.73	42.09	122.09	7478
17	-4.50	85.00	67.99	18.32	254.08	41.92	126.92	7727
18	-5.00	90.00	71.57	19.58	266.40	41.45	131.45	7977
19	-5.20	92.00	73.00	20.08	271.31	40.17	132.17	8076
		92.00	73.00	8.27	377.33	1.53	93.53A	29913
20	-5.80	98.00	79.08	9.99	403.88	37.92	135.92	29913
21	-6.40	104.00	85.15	11.71	430.39	53.38	157.38	29913
22	-7.20	112.00	93.22	14.00	465.68	67.53	179.53	29913
23	-8.00	120.00	101.29	16.29	500.92	80.45	200.45	29913
24	-8.80	128.00	109.34	18.57	536.11	90.62	218.62	29913
25	-9.40	134.00	115.38	20.28	562.48	91.87	225.87	29913
26	-10.00	140.00	121.40	21.99	588.82	72.34	212.34	29913
27	-10.40	144.00	125.42	23.13	606.38	125.87	269.87	29913
		144.00	125.42	12.14	664.74	99.13	243.13	49855
28	-11.70	157.00	142.37	17.09	738.78	178.57	335.57	49855
		157.00	142.37	0.00	5198.41	109.03	266.03	997093
29	-13.85	178.50	178.96	0.00	5706.56	179.51	358.01	997093
30	-16.00	200.00	215.53	0.00	6214.28	215.98	415.98	997093
31	-18.00	220.00	249.52	0.00	6686.25	249.43	469.43	997093
32	-20.00	240.00	283.49	0.00	7157.96	274.87	514.87	997093

(continued)

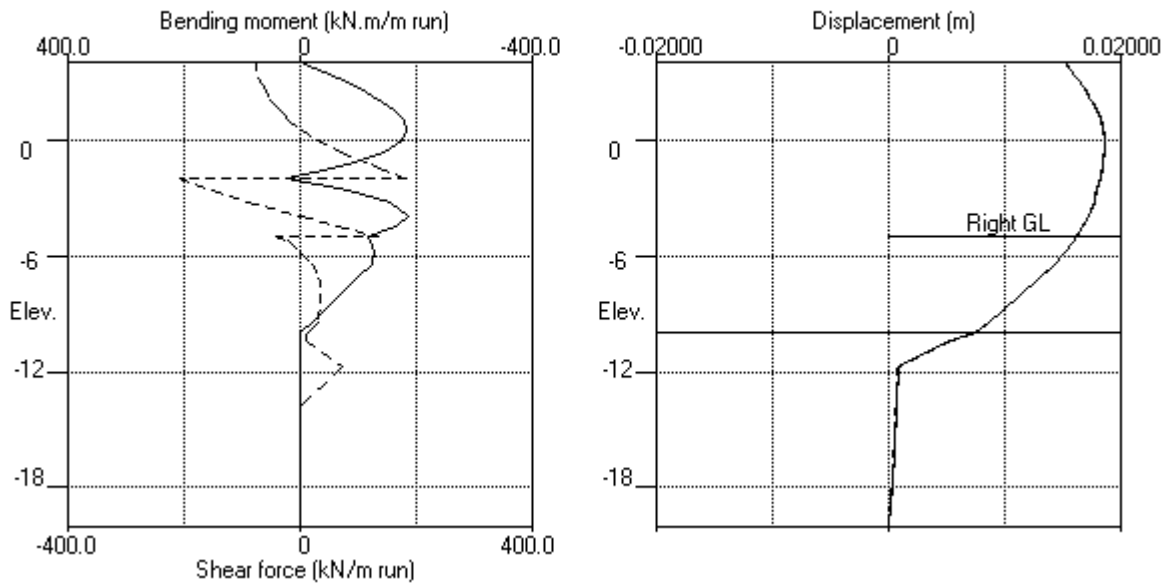
Stage No.16 Apply water pressure profile no.1

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-5.20	0.00	0.00	0.00	20.03	19.20	19.20	7977
		2.00	1.40	0.00	24.85	24.21	26.21	8077
		2.00	1.40	0.00	64.48	62.09	64.09	29915
20	-5.80	8.00	7.40	0.00	90.70	90.70	98.70p	29915
21	-6.40	14.00	13.40	0.00	116.92	116.92	130.92p	29915
22	-7.20	22.00	21.41	0.00	151.91	151.91	173.91p	29915
23	-8.00	30.00	29.43	0.00	186.94	172.44	202.44	29915
24	-8.80	38.00	37.46	0.00	222.02	178.30	216.30	29915
25	-9.40	44.00	43.49	0.00	248.36	188.85	232.85	29915
26	-10.00	50.00	49.52	1.62	274.75	221.67	271.67	29915
27	-10.40	54.00	53.56	2.76	292.37	175.07	229.07	29915
28	-11.70	54.00	53.56	0.00	350.73	201.67	255.67	49858
		67.00	70.60	0.00	425.18	156.60	223.60	49858
		67.00	70.60	0.00	4201.77	266.72	333.72	997169
29	-13.85	88.50	107.51	0.00	4714.42	269.50	358.00	997169
30	-16.00	110.00	144.64	0.00	5229.91	305.98	415.98	997169
31	-18.00	130.00	179.38	0.00	5712.28	339.42	469.42	997169
32	-20.00	150.00	214.32	0.00	6197.55	364.95	514.95	997169

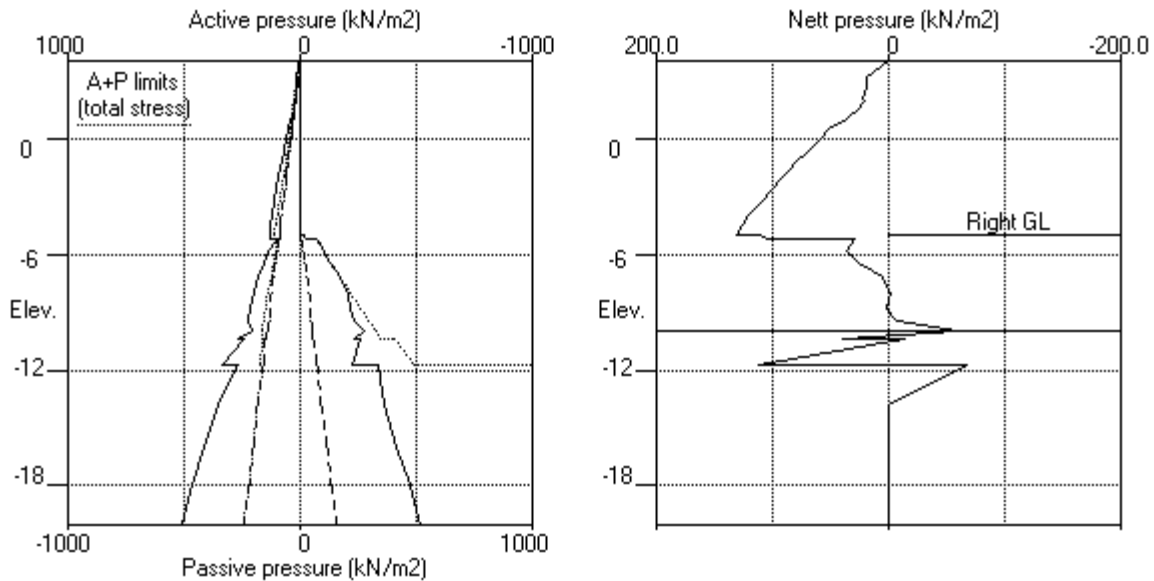
Note: 12.34 a Soil pressure at active limit
 173.91 p Soil pressure at passive limit
 93.53A Arching - soil pressure below active limit

Units: kN,m

Stage No.16 Apply water pressure profile no.1



Stage No.16 Apply water pressure profile no.1



```
| Sheet No.  
| Job No.   B01493  
| Made by :   DJC  
|  
| Date:16-11-2022  
| Checked :
```

Stage No.	Ground level		Prop Elev.	FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		Direction of failure
	Act.	Pass.		Factor of Safety	Moment equilib. at elev.	Toe elev.	Wall Penetr -ation	
1	4.00	4.00	---	Conditions not suitable for FoS calc.				
2	4.00	2.00	Cant.	12.542	-7.69	-0.21	2.21	L to R
3	4.00	2.00		No analysis at this stage				
4	4.00	-1.50	2.00	9.383	n/a	-3.36	1.86	L to R
5	4.00	-1.50		No analysis at this stage				
All remaining stages have more than one prop - FoS calculation n/a								

Units: kN,m

Summary of results

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries:	Left side 30.00 from wall	Rough boundary
	Right side 20.00 from wall	Smooth boundary
Lower rigid boundary at elevation -20.00		Rough boundary

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement		Bending moment		Shear force	
		maximum	minimum	maximum	minimum	maximum	minimum
		m	m	kN.m/m	kN.m/m	kN/m	kN/m
1	4.00	0.018	0.000	0.0	-0.0	0.0	-80.9
2	3.20	0.017	0.000	1.2	-65.0	5.8	-73.1
3	2.65	0.017	0.000	7.0	-103.1	13.5	-62.4
4	2.10	0.017	0.000	16.9	-135.4	64.5	-50.8
5	2.00	0.018	0.000	22.0	-140.6	65.8	-101.1
6	1.50	0.018	0.000	15.8	-162.5	10.9	-94.5
7	1.00	0.018	0.000	19.4	-178.3	4.6	-85.2
8	0.50	0.018	0.000	22.1	-183.8	5.6	-69.2
9	0.00	0.019	0.000	25.0	-182.3	31.5	-51.3
10	-0.65	0.019	0.000	28.9	-175.1	73.6	-24.7
11	-1.30	0.018	0.000	33.3	-178.1	122.8	-168.4
12	-1.50	0.018	0.000	34.8	-175.3	139.3	-158.0
13	-2.00	0.018	0.000	38.8	-188.6	183.4	-207.2
14	-2.60	0.018	0.000	44.4	-254.1	40.8	-149.1
15	-3.20	0.018	0.000	51.0	-297.0	49.5	-85.7
16	-4.00	0.017	0.000	61.7	-315.6	60.6	-19.1
17	-4.50	0.017	0.000	69.4	-303.0	69.3	0.0
18	-5.00	0.016	0.000	77.8	-270.3	133.9	-42.2
19	-5.20	0.016	0.000	81.3	-251.8	98.5	-20.4
20	-5.80	0.015	0.000	81.7	-199.0	90.3	-6.5
21	-6.40	0.014	0.000	73.5	-148.0	83.6	-17.1
22	-7.20	0.013	0.000	56.2	-97.7	64.6	-23.2
23	-8.00	0.011	0.000	36.4	-68.1	41.4	-23.8
24	-8.80	0.010	0.000	18.0	-40.2	33.2	-20.4
25	-9.40	0.009	0.000	6.9	-18.6	31.8	-15.0
26	-10.00	0.007	0.000	0.0	-0.0	11.9	-4.6
27	-10.40	0.005	0.000	0.0	0.0	8.2	0.0
28	-11.70	0.001	0.000	0.0	0.0	72.8	0.0
29	-13.85	0.001	0.000	0.0	0.0	0.0	-0.0
30	-16.00	0.000	0.000	0.0	0.0	0.1	-0.0
31	-18.00	0.000	0.000	0.0	0.0	0.1	0.0
32	-20.00	0.000	0.000	0.0	0.0	0.0	0.0

Summary of results (continued)

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment				Shear force			
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>
	kN.m/m		kN.m/m		kN/m		kN/m	
1	2.2	-6.40	-9.8	-1.50	5.0	-5.20	-3.2	1.50
2	81.7	-5.80	-0.0	4.00	17.0	-5.00	-23.8	-8.00
3	No calculation at this stage							
4	46.4	-6.40	-178.1	-1.30	73.1	-5.20	-101.1	2.00
5	No calculation at this stage							
6	36.0	-6.40	-170.3	-1.30	71.1	-5.20	-98.9	2.00
7	19.1	2.00	-315.6	-4.00	98.5	-5.20	-165.0	-1.30
8	22.0	2.00	-306.0	-4.00	95.7	-5.20	-168.4	-1.30
9	19.1	2.00	-315.6	-4.00	98.5	-5.20	-165.0	-1.30
10	No calculation at this stage							
11	No calculation at this stage							
12	19.0	2.00	-294.2	-4.00	93.7	-5.20	-132.6	-2.00
13	No calculation at this stage							
14	0.0	-10.00	-271.8	-4.00	92.7	-2.00	-150.8	-2.00
15	0.0	-10.00	-224.6	-4.00	103.1	-2.00	-152.1	-2.00
16	23.2	-2.00	-185.7	-4.00	183.4	-2.00	-207.2	-2.00

Maximum and minimum displacement at each stage

Stage no.	Displacement				Stage description
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	
	m		m		
1	0.001	4.00	0.000	4.00	Apply surcharge no.1 at elev. 4.00
2	0.018	4.00	0.000	4.00	Excav. to elev. 2.00 on RIGHT side
3	No calculation at this stage				Install prop no.1 at elev. 2.00
4	0.017	4.00	0.000	4.00	Excav. to elev. -1.50 on RIGHT side
5	No calculation at this stage				Install prop no.2 at elev. -1.30
6	0.017	4.00	0.000	4.00	Apply water pressure profile no.2
7	0.018	-2.00	0.000	4.00	Excav. to elev. -5.00 on RIGHT side
8	0.018	-2.00	0.000	4.00	Apply load no.1 at elev. 2.10
9	0.018	-2.00	0.000	4.00	Apply load no.2 at elev. 2.10
10	No calculation at this stage				Install prop no.3 at elev. -5.00
11	No calculation at this stage				Install prop no.4 at elev. -2.00
12	0.018	-1.50	0.000	4.00	Remove prop no.2 at elev. -1.30
13	No calculation at this stage				Install prop no.5 at elev. 4.00
14	0.018	-0.65	0.000	4.00	Remove prop no.1 at elev. 2.00
15	0.018	-0.65	0.000	4.00	Change EI of wall to 400711kN.m2/m run
16	0.019	0.00	0.000	4.00	Apply water pressure profile no.1

Summary of results (continued)

Prop forces at each stage (horizontal components)

Stage no.	--- Strut no. 1 --- at elev. 2.00		--- Strut no. 2 --- at elev.-1.30		--- Strut no. 3 --- at elev.-5.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
4	117.36	880.22	---	---	---	---
6	115.50	866.22	7.05	52.86	---	---
7	98.53	739.00	198.80	1490.98	---	---
8	136.58	1024.32	206.78	1550.82	---	---
9	98.53	739.00	198.80	1490.98	---	---
12	123.52	926.37	---	---	-0.81	-0.81
14	---	---	---	---	-15.31	-15.31
15	---	---	---	---	-4.19	-4.19
16	---	---	---	---	176.10	176.10

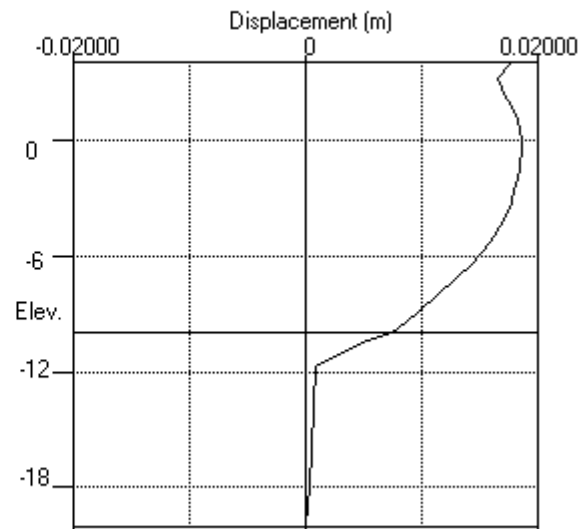
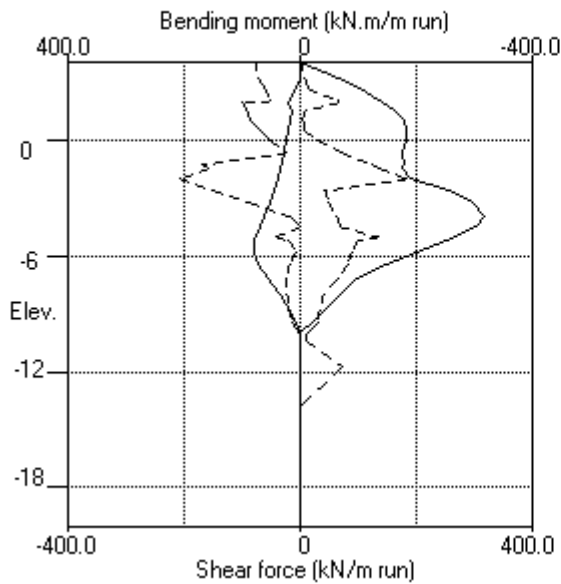
Stage no.	--- Strut no. 4 --- at elev.-2.00		--- Strut no. 5 --- at elev. 4.00	
	kN/m run	kN/prop	kN/m run	kN/prop
12	176.35	176.35	---	---
14	243.47	243.47	70.22	70.22
15	255.14	255.14	59.16	59.16
16	390.58	390.58	80.88	80.88

EDG CONSULTING PTY LTD
Program: WALLAP Version 6.07 Revision A55.B74.R58
Licensed from GEOSOLVE
Data filename/Run ID: Section_4
Albert Street Development
Section 4

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
Checked :

Units: kN,m

Bending moment, shear force, displacement envelopes



Units: kN,m

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	Soil types	
		Left side	Right side
1	4.00	1 FL	1 FL
2	1.00	2 AL F	2 AL F
3	-5.30	4 RS F	4 RS F
4	-9.80	5 NFG 5	5 NFG 5
5	-13.00	6 NFG 3	6 NFG 3

SOIL PROPERTIES

-- Soil type --	Bulk density	Young's Modulus	At rest coeff.	Consol state.	Active limit	Passive limit	Cohesion
No. Description (Datum elev.)	kN/m3	Eh, kN/m2 (dEh/dy)	Ko (dKo/dy)	NC/OC (Nu)	Ka (Kac)	Kp (Kpc)	kN/m2 (dc/dy)
1 FL	17.00	10000	0.700	OC (0.300)	0.309 (0.000)	3.868 (0.000)	
2 AL F (1.00)	17.00	5000 (500.0)	0.700	OC (0.300)	0.351 (1.391)	3.442 (5.007)	4.000d
3 Not defined							
4 RS F	20.00	30000	1.000	OC (0.300)	0.283 (1.241)	4.369 (5.836)	10.00d
5 NFG 5	23.00	50000	1.000	OC (0.300)	0.292 (1.226)	4.369 (5.836)	20.00d
6 NFG 3	27.00	1000000	1.000	OC (0.200)	0.146 (0.854)	13.89 (12.886)	250.0d

Additional soil parameters associated with Ka and Kp

		--- parameters for Ka ---			--- parameters for Kp ---		
		Soil friction	Wall adhesion	Back-fill	Soil friction	Wall adhesion	Back-fill
----- Soil type -----	No. Description	angle	coeff.	angle	angle	coeff.	angle
	1 FL	28.00	0.670	0.00	28.00	0.500	0.00
	2 AL F	25.00	0.670	0.00	26.00	0.500	0.00
	3 Not defined						
	4 RS F	30.00	0.670	0.00	30.00	0.500	0.00
	5 NFG 5	30.00	0.500	0.00	30.00	0.500	0.00
	6 NFG 3	45.00	0.500	0.00	45.00	0.500	0.00

GROUND WATER CONDITIONS

Density of water = 10.00 kN/m3

	Left side	Right side
Initial water table elevation	-4.00	-4.00

Automatic water pressure balancing at toe of wall : No

		Left side			Right side			
Water press.	profile	Point no.	Elev. m	Piezo elev. m	Water press. kN/m2	Point no.	Elev. m	Piezo elev. m
		1	4.00	4.00	0.0	1	-5.00	-5.00
		2	-4.00	-4.00	0.0	1	-5.00	-5.00

WALL PROPERTIES

Type of structure = Soldier Pile Wall
 Soldier Pile width = 0.90 m
 Soldier Pile spacing = 1.80 m
 Passive mobilisation factor = 3.00
 Elevation of toe of wall = -8.00
 Maximum finite element length = 0.60 m
 Youngs modulus of wall E = 3.2000E+07 kN/m2
 Moment of inertia of wall I = 0.017889 m4/m run
 = 0.032200 m4 per pile
 E.I = 572444 kN.m2/m run
 Yield Moment of wall = Not defined

STRUTS and ANCHORS

Prop no.	Elev.	Prop spacing m	Cross- section area sq.m	Youngs modulus kN/m2	Free length m	Inclin -ation (degs)	Pre- stress /prop kN	Strut or Anchor	Allow tension ?	L/R
1	2.00	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
2	-1.30	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
3	-5.00	1.00	0.150000	3.280E+07	20.00	0.00	0	Strut	Yes	R
4	-2.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
5	1.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
6	4.00	1.00	0.400000	3.280E+07	20.00	0.00	0	Strut	Yes	R

HORIZONTAL and MOMENT LOADS/RESTRAINTS

Load no.	Elevation	Horizontal load kN/m run	Moment load kN.m/m run	Moment restraint kN.m/m/rad	Partial factor (Category)
1	2.10	45.00	0	0	N/A
2	2.10	-45.00	0	0	N/A

SURCHARGE LOADS

Surch -arge no.	Elev.	Distance from wall	Length parallel to wall	Width perpend. to wall	Surcharge ----- kN/m2	----- Near edge	Far edge	Equiv. soil type	Partial factor/ Category
1	4.00	3.00 (L)	100.00	100.00	25.00	=		N/A	N/A

Note: L = Left side, R = Right side

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Apply surcharge no.1 at elevation 4.00
2	Excavate to elevation 2.00 on RIGHT side
3	Install strut or anchor no.1 at elevation 2.00
4	Excavate to elevation -1.50 on RIGHT side
5	Install strut or anchor no.2 at elevation -1.30
6	Apply water pressure profile no.2
7	Excavate to elevation -5.00 on RIGHT side
8	Apply load no.1 at elevation 2.10
9	Apply load no.2 at elevation 2.10
10	Install strut or anchor no.3 at elevation -5.00
11	Install strut or anchor no.4 at elevation -2.00
12	Remove strut or anchor no.2 at elevation -1.30
13	Install strut or anchor no.5 at elevation 1.00
14	Install strut or anchor no.6 at elevation 4.00
15	Remove strut or anchor no.1 at elevation 2.00
16	Change EI of wall to 400711 kN.m2/m run Allow wall to relax with new modulus value
17	Apply water pressure profile no.1

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:

Method of analysis - Burland-Potts

Factor on passive for calculating wall depth = 1.50

Parameters for undrained strata:

Minimum equivalent fluid density = 5.00 kN/m³

Maximum depth of water filled tension crack = 0.00 m

Bending moment and displacement calculation:

Method - 2-D finite element model

Open Tension Crack analysis? - No

Active limit arching modelled? - Yes

Non-linear Modulus Parameter (L) = 9.000 m

Boundary conditions:

Length of wall (normal to plane of analysis) = 40.00 m

Width of excavation on Left side of wall = 60.00 m

Width of excavation on Right side of wall = 60.00 m

Distance to rigid boundary on Left side = 20.00 m

Distance to rigid boundary on Right side = 30.00 m

Elevation of rigid lower boundary = -20.00

Lower rigid boundary at elevation -20.00 - Rough

Rigid boundary on Left side - Rough

Rigid boundary on Right side - Smooth

Wall / soil interface - Rough

OUTPUT OPTIONS

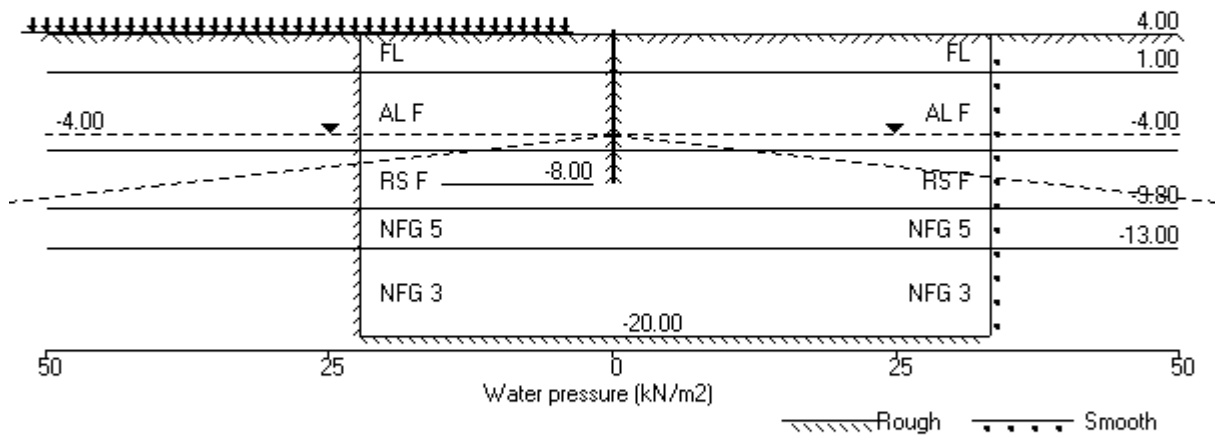
Stage no.	Stage description	Displacement Bending mom. Shear force	Active, Passive pressures	Graph. output
1	Apply surcharge no.1 at elev. 4.00	Yes	Yes	Yes
2	Excav. to elev. 2.00 on RIGHT side	Yes	Yes	Yes
3	Install prop no.1 at elev. 2.00	Yes	Yes	Yes
4	Excav. to elev. -1.50 on RIGHT side	Yes	Yes	Yes
5	Install prop no.2 at elev. -1.30	Yes	Yes	Yes
6	Apply water pressure profile no.2	Yes	Yes	Yes
7	Excav. to elev. -5.00 on RIGHT side	Yes	Yes	Yes
8	Apply load no.1 at elev. 2.10	Yes	Yes	Yes
9	Apply load no.2 at elev. 2.10	Yes	Yes	Yes
10	Install prop no.3 at elev. -5.00	Yes	Yes	Yes
11	Install prop no.4 at elev. -2.00	Yes	Yes	Yes
12	Remove prop no.2 at elev. -1.30	Yes	Yes	Yes
13	Install prop no.5 at elev. 1.00	Yes	Yes	Yes
14	Install prop no.6 at elev. 4.00	Yes	Yes	Yes
15	Remove prop no.1 at elev. 2.00	Yes	Yes	Yes
16	Change EI of wall to 400711kN.m ² /m run	Yes	Yes	Yes
17	Apply water pressure profile no.1	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

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Data filename/Run ID: Section_5
Albert Street Development
Section 5

| Sheet No.
| Job No. B01493
| Made by : DJC
|
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Units: kN,m

Stage No. 1 Apply surcharge no.1 at elevation 4.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u>
				<u>Factor</u> <u>of</u>	<u>Moment</u> <u>equilib.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u>	
1	4.00	4.00	---	<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
<u>Conditions not suitable for FoS calc.</u>								

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.001	-6.23E-05	0.0	0.0		572444
2	3.50	-2.52	0.001	-6.23E-05	-0.6	0.0		572444
3	3.00	-2.18	0.001	-6.21E-05	-1.8	-0.6		572444
4	2.55	-1.98	0.001	-6.12E-05	-2.7	-1.6		572444
5	2.10	-1.68	0.001	-5.93E-05	-3.6	-3.1		572444
6	2.00	-1.65	0.001	-5.87E-05	-3.7	-3.4		572444
7	1.50	-1.17	0.001	-5.49E-05	-4.4	-5.5		572444
8	1.00	-0.70	0.001	-4.90E-05	-4.9	-7.8		572444
		0.62	0.001	-4.90E-05	-4.9	-7.8		
9	0.50	0.77	0.001	-4.12E-05	-4.6	-10.2		572444
10	0.00	1.08	0.001	-3.14E-05	-4.1	-12.3		572444
11	-0.60	1.50	0.001	-1.73E-05	-3.3	-14.5		572444
12	-0.95	1.66	0.001	-8.12E-06	-2.8	-15.6		572444
13	-1.30	1.86	0.001	1.68E-06	-2.1	-16.5		572444
14	-1.50	1.89	0.001	7.50E-06	-1.8	-16.9		572444
15	-2.00	2.16	0.001	2.25E-05	-0.8	-17.5		572444
16	-2.50	2.35	0.001	3.78E-05	0.4	-17.6		572444
17	-3.00	2.53	0.001	5.29E-05	1.6	-17.1		572444
18	-3.50	2.68	0.001	6.74E-05	2.9	-16.0		572444
19	-4.00	2.78	0.001	8.05E-05	4.3	-14.2		572444
20	-4.50	2.79	0.001	9.18E-05	5.6	-11.7		572444
21	-5.00	2.61	0.001	1.00E-04	7.0	-8.5		572444
22	-5.30	2.02	0.001	1.04E-04	7.7	-6.3		572444
		-10.16	0.001	1.04E-04	7.7	-6.3		
23	-5.65	-5.05	0.001	1.07E-04	5.0	-4.2		572444
24	-6.00	-3.29	0.001	1.09E-04	3.6	-2.8		572444
25	-6.60	-2.10	0.001	1.12E-04	2.0	-1.2		572444
26	-7.20	-1.28	0.001	1.12E-04	0.9	-0.4		572444
27	-7.60	-0.92	0.001	1.13E-04	0.5	-0.1		572444
28	-8.00	-1.16	0.001	1.13E-04	0.1	-0.0		0
29	-8.15	-0.10	0.001	0	-0.0	0.0		0
30	-9.80	1.93	0.001	0	1.5	0.0		0
		-1.96	0.001	0	1.5	0.0		

(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
31	-11.40	0.01	0.000	0	-0.1	0.0		0
32	-13.00	7.64 -6.41	0.000	0	6.1	0.0		0
33	-14.90	0.00	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	-0.0	0.0		0
36	-20.00	0.01	0.000	0	0.0	0.0		---

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	4.64	4.64	9981
3	3.00	0.00	17.35	5.36	67.10	10.83	10.83	9981
4	2.55	0.00	25.58	7.90	98.95	16.41	16.41	9981
5	2.10	0.00	34.09	10.53	131.87	22.11	22.11	9981
6	2.00	0.00	36.01	11.13	139.30	23.36	23.36	9981
7	1.50	0.00	45.73	14.13	176.89	29.81	29.81	9981
8	1.00	0.00	55.54	17.16	214.84	36.27	36.27	9981
		0.00	55.54	13.95	211.21	36.96	36.96	4991
9	0.50	0.00	65.35	17.39	244.99	43.26	43.26	5240
10	0.00	0.00	75.11	20.82	278.59	49.64	49.64	5490
11	-0.60	0.00	86.71	24.90	318.51	57.29	57.29	5789
12	-0.95	0.00	93.41	27.25	341.58	61.69	61.69	5964
13	-1.30	0.00	100.07	29.59	364.48	66.11	66.11	6138
14	-1.50	0.00	103.85	30.91	377.50	68.59	68.59	6238
15	-2.00	0.00	113.24	34.21	409.82	74.86	74.86	6488
16	-2.50	0.00	122.54	37.48	441.84	81.08	81.08	6737
17	-3.00	0.00	131.77	40.72	473.60	87.27	87.27	6987
18	-3.50	0.00	140.92	43.94	505.11	93.44	93.44	7236
19	-4.00	0.00	150.02	47.13	536.42	99.57	99.57	7486
20	-4.50	5.00	154.05	48.55	550.32	102.14	107.14	7735
21	-5.00	10.00	158.05	49.95	564.06	104.60	114.60	7985
22	-5.30	13.00	160.42	50.79	572.23	105.86	118.86	8135
		13.00	160.42	33.04	759.29	143.30	156.30	29943
23	-5.65	16.50	164.22	34.12	775.89	149.36	165.86	29943
24	-6.00	20.00	168.00	35.19	792.42	153.81	173.81	29943
25	-6.60	26.00	174.44	37.02	820.58	160.50	186.50	29943
26	-7.20	32.00	180.85	38.83	848.54	167.00	199.00	29943
27	-7.60	36.00	185.09	40.03	867.09	171.23	207.23	29943
28	-8.00	40.00	189.32	41.23	885.57	175.17	215.17	29943
29	-8.15	41.50	190.90	41.68	892.48	177.21	218.71	29943
30	-9.80	58.00	208.19	46.58	968.01	194.91	252.91	29943
		58.00	208.19	36.32	1026.37	192.95	250.95	49905
31	-11.40	74.00	229.57	42.58	1119.82	214.87	288.87	49905
32	-13.00	90.00	250.83	48.79	1212.70	239.62	329.62	49905
		90.00	250.83	0.00	6704.52	230.80	320.80	998109
33	-14.90	109.00	283.54	0.00	7158.75	266.35	375.35	998109
34	-16.80	128.00	316.14	0.00	7611.40	298.71	426.71	998109
35	-18.40	144.00	343.52	0.00	7991.58	325.94	469.94	998109
36	-20.00	160.00	370.84	0.00	8371.01	352.64	512.64	998109

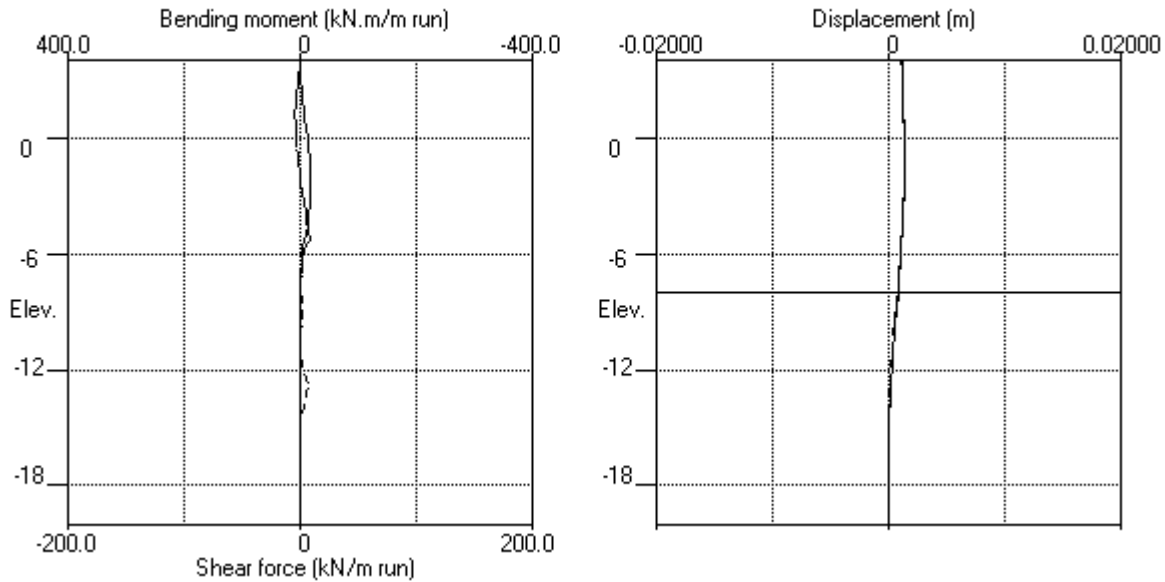
(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

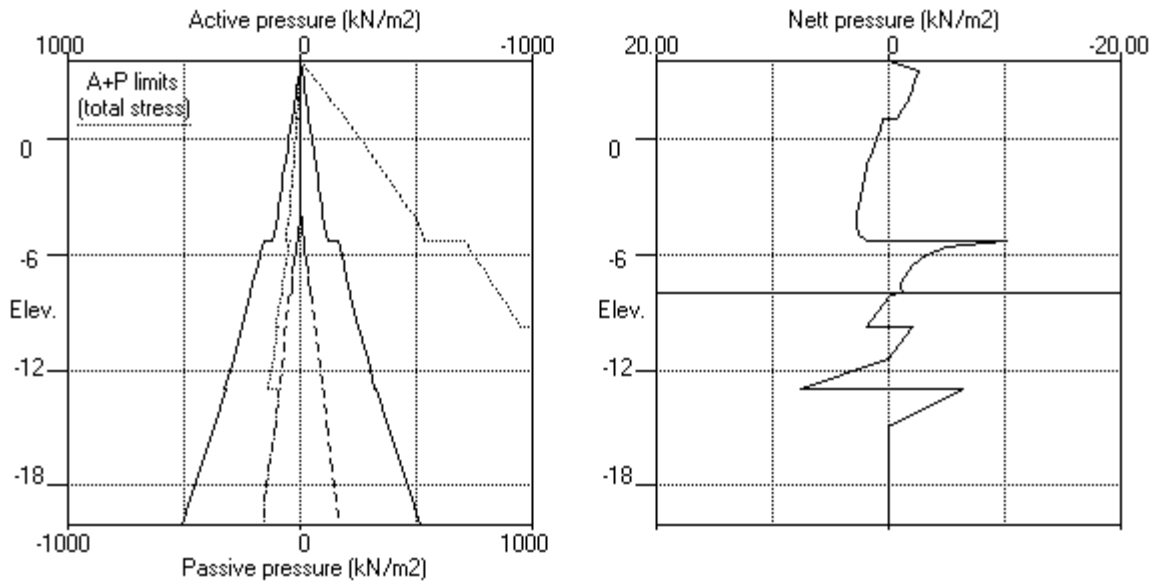
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	10053
2	3.50	0.00	8.50	2.63	32.88	7.16	7.16	10053
3	3.00	0.00	17.00	5.25	65.76	13.01	13.01	10053
4	2.55	0.00	24.65	7.62	95.35	18.39	18.39	10053
5	2.10	0.00	32.30	9.98	124.95	23.78	23.78	10053
6	2.00	0.00	34.00	10.51	131.52	25.01	25.01	10053
7	1.50	0.00	42.50	13.13	164.40	30.98	30.98	10053
8	1.00	0.00	51.00	15.76	197.28	36.97	36.97	10053
		0.00	51.00	12.35	195.58	36.34	36.34	5027
9	0.50	0.00	59.50	15.34	224.84	42.49	42.49	5278
10	0.00	0.00	68.00	18.32	254.10	48.56	48.56	5529
11	-0.60	0.00	78.20	21.91	289.21	55.79	55.79	5831
12	-0.95	0.00	84.15	24.00	309.69	60.03	60.03	6007
13	-1.30	0.00	90.10	26.09	330.17	64.25	64.25	6183
14	-1.50	0.00	93.50	27.28	341.88	66.70	66.70	6283
15	-2.00	0.00	102.00	30.27	371.14	72.70	72.70	6535
16	-2.50	0.00	110.50	33.25	400.40	78.73	78.73	6786
17	-3.00	0.00	119.00	36.24	429.66	84.75	84.75	7037
18	-3.50	0.00	127.50	39.22	458.91	90.76	90.76	7289
19	-4.00	0.00	136.00	42.21	488.17	96.79	96.79	7540
20	-4.50	5.00	139.50	43.44	500.22	99.35	104.35	7791
21	-5.00	10.00	143.00	44.67	512.27	101.99	111.99	8043
22	-5.30	13.00	145.10	45.41	519.50	103.84	116.84	8193
		13.00	145.10	28.70	692.36	153.46	166.46	30160
23	-5.65	16.50	148.60	29.69	707.65	154.41	170.91	30160
24	-6.00	20.00	152.10	30.68	722.94	157.10	177.10	30160
25	-6.60	26.00	158.10	32.38	749.16	162.60	188.60	30160
26	-7.20	32.00	164.10	34.08	775.38	168.28	200.28	30160
27	-7.60	36.00	168.10	35.22	792.85	172.15	208.15	30160
28	-8.00	40.00	172.10	36.35	810.33	176.33	216.33	30160
29	-8.15	41.50	173.60	36.78	816.88	177.31	218.81	30160
30	-9.80	58.00	190.10	41.45	888.98	192.98	250.98	30160
		58.00	190.10	31.04	947.34	194.90	252.90	50266
31	-11.40	74.00	210.90	37.12	1038.22	214.86	288.86	50266
32	-13.00	90.00	231.70	43.20	1129.11	231.98	321.98	50266
		90.00	231.70	0.00	6438.86	237.21	327.21	1005321
33	-14.90	109.00	264.00	0.00	6887.38	266.35	375.35	1005321
34	-16.80	128.00	296.30	0.00	7335.89	298.70	426.70	1005321
35	-18.40	144.00	323.50	0.00	7713.59	325.94	469.94	1005321
36	-20.00	160.00	350.70	0.00	8091.29	352.63	512.63	1005321

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Stage No.1 Apply surcharge no.1 at elev. 4.00

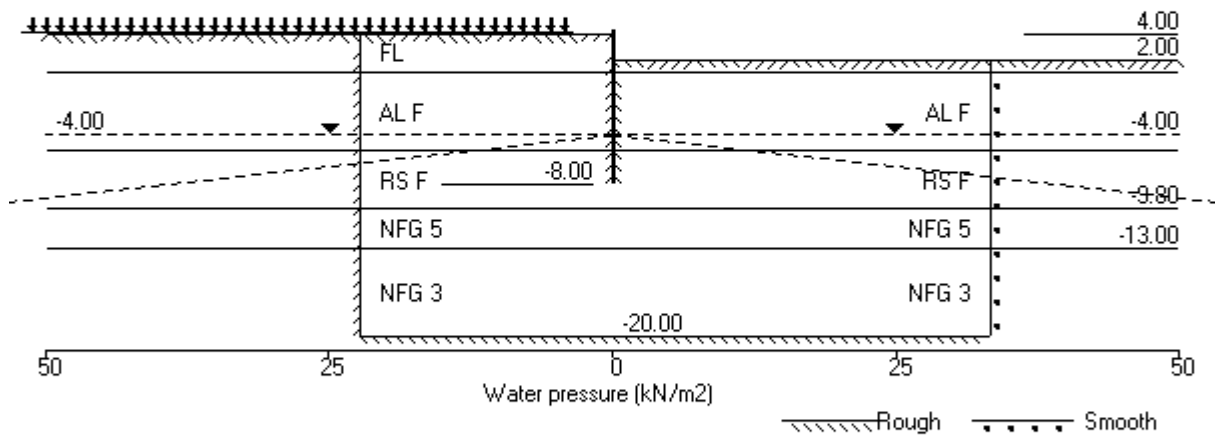


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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Units: kN,m

Stage No. 2 Excavate to elevation 2.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
2	4.00	2.00	Cant.	11.179	-6.47	-0.12	2.12	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.018	1.51E-03	0.0	0.0		572444
2	3.50	2.64	0.017	1.51E-03	0.7	0.3		572444
3	3.00	5.36	0.017	1.51E-03	2.7	1.2		572444
4	2.55	7.90	0.016	1.51E-03	5.6	3.1		572444
5	2.10	10.53	0.015	1.50E-03	9.8	6.7		572444
6	2.00	11.13	0.015	1.50E-03	10.9	7.7		572444
7	1.50	-17.33	0.014	1.49E-03	9.3	14.1		572444
8	1.00	-13.26	0.014	1.48E-03	1.7	16.6		572444
		1.63	0.014	1.48E-03	1.7	16.6		
9	0.50	-0.78	0.013	1.46E-03	1.9	17.7		572444
10	0.00	-0.62	0.012	1.45E-03	1.5	18.6		572444
11	-0.60	0.19	0.011	1.43E-03	1.4	19.4		572444
12	-0.95	0.64	0.011	1.42E-03	1.6	19.9		572444
13	-1.30	1.14	0.010	1.40E-03	1.9	20.5		572444
14	-1.50	1.39	0.010	1.40E-03	2.1	20.9		572444
15	-2.00	2.09	0.009	1.38E-03	3.0	22.2		572444
16	-2.50	2.73	0.009	1.36E-03	4.2	24.0		572444
17	-3.00	3.29	0.008	1.33E-03	5.7	26.4		572444
18	-3.50	3.71	0.007	1.31E-03	7.5	29.7		572444
19	-4.00	3.85	0.007	1.28E-03	9.3	33.9		572444
20	-4.50	3.34	0.006	1.25E-03	11.1	39.0		572444
21	-5.00	1.44	0.005	1.21E-03	12.3	45.0		572444
22	-5.30	-3.16	0.005	1.19E-03	12.1	48.8		572444
		-68.28	0.005	1.19E-03	12.1	48.8		
23	-5.65	-34.61	0.005	1.16E-03	-5.9	48.9		572444
24	-6.00	-19.47	0.004	1.13E-03	-15.4	44.7		572444
25	-6.60	-7.64	0.003	1.09E-03	-23.5	31.9		572444
26	-7.20	3.35	0.003	1.07E-03	-24.8	16.5		572444
27	-7.60	17.75	0.002	1.06E-03	-20.6	6.8		572444
28	-8.00	61.95	0.002	1.05E-03	-4.6	-0.0		0
29	-8.15	-0.10	0.002	0	-0.0	0.0		0
30	-9.80	5.52	0.002	0	4.5	0.0		0
		-5.66	0.002	0	4.5	0.0		

(continued)

Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
31	-11.40	0.01	0.001	0	-0.1	0.0		0
32	-13.00	21.13 -17.77	0.000	0	16.9	0.0		0
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	-0.0	0.0		0
36	-20.00	0.00	0.000	0	0.0	0.0		---

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	2.64	2.64a	9981
3	3.00	0.00	17.35	5.36	67.10	5.36	5.36a	9981
4	2.55	0.00	25.58	7.90	98.95	7.90	7.90a	9981
5	2.10	0.00	34.09	10.53	131.87	10.53	10.53a	9981
6	2.00	0.00	36.01	11.13	139.30	11.13	11.13a	9981
7	1.50	0.00	45.73	14.13	176.89	15.55	15.55	9981
8	1.00	0.00	55.54	17.16	214.84	24.83	24.83	9981
		0.00	55.54	13.95	211.21	31.24	31.24	4991
9	0.50	0.00	65.35	17.39	244.99	35.99	35.99	5240
10	0.00	0.00	75.11	20.82	278.59	42.05	42.05	5490
11	-0.60	0.00	86.71	24.90	318.51	49.73	49.73	5789
12	-0.95	0.00	93.41	27.25	341.58	54.18	54.18	5964
13	-1.30	0.00	100.07	29.59	364.48	58.69	58.69	6138
14	-1.50	0.00	103.85	30.91	377.50	61.23	61.23	6238
15	-2.00	0.00	113.24	34.21	409.82	67.66	67.66	6488
16	-2.50	0.00	122.54	37.48	441.84	74.05	74.05	6737
17	-3.00	0.00	131.77	40.72	473.60	80.40	80.40	6987
18	-3.50	0.00	140.92	43.94	505.11	86.67	86.67	7236
19	-4.00	0.00	150.02	47.13	536.42	92.79	92.79	7486
20	-4.50	5.00	154.05	48.55	550.32	95.08	100.08	7735
21	-5.00	10.00	158.05	49.95	564.06	96.66	106.66	7985
22	-5.30	13.00	160.42	50.79	572.23	96.06	109.06	8135
		13.00	160.42	33.04	759.29	107.23	120.23	29943
23	-5.65	16.50	164.22	34.12	775.89	127.15	143.65	29943
24	-6.00	20.00	168.00	35.19	792.42	138.28	158.28	29943
25	-6.60	26.00	174.44	37.02	820.58	150.28	176.28	29943
26	-7.20	32.00	180.85	38.83	848.54	161.86	193.86	29943
27	-7.60	36.00	185.09	40.03	867.09	173.21	209.21	29943
28	-8.00	40.00	189.32	41.23	885.57	198.14	238.14	29943
29	-8.15	41.50	190.90	41.68	892.48	170.02	211.52	29943
30	-9.80	58.00	208.19	46.58	968.01	189.30	247.30	29943
		58.00	208.19	36.32	1026.37	183.60	241.60	49905
31	-11.40	74.00	229.57	42.58	1119.82	207.44	281.44	49905
32	-13.00	90.00	250.83	48.79	1212.70	239.10	329.10	49905
		90.00	250.83	0.00	6704.52	220.58	310.58	998109
33	-14.90	109.00	283.54	0.00	7158.75	261.77	370.77	998109
34	-16.80	128.00	316.14	0.00	7611.40	294.19	422.19	998109
35	-18.40	144.00	343.52	0.00	7991.58	321.52	465.52	998109
36	-20.00	160.00	370.84	0.00	8371.01	347.39	507.39	998109

(continued)

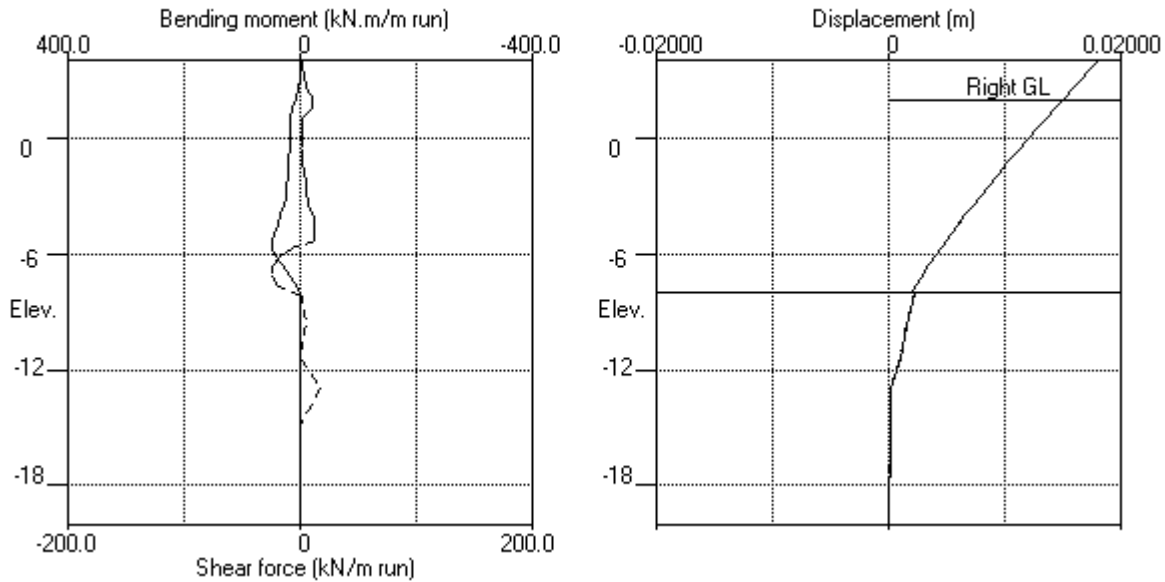
Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>modulus</u>
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	0.00	0.00	0.00	10048
7	1.50	0.00	8.50	2.63	32.88	32.88	32.88p	10048
8	1.00	0.00	17.00	5.25	65.76	38.10	38.10	10048
		0.00	17.00	0.41	78.55	29.61	29.61	5024
9	0.50	0.00	25.50	3.39	107.81	36.77	36.77	5275
10	0.00	0.00	34.00	6.38	137.07	42.67	42.67	5527
11	-0.60	0.00	44.20	9.96	172.18	49.54	49.54	5828
12	-0.95	0.00	50.15	12.05	192.66	53.54	53.54	6004
13	-1.30	0.00	56.10	14.14	213.15	57.55	57.55	6180
14	-1.50	0.00	59.50	15.34	224.85	59.83	59.83	6280
15	-2.00	0.00	68.00	18.32	254.12	65.57	65.57	6531
16	-2.50	0.00	76.51	21.31	283.38	71.32	71.32	6783
17	-3.00	0.00	85.01	24.30	312.65	77.11	77.11	7034
18	-3.50	0.00	93.51	27.28	341.92	82.96	82.96	7285
19	-4.00	0.00	102.01	30.27	371.19	88.94	88.94	7536
20	-4.50	5.00	105.52	31.50	383.25	91.74	96.74	7787
21	-5.00	10.00	109.02	32.73	395.31	95.22	105.22	8039
22	-5.30	13.00	111.13	33.47	402.55	99.23	112.23	8189
		13.00	111.13	19.07	543.91	175.51	188.51	30145
23	-5.65	16.50	114.63	20.07	559.22	161.76	178.26	30145
24	-6.00	20.00	118.13	21.06	574.53	157.74	177.74	30145
25	-6.60	26.00	124.14	22.76	600.78	157.92	183.92	30145
26	-7.20	32.00	130.15	24.46	627.04	158.51	190.51	30145
27	-7.60	36.00	134.16	25.60	644.54	155.46	191.46	30145
28	-8.00	40.00	138.16	26.74	662.05	136.19	176.19	30145
29	-8.15	41.50	139.67	27.16	668.62	170.11	211.61	30145
30	-9.80	58.00	156.20	31.85	740.88	183.79	241.79	30145
		58.00	156.20	21.13	799.24	189.26	247.26	50241
31	-11.40	74.00	177.05	27.23	890.33	207.43	281.43	50241
32	-13.00	90.00	197.91	33.32	981.46	217.97	307.97	50241
		90.00	197.91	0.00	5969.65	238.36	328.36	1004823
33	-14.90	109.00	230.29	0.00	6419.34	261.77	370.77	1004823
34	-16.80	128.00	262.70	0.00	6869.28	294.18	422.18	1004823
35	-18.40	144.00	290.00	0.00	7248.37	321.52	465.52	1004823
36	-20.00	160.00	317.31	0.00	7627.65	347.39	507.39	1004823

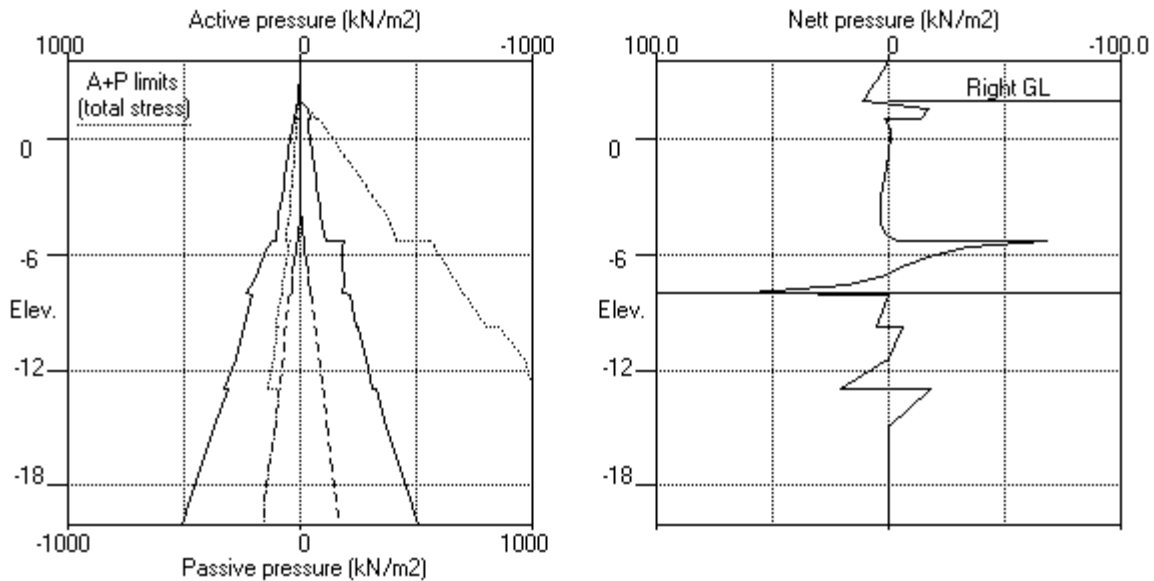
Note: 11.13 a Soil pressure at active limit
 32.88 p Soil pressure at passive limit

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Stage No.2 Excav. to elev. 2.00 on RIGHT side

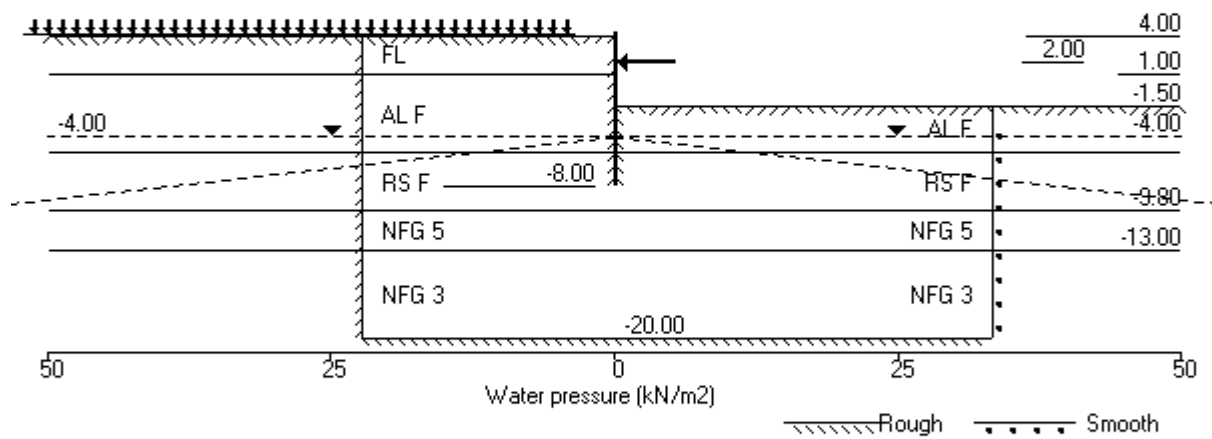


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Units: kN,m

Stage No. 4 Excavate to elevation -1.50 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
4	4.00	-1.50	2.00	6.687	n/a	-3.41	1.91	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.017	2.06E-04	0.0	-0.0		572444
2	3.50	8.59	0.017	2.06E-04	2.1	0.3		572444
3	3.00	8.80	0.017	2.05E-04	6.5	2.7		572444
4	2.55	9.41	0.017	2.01E-04	10.6	6.7		572444
5	2.10	10.70	0.017	1.93E-04	15.1	12.6		572444
6	2.00	9.90	0.017	1.91E-04	16.1	14.2	-118.2	572444
		9.90	0.017	1.91E-04	-102.1	14.2		
7	1.50	12.71	0.017	2.00E-04	-96.4	-34.7		572444
8	1.00	19.68	0.016	2.50E-04	-88.3	-81.0		572444
		28.67	0.016	2.50E-04	-88.3	-81.0		
9	0.50	32.57	0.016	3.39E-04	-73.0	-121.3		572444
10	0.00	37.82	0.016	4.59E-04	-55.4	-153.5		572444
11	-0.60	44.77	0.016	6.33E-04	-30.6	-179.5		572444
12	-0.95	48.56	0.016	7.45E-04	-14.3	-187.4		572444
13	-1.30	52.68	0.015	8.60E-04	3.4	-189.3		572444
14	-1.50	54.77	0.015	9.26E-04	14.2	-187.5		572444
		34.74	0.015	9.26E-04	14.2	-187.5		
15	-2.00	14.86	0.015	1.08E-03	26.6	-176.7		572444
16	-2.50	14.73	0.014	1.23E-03	34.0	-161.6		572444
17	-3.00	14.46	0.013	1.36E-03	41.3	-142.7		572444
18	-3.50	14.19	0.013	1.48E-03	48.4	-120.3		572444
19	-4.00	13.68	0.012	1.57E-03	55.4	-94.3		572444
20	-4.50	12.26	0.011	1.64E-03	61.9	-64.9		572444
21	-5.00	8.66	0.010	1.68E-03	67.1	-32.4		572444
22	-5.30	0.92	0.010	1.69E-03	68.5	-11.9		572444
		-121.64	0.010	1.69E-03	68.5	-11.9		
23	-5.65	-64.79	0.009	1.70E-03	35.9	4.7		572444
24	-6.00	-41.47	0.009	1.69E-03	17.3	13.3		572444
25	-6.60	-24.16	0.008	1.67E-03	-2.4	16.2		572444
26	-7.20	-9.34	0.007	1.66E-03	-12.4	10.4		572444
27	-7.60	6.19	0.006	1.66E-03	-13.1	4.7		572444
28	-8.00	42.97	0.005	1.65E-03	-3.2	-0.0		0

(continued)

Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-8.15	-0.10	0.005	0	-0.0	0.0		0
30	-9.80	11.82	0.003	0	9.7	0.0		0
		-12.15	0.003	0	9.7	0.0		
31	-11.40	0.01	0.002	0	-0.1	0.0		0
32	-13.00	44.86	0.000	0	35.8	0.0		0
		-37.76	0.000	0	35.8	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force = 118.2 kN/m run			

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	8.59	8.59	9981
3	3.00	0.00	17.35	5.36	67.10	8.80	8.80	9981
4	2.55	0.00	25.58	7.90	98.95	9.41	9.41	9981
5	2.10	0.00	34.09	10.53	131.87	10.70	10.70	9981
6	2.00	0.00	36.01	11.13	139.30	9.90	9.90A	9981
7	1.50	0.00	45.73	14.13	176.89	12.71	12.71A	9981
8	1.00	0.00	55.54	17.16	214.84	19.68	19.68	9981
		0.00	55.54	13.95	211.21	28.67	28.67	4991
9	0.50	0.00	65.35	17.39	244.99	32.57	32.57	5240
10	0.00	0.00	75.11	20.82	278.59	37.82	37.82	5490
11	-0.60	0.00	86.71	24.90	318.51	44.77	44.77	5789
12	-0.95	0.00	93.41	27.25	341.58	48.56	48.56	5964
13	-1.30	0.00	100.07	29.59	364.48	52.68	52.68	6138
14	-1.50	0.00	103.85	30.91	377.50	54.77	54.77	6238
15	-2.00	0.00	113.24	34.21	409.82	60.82	60.82	6488
16	-2.50	0.00	122.54	37.48	441.84	66.79	66.79	6737
17	-3.00	0.00	131.77	40.72	473.60	72.79	72.79	6987
18	-3.50	0.00	140.92	43.94	505.11	78.78	78.78	7236
19	-4.00	0.00	150.02	47.13	536.42	84.63	84.63	7486
20	-4.50	5.00	154.05	48.55	550.32	86.52	91.52	7735
21	-5.00	10.00	158.05	49.95	564.06	87.27	97.27	7985
22	-5.30	13.00	160.42	50.79	572.23	85.36	98.36	8135
		13.00	160.42	33.04	759.29	67.82	80.82	29943
23	-5.65	16.50	164.22	34.12	775.89	98.99	115.49	29943
24	-6.00	20.00	168.00	35.19	792.42	114.21	134.21	29943
25	-6.60	26.00	174.44	37.02	820.58	128.97	154.97	29943
26	-7.20	32.00	180.85	38.83	848.54	142.50	174.50	29943
27	-7.60	36.00	185.09	40.03	867.09	154.41	190.41	29943
28	-8.00	40.00	189.32	41.23	885.57	175.92	215.92	29943
29	-8.15	41.50	190.90	41.68	892.48	157.01	198.51	29943
30	-9.80	58.00	208.19	46.58	968.01	179.58	237.58	29943
		58.00	208.19	36.32	1026.37	167.40	225.40	49905
31	-11.40	74.00	229.57	42.58	1119.82	194.57	268.57	49905
32	-13.00	90.00	250.83	48.79	1212.70	238.22	328.22	49905
		90.00	250.83	0.00	6704.52	202.85	292.85	998109
33	-14.90	109.00	283.54	0.00	7158.75	254.03	363.03	998109
34	-16.80	128.00	316.14	0.00	7611.40	286.52	414.52	998109
35	-18.40	144.00	343.52	0.00	7991.58	313.92	457.92	998109
36	-20.00	160.00	370.84	0.00	8371.01	338.20	498.20	998109

(continued)

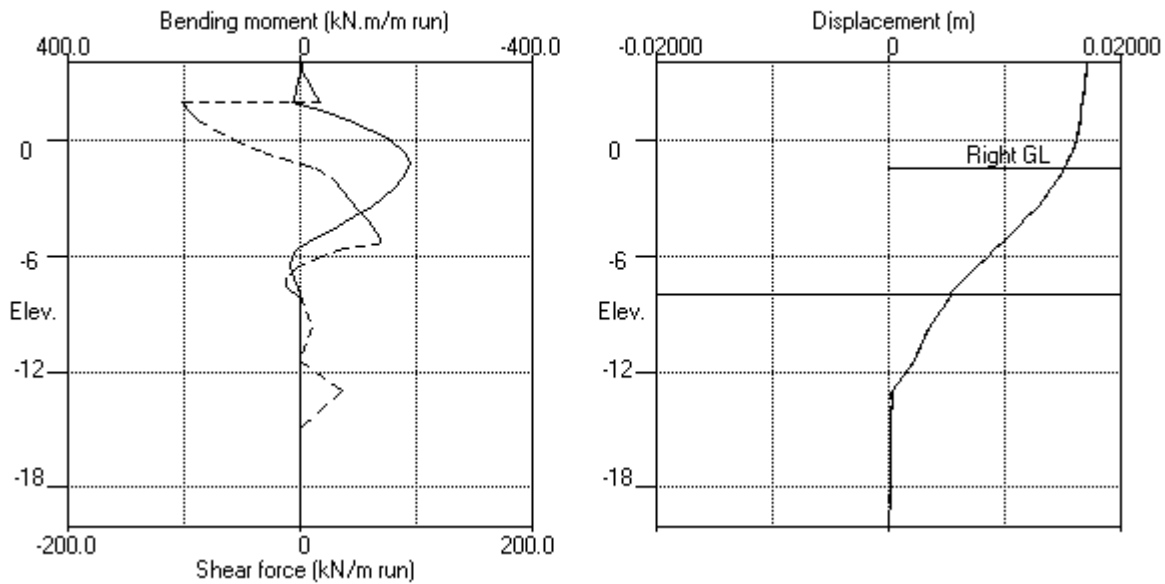
Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	6274
15	-2.00	0.00	8.50	0.00	49.29	45.96	45.96	6525
16	-2.50	0.00	17.00	0.41	78.55	52.05	52.05	6776
17	-3.00	0.00	25.50	3.39	107.81	58.33	58.33	7027
18	-3.50	0.00	34.00	6.38	137.07	64.59	64.59	7278
19	-4.00	0.00	42.50	9.37	166.33	70.95	70.95	7529
20	-4.50	5.00	46.00	10.60	178.39	74.26	79.26	7780
21	-5.00	10.00	49.51	11.83	190.45	78.61	88.61	8031
22	-5.30	13.00	51.61	12.56	197.68	84.44	97.44	8181
		13.00	51.61	2.21	283.86	189.46	202.46	30115
23	-5.65	16.50	55.11	3.20	299.17	163.78	180.28	30115
24	-6.00	20.00	58.62	4.20	314.48	155.68	175.68	30115
25	-6.60	26.00	64.62	5.90	340.73	153.13	179.13	30115
26	-7.20	32.00	70.63	7.60	366.99	151.84	183.84	30115
27	-7.60	36.00	74.64	8.74	384.50	148.22	184.22	30115
28	-8.00	40.00	78.65	9.87	402.01	132.95	172.95	30115
29	-8.15	41.50	80.15	10.30	408.58	157.11	198.61	30115
30	-9.80	58.00	96.70	14.99	480.89	167.76	225.76	30115
		58.00	96.70	3.74	539.25	179.56	237.56	50192
31	-11.40	74.00	117.57	9.84	630.44	194.56	268.56	50192
32	-13.00	90.00	138.47	15.95	721.74	193.35	283.35	50192
		90.00	138.47	0.00	5144.24	240.61	330.61	1003838
33	-14.90	109.00	170.92	0.00	5594.83	254.02	363.02	1003838
34	-16.80	128.00	203.41	0.00	6046.03	286.51	414.51	1003838
35	-18.40	144.00	230.81	0.00	6426.49	313.92	457.92	1003838
36	-20.00	160.00	258.24	0.00	6807.43	338.21	498.21	1003838

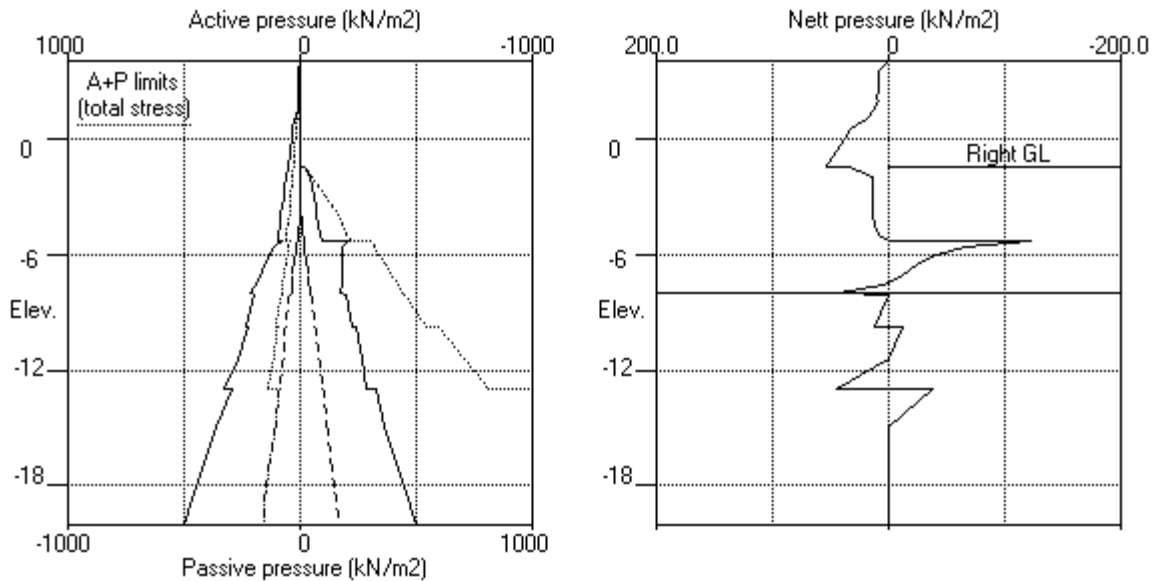
Note: 12.34 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit
 12.71A Arching - soil pressure below active limit

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side

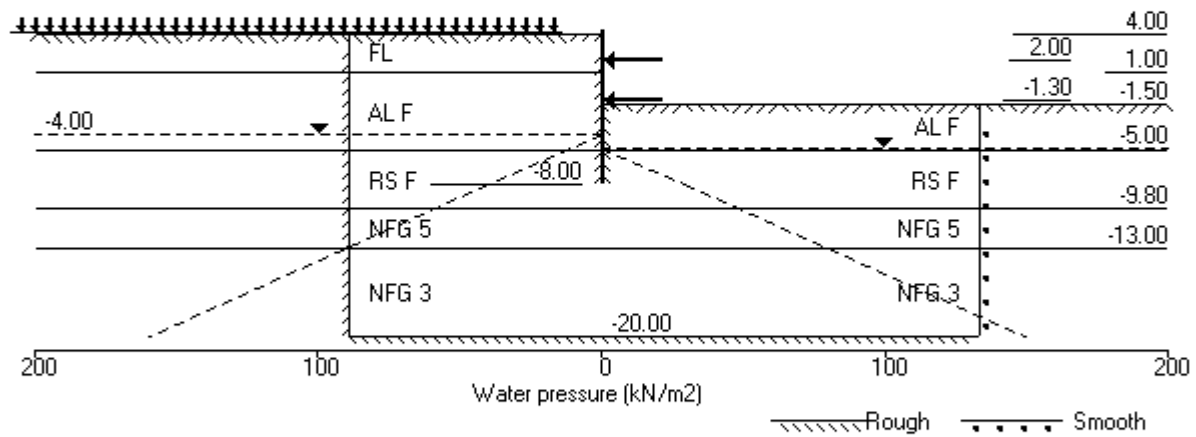


Stage No.4 Excav. to elev. -1.50 on RIGHT side



Units: kN,m

Stage No.6 Apply water pressure profile no.2



Units: kN,m

Stage No. 6 Apply water pressure profile no.2

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>Penetr</u> <u>-ation</u>	
6	4.00	-1.50		More than one prop. No FoS calc.		

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.017	1.77E-04	0.0	-0.0		572444
2	3.50	8.81	0.017	1.77E-04	2.2	0.3		572444
3	3.00	8.99	0.017	1.76E-04	6.6	2.7		572444
4	2.55	9.58	0.017	1.72E-04	10.8	6.8		572444
5	2.10	10.85	0.017	1.64E-04	15.4	12.9		572444
6	2.00	10.04	0.017	1.62E-04	16.5	14.5	-116.0	572444
		10.04	0.017	1.62E-04	-99.5	14.5		
7	1.50	12.84	0.017	1.70E-04	-93.8	-33.1		572444
8	1.00	19.81	0.016	2.19E-04	-85.6	-78.1		572444
		28.73	0.016	2.19E-04	-85.6	-78.1		
9	0.50	32.63	0.016	3.04E-04	-70.3	-117.0		572444
10	0.00	37.88	0.016	4.19E-04	-52.7	-147.8		572444
11	-0.60	44.82	0.016	5.87E-04	-27.8	-172.1		572444
12	-0.95	48.61	0.016	6.94E-04	-11.5	-179.1		572444
13	-1.30	52.72	0.015	8.04E-04	6.2	-180.0	-6.8	572444
		52.72	0.015	8.04E-04	-0.6	-180.0		
14	-1.50	54.79	0.015	8.67E-04	10.2	-179.1		572444
		34.95	0.015	8.67E-04	10.2	-179.1		
15	-2.00	14.99	0.015	1.01E-03	22.7	-170.2		572444
16	-2.50	14.75	0.014	1.16E-03	30.1	-157.0		572444
17	-3.00	14.35	0.014	1.29E-03	37.4	-140.1		572444
18	-3.50	13.94	0.013	1.40E-03	44.4	-119.6		572444
19	-4.00	13.28	0.012	1.49E-03	51.3	-95.6		572444
20	-4.50	14.55	0.011	1.57E-03	58.2	-68.2		572444
21	-5.00	13.65	0.011	1.61E-03	65.3	-37.1		572444
22	-5.30	5.76	0.010	1.63E-03	68.2	-16.9		572444
		-119.13	0.010	1.63E-03	68.2	-16.9		
23	-5.65	-62.13	0.010	1.63E-03	36.4	-0.4		572444
24	-6.00	-39.44	0.009	1.63E-03	18.7	8.6		572444
25	-6.60	-22.99	0.008	1.62E-03	-0.1	12.7		572444
26	-7.20	-9.27	0.007	1.61E-03	-9.7	8.6		572444
27	-7.60	4.47	0.006	1.60E-03	-10.7	3.9		572444

(continued)

Stage No.6 Apply water pressure profile no.2

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-8.00	35.64	0.006	1.60E-03	-2.7	-0.0		0
29	-8.15	-0.10	0.006	0	-0.0	0.0		0
30	-9.80	13.23	0.004	0	10.8	0.0		0
		-13.61	0.004	0	10.8	0.0		
31	-11.40	0.01	0.002	0	-0.1	0.0		0
32	-13.00	49.99	0.000	0	39.9	0.0		0
		-42.07	0.000	0	39.9	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	116.0	kN/m run		
At elev. -1.30				Prop force =	6.8	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	8.81	8.81	9981
3	3.00	0.00	17.35	5.36	67.10	8.99	8.99	9981
4	2.55	0.00	25.58	7.90	98.95	9.58	9.58	9981
5	2.10	0.00	34.09	10.53	131.87	10.85	10.85	9981
6	2.00	0.00	36.01	11.13	139.30	10.04	10.04A	9981
7	1.50	0.00	45.73	14.13	176.89	12.84	12.84A	9981
8	1.00	0.00	55.54	17.16	214.84	19.81	19.81	9981
		0.00	55.54	13.95	211.21	28.73	28.73	4991
9	0.50	0.00	65.35	17.39	244.99	32.63	32.63	5240
10	0.00	0.00	75.11	20.82	278.59	37.88	37.88	5490
11	-0.60	0.00	86.71	24.90	318.51	44.82	44.82	5789
12	-0.95	0.00	93.41	27.25	341.58	48.61	48.61	5964
13	-1.30	0.00	100.07	29.59	364.48	52.72	52.72	6138
14	-1.50	0.00	103.85	30.91	377.50	54.79	54.79	6238
15	-2.00	0.00	113.24	34.21	409.82	60.81	60.81	6488
16	-2.50	0.00	122.54	37.48	441.84	66.73	66.73	6737
17	-3.00	0.00	131.77	40.72	473.60	72.67	72.67	6987
18	-3.50	0.00	140.92	43.94	505.11	78.60	78.60	7236
19	-4.00	0.00	150.02	47.13	536.42	84.38	84.38	7486
20	-4.50	5.00	154.05	48.55	550.32	86.19	91.19	7735
21	-5.00	10.00	158.05	49.95	564.06	86.88	96.88	7985
22	-5.30	13.00	160.42	50.79	572.23	84.91	97.91	8135
		13.00	160.42	33.04	759.29	66.17	79.17	29943
23	-5.65	16.50	164.22	34.12	775.89	97.41	113.91	29943
24	-6.00	20.00	168.00	35.19	792.42	112.31	132.31	29943
25	-6.60	26.00	174.44	37.02	820.58	126.65	152.65	29943
26	-7.20	32.00	180.85	38.83	848.54	139.63	171.63	29943
27	-7.60	36.00	185.09	40.03	867.09	150.64	186.64	29943
28	-8.00	40.00	189.32	41.23	885.57	169.48	209.48	29943
29	-8.15	41.50	190.90	41.68	892.48	154.09	195.59	29943
30	-9.80	58.00	208.19	46.58	968.01	177.41	235.41	29943
		58.00	208.19	36.32	1026.37	163.78	221.78	49905
31	-11.40	74.00	229.57	42.58	1119.82	191.69	265.69	49905
32	-13.00	90.00	250.83	48.79	1212.70	237.92	327.92	49905
		90.00	250.83	0.00	6704.52	196.89	286.89	998109
33	-14.90	109.00	283.54	0.00	7158.75	250.23	359.23	998109
34	-16.80	128.00	316.14	0.00	7611.40	282.73	410.73	998109

(continued)

Stage No.6 Apply water pressure profile no.2

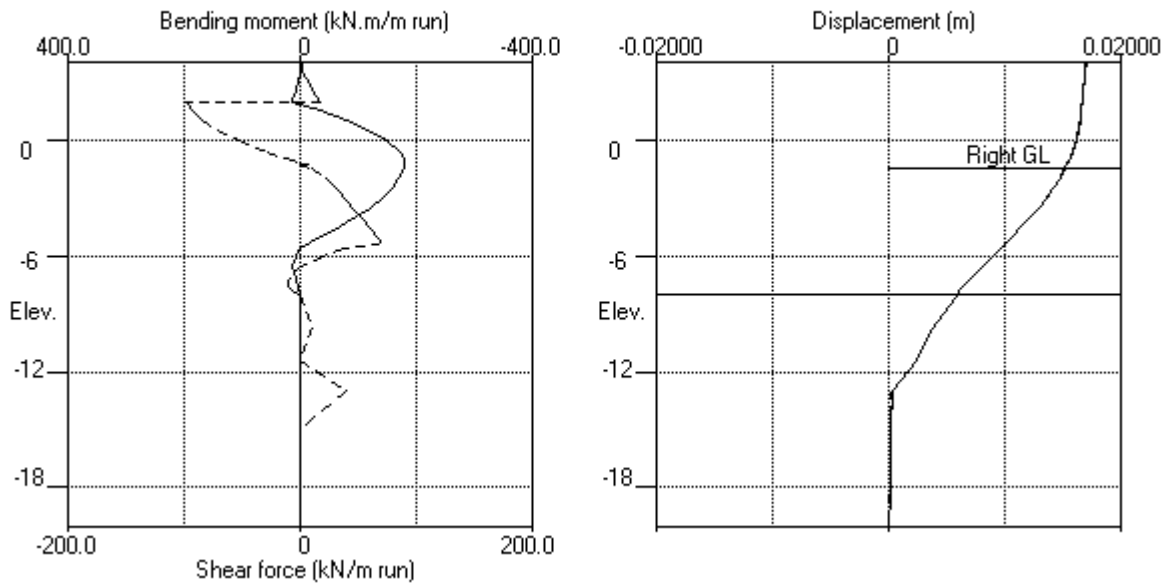
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
35	-18.40	144.00	343.52	0.00	7991.58	310.13	454.13	998109
36	-20.00	160.00	370.84	0.00	8371.01	333.65	493.65	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	8.50	0.00	20.03	19.84	19.84	6274
16	-2.50	0.00	17.00	0.41	49.29	45.82	45.82	6525
17	-3.00	0.00	25.50	3.39	78.55	51.97	51.97	6776
18	-3.50	0.00	34.00	6.38	107.81	58.32	58.32	7027
19	-4.00	0.00	42.50	9.37	137.07	64.66	64.66	7278
20	-4.50	0.00	51.00	12.35	166.33	71.11	71.11	7529
21	-5.00	0.00	59.51	15.34	195.60	76.65	76.65	7780
22	-5.30	3.00	61.61	16.08	224.87	83.23	83.23	8031
23	-5.65	6.50	65.11	6.04	232.11	89.15	92.15	8181
24	-6.00	10.00	68.62	7.03	327.56	195.30	198.30	30115
25	-6.60	16.00	74.62	8.73	342.86	169.54	176.04	30115
26	-7.20	22.00	80.63	10.43	358.17	161.76	171.76	30115
27	-7.60	26.00	84.64	11.57	384.42	159.64	175.64	30115
28	-8.00	30.00	88.65	12.71	410.68	158.89	180.89	30115
29	-8.15	31.50	90.15	13.13	428.19	156.17	182.17	30115
30	-9.80	48.00	106.70	17.82	445.70	143.84	173.84	30115
31	-11.40	48.00	106.70	6.67	452.27	164.19	195.69	30115
32	-13.00	64.00	127.57	12.77	524.58	174.18	222.18	30115
33	-14.90	99.00	180.92	0.00	582.94	187.39	235.39	50192
34	-16.80	118.00	213.41	0.00	674.13	201.67	265.67	50192
35	-18.40	134.00	240.81	0.00	765.43	197.93	277.93	50192
36	-20.00	150.00	268.24	0.00	5283.10	248.97	328.97	1003838
37	-21.00	160.00	280.00	0.00	5733.69	260.22	359.22	1003838
38	-22.00	170.00	290.00	0.00	6184.89	292.72	410.72	1003838
39	-23.00	180.00	300.00	0.00	6565.35	320.12	454.12	1003838
40	-24.00	190.00	310.00	0.00	6946.29	343.66	493.66	1003838

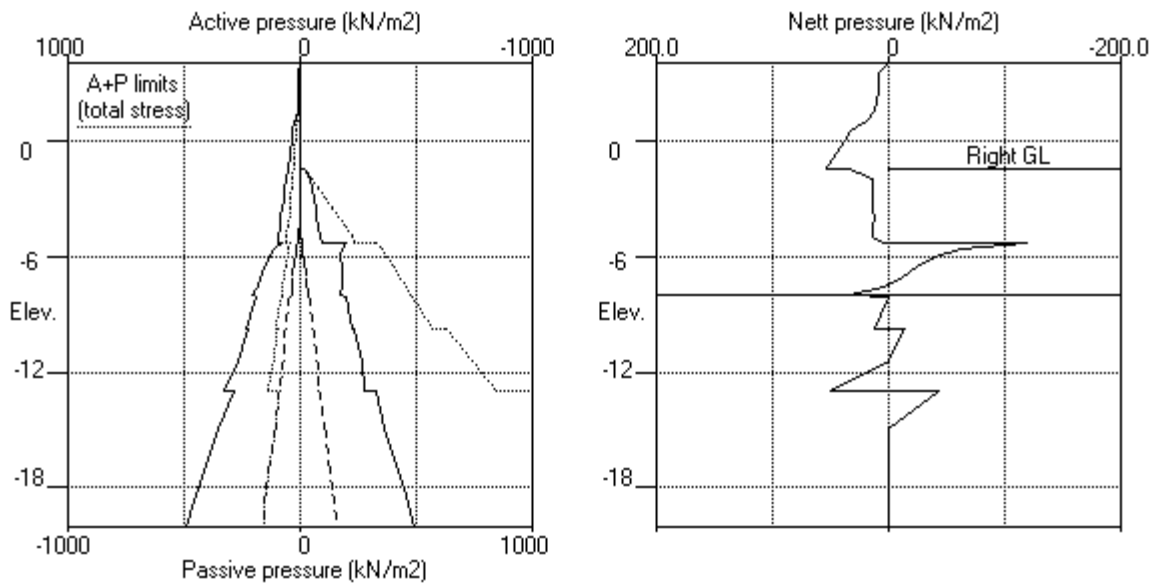
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 12.84A Arching - soil pressure below active limit

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Stage No.6 Apply water pressure profile no.2

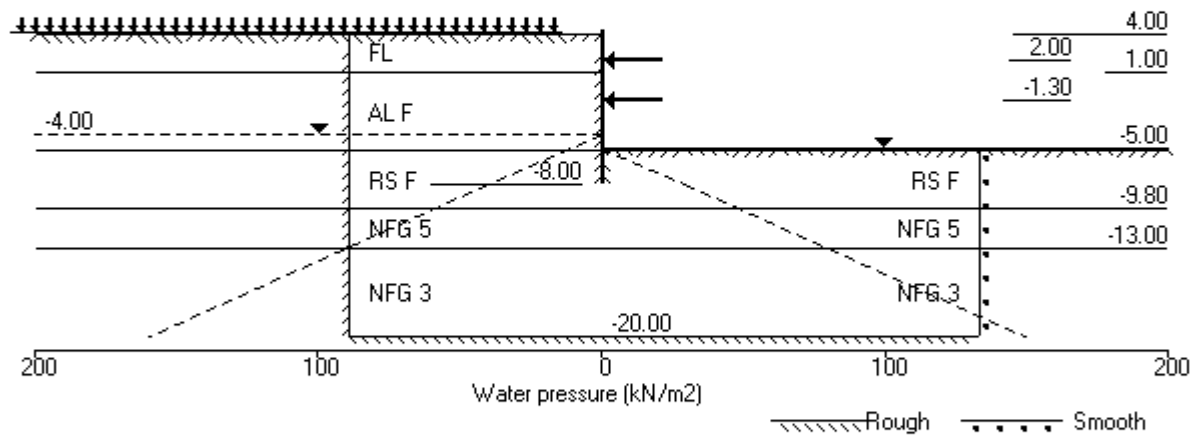


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Units: kN,m

Stage No. 7 Excavate to elevation -5.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
7	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-6.09E-04	0.0	-0.0		572444
2	3.50	14.25	0.015	-6.09E-04	3.6	0.3		572444
3	3.00	13.11	0.016	-6.11E-04	10.4	4.1		572444
4	2.55	12.79	0.016	-6.17E-04	16.2	10.3		572444
5	2.10	13.46	0.016	-6.29E-04	22.1	19.1		572444
6	2.00	12.06	0.016	-6.32E-04	23.4	21.4	-92.8	572444
		12.06	0.016	-6.32E-04	-69.4	21.4		
7	1.50	14.23	0.017	-6.37E-04	-62.8	-10.8		572444
8	1.00	20.38	0.017	-6.14E-04	-54.2	-40.2		572444
		29.02	0.017	-6.14E-04	-54.2	-40.2		
9	0.50	32.78	0.017	-5.69E-04	-38.7	-63.4		572444
10	0.00	37.77	0.018	-5.07E-04	-21.1	-78.3		572444
11	-0.60	44.38	0.018	-4.22E-04	3.6	-83.7		572444
12	-0.95	47.73	0.018	-3.72E-04	19.7	-79.7		572444
13	-1.30	51.44	0.018	-3.27E-04	37.0	-69.8	-199.5	572444
		51.44	0.018	-3.27E-04	-162.4	-69.8		
14	-1.50	52.86	0.018	-2.97E-04	-152.0	-101.2		572444
15	-2.00	57.99	0.018	-1.78E-04	-124.3	-170.1		572444
16	-2.50	62.67	0.018	-6.37E-06	-94.1	-224.8		572444
17	-3.00	67.33	0.018	2.06E-04	-61.6	-263.7		572444
18	-3.50	71.97	0.018	4.46E-04	-26.8	-285.8		572444
19	-4.00	76.52	0.018	6.98E-04	10.3	-290.0		572444
20	-4.50	82.09	0.017	9.45E-04	50.0	-274.9		572444
21	-5.00	86.53	0.017	1.16E-03	92.1	-239.3		572444
		66.50	0.017	1.16E-03	92.1	-239.3		
22	-5.30	56.21	0.017	1.28E-03	110.5	-208.6		572444
		-33.49	0.017	1.28E-03	110.5	-208.6		
23	-5.65	-11.03	0.016	1.40E-03	102.7	-172.8		572444
24	-6.00	-12.24	0.016	1.49E-03	98.7	-138.0		572444
25	-6.60	-26.33	0.015	1.61E-03	87.1	-82.7		572444
26	-7.20	-43.76	0.014	1.67E-03	66.1	-35.8		572444
27	-7.60	-62.88	0.013	1.69E-03	44.7	-12.9		572444

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-8.00	-116.95	0.012	1.69E-03	8.8	-0.0		0
29	-8.15	-0.10	0.011	0	-0.0	0.0		0
30	-9.80	19.54	0.006	0	16.0	0.0		0
		-20.12	0.006	0	16.0	0.0		
31	-11.40	0.01	0.004	0	-0.1	0.0		0
32	-13.00	73.79	0.001	0	59.0	0.0		0
		-62.12	0.001	0	59.0	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	92.8	kN/m run		
At elev. -1.30				Prop force =	199.5	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	14.25	14.25	9981
3	3.00	0.00	17.35	5.36	67.10	13.11	13.11	9981
4	2.55	0.00	25.58	7.90	98.95	12.79	12.79	9981
5	2.10	0.00	34.09	10.53	131.87	13.46	13.46	9981
6	2.00	0.00	36.01	11.13	139.30	12.06	12.06	9981
7	1.50	0.00	45.73	14.13	176.89	14.23	14.23	9981
8	1.00	0.00	55.54	17.16	214.84	20.38	20.38	9981
		0.00	55.54	13.95	211.21	29.02	29.02	4991
9	0.50	0.00	65.35	17.39	244.99	32.78	32.78	5240
10	0.00	0.00	75.11	20.82	278.59	37.77	37.77	5490
11	-0.60	0.00	86.71	24.90	318.51	44.38	44.38	5789
12	-0.95	0.00	93.41	27.25	341.58	47.73	47.73	5964
13	-1.30	0.00	100.07	29.59	364.48	51.44	51.44	6138
14	-1.50	0.00	103.85	30.91	377.50	52.86	52.86	6238
15	-2.00	0.00	113.24	34.21	409.82	57.99	57.99	6488
16	-2.50	0.00	122.54	37.48	441.84	62.67	62.67	6737
17	-3.00	0.00	131.77	40.72	473.60	67.33	67.33	6987
18	-3.50	0.00	140.92	43.94	505.11	71.97	71.97	7236
19	-4.00	0.00	150.02	47.13	536.42	76.52	76.52	7486
20	-4.50	5.00	154.05	48.55	550.32	77.09	82.09	7735
21	-5.00	10.00	158.05	49.95	564.06	76.53	86.53	7985
22	-5.30	13.00	160.42	50.79	572.23	73.47	86.47	8135
		13.00	160.42	33.04	759.29	24.05	37.05A	29943
23	-5.65	16.50	164.22	34.12	775.89	61.79	78.29	29943
24	-6.00	20.00	168.00	35.19	792.42	75.88	95.88	29943
25	-6.60	26.00	174.44	37.02	820.58	88.02	114.02	29943
26	-7.20	32.00	180.85	38.83	848.54	96.81	128.81	29943
27	-7.60	36.00	185.09	40.03	867.09	95.17	131.17	29943
28	-8.00	40.00	189.32	41.23	885.57	58.60	98.60	29943
29	-8.15	41.50	190.90	41.68	892.48	140.20	181.70	29943
30	-9.80	58.00	208.19	46.58	968.01	167.59	225.59	29943
		58.00	208.19	36.32	1026.37	147.42	205.42	49905
31	-11.40	74.00	229.57	42.58	1119.82	178.71	252.71	49905
32	-13.00	90.00	250.83	48.79	1212.70	237.03	327.03	49905
		90.00	250.83	0.00	6704.52	179.06	269.06	998109
33	-14.90	109.00	283.54	0.00	7158.75	242.39	351.39	998109
34	-16.80	128.00	316.14	0.00	7611.40	274.97	402.97	998109

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

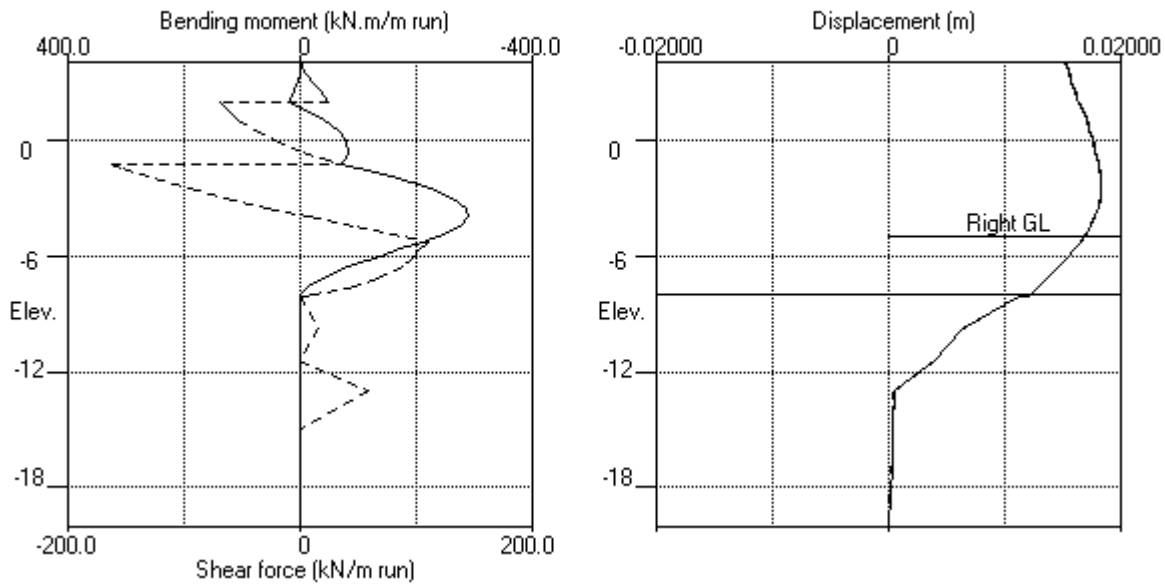
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
35	-18.40	144.00	343.52	0.00	7991.58	302.43	446.43	998109
36	-20.00	160.00	370.84	0.00	8371.01	324.27	484.27	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.30	0.00	0.00	0.00	20.03	20.03	20.03p	8021
		3.00	2.10	0.00	27.26	27.26	30.26p	8172
		3.00	2.10	0.00	67.54	67.54	70.54p	30080
23	-5.65	6.50	5.60	0.00	82.83	82.83	89.33p	30080
24	-6.00	10.00	9.10	0.00	98.12	98.12	108.12p	30080
25	-6.60	16.00	15.10	0.00	124.34	124.34	140.34p	30080
26	-7.20	22.00	21.10	0.00	150.57	150.57	172.57p	30080
27	-7.60	26.00	25.11	0.00	168.05	168.05	194.05p	30080
28	-8.00	30.00	29.11	0.00	185.54	185.54	215.54p	30080
29	-8.15	31.50	30.61	0.00	192.10	150.30	181.80	30080
30	-9.80	48.00	47.13	0.94	264.30	158.05	206.05	30080
		48.00	47.13	0.00	322.66	177.53	225.53	50133
31	-11.40	64.00	67.98	0.00	413.74	188.70	252.70	50133
32	-13.00	80.00	88.85	1.45	504.94	173.24	253.24	50133
		80.00	88.85	0.00	4455.26	251.18	331.18	1002652
33	-14.90	99.00	121.28	0.00	4905.61	252.38	351.38	1002652
34	-16.80	118.00	153.77	0.00	5356.75	284.96	402.96	1002652
35	-18.40	134.00	181.18	0.00	5737.37	312.43	446.43	1002652
36	-20.00	150.00	208.64	0.00	6118.70	334.28	484.28	1002652

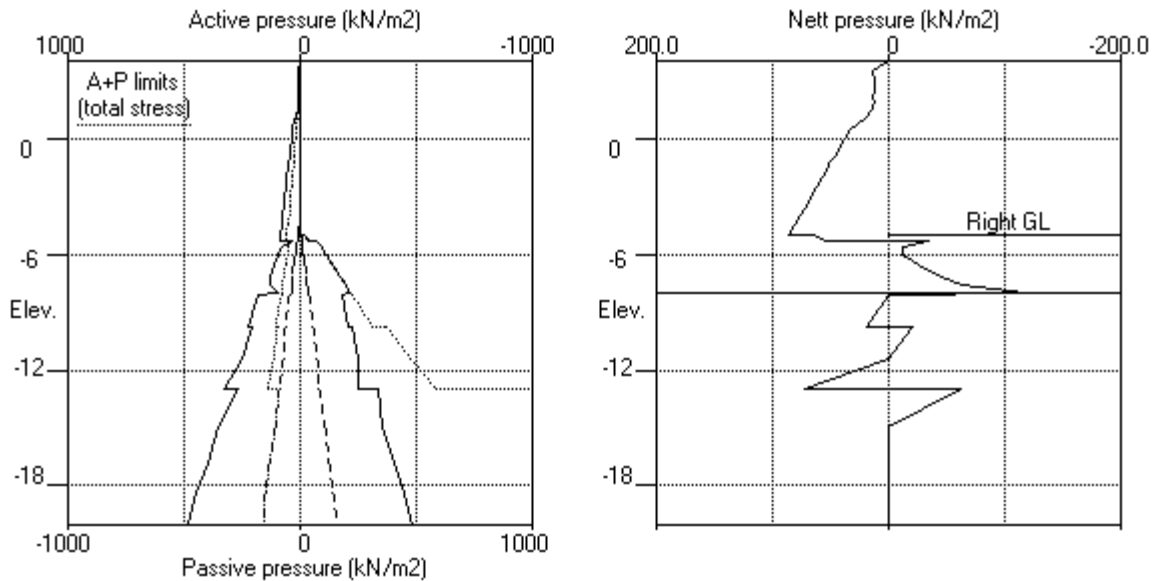
Note: 12.34 a Soil pressure at active limit
 215.54 p Soil pressure at passive limit
 37.05A Arching - soil pressure below active limit

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Stage No.7 Excav. to elev. -5.00 on RIGHT side

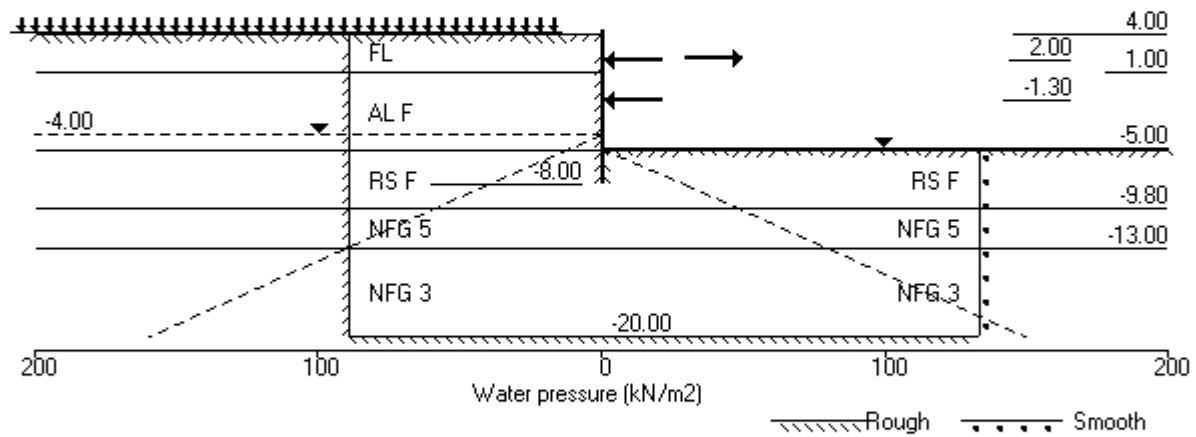


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 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.10



EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No. 8 Apply load no.1 at elevation 2.10

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>More than one prop. No FoS calc.</u>			
8	4.00	-5.00					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.016	-4.64E-04	0.0	-0.0		572444
2	3.50	12.57	0.016	-4.64E-04	3.1	0.3		572444
3	3.00	11.85	0.016	-4.65E-04	9.2	3.7		572444
4	2.55	11.79	0.017	-4.71E-04	14.6	9.2		572444
5	2.10	12.63	0.017	-4.81E-04	20.1	17.2	45.0	572444
		12.63	0.017	-4.81E-04	65.1	17.2		
6	2.00	11.41	0.017	-4.84E-04	66.3	23.8	-130.5	572444
		11.41	0.017	-4.84E-04	-64.2	23.8		
7	1.50	13.77	0.017	-4.92E-04	-57.9	-6.0		572444
8	1.00	20.19	0.017	-4.75E-04	-49.4	-33.0		572444
		28.92	0.017	-4.75E-04	-49.4	-33.0		
9	0.50	32.66	0.018	-4.37E-04	-34.0	-53.7		572444
10	0.00	37.69	0.018	-3.85E-04	-16.4	-66.4		572444
11	-0.60	44.34	0.018	-3.14E-04	8.2	-69.0		572444
12	-0.95	47.74	0.018	-2.74E-04	24.3	-63.4		572444
13	-1.30	51.48	0.018	-2.38E-04	41.7	-51.8	-207.5	572444
		51.48	0.018	-2.38E-04	-165.9	-51.8		
14	-1.50	52.93	0.018	-2.15E-04	-155.4	-84.0		572444
15	-2.00	58.08	0.018	-1.10E-04	-127.7	-154.6		572444
16	-2.50	62.78	0.018	4.87E-05	-97.5	-210.9		572444
17	-3.00	67.45	0.018	2.50E-04	-64.9	-251.5		572444
18	-3.50	72.11	0.018	4.80E-04	-30.0	-275.2		572444
19	-4.00	76.66	0.018	7.23E-04	7.2	-281.0		572444
20	-4.50	82.23	0.017	9.63E-04	46.9	-267.4		572444
21	-5.00	86.66	0.017	1.18E-03	89.1	-233.3		572444
		66.70	0.017	1.18E-03	89.1	-233.3		
22	-5.30	56.41	0.016	1.29E-03	107.6	-203.6		572444
		-32.76	0.016	1.29E-03	107.6	-203.6		
23	-5.65	-10.33	0.016	1.41E-03	100.0	-168.8		572444
24	-6.00	-11.48	0.015	1.50E-03	96.2	-134.9		572444
25	-6.60	-25.51	0.015	1.61E-03	85.1	-80.9		572444
26	-7.20	-42.85	0.014	1.67E-03	64.6	-35.0		572444

(continued)

Stage No.8 Apply load no.1 at elevation 2.10

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
27	-7.60	-61.66	0.013	1.69E-03	43.7	-12.6		572444
28	-8.00	-114.14	0.012	1.69E-03	8.6	-0.0		0
29	-8.15	-0.10	0.011	0	-0.0	0.0		0
30	-9.80	19.54	0.006	0	16.0	0.0		0
		-20.12	0.006	0	16.0	0.0		
31	-11.40	0.01	0.004	0	-0.1	0.0		0
32	-13.00	73.79	0.001	0	59.0	0.0		0
		-62.12	0.001	0	59.0	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	130.5 kN/m run			
At elev. -1.30				Prop force =	207.5 kN/m run			

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	12.57	12.57	9981
3	3.00	0.00	17.35	5.36	67.10	11.85	11.85	9981
4	2.55	0.00	25.58	7.90	98.95	11.79	11.79	9981
5	2.10	0.00	34.09	10.53	131.87	12.63	12.63	9981
6	2.00	0.00	36.01	11.13	139.30	11.41	11.41	9981
7	1.50	0.00	45.73	14.13	176.89	13.77	13.77A	9981
8	1.00	0.00	55.54	17.16	214.84	20.19	20.19	9981
		0.00	55.54	13.95	211.21	28.92	28.92	4991
9	0.50	0.00	65.35	17.39	244.99	32.66	32.66	5240
10	0.00	0.00	75.11	20.82	278.59	37.69	37.69	5490
11	-0.60	0.00	86.71	24.90	318.51	44.34	44.34	5789
12	-0.95	0.00	93.41	27.25	341.58	47.74	47.74	5964
13	-1.30	0.00	100.07	29.59	364.48	51.48	51.48	6138
14	-1.50	0.00	103.85	30.91	377.50	52.93	52.93	6238
15	-2.00	0.00	113.24	34.21	409.82	58.08	58.08	6488
16	-2.50	0.00	122.54	37.48	441.84	62.78	62.78	6737
17	-3.00	0.00	131.77	40.72	473.60	67.45	67.45	6987
18	-3.50	0.00	140.92	43.94	505.11	72.11	72.11	7236
19	-4.00	0.00	150.02	47.13	536.42	76.66	76.66	7486
20	-4.50	5.00	154.05	48.55	550.32	77.23	82.23	7735
21	-5.00	10.00	158.05	49.95	564.06	76.66	86.66	7985
22	-5.30	13.00	160.42	50.79	572.23	73.59	86.59	8135
		13.00	160.42	33.04	759.29	24.50	37.50A	29943
23	-5.65	16.50	164.22	34.12	775.89	62.22	78.72	29943
24	-6.00	20.00	168.00	35.19	792.42	76.32	96.32	29943
25	-6.60	26.00	174.44	37.02	820.58	88.46	114.46	29943
26	-7.20	32.00	180.85	38.83	848.54	97.30	129.30	29943
27	-7.60	36.00	185.09	40.03	867.09	95.81	131.81	29943
28	-8.00	40.00	189.32	41.23	885.57	59.97	99.97	29943
29	-8.15	41.50	190.90	41.68	892.48	140.23	181.73	29943
30	-9.80	58.00	208.19	46.58	968.01	167.60	225.60	29943
		58.00	208.19	36.32	1026.37	147.43	205.43	49905
31	-11.40	74.00	229.57	42.58	1119.82	178.71	252.71	49905
32	-13.00	90.00	250.83	48.79	1212.70	237.03	327.03	49905
		90.00	250.83	0.00	6704.52	179.07	269.07	998109
33	-14.90	109.00	283.54	0.00	7158.75	242.39	351.39	998109

(continued)

Stage No.8 Apply load no.1 at elevation 2.10

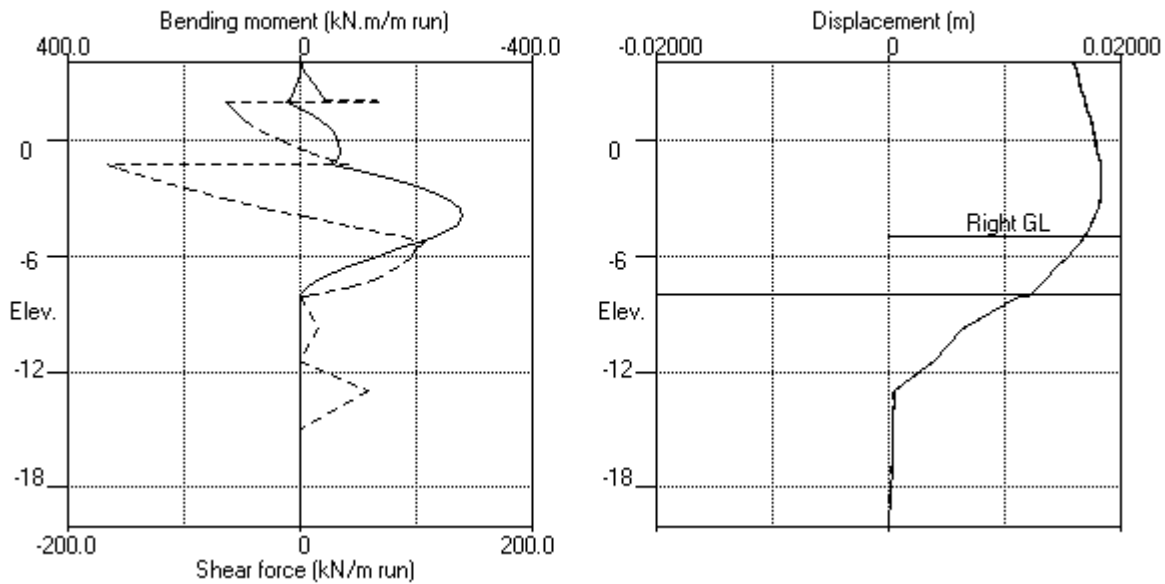
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
34	-16.80	128.00	316.14	0.00	7611.40	274.96	402.96	998109
35	-18.40	144.00	343.52	0.00	7991.58	302.43	446.43	998109
36	-20.00	160.00	370.84	0.00	8371.01	324.27	484.27	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.96	19.96	8021
22	-5.30	3.00	2.10	0.00	27.26	27.18	30.18	8172
		3.00	2.10	0.00	67.54	67.25	70.25	30080
23	-5.65	6.50	5.60	0.00	82.83	82.54	89.04	30080
24	-6.00	10.00	9.10	0.00	98.12	97.79	107.79	30080
25	-6.60	16.00	15.10	0.00	124.34	123.97	139.97	30080
26	-7.20	22.00	21.10	0.00	150.57	150.14	172.14	30080
27	-7.60	26.00	25.11	0.00	168.05	167.47	193.47	30080
28	-8.00	30.00	29.11	0.00	185.54	184.11	214.11	30080
29	-8.15	31.50	30.61	0.00	192.10	150.33	181.83	30080
30	-9.80	48.00	47.13	0.94	264.30	158.06	206.06	30080
		48.00	47.13	0.00	322.66	177.54	225.54	50133
31	-11.40	64.00	67.98	0.00	413.74	188.70	252.70	50133
32	-13.00	80.00	88.85	1.45	504.94	173.24	253.24	50133
		80.00	88.85	0.00	4455.26	251.19	331.19	1002652
33	-14.90	99.00	121.28	0.00	4905.61	252.39	351.39	1002652
34	-16.80	118.00	153.77	0.00	5356.75	284.96	402.96	1002652
35	-18.40	134.00	181.18	0.00	5737.37	312.43	446.43	1002652
36	-20.00	150.00	208.64	0.00	6118.70	334.28	484.28	1002652

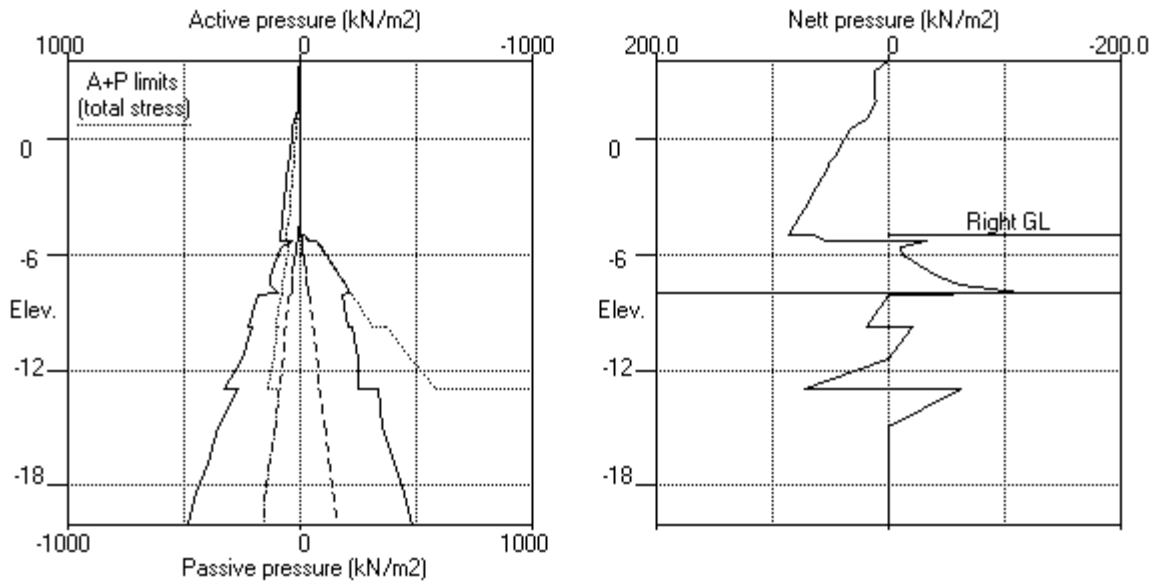
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 37.50A Arching - soil pressure below active limit

Units: kN,m

Stage No.8 Apply load no.1 at elev. 2.10



Stage No.8 Apply load no.1 at elev. 2.10

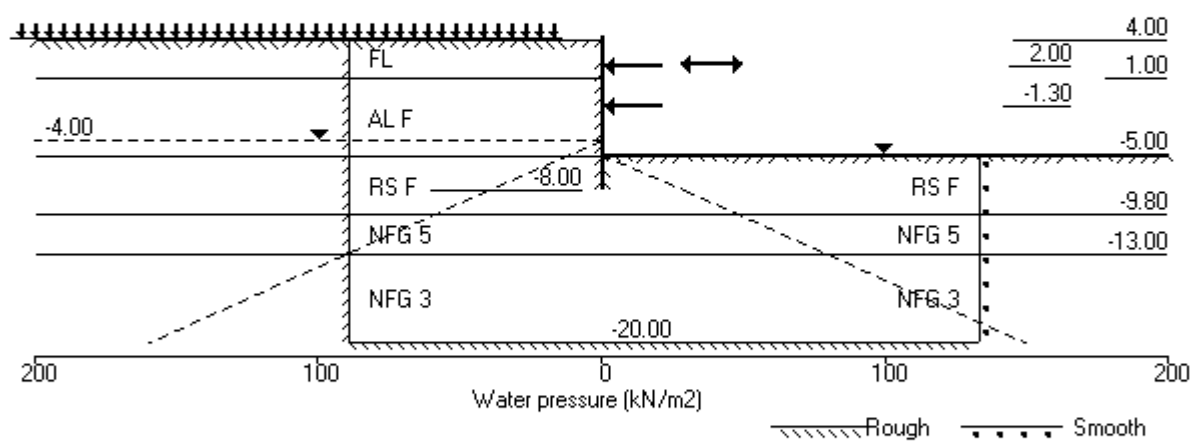


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.10



Units: kN,m

Stage No. 9 Apply load no.2 at elevation 2.10

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
9	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-6.09E-04	0.0	-0.0		572444
2	3.50	14.25	0.015	-6.09E-04	3.6	0.3		572444
3	3.00	13.11	0.016	-6.11E-04	10.4	4.1		572444
4	2.55	12.79	0.016	-6.17E-04	16.2	10.3		572444
5	2.10	13.46	0.016	-6.29E-04	22.1	19.1		572444
6	2.00	12.06	0.016	-6.32E-04	23.4	21.4	-92.8	572444
		12.06	0.016	-6.32E-04	-69.4	21.4		
7	1.50	14.23	0.017	-6.37E-04	-62.8	-10.8		572444
8	1.00	20.38	0.017	-6.14E-04	-54.2	-40.2		572444
		29.02	0.017	-6.14E-04	-54.2	-40.2		
9	0.50	32.78	0.017	-5.69E-04	-38.7	-63.4		572444
10	0.00	37.77	0.018	-5.07E-04	-21.1	-78.3		572444
11	-0.60	44.38	0.018	-4.22E-04	3.6	-83.7		572444
12	-0.95	47.73	0.018	-3.72E-04	19.7	-79.7		572444
13	-1.30	51.44	0.018	-3.27E-04	37.0	-69.8	-199.5	572444
		51.44	0.018	-3.27E-04	-162.4	-69.8		
14	-1.50	52.86	0.018	-2.97E-04	-152.0	-101.2		572444
15	-2.00	57.99	0.018	-1.78E-04	-124.3	-170.1		572444
16	-2.50	62.67	0.018	-6.37E-06	-94.1	-224.8		572444
17	-3.00	67.33	0.018	2.06E-04	-61.6	-263.7		572444
18	-3.50	71.97	0.018	4.46E-04	-26.8	-285.8		572444
19	-4.00	76.52	0.018	6.98E-04	10.3	-290.0		572444
20	-4.50	82.09	0.017	9.45E-04	50.0	-274.9		572444
21	-5.00	86.53	0.017	1.16E-03	92.1	-239.3		572444
		66.50	0.017	1.16E-03	92.1	-239.3		
22	-5.30	56.21	0.017	1.28E-03	110.5	-208.6		572444
		-33.49	0.017	1.28E-03	110.5	-208.6		
23	-5.65	-11.03	0.016	1.40E-03	102.7	-172.8		572444
24	-6.00	-12.24	0.016	1.49E-03	98.7	-138.0		572444
25	-6.60	-26.33	0.015	1.61E-03	87.1	-82.7		572444
26	-7.20	-43.76	0.014	1.67E-03	66.1	-35.8		572444
27	-7.60	-62.88	0.013	1.69E-03	44.7	-12.9		572444

(continued)

Stage No.9 Apply load no.2 at elevation 2.10

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
28	-8.00	-116.95	0.012	1.69E-03	8.8	-0.0		0
29	-8.15	-0.10	0.011	0	-0.0	0.0		0
30	-9.80	19.54	0.006	0	16.0	0.0		0
		-20.12	0.006	0	16.0	0.0		
31	-11.40	0.01	0.004	0	-0.1	0.0		0
32	-13.00	73.79	0.001	0	59.0	0.0		0
		-62.12	0.001	0	59.0	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	92.8	kN/m run		
At elev. -1.30				Prop force =	199.5	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	14.25	14.25	9981
3	3.00	0.00	17.35	5.36	67.10	13.11	13.11	9981
4	2.55	0.00	25.58	7.90	98.95	12.79	12.79	9981
5	2.10	0.00	34.09	10.53	131.87	13.46	13.46	9981
6	2.00	0.00	36.01	11.13	139.30	12.06	12.06	9981
7	1.50	0.00	45.73	14.13	176.89	14.23	14.23	9981
8	1.00	0.00	55.54	17.16	214.84	20.38	20.38	9981
		0.00	55.54	13.95	211.21	29.02	29.02	4991
9	0.50	0.00	65.35	17.39	244.99	32.78	32.78	5240
10	0.00	0.00	75.11	20.82	278.59	37.77	37.77	5490
11	-0.60	0.00	86.71	24.90	318.51	44.38	44.38	5789
12	-0.95	0.00	93.41	27.25	341.58	47.73	47.73	5964
13	-1.30	0.00	100.07	29.59	364.48	51.44	51.44	6138
14	-1.50	0.00	103.85	30.91	377.50	52.86	52.86	6238
15	-2.00	0.00	113.24	34.21	409.82	57.99	57.99	6488
16	-2.50	0.00	122.54	37.48	441.84	62.67	62.67	6737
17	-3.00	0.00	131.77	40.72	473.60	67.33	67.33	6987
18	-3.50	0.00	140.92	43.94	505.11	71.97	71.97	7236
19	-4.00	0.00	150.02	47.13	536.42	76.52	76.52	7486
20	-4.50	5.00	154.05	48.55	550.32	77.09	82.09	7735
21	-5.00	10.00	158.05	49.95	564.06	76.53	86.53	7985
22	-5.30	13.00	160.42	50.79	572.23	73.47	86.47	8135
		13.00	160.42	33.04	759.29	24.05	37.05A	29943
23	-5.65	16.50	164.22	34.12	775.89	61.79	78.29	29943
24	-6.00	20.00	168.00	35.19	792.42	75.88	95.88	29943
25	-6.60	26.00	174.44	37.02	820.58	88.02	114.02	29943
26	-7.20	32.00	180.85	38.83	848.54	96.81	128.81	29943
27	-7.60	36.00	185.09	40.03	867.09	95.17	131.17	29943
28	-8.00	40.00	189.32	41.23	885.57	58.60	98.60	29943
29	-8.15	41.50	190.90	41.68	892.48	140.20	181.70	29943
30	-9.80	58.00	208.19	46.58	968.01	167.59	225.59	29943
		58.00	208.19	36.32	1026.37	147.42	205.42	49905
31	-11.40	74.00	229.57	42.58	1119.82	178.71	252.71	49905
32	-13.00	90.00	250.83	48.79	1212.70	237.03	327.03	49905
		90.00	250.83	0.00	6704.52	179.06	269.06	998109
33	-14.90	109.00	283.54	0.00	7158.75	242.39	351.39	998109
34	-16.80	128.00	316.14	0.00	7611.40	274.97	402.97	998109

(continued)

Stage No.9 Apply load no.2 at elevation 2.10

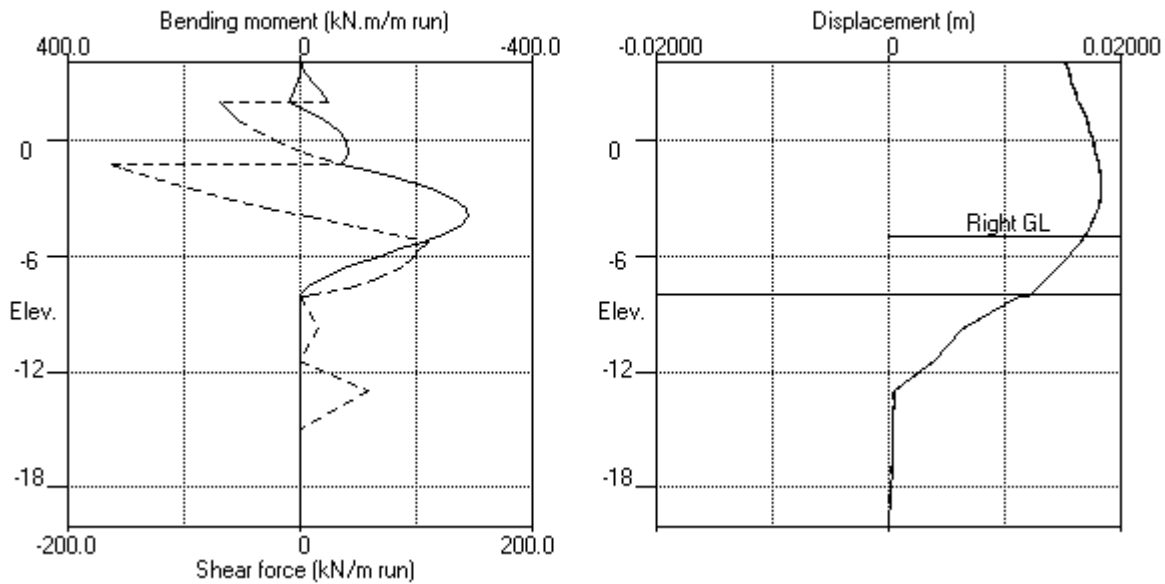
LEFT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
35	-18.40	144.00	343.52	0.00	7991.58	302.43	446.43	998109
36	-20.00	160.00	370.84	0.00	8371.01	324.27	484.27	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Vertic -al kN/m2	Effective stresses		Earth pressure kN/m2	Total earth pressure kN/m2	Adjusted soil modulus kN/m2
				Active limit kN/m2	Passive limit kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
22	-5.30	0.00	0.00	0.00	20.03	20.03	20.03p	8021
		3.00	2.10	0.00	27.26	27.26	30.26p	8172
		3.00	2.10	0.00	67.54	67.54	70.54p	30080
23	-5.65	6.50	5.60	0.00	82.83	82.83	89.33p	30080
24	-6.00	10.00	9.10	0.00	98.12	98.12	108.12p	30080
25	-6.60	16.00	15.10	0.00	124.34	124.34	140.34p	30080
26	-7.20	22.00	21.10	0.00	150.57	150.57	172.57p	30080
27	-7.60	26.00	25.11	0.00	168.05	168.05	194.05p	30080
28	-8.00	30.00	29.11	0.00	185.54	185.54	215.54p	30080
29	-8.15	31.50	30.61	0.00	192.10	150.30	181.80	30080
30	-9.80	48.00	47.13	0.94	264.30	158.05	206.05	30080
		48.00	47.13	0.00	322.66	177.53	225.53	50133
31	-11.40	64.00	67.98	0.00	413.74	188.70	252.70	50133
32	-13.00	80.00	88.85	1.45	504.94	173.24	253.24	50133
		80.00	88.85	0.00	4455.26	251.18	331.18	1002652
33	-14.90	99.00	121.28	0.00	4905.61	252.38	351.38	1002652
34	-16.80	118.00	153.77	0.00	5356.75	284.96	402.96	1002652
35	-18.40	134.00	181.18	0.00	5737.37	312.43	446.43	1002652
36	-20.00	150.00	208.64	0.00	6118.70	334.28	484.28	1002652

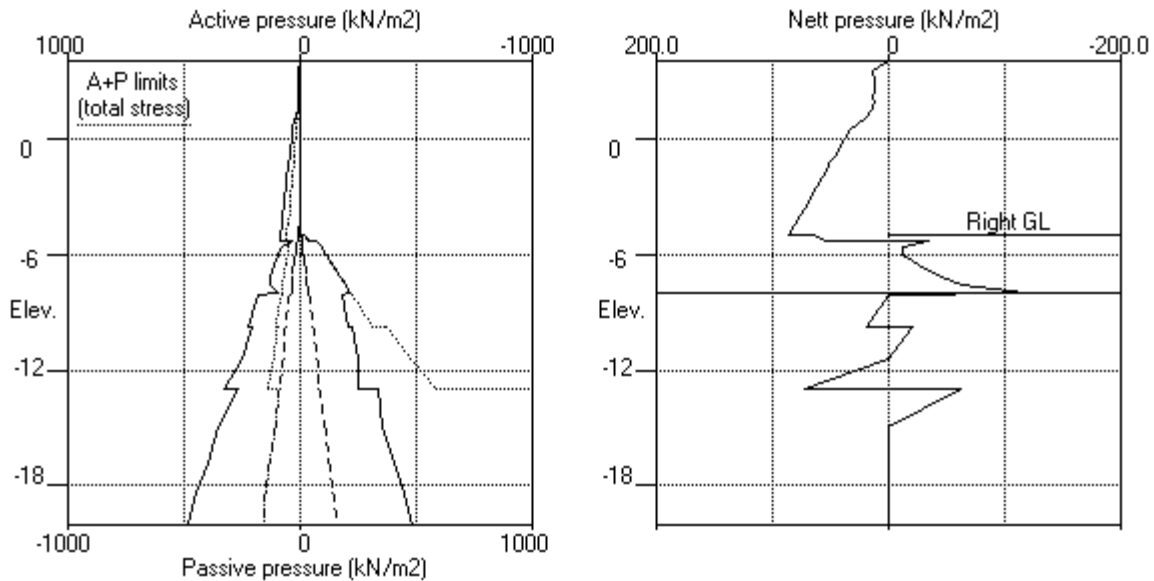
Note: 12.34 a Soil pressure at active limit
 215.54 p Soil pressure at passive limit
 37.05A Arching - soil pressure below active limit

Units: kN,m

Stage No.9 Apply load no.2 at elev. 2.10

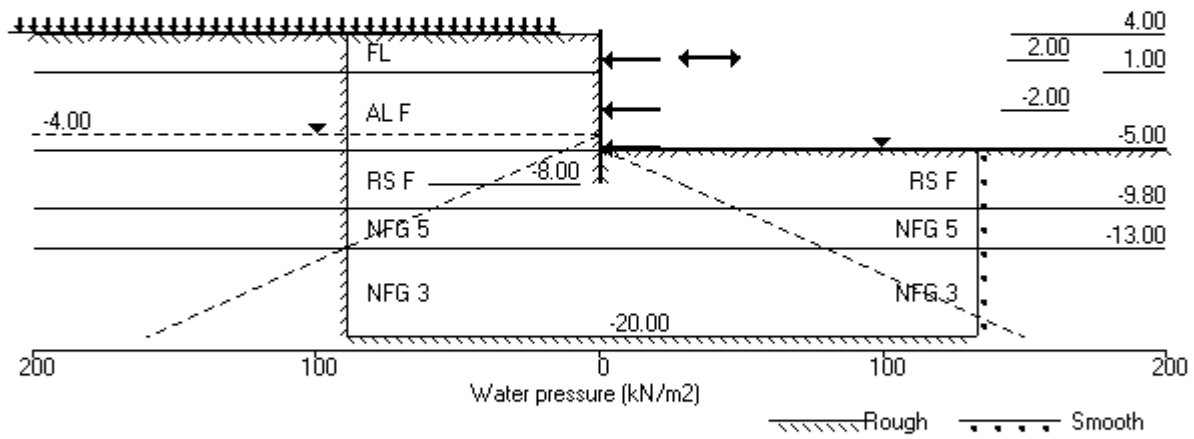


Stage No.9 Apply load no.2 at elev. 2.10



Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Units: kN,m

Stage No. 12 Remove strut or anchor no.2 at elevation -1.30

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
12	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-7.15E-04	0.0	-0.0		572444
2	3.50	14.42	0.016	-7.15E-04	3.6	0.3		572444
3	3.00	13.05	0.016	-7.17E-04	10.5	4.2		572444
4	2.55	12.54	0.016	-7.23E-04	16.2	10.4		572444
5	2.10	13.07	0.017	-7.34E-04	22.0	19.1		572444
6	2.00	11.52	0.017	-7.38E-04	23.2	21.4	-117.8	572444
		11.52	0.017	-7.38E-04	-94.6	21.4		
7	1.50	13.50	0.017	-7.37E-04	-88.4	-23.5		572444
8	1.00	19.37	0.017	-6.98E-04	-80.2	-65.8		572444
		28.51	0.017	-6.98E-04	-80.2	-65.8		
9	0.50	32.13	0.018	-6.25E-04	-65.0	-102.0		572444
10	0.00	37.02	0.018	-5.23E-04	-47.7	-130.2		572444
11	-0.60	43.55	0.018	-3.76E-04	-23.5	-151.7		572444
12	-0.95	46.89	0.018	-2.81E-04	-7.7	-157.2		572444
13	-1.30	50.65	0.019	-1.85E-04	9.4	-156.9		572444
14	-1.50	52.22	0.019	-1.31E-04	19.6	-154.0		572444
15	-2.00	57.59	0.019	-4.38E-06	47.1	-137.1	-178.1	572444
		57.59	0.019	-4.38E-06	-131.0	-137.1		
16	-2.50	62.46	0.019	1.40E-04	-101.0	-195.2		572444
17	-3.00	67.24	0.018	3.29E-04	-68.6	-237.6		572444
18	-3.50	71.95	0.018	5.48E-04	-33.8	-263.2		572444
19	-4.00	76.54	0.018	7.81E-04	3.3	-270.8		572444
20	-4.50	82.13	0.017	1.01E-03	43.0	-259.2		572444
21	-5.00	86.55	0.017	1.22E-03	85.2	-227.0	1.9	572444
		66.52	0.017	1.22E-03	87.1	-227.0		
22	-5.30	56.17	0.016	1.33E-03	105.5	-197.9		572444
		-33.62	0.016	1.33E-03	105.5	-197.9		
23	-5.65	-10.83	0.016	1.44E-03	97.7	-163.9		572444
24	-6.00	-11.61	0.015	1.53E-03	93.8	-130.8		572444
25	-6.60	-25.19	0.015	1.64E-03	82.8	-78.3		572444
26	-7.20	-42.06	0.014	1.70E-03	62.6	-33.7		572444
27	-7.60	-60.09	0.013	1.72E-03	42.2	-12.1		572444

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-8.00	-109.66	0.012	1.72E-03	8.2	-0.0		0
29	-8.15	-0.10	0.011	0	-0.0	0.0		0
30	-9.80	19.54	0.006	0	16.0	0.0		0
		-20.12	0.006	0	16.0	0.0		
31	-11.40	0.01	0.004	0	-0.1	0.0		0
32	-13.00	73.79	0.001	0	59.0	0.0		0
		-62.12	0.001	0	59.0	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 2.00					Prop force = 117.8 kN/m run			
At elev. -2.00					Prop force = 178.1 kN/m run			
At elev. -5.00					Prop force = -1.9 kN/m run			

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	14.42	14.42	9981
3	3.00	0.00	17.35	5.36	67.10	13.05	13.05	9981
4	2.55	0.00	25.58	7.90	98.95	12.54	12.54	9981
5	2.10	0.00	34.09	10.53	131.87	13.07	13.07	9981
6	2.00	0.00	36.01	11.13	139.30	11.52	11.52	9981
7	1.50	0.00	45.73	14.13	176.89	13.50	13.50A	9981
8	1.00	0.00	55.54	17.16	214.84	19.37	19.37	9981
		0.00	55.54	13.95	211.21	28.51	28.51	4991
9	0.50	0.00	65.35	17.39	244.99	32.13	32.13	5240
10	0.00	0.00	75.11	20.82	278.59	37.02	37.02	5490
11	-0.60	0.00	86.71	24.90	318.51	43.55	43.55	5789
12	-0.95	0.00	93.41	27.25	341.58	46.89	46.89	5964
13	-1.30	0.00	100.07	29.59	364.48	50.65	50.65	6138
14	-1.50	0.00	103.85	30.91	377.50	52.22	52.22	6238
15	-2.00	0.00	113.24	34.21	409.82	57.59	57.59	6488
16	-2.50	0.00	122.54	37.48	441.84	62.46	62.46	6737
17	-3.00	0.00	131.77	40.72	473.60	67.24	67.24	6987
18	-3.50	0.00	140.92	43.94	505.11	71.95	71.95	7236
19	-4.00	0.00	150.02	47.13	536.42	76.54	76.54	7486
20	-4.50	5.00	154.05	48.55	550.32	77.13	82.13	7735
21	-5.00	10.00	158.05	49.95	564.06	76.55	86.55	7985
22	-5.30	13.00	160.42	50.79	572.23	73.43	86.43	8135
		13.00	160.42	33.04	759.29	23.91	36.91A	29943
23	-5.65	16.50	164.22	34.12	775.89	62.00	78.50	29943
24	-6.00	20.00	168.00	35.19	792.42	76.33	96.33	29943
25	-6.60	26.00	174.44	37.02	820.58	88.68	114.68	29943
26	-7.20	32.00	180.85	38.83	848.54	97.74	129.74	29943
27	-7.60	36.00	185.09	40.03	867.09	96.64	132.64	29943
28	-8.00	40.00	189.32	41.23	885.57	62.17	102.17	29943
29	-8.15	41.50	190.90	41.68	892.48	140.27	181.77	29943
30	-9.80	58.00	208.19	46.58	968.01	167.61	225.61	29943
		58.00	208.19	36.32	1026.37	147.45	205.45	49905
31	-11.40	74.00	229.57	42.58	1119.82	178.72	252.72	49905
32	-13.00	90.00	250.83	48.79	1212.70	237.03	327.03	49905
		90.00	250.83	0.00	6704.52	179.08	269.08	998109
33	-14.90	109.00	283.54	0.00	7158.75	242.40	351.40	998109

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

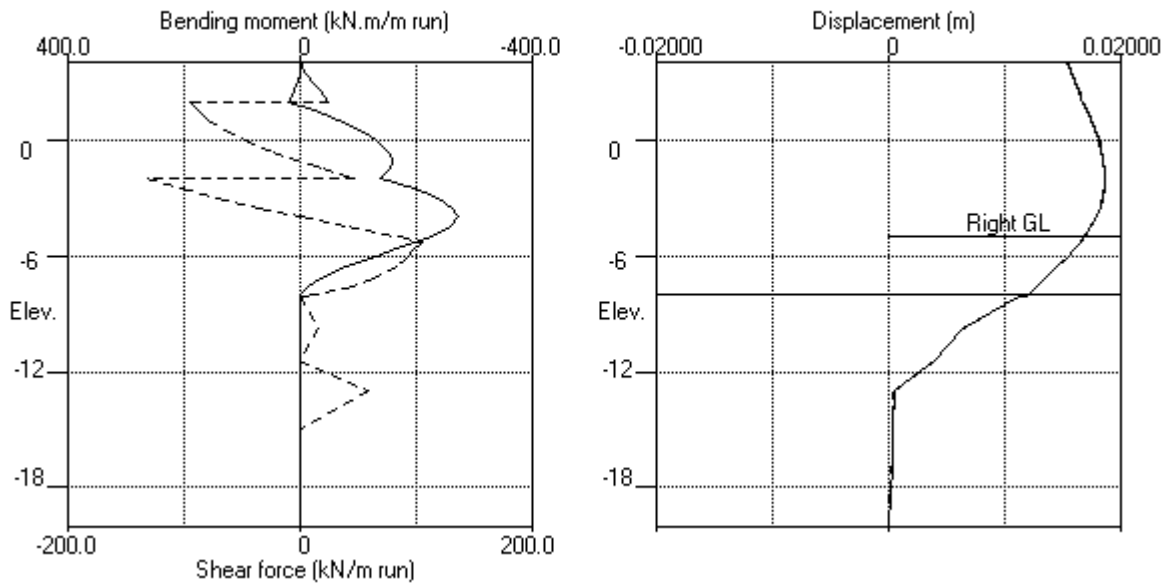
LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
34	-16.80	128.00	316.14	0.00	7611.40	274.97	402.97	998109
35	-18.40	144.00	343.52	0.00	7991.58	302.44	446.44	998109
36	-20.00	160.00	370.84	0.00	8371.01	324.28	484.28	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	8021
22	-5.30	3.00	2.10	0.00	27.26	27.26	30.26p	8172
		3.00	2.10	0.00	67.54	67.54	70.54p	30080
23	-5.65	6.50	5.60	0.00	82.83	82.83	89.33p	30080
24	-6.00	10.00	9.10	0.00	98.12	97.95	107.95	30080
25	-6.60	16.00	15.10	0.00	124.34	123.88	139.88	30080
26	-7.20	22.00	21.10	0.00	150.57	149.79	171.79	30080
27	-7.60	26.00	25.11	0.00	168.05	166.73	192.73	30080
28	-8.00	30.00	29.11	0.00	185.54	181.83	211.83	30080
29	-8.15	31.50	30.61	0.00	192.10	150.37	181.87	30080
30	-9.80	48.00	47.13	0.94	264.30	158.07	206.07	30080
		48.00	47.13	0.00	322.66	177.56	225.56	50133
31	-11.40	64.00	67.98	0.00	413.74	188.71	252.71	50133
32	-13.00	80.00	88.85	1.45	504.94	173.24	253.24	50133
		80.00	88.85	0.00	4455.26	251.19	331.19	1002652
33	-14.90	99.00	121.28	0.00	4905.61	252.39	351.39	1002652
34	-16.80	118.00	153.77	0.00	5356.75	284.97	402.97	1002652
35	-18.40	134.00	181.18	0.00	5737.37	312.43	446.43	1002652
36	-20.00	150.00	208.64	0.00	6118.70	334.29	484.29	1002652

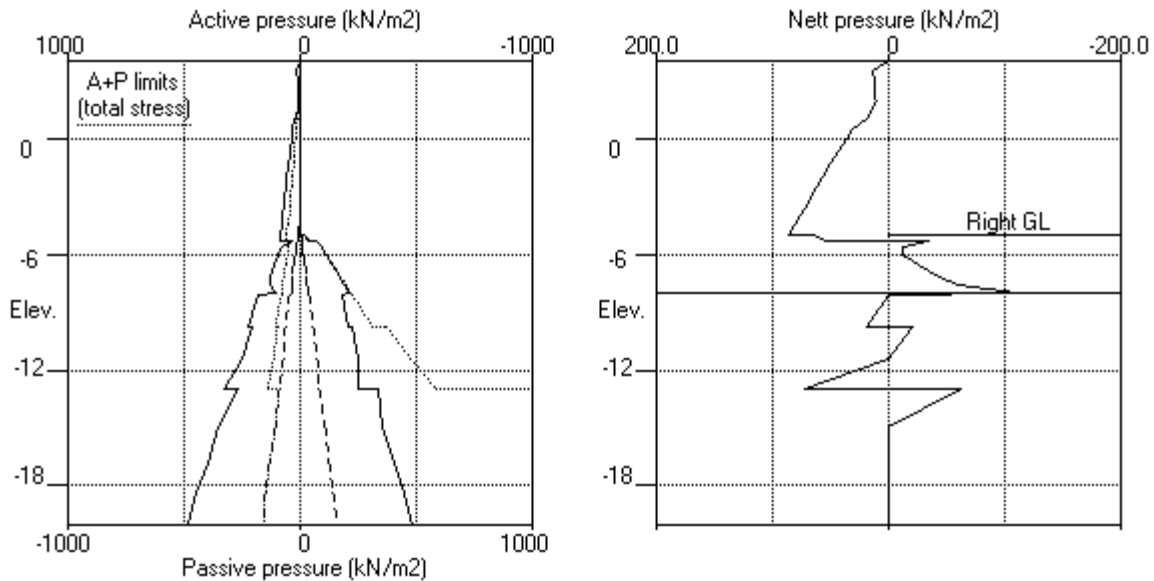
Note: 12.34 a Soil pressure at active limit
 89.33 p Soil pressure at passive limit
 36.91A Arching - soil pressure below active limit

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Stage No.12 Remove prop no.2 at elev. -1.30

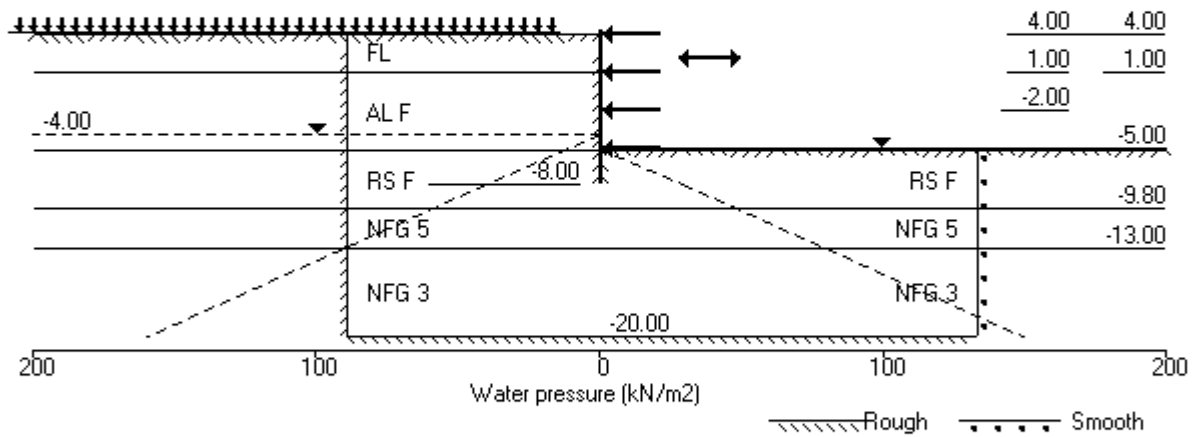


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.15 Remove prop no.1 at elev. 2.00



Units: kN,m

Stage No. 15 Remove strut or anchor no.1 at elevation 2.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -8.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u>
				<u>Factor</u> <u>of</u>	<u>Moment</u> <u>equilib.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u>	
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
15	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-8.27E-04	-35.9	-0.0	-35.9	572444
2	3.50	14.46	0.016	-8.19E-04	-32.3	-17.6		572444
3	3.00	12.71	0.016	-7.97E-04	-25.5	-31.7		572444
4	2.55	11.97	0.016	-7.68E-04	-19.9	-41.7		572444
5	2.10	12.40	0.017	-7.33E-04	-14.4	-49.2		572444
6	2.00	10.89	0.017	-7.24E-04	-13.3	-50.6		572444
7	1.50	13.05	0.017	-6.78E-04	-7.3	-54.9		572444
8	1.00	19.22	0.018	-6.29E-04	0.8	-56.7	-80.9	572444
		28.43	0.018	-6.29E-04	-80.1	-56.7		
9	0.50	32.09	0.018	-5.64E-04	-65.0	-92.9		572444
10	0.00	37.00	0.018	-4.70E-04	-47.7	-121.1		572444
11	-0.60	43.56	0.018	-3.32E-04	-23.5	-142.6		572444
12	-0.95	46.92	0.018	-2.43E-04	-7.7	-148.1		572444
13	-1.30	50.70	0.019	-1.53E-04	9.4	-147.8		572444
14	-1.50	52.29	0.019	-1.02E-04	19.7	-144.9		572444
15	-2.00	57.66	0.019	1.69E-05	47.2	-128.0	-181.3	572444
		57.66	0.019	1.69E-05	-134.1	-128.0		
16	-2.50	62.54	0.019	1.54E-04	-104.0	-187.6		572444
17	-3.00	67.31	0.018	3.37E-04	-71.6	-231.5		572444
18	-3.50	72.03	0.018	5.51E-04	-36.7	-258.6		572444
19	-4.00	76.61	0.018	7.81E-04	0.4	-267.7		572444
20	-4.50	82.18	0.017	1.01E-03	40.1	-257.6		572444
21	-5.00	86.60	0.017	1.22E-03	82.3	-226.8	4.6	572444
		66.62	0.017	1.22E-03	86.9	-226.8		
22	-5.30	56.25	0.016	1.33E-03	105.3	-197.8		572444
		-33.35	0.016	1.33E-03	105.3	-197.8		
23	-5.65	-10.65	0.016	1.44E-03	97.6	-163.8		572444
24	-6.00	-11.48	0.015	1.53E-03	93.7	-130.8		572444
25	-6.60	-25.10	0.015	1.64E-03	82.7	-78.3		572444
26	-7.20	-42.01	0.014	1.70E-03	62.6	-33.8		572444
27	-7.60	-60.08	0.013	1.71E-03	42.2	-12.1		572444
28	-8.00	-109.74	0.012	1.72E-03	8.2	-0.0		0

(continued)

Stage No.15 Remove strut or anchor no.1 at elevation 2.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-8.15	-0.10	0.011	0	-0.0	0.0		0
30	-9.80	19.54	0.006	0	16.0	0.0		0
		-20.12	0.006	0	16.0	0.0		
31	-11.40	0.01	0.004	0	-0.1	0.0		0
32	-13.00	73.79	0.001	0	59.0	0.0		0
		-62.12	0.001	0	59.0	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	35.9 kN/m run			
At elev. 1.00				Prop force =	80.9 kN/m run			
At elev. -2.00				Prop force =	181.3 kN/m run			
At elev. -5.00				Prop force =	-4.6 kN/m run			

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	14.46	14.46	9981
3	3.00	0.00	17.35	5.36	67.10	12.71	12.71	9981
4	2.55	0.00	25.58	7.90	98.95	11.97	11.97	9981
5	2.10	0.00	34.09	10.53	131.87	12.40	12.40	9981
6	2.00	0.00	36.01	11.13	139.30	10.89	10.89A	9981
7	1.50	0.00	45.73	14.13	176.89	13.05	13.05A	9981
8	1.00	0.00	55.54	17.16	214.84	19.22	19.22	9981
		0.00	55.54	13.95	211.21	28.43	28.43	4991
9	0.50	0.00	65.35	17.39	244.99	32.09	32.09	5240
10	0.00	0.00	75.11	20.82	278.59	37.00	37.00	5490
11	-0.60	0.00	86.71	24.90	318.51	43.56	43.56	5789
12	-0.95	0.00	93.41	27.25	341.58	46.92	46.92	5964
13	-1.30	0.00	100.07	29.59	364.48	50.70	50.70	6138
14	-1.50	0.00	103.85	30.91	377.50	52.29	52.29	6238
15	-2.00	0.00	113.24	34.21	409.82	57.66	57.66	6488
16	-2.50	0.00	122.54	37.48	441.84	62.54	62.54	6737
17	-3.00	0.00	131.77	40.72	473.60	67.31	67.31	6987
18	-3.50	0.00	140.92	43.94	505.11	72.03	72.03	7236
19	-4.00	0.00	150.02	47.13	536.42	76.61	76.61	7486
20	-4.50	5.00	154.05	48.55	550.32	77.18	82.18	7735
21	-5.00	10.00	158.05	49.95	564.06	76.60	86.60	7985
22	-5.30	13.00	160.42	50.79	572.23	73.47	86.47	8135
		13.00	160.42	33.04	759.29	24.05	37.05A	29943
23	-5.65	16.50	164.22	34.12	775.89	62.10	78.60	29943
24	-6.00	20.00	168.00	35.19	792.42	76.41	96.41	29943
25	-6.60	26.00	174.44	37.02	820.58	88.74	114.74	29943
26	-7.20	32.00	180.85	38.83	848.54	97.77	129.77	29943
27	-7.60	36.00	185.09	40.03	867.09	96.65	132.65	29943
28	-8.00	40.00	189.32	41.23	885.57	62.14	102.14	29943
29	-8.15	41.50	190.90	41.68	892.48	140.27	181.77	29943
30	-9.80	58.00	208.19	46.58	968.01	167.61	225.61	29943
		58.00	208.19	36.32	1026.37	147.45	205.45	49905
31	-11.40	74.00	229.57	42.58	1119.82	178.72	252.72	49905
32	-13.00	90.00	250.83	48.79	1212.70	237.03	327.03	49905
		90.00	250.83	0.00	6704.52	179.08	269.08	998109
33	-14.90	109.00	283.54	0.00	7158.75	242.40	351.40	998109

(continued)

Stage No.15 Remove strut or anchor no.1 at elevation 2.00

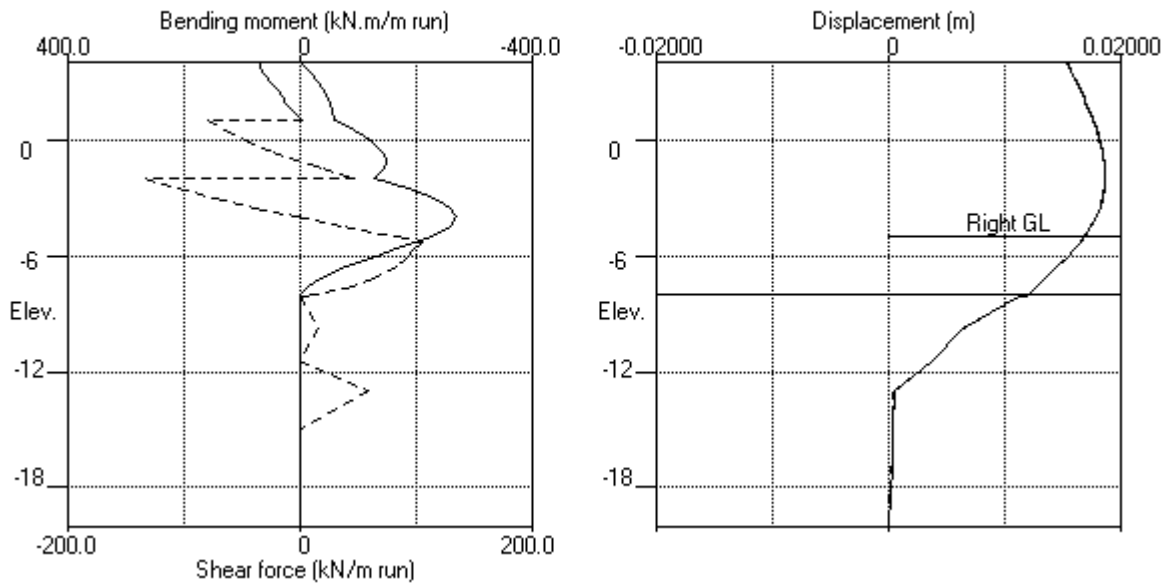
LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
34	-16.80	128.00	316.14	0.00	7611.40	274.97	402.97	998109
35	-18.40	144.00	343.52	0.00	7991.58	302.44	446.44	998109
36	-20.00	160.00	370.84	0.00	8371.01	324.28	484.28	998109

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.97	19.97	8021
22	-5.30	3.00	2.10	0.00	27.26	27.22	30.22	8172
		3.00	2.10	0.00	67.54	67.40	70.40	30080
23	-5.65	6.50	5.60	0.00	82.83	82.74	89.24	30080
24	-6.00	10.00	9.10	0.00	98.12	97.89	107.89	30080
25	-6.60	16.00	15.10	0.00	124.34	123.84	139.84	30080
26	-7.20	22.00	21.10	0.00	150.57	149.77	171.77	30080
27	-7.60	26.00	25.11	0.00	168.05	166.73	192.73	30080
28	-8.00	30.00	29.11	0.00	185.54	181.88	211.88	30080
29	-8.15	31.50	30.61	0.00	192.10	150.37	181.87	30080
30	-9.80	48.00	47.13	0.94	264.30	158.07	206.07	30080
		48.00	47.13	0.00	322.66	177.56	225.56	50133
31	-11.40	64.00	67.98	0.00	413.74	188.71	252.71	50133
32	-13.00	80.00	88.85	1.45	504.94	173.24	253.24	50133
		80.00	88.85	0.00	4455.26	251.20	331.20	1002652
33	-14.90	99.00	121.28	0.00	4905.61	252.39	351.39	1002652
34	-16.80	118.00	153.77	0.00	5356.75	284.97	402.97	1002652
35	-18.40	134.00	181.18	0.00	5737.37	312.43	446.43	1002652
36	-20.00	150.00	208.64	0.00	6118.70	334.29	484.29	1002652

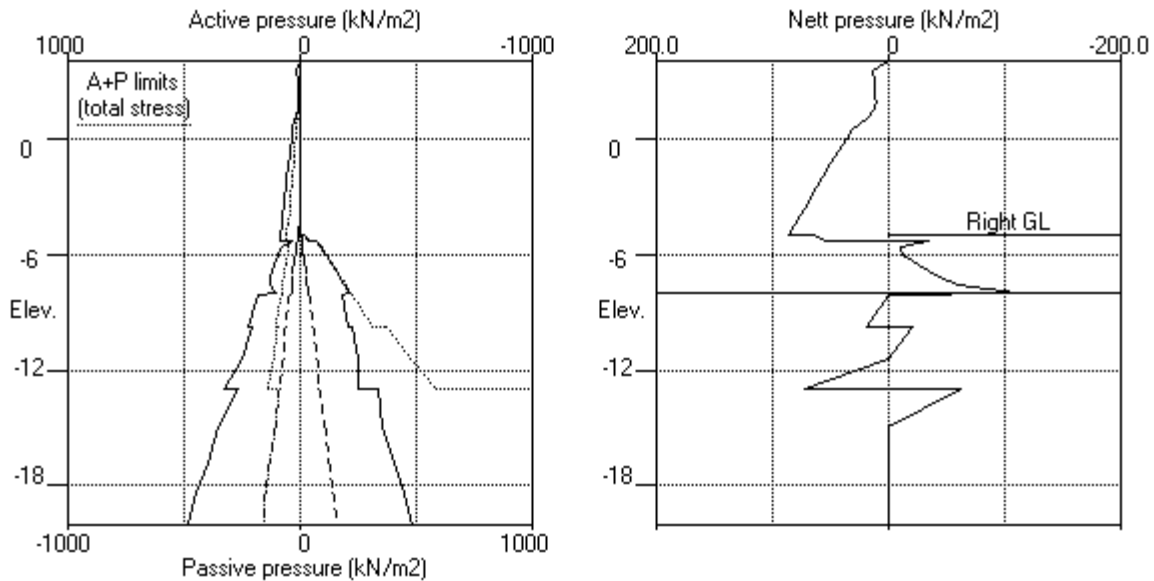
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 37.05A Arching - soil pressure below active limit

Units: kN,m

Stage No.15 Remove prop no.1 at elev. 2.00



Stage No.15 Remove prop no.1 at elev. 2.00

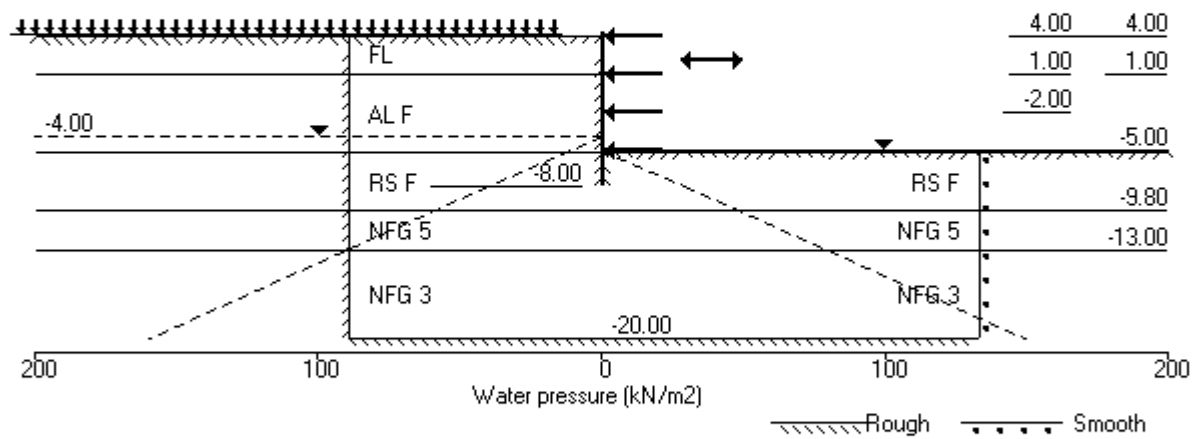


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_5
 Albert Street Development
 Section 5

| Sheet No.
 | Job No. B01493
 | Made by : DJC
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.16 Change EI of wall to 400711kN.m2/m run



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DJC
Data filename/Run ID: Section_5	
Albert Street Development	Date:16-11-2022
Section 5	Checked :

Units: kN,m

Stage No. 16 Change EI of wall to 400711 kN.m2/m run
Allow wall to relax with new modulus value

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method
Factor of safety on nett available passive

			FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		
<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Elev.</u>	<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	<u>Direction</u> <u>of</u> <u>failure</u>
16	4.00	-5.00	More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 40.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
Right side 30.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.015	-8.31E-04	-28.2	-0.0	-28.2	400711
2	3.50	14.48	0.016	-8.22E-04	-24.6	-14.7		400711
3	3.00	12.72	0.016	-7.99E-04	-17.8	-25.8		400711
4	2.55	11.97	0.016	-7.68E-04	-12.3	-33.2		400711
5	2.10	12.41	0.017	-7.31E-04	-6.8	-38.1		400711
6	2.00	10.91	0.017	-7.23E-04	-5.6	-38.9		400711
7	1.50	13.08	0.017	-6.78E-04	0.4	-40.2		400711
8	1.00	19.24	0.018	-6.35E-04	8.5	-39.0	-76.4	400711
		28.44	0.018	-6.35E-04	-67.9	-39.0		
9	0.50	32.09	0.018	-5.74E-04	-52.8	-70.5		400711
10	0.00	36.99	0.018	-4.81E-04	-35.5	-94.0		400711
11	-0.60	43.55	0.018	-3.41E-04	-11.3	-109.9		400711
12	-0.95	46.92	0.018	-2.53E-04	4.5	-112.1		400711
13	-1.30	50.70	0.019	-1.67E-04	21.6	-108.5		400711
14	-1.50	52.29	0.019	-1.20E-04	31.9	-103.8		400711
15	-2.00	57.63	0.019	-2.06E-05	59.4	-82.2	-199.1	400711
		57.63	0.019	-2.06E-05	-139.8	-82.2		
16	-2.50	62.39	0.019	1.03E-04	-109.8	-143.9		400711
17	-3.00	67.00	0.018	2.96E-04	-77.4	-190.1		400711
18	-3.50	71.58	0.018	5.36E-04	-42.8	-219.5		400711
19	-4.00	76.06	0.018	8.03E-04	-5.9	-230.9		400711
20	-4.50	81.60	0.017	1.07E-03	33.6	-223.2		400711
21	-5.00	86.00	0.017	1.32E-03	75.5	-195.1	-2.9	400711
		65.97	0.017	1.32E-03	72.5	-195.1		
22	-5.30	55.59	0.016	1.45E-03	90.8	-169.4		400711
		-35.78	0.016	1.45E-03	90.8	-169.4		
23	-5.65	-12.03	0.016	1.57E-03	82.4	-139.4		400711
24	-6.00	-12.01	0.015	1.68E-03	78.2	-110.5		400711
25	-6.60	-23.40	0.014	1.80E-03	67.6	-65.3		400711
26	-7.20	-37.11	0.013	1.87E-03	49.4	-27.5		400711
27	-7.60	-49.82	0.012	1.88E-03	32.0	-9.6		400711

(continued)

Stage No.16 Change EI of wall to 400711 kN.m²/m run
 Allow wall to relax with new modulus value

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m ²	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m ² /m
28	-8.00	-80.25	0.012	1.89E-03	6.0	-0.0		0
29	-8.15	-0.10	0.011	0	-0.0	0.0		0
30	-9.80	19.54	0.006	0	16.0	0.0		0
		-20.12	0.006	0	16.0	0.0		
31	-11.40	0.01	0.004	0	-0.1	0.0		0
32	-13.00	73.79	0.001	0	59.0	0.0		0
		-62.12	0.001	0	59.0	0.0		
33	-14.90	0.01	0.000	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	28.2	kN/m run		
At elev. 1.00				Prop force =	76.4	kN/m run		
At elev. -2.00				Prop force =	199.1	kN/m run		
At elev. -5.00				Prop force =	2.9	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m ²	<u>Vertic</u> <u>-al</u> kN/m ²	<u>Effective</u> <u>stresses</u> <u>Active</u> <u>limit</u> kN/m ²	<u>Passive</u> <u>limit</u> kN/m ²	<u>Earth</u> <u>pressure</u> kN/m ²	<u>Total</u> <u>earth</u> <u>pressure</u> kN/m ²	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m ²
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	0.00	8.55	2.64	33.06	14.48	14.48	9981
3	3.00	0.00	17.35	5.36	67.10	12.72	12.72	9981
4	2.55	0.00	25.58	7.90	98.95	11.97	11.97	9981
5	2.10	0.00	34.09	10.53	131.87	12.41	12.41	9981
6	2.00	0.00	36.01	11.13	139.30	10.91	10.91A	9981
7	1.50	0.00	45.73	14.13	176.89	13.08	13.08A	9981
8	1.00	0.00	55.54	17.16	214.84	19.24	19.24	9981
		0.00	55.54	13.95	211.21	28.44	28.44	4991
9	0.50	0.00	65.35	17.39	244.99	32.09	32.09	5240
10	0.00	0.00	75.11	20.82	278.59	36.99	36.99	5490
11	-0.60	0.00	86.71	24.90	318.51	43.55	43.55	5789
12	-0.95	0.00	93.41	27.25	341.58	46.92	46.92	5964
13	-1.30	0.00	100.07	29.59	364.48	50.70	50.70	6138
14	-1.50	0.00	103.85	30.91	377.50	52.29	52.29	6238
15	-2.00	0.00	113.24	34.21	409.82	57.63	57.63	6488
16	-2.50	0.00	122.54	37.48	441.84	62.39	62.39	6737
17	-3.00	0.00	131.77	40.72	473.60	67.00	67.00	6987
18	-3.50	0.00	140.92	43.94	505.11	71.58	71.58	7236
19	-4.00	0.00	150.02	47.13	536.42	76.06	76.06	7486
20	-4.50	5.00	154.05	48.55	550.32	76.60	81.60	7735
21	-5.00	10.00	158.05	49.95	564.06	76.00	86.00	7985
22	-5.30	13.00	160.42	50.79	572.23	72.84	85.84	8135
		13.00	160.42	33.04	759.29	21.76	34.76A	29943
23	-5.65	16.50	164.22	34.12	775.89	60.80	77.30	29943
24	-6.00	20.00	168.00	35.19	792.42	76.11	96.11	29943
25	-6.60	26.00	174.44	37.02	820.58	89.71	115.71	29943
26	-7.20	32.00	180.85	38.83	848.54	100.31	132.31	29943
27	-7.60	36.00	185.09	40.03	867.09	101.91	137.91	29943
28	-8.00	40.00	189.32	41.23	885.57	76.46	116.46	29943
29	-8.15	41.50	190.90	41.68	892.48	140.43	181.93	29943
30	-9.80	58.00	208.19	46.58	968.01	167.63	225.63	29943
		58.00	208.19	36.32	1026.37	147.49	205.49	49905
31	-11.40	74.00	229.57	42.58	1119.82	178.74	252.74	49905
32	-13.00	90.00	250.83	48.79	1212.70	237.03	327.03	49905
		90.00	250.83	0.00	6704.52	179.10	269.10	998109

(continued)

Stage No.16 Change EI of wall to 400711 kN.m2/m run
 Allow wall to relax with new modulus value

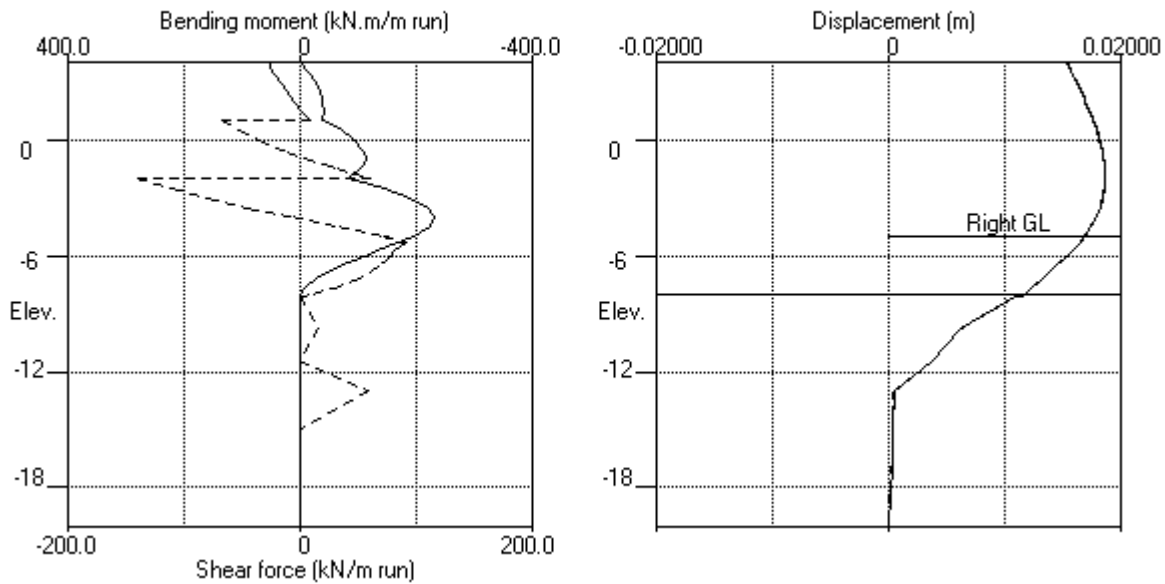
LEFT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
33	-14.90	109.00	283.54	0.00	7158.75	242.42	351.42	998109
34	-16.80	128.00	316.14	0.00	7611.40	274.99	402.99	998109
35	-18.40	144.00	343.52	0.00	7991.58	302.44	446.44	998109
36	-20.00	160.00	370.84	0.00	8371.01	324.29	484.29	998109

RIGHT side								
Node no.	Y coord	Effective stresses					Total earth pressure	Adjusted soil modulus
		Water press.	Vertic -al	Active limit	Passive limit	Earth pressure		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	8021
22	-5.30	3.00	2.10	0.00	27.26	27.26	30.26p	8172
		3.00	2.10	0.00	67.54	67.54	70.54p	30080
23	-5.65	6.50	5.60	0.00	82.83	82.83	89.33p	30080
24	-6.00	10.00	9.10	0.00	98.12	98.12	108.12p	30080
25	-6.60	16.00	15.10	0.00	124.34	123.11	139.11	30080
26	-7.20	22.00	21.10	0.00	150.57	147.42	169.42	30080
27	-7.60	26.00	25.11	0.00	168.05	161.72	187.72	30080
28	-8.00	30.00	29.11	0.00	185.54	166.71	196.71	30080
29	-8.15	31.50	30.61	0.00	192.10	150.53	182.03	30080
30	-9.80	48.00	47.13	0.94	264.30	158.09	206.09	30080
		48.00	47.13	0.00	322.66	177.60	225.60	50133
31	-11.40	64.00	67.98	0.00	413.74	188.73	252.73	50133
32	-13.00	80.00	88.85	1.45	504.94	173.24	253.24	50133
		80.00	88.85	0.00	4455.26	251.21	331.21	1002652
33	-14.90	99.00	121.28	0.00	4905.61	252.41	351.41	1002652
34	-16.80	118.00	153.77	0.00	5356.75	284.98	402.98	1002652
35	-18.40	134.00	181.18	0.00	5737.37	312.44	446.44	1002652
36	-20.00	150.00	208.64	0.00	6118.70	334.30	484.30	1002652

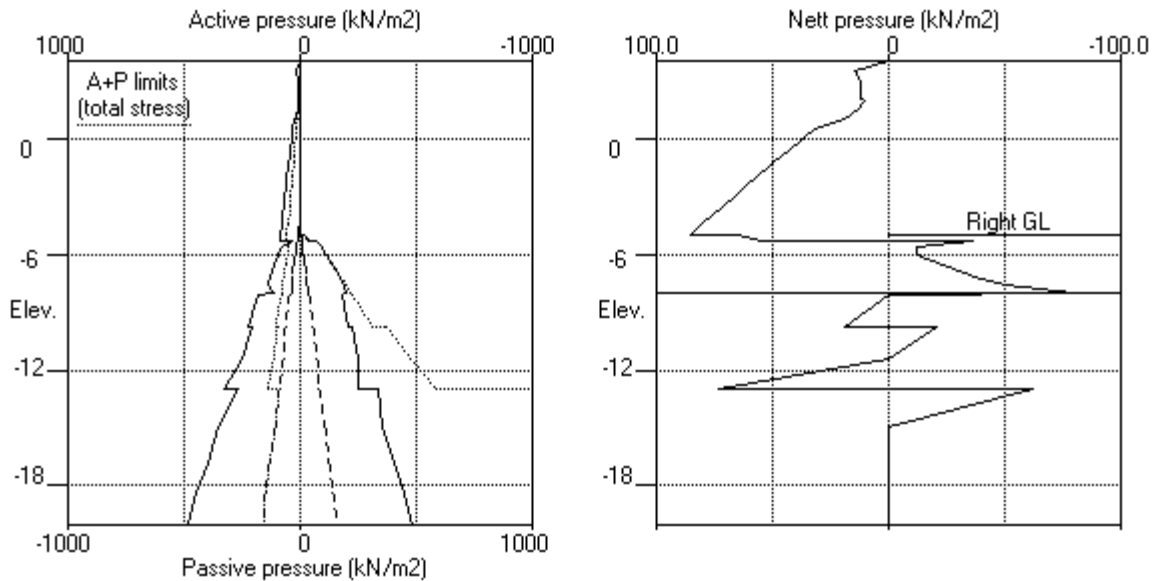
Note: 12.34 a Soil pressure at active limit
 108.12 p Soil pressure at passive limit
 34.76A Arching - soil pressure below active limit

Units: kN,m

Stage No.16 Change EI of wall to 400711kN.m2/m run

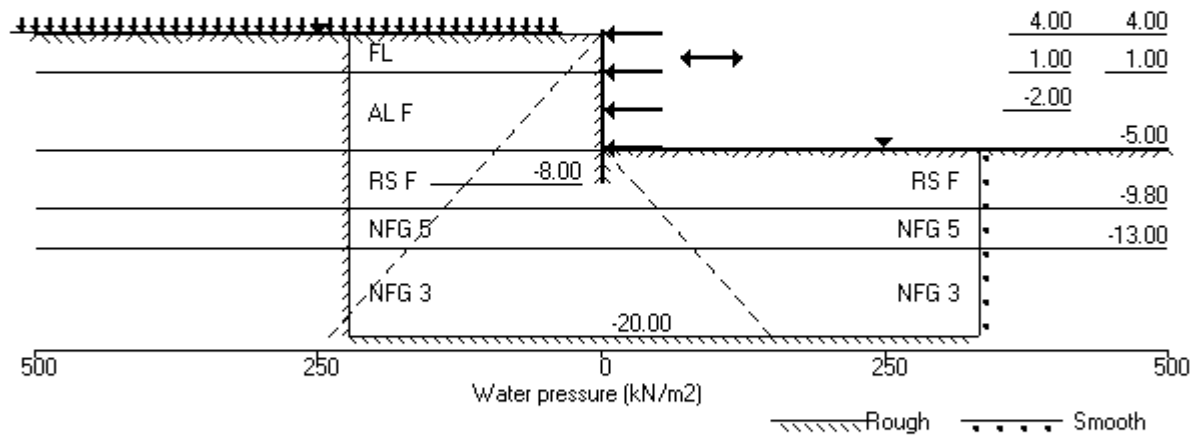


Stage No.16 Change EI of wall to 400711kN.m2/m run



Units: kN,m

Stage No.17 Apply water pressure profile no.1



Units: kN,m

Stage No. 17 Apply water pressure profile no.1

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	FoS for toe elev. = -8.00	Toe elev. for FoS = 1.500	<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Toe</u> <u>elev.</u> <u>-ation</u>	
17	4.00	-5.00		<u>Moment</u> <u>at elev.</u> <u>More than one prop. No FoS calc.</u>	<u>Wall</u> <u>Penetr</u>	

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 20.00 from wall Rough boundary
 Right side 30.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-8.65E-04	-33.9	-0.0	-33.9	400711
2	3.50	17.28	0.016	-8.54E-04	-29.6	-17.4		400711
3	3.00	18.45	0.016	-8.26E-04	-20.7	-30.6		400711
4	2.55	20.34	0.017	-7.89E-04	-12.0	-38.6		400711
5	2.10	23.41	0.017	-7.47E-04	-2.1	-42.4		400711
6	2.00	22.53	0.017	-7.38E-04	0.2	-42.7		400711
7	1.50	27.66	0.017	-6.91E-04	12.7	-39.6		400711
8	1.00	36.85	0.018	-6.54E-04	28.8	-30.3	-119.5	400711
		45.82	0.018	-6.54E-04	-90.7	-30.3		
9	0.50	52.29	0.018	-5.98E-04	-66.2	-70.9		400711
10	0.00	60.06	0.018	-5.02E-04	-38.1	-98.4		400711
11	-0.60	70.10	0.018	-3.58E-04	1.0	-111.5		400711
12	-0.95	75.55	0.019	-2.71E-04	26.5	-107.7		400711
13	-1.30	81.41	0.019	-1.93E-04	53.9	-94.7		400711
14	-1.50	84.26	0.019	-1.54E-04	70.5	-82.8		400711
15	-2.00	92.58	0.019	-9.57E-05	114.7	-37.9	-287.7	400711
		92.58	0.019	-9.57E-05	-173.0	-37.9		
16	-2.50	100.27	0.019	-1.91E-05	-124.8	-111.7		400711
17	-3.00	107.80	0.019	1.34E-04	-72.8	-160.6		400711
18	-3.50	115.31	0.019	3.33E-04	-17.0	-182.4		400711
19	-4.00	122.78	0.018	5.42E-04	42.5	-175.4		400711
20	-4.50	128.45	0.018	7.24E-04	105.3	-137.7		400711
21	-5.00	132.95	0.018	8.40E-04	170.7	-67.8	-208.9	400711
		115.21	0.018	8.40E-04	-38.2	-67.8		
22	-5.30	104.25	0.017	8.86E-04	-5.3	-73.1		400711
		33.31	0.017	8.86E-04	-5.3	-73.1		
23	-5.65	39.25	0.017	9.43E-04	7.4	-72.8		400711
24	-6.00	31.66	0.017	9.98E-04	19.8	-67.0		400711
25	-6.60	14.24	0.016	1.07E-03	33.6	-49.0		400711
26	-7.20	-6.73	0.016	1.12E-03	35.8	-24.8		400711
27	-7.60	-28.95	0.015	1.14E-03	28.7	-9.9		400711
28	-8.00	-83.23	0.015	1.14E-03	6.2	-0.0		0

(continued)

Stage No.17 Apply water pressure profile no.1

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-8.15	-0.10	0.014	0	-0.0	0.0		0
30	-9.80	30.84	0.009	0	25.4	0.0		0
		-31.77	0.009	0	25.4	0.0		
31	-11.40	0.01	0.006	0	-0.1	0.0		0
32	-13.00	114.78	0.001	0	91.8	0.0		0
		-96.63	0.001	0	91.8	0.0		
33	-14.90	0.01	0.001	0	-0.0	0.0		0
34	-16.80	0.01	0.000	0	-0.0	0.0		0
35	-18.40	0.00	0.000	0	0.0	0.0		0
36	-20.00	-0.01	0.000	0	0.0	0.0		---
At elev. 4.00				Prop force =	33.9	kN/m run		
At elev. 1.00				Prop force =	119.5	kN/m run		
At elev. -2.00				Prop force =	287.7	kN/m run		
At elev. -5.00				Prop force =	208.9	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9981
2	3.50	5.00	3.55	1.10	13.72	12.28	17.28	9981
3	3.00	10.00	7.35	2.27	28.42	8.45	18.45	9981
4	2.55	14.50	11.08	3.42	42.86	5.84	20.34	9981
5	2.10	19.00	15.09	4.66	58.37	4.41	23.41A	9981
6	2.00	20.00	16.01	4.95	61.94	2.53	22.53A	9981
7	1.50	25.00	20.73	6.41	80.18	2.66	27.66A	9981
8	1.00	30.00	25.54	7.89	98.80	6.85	36.85A	9981
		30.00	25.54	3.41	107.94	15.82	45.82	4991
9	0.50	35.00	30.35	5.10	124.52	17.29	52.29	5240
10	0.00	40.00	35.11	6.77	140.90	20.06	60.06	5490
11	-0.60	46.00	40.71	8.74	160.17	24.10	70.10	5789
12	-0.95	49.50	43.91	9.86	171.19	26.05	75.55	5964
13	-1.30	53.00	47.07	10.97	182.05	28.41	81.41	6138
14	-1.50	55.00	48.85	11.59	188.18	29.26	84.26	6238
15	-2.00	60.00	53.24	13.14	203.28	32.58	92.58	6488
16	-2.50	65.00	57.54	14.65	218.09	35.27	100.27	6737
17	-3.00	70.00	61.77	16.13	232.64	37.80	107.80	6987
18	-3.50	75.00	65.92	17.59	246.95	40.31	115.31	7236
19	-4.00	80.00	70.02	19.03	261.04	42.78	122.78	7486
20	-4.50	85.00	74.05	20.45	274.94	43.45	128.45	7735
21	-5.00	90.00	78.05	21.85	288.68	42.95	132.95	7985
22	-5.30	93.00	80.42	22.68	296.85	39.76	132.76	8135
		93.00	80.42	10.37	409.74	4.42	97.42A	29943
23	-5.65	96.50	84.22	11.45	426.34	28.28	124.78	29943
24	-6.00	100.00	88.00	12.52	442.87	39.78	139.78	29943
25	-6.60	106.00	94.44	14.35	471.03	48.58	154.58	29943
26	-7.20	112.00	100.85	16.16	498.99	53.84	165.84	29943
27	-7.60	116.00	105.09	17.36	517.54	49.10	165.10	29943
28	-8.00	120.00	109.32	18.56	536.02	12.31	132.31A	29943
29	-8.15	121.50	110.90	19.01	542.93	82.83	204.33	29943
30	-9.80	138.00	128.19	23.91	618.45	115.91	253.91	29943
		138.00	128.19	12.94	676.81	84.14	222.14	49905
31	-11.40	154.00	149.57	19.20	770.27	121.37	275.37	49905
32	-13.00	170.00	170.83	25.41	863.15	200.36	370.36	49905
		170.00	170.83	0.00	5593.65	111.50	281.50	998109
33	-14.90	189.00	203.54	0.00	6047.87	192.06	381.06	998109

(continued)

Stage No.17 Apply water pressure profile no.1

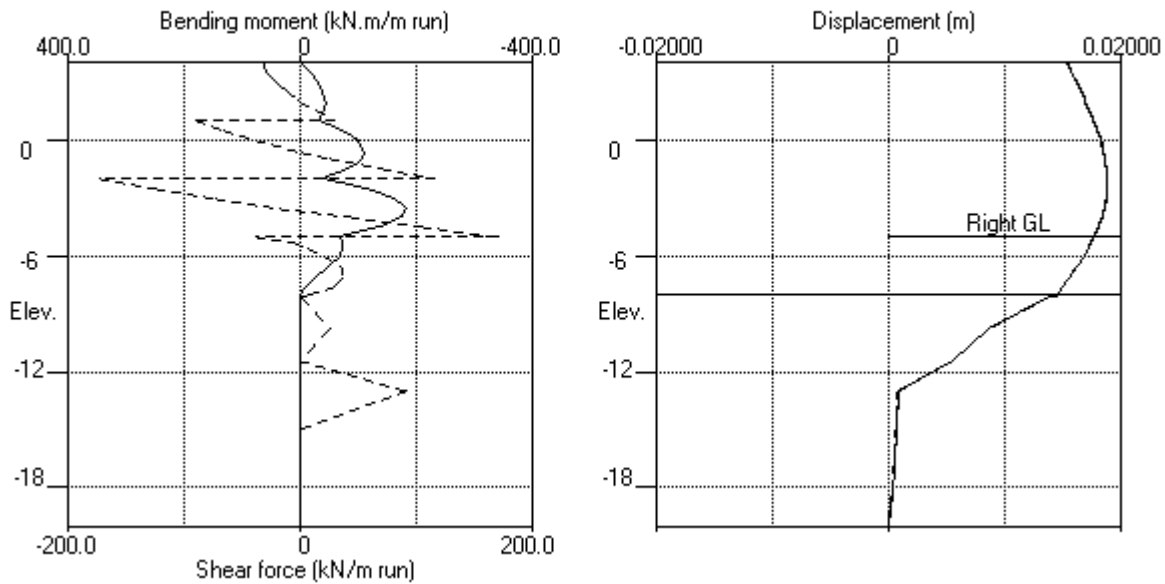
LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective stresses</u>			<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
				<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
34	-16.80	208.00	236.14	0.00	6500.52	224.72	432.72	998109
35	-18.40	224.00	263.52	0.00	6880.71	252.14	476.14	998109
36	-20.00	240.00	290.84	0.00	7260.13	267.96	507.96	998109

RIGHT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective stresses</u>			<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
				<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
19	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
20	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
21	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	17.74	17.74	8021
22	-5.30	3.00	2.10	0.00	27.26	25.51	28.51	8172
		3.00	2.10	0.00	67.54	61.11	64.11	30080
23	-5.65	6.50	5.60	0.00	82.83	79.02	85.52	30080
24	-6.00	10.00	9.10	0.00	98.12	98.12	108.12p	30080
25	-6.60	16.00	15.10	0.00	124.34	124.34	140.34p	30080
26	-7.20	22.00	21.10	0.00	150.57	150.57	172.57p	30080
27	-7.60	26.00	25.11	0.00	168.05	168.05	194.05p	30080
28	-8.00	30.00	29.11	0.00	185.54	185.54	215.54p	30080
29	-8.15	31.50	30.61	0.00	192.10	172.92	204.42	30080
30	-9.80	48.00	47.13	0.94	264.30	175.08	223.08	30080
		48.00	47.13	0.00	322.66	205.91	253.91	50133
31	-11.40	64.00	67.98	0.00	413.74	211.36	275.36	50133
32	-13.00	80.00	88.85	1.45	504.94	175.59	255.59	50133
		80.00	88.85	0.00	4455.26	298.13	378.13	1002652
33	-14.90	99.00	121.28	0.00	4905.61	282.05	381.05	1002652
34	-16.80	118.00	153.77	0.00	5356.75	314.71	432.71	1002652
35	-18.40	134.00	181.18	0.00	5737.37	342.14	476.14	1002652
36	-20.00	150.00	208.64	0.00	6118.70	357.98	507.98	1002652

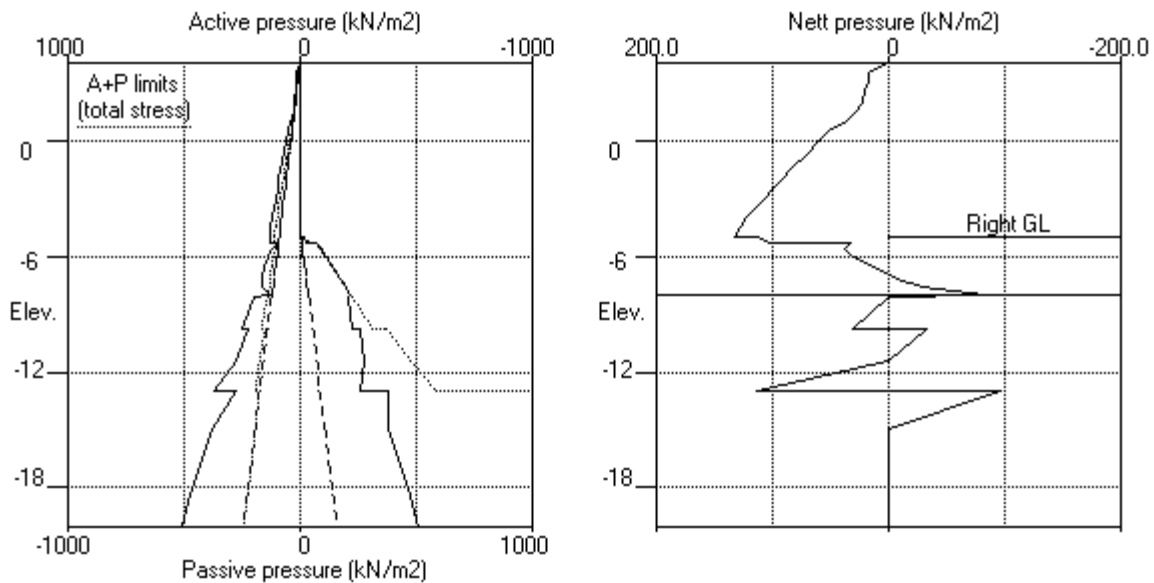
Note: 12.34 a Soil pressure at active limit
 215.54 p Soil pressure at passive limit
 132.31A Arching - soil pressure below active limit

Units: kN,m

Stage No.17 Apply water pressure profile no.1



Stage No.17 Apply water pressure profile no.1



Stage No.	Ground level		Prop Elev.	FoS for toe elev. = -8.00		Toe elev. for FoS = 1.500		Direction of failure
	Act.	Pass.		Factor of Safety	Moment equilib. at elev.	Toe elev.	Wall Penetr -ation	
1	4.00	4.00	---	Conditions not suitable for FoS calc.				
2	4.00	2.00	Cant.	11.179	-6.47	-0.12	2.12	L to R
3	4.00	2.00		No analysis at this stage				
4	4.00	-1.50	2.00	6.687	n/a	-3.41	1.91	L to R
5	4.00	-1.50		No analysis at this stage				
All remaining stages have more than one prop - FoS calculation n/a								

Units: kN,m

Summary of results

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 40.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries:	Left side 20.00 from wall	Rough boundary
	Right side 30.00 from wall	Smooth boundary
Lower rigid boundary at elevation -20.00		Rough boundary

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement		Bending moment		Shear force	
		maximum	minimum	maximum	minimum	maximum	minimum
		m	m	kN.m/m	kN.m/m	kN/m	kN/m
1	4.00	0.018	0.000	0.0	-0.0	0.0	-35.9
2	3.50	0.017	0.000	0.3	-17.6	3.6	-32.3
3	3.00	0.017	0.000	4.2	-31.7	10.5	-25.5
4	2.55	0.017	0.000	10.4	-41.7	16.2	-19.9
5	2.10	0.017	0.000	19.1	-49.2	65.1	-14.4
6	2.00	0.017	0.000	23.8	-50.6	66.3	-102.1
7	1.50	0.017	0.000	14.1	-54.9	12.7	-96.4
8	1.00	0.018	0.000	16.6	-81.0	28.8	-90.7
9	0.50	0.018	0.000	17.7	-121.3	1.9	-73.0
10	0.00	0.018	0.000	18.6	-153.5	1.5	-55.4
11	-0.60	0.018	0.000	19.4	-179.5	8.2	-30.6
12	-0.95	0.019	0.000	19.9	-187.4	26.5	-14.3
13	-1.30	0.019	0.000	20.5	-189.3	53.9	-165.9
14	-1.50	0.019	0.000	20.9	-187.5	70.5	-155.4
15	-2.00	0.019	0.000	22.2	-176.7	114.7	-173.0
16	-2.50	0.019	0.000	24.0	-224.8	34.0	-124.8
17	-3.00	0.019	0.000	26.4	-263.7	41.3	-77.4
18	-3.50	0.019	0.000	29.7	-285.8	48.4	-42.8
19	-4.00	0.018	0.000	33.9	-290.0	55.4	-5.9
20	-4.50	0.018	0.000	39.0	-274.9	105.3	0.0
21	-5.00	0.018	0.000	45.0	-239.3	170.7	-38.2
22	-5.30	0.017	0.000	48.8	-208.6	110.5	-5.3
23	-5.65	0.017	0.000	48.9	-172.8	102.7	-5.9
24	-6.00	0.017	0.000	44.7	-138.0	98.7	-15.4
25	-6.60	0.016	0.000	31.9	-82.7	87.1	-23.5
26	-7.20	0.016	0.000	16.5	-35.8	66.1	-24.8
27	-7.60	0.015	0.000	6.8	-12.9	44.7	-20.6
28	-8.00	0.015	0.000	0.0	-0.0	8.8	-4.6
29	-8.15	0.014	0.000	0.0	0.0	0.0	-0.0
30	-9.80	0.009	0.000	0.0	0.0	25.4	0.0
31	-11.40	0.006	0.000	0.0	0.0	0.0	-0.1
32	-13.00	0.001	0.000	0.0	0.0	91.8	0.0
33	-14.90	0.001	0.000	0.0	0.0	0.0	-0.0
34	-16.80	0.000	0.000	0.0	0.0	0.0	-0.0
35	-18.40	0.000	0.000	0.0	0.0	0.0	-0.0
36	-20.00	0.000	0.000	0.0	0.0	0.0	0.0

Summary of results (continued)

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment				Shear force			
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>
	kN.m/m		kN.m/m		kN/m		kN/m	
1	0.0	3.50	-17.6	-2.50	7.7	-5.30	-4.9	1.00
2	48.9	-5.65	-0.0	-8.00	16.9	-13.00	-24.8	-7.20
3	No calculation at this stage							
4	16.2	-6.60	-189.3	-1.30	68.5	-5.30	-102.1	2.00
5	No calculation at this stage							
6	14.5	2.00	-180.0	-1.30	68.2	-5.30	-99.5	2.00
7	21.4	2.00	-290.0	-4.00	110.5	-5.30	-162.4	-1.30
8	23.8	2.00	-281.0	-4.00	107.6	-5.30	-165.9	-1.30
9	21.4	2.00	-290.0	-4.00	110.5	-5.30	-162.4	-1.30
10	No calculation at this stage							
11	No calculation at this stage							
12	21.4	2.00	-270.8	-4.00	105.5	-5.30	-131.0	-2.00
13	No calculation at this stage							
14	No calculation at this stage							
15	0.0	4.00	-267.7	-4.00	105.3	-5.30	-134.1	-2.00
16	0.0	4.00	-230.9	-4.00	90.8	-5.30	-139.8	-2.00
17	0.0	4.00	-182.4	-3.50	170.7	-5.00	-173.0	-2.00

Maximum and minimum displacement at each stage

Stage no.	Displacement				Stage description
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	
	m		m		
1	0.001	-1.30	0.000	4.00	Apply surcharge no.1 at elev. 4.00
2	0.018	4.00	0.000	4.00	Excav. to elev. 2.00 on RIGHT side
3	No calculation at this stage				Install prop no.1 at elev. 2.00
4	0.017	4.00	0.000	4.00	Excav. to elev. -1.50 on RIGHT side
5	No calculation at this stage				Install prop no.2 at elev. -1.30
6	0.017	4.00	0.000	4.00	Apply water pressure profile no.2
7	0.018	-2.50	0.000	4.00	Excav. to elev. -5.00 on RIGHT side
8	0.018	-2.50	0.000	4.00	Apply load no.1 at elev. 2.10
9	0.018	-2.50	0.000	4.00	Apply load no.2 at elev. 2.10
10	No calculation at this stage				Install prop no.3 at elev. -5.00
11	No calculation at this stage				Install prop no.4 at elev. -2.00
12	0.019	-2.00	0.000	4.00	Remove prop no.2 at elev. -1.30
13	No calculation at this stage				Install prop no.5 at elev. 1.00
14	No calculation at this stage				Install prop no.6 at elev. 4.00
15	0.019	-2.00	0.000	4.00	Remove prop no.1 at elev. 2.00
16	0.019	-2.00	0.000	4.00	Change EI of wall to 400711kN.m2/m run
17	0.019	-2.50	0.000	4.00	Apply water pressure profile no.1

Summary of results (continued)

Prop forces at each stage (horizontal components)

Stage no.	--- Strut no. 1 --- at elev. 2.00		--- Strut no. 2 --- at elev.-1.30		--- Strut no. 3 --- at elev.-5.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
4	118.22	886.66	---	---	---	---
6	115.98	869.83	6.81	51.10	---	---
7	92.80	695.99	199.49	1496.21	---	---
8	130.48	978.57	207.53	1556.47	---	---
9	92.80	695.99	199.49	1496.21	---	---
12	117.85	883.84	---	---	-1.93	-1.93
15	---	---	---	---	-4.55	-4.55
16	---	---	---	---	2.92	2.92
17	---	---	---	---	208.91	208.91

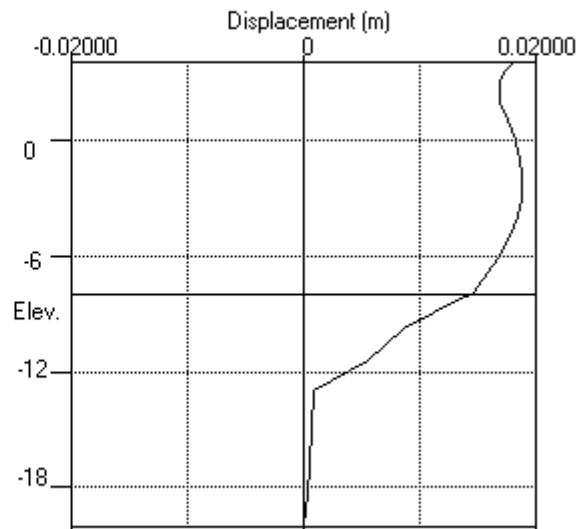
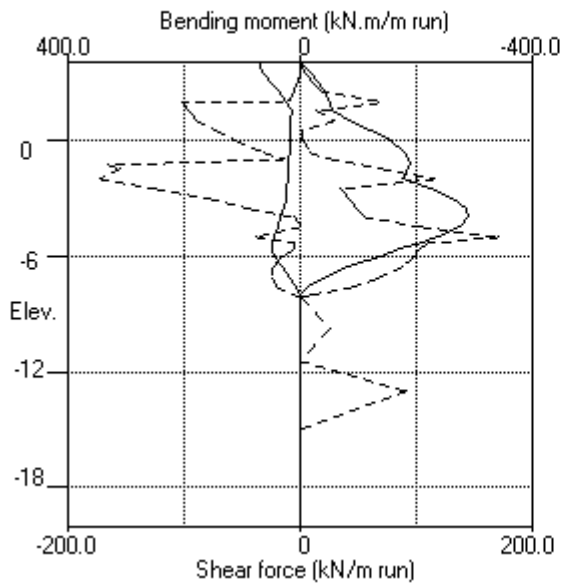
Stage no.	--- Strut no. 4 --- at elev.-2.00		--- Strut no. 5 --- at elev. 1.00		--- Strut no. 6 --- at elev. 4.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
12	178.11	178.11	---	---	---	---
15	181.26	181.26	80.89	80.89	35.87	35.87
16	199.13	199.13	76.37	76.37	28.24	28.24
17	287.71	287.71	119.54	119.54	33.95	33.95

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Section 5

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| Made by : DJC
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| Date:16-11-2022
| Checked :

Units: kN,m

Bending moment, shear force, displacement envelopes



EDG CONSULTING PTY LTD	Sheet No.
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Data filename/Run ID: Section_6	
Albert Street Development	Date:16-11-2022
Section 6	Checked :

Units: kN,m

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	Soil types	
		Left side	Right side
1	4.00	1 FL	1 FL
2	0.80	2 AL F	2 AL F
3	-6.60	3 AL C	3 AL C
4	-8.10	4 RS F	4 RS F
5	-11.00	5 NFG 5	5 NFG 5
6	-12.80	6 NFG 3	6 NFG 3

SOIL PROPERTIES

-- Soil type --	Bulk density	Young's Modulus	At rest coeff.	Consol state.	Active limit	Passive limit	Cohesion
No. Description (Datum elev.)	kN/m3	Eh, kN/m2 (dEh/dy)	Ko (dKo/dy)	NC/OC (Nu)	Ka (Kac)	Kp (Kpc)	kN/m2 (dc/dy)
1 FL	17.00	10000	0.700	OC (0.300)	0.309 (0.000)	3.868 (0.000)	
2 AL F (1.00)	17.00	5000 (500.0)	0.700	OC (0.300)	0.351 (1.391)	3.442 (5.007)	4.000d
3 AL C	17.00	20000	0.700	OC (0.300)	0.292 (0.000)	4.369 (0.000)	
4 RS F	20.00	30000	1.000	OC (0.300)	0.283 (1.241)	4.369 (5.836)	10.00d
5 NFG 5	23.00	50000	1.000	OC (0.300)	0.292 (1.226)	4.369 (5.836)	20.00d
6 NFG 3	27.00	1000000	1.000	OC (0.200)	0.146 (0.854)	13.89 (12.886)	250.0d

Additional soil parameters associated with Ka and Kp

No. Description	--- parameters for Ka ---			--- parameters for Kp ---		
	Soil friction angle	Wall adhesion coeff.	Back-fill angle	Soil friction angle	Wall adhesion coeff.	Back-fill angle
1 FL	28.00	0.670	0.00	28.00	0.500	0.00
2 AL F	25.00	0.670	0.00	26.00	0.500	0.00
3 AL C	30.00	0.500	0.00	30.00	0.500	0.00
4 RS F	30.00	0.670	0.00	30.00	0.500	0.00
5 NFG 5	30.00	0.500	0.00	30.00	0.500	0.00
6 NFG 3	45.00	0.500	0.00	45.00	0.500	0.00

GROUND WATER CONDITIONS

Density of water = 10.00 kN/m3

	Left side	Right side
Initial water table elevation	-4.00	-4.00

Automatic water pressure balancing at toe of wall : No

Left side				Right side			
Water profile no.	Point no.	Elev. m	Piezo elev. m	Water press. kN/m2	Point no.	Elev. m	Piezo elev. m
1	1	4.00	4.00	0.0	1	-5.00	-5.00
2	1	-4.00	-4.00	0.0	1	-5.00	-5.00

WALL PROPERTIES

Type of structure = Soldier Pile Wall
 Soldier Pile width = 0.90 m
 Soldier Pile spacing = 1.80 m
 Passive mobilisation factor = 3.00
 Elevation of toe of wall = -10.00
 Maximum finite element length = 0.80 m
 Youngs modulus of wall E = 3.2000E+07 kN/m2
 Moment of inertia of wall I = 0.017889 m4/m run
 = 0.032200 m4 per pile
 E.I = 572444 kN.m2/m run
 Yield Moment of wall = Not defined

STRUTS and ANCHORS

Prop no.	Prop Elev.	Prop spacing m	Cross- section area sq.m	Youngs modulus kN/m2	Free length m	Inclin -ation (degs)	Pre- stress /prop kN	Strut or Anchor	Allow tension ?	L/R
1	2.00	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
2	-1.30	7.50	0.053698	2.000E+08	20.00	0.00	0	Strut	No	R
3	-5.00	1.00	0.150000	3.280E+07	20.00	0.00	0	Strut	Yes	R
4	-2.00	1.00	0.350000	3.280E+07	20.00	0.00	0	Strut	Yes	R
5	1.00	1.00	0.425000	3.280E+07	20.00	0.00	0	Strut	Yes	R

HORIZONTAL and MOMENT LOADS/RESTRAINTS

Load no.	Elevation	Horizontal load kN/m run	Moment load kN.m/m run	Moment restraint kN.m/m/rad	Partial factor (Category)
1	1.90	51.20	0	0	N/A
2	1.90	-51.20	0	0	N/A

SURCHARGE LOADS

Surch -arge no.	Distance from wall	Length parallel to wall	Width perpend. to wall	Surcharge ----- kN/m2 -----		Equiv. soil type	Partial factor/ Category
	Elev.			Near edge	Far edge		
1	4.00	1.00(L)	100.00	10.00	=	N/A	N/A

Note: L = Left side, R = Right side

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Apply surcharge no.1 at elevation 4.00
2	Excavate to elevation 2.00 on RIGHT side
3	Install strut or anchor no.1 at elevation 2.00
4	Excavate to elevation -1.50 on RIGHT side
5	Install strut or anchor no.2 at elevation -1.30
6	Apply water pressure profile no.2
7	Excavate to elevation -5.00 on RIGHT side
8	Apply load no.1 at elevation 1.90
9	Apply load no.2 at elevation 1.90
10	Install strut or anchor no.3 at elevation -5.00
11	Install strut or anchor no.4 at elevation -2.00
12	Remove strut or anchor no.2 at elevation -1.30
13	Install strut or anchor no.5 at elevation 1.00
14	Remove strut or anchor no.1 at elevation 2.00
15	Apply water pressure profile no.1
16	Change EI of wall to 400711 kN.m2/m run Allow wall to relax with new modulus value

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:

Method of analysis - Burland-Potts

Factor on passive for calculating wall depth = 1.50

Parameters for undrained strata:

Minimum equivalent fluid density = 5.00 kN/m³

Maximum depth of water filled tension crack = 0.00 m

Bending moment and displacement calculation:

Method - 2-D finite element model

Open Tension Crack analysis? - No

Active limit arching modelled? - Yes

Non-linear Modulus Parameter (L) = 9.000 m

Boundary conditions:

Length of wall (normal to plane of analysis) = 60.00 m

Width of excavation on Left side of wall = 40.00 m

Width of excavation on Right side of wall = 40.00 m

Distance to rigid boundary on Left side = 30.00 m

Distance to rigid boundary on Right side = 20.00 m

Elevation of rigid lower boundary = -20.00

Lower rigid boundary at elevation -20.00 - Rough

Rigid boundary on Left side - Rough

Rigid boundary on Right side - Smooth

Wall / soil interface - Rough

OUTPUT OPTIONS

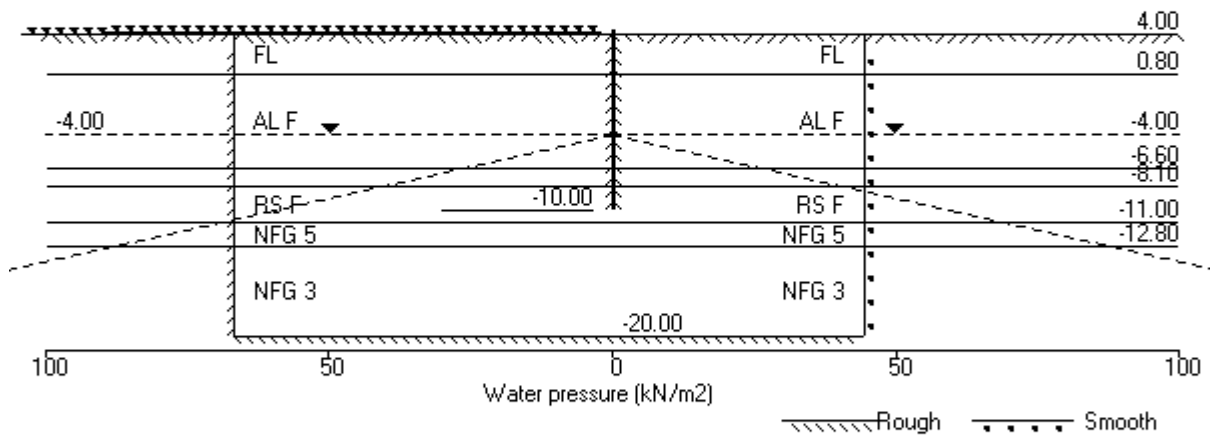
Stage no.	Stage description	Displacement Bending mom. Shear force	Active, Passive pressures	Graph. output
1	Apply surcharge no.1 at elev. 4.00	Yes	Yes	Yes
2	Excav. to elev. 2.00 on RIGHT side	Yes	Yes	Yes
3	Install prop no.1 at elev. 2.00	Yes	Yes	Yes
4	Excav. to elev. -1.50 on RIGHT side	Yes	Yes	Yes
5	Install prop no.2 at elev. -1.30	Yes	Yes	Yes
6	Apply water pressure profile no.2	Yes	Yes	Yes
7	Excav. to elev. -5.00 on RIGHT side	Yes	Yes	Yes
8	Apply load no.1 at elev. 1.90	Yes	Yes	Yes
9	Apply load no.2 at elev. 1.90	Yes	Yes	Yes
10	Install prop no.3 at elev. -5.00	Yes	Yes	Yes
11	Install prop no.4 at elev. -2.00	Yes	Yes	Yes
12	Remove prop no.2 at elev. -1.30	Yes	Yes	Yes
13	Install prop no.5 at elev. 1.00	Yes	Yes	Yes
14	Remove prop no.1 at elev. 2.00	Yes	Yes	Yes
15	Apply water pressure profile no.1	Yes	Yes	Yes
16	Change EI of wall to 400711kN.m ² /m run	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

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 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Units: kN,m

Stage No. 1 Apply surcharge no.1 at elevation 4.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

				FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>	
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	
				<u>at elev.</u>	<u>Safety</u>	<u>-ation</u>	<u>of failure</u>	
1	4.00	4.00	---	Conditions not suitable for FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.001	-6.45E-06	0.0	0.0		572444
2	3.20	-2.66	0.001	-6.49E-06	-1.1	0.1		572444
3	2.60	-1.55	0.001	-5.99E-06	-2.3	-1.0		572444
4	2.00	-0.90	0.001	-4.07E-06	-3.1	-2.7		572444
5	1.90	-0.78	0.001	-3.58E-06	-3.1	-3.0		572444
6	1.45	-0.43	0.001	-6.69E-07	-3.4	-4.4		572444
7	1.00	-0.09	0.001	3.44E-06	-3.5	-6.0		572444
8	0.80	-0.15	0.001	5.67E-06	-3.6	-6.7		572444
		1.24	0.001	5.67E-06	-3.6	-6.7		
9	0.00	1.15	0.001	1.67E-05	-2.6	-9.1		572444
10	-0.65	1.11	0.001	2.79E-05	-1.9	-10.6		572444
11	-1.30	1.14	0.001	4.05E-05	-1.1	-11.6		572444
12	-1.50	1.05	0.001	4.46E-05	-0.9	-11.8		572444
13	-2.00	1.06	0.001	5.50E-05	-0.4	-12.1		572444
14	-2.60	1.04	0.001	6.77E-05	0.2	-12.1		572444
15	-3.20	1.02	0.001	8.02E-05	0.9	-11.8		572444
16	-4.00	1.04	0.001	9.59E-05	1.7	-10.8		572444
17	-4.50	1.02	0.001	1.04E-04	2.2	-9.8		572444
18	-5.00	0.99	0.001	1.12E-04	2.7	-8.6		572444
19	-5.80	0.90	0.001	1.23E-04	3.5	-6.1		572444
20	-6.60	0.65	0.001	1.29E-04	4.1	-3.0		572444
		-3.31	0.001	1.29E-04	4.1	-3.0		
21	-7.35	-1.44	0.001	1.32E-04	2.3	-0.9		572444
22	-8.10	-1.03	0.001	1.32E-04	1.4	0.4		572444
		-3.45	0.001	1.32E-04	1.4	0.4		
23	-8.58	-1.67	0.001	1.32E-04	0.1	0.7		572444
24	-9.05	-0.72	0.000	1.31E-04	-0.4	0.5		572444
25	-9.53	0.12	0.000	1.31E-04	-0.6	0.3		572444
26	-10.00	1.59	0.000	1.31E-04	-0.2	0.0		0
27	-10.20	-0.00	0.000	0	-0.0	0.0		0
28	-11.00	1.22	0.000	0	0.5	0.0		0
		-0.55	0.000	0	0.5	0.0		

(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
29	-12.80	3.68	0.000	0	3.3	0.0		0
		-2.07	0.000	0	3.3	0.0		
30	-16.00	0.00	0.000	0	-0.0	0.0		0
31	-18.00	0.00	0.000	0	0.0	0.0		0
32	-20.00	-0.00	0.000	0	-0.0	0.0		---

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Effective stresses</u>		<u>Earth pressure</u> kN/m2	<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
				<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	8.49	8.49	9971
3	2.60	0.00	26.84	8.29	103.83	16.58	16.58	9971
4	2.00	0.00	38.50	11.90	148.93	24.36	24.36	9971
5	1.90	0.00	40.40	12.48	156.28	25.65	25.65	9971
6	1.45	0.00	48.81	15.08	188.80	31.34	31.34	9971
7	1.00	0.00	57.04	17.63	220.65	36.99	36.99	9971
8	0.80	0.00	60.66	18.74	234.64	39.39	39.39	9971
		0.00	60.66	15.74	228.83	40.06	40.06	5085
9	0.00	0.00	74.94	20.76	277.99	49.68	49.68	5484
10	-0.65	0.00	86.39	24.78	317.40	57.49	57.49	5808
11	-1.30	0.00	97.75	28.77	356.50	65.30	65.30	6132
12	-1.50	0.00	101.23	29.99	368.48	67.65	67.65	6232
13	-2.00	0.00	109.91	33.04	398.36	73.64	73.64	6481
14	-2.60	0.00	120.29	36.69	434.09	80.81	80.81	6780
15	-3.20	0.00	130.64	40.33	469.73	87.97	87.97	7079
16	-4.00	0.00	144.41	45.16	517.11	97.54	97.54	7478
17	-4.50	5.00	147.99	46.42	529.46	100.00	105.00	7727
18	-5.00	10.00	151.57	47.68	541.78	102.45	112.45	7977
19	-5.80	18.00	157.28	49.68	561.42	106.34	124.34	8376
20	-6.60	26.00	162.97	51.68	581.00	110.15	136.15	8774
		26.00	162.97	47.59	712.00	108.18	134.18	19942
21	-7.35	33.50	168.29	49.14	735.24	112.80	146.30	19942
22	-8.10	41.00	173.59	50.69	758.43	116.70	157.70	19942
		41.00	173.59	36.77	816.86	164.90	205.90	29913
23	-8.58	45.75	178.38	38.13	837.75	170.54	216.29	29913
24	-9.05	50.50	183.16	39.48	858.64	175.78	226.28	29913
25	-9.53	55.25	187.93	40.84	879.51	180.95	236.20	29913
26	-10.00	60.00	192.70	42.19	900.36	186.42	246.42	29913
27	-10.20	62.00	194.71	42.76	909.14	187.66	249.66	29913
28	-11.00	70.00	202.75	45.03	944.23	196.26	266.26	29913
		70.00	202.75	34.73	1002.59	195.38	265.38	49855
29	-12.80	88.00	226.20	41.59	1105.06	220.89	308.89	49855
		88.00	226.20	0.00	6362.43	217.24	305.24	997093
30	-16.00	120.00	280.63	0.00	7118.25	272.69	392.69	997093
31	-18.00	140.00	314.62	0.00	7590.22	306.67	446.67	997093
32	-20.00	160.00	348.59	0.00	8061.94	340.46	500.46	997093

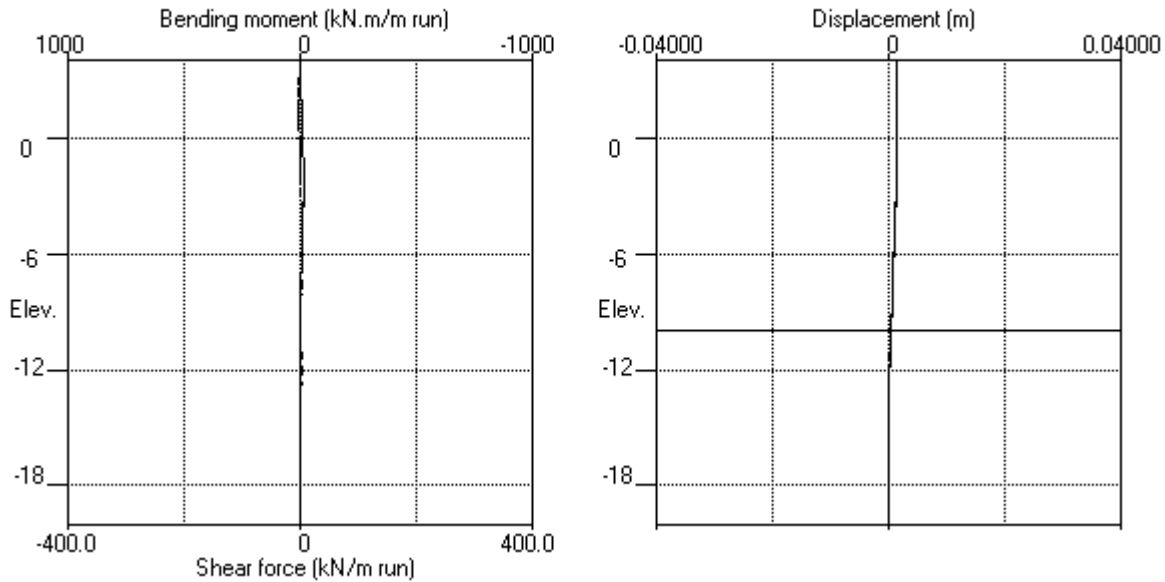
(continued)

Stage No.1 Apply surcharge no.1 at elevation 4.00

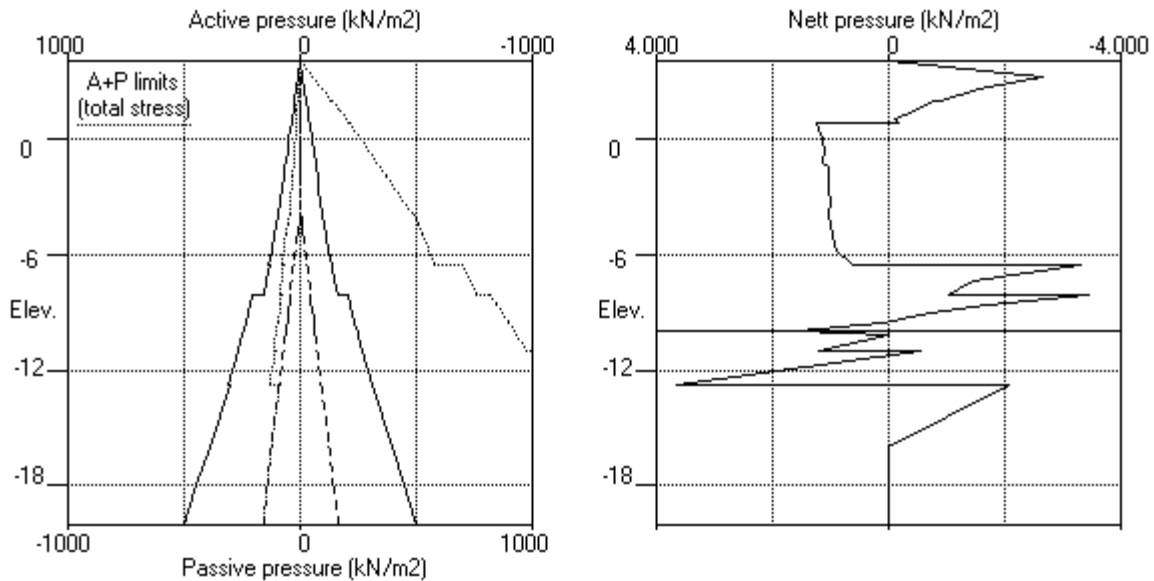
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9945
2	3.20	0.00	13.60	4.20	52.61	11.15	11.15	9945
3	2.60	0.00	23.80	7.35	92.07	18.13	18.13	9945
4	2.00	0.00	34.00	10.51	131.52	25.25	25.25	9945
5	1.90	0.00	35.70	11.03	138.10	26.43	26.43	9945
6	1.45	0.00	43.35	13.40	167.69	31.77	31.77	9945
7	1.00	0.00	51.00	15.76	197.28	37.08	37.08	9945
8	0.80	0.00	54.40	16.81	210.43	39.54	39.54	9945
		0.00	54.40	13.54	207.29	38.82	38.82	5072
9	0.00	0.00	68.00	18.32	254.10	48.53	48.53	5470
10	-0.65	0.00	79.05	22.20	292.14	56.37	56.37	5793
11	-1.30	0.00	90.10	26.09	330.17	64.16	64.16	6116
12	-1.50	0.00	93.50	27.28	341.88	66.60	66.60	6216
13	-2.00	0.00	102.00	30.27	371.14	72.59	72.59	6464
14	-2.60	0.00	112.20	33.85	406.25	79.77	79.77	6763
15	-3.20	0.00	122.40	37.43	441.36	86.96	86.96	7061
16	-4.00	0.00	136.00	42.21	488.17	96.50	96.50	7459
17	-4.50	5.00	139.50	43.44	500.22	98.98	103.98	7708
18	-5.00	10.00	143.00	44.67	512.27	101.46	111.46	7956
19	-5.80	18.00	148.60	46.63	531.55	105.44	123.44	8354
20	-6.60	26.00	154.20	48.60	550.82	109.50	135.50	8752
		26.00	154.20	45.03	673.70	111.49	137.49	19891
21	-7.35	33.50	159.45	46.56	696.64	114.24	147.74	19891
22	-8.10	41.00	164.70	48.09	719.57	117.73	158.73	19891
		41.00	164.70	34.25	778.00	168.36	209.36	29836
23	-8.58	45.75	169.45	35.60	798.75	172.21	217.96	29836
24	-9.05	50.50	174.20	36.95	819.51	176.50	227.00	29836
25	-9.53	55.25	178.95	38.29	840.26	180.84	236.09	29836
26	-10.00	60.00	183.70	39.64	861.02	184.82	244.82	29836
27	-10.20	62.00	185.70	40.20	869.75	187.66	249.66	29836
28	-11.00	70.00	193.70	42.47	904.71	195.04	265.04	29836
		70.00	193.70	32.09	963.07	195.93	265.93	49726
29	-12.80	88.00	217.10	38.93	1065.31	217.21	305.21	49726
		88.00	217.10	0.00	6236.12	219.31	307.31	994529
30	-16.00	120.00	271.50	0.00	6991.52	272.68	392.68	994529
31	-18.00	140.00	305.50	0.00	7463.64	306.66	446.66	994529
32	-20.00	160.00	339.50	0.00	7935.76	340.46	500.46	994529

Units: kN,m

Stage No.1 Apply surcharge no.1 at elev. 4.00



Stage No.1 Apply surcharge no.1 at elev. 4.00

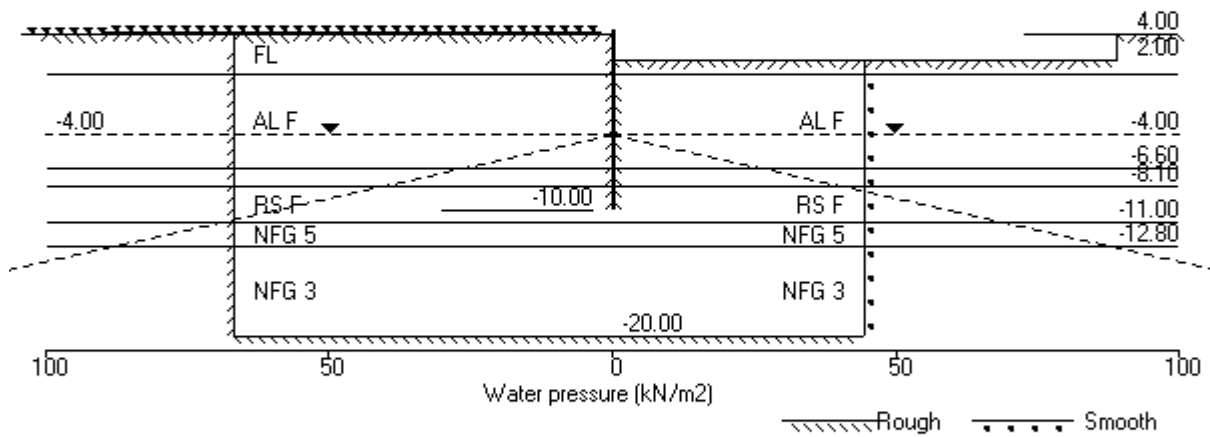


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Program: WALLAP Version 6.07 Revision A55.B74.R58
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Data filename/Run ID: Section_6
Albert Street Development
Section 6

| Sheet No.
| Job No. B01493
| Made by : DL
|
| Date:16-11-2022
Checked :

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Units: kN,m

Stage No. 2 Excavate to elevation 2.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
2	4.00	2.00	Cant.	12.246	-8.04	-0.24	2.24	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.019	1.44E-03	0.0	-0.0		572444
2	3.20	4.57	0.017	1.44E-03	1.8	1.2		572444
3	2.60	8.29	0.017	1.44E-03	5.7	3.6		572444
4	2.00	11.90	0.016	1.43E-03	11.7	9.0		572444
5	1.90	5.91	0.015	1.43E-03	12.6	10.2		572444
6	1.45	-18.93	0.015	1.42E-03	9.7	16.3		572444
7	1.00	-15.18	0.014	1.40E-03	2.0	18.8		572444
8	0.80	-10.72	0.014	1.40E-03	-0.6	18.9		572444
		2.99	0.014	1.40E-03	-0.6	18.9		
9	0.00	-0.13	0.013	1.37E-03	0.6	19.4		572444
10	-0.65	-0.24	0.012	1.35E-03	0.5	19.8		572444
11	-1.30	0.17	0.011	1.32E-03	0.4	20.1		572444
12	-1.50	0.20	0.011	1.32E-03	0.5	20.2		572444
13	-2.00	0.55	0.010	1.30E-03	0.7	20.4		572444
14	-2.60	0.98	0.009	1.28E-03	1.1	20.9		572444
15	-3.20	1.41	0.009	1.26E-03	1.8	21.8		572444
16	-4.00	1.96	0.008	1.22E-03	3.2	23.7		572444
17	-4.50	2.23	0.007	1.20E-03	4.2	25.6		572444
18	-5.00	2.32	0.006	1.18E-03	5.4	28.0		572444
19	-5.80	1.75	0.005	1.14E-03	7.0	33.0		572444
20	-6.60	-0.20	0.005	1.09E-03	7.6	39.2		572444
		-23.71	0.005	1.09E-03	7.6	39.2		
21	-7.35	-10.14	0.004	1.04E-03	-5.1	38.2		572444
22	-8.10	-6.73	0.003	9.94E-04	-11.4	31.6		572444
		-19.23	0.003	9.94E-04	-11.4	31.6		
23	-8.58	-6.55	0.003	9.71E-04	-17.5	24.0		572444
24	-9.05	1.43	0.002	9.55E-04	-18.7	15.0		572444
25	-9.53	11.15	0.002	9.46E-04	-15.7	6.2		572444
26	-10.00	38.80	0.001	9.43E-04	-3.9	-0.0		0
27	-10.20	0.00	0.001	0	0.0	0.0		0
28	-11.00	5.77	0.001	0	2.3	0.0		0
		-2.55	0.001	0	2.3	0.0		

(continued)

Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
29	-12.80	17.19	0.000	0	15.5	0.0		0
		-9.65	0.000	0	15.5	0.0		
30	-16.00	-0.01	0.000	0	0.0	0.0		0
31	-18.00	0.00	0.000	0	0.0	0.0		0
32	-20.00	-0.03	0.000	0	0.0	0.0		---

LEFT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Effective stresses</u>		<u>Earth</u> <u>pressure</u> kN/m2	<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
				<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2			
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	4.57	4.57a	9971
3	2.60	0.00	26.84	8.29	103.83	8.29	8.29a	9971
4	2.00	0.00	38.50	11.90	148.93	11.90	11.90a	9971
5	1.90	0.00	40.40	12.48	156.28	12.48	12.48a	9971
6	1.45	0.00	48.81	15.08	188.80	17.24	17.24	9971
7	1.00	0.00	57.04	17.63	220.65	24.99	24.99	9971
8	0.80	0.00	60.66	18.74	234.64	28.55	28.55	9971
		0.00	60.66	15.74	228.83	34.53	34.53	5085
9	0.00	0.00	74.94	20.76	277.99	42.56	42.56	5484
10	-0.65	0.00	86.39	24.78	317.40	50.13	50.13	5808
11	-1.30	0.00	97.75	28.77	356.50	58.03	58.03	6132
12	-1.50	0.00	101.23	29.99	368.48	60.39	60.39	6232
13	-2.00	0.00	109.91	33.04	398.36	66.50	66.50	6481
14	-2.60	0.00	120.29	36.69	434.09	73.84	73.84	6780
15	-3.20	0.00	130.64	40.33	469.73	81.18	81.18	7079
16	-4.00	0.00	144.41	45.16	517.11	90.96	90.96	7478
17	-4.50	5.00	147.99	46.42	529.46	93.54	98.54	7727
18	-5.00	10.00	151.57	47.68	541.78	96.02	106.02	7977
19	-5.80	18.00	157.28	49.68	561.42	99.64	117.64	8376
20	-6.60	26.00	162.97	51.68	581.00	102.58	128.58	8774
		26.00	162.97	47.59	712.00	90.98	116.98	19942
21	-7.35	33.50	168.29	49.14	735.24	101.37	134.87	19942
22	-8.10	41.00	173.59	50.69	758.43	106.78	147.78	19942
		41.00	173.59	36.77	816.86	150.04	191.04	29913
23	-8.58	45.75	178.38	38.13	837.75	161.08	206.83	29913
24	-9.05	50.50	183.16	39.48	858.64	169.83	220.33	29913
25	-9.53	55.25	187.93	40.84	879.51	179.50	234.75	29913
26	-10.00	60.00	192.70	42.19	900.36	197.48	257.48	29913
27	-10.20	62.00	194.71	42.76	909.14	180.86	242.86	29913
28	-11.00	70.00	202.75	45.03	944.23	191.43	261.43	29913
		70.00	202.75	34.73	1002.59	187.33	257.33	49855
29	-12.80	88.00	226.20	41.59	1105.06	220.51	308.51	49855
		88.00	226.20	0.00	6362.43	209.62	297.62	997093
30	-16.00	120.00	280.63	0.00	7118.25	268.88	388.88	997093
31	-18.00	140.00	314.62	0.00	7590.22	302.78	442.78	997093
32	-20.00	160.00	348.59	0.00	8061.94	335.80	495.80	997093

(continued)

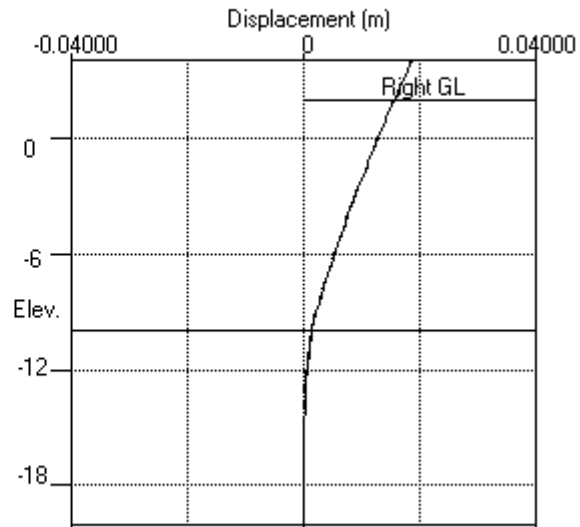
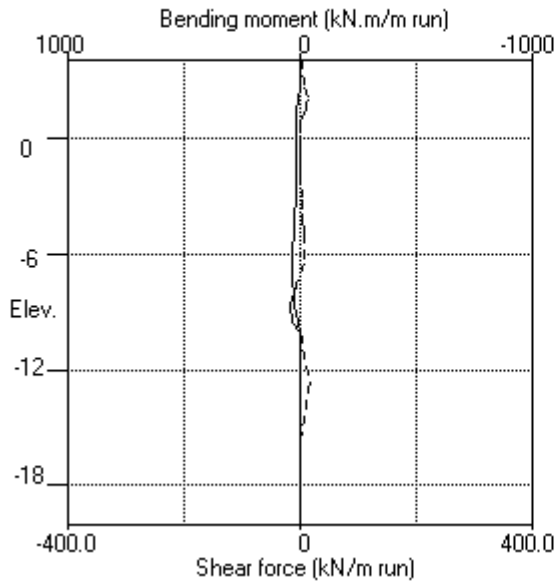
Stage No.2 Excavate to elevation 2.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u> <u>modulus</u>
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	0.00	0.00	0.00	9951
5	1.90	0.00	1.70	0.53	6.58	6.58	6.58p	9951
6	1.45	0.00	9.35	2.89	36.17	36.17	36.17p	9951
7	1.00	0.00	17.00	5.25	65.76	40.17	40.17	9951
8	0.80	0.00	20.40	6.30	78.91	39.27	39.27	9951
		0.00	20.40	1.60	90.25	31.55	31.55	5075
9	0.00	0.00	34.00	6.38	137.07	42.69	42.69	5473
10	-0.65	0.00	45.05	10.26	175.12	50.37	50.37	5797
11	-1.30	0.00	56.11	14.14	213.17	57.87	57.87	6120
12	-1.50	0.00	59.51	15.34	224.88	60.19	60.19	6220
13	-2.00	0.00	68.01	18.33	254.15	65.95	65.95	6468
14	-2.60	0.00	78.22	21.91	289.29	72.86	72.86	6767
15	-3.20	0.00	88.43	25.50	324.43	79.77	79.77	7066
16	-4.00	0.00	102.05	30.28	371.30	89.00	89.00	7464
17	-4.50	5.00	105.56	31.52	383.39	91.30	96.30	7712
18	-5.00	10.00	109.07	32.75	395.49	93.70	103.70	7961
19	-5.80	18.00	114.70	34.73	414.86	97.89	115.89	8359
20	-6.60	26.00	120.34	36.71	434.25	102.79	128.79	8757
		26.00	120.34	35.14	525.75	114.70	140.70	19903
21	-7.35	33.50	125.62	36.68	548.85	111.51	145.01	19903
22	-8.10	41.00	130.92	38.23	571.97	113.51	154.51	19903
		41.00	130.92	24.68	630.38	169.27	210.27	29854
23	-8.58	45.75	135.70	26.04	651.27	167.62	213.37	29854
24	-9.05	50.50	140.48	27.39	672.16	168.40	218.90	29854
25	-9.53	55.25	145.26	28.75	693.07	168.35	223.60	29854
26	-10.00	60.00	150.05	30.10	713.99	158.68	218.68	29854
27	-10.20	62.00	152.07	30.67	722.80	180.85	242.85	29854
28	-11.00	70.00	160.14	32.96	758.07	185.65	255.65	29854
		70.00	160.14	22.28	816.43	189.88	259.88	49757
29	-12.80	88.00	183.73	29.18	919.49	203.32	291.32	49757
		88.00	183.73	0.00	5772.70	219.27	307.27	995147
30	-16.00	120.00	238.55	0.00	6534.01	268.89	388.89	995147
31	-18.00	140.00	272.88	0.00	7010.65	302.77	442.77	995147
32	-20.00	160.00	307.24	0.00	7487.86	335.83	495.83	995147

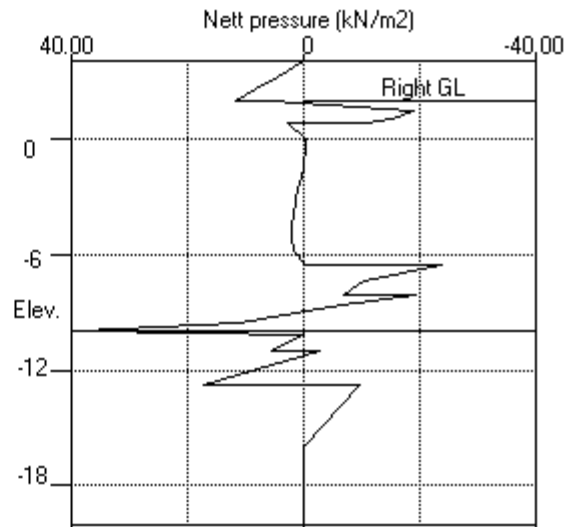
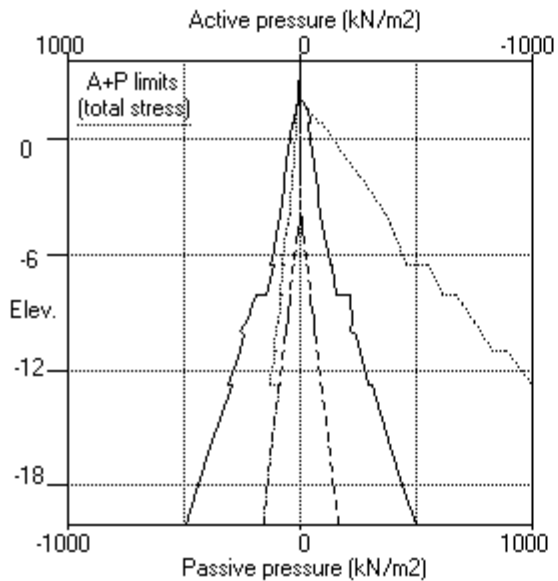
Note: 12.48 a Soil pressure at active limit
 36.17 p Soil pressure at passive limit

Units: kN,m

Stage No.2 Excav. to elev. 2.00 on RIGHT side



Stage No.2 Excav. to elev. 2.00 on RIGHT side

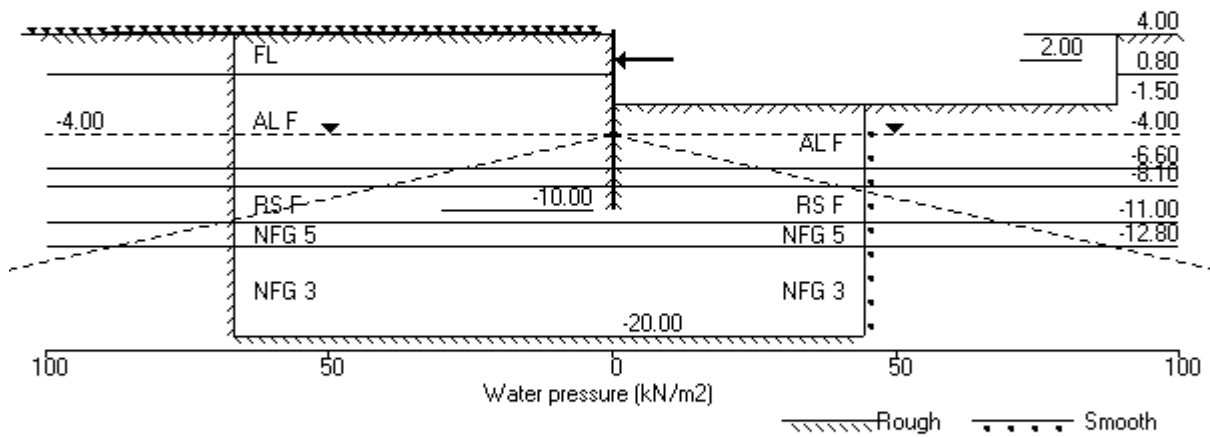


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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_6
 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DL
Data filename/Run ID: Section_6	
Albert Street Development	Date:16-11-2022
Section 6	Checked :

Units: kN,m

Stage No. 4 Excavate to elevation -1.50 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>of</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
4	4.00	-1.50	2.00	7.528	n/a	-3.36	1.86	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.017	-1.48E-04	0.0	-0.0		572444
2	3.20	10.93	0.017	-1.49E-04	4.4	1.2		572444
3	2.60	11.07	0.017	-1.53E-04	11.0	6.3		572444
4	2.00	12.65	0.017	-1.64E-04	18.1	15.3	-127.4	572444
		12.65	0.017	-1.64E-04	-109.3	15.3		
5	1.90	11.44	0.017	-1.66E-04	-108.1	4.5		572444
6	1.45	14.54	0.018	-1.51E-04	-102.3	-42.2		572444
7	1.00	20.39	0.018	-1.00E-04	-94.4	-86.6		572444
8	0.80	21.38	0.018	-6.72E-05	-90.2	-105.1		572444
		30.88	0.018	-6.72E-05	-90.2	-105.1		
9	0.00	38.06	0.018	1.22E-04	-62.7	-166.2		572444
10	-0.65	44.40	0.017	3.29E-04	-35.9	-198.3		572444
11	-1.30	51.47	0.017	5.62E-04	-4.7	-211.7		572444
12	-1.50	53.07	0.017	6.35E-04	5.7	-211.6		572444
		33.04	0.017	6.35E-04	5.7	-211.6		
13	-2.00	11.52	0.017	8.18E-04	16.9	-205.2		572444
14	-2.60	10.64	0.016	1.02E-03	23.5	-193.0		572444
15	-3.20	9.57	0.015	1.22E-03	29.6	-177.0		572444
16	-4.00	9.20	0.014	1.44E-03	37.1	-150.2		572444
17	-4.50	8.68	0.014	1.57E-03	41.6	-130.5		572444
18	-5.00	8.15	0.013	1.67E-03	45.8	-108.7		572444
19	-5.80	6.59	0.011	1.80E-03	51.7	-69.4		572444
20	-6.60	2.80	0.010	1.86E-03	55.4	-26.0		572444
		-49.38	0.010	1.86E-03	55.4	-26.0		
21	-7.35	-23.44	0.009	1.88E-03	28.1	1.7		572444
22	-8.10	-17.49	0.007	1.87E-03	12.8	16.2		572444
		-48.14	0.007	1.87E-03	12.8	16.2		
23	-8.58	-23.25	0.006	1.85E-03	-4.2	16.8		572444
24	-9.05	-9.12	0.005	1.84E-03	-11.9	12.2		572444
25	-9.53	4.90	0.004	1.83E-03	-12.9	5.6		572444
26	-10.00	34.68	0.004	1.83E-03	-3.5	-0.0		0
27	-10.20	0.01	0.003	0	0.0	0.0		0

(continued)

Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
28	-11.00	13.83	0.002	0	5.5	0.0		0
		-6.11	0.002	0	5.5	0.0		
29	-12.80	41.19	0.000	0	37.1	0.0		0
		-23.13	0.000	0	37.1	0.0		
30	-16.00	-0.02	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.07	0.000	0	0.0	0.0		---
At elev. 2.00		Prop force =			127.4	kN/m run		

LEFT side

<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	10.93	10.93	9971
3	2.60	0.00	26.84	8.29	103.83	11.07	11.07	9971
4	2.00	0.00	38.50	11.90	148.93	12.65	12.65	9971
5	1.90	0.00	40.40	12.48	156.28	11.44	11.44A	9971
6	1.45	0.00	48.81	15.08	188.80	14.54	14.54A	9971
7	1.00	0.00	57.04	17.63	220.65	20.39	20.39	9971
8	0.80	0.00	60.66	18.74	234.64	21.38	21.38	9971
		0.00	60.66	15.74	228.83	30.88	30.88	5085
9	0.00	0.00	74.94	20.76	277.99	38.06	38.06	5484
10	-0.65	0.00	86.39	24.78	317.40	44.40	44.40	5808
11	-1.30	0.00	97.75	28.77	356.50	51.47	51.47	6132
12	-1.50	0.00	101.23	29.99	368.48	53.07	53.07	6232
13	-2.00	0.00	109.91	33.04	398.36	58.62	58.62	6481
14	-2.60	0.00	120.29	36.69	434.09	65.32	65.32	6780
15	-3.20	0.00	130.64	40.33	469.73	72.04	72.04	7079
16	-4.00	0.00	144.41	45.16	517.11	81.47	81.47	7478
17	-4.50	5.00	147.99	46.42	529.46	83.73	88.73	7727
18	-5.00	10.00	151.57	47.68	541.78	85.96	95.96	7977
19	-5.80	18.00	157.28	49.68	561.42	89.13	107.13	8376
20	-6.60	26.00	162.97	51.68	581.00	91.29	117.29	8774
		26.00	162.97	47.59	712.00	65.31	91.31	19942
21	-7.35	33.50	168.29	49.14	735.24	81.85	115.35	19942
22	-8.10	41.00	173.59	50.69	758.43	88.63	129.63	19942
		41.00	173.59	36.77	816.86	122.80	163.80	29913
23	-8.58	45.75	178.38	38.13	837.75	139.91	185.66	29913
24	-9.05	50.50	183.16	39.48	858.64	151.76	202.26	29913
25	-9.53	55.25	187.93	40.84	879.51	163.58	218.83	29913
26	-10.00	60.00	192.70	42.19	900.36	182.66	242.66	29913
27	-10.20	62.00	194.71	42.76	909.14	168.09	230.09	29913
28	-11.00	70.00	202.75	45.03	944.23	182.72	252.72	29913
		70.00	202.75	34.73	1002.59	172.81	242.81	49855
29	-12.80	88.00	226.20	41.59	1105.06	219.81	307.81	49855
		88.00	226.20	0.00	6362.43	195.68	283.68	997093
30	-16.00	120.00	280.63	0.00	7118.25	261.73	381.73	997093
31	-18.00	140.00	314.62	0.00	7590.22	295.58	435.58	997093
32	-20.00	160.00	348.59	0.00	8061.94	327.34	487.34	997093

(continued)

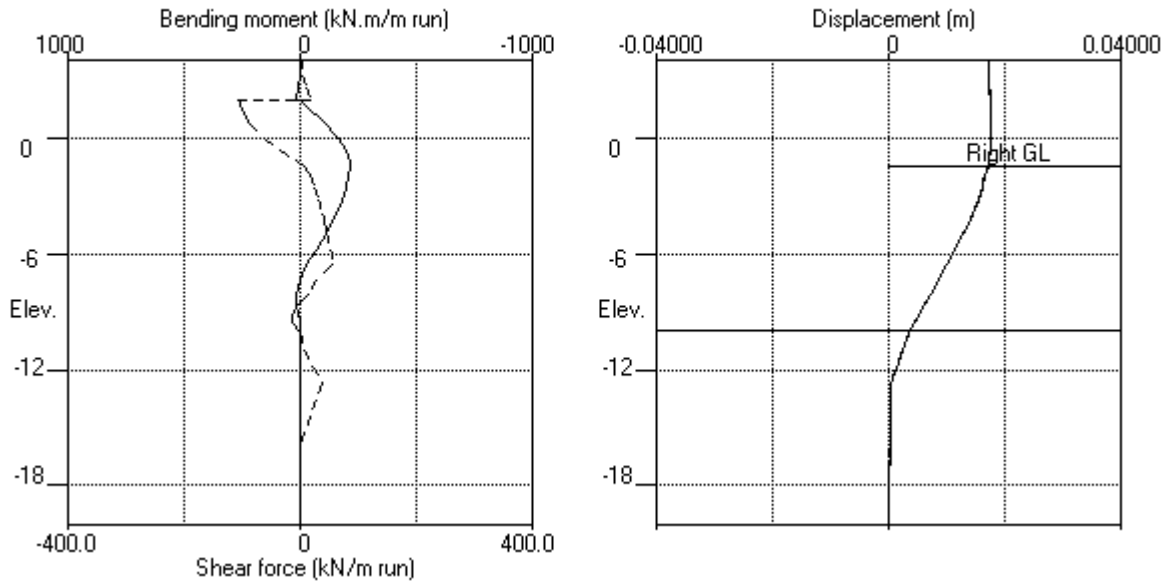
Stage No.4 Excavate to elevation -1.50 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	6226
13	-2.00	0.00	8.50	0.00	49.29	47.10	47.10	6475
14	-2.60	0.00	18.70	1.00	84.40	54.68	54.68	6774
15	-3.20	0.00	28.90	4.59	119.52	62.47	62.47	7073
16	-4.00	0.00	42.51	9.37	166.36	72.27	72.27	7471
17	-4.50	5.00	46.02	10.60	178.43	75.05	80.05	7720
18	-5.00	10.00	49.53	11.83	190.51	77.81	87.81	7969
19	-5.80	18.00	55.15	13.81	209.86	82.54	100.54	8368
20	-6.60	26.00	60.78	15.79	229.25	88.49	114.49	8766
		26.00	60.78	17.75	265.55	114.69	140.69	19923
21	-7.35	33.50	66.07	19.29	288.66	105.29	138.79	19923
22	-8.10	41.00	71.37	20.84	311.83	106.11	147.11	19923
		41.00	71.37	7.81	370.21	170.94	211.94	29884
23	-8.58	45.75	76.16	9.17	391.14	163.15	208.90	29884
24	-9.05	50.50	80.96	10.53	412.09	160.87	211.37	29884
25	-9.53	55.25	85.76	11.89	433.06	158.68	213.93	29884
26	-10.00	60.00	90.56	13.25	454.06	147.98	207.98	29884
27	-10.20	62.00	92.59	13.82	462.90	168.08	230.08	29884
28	-11.00	70.00	100.70	16.12	498.35	168.89	238.89	29884
		70.00	100.70	4.91	556.71	178.92	248.92	49807
29	-12.80	88.00	124.42	11.84	660.34	178.62	266.62	49807
		88.00	124.42	0.00	4949.12	218.81	306.81	996147
30	-16.00	120.00	179.63	0.00	5715.81	261.75	381.75	996147
31	-18.00	140.00	214.30	0.00	6197.31	295.57	435.57	996147
32	-20.00	160.00	249.11	0.00	6680.57	327.40	487.40	996147

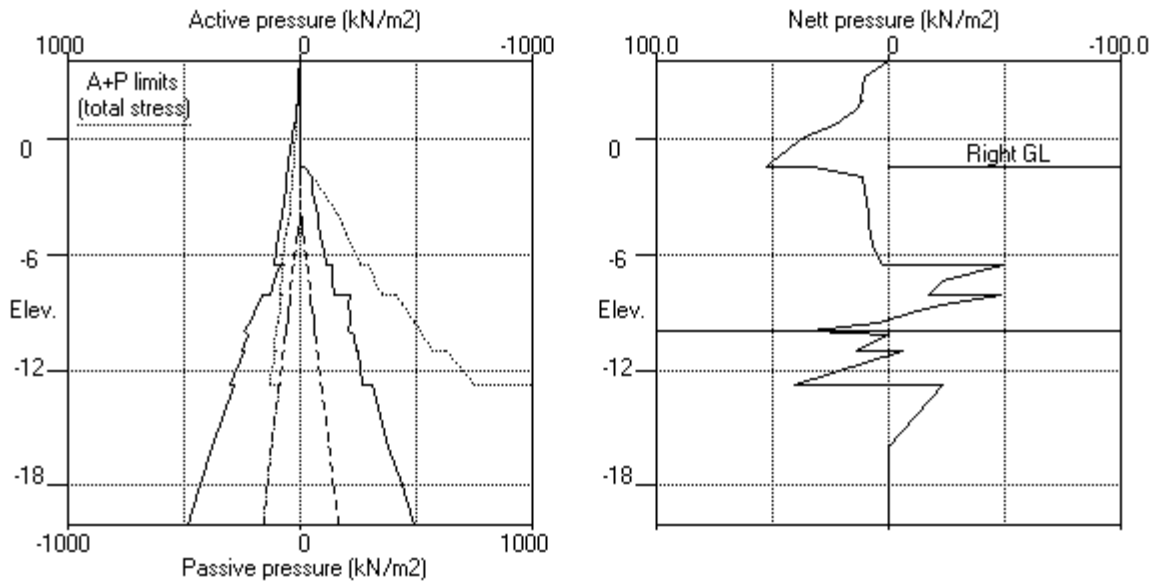
Note: 12.34 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit
 14.54A Arching - soil pressure below active limit

Units: kN,m

Stage No.4 Excav. to elev. -1.50 on RIGHT side



Stage No.4 Excav. to elev. -1.50 on RIGHT side

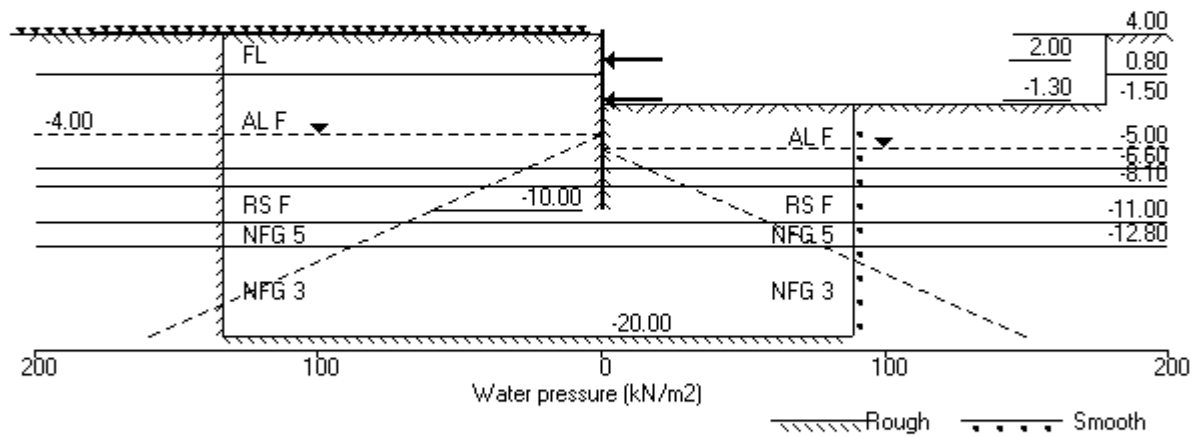


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 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Units: kN,m

Stage No. 6 Apply water pressure profile no.2

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>More than one prop. No FoS calc.</u>			
6	4.00	-1.50					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.017	-1.86E-04	0.0	-0.0		572444
2	3.20	11.20	0.017	-1.87E-04	4.5	1.2		572444
3	2.60	11.29	0.017	-1.91E-04	11.2	6.4		572444
4	2.00	12.84	0.017	-2.02E-04	18.5	15.6	-124.9	572444
		12.84	0.017	-2.02E-04	-106.5	15.6		
5	1.90	11.60	0.017	-2.04E-04	-105.2	5.1		572444
6	1.45	14.69	0.017	-1.90E-04	-99.3	-40.3		572444
7	1.00	20.52	0.018	-1.42E-04	-91.4	-83.4		572444
8	0.80	21.50	0.018	-1.10E-04	-87.2	-101.2		572444
		30.94	0.018	-1.10E-04	-87.2	-101.2		
9	0.00	38.12	0.018	7.24E-05	-59.6	-159.9		572444
10	-0.65	44.44	0.018	2.71E-04	-32.7	-190.0		572444
11	-1.30	51.49	0.017	4.93E-04	-1.6	-201.4	-9.0	572444
		51.49	0.017	4.93E-04	-10.6	-201.4		
12	-1.50	53.05	0.017	5.63E-04	-0.2	-202.4		572444
		33.16	0.017	5.63E-04	-0.2	-202.4		
13	-2.00	11.54	0.017	7.39E-04	11.0	-199.0		572444
14	-2.60	10.49	0.016	9.43E-04	17.6	-190.3		572444
15	-3.20	9.18	0.016	1.13E-03	23.5	-177.8		572444
16	-4.00	8.56	0.015	1.36E-03	30.6	-156.0		572444
17	-4.50	10.65	0.014	1.49E-03	35.4	-139.5		572444
18	-5.00	12.72	0.013	1.61E-03	41.3	-120.4		572444
19	-5.80	10.87	0.012	1.75E-03	50.7	-83.3		572444
20	-6.60	6.77	0.010	1.83E-03	57.8	-39.2		572444
		-47.61	0.010	1.83E-03	57.8	-39.2		
21	-7.35	-21.57	0.009	1.87E-03	31.8	-9.3		572444
22	-8.10	-16.03	0.008	1.87E-03	17.7	8.5		572444
		-48.80	0.008	1.87E-03	17.7	8.5		
23	-8.58	-23.81	0.007	1.86E-03	0.5	11.4		572444
24	-9.05	-10.18	0.006	1.85E-03	-7.6	9.0		572444
25	-9.53	2.40	0.005	1.84E-03	-9.4	4.2		572444
26	-10.00	26.30	0.004	1.84E-03	-2.6	-0.0		0

(continued)

Stage No.6 Apply water pressure profile no.2

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-10.20	0.01	0.004	0	0.0	0.0		0
28	-11.00	15.63	0.003	0	6.3	0.0		0
		-6.91	0.003	0	6.3	0.0		
29	-12.80	46.38	0.000	0	41.8	0.0		0
		-26.05	0.000	0	41.8	0.0		
30	-16.00	-0.02	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.07	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	124.9 kN/m run			
At elev. -1.30				Prop force =	9.0 kN/m run			

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	11.20	11.20	9971
3	2.60	0.00	26.84	8.29	103.83	11.29	11.29	9971
4	2.00	0.00	38.50	11.90	148.93	12.84	12.84	9971
5	1.90	0.00	40.40	12.48	156.28	11.60	11.60A	9971
6	1.45	0.00	48.81	15.08	188.80	14.69	14.69A	9971
7	1.00	0.00	57.04	17.63	220.65	20.52	20.52	9971
8	0.80	0.00	60.66	18.74	234.64	21.50	21.50	9971
		0.00	60.66	15.74	228.83	30.94	30.94	5085
9	0.00	0.00	74.94	20.76	277.99	38.12	38.12	5484
10	-0.65	0.00	86.39	24.78	317.40	44.44	44.44	5808
11	-1.30	0.00	97.75	28.77	356.50	51.49	51.49	6132
12	-1.50	0.00	101.23	29.99	368.48	53.05	53.05	6232
13	-2.00	0.00	109.91	33.04	398.36	58.55	58.55	6481
14	-2.60	0.00	120.29	36.69	434.09	65.17	65.17	6780
15	-3.20	0.00	130.64	40.33	469.73	71.79	71.79	7079
16	-4.00	0.00	144.41	45.16	517.11	81.10	81.10	7478
17	-4.50	5.00	147.99	46.42	529.46	83.24	88.24	7727
18	-5.00	10.00	151.57	47.68	541.78	85.35	95.35	7977
19	-5.80	18.00	157.28	49.68	561.42	88.38	106.38	8376
20	-6.60	26.00	162.97	51.68	581.00	90.41	116.41	8774
		26.00	162.97	47.59	712.00	63.31	89.31	19942
21	-7.35	33.50	168.29	49.14	735.24	79.90	113.40	19942
22	-8.10	41.00	173.59	50.69	758.43	86.48	127.48	19942
		41.00	173.59	36.77	816.86	119.58	160.58	29913
23	-8.58	45.75	178.38	38.13	837.75	136.74	182.49	29913
24	-9.05	50.50	183.16	39.48	858.64	148.34	198.84	29913
25	-9.53	55.25	187.93	40.84	879.51	159.44	214.69	29913
26	-10.00	60.00	192.70	42.19	900.36	175.70	235.70	29913
27	-10.20	62.00	194.71	42.76	909.14	165.16	227.16	29913
28	-11.00	70.00	202.75	45.03	944.23	180.75	250.75	29913
		70.00	202.75	34.73	1002.59	169.53	239.53	49855
29	-12.80	88.00	226.20	41.59	1105.06	219.55	307.55	49855
		88.00	226.20	0.00	6362.43	190.48	278.48	997093
30	-16.00	120.00	280.63	0.00	7118.25	258.00	378.00	997093
31	-18.00	140.00	314.62	0.00	7590.22	291.82	431.82	997093
32	-20.00	160.00	348.59	0.00	8061.94	323.02	483.02	997093

(continued)

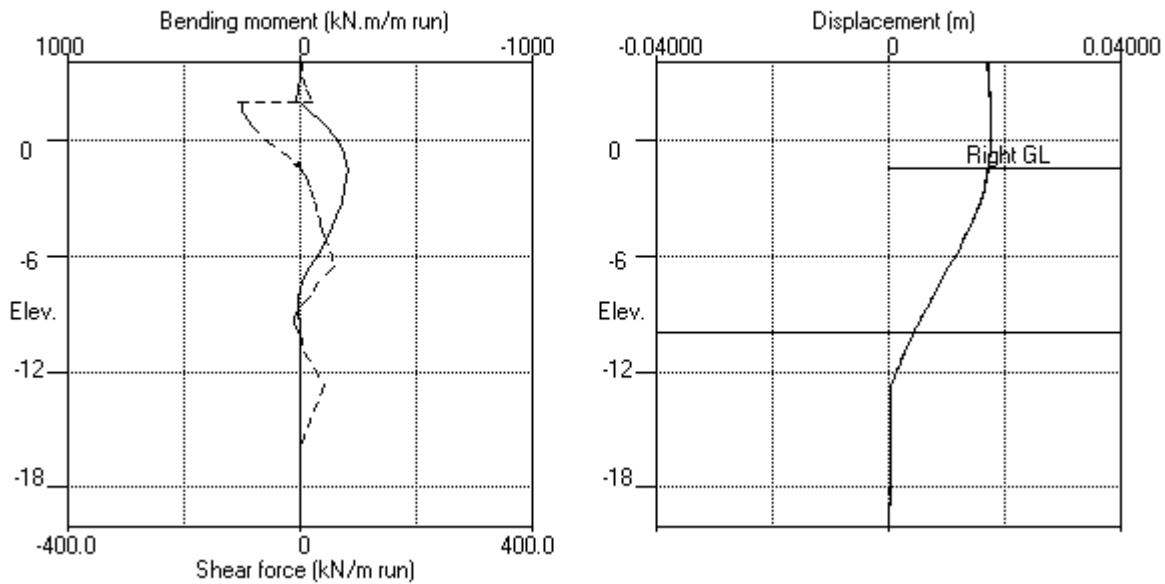
Stage No.6 Apply water pressure profile no.2

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.89	19.89	6226
13	-2.00	0.00	8.50	0.00	49.29	47.01	47.01	6475
14	-2.60	0.00	18.70	1.00	84.40	54.68	54.68	6774
15	-3.20	0.00	28.90	4.59	119.52	62.61	62.61	7073
16	-4.00	0.00	42.51	9.37	166.36	72.54	72.54	7471
17	-4.50	0.00	51.02	12.36	195.64	77.59	77.59	7720
18	-5.00	0.00	59.53	15.35	224.93	82.63	82.63	7969
19	-5.80	8.00	65.15	17.32	244.29	87.51	95.51	8368
20	-6.60	16.00	70.78	19.30	263.67	93.63	109.63	8766
		16.00	70.78	20.67	309.24	120.92	136.92	19923
21	-7.35	23.50	76.07	22.21	332.35	111.48	134.98	19923
22	-8.10	31.00	81.37	23.76	355.52	112.51	143.51	19923
		31.00	81.37	10.64	413.91	178.39	209.39	29884
23	-8.58	35.75	86.16	12.00	434.83	170.55	206.30	29884
24	-9.05	40.50	90.96	13.36	455.78	168.52	209.02	29884
25	-9.53	45.25	95.76	14.72	476.75	167.04	212.29	29884
26	-10.00	50.00	100.56	16.08	497.75	159.40	209.40	29884
27	-10.20	52.00	102.59	16.65	506.60	175.15	227.15	29884
28	-11.00	60.00	110.70	18.95	542.04	175.12	235.12	29884
		60.00	110.70	7.83	600.40	186.45	246.45	49807
29	-12.80	78.00	134.42	14.77	704.03	183.17	261.17	49807
		78.00	134.42	0.00	5087.98	226.53	304.53	996147
30	-16.00	110.00	189.63	0.00	5854.67	268.01	378.01	996147
31	-18.00	130.00	224.30	0.00	6336.17	301.82	431.82	996147
32	-20.00	150.00	259.11	0.00	6819.43	333.09	483.09	996147

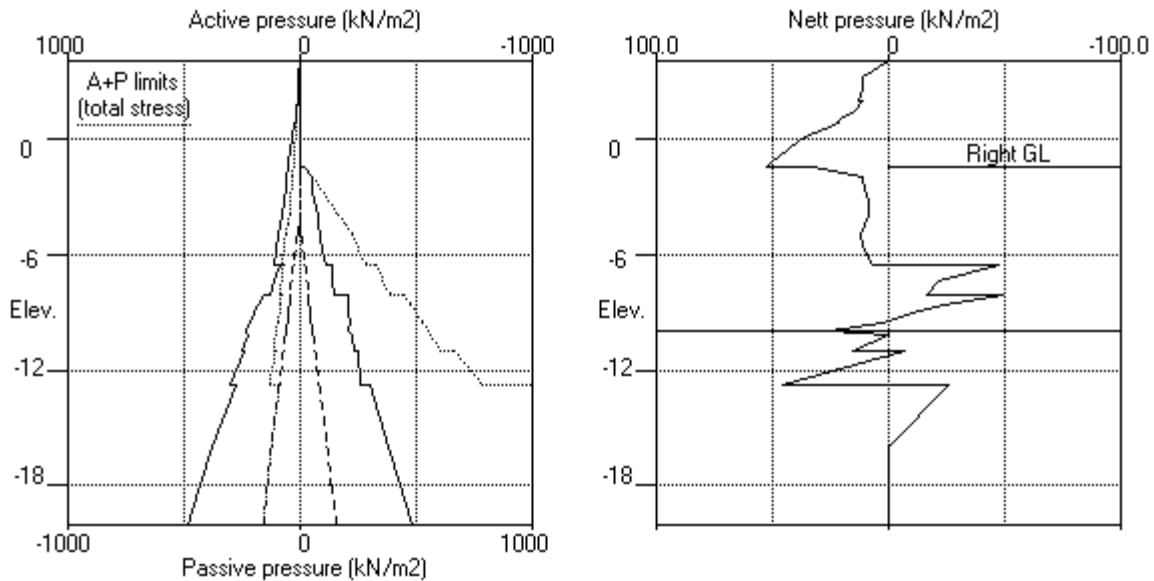
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 14.69A Arching - soil pressure below active limit

Units: kN,m

Stage No.6 Apply water pressure profile no.2



Stage No.6 Apply water pressure profile no.2

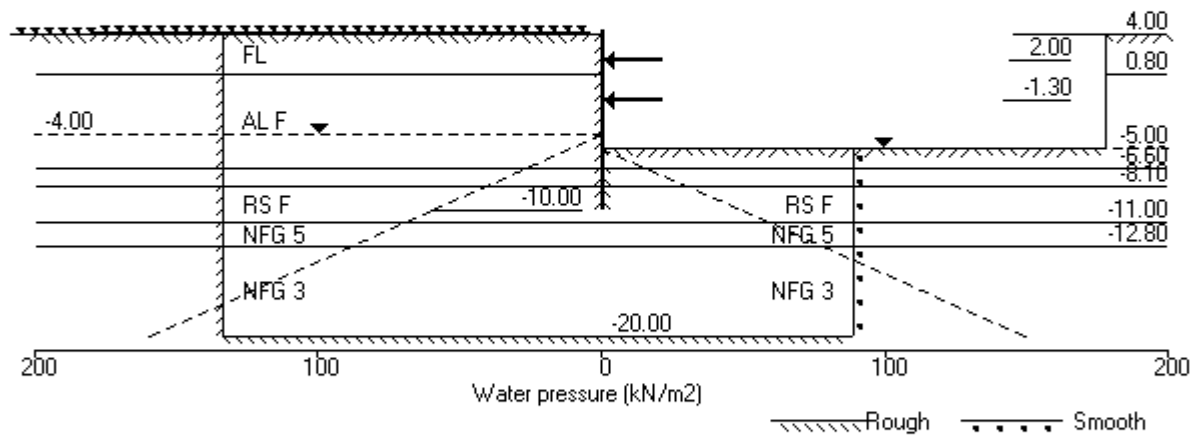


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_6
 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Units: kN,m

Stage No. 7 Excavate to elevation -5.00 on RIGHT side

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>More than one prop. No FoS calc.</u>			
7	4.00	-5.00					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.07E-03	0.0	-0.0		572444
2	3.20	16.68	0.016	-1.07E-03	6.7	1.2		572444
3	2.60	15.10	0.016	-1.08E-03	16.2	8.7		572444
4	2.00	15.78	0.017	-1.09E-03	25.5	21.6	-100.7	572444
		15.78	0.017	-1.09E-03	-75.3	21.6		
5	1.90	13.82	0.017	-1.10E-03	-73.8	14.2		572444
6	1.45	16.27	0.018	-1.10E-03	-67.0	-16.8		572444
7	1.00	21.36	0.018	-1.07E-03	-58.5	-45.2		572444
8	0.80	21.51	0.018	-1.05E-03	-54.3	-56.4		572444
		30.94	0.018	-1.05E-03	-54.3	-56.4		
9	0.00	37.90	0.019	-9.58E-04	-26.7	-88.7		572444
10	-0.65	43.62	0.020	-8.52E-04	-0.2	-97.5		572444
11	-1.30	50.02	0.020	-7.47E-04	30.2	-87.9	-225.1	572444
		50.02	0.020	-7.47E-04	-194.9	-87.9		
12	-1.50	50.68	0.020	-7.10E-04	-184.8	-125.9		572444
13	-2.00	55.07	0.021	-5.62E-04	-158.4	-211.4		572444
14	-2.60	60.08	0.021	-2.96E-04	-123.8	-296.1		572444
15	-3.20	64.75	0.021	4.66E-05	-86.4	-359.1		572444
16	-4.00	72.34	0.021	5.81E-04	-31.6	-406.4		572444
17	-4.50	77.97	0.020	9.39E-04	6.0	-412.8		572444
18	-5.00	83.81	0.020	1.29E-03	46.5	-399.7		572444
		63.78	0.020	1.29E-03	46.5	-399.7		
19	-5.80	46.19	0.019	1.81E-03	90.5	-343.7		572444
20	-6.60	27.66	0.017	2.23E-03	120.0	-257.9		572444
		-7.81	0.017	2.23E-03	120.0	-257.9		
21	-7.35	-9.21	0.015	2.51E-03	113.6	-173.2		572444
22	-8.10	-25.01	0.013	2.69E-03	100.8	-91.9		572444
		-63.55	0.013	2.69E-03	100.8	-91.9		
23	-8.58	-61.05	0.012	2.74E-03	71.2	-51.2		572444
24	-9.05	-47.09	0.011	2.78E-03	45.5	-24.2		572444
25	-9.53	-37.13	0.009	2.79E-03	25.5	-7.9		572444
26	-10.00	-49.45	0.008	2.79E-03	4.9	-0.0		0

(continued)

Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-10.20	0.00	0.007	0	0.0	0.0		0
28	-11.00	23.72	0.005	0	9.5	0.0		0
		-10.52	0.005	0	9.5	0.0		
29	-12.80	70.61	0.001	0	63.6	0.0		0
		-39.67	0.001	0	63.6	0.0		
30	-16.00	-0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	100.7	kN/m run		
At elev. -1.30				Prop force =	225.1	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	16.68	16.68	9971
3	2.60	0.00	26.84	8.29	103.83	15.10	15.10	9971
4	2.00	0.00	38.50	11.90	148.93	15.78	15.78	9971
5	1.90	0.00	40.40	12.48	156.28	13.82	13.82	9971
6	1.45	0.00	48.81	15.08	188.80	16.27	16.27	9971
7	1.00	0.00	57.04	17.63	220.65	21.36	21.36	9971
8	0.80	0.00	60.66	18.74	234.64	21.51	21.51	9971
		0.00	60.66	15.74	228.83	30.94	30.94	5085
9	0.00	0.00	74.94	20.76	277.99	37.90	37.90	5484
10	-0.65	0.00	86.39	24.78	317.40	43.62	43.62	5808
11	-1.30	0.00	97.75	28.77	356.50	50.02	50.02	6132
12	-1.50	0.00	101.23	29.99	368.48	50.68	50.68	6232
13	-2.00	0.00	109.91	33.04	398.36	55.07	55.07	6481
14	-2.60	0.00	120.29	36.69	434.09	60.08	60.08	6780
15	-3.20	0.00	130.64	40.33	469.73	64.75	64.75	7079
16	-4.00	0.00	144.41	45.16	517.11	72.34	72.34	7478
17	-4.50	5.00	147.99	46.42	529.46	72.97	77.97	7727
18	-5.00	10.00	151.57	47.68	541.78	73.81	83.81	7977
19	-5.80	18.00	157.28	49.68	561.42	75.50	93.50	8376
20	-6.60	26.00	162.97	51.68	581.00	76.25	102.25	8774
		26.00	162.97	47.59	712.00	31.14	57.14A	19942
21	-7.35	33.50	168.29	49.14	735.24	52.71	86.21	19942
22	-8.10	41.00	173.59	50.69	758.43	59.93	100.93	19942
		41.00	173.59	36.77	816.86	79.76	120.76	29913
23	-8.58	45.75	178.38	38.13	837.75	103.08	148.83	29913
24	-9.05	50.50	183.16	39.48	858.64	116.94	167.44	29913
25	-9.53	55.25	187.93	40.84	879.51	126.64	181.89	29913
26	-10.00	60.00	192.70	42.19	900.36	125.83	185.83	29913
27	-10.20	62.00	194.71	42.76	909.14	151.78	213.78	29913
28	-11.00	70.00	202.75	45.03	944.23	171.96	241.96	29913
		70.00	202.75	34.73	1002.59	154.88	224.88	49855
29	-12.80	88.00	226.20	41.59	1105.06	218.85	306.85	49855
		88.00	226.20	0.00	6362.43	176.48	264.48	997093
30	-16.00	120.00	280.63	0.00	7118.25	250.77	370.77	997093
31	-18.00	140.00	314.62	0.00	7590.22	284.48	424.48	997093
32	-20.00	160.00	348.59	0.00	8061.94	314.30	474.30	997093

(continued)

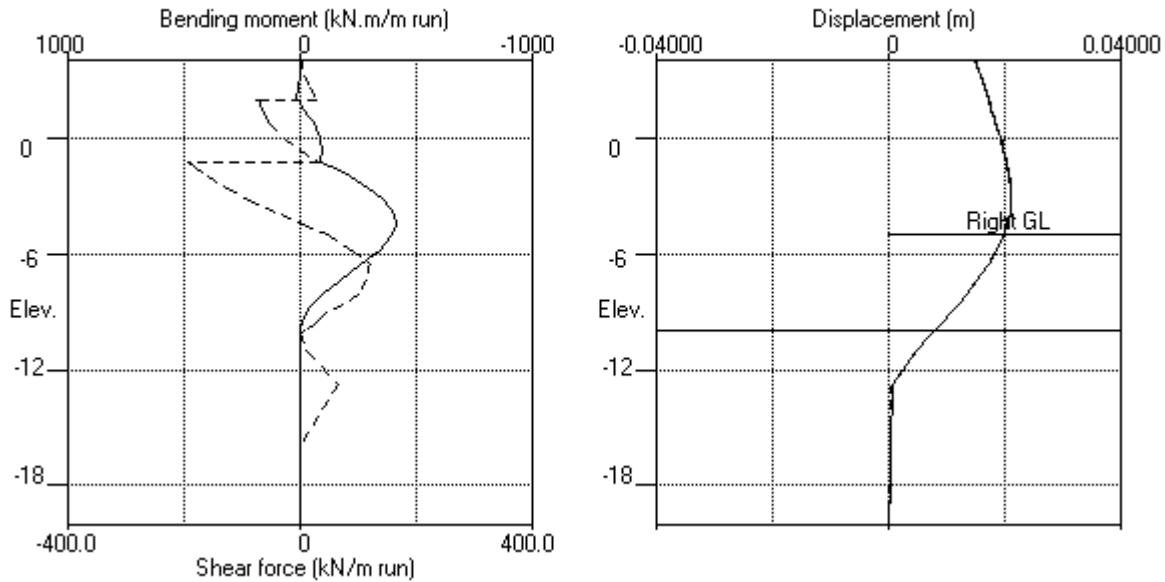
Stage No.7 Excavate to elevation -5.00 on RIGHT side

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u> <u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Active</u> <u>limit</u>	<u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	7977
19	-5.80	8.00	5.60	0.00	39.31	39.31	47.31p	8376
20	-6.60	16.00	11.20	0.00	58.60	58.60	74.60p	8775
		16.00	11.20	3.27	48.95	48.95	64.95p	19943
21	-7.35	23.50	16.46	4.81	71.93	71.93	95.43p	19943
22	-8.10	31.00	21.73	6.35	94.94	94.94	125.94p	19943
		31.00	21.73	0.00	153.31	153.31	184.31p	29915
23	-8.58	35.75	26.50	0.00	174.13	174.13	209.88p	29915
24	-9.05	40.50	31.27	0.00	194.98	174.03	214.53	29915
25	-9.53	45.25	36.04	0.00	215.84	173.77	219.02	29915
26	-10.00	50.00	40.82	0.00	236.74	185.28	235.28	29915
27	-10.20	52.00	42.84	0.00	245.54	161.78	213.78	29915
28	-11.00	60.00	50.91	2.01	280.82	158.24	218.24	29915
		60.00	50.91	0.00	339.18	175.40	235.40	49858
29	-12.80	78.00	74.56	0.00	442.50	158.25	236.25	49858
		78.00	74.56	0.00	4256.83	226.15	304.15	997169
30	-16.00	110.00	129.74	0.00	5023.01	260.79	370.79	997169
31	-18.00	130.00	164.48	0.00	5505.38	294.48	424.48	997169
32	-20.00	150.00	199.42	0.00	5990.65	324.38	474.38	997169

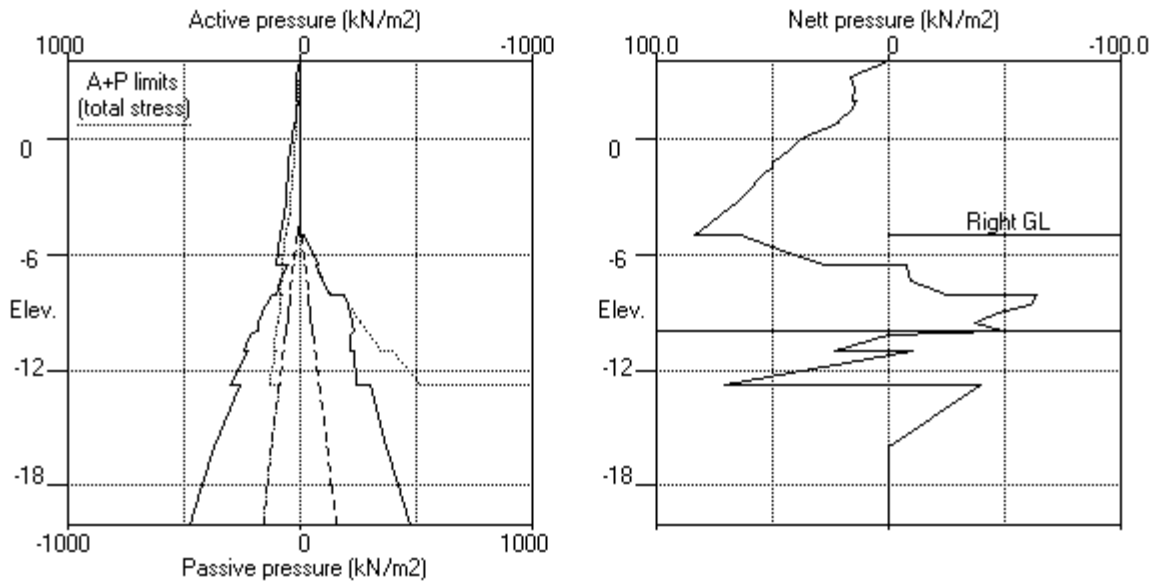
Note: 12.34 a Soil pressure at active limit
 209.88 p Soil pressure at passive limit
 57.14A Arching - soil pressure below active limit

Units: kN,m

Stage No.7 Excav. to elev. -5.00 on RIGHT side



Stage No.7 Excav. to elev. -5.00 on RIGHT side

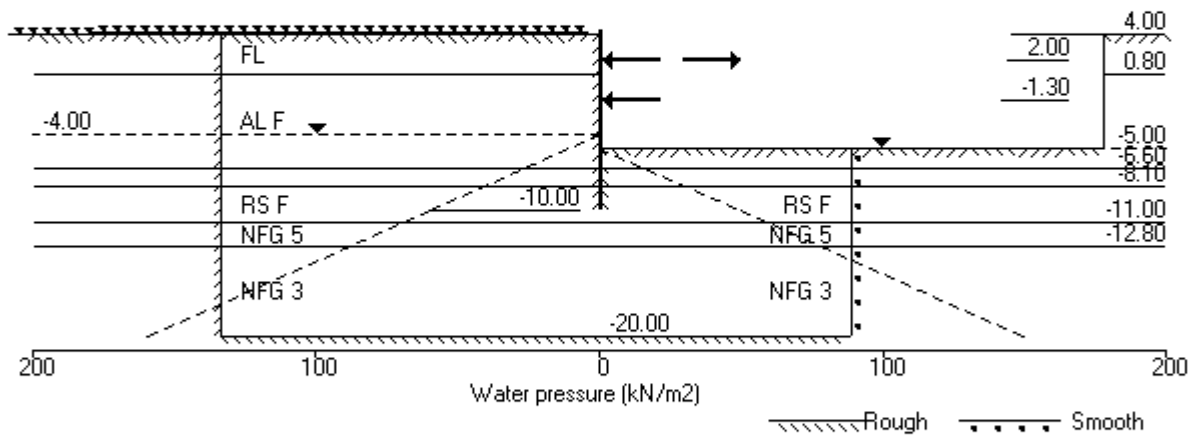


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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_6
 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.8 Apply load no.1 at elev. 1.90



Units: kN,m

Stage No. 8 Apply load no.1 at elevation 1.90

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u>
				<u>Factor</u> <u>of</u>	<u>Moment</u> <u>equilib.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u>	
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>
8	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.016	-9.44E-04	0.0	-0.0		572444
2	3.20	15.26	0.016	-9.45E-04	6.1	1.2		572444
3	2.60	14.07	0.017	-9.50E-04	14.9	8.1		572444
4	2.00	14.92	0.018	-9.64E-04	23.6	20.1	-141.8	572444
		14.92	0.018	-9.64E-04	-118.2	20.1		
5	1.90	13.11	0.018	-9.67E-04	-116.8	8.3	51.2	572444
		13.11	0.018	-9.67E-04	-65.6	8.3		
6	1.45	15.71	0.018	-9.63E-04	-59.1	-19.1		572444
7	1.00	20.99	0.019	-9.38E-04	-50.9	-43.9		572444
8	0.80	21.34	0.019	-9.21E-04	-46.6	-53.7		572444
		30.86	0.019	-9.21E-04	-46.6	-53.7		
9	0.00	37.79	0.019	-8.27E-04	-19.2	-79.9		572444
10	-0.65	43.58	0.020	-7.34E-04	7.3	-83.9		572444
11	-1.30	50.04	0.020	-6.47E-04	37.7	-69.4	-235.7	572444
		50.04	0.020	-6.47E-04	-198.0	-69.4		
12	-1.50	50.75	0.021	-6.16E-04	-187.9	-108.0		572444
13	-2.00	55.16	0.021	-4.84E-04	-161.4	-195.1		572444
14	-2.60	60.21	0.021	-2.34E-04	-126.8	-281.6		572444
15	-3.20	64.91	0.021	9.43E-05	-89.3	-346.3		572444
16	-4.00	72.52	0.021	6.13E-04	-34.3	-395.9		572444
17	-4.50	78.15	0.020	9.62E-04	3.3	-403.7		572444
18	-5.00	83.99	0.020	1.30E-03	43.9	-391.9		572444
		64.02	0.020	1.30E-03	43.9	-391.9		
19	-5.80	46.46	0.019	1.81E-03	88.1	-337.9		572444
20	-6.60	27.94	0.017	2.23E-03	117.8	-253.9		572444
		-7.17	0.017	2.23E-03	117.8	-253.9		
21	-7.35	-8.67	0.015	2.51E-03	111.9	-170.6		572444
22	-8.10	-24.50	0.013	2.68E-03	99.4	-90.5		572444
		-62.79	0.013	2.68E-03	99.4	-90.5		
23	-8.58	-60.43	0.012	2.74E-03	70.2	-50.3		572444
24	-9.05	-46.53	0.011	2.77E-03	44.8	-23.8		572444
25	-9.53	-36.56	0.009	2.78E-03	25.0	-7.8		572444

(continued)

Stage No.8 Apply load no.1 at elevation 1.90

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
26	-10.00	-48.48	0.008	2.78E-03	4.8	-0.0		0
27	-10.20	0.00	0.007	0	0.0	0.0		0
28	-11.00	23.72	0.005	0	9.5	0.0		0
		-10.52	0.005	0	9.5	0.0		
29	-12.80	70.61	0.001	0	63.6	0.0		0
		-39.67	0.001	0	63.6	0.0		
30	-16.00	-0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	141.8	kN/m run		
At elev. -1.30				Prop force =	235.7	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Effective stresses</u>					<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
		<u>Water</u> <u>press.</u> kN/m2	<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	15.26	15.26	9971
3	2.60	0.00	26.84	8.29	103.83	14.07	14.07	9971
4	2.00	0.00	38.50	11.90	148.93	14.92	14.92	9971
5	1.90	0.00	40.40	12.48	156.28	13.11	13.11	9971
6	1.45	0.00	48.81	15.08	188.80	15.71	15.71	9971
7	1.00	0.00	57.04	17.63	220.65	20.99	20.99	9971
8	0.80	0.00	60.66	18.74	234.64	21.34	21.34	9971
		0.00	60.66	15.74	228.83	30.86	30.86	5085
9	0.00	0.00	74.94	20.76	277.99	37.79	37.79	5484
10	-0.65	0.00	86.39	24.78	317.40	43.58	43.58	5808
11	-1.30	0.00	97.75	28.77	356.50	50.04	50.04	6132
12	-1.50	0.00	101.23	29.99	368.48	50.75	50.75	6232
13	-2.00	0.00	109.91	33.04	398.36	55.16	55.16	6481
14	-2.60	0.00	120.29	36.69	434.09	60.21	60.21	6780
15	-3.20	0.00	130.64	40.33	469.73	64.91	64.91	7079
16	-4.00	0.00	144.41	45.16	517.11	72.52	72.52	7478
17	-4.50	5.00	147.99	46.42	529.46	73.15	78.15	7727
18	-5.00	10.00	151.57	47.68	541.78	73.99	83.99	7977
19	-5.80	18.00	157.28	49.68	561.42	75.67	93.67	8376
20	-6.60	26.00	162.97	51.68	581.00	76.41	102.41	8774
		26.00	162.97	47.59	712.00	31.50	57.50A	19942
21	-7.35	33.50	168.29	49.14	735.24	53.01	86.51	19942
22	-8.10	41.00	173.59	50.69	758.43	60.20	101.20	19942
		41.00	173.59	36.77	816.86	80.16	121.16	29913
23	-8.58	45.75	178.38	38.13	837.75	103.41	149.16	29913
24	-9.05	50.50	183.16	39.48	858.64	117.24	167.74	29913
25	-9.53	55.25	187.93	40.84	879.51	126.94	182.19	29913
26	-10.00	60.00	192.70	42.19	900.36	126.31	186.31	29913
27	-10.20	62.00	194.71	42.76	909.14	151.80	213.80	29913
28	-11.00	70.00	202.75	45.03	944.23	171.96	241.96	29913
		70.00	202.75	34.73	1002.59	154.89	224.89	49855
29	-12.80	88.00	226.20	41.59	1105.06	218.85	306.85	49855
		88.00	226.20	0.00	6362.43	176.49	264.49	997093
30	-16.00	120.00	280.63	0.00	7118.25	250.78	370.78	997093
31	-18.00	140.00	314.62	0.00	7590.22	284.49	424.49	997093
32	-20.00	160.00	348.59	0.00	8061.94	314.30	474.30	997093

(continued)

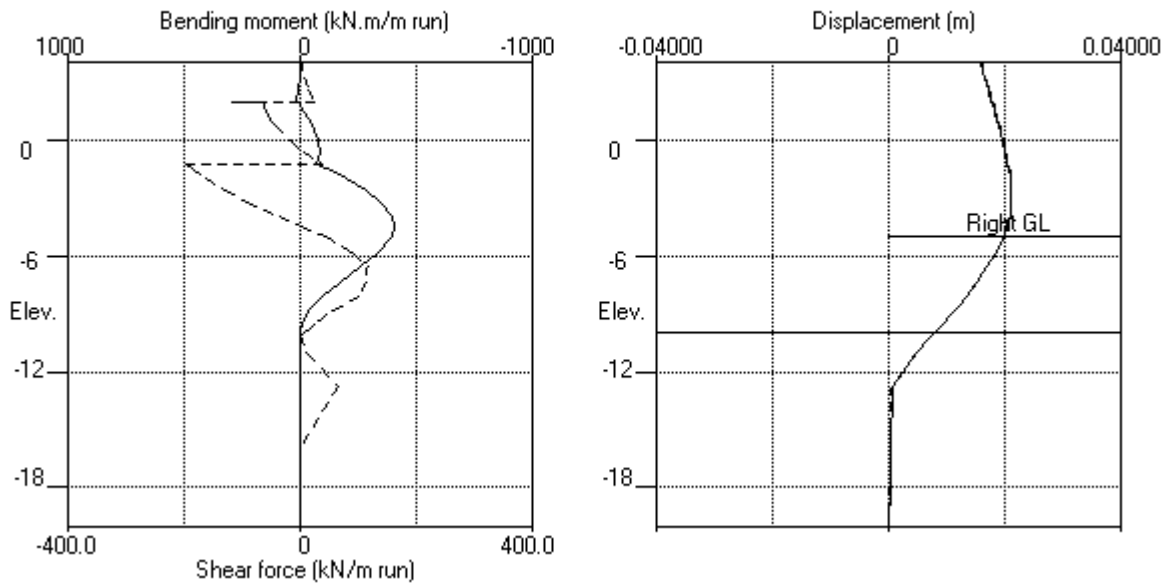
Stage No.8 Apply load no.1 at elevation 1.90

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.97	19.97	7977
19	-5.80	8.00	5.60	0.00	39.31	39.21	47.21	8376
20	-6.60	16.00	11.20	0.00	58.60	58.48	74.48	8775
		16.00	11.20	3.27	48.95	48.68	64.68	19943
21	-7.35	23.50	16.46	4.81	71.93	71.69	95.19	19943
22	-8.10	31.00	21.73	6.35	94.94	94.70	125.70	19943
		31.00	21.73	0.00	153.31	152.95	183.95	29915
23	-8.58	35.75	26.50	0.00	174.13	173.84	209.59	29915
24	-9.05	40.50	31.27	0.00	194.98	173.77	214.27	29915
25	-9.53	45.25	36.04	0.00	215.84	173.50	218.75	29915
26	-10.00	50.00	40.82	0.00	236.74	184.79	234.79	29915
27	-10.20	52.00	42.84	0.00	245.54	161.79	213.79	29915
28	-11.00	60.00	50.91	2.01	280.82	158.24	218.24	29915
		60.00	50.91	0.00	339.18	175.40	235.40	49858
29	-12.80	78.00	74.56	0.00	442.50	158.25	236.25	49858
		78.00	74.56	0.00	4256.83	226.17	304.17	997169
30	-16.00	110.00	129.74	0.00	5023.01	260.79	370.79	997169
31	-18.00	130.00	164.48	0.00	5505.38	294.48	424.48	997169
32	-20.00	150.00	199.42	0.00	5990.65	324.38	474.38	997169

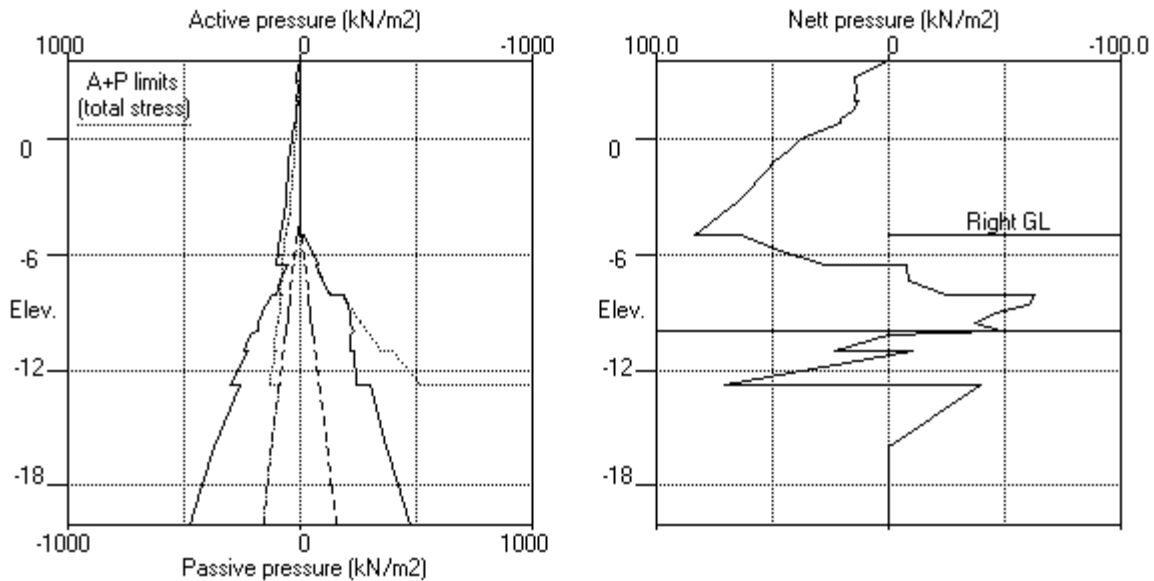
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 57.50A Arching - soil pressure below active limit

Units: kN,m

Stage No.8 Apply load no.1 at elev. 1.90



Stage No.8 Apply load no.1 at elev. 1.90

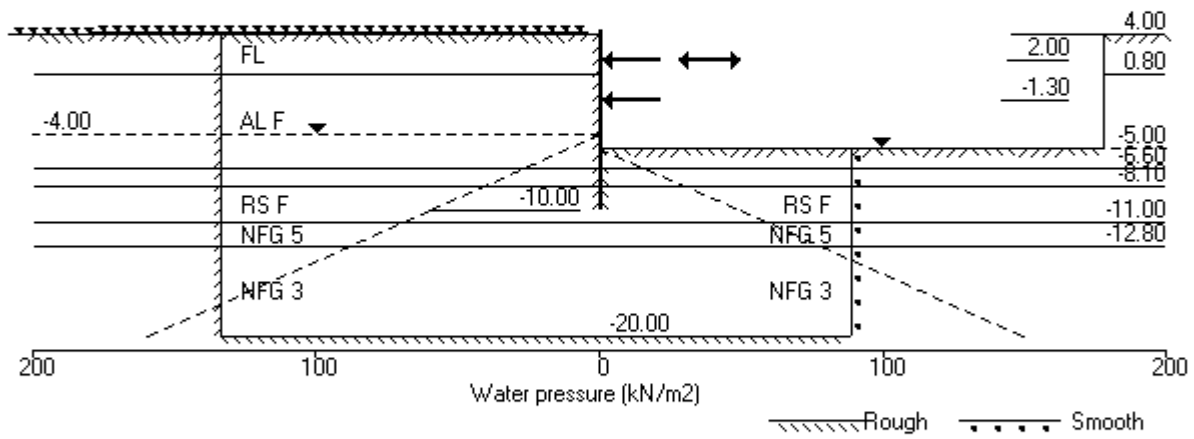


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 Data filename/Run ID: Section_6
 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.9 Apply load no.2 at elev. 1.90



Units: kN,m

Stage No. 9 Apply load no.2 at elevation 1.90

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
				<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u> <u>More than one prop.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
9	4.00	-5.00			No FoS calc.			

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.07E-03	0.0	-0.0		572444
2	3.20	16.68	0.016	-1.07E-03	6.7	1.2		572444
3	2.60	15.10	0.016	-1.08E-03	16.2	8.7		572444
4	2.00	15.78	0.017	-1.09E-03	25.5	21.6	-100.7	572444
		15.78	0.017	-1.09E-03	-75.3	21.6		
5	1.90	13.82	0.017	-1.10E-03	-73.8	14.2		572444
6	1.45	16.27	0.018	-1.10E-03	-67.0	-16.8		572444
7	1.00	21.36	0.018	-1.07E-03	-58.5	-45.2		572444
8	0.80	21.51	0.018	-1.05E-03	-54.3	-56.4		572444
		30.94	0.018	-1.05E-03	-54.3	-56.4		
9	0.00	37.90	0.019	-9.58E-04	-26.7	-88.7		572444
10	-0.65	43.62	0.020	-8.52E-04	-0.2	-97.5		572444
11	-1.30	50.02	0.020	-7.47E-04	30.2	-87.9	-225.1	572444
		50.02	0.020	-7.47E-04	-194.9	-87.9		
12	-1.50	50.68	0.020	-7.10E-04	-184.8	-125.9		572444
13	-2.00	55.07	0.021	-5.62E-04	-158.4	-211.4		572444
14	-2.60	60.08	0.021	-2.96E-04	-123.8	-296.1		572444
15	-3.20	64.75	0.021	4.66E-05	-86.4	-359.1		572444
16	-4.00	72.34	0.021	5.81E-04	-31.6	-406.4		572444
17	-4.50	77.97	0.020	9.39E-04	6.0	-412.8		572444
18	-5.00	83.81	0.020	1.29E-03	46.5	-399.7		572444
		63.78	0.020	1.29E-03	46.5	-399.7		
19	-5.80	46.19	0.019	1.81E-03	90.5	-343.7		572444
20	-6.60	27.66	0.017	2.23E-03	120.0	-257.9		572444
		-7.81	0.017	2.23E-03	120.0	-257.9		
21	-7.35	-9.21	0.015	2.51E-03	113.6	-173.2		572444
22	-8.10	-25.01	0.013	2.69E-03	100.8	-91.9		572444
		-63.55	0.013	2.69E-03	100.8	-91.9		
23	-8.58	-61.05	0.012	2.74E-03	71.2	-51.2		572444
24	-9.05	-47.09	0.011	2.78E-03	45.5	-24.2		572444
25	-9.53	-37.13	0.009	2.79E-03	25.5	-7.9		572444
26	-10.00	-49.45	0.008	2.79E-03	4.9	-0.0		0

(continued)

Stage No.9 Apply load no.2 at elevation 1.90

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-10.20	0.00	0.007	0	0.0	0.0		0
28	-11.00	23.72	0.005	0	9.5	0.0		0
		-10.52	0.005	0	9.5	0.0		
29	-12.80	70.61	0.001	0	63.6	0.0		0
		-39.67	0.001	0	63.6	0.0		
30	-16.00	-0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	100.7	kN/m run		
At elev. -1.30				Prop force =	225.1	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Effective stresses</u>				<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
			<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	16.68	16.68	9971
3	2.60	0.00	26.84	8.29	103.83	15.10	15.10	9971
4	2.00	0.00	38.50	11.90	148.93	15.78	15.78	9971
5	1.90	0.00	40.40	12.48	156.28	13.82	13.82	9971
6	1.45	0.00	48.81	15.08	188.80	16.27	16.27	9971
7	1.00	0.00	57.04	17.63	220.65	21.36	21.36	9971
8	0.80	0.00	60.66	18.74	234.64	21.51	21.51	9971
		0.00	60.66	15.74	228.83	30.94	30.94	5085
9	0.00	0.00	74.94	20.76	277.99	37.90	37.90	5484
10	-0.65	0.00	86.39	24.78	317.40	43.62	43.62	5808
11	-1.30	0.00	97.75	28.77	356.50	50.02	50.02	6132
12	-1.50	0.00	101.23	29.99	368.48	50.68	50.68	6232
13	-2.00	0.00	109.91	33.04	398.36	55.07	55.07	6481
14	-2.60	0.00	120.29	36.69	434.09	60.08	60.08	6780
15	-3.20	0.00	130.64	40.33	469.73	64.75	64.75	7079
16	-4.00	0.00	144.41	45.16	517.11	72.34	72.34	7478
17	-4.50	5.00	147.99	46.42	529.46	72.97	77.97	7727
18	-5.00	10.00	151.57	47.68	541.78	73.81	83.81	7977
19	-5.80	18.00	157.28	49.68	561.42	75.50	93.50	8376
20	-6.60	26.00	162.97	51.68	581.00	76.25	102.25	8774
		26.00	162.97	47.59	712.00	31.14	57.14A	19942
21	-7.35	33.50	168.29	49.14	735.24	52.71	86.21	19942
22	-8.10	41.00	173.59	50.69	758.43	59.93	100.93	19942
		41.00	173.59	36.77	816.86	79.76	120.76	29913
23	-8.58	45.75	178.38	38.13	837.75	103.08	148.83	29913
24	-9.05	50.50	183.16	39.48	858.64	116.94	167.44	29913
25	-9.53	55.25	187.93	40.84	879.51	126.64	181.89	29913
26	-10.00	60.00	192.70	42.19	900.36	125.83	185.83	29913
27	-10.20	62.00	194.71	42.76	909.14	151.78	213.78	29913
28	-11.00	70.00	202.75	45.03	944.23	171.96	241.96	29913
		70.00	202.75	34.73	1002.59	154.88	224.88	49855
29	-12.80	88.00	226.20	41.59	1105.06	218.85	306.85	49855
		88.00	226.20	0.00	6362.43	176.48	264.48	997093
30	-16.00	120.00	280.63	0.00	7118.25	250.77	370.77	997093
31	-18.00	140.00	314.62	0.00	7590.22	284.48	424.48	997093
32	-20.00	160.00	348.59	0.00	8061.94	314.30	474.30	997093

(continued)

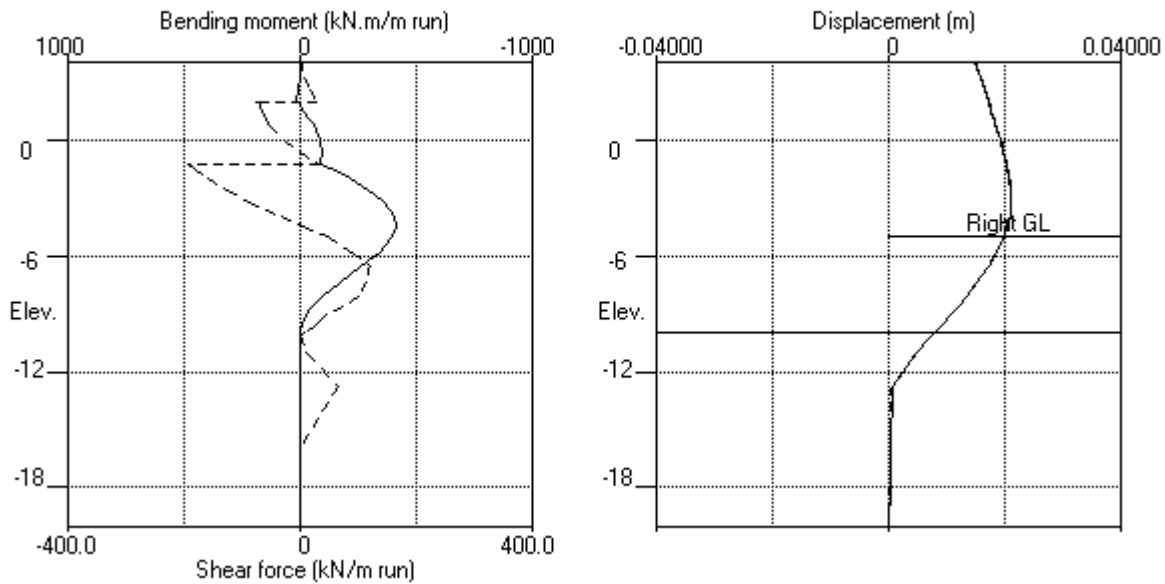
Stage No.9 Apply load no.2 at elevation 1.90

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	7977
19	-5.80	8.00	5.60	0.00	39.31	39.31	47.31p	8376
20	-6.60	16.00	11.20	0.00	58.60	58.60	74.60p	8775
		16.00	11.20	3.27	48.95	48.95	64.95p	19943
21	-7.35	23.50	16.46	4.81	71.93	71.93	95.43p	19943
22	-8.10	31.00	21.73	6.35	94.94	94.94	125.94p	19943
		31.00	21.73	0.00	153.31	153.31	184.31p	29915
23	-8.58	35.75	26.50	0.00	174.13	174.13	209.88p	29915
24	-9.05	40.50	31.27	0.00	194.98	174.03	214.53	29915
25	-9.53	45.25	36.04	0.00	215.84	173.77	219.02	29915
26	-10.00	50.00	40.82	0.00	236.74	185.28	235.28	29915
27	-10.20	52.00	42.84	0.00	245.54	161.78	213.78	29915
28	-11.00	60.00	50.91	2.01	280.82	158.24	218.24	29915
		60.00	50.91	0.00	339.18	175.40	235.40	49858
29	-12.80	78.00	74.56	0.00	442.50	158.25	236.25	49858
		78.00	74.56	0.00	4256.83	226.15	304.15	997169
30	-16.00	110.00	129.74	0.00	5023.01	260.79	370.79	997169
31	-18.00	130.00	164.48	0.00	5505.38	294.48	424.48	997169
32	-20.00	150.00	199.42	0.00	5990.65	324.38	474.38	997169

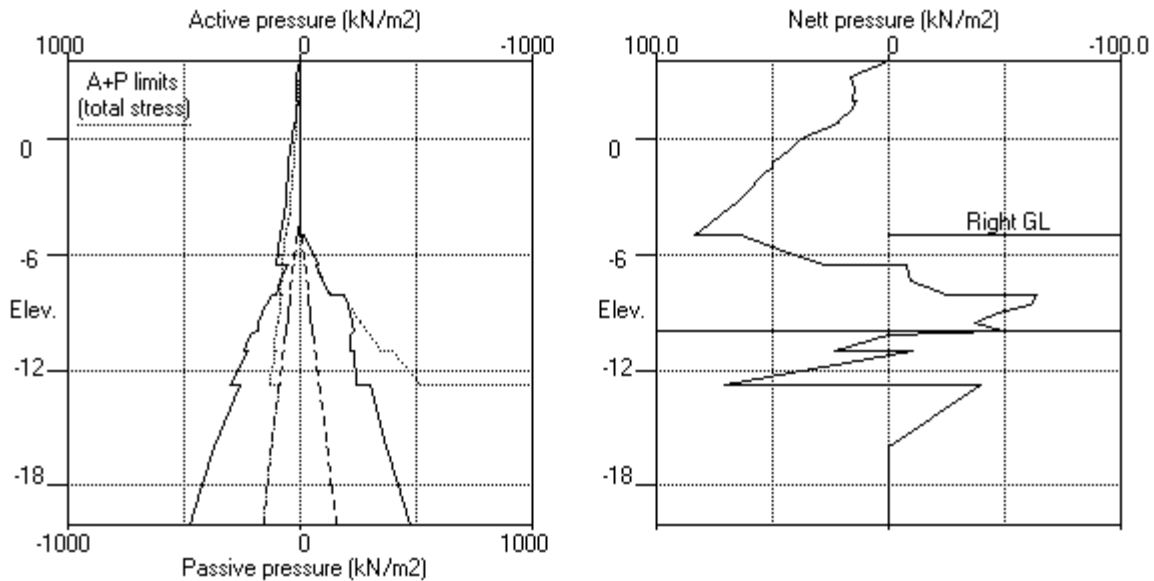
Note: 12.34 a Soil pressure at active limit
 209.88 p Soil pressure at passive limit
 57.14A Arching - soil pressure below active limit

Units: kN,m

Stage No.9 Apply load no.2 at elev. 1.90



Stage No.9 Apply load no.2 at elev. 1.90

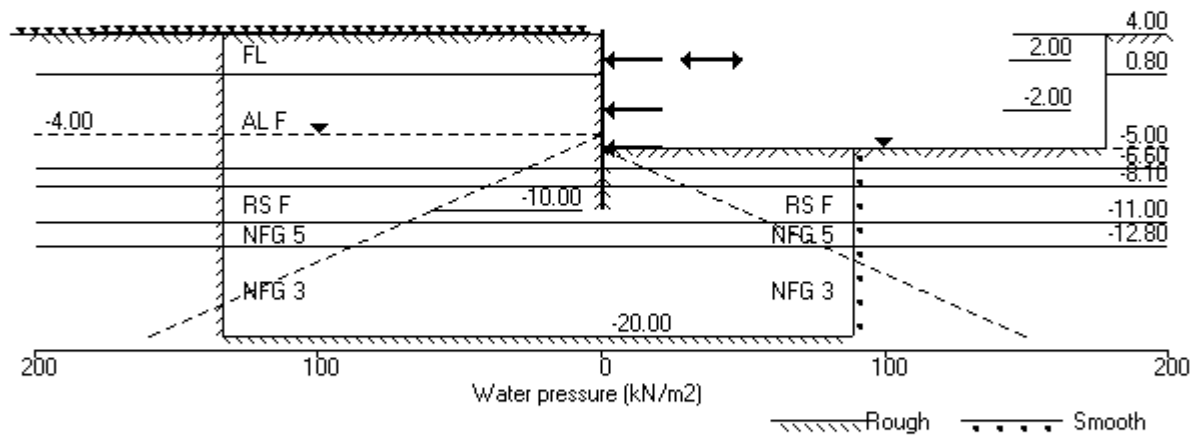


EDG CONSULTING PTY LTD
 Program: WALLAP Version 6.07 Revision A55.B74.R58
 Licensed from GEOSOLVE
 Data filename/Run ID: Section_6
 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Units: kN,m

Stage No. 12 Remove strut or anchor no.2 at elevation -1.30

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -10.00</u>		<u>Toe elev. for</u> <u>FoS = 1.500</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
12	4.00	-5.00		More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.015	-1.19E-03	0.0	-0.0		572444
2	3.20	16.77	0.016	-1.19E-03	6.7	1.2		572444
3	2.60	14.87	0.017	-1.20E-03	16.2	8.8		572444
4	2.00	15.35	0.017	-1.21E-03	25.3	21.6	-129.0	572444
		15.35	0.017	-1.21E-03	-103.8	21.6		
5	1.90	13.20	0.018	-1.22E-03	-102.4	11.3		572444
6	1.45	15.47	0.018	-1.21E-03	-95.9	-32.6		572444
7	1.00	20.35	0.019	-1.17E-03	-87.8	-74.0		572444
8	0.80	20.18	0.019	-1.14E-03	-83.8	-91.2		572444
		30.27	0.019	-1.14E-03	-83.8	-91.2		
9	0.00	37.10	0.020	-9.76E-04	-56.8	-147.3		572444
10	-0.65	42.71	0.020	-7.92E-04	-30.9	-175.9		572444
11	-1.30	49.15	0.021	-5.86E-04	-1.0	-186.4		572444
12	-1.50	50.00	0.021	-5.21E-04	8.9	-185.6		572444
13	-2.00	54.68	0.021	-3.64E-04	35.0	-174.4	-199.9	572444
		54.68	0.021	-3.64E-04	-164.9	-174.4		
14	-2.60	59.94	0.021	-1.35E-04	-130.5	-263.0		572444
15	-3.20	64.77	0.021	1.75E-04	-93.1	-330.0		572444
16	-4.00	72.46	0.021	6.73E-04	-38.2	-382.7		572444
17	-4.50	78.14	0.020	1.01E-03	-0.5	-392.4		572444
18	-5.00	84.02	0.020	1.35E-03	40.0	-382.6	1.6	572444
		63.99	0.020	1.35E-03	41.6	-382.6		
19	-5.80	46.43	0.019	1.84E-03	85.8	-330.3		572444
20	-6.60	27.97	0.017	2.25E-03	115.6	-248.2		572444
		-7.11	0.017	2.25E-03	115.6	-248.2		
21	-7.35	-8.43	0.015	2.52E-03	109.7	-166.6		572444
22	-8.10	-24.18	0.013	2.69E-03	97.5	-87.9		572444
		-62.31	0.013	2.69E-03	97.5	-87.9		
23	-8.58	-59.86	0.012	2.74E-03	68.5	-48.6		572444
24	-9.05	-45.85	0.011	2.77E-03	43.4	-22.9		572444
25	-9.53	-35.60	0.009	2.78E-03	24.1	-7.4		572444
26	-10.00	-46.22	0.008	2.79E-03	4.6	-0.0		0

(continued)

Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-10.20	0.00	0.007	0	0.0	0.0		0
28	-11.00	23.72	0.005	0	9.5	0.0		0
		-10.52	0.005	0	9.5	0.0		
29	-12.80	70.61	0.001	0	63.6	0.0		0
		-39.67	0.001	0	63.6	0.0		
30	-16.00	-0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 2.00				Prop force =	129.0 kN/m run			
At elev. -2.00				Prop force =	199.9 kN/m run			
At elev. -5.00				Prop force =	-1.6 kN/m run			

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	16.77	16.77	9971
3	2.60	0.00	26.84	8.29	103.83	14.87	14.87	9971
4	2.00	0.00	38.50	11.90	148.93	15.35	15.35	9971
5	1.90	0.00	40.40	12.48	156.28	13.20	13.20	9971
6	1.45	0.00	48.81	15.08	188.80	15.47	15.47	9971
7	1.00	0.00	57.04	17.63	220.65	20.35	20.35	9971
8	0.80	0.00	60.66	18.74	234.64	20.18	20.18	9971
		0.00	60.66	15.74	228.83	30.27	30.27	5085
9	0.00	0.00	74.94	20.76	277.99	37.10	37.10	5484
10	-0.65	0.00	86.39	24.78	317.40	42.71	42.71	5808
11	-1.30	0.00	97.75	28.77	356.50	49.15	49.15	6132
12	-1.50	0.00	101.23	29.99	368.48	50.00	50.00	6232
13	-2.00	0.00	109.91	33.04	398.36	54.68	54.68	6481
14	-2.60	0.00	120.29	36.69	434.09	59.94	59.94	6780
15	-3.20	0.00	130.64	40.33	469.73	64.77	64.77	7079
16	-4.00	0.00	144.41	45.16	517.11	72.46	72.46	7478
17	-4.50	5.00	147.99	46.42	529.46	73.14	78.14	7727
18	-5.00	10.00	151.57	47.68	541.78	74.02	84.02	7977
19	-5.80	18.00	157.28	49.68	561.42	75.72	93.72	8376
20	-6.60	26.00	162.97	51.68	581.00	76.45	102.45	8774
		26.00	162.97	47.59	712.00	31.59	57.59A	19942
21	-7.35	33.50	168.29	49.14	735.24	53.17	86.67	19942
22	-8.10	41.00	173.59	50.69	758.43	60.38	101.38	19942
		41.00	173.59	36.77	816.86	80.43	121.43	29913
23	-8.58	45.75	178.38	38.13	837.75	103.72	149.47	29913
24	-9.05	50.50	183.16	39.48	858.64	117.60	168.10	29913
25	-9.53	55.25	187.93	40.84	879.51	127.45	182.70	29913
26	-10.00	60.00	192.70	42.19	900.36	127.43	187.43	29913
27	-10.20	62.00	194.71	42.76	909.14	151.83	213.83	29913
28	-11.00	70.00	202.75	45.03	944.23	171.97	241.97	29913
		70.00	202.75	34.73	1002.59	154.90	224.90	49855
29	-12.80	88.00	226.20	41.59	1105.06	218.85	306.85	49855
		88.00	226.20	0.00	6362.43	176.50	264.50	997093
30	-16.00	120.00	280.63	0.00	7118.25	250.78	370.78	997093
31	-18.00	140.00	314.62	0.00	7590.22	284.49	424.49	997093
32	-20.00	160.00	348.59	0.00	8061.94	314.30	474.30	997093

(continued)

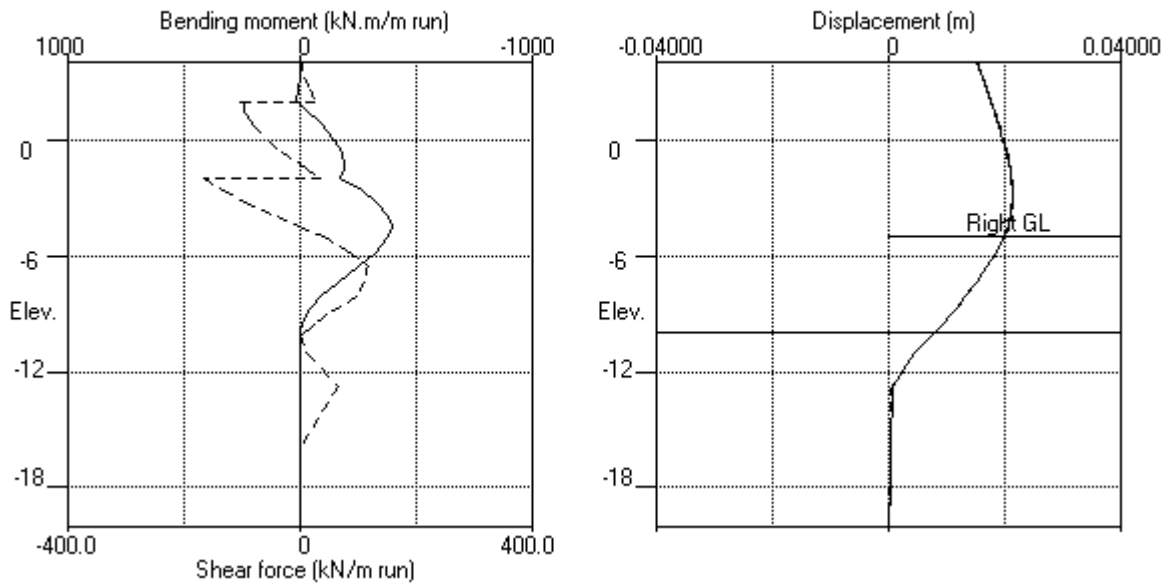
Stage No.12 Remove strut or anchor no.2 at elevation -1.30

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	20.03	20.03p	7977
19	-5.80	8.00	5.60	0.00	39.31	39.29	47.29	8376
20	-6.60	16.00	11.20	0.00	58.60	58.48	74.48	8775
		16.00	11.20	3.27	48.95	48.69	64.69	19943
21	-7.35	23.50	16.46	4.81	71.93	71.60	95.10	19943
22	-8.10	31.00	21.73	6.35	94.94	94.56	125.56	19943
		31.00	21.73	0.00	153.31	152.75	183.75	29915
23	-8.58	35.75	26.50	0.00	174.13	173.58	209.33	29915
24	-9.05	40.50	31.27	0.00	194.98	173.45	213.95	29915
25	-9.53	45.25	36.04	0.00	215.84	173.04	218.29	29915
26	-10.00	50.00	40.82	0.00	236.74	183.65	233.65	29915
27	-10.20	52.00	42.84	0.00	245.54	161.82	213.82	29915
28	-11.00	60.00	50.91	2.01	280.82	158.25	218.25	29915
		60.00	50.91	0.00	339.18	175.41	235.41	49858
29	-12.80	78.00	74.56	0.00	442.50	158.25	236.25	49858
		78.00	74.56	0.00	4256.83	226.17	304.17	997169
30	-16.00	110.00	129.74	0.00	5023.01	260.80	370.80	997169
31	-18.00	130.00	164.48	0.00	5505.38	294.48	424.48	997169
32	-20.00	150.00	199.42	0.00	5990.65	324.38	474.38	997169

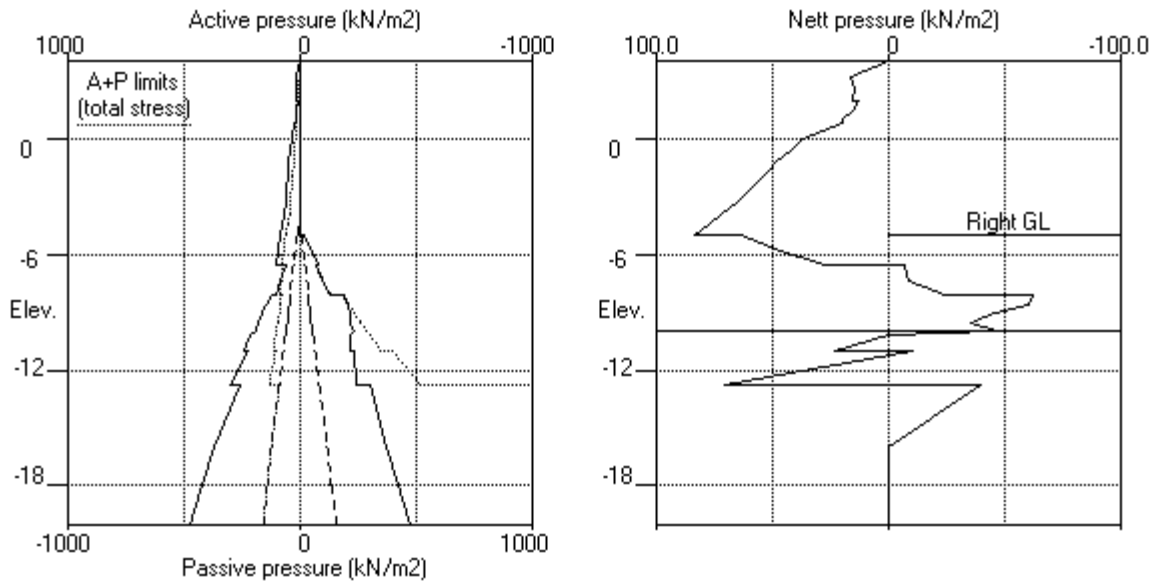
Note: 12.34 a Soil pressure at active limit
 20.03 p Soil pressure at passive limit
 57.59A Arching - soil pressure below active limit

Units: kN,m

Stage No.12 Remove prop no.2 at elev. -1.30



Stage No.12 Remove prop no.2 at elev. -1.30

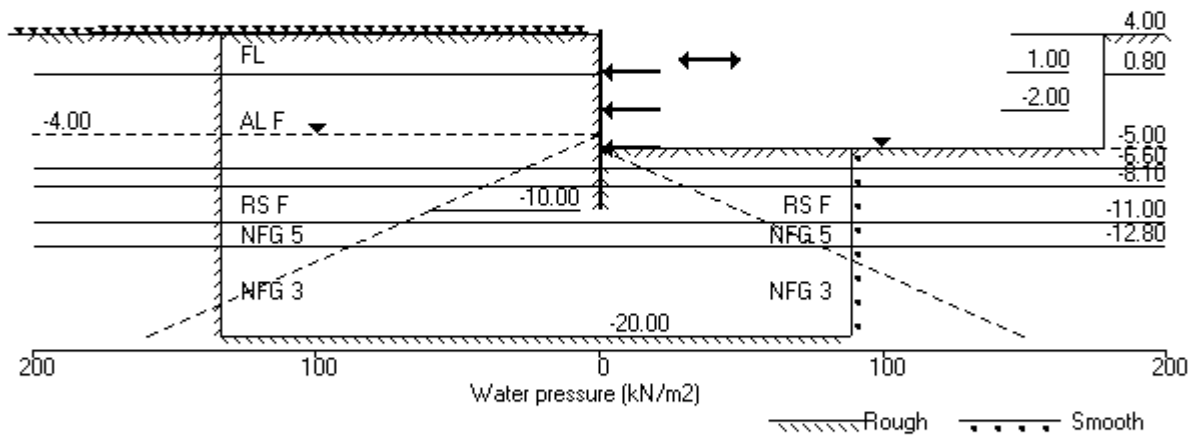


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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_6
 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Units: kN,m

Stage No. 14 Remove strut or anchor no.1 at elevation 2.00

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>failure</u>			
14	4.00	-5.00		More than one prop. No FoS calc.			

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u>	<u>Wall</u> <u>disp.</u>	<u>Wall</u> <u>rotation</u>	<u>Shear</u> <u>force</u>	<u>Bending</u> <u>moment</u>	<u>Prop</u> <u>forces</u>	<u>EI of</u> <u>wall</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m	kN.m2/m
1	4.00	0.00	0.017	-7.77E-04	0.0	-0.0		572444
2	3.20	13.89	0.017	-7.78E-04	5.6	1.2		572444
3	2.60	13.24	0.018	-7.83E-04	13.7	7.5		572444
4	2.00	14.38	0.018	-7.97E-04	22.0	18.6		572444
5	1.90	12.86	0.018	-8.00E-04	23.3	20.9		572444
6	1.45	15.73	0.019	-8.21E-04	29.8	33.5		572444
7	1.00	21.24	0.019	-8.54E-04	38.1	48.7	-166.5	572444
		21.24	0.019	-8.54E-04	-128.4	48.7		
8	0.80	21.55	0.019	-8.66E-04	-124.1	23.4		572444
		30.97	0.019	-8.66E-04	-124.1	23.4		
9	0.00	37.71	0.020	-8.37E-04	-96.6	-64.7		572444
10	-0.65	43.27	0.020	-7.33E-04	-70.3	-119.0		572444
11	-1.30	49.62	0.021	-5.78E-04	-40.1	-155.0		572444
12	-1.50	50.40	0.021	-5.22E-04	-30.1	-162.0		572444
13	-2.00	54.99	0.021	-3.77E-04	-3.8	-170.3	-163.9	572444
		54.99	0.021	-3.77E-04	-167.6	-170.3		
14	-2.60	60.17	0.021	-1.51E-04	-133.1	-260.5		572444
15	-3.20	64.93	0.021	1.57E-04	-95.6	-329.0		572444
16	-4.00	72.57	0.021	6.55E-04	-40.6	-383.6		572444
17	-4.50	78.21	0.020	9.95E-04	-2.9	-394.5		572444
18	-5.00	84.05	0.020	1.33E-03	37.7	-385.9	4.7	572444
		64.11	0.020	1.33E-03	42.3	-385.9		
19	-5.80	46.46	0.019	1.83E-03	86.6	-333.0		572444
20	-6.60	27.97	0.017	2.24E-03	116.4	-250.3		572444
		-7.09	0.017	2.24E-03	116.4	-250.3		
21	-7.35	-8.50	0.015	2.51E-03	110.5	-168.0		572444
22	-8.10	-24.29	0.013	2.68E-03	98.2	-88.9		572444
		-62.47	0.013	2.68E-03	98.2	-88.9		
23	-8.58	-60.06	0.012	2.74E-03	69.1	-49.3		572444
24	-9.05	-46.09	0.011	2.77E-03	43.9	-23.2		572444
25	-9.53	-35.95	0.009	2.78E-03	24.4	-7.5		572444
26	-10.00	-47.05	0.008	2.79E-03	4.7	-0.0		0

(continued)

Stage No.14 Remove strut or anchor no.1 at elevation 2.00

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-10.20	0.00	0.007	0	0.0	0.0		0
28	-11.00	23.72	0.005	0	9.5	0.0		0
		-10.52	0.005	0	9.5	0.0		
29	-12.80	70.61	0.001	0	63.6	0.0		0
		-39.67	0.001	0	63.6	0.0		
30	-16.00	-0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 1.00				Prop force =	166.5	kN/m run		
At elev. -2.00				Prop force =	163.9	kN/m run		
At elev. -5.00				Prop force =	-4.7	kN/m run		

LEFT side								
		Effective stresses					Total	Adjusted
<u>Node no.</u>	<u>Y coord</u>	<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2	<u>earth pressure</u> kN/m2	<u>soil modulus</u> kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	0.00	14.79	4.57	57.21	13.89	13.89	9971
3	2.60	0.00	26.84	8.29	103.83	13.24	13.24	9971
4	2.00	0.00	38.50	11.90	148.93	14.38	14.38	9971
5	1.90	0.00	40.40	12.48	156.28	12.86	12.86	9971
6	1.45	0.00	48.81	15.08	188.80	15.73	15.73	9971
7	1.00	0.00	57.04	17.63	220.65	21.24	21.24	9971
8	0.80	0.00	60.66	18.74	234.64	21.55	21.55	9971
		0.00	60.66	15.74	228.83	30.97	30.97	5085
9	0.00	0.00	74.94	20.76	277.99	37.71	37.71	5484
10	-0.65	0.00	86.39	24.78	317.40	43.27	43.27	5808
11	-1.30	0.00	97.75	28.77	356.50	49.62	49.62	6132
12	-1.50	0.00	101.23	29.99	368.48	50.40	50.40	6232
13	-2.00	0.00	109.91	33.04	398.36	54.99	54.99	6481
14	-2.60	0.00	120.29	36.69	434.09	60.17	60.17	6780
15	-3.20	0.00	130.64	40.33	469.73	64.93	64.93	7079
16	-4.00	0.00	144.41	45.16	517.11	72.57	72.57	7478
17	-4.50	5.00	147.99	46.42	529.46	73.21	78.21	7727
18	-5.00	10.00	151.57	47.68	541.78	74.05	84.05	7977
19	-5.80	18.00	157.28	49.68	561.42	75.73	93.73	8376
20	-6.60	26.00	162.97	51.68	581.00	76.45	102.45	8774
		26.00	162.97	47.59	712.00	31.60	57.60A	19942
21	-7.35	33.50	168.29	49.14	735.24	53.13	86.63	19942
22	-8.10	41.00	173.59	50.69	758.43	60.33	101.33	19942
		41.00	173.59	36.77	816.86	80.36	121.36	29913
23	-8.58	45.75	178.38	38.13	837.75	103.63	149.38	29913
24	-9.05	50.50	183.16	39.48	858.64	117.48	167.98	29913
25	-9.53	55.25	187.93	40.84	879.51	127.27	182.52	29913
26	-10.00	60.00	192.70	42.19	900.36	127.02	187.02	29913
27	-10.20	62.00	194.71	42.76	909.14	151.82	213.82	29913
28	-11.00	70.00	202.75	45.03	944.23	171.97	241.97	29913
		70.00	202.75	34.73	1002.59	154.90	224.90	49855
29	-12.80	88.00	226.20	41.59	1105.06	218.86	306.86	49855
		88.00	226.20	0.00	6362.43	176.51	264.51	997093
30	-16.00	120.00	280.63	0.00	7118.25	250.78	370.78	997093
31	-18.00	140.00	314.62	0.00	7590.22	284.49	424.49	997093
32	-20.00	160.00	348.59	0.00	8061.94	314.30	474.30	997093

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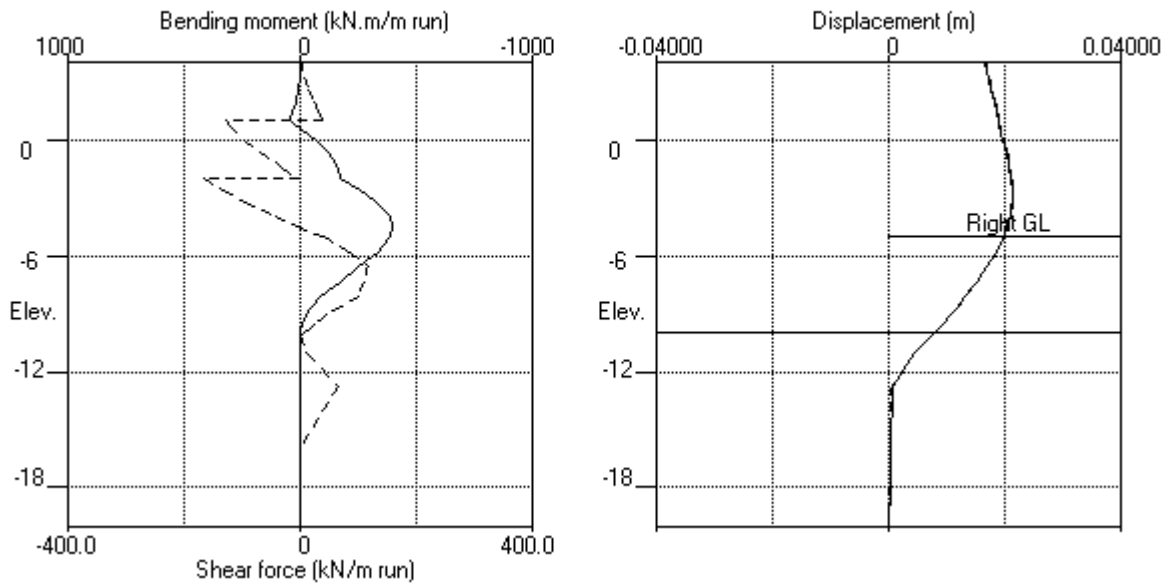
Stage No.14 Remove strut or anchor no.1 at elevation 2.00

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.94	19.94	7977
19	-5.80	8.00	5.60	0.00	39.31	39.26	47.26	8376
20	-6.60	16.00	11.20	0.00	58.60	58.48	74.48	8775
		16.00	11.20	3.27	48.95	48.69	64.69	19943
21	-7.35	23.50	16.46	4.81	71.93	71.63	95.13	19943
22	-8.10	31.00	21.73	6.35	94.94	94.62	125.62	19943
		31.00	21.73	0.00	153.31	152.83	183.83	29915
23	-8.58	35.75	26.50	0.00	174.13	173.68	209.43	29915
24	-9.05	40.50	31.27	0.00	194.98	173.57	214.07	29915
25	-9.53	45.25	36.04	0.00	215.84	173.22	218.47	29915
26	-10.00	50.00	40.82	0.00	236.74	184.07	234.07	29915
27	-10.20	52.00	42.84	0.00	245.54	161.81	213.81	29915
28	-11.00	60.00	50.91	2.01	280.82	158.25	218.25	29915
		60.00	50.91	0.00	339.18	175.41	235.41	49858
29	-12.80	78.00	74.56	0.00	442.50	158.25	236.25	49858
		78.00	74.56	0.00	4256.83	226.18	304.18	997169
30	-16.00	110.00	129.74	0.00	5023.01	260.80	370.80	997169
31	-18.00	130.00	164.48	0.00	5505.38	294.48	424.48	997169
32	-20.00	150.00	199.42	0.00	5990.65	324.38	474.38	997169

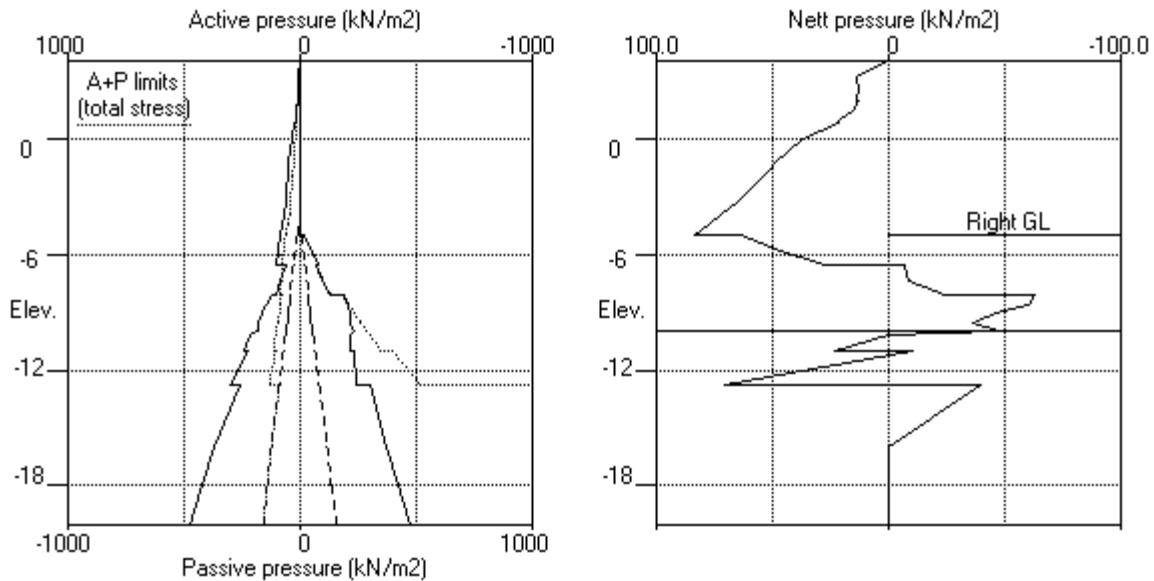
Note: 12.34 a Soil pressure at active limit
 123.45 p Soil pressure at passive limit
 57.60A Arching - soil pressure below active limit

Units: kN,m

Stage No.14 Remove prop no.1 at elev. 2.00



Stage No.14 Remove prop no.1 at elev. 2.00

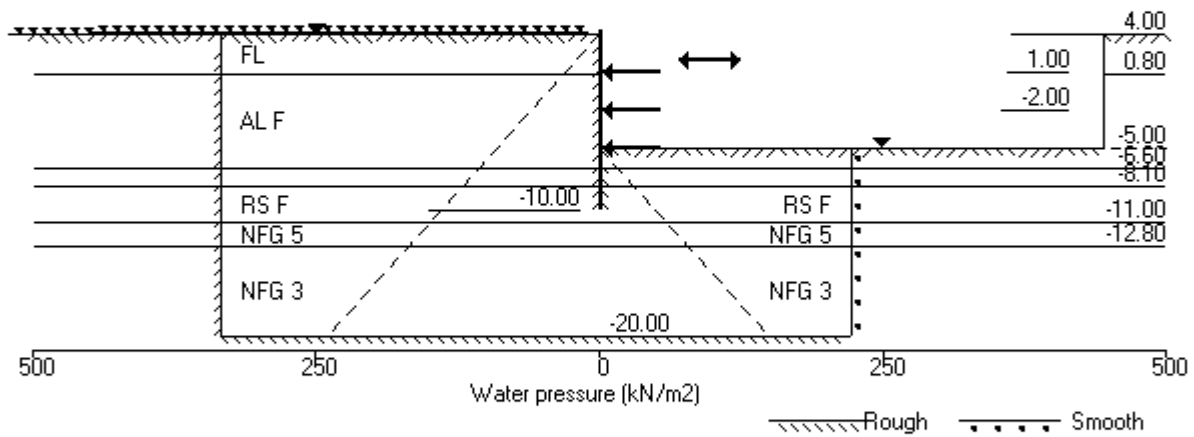


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 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
Checked :

Units: kN,m

Stage No.15 Apply water pressure profile no.1



Units: kN,m

Stage No. 15 Apply water pressure profile no.1

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method

Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>Elev.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>
				<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>
				<u>More than one prop.</u>	<u>No FoS calc.</u>		<u>failure</u>
15	4.00	-5.00					

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
 Right side 20.00 from wall Smooth boundary
 Lower rigid boundary at elevation -20.00 Rough boundary

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
1	4.00	0.00	0.017	-7.24E-04	0.0	-0.0		572444
2	3.20	18.12	0.017	-7.26E-04	7.2	1.7		572444
3	2.60	21.25	0.018	-7.32E-04	19.1	10.0		572444
4	2.00	26.00	0.018	-7.51E-04	33.2	25.9		572444
5	1.90	25.20	0.018	-7.55E-04	35.8	29.4		572444
6	1.45	30.78	0.019	-7.86E-04	48.4	49.0		572444
7	1.00	39.01	0.019	-8.35E-04	64.1	74.1	-216.2	572444
		39.01	0.019	-8.35E-04	-152.1	74.1		
8	0.80	40.66	0.019	-8.55E-04	-144.2	44.5		572444
		49.67	0.019	-8.55E-04	-144.2	44.5		
9	0.00	60.93	0.020	-8.49E-04	-99.9	-53.3		572444
10	-0.65	70.26	0.020	-7.60E-04	-57.3	-104.5		572444
11	-1.30	80.41	0.021	-6.29E-04	-8.3	-126.1		572444
12	-1.50	82.41	0.021	-5.85E-04	8.0	-126.1		572444
13	-2.00	89.92	0.021	-4.81E-04	51.1	-111.2	-254.8	572444
		89.92	0.021	-4.81E-04	-203.8	-111.2		
14	-2.60	98.54	0.021	-3.09E-04	-147.2	-216.6		572444
15	-3.20	106.71	0.022	-4.60E-05	-85.6	-286.5		572444
16	-4.00	118.89	0.021	3.77E-04	4.6	-319.3		572444
17	-4.50	124.47	0.021	6.48E-04	65.4	-301.8		572444
18	-5.00	130.01	0.021	8.90E-04	129.1	-253.2	-213.8	572444
		111.46	0.021	8.90E-04	-84.7	-253.2		
19	-5.80	92.17	0.020	1.26E-03	-3.3	-286.9		572444
20	-6.60	71.99	0.019	1.65E-03	62.4	-261.4		572444
		41.05	0.019	1.65E-03	62.4	-261.4		
21	-7.35	30.43	0.017	1.95E-03	89.2	-206.4		572444
22	-8.10	11.67	0.016	2.17E-03	105.0	-132.3		572444
		-31.39	0.016	2.17E-03	105.0	-132.3		
23	-8.58	-32.36	0.015	2.27E-03	89.8	-85.9		572444
24	-9.05	-43.80	0.014	2.32E-03	71.7	-46.9		572444
25	-9.53	-50.25	0.013	2.35E-03	49.4	-17.8		572444
26	-10.00	-111.01	0.011	2.35E-03	11.1	-0.0		0

(continued)

Stage No.15 Apply water pressure profile no.1

<u>Node no.</u>	<u>Y coord</u>	<u>Nett pressure</u> kN/m2	<u>Wall disp.</u> m	<u>Wall rotation</u> rad.	<u>Shear force</u> kN/m	<u>Bending moment</u> kN.m/m	<u>Prop forces</u> kN/m	<u>EI of wall</u> kN.m2/m
27	-10.20	0.00	0.010	0	0.0	0.0		0
28	-11.00	38.15	0.007	0	15.3	0.0		0
		-16.93	0.007	0	15.3	0.0		
29	-12.80	112.15	0.001	0	101.0	0.0		0
		-63.04	0.001	0	101.0	0.0		
30	-16.00	-0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 1.00				Prop force =	216.2	kN/m run		
At elev. -2.00				Prop force =	254.8	kN/m run		
At elev. -5.00				Prop force =	213.8	kN/m run		

LEFT side								
<u>Node no.</u>	<u>Y coord</u>	<u>Effective stresses</u>					<u>Total earth pressure</u> kN/m2	<u>Adjusted soil modulus</u> kN/m2
		<u>Water press.</u> kN/m2	<u>Vertic -al</u> kN/m2	<u>Active limit</u> kN/m2	<u>Passive limit</u> kN/m2	<u>Earth pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	8.00	6.79	2.10	26.27	10.12	18.12	9971
3	2.60	14.00	12.84	3.97	49.67	7.25	21.25	9971
4	2.00	20.00	18.50	5.72	71.57	6.00	26.00	9971
5	1.90	21.00	19.40	5.99	75.04	4.20	25.20A	9971
6	1.45	25.50	23.31	7.20	90.16	5.28	30.78A	9971
7	1.00	30.00	27.04	8.36	104.60	9.01	39.01	9971
8	0.80	32.00	28.66	8.86	110.86	8.66	40.66A	9971
		32.00	28.66	4.50	118.68	17.67	49.67	5085
9	0.00	40.00	34.94	6.71	140.30	20.93	60.93	5484
10	-0.65	46.50	39.89	8.45	157.34	23.76	70.26	5808
11	-1.30	53.00	44.75	10.15	174.06	27.41	80.41	6132
12	-1.50	55.00	46.23	10.67	179.16	27.41	82.41	6232
13	-2.00	60.00	49.91	11.97	191.83	29.92	89.92	6481
14	-2.60	66.00	54.29	13.51	206.91	32.54	98.54	6780
15	-3.20	72.00	58.64	15.03	221.89	34.71	106.71	7079
16	-4.00	80.00	64.41	17.06	241.73	38.89	118.89	7478
17	-4.50	85.00	67.99	18.32	254.08	39.47	124.47	7727
18	-5.00	90.00	71.57	19.58	266.40	40.01	130.01	7977
19	-5.80	98.00	77.28	21.58	286.04	40.90	138.90	8376
20	-6.60	106.00	82.97	23.58	305.62	40.59	146.59	8774
		106.00	82.97	24.23	362.48	0.00	106.00A	19942
21	-7.35	113.50	88.29	25.78	385.72	12.36	125.86A	19942
22	-8.10	121.00	93.59	27.33	408.91	16.61	137.61A	19942
		121.00	93.59	14.11	467.31	31.91	152.91	29913
23	-8.58	125.75	98.38	15.46	488.20	51.77	177.52	29913
24	-9.05	130.50	103.16	16.82	509.09	61.12	191.62	29913
25	-9.53	135.25	107.93	18.17	529.95	62.52	197.77	29913
26	-10.00	140.00	112.70	19.52	550.81	35.73	175.73	29913
27	-10.20	142.00	114.71	20.09	559.59	93.98	235.98	29913
28	-11.00	150.00	122.75	22.37	594.68	121.91	271.91	29913
		150.00	122.75	11.35	653.04	94.33	244.33	49855
29	-12.80	168.00	146.20	18.21	755.51	182.49	350.49	49855
		168.00	146.20	0.00	5251.56	114.85	282.85	997093
30	-16.00	200.00	200.63	0.00	6007.38	200.84	400.84	997093
31	-18.00	220.00	234.62	0.00	6479.35	234.40	454.40	997093
32	-20.00	240.00	268.59	0.00	6951.06	259.80	499.80	997093

(continued)

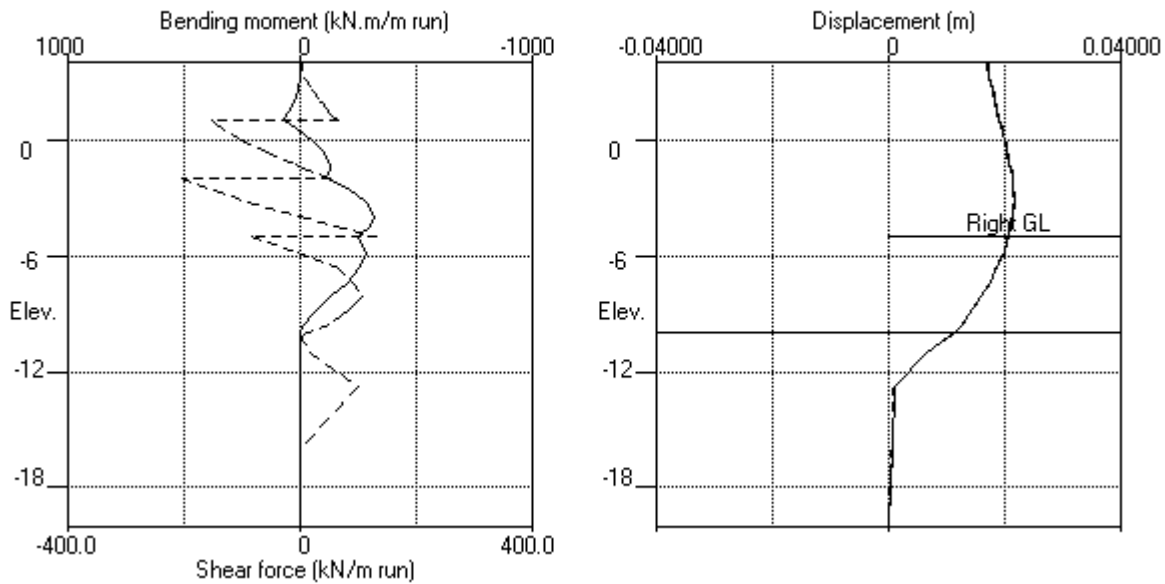
Stage No.15 Apply water pressure profile no.1

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>RIGHT side</u>					<u>Total</u> <u>earth</u> <u>pressure</u>	<u>Adjusted</u> <u>soil</u> <u>modulus</u>
		<u>Water</u> <u>press.</u>	<u>Vertic</u> <u>-al</u>	<u>Effective</u> <u>Active</u> <u>limit</u>	<u>Effective</u> <u>Passive</u> <u>limit</u>	<u>Earth</u> <u>pressure</u>		
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	18.55	18.55	7977
19	-5.80	8.00	5.60	0.00	39.31	38.73	46.73	8376
20	-6.60	16.00	11.20	0.00	58.60	58.60	74.60p	8775
		16.00	11.20	3.27	48.95	48.95	64.95p	19943
21	-7.35	23.50	16.46	4.81	71.93	71.93	95.43p	19943
22	-8.10	31.00	21.73	6.35	94.94	94.94	125.94p	19943
		31.00	21.73	0.00	153.31	153.31	184.31p	29915
23	-8.58	35.75	26.50	0.00	174.13	174.13	209.88p	29915
24	-9.05	40.50	31.27	0.00	194.98	194.92	235.42	29915
25	-9.53	45.25	36.04	0.00	215.84	202.77	248.02	29915
26	-10.00	50.00	40.82	0.00	236.74	236.74	286.74p	29915
27	-10.20	52.00	42.84	0.00	245.54	183.97	235.97	29915
28	-11.00	60.00	50.91	2.01	280.82	173.76	233.76	29915
		60.00	50.91	0.00	339.18	201.26	261.26	49858
29	-12.80	78.00	74.56	0.00	442.50	160.33	238.33	49858
		78.00	74.56	0.00	4256.83	267.89	345.89	997169
30	-16.00	110.00	129.74	0.00	5023.01	290.85	400.85	997169
31	-18.00	130.00	164.48	0.00	5505.38	324.39	454.39	997169
32	-20.00	150.00	199.42	0.00	5990.65	349.88	499.88	997169

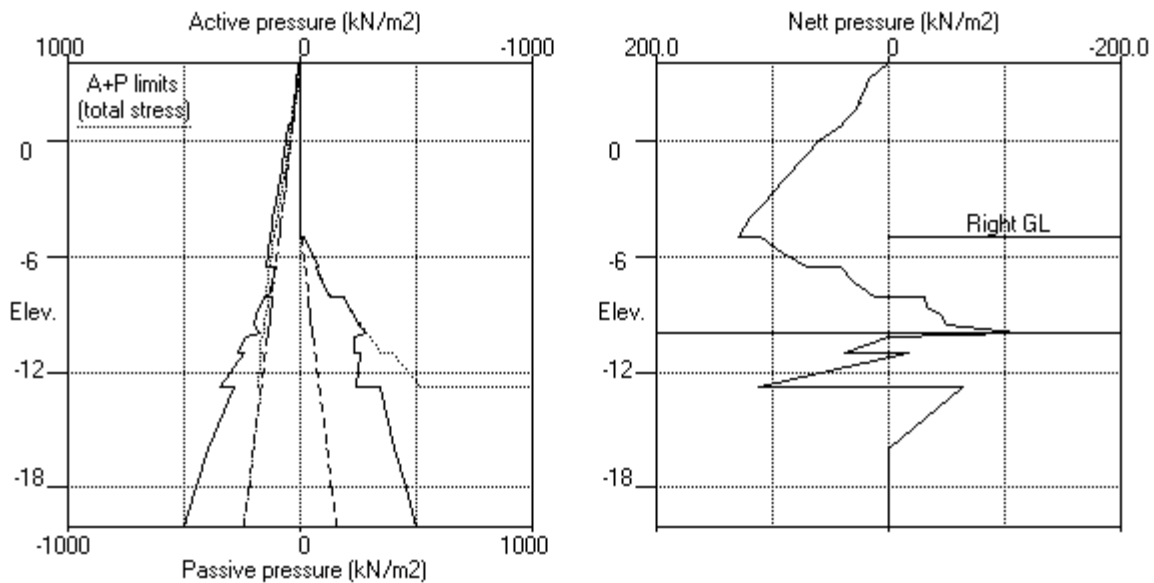
Note: 12.34 a Soil pressure at active limit
 286.74 p Soil pressure at passive limit
 137.61A Arching - soil pressure below active limit

Units: kN,m

Stage No.15 Apply water pressure profile no.1



Stage No.15 Apply water pressure profile no.1

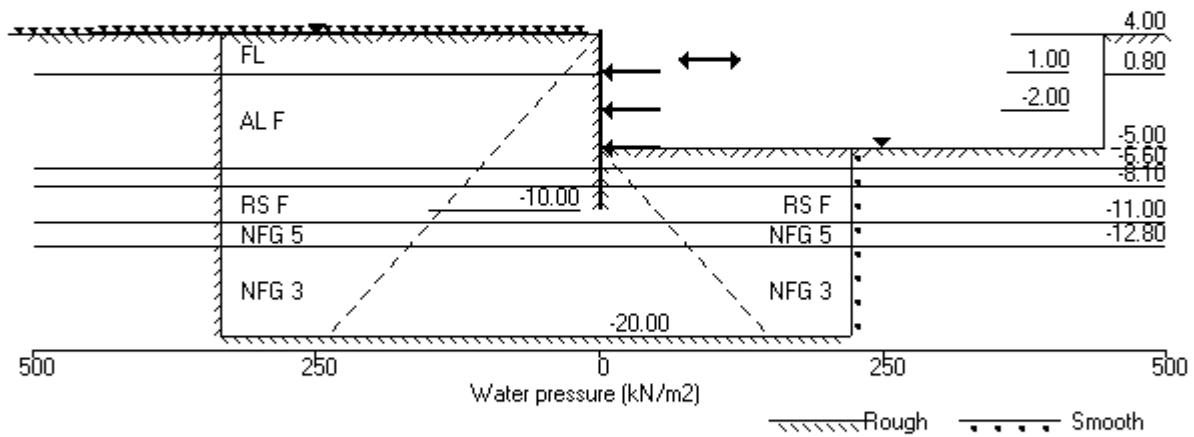


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 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 | Date:16-11-2022
 | Checked :

Units: kN,m

Stage No.16 Change EI of wall to 400711kN.m2/m run



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Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
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Data filename/Run ID: Section_6	
Albert Street Development	Date:16-11-2022
Section 6	Checked :

Units: kN,m

Stage No. 16 Change EI of wall to 400711 kN.m2/m run
Allow wall to relax with new modulus value

STABILITY ANALYSIS of Soldier Pile Wall according to Burland-Potts method
Factor of safety on nett available passive

			FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		
<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u>	<u>Prop</u> <u>Elev.</u>	<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	<u>Direction</u> <u>of</u> <u>failure</u>
16	4.00	-5.00	More than one prop. No FoS calc.				

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
Passive mobilisation factor = 3.000
Length of wall perpendicular to section = 60.00m
2-D finite element model. Active limit arching modelled.
Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries: Left side 30.00 from wall Rough boundary
Right side 20.00 from wall Smooth boundary
Lower rigid boundary at elevation -20.00 Rough boundary

Node no.	Y coord	Nett pressure kN/m2	Wall disp. m	Wall rotation rad.	Shear force kN/m	Bending moment kN.m/m	Prop forces kN/m	EI of wall kN.m2/m
1	4.00	0.00	0.017	-6.63E-04	0.0	-0.0		400711
2	3.20	17.86	0.017	-6.65E-04	7.1	1.7		400711
3	2.60	21.19	0.018	-6.74E-04	18.9	9.9		400711
4	2.00	26.05	0.018	-7.00E-04	33.0	25.8		400711
5	1.90	25.34	0.018	-7.07E-04	35.6	29.2		400711
6	1.45	30.98	0.019	-7.51E-04	48.3	48.7		400711
7	1.00	39.26	0.019	-8.20E-04	64.1	73.8	-197.1	400711
		39.26	0.019	-8.20E-04	-133.0	73.8		
8	0.80	40.89	0.019	-8.50E-04	-125.0	47.1		400711
		49.79	0.019	-8.50E-04	-125.0	47.1		
9	0.00	61.02	0.020	-8.63E-04	-80.7	-38.8		400711
10	-0.65	70.32	0.020	-7.76E-04	-38.0	-80.4		400711
11	-1.30	80.47	0.021	-6.50E-04	11.0	-92.4		400711
12	-1.50	82.48	0.021	-6.10E-04	27.3	-89.4		400711
13	-2.00	89.96	0.021	-5.27E-04	70.4	-67.0	-265.9	400711
		89.96	0.021	-5.27E-04	-195.5	-67.0		
14	-2.60	98.44	0.021	-3.72E-04	-139.0	-168.6		400711
15	-3.20	106.44	0.022	-9.26E-05	-77.5	-234.7		400711
16	-4.00	118.53	0.022	3.71E-04	12.5	-262.6		400711
17	-4.50	124.11	0.021	6.64E-04	73.1	-242.1		400711
18	-5.00	129.66	0.021	9.11E-04	136.6	-190.6	-237.5	400711
		110.64	0.021	9.11E-04	-100.9	-190.6		
19	-5.80	91.23	0.020	1.30E-03	-20.2	-234.4		400711
20	-6.60	71.50	0.019	1.72E-03	44.9	-219.6		400711
		41.05	0.019	1.72E-03	44.9	-219.6		
21	-7.35	29.79	0.017	2.07E-03	71.5	-174.6		400711
22	-8.10	11.63	0.016	2.32E-03	87.0	-110.8		400711
		-31.46	0.016	2.32E-03	87.0	-110.8		
23	-8.58	-29.98	0.015	2.42E-03	72.4	-71.1		400711
24	-9.05	-38.62	0.013	2.48E-03	56.1	-38.2		400711
25	-9.53	-40.10	0.012	2.51E-03	37.4	-14.3		400711

(continued)

Stage No.16 Change EI of wall to 400711 kN.m2/m run
 Allow wall to relax with new modulus value

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m	<u>EI of</u> <u>wall</u> kN.m2/m
26	-10.00	-82.73	0.011	2.52E-03	8.3	-0.0		0
27	-10.20	0.00	0.010	0	0.0	0.0		0
28	-11.00	38.15	0.007	0	15.3	0.0		0
		-16.93	0.007	0	15.3	0.0		
29	-12.80	112.15	0.001	0	101.0	0.0		0
		-63.04	0.001	0	101.0	0.0		
30	-16.00	-0.01	0.000	0	0.1	0.0		0
31	-18.00	0.01	0.000	0	0.1	0.0		0
32	-20.00	-0.08	0.000	0	0.0	0.0		---
At elev. 1.00				Prop force =	197.1	kN/m run		
At elev. -2.00				Prop force =	265.9	kN/m run		
At elev. -5.00				Prop force =	237.5	kN/m run		

LEFT side								
<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Water</u> <u>press.</u> kN/m2	<u>Effective stresses</u>				<u>Total</u> <u>earth</u> <u>pressure</u> kN/m2	<u>Adjusted</u> <u>soil</u> <u>modulus</u> kN/m2
			<u>Vertic</u> <u>-al</u> kN/m2	<u>Active</u> <u>limit</u> kN/m2	<u>Passive</u> <u>limit</u> kN/m2	<u>Earth</u> <u>pressure</u> kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	9971
2	3.20	8.00	6.79	2.10	26.27	9.86	17.86	9971
3	2.60	14.00	12.84	3.97	49.67	7.19	21.19	9971
4	2.00	20.00	18.50	5.72	71.57	6.05	26.05	9971
5	1.90	21.00	19.40	5.99	75.04	4.34	25.34A	9971
6	1.45	25.50	23.31	7.20	90.16	5.48	30.98A	9971
7	1.00	30.00	27.04	8.36	104.60	9.26	39.26	9971
8	0.80	32.00	28.66	8.86	110.86	8.89	40.89	9971
		32.00	28.66	4.50	118.68	17.79	49.79	5085
9	0.00	40.00	34.94	6.71	140.30	21.02	61.02	5484
10	-0.65	46.50	39.89	8.45	157.34	23.82	70.32	5808
11	-1.30	53.00	44.75	10.15	174.06	27.47	80.47	6132
12	-1.50	55.00	46.23	10.67	179.16	27.48	82.48	6232
13	-2.00	60.00	49.91	11.97	191.83	29.96	89.96	6481
14	-2.60	66.00	54.29	13.51	206.91	32.44	98.44	6780
15	-3.20	72.00	58.64	15.03	221.89	34.44	106.44	7079
16	-4.00	80.00	64.41	17.06	241.73	38.53	118.53	7478
17	-4.50	85.00	67.99	18.32	254.08	39.11	124.11	7727
18	-5.00	90.00	71.57	19.58	266.40	39.66	129.66	7977
19	-5.80	98.00	77.28	21.58	286.04	40.45	138.45	8376
20	-6.60	106.00	82.97	23.58	305.62	40.09	146.09	8774
		106.00	82.97	24.23	362.48	0.00	106.00A	19942
21	-7.35	113.50	88.29	25.78	385.72	11.72	125.22A	19942
22	-8.10	121.00	93.59	27.33	408.91	16.56	137.56A	19942
		121.00	93.59	14.11	467.31	31.85	152.85	29913
23	-8.58	125.75	98.38	15.46	488.20	53.00	178.75	29913
24	-9.05	130.50	103.16	16.82	509.09	63.75	194.25	29913
25	-9.53	135.25	107.93	18.17	529.95	67.67	202.92	29913
26	-10.00	140.00	112.70	19.52	550.81	49.52	189.52	29913
27	-10.20	142.00	114.71	20.09	559.59	94.19	236.19	29913
28	-11.00	150.00	122.75	22.37	594.68	121.93	271.93	29913
		150.00	122.75	11.35	653.04	94.35	244.35	49855
29	-12.80	168.00	146.20	18.21	755.51	182.49	350.49	49855
		168.00	146.20	0.00	5251.56	114.85	282.85	997093
30	-16.00	200.00	200.63	0.00	6007.38	200.84	400.84	997093
31	-18.00	220.00	234.62	0.00	6479.35	234.40	454.40	997093
32	-20.00	240.00	268.59	0.00	6951.06	259.81	499.81	997093

(continued)

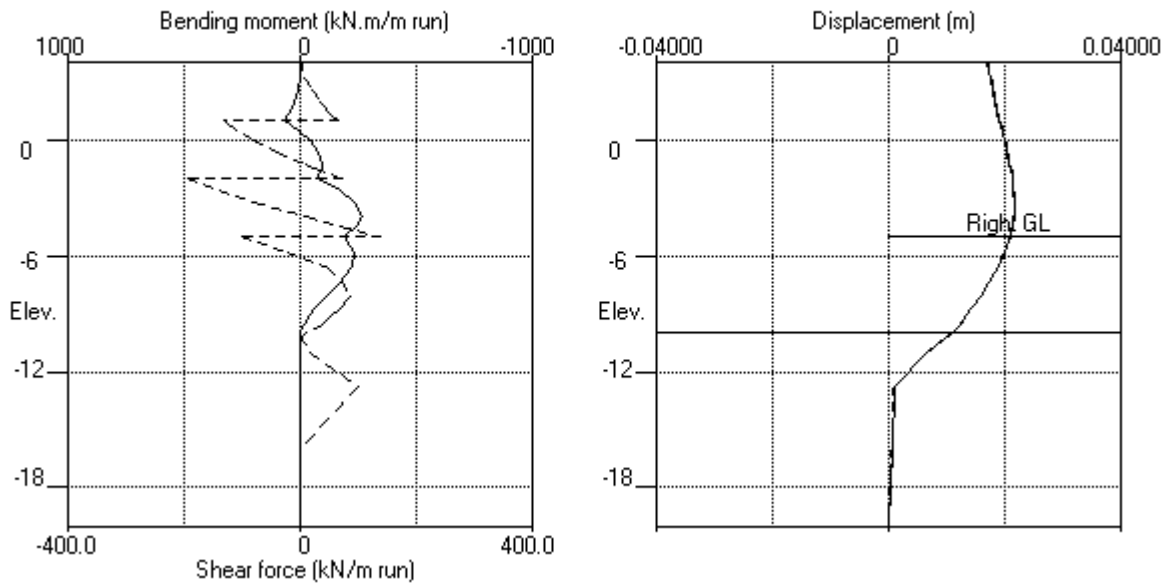
Stage No.16 Change EI of wall to 400711 kN.m2/m run
 Allow wall to relax with new modulus value

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Adjusted soil modulus kN/m2
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.0
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.0
11	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
12	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
13	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
14	-2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	-3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
16	-4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
17	-4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
18	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	20.03	19.02	19.02	7977
19	-5.80	8.00	5.60	0.00	39.31	39.22	47.22	8376
20	-6.60	16.00	11.20	0.00	58.60	58.60	74.60p	8775
		16.00	11.20	3.27	48.95	48.95	64.95p	19943
21	-7.35	23.50	16.46	4.81	71.93	71.93	95.43p	19943
22	-8.10	31.00	21.73	6.35	94.94	94.94	125.94p	19943
		31.00	21.73	0.00	153.31	153.31	184.31p	29915
23	-8.58	35.75	26.50	0.00	174.13	172.98	208.73	29915
24	-9.05	40.50	31.27	0.00	194.98	192.37	232.87	29915
25	-9.53	45.25	36.04	0.00	215.84	197.77	243.02	29915
26	-10.00	50.00	40.82	0.00	236.74	222.25	272.25	29915
27	-10.20	52.00	42.84	0.00	245.54	184.18	236.18	29915
28	-11.00	60.00	50.91	2.01	280.82	173.77	233.77	29915
		60.00	50.91	0.00	339.18	201.28	261.28	49858
29	-12.80	78.00	74.56	0.00	442.50	160.33	238.33	49858
		78.00	74.56	0.00	4256.83	267.89	345.89	997169
30	-16.00	110.00	129.74	0.00	5023.01	290.85	400.85	997169
31	-18.00	130.00	164.48	0.00	5505.38	324.39	454.39	997169
32	-20.00	150.00	199.42	0.00	5990.65	349.89	499.89	997169

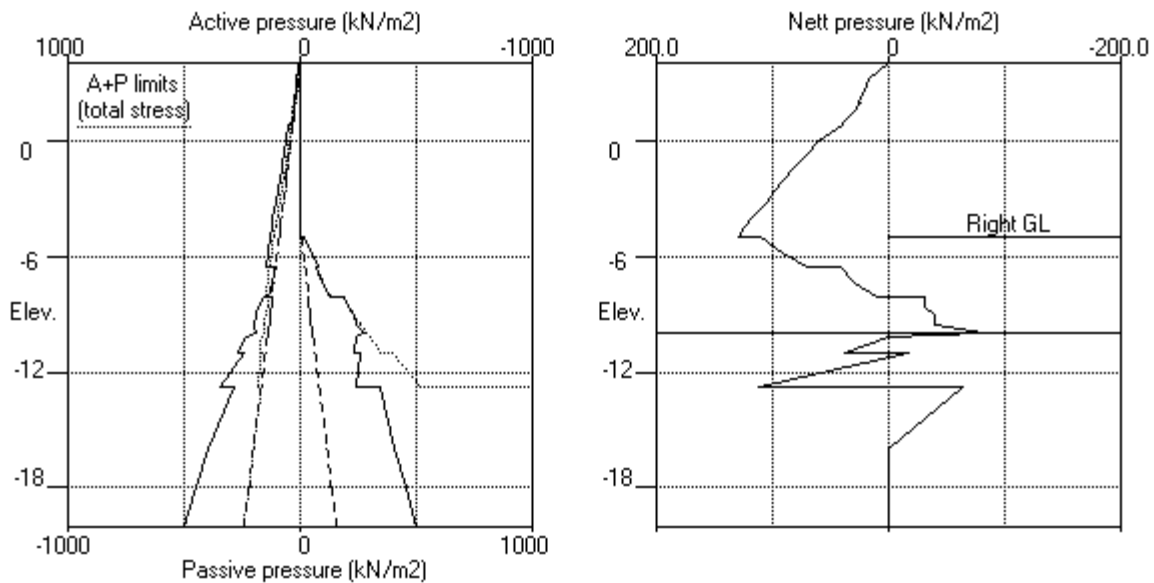
Note: 12.34 a Soil pressure at active limit
 184.31 p Soil pressure at passive limit
 137.56A Arching - soil pressure below active limit

Units: kN,m

Stage No.16 Change EI of wall to 400711kN.m2/m run



Stage No.16 Change EI of wall to 400711kN.m2/m run



| Checked :

Stage No.	Ground level		Prop Elev.	FoS for toe elev. = -10.00		Toe elev. for FoS = 1.500		Direction of failure
	Act.	Pass.		Factor of Safety	Moment equilib. at elev.	Toe elev.	Wall Penetr -ation	
1	4.00	4.00	---	Conditions not suitable for FoS calc.				
2	4.00	2.00	Cant.	12.246	-8.04	-0.24	2.24	L to R
3	4.00	2.00		No analysis at this stage				
4	4.00	-1.50	2.00	7.528	n/a	-3.36	1.86	L to R
5	4.00	-1.50		No analysis at this stage				
All remaining stages have more than one prop - FoS calculation n/a								

EDG CONSULTING PTY LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. B01493
Licensed from GEOSOLVE	Made by : DL
Data filename/Run ID: Section_6	
Albert Street Development	Date:16-11-2022
Section 6	Checked :

Units: kN,m

Summary of results

BENDING MOMENT and DISPLACEMENT ANALYSIS of Soldier Pile Wall

Analysis options

Soldier Pile width = 0.90m; spacing = 1.80m
 Passive mobilisation factor = 3.000
 Length of wall perpendicular to section = 60.00m
 2-D finite element model. Active limit arching modelled.
 Soil deformations are elastic until the active or passive limit is reached

Rigid boundaries:	Left side 30.00 from wall	Rough boundary
	Right side 20.00 from wall	Smooth boundary
Lower rigid boundary at elevation -20.00		Rough boundary

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement		Bending moment		Shear force	
		maximum	minimum	maximum	minimum	maximum	minimum
		m	m	kN.m/m	kN.m/m	kN/m	kN/m
1	4.00	0.019	0.000	0.0	-0.0	0.0	0.0
2	3.20	0.017	0.000	1.7	0.0	7.2	-1.1
3	2.60	0.018	0.000	10.0	-1.0	19.1	-2.3
4	2.00	0.018	0.000	25.9	-2.7	33.2	-118.2
5	1.90	0.018	0.000	29.4	-3.0	35.8	-116.8
6	1.45	0.019	0.000	49.0	-42.2	48.4	-102.3
7	1.00	0.019	0.000	74.1	-86.6	64.1	-152.1
8	0.80	0.019	0.000	47.1	-105.1	0.0	-144.2
9	0.00	0.020	0.000	19.4	-166.2	0.6	-99.9
10	-0.65	0.020	0.000	19.8	-198.3	7.3	-70.3
11	-1.30	0.021	0.000	20.1	-211.7	37.7	-198.0
12	-1.50	0.021	0.000	20.2	-211.6	27.3	-187.9
13	-2.00	0.021	0.000	20.4	-211.4	70.4	-203.8
14	-2.60	0.021	0.000	20.9	-296.1	23.5	-147.2
15	-3.20	0.022	0.000	21.8	-359.1	29.6	-95.6
16	-4.00	0.022	0.000	23.7	-406.4	37.1	-40.6
17	-4.50	0.021	0.000	25.6	-412.8	73.1	-2.9
18	-5.00	0.021	0.000	28.0	-399.7	136.6	-100.9
19	-5.80	0.020	0.000	33.0	-343.7	90.5	-20.2
20	-6.60	0.019	0.000	39.2	-261.4	120.0	0.0
21	-7.35	0.017	0.000	38.2	-206.4	113.6	-5.1
22	-8.10	0.016	0.000	31.6	-132.3	105.0	-11.4
23	-8.58	0.015	0.000	24.0	-85.9	89.8	-17.5
24	-9.05	0.014	0.000	15.0	-46.9	71.7	-18.7
25	-9.53	0.013	0.000	6.2	-17.8	49.4	-15.7
26	-10.00	0.011	0.000	0.0	-0.0	11.1	-3.9
27	-10.20	0.010	0.000	0.0	0.0	0.0	-0.0
28	-11.00	0.007	0.000	0.0	0.0	15.3	0.0
29	-12.80	0.001	0.000	0.0	0.0	101.0	0.0
30	-16.00	0.000	0.000	0.0	0.0	0.1	-0.0
31	-18.00	0.000	0.000	0.0	0.0	0.1	0.0
32	-20.00	0.000	0.000	0.0	0.0	0.0	-0.0

Summary of results (continued)

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment				Shear force			
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>
	kN.m/m		kN.m/m		kN/m		kN/m	
1	0.7	-8.58	-12.1	-2.60	4.1	-6.60	-3.6	0.80
2	39.2	-6.60	-0.0	-10.00	15.5	-12.80	-18.7	-9.05
3	No calculation at this stage							
4	16.8	-8.58	-211.7	-1.30	55.4	-6.60	-109.3	2.00
5	No calculation at this stage							
6	15.6	2.00	-202.4	-1.50	57.8	-6.60	-106.5	2.00
7	21.6	2.00	-412.8	-4.50	120.0	-6.60	-194.9	-1.30
8	20.1	2.00	-403.7	-4.50	117.8	-6.60	-198.0	-1.30
9	21.6	2.00	-412.8	-4.50	120.0	-6.60	-194.9	-1.30
10	No calculation at this stage							
11	No calculation at this stage							
12	21.6	2.00	-392.4	-4.50	115.6	-6.60	-164.9	-2.00
13	No calculation at this stage							
14	48.7	1.00	-394.5	-4.50	116.4	-6.60	-167.6	-2.00
15	74.1	1.00	-319.3	-4.00	129.1	-5.00	-203.8	-2.00
16	73.8	1.00	-262.6	-4.00	136.6	-5.00	-195.5	-2.00

Maximum and minimum displacement at each stage

Stage no.	Displacement				<u>Stage description</u>
	<u>maximum</u>	<u>elev.</u>	<u>minimum</u>	<u>elev.</u>	
	m		m		
1	0.001	1.45	0.000	4.00	Apply surcharge no.1 at elev. 4.00
2	0.019	4.00	0.000	4.00	Excav. to elev. 2.00 on RIGHT side
3	No calculation at this stage				Install prop no.1 at elev. 2.00
4	0.018	0.80	0.000	4.00	Excav. to elev. -1.50 on RIGHT side
5	No calculation at this stage				Install prop no.2 at elev. -1.30
6	0.018	0.00	0.000	4.00	Apply water pressure profile no.2
7	0.021	-3.20	0.000	4.00	Excav. to elev. -5.00 on RIGHT side
8	0.021	-3.20	0.000	4.00	Apply load no.1 at elev. 1.90
9	0.021	-3.20	0.000	4.00	Apply load no.2 at elev. 1.90
10	No calculation at this stage				Install prop no.3 at elev. -5.00
11	No calculation at this stage				Install prop no.4 at elev. -2.00
12	0.021	-2.60	0.000	4.00	Remove prop no.2 at elev. -1.30
13	No calculation at this stage				Install prop no.5 at elev. 1.00
14	0.021	-3.20	0.000	4.00	Remove prop no.1 at elev. 2.00
15	0.022	-3.20	0.000	4.00	Apply water pressure profile no.1
16	0.022	-3.20	0.000	4.00	Change EI of wall to 400711kN.m2/m run

Summary of results (continued)

Prop forces at each stage (horizontal components)

Stage no.	--- Strut no. 1 --- at elev. 2.00		--- Strut no. 2 --- at elev.-1.30		--- Strut no. 3 --- at elev.-5.00	
	kN/m run	kN/prop	kN/m run	kN/prop	kN/m run	kN/prop
4	127.42	955.62	---	---	---	---
6	124.93	936.95	9.03	67.74	---	---
7	100.73	755.48	225.11	1688.31	---	---
8	141.82	1063.65	235.68	1767.61	---	---
9	100.73	755.48	225.11	1688.31	---	---
12	129.05	967.84	---	---	-1.64	-1.64
14	---	---	---	---	-4.65	-4.65
15	---	---	---	---	213.80	213.80
16	---	---	---	---	237.48	237.48

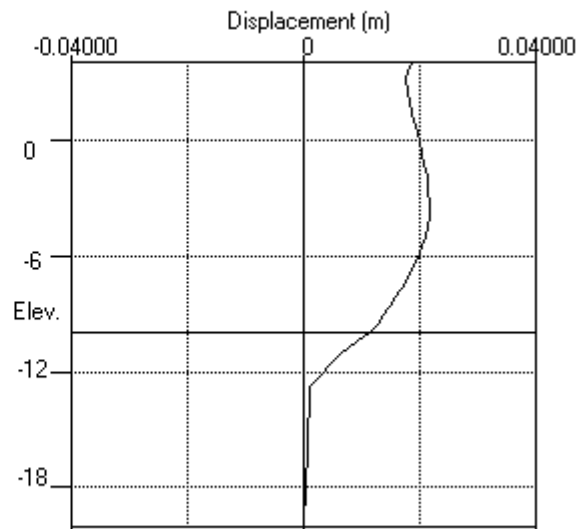
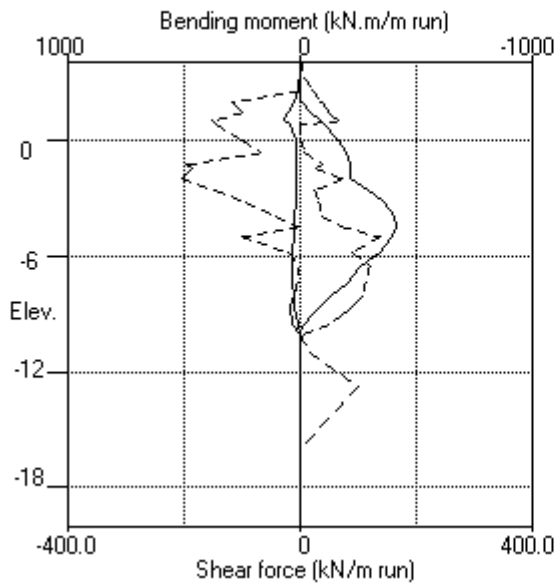
Stage no.	--- Strut no. 4 --- at elev.-2.00		--- Strut no. 5 --- at elev. 1.00	
	kN/m run	kN/prop	kN/m run	kN/prop
12	199.91	199.91	---	---
14	163.88	163.88	166.46	166.46
15	254.81	254.81	216.22	216.22
16	265.93	265.93	197.10	197.10

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 Program: WALLAP Version 6.07 Revision A55.B74.R58
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 Data filename/Run ID: Section_6
 Albert Street Development
 Section 6

| Sheet No.
 | Job No. B01493
 | Made by : DL
 |
 | Date:16-11-2022
 | Checked :

Units: kN,m

Bending moment, shear force, displacement envelopes



Appendix A

TBD

Appendix B

TBD

