HRC/CHK-LST-GT-ENG

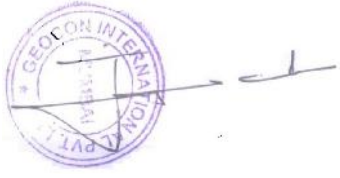
Check List for the Main Geotechnical Consultant

Sr. No.	Item	References
1.	Property Details	Acme Housing India Pvt. Ltd.
	Project Name	ACME OZONE (Sub Plot A- EUCALYPTIA & FENELIA bldg No. 5 & 6)
	Project Address	ACME Ozone,Proposed Development on land bearing Gut no.61/1/2,3,4 & 61/2/1,2,3 of Village Chitalsar,Manpada, Taluka & Dist. Thane
2.	Detail of the Structure	
	North side	20m wide Existing Road
	West side	Amenity & Market bldg common Compound wall
	South Side	Godrej project & common compound wall
	East Side	Dandelia Bldg no.4 & Gingelia bldg no.7
	No. of Basement	2 Basements
	Height of each basement	1st Basement = 5m 2nd Basement =3.2m
3.	Soil Investigation Details	
	Boring methods	Double tube for boring
	No. of Bore holes	Total 9 Boreholes
	Spacing of bore holes	Approx. 20m to 30m
	Terminated Depth of Boreholes	NBH-01, NBH-4 – 28m (Tower Area Boreholes) NBH-05 – 26m NBH-6 and NBH-9 – 20m
	GWL (m)	Approx. 1.0m to 8.0m Below Ground
	Testing Laboratory	Not NABL Accredited

4.	Foundation	
	Type of proposed foundation	Spread/Raft Foundation
	Depth of Footing	10.5m
	Load Calculation / contact pressure	Eucalyptia – 217 t/m^2 Fenelia – 125 t/m^2
	SBC estimated	300 t/m^2
	Sub-grade Elastic Modulus	1,70,00 t/m^3
	Settlement	12mm.
	Differential settlement	<L/500, Within permissible settlement
4.1	Raft Foundation	
	Bottom level of raft	10.5m
	Minimum clearance between outermost basement retaining wall and compound wall	1.5m
	Size	Various Sized. Foundation layout is attached in annexure.
	Thickness	2000mm
	Depth	-
	Modulus of Subgrade Reaction	Zoned Spring Constants
	Modeling of Soil for raft foundation	Yes
	Anchors details	Yes, Passive Rock anchor details of 25 tons
4.2	Pile Raft	NA
	Sharing of load by raft and piles	NA
	Pile cap rest on strata	NA
	Pile raft design	NA
	Foundation settlement and pressure measurement	NA



4.3	Pile Foundation	NA
	Type, diameter, spacing	NA
	Socket depth	NA
	Foundation settlement and pressure measurement	NA
4.4	Lateral load analysis	NA
	Pile load test	NA
	Initial	
	Routine	
	Any other Field test / conducted / recommended	
4.5	Uplift capacity of foundation	
	Based on wind pressure	Within Permissible Limit (Pressure diagrams are attached in Annexure.
	Based on GWL	Calculation Attached in Annexure.
	Based on earthquake	Within Permissible Limit
	If rock anchors are used are they grouted after installation and stressing? Or Passive anchor	Passive Rock Anchors
	Whether pressure release pipes have been used?	To be filled by Structural Consultant
5	Shoring Arrangement	
	Has a shoring system been installed	Yes
	Type (touching piles C/C spacing Secent pile / diaphragm wall)	Touching Piles
	Size and Depth	300mm Dia @ 400mm C/C and 800mm Dia @ 900mm C/C (Details Attached in Annexure).
	Achors if required	Yes
	GWL	-1.0m to Rock Lvl.
7	Retaining wall (If any)	Yes
8	Submission of final report	In advance to authority should reach the minimum 5 days before



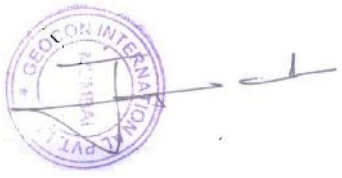
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GEOTECHNICAL INVESTIGATION REPORT
PROPOSED HIGH RISE BUILDINGS "FENELIA & EUCALYPITA"
ACME OZONE, THANE (W)

Submitted to,
ACME HOUSING INDIA PVT. LTD.

Submitted By,
GEOCON INTERNATIONAL PVT. LTD.



GEOTECHNICAL INVESTIGATION REPORT
PROPOSED HIGH RISE BUILDINGS "FENELIA & EUCALYPITA"
AT ACME OZONE, THANE (W)
FOR ACME HOUSING INDIA PVT. LTD.

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ANNEXURES
- Location Plan of Boreholes
- Borehole Logs
- Subsurface Profile
- Laboratory Test Rsults
- Foundation Layout
- Plaxis Analysis
- Pressure & Settlement Contours
- Hydro-static Uplift Calculations
- Excavation Shoring Scheme
- Core Box Photographs

GEOTECHNICAL INVESTIGATION REPORT
PROPOSED HIGH RISE BUILDINGS "FENELIA & EUCALYPITA"
AT ACME OZONE, THANE (W)
FOR ACME HOUSING INDIA PVT. LTD.

1.0 INTRODUCTION

Acme Housing India Pvt. Ltd. plans construction of High Rise buildings (Fenelia& Eucalypita) in Thane (W). The proposed high-rise buildings will consist of Double Basement + 3 Podiums + Stilt + Ground + 36 Upper Floors. The work of geotechnical investigation was awarded to Shree Samarth Krupa Geotechnics. The field work for the geotechnical investigation was completed by Shree Samarth Krupa Geotechnics in June 2019. This report prepared by Geocon International Pvt. Ltd. presents results of the geotechnical investigation along with foundation recommendations for proposed buildings.

1.1 Project Description

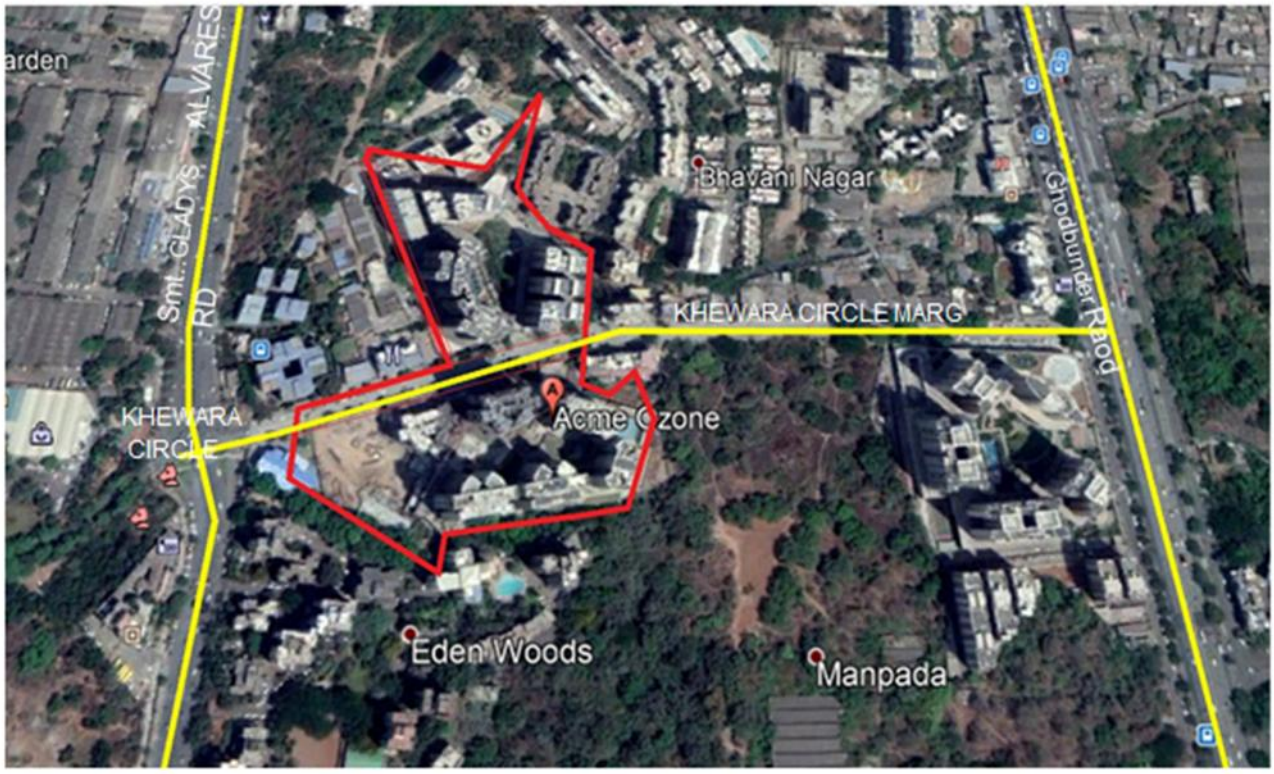
The building configurations, building height and current status of buildings are given in Table A below.

TABLE A
PROJECT DESCRIPTION

Sr. Nos.	Building Name	Building Configuration	Height of proposed building	Current status on site
1	Fennila	2Basments + 1st Podium(pt)/ Ground part (shop)+2nd Podium (part) / Mezzanine part (shop)+ 3rd podium +Stilt + 1ST to 36th Part floor	121.77m	Work has not started yet.
2	Eucalyptia	2Basments + 1st Podium +2nd Podium + 3rd podium +Stilt + 1ST to 36th Part floor		

1.2 Site Location

The proposed site is located in Thane. The site location is illustrated in sketch 1 below:



Sketch 1 – Google Image of Site

1.3 Area Geology

As per IS1893-1984; the area of the site has been classified as Volcanic rocks and minor basic intrusives. The general area of the project consists mostly of nearly horizontal dispersed lava flows of Deccan Trap Basaltic Formation of Cretaceous to Eocene age. The Igneous rocks are generally of horizontal deposition. The inclination of the rock layers near the Mumbai region range between 5 degrees to 15 degrees with the horizontal.

As per IS 1893, the site falls under Seismic Zone III, which corresponds to a Modified Mercalli Intensity of VII. The basic horizontal seismic coefficient corresponding to this zone is 0.16g (Where g is the gravitational acceleration).

2.0 EXPLORATION PROGRAM

2.1 Exploration Scope

Nine boreholes (NBH-1 to NBH-9) were completed for the project as illustrated on the Borehole Location Plan in the Annexure. Borehole termination depths are summarized in Table B below.

TABLE B
BOREHOLE TERMINATION DEPTHS

Borehole Number	Borehole Location	Ground Reduced Levels	Borehole Termination Depths
NBH-01	Fenelia Building	+97.9m	28.0m
NBH-02		+100.5m	28.0m
NBH-03		+99.5m	28.0m
NBH-03	Eucalypita Building	+99.5m	28.0m
NBH-04		+103.1m	28.0m
NBH-05	Non-Tower Area	+99.3m	26.0m
NBH-06		+100.9m	20.0m
NBH-07		+103.2m	19.0m
NBH-08		+103.2m	22.0m
NBH-09		+104.0m	20.0m

2.2 Subsurface Conditions

Subsurface profile at this site generally consists of residual soils overlying completely weathered rock underlain by basalt bedrock. Encountered soil/rock layers are described below;

LAYER I: RESIDUAL SOILS

Residual soils, consisting mostly of brownish / yellowish clay and sand were encountered at ground surface in the boreholes. Based on Standard Penetration Tests (SPT) conducted within this layer, consistency of cohesive soils (clay) was medium stiff to stiff and the relative density of cohesion less soils (sand) was loose to medium dense. The lower boundary of this layer was encountered at depths of 2.0m to 8.0m below ground.

LAYER II: COMPLETELY WEATHERED ROCK

Completely weathered rock was encountered at depths of 2.0m to 8.0m below ground surface in few boreholes. This layer is formed by the complete in-place disintegration of parent bedrock material, but still partially retains the original rock mass structure. SPT tests conducted in this layer encountered refusals. Core recoveries were typically less than 35%. The lower boundary of this layer was encountered at depths of 6.0m to 15.0m below ground surface.

LAYER III: HARD BASALT BEDROCK

Grey basalt bedrock was encountered at depths of 2.0m to 15.0m below ground surface in the boreholes. The bedrock was moderately weathered to sound, generally improving with depth. Core Recoveries in the bedrock layer varied between 37% and 99%, and Rock Quality Designations (RQDs) varied between Nil and 97%. The boreholes were terminated in this layer at depths of 19.0m to 28.0m below ground surface.

2.3 Ground Water Table

Groundwater accumulation in boreholes was monitored during and after completion of drilling activities. Groundwater was observed in boreholes at depths of 1.0m to 8.0m below ground level. Seasonal and annual fluctuations in ground water levels can be expected.

3.0 FOUNDATION RECOMMENDATIONS

Hard rock is encountered at depths of typically 2.0m to 6.0m below ground within tower area. Spread/Raft foundations for proposed buildings with double basement can be supported on this hard bedrock or PCC extended to hard rock. Foundation recommendations are summarized in Table B given below.

TABLE B
FOUNDATION RECOMMENDATIONS

Borehole Number	Borehole Location	Ground Reduced Levels	Depths To CWR	Depths To Hard Rock	Net Allowable Bearing Capacity
NBH-01	Fenelia Building	+97.9m	4.5m (RL +93.4m)	4.5m (RL +93.4m)	300 t/m^2 on HR
NBH-02		+100.5m	2.0m (RL +98.5m)	2.0m (RL +98.5m)	
NBH-03		+99.5m	5.0m (RL +94.5m)	5.0m (RL +94.5m)	
NBH-03	Eucalypita Building	+99.5m	5.0m (RL +94.5m)	5.0m (RL +94.5m)	
NBH-04		+103.1m	2.5m (RL +100.6m)	6.0m (RL +97.1m)	
NBH-05	Non Tower Area	+99.3m	5.5m (RL +93.8m)	15.0m (RL +84.3m)	50 t/m^2 on CWR or 100 t/m^2 on HR
NBH-06		+100.9m	2.0m (RL +98.9m)	2.0m (RL +98.9m)	
NBH-07		+103.2m	7.0m (RL +96.2m)	9.0m (RL +94.2m)	
NBH-08		+103.2m	7.0m (RL +96.2m)	13.0m (RL +90.2m)	
NBH-09		+104.0m	8.0m (RL +96.0m)	15.0m (RL +89m)	

CWR – Completely Weathered Rock
HR – Hard Rock

Wherever hard rock is encountered at deeper depths (Near Borehole NPBH-04), foundation should be rest on deeper depths (up to hard rock where complete refusals obtained) and same should be backfilled with PCC.

Maximum settlement of foundations will be less than 12mm. Zoned modulus of subgrade reaction can be utilized for design of raft foundations as given in Annexure (Plaxis Analysis).

3.1 Soil Structure Interaction for Zoned Spring Constants

Soil structure interaction using Finite Element Methods was completed for design of raft foundation. Software "Plaxis 3D Foundation" was utilized for analysis.

Software input parameters are summarized below.

1) Column locations and column loads obtained from structural consultants.
2) Raft Thickness = 2.0m
3) Raft E Value = 3.0×10^7 KN/m^2
4) Rock E Value = 1,70,000 KN/m^2 (Ref -1)

Zoned spring constants for structural design were obtained from Plaxis Software as the ratio of pressure under Raft divided by corresponding Settlement. Zoned spring constants are included in Annexure.

The above spring constants were then input by structural consultants in structural engineering software (SAFE) for structural design of raft foundations.

3.2 Basement Consideration

Basement floors and walls should be adequately water-proofed. Adequate uplift resistance in the form of dead weight or rock anchors should be provided. An allowable grout/rock bond stress of 40 t/m^2 can be utilized for design of rock anchors for tower area and 20 t/m^2 for non-tower area. Maximum groundwater table for uplift design should be taken at ground surface.

3.3 Lateral Earth Pressures

Basement walls and pile shoring walls, if any, will be subjected to lateral earth pressures. A soil submerged unit weight (r_{sub}) and coefficient of active lateral earth pressure (k_a) of 0.8 t/m^3 and 0.5, respectively, should be utilized for design of basement walls installed without adjacent pile shoring walls. Hydrostatic pressures and surcharge pressures, if any, should also be considered.

3.4 Foundation Excavation Observations

We hereby undertake to confirm founding strata following completion of excavation and prior to concreting, upon intimation by client/owner.

3.5 Foundation Protection

Results of chemical analysis on soil and groundwater samples enclosed in the Annexure, indicate that the site falls under Class 1 for sulphate concentrations and chloride concentrations (As per IS456 and as per CIRIA Sp. Publication No. 31). A 'Moderate' Exposure Condition was assigned to this site. Therefore following precautions are recommended to protect subsurface concrete and reinforcement.

Type of Cement:	OPC or PPC
Minimum Grade of Reinforced Concrete:	M25
Minimum Cement Content for Spread Foundation:	300 kg/m^3
Maximum Water Cement Ratio:	0.50
Minimum Cover to Reinforcement:	50mm

4.0 FIELD EXPLORATION PROCEDURES

The sub-surface investigation was completed generally as per IS: 1892-1979. The field investigation was carried out using rotary rigs (Calyx, 8 HP, Engine). Casing was used to support sides of borehole until sufficiently stiff strata was encountered. Standard Penetration Tests (i.e. SPT) were carried out at every 1.5m vertical interval up to bedrock, in accordance with IS 2131-1981. Using this procedure, a 5 cm outside diameter split-barrel sampler is driven into the soil by 63.5 kg. weight falling through 75 cm height. After an initial set of 15cm, the number of blows required to drive the sampler an additional 30 cm, is known as the “penetration resistance” or “N value”.

After SPT refusal was obtained, NX sized rock coring was done in maximum of 1.5m runs, using diamond bit and double tube core barrel. Percent Rock Core Recovery and percent Rock Quality Designation (%RQD) were determined. % RQD = 100 x Sum of length of rock pieces in cms, each having lengths greater than 10cms/Total length of core run in cms.

Sincerely,

GEOCON INTERNATIONAL PVT. LTD.



_____

Jaydeep Wagh
B.E., M.S., P.E. (Geotechnical)

REFERENCES

1) Foundation Analysis and Design, J.E. Bowles, McGraw Hill Publication, 5th Edition, 1996.

2) Canadian Foundation Engineering Manual.

3) Soil Mechanics in Engineering Practice, 2nd Edition, Terzaghi K. and Peck R. B., John Willey and Sons, 1967.

4) Foundation Design Manual, N. V. Nayak, 5th Edition, 1996.

5) IS:6403-1981, Code of Practice for Design and Construction of Shallow Foundations on Soils.

6) IS 12070: 1987, Code of Practice for Design and Construction of Shallow Foundations on Rocks

SAMPLE CALCULATION OF ALLOWABLE BEARING CAPACITY FOR FOUNDATIONS ON HARD BEDROCK (FOR TOWER AREA – BH-01 to BH-04)

_____ GL +0.0m
Layer I, Residual Soils
_____-2.0m to 5.0m
Layer II, Completely Weathered Rock
_____ -2.0m to -6.0m
Layer III, Hard Basalt Bedrock

Allowable bearing capacity = (Nj) x Qu (Ref. 6, Clause 6.2, pg. 7)

Where,
Nj = Joint condition factor = 0.1 to 0.4 (Ref. 6, Table 4, clause 6.2, pg. 9)
Assumed as 0.1 for hard rock

Qu = Rock Compressive strength = minimum of 3270 t/m^2 (Annexure, Laboratory Test Result)

Therefore, Allowable Bearing Capacity = 0.1 x 3270 = 327 t/m^2

Restricted to 300 t/m^2

B) CALCULATION OF SETTLEMENTS OF SPREAD FOUNDATIONS (5m x 5m) EXERTING PRESSURE OF 300 t/m^2:

$$\text{Settlement} = S = q_0 B' \frac{1-\mu^2}{E_s} m I_s I_f$$

Where,
q_0 = Footing Pressure = 300 t/m^2
B' = B/2 (Where B is the width of pressure distribution
μ = Poisson's ratio = 0.25
E = Modulus of Elasticity
I_s = Influence Factor (Obtained from Table 5-2, Reference No. 1)
I_f = Depth Factor (Obtained from Figure 5-7, Reference No. 1)
m = 4 for center of footing

E value for Basalt bedrock = 17,00,000 t/m^2 (Reference No. 1)
Using 1/10th of this value, E = 1,70,000 t/m^2

L' =5/2 =2.5, B' = 5/2 = 2.5, H=10m, and D=10.5m
Therefore, M=L/B=1; and N=H/B'=4 and D/B=4.2
Corresponding, I_s = 0.43, Conservative I_f = 1.0 (From Table 5-2, Reference 1)

Settlement of Layer = $S_1 = 300x2.5x\frac{1-0.25^2}{1{,}70{,}000}x4x0.43x1.0$ = 0.007m = 7mm

SAMPLE CALCULATION OF ALLOWABLE BEARING CAPACITY FOR FOUNDATIONS ON COMPLETELY WEATHERED ROCK (For NON TOWER AREA)

_____ GL +0.0m
Layer I, Residual Soils
_____-2.0m to 8.0m
Layer II, Completely Weathered Rock
_____ -2.0m to -13.0m
Layer III, Hard Basalt Bedrock

(Assuming completely weathered rock to be a very dense granular soil.)

Net Ultimate Bearing Capacity = $q_u = cNc\ s_c + q\ (N_q - 1)\ s_q + 0.5\ B\ \gamma N\gamma\ s_\gamma$ (Refn. 5, Table 4-1)

Where,

q = Overburden Pressure (i.e. submerged unit weight x depth of foundation)
c = Cohesion
B = Minimum Width of foundation = 1m
γ' = submerged unit weight of soil = 0.80
N_c, N_q, N_γ = Terzaghi's Bearing capacity factors
Sc, sq, s_γ = Shape factors = Conservatively assumed as 1, 1, and 0.6
D = Minimum depth of Footing below basement top = 1.5m

Minimum SPT N value obtained in boreholes = 50
Corresponding friction angle = 42^o (Reference No. 5)
Corresponding Nc=75, Nq=92, N_γ=174 (Reference 5, IS:6403-1981);

Substituting these values in the above equation;
q ultimate =q_u =[0x75x1]+[1.5x0.8x(92-1)x1]+[0.5x1x0.8x174x0.6]= 0+109+41 = 150 t/m^2
q safe = q_u/F.S. = 150/3 = 50 t/m^2

CALCULATION OF SETTLEMENTS OF FOUNDATIONS (3m x 3m) EXERTING PRESSURE OF 50 t/m^2:

From Reference No. 1:

$$\text{Settlement} = S = q_0 B' \frac{1 - «^2}{E_s} m I_s I_f$$

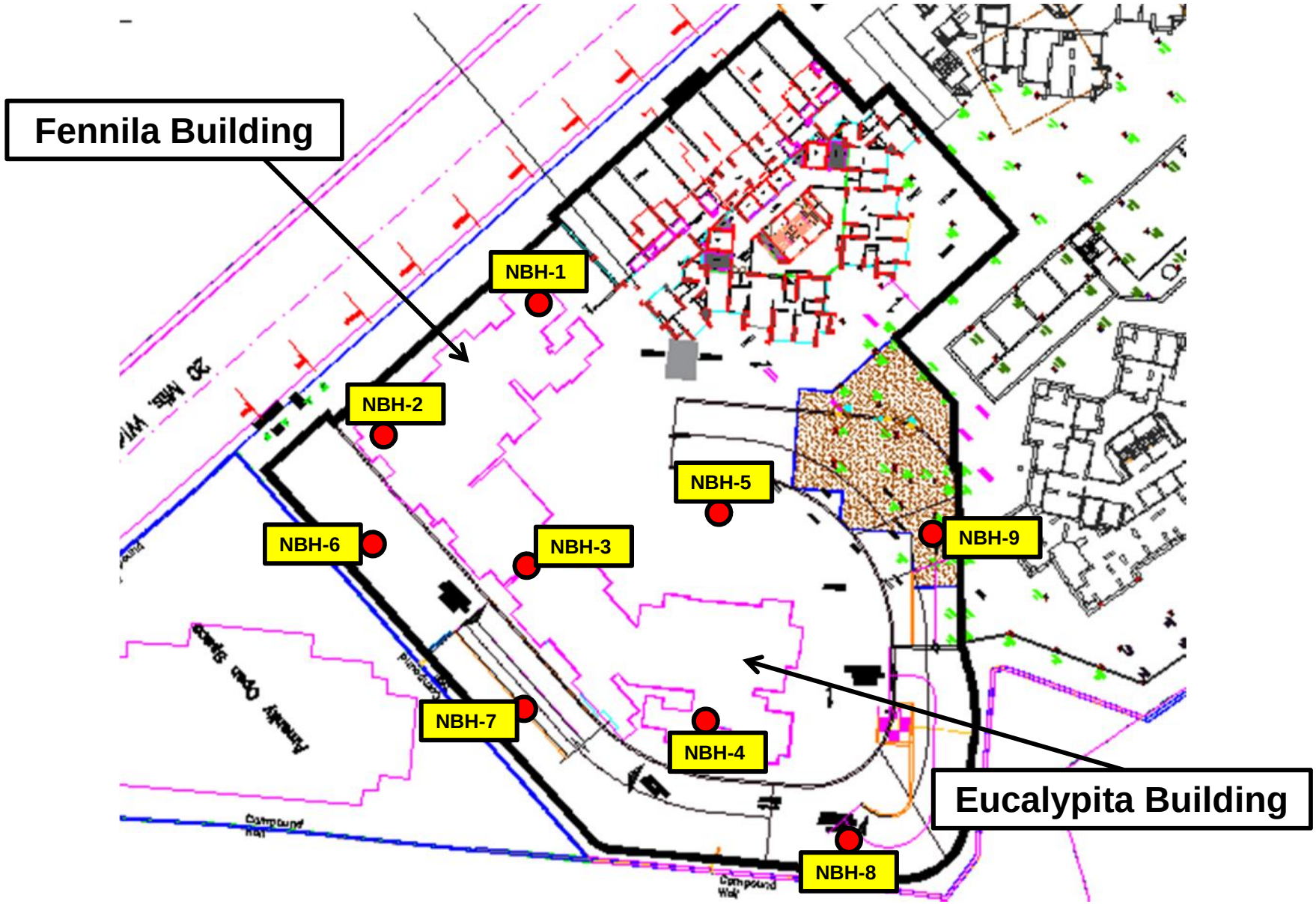
Where,
q_0 = Footing Pressure = 50 t/m^2
B' = B/2 (Where B is the width of pressure distribution
μ = Poisson's ratio = 0.3
E = Modulus of Elasticity
I_s = Influence Factor (Obtained from Table 5-2, Reference No. 1)
I_f = Depth Factor (Obtained from Figure 5-7, Reference No. 1)
m = 4 for center of footing

Very conservatively assuming completely weathered rock to be over-consolidated sand:
E value for over-consolidated sand = 105(N)+4000 (Reference No. 1)
Therefore, for a SPT N value of 50, E=9250 t/m^2

L' = 3/2 =1.5, B' = 3/2 = 1.5, H=6m, and D=10.5m
Therefore, M=L/B=1; and N=H/B'=4, and D/B=3.5
Corresponding, I_s = 0.43, Conservative I_f = 1 (From Table 5-2, Reference 1)

Settlement of Layer = S_1 = $50x1.5x\frac{1-0.3^2}{9250}x4x0.51x1$ = 0.012m = 12mm

BOREHOLE LOCATION MAP



CLIENT	: ACME HOUSING INDIA PVT. LTD.		BOREHOLE NO. :NBH-01 SHEET NO. : 1 of 3
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)		
LOCATION	: --		
CO-ORDINATES	: --	DATE	: 09/06/2019 TO 20/06/2019
GROUND R. L.	: 97.9m	METHOD	: ROTARY DRILLING
GROUND W. T.	: 3.00m	CASING	: 4.00m

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.50									
2.00			Brownish Weathered Rock										
3.00	NX			3.00									
				3.60		SPT 1	06	09	11	16	20		
4.00				4.50									
5.00				5.00								72	72
6.00			Grayish BASALT	6.00								66	58
7.00				7.00								63	63
8.00				8.00								90	90
9.00				9.00								98	92
10.00				10.00								96	96

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-01
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				10.00									
11.00	NX			11.00								73	73
12.00			Grayish BASALT	12.00								94	94
13.00				13.00								96	88
14.00				14.00								91	91
15.00				15.00								79	70
16.00				16.00								99	82
			Grayish to Reddish BASALT										
17.00				17.00								70	70
18.00				18.00								86	86
19.00				19.00								87	87
20.00				20.00								76	71
21.00				21.00								82	82

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-0
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 3 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				21.00									
22.00	NX			22.00								77	41
				23.00								80	80
23.00			Grayish BASALT										
				24.00								76	76
24.00													
			Grayish to Reddish BASALT	25.00								83	78
25.00													
				26.00								80	61
26.00													
			Grayish BASALT	27.00								79	68
27.00													
				28.00								97	97
28.00													
29.00													
30.00													
31.00													
32.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 28.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: **ACME HOUSING INDIA PVT. LTD.**	BOREHOLE NO. :NBH-02	
PROJECT	: **PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)**	SHEET NO.	: 1 of 3
LOCATION	: --		
CO-ORDINATES	: --	**DATE**	: **12/06/2019 TO 24/06/2019**
GROUND R. L.	: **100.52m**	**METHOD**	: **ROTARY DRILLING**
GROUND W. T.	: **2.00m**	**CASING**	: **1.50m**

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.00									
2.00			Boulders	2.00									
				2.06		SPT 1	52	--	--	--	R		
3.00	NX			3.00								46	31
4.00				4.00								75	40
5.00				5.00								74	74
6.00			Grayish BASALT	6.00								54	27
7.00				7.00								57	57
8.00				8.00								65	31
9.00				9.00								84	77
10.00				10.00								68	68

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST | W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-02
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				10.00									
11.00	NX			11.00								78	70
12.00			Grayish BASALT	12.00								74	74
13.00				13.00								87	87
14.00				14.00								91	84
15.00				15.00								70	70
16.00				16.00								82	82
17.00				17.00								93	93
18.00				18.00								94	51
19.00				19.00								87	87
20.00				20.00								90	90
21.00				21.00								84	84

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: **ACME HOUSING INDIA PVT. LTD.**	BOREHOLE NO. :NBH-02
PROJECT	: **PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)**	SHEET NO. : 3 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				21.00									
22.00	NX			22.00								93	80
			Grayish to Reddish BASALT										
23.00				23.00								88	88
24.00				24.00								76	76
25.00				25.00								82	82
26.00			Grayish BASALT	26.00								88	80
27.00				27.00								86	71
28.00				28.00								88	88
29.00													
30.00													
31.00													
32.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 28.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-03	
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 1 of 3	
LOCATION	: --		
CO-ORDINATES	: --	DATE	: 12/06/2019 TO 24/06/2019
GROUND R. L.	: 99.54m	METHOD	: ROTARY DRILLING
GROUND W. T.	: 2.00m	CASING	: 1.50m

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.00									
			Brownish Clay	1.50									
2.00				1.95		SPT 1	02	02	04	--	06		
3.00	NX		Brownish Clay with Gravels	3.00									
				3.45		SPT 2	03	05	06	--	11		
4.00				4.00									
5.00			Brownish Weathered BASALT	5.00									
6.00			Gray to Reddish BASALT	6.00								12	NIL
7.00				7.00								55	14
8.00				8.00								59	48
9.00				9.00								76	67
10.00			Grayish BASALT	10.00								71	52

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-03
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
11.00	NX		Grayish BASALT	10.00								83	83
12.00				11.00								73	65
13.00				12.00								71	71
14.00				13.00								81	70
15.00				14.00								83	83
16.00				15.00								91	82
17.00				16.00								89	53
18.00				17.00								82	82
19.00				18.00								80	80
20.00				19.00								87	87
21.00				20.00								86	86
				21.00									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-03
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 3 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				21.00									
												85	68
22.00	NX			22.00									
												88	79
23.00				23.00									
												82	82
24.00				24.00									
			Grayish BASALT									82	82
25.00				25.00									
												81	81
26.00				26.00									
												89	60
27.00				27.00									
												86	74
28.00				28.00									
29.00													
30.00													
31.00													
32.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 28.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-04	
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO.	: 1 of 3
LOCATION	: --		
CO-ORDINATES	: --	DATE	: 20/06/2019 TO 01/07/2019
GROUND R. L.	: 103.07m	METHOD	: ROTARY DRILLING
GROUND W. T.	: 4.50m	CASING	: 3.00m

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.00									
2.00			Boulders	2.00									
	NX			2.50									
				2.60		SPT 1	52	--	--	--	R		
3.00				3.00								11	NIL
4.00			Brownish Weathered Rock	4.00								19	NIL
5.00				5.00								16	NIL
6.00				6.00								33	33
7.00				7.00								53	33
8.00			Grayish BASALT	8.00								52	31
9.00				9.00								69	60
10.00				10.00								71	69

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST | W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-04
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
11.00	NX			10.00								73	73
12.00			Grayish BASALT	11.00								85	77
13.00				12.00								91	91
14.00				13.00								87	87
15.00			Red to Grayish BASALT	14.00								90	90
16.00				15.00								79	58
17.00			Grayish BASALT	16.00								81	81
18.00				17.00								92	83
19.00				18.00								94	75
20.00			Gray to Reddish BASALT	19.00								90	80
21.00				20.00								93	85
				21.00									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-04
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 3 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
22.00	NX		Grayish BASALT	21.00								95	95
				22.00									
23.00				23.00								93	86
24.00				24.00								86	86
25.00				25.00								82	82
26.00				26.00								88	88
27.00				27.00								79	79
28.00				28.00								82	82
29.00													
30.00													
31.00													
32.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 28.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: **ACME HOUSING INDIA PVT. LTD.**	BOREHOLE NO. :NBH-05	
PROJECT	: **PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)**	SHEET NO. : 1 of 3	
LOCATION	: --		
CO-ORDINATES	: --	**DATE**	: **12/07/2019 TO 18/07/2019**
GROUND R. L.	: **99.34m**	**METHOD**	: **ROTARY DRILLING**
GROUND W. T.	: **8.00m**	**CASING**	: **5.00m**

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.00		DS 1							
2.00	NX		Brownish Clay with Gravel	2.00									
				2.45		SPT 1	03	04	05	--	09		
3.00				3.50									
				3.95		SPT 2	03	05	06	--	11		
4.00													
5.00				5.00									
				5.45		SPT 3	05	07	09	--	16		
6.00				6.00								18	NIL
7.00			Brownish Weathered Rock (Fractured)	7.00								15	NIL
8.00				8.00								16	NIL
9.00				9.00								21	NIL
10.00				10.00								23	NIL

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-05
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
11.00	NX		Brownish Weathered Rock (Fractured)	10.00								24	NIL
				11.00									
12.00				12.00								27	NIL
13.00				13.00								29	NIL
14.00				14.00								26	NIL
15.00				15.00								31	20
16.00				16.00								38	NIL
17.00			Brownish Weathered Grayish BASALT (Fractured)	17.00								45	NIL
18.00				18.00								50	20
19.00			Grayish BASALT	19.00								75	67
20.00				20.00								77	77
21.00				21.00								75	75

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-05
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 3 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				21.00									
22.00	NX			22.00								82	82
23.00				23.00								74	74
24.00				24.00								78	78
25.00			Grayish BASALT	25.00								81	77
26.00				26.00								87	87
27.00													
28.00													
29.00													
30.00													
31.00													
32.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 26.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-06	
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO.	: 1 of 2
LOCATION	: --		
CO-ORDINATES	: --	DATE	: 12/06/2019 TO 20/06/2019
GROUND R. L.	: 100.94m	METHOD	: ROTARY DRILLING
GROUND W. T.	: 1.00m	CASING	: 2.00m

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.50									
2.00				2.00									
3.00	NX			3.00								49	NIL
4.00				4.00								66	66
5.00				5.00								72	72
6.00			Grayish BASALT	6.00								80	50
7.00				7.00								83	60
8.00				8.00								87	85
9.00				9.00								92	92
10.00				10.00								79	79

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST | W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-06
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 2

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				10.00									
11.00	NX			11.00								83	68
12.00			Grayish BASALT	12.00								85	85
13.00				13.00								94	86
14.00				14.00								96	96
15.00				15.00								86	63
16.00				16.00								86	79
17.00				17.00								84	68
18.00				18.00								87	65
19.00				19.00								89	89
20.00				20.00								84	84
21.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 20.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.		BOREHOLE NO. :NBH-07 SHEET NO. : 1 of 2
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)		
LOCATION	: --		
CO-ORDINATES	: --	DATE	: 08/07/2019 TO 12/07/2019
GROUND R. L.	: 103.18m	METHOD	: ROTARY DRILLING
GROUND W. T.	: 6.00m	CASING	: 4.00m

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.00									
2.00	NX		Brownish Clay with Gravel	2.50									
3.00				2.95		SPT 1	03	04	05	--	09		
4.00				4.00									
				4.45		SPT 2	05	05	07	--	12		
5.00				5.50									
6.00				5.95		SPT 3	06	08	11	--	19		
7.00			Brownish Weathered Rock	7.00									
8.00				8.00								08	NIL
9.00				9.00								12	NIL
10.00			Grayish BASALT	10.00								79	79

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-07
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 2

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
				10.00									
11.00	NX			11.00								85	85
12.00			Grayish BASALT	12.00								83	73
13.00				13.00								80	69
14.00				14.00								82	82
15.00				15.00								85	80
16.00				16.00								90	66
17.00				17.00								96	94
18.00				18.00								91	82
19.00				19.00								84	84
20.00													
21.00													

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST | W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 19.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: **ACME HOUSING INDIA PVT. LTD.**	BOREHOLE NO. :NBH-08	
PROJECT	: **PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)**	SHEET NO. : 1 of 3	
LOCATION	: --		
CO-ORDINATES	: --	**DATE**	: **12/07/2019 TO 18/07/2019**
GROUND R. L.	: **103.16m**	**METHOD**	: **ROTARY DRILLING**
GROUND W. T.	: **8.00m**	**CASING**	: **5.00m**

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.50		DS 1							
2.00	NX		Brownish Clay with Gravel	3.00									
3.00				3.45		SPT 1	03	04	04	--	08		
4.00				4.50									
5.00				4.95		SPT 2	05	07	08	--	15		
6.00				6.00									
7.00			Brownish Clay with Weathered Rock	6.45		SPT 3	08	11	15	--	26		
8.00				7.00									
9.00			Brownish Weathered Rock (Fractured)	8.00								16	NIL
10.00				9.00								19	NIL
				10.00								18	NIL

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST | W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-08
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
11.00	NX		Brownish Weathered Rock	10.00 11.00								14	NIL
12.00				12.00								23	NIL
13.00				13.00								33	12
14.00				14.00								39	15
15.00				15.00								82	82
16.00			Grayish BASALT (Fractured)	16.00								85	61
17.00				17.00								82	67
18.00				18.00								82	82
19.00				19.00								79	68
20.00				20.00								93	93
21.00				21.00								92	82

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-08
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 3 of 3

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
22.00	NX		Grayish BASALT	21.00 22.00								90	85
23.00													
24.00													
25.00													
26.00													
27.00													
28.00													
29.00													
30.00													
31.00													
32.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 22.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-09	
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 1 of 2	
LOCATION	: --		
CO-ORDINATES	: --	DATE	: 07/07/2019 TO 12/07/2019
GROUND R. L.	: 104.02m	METHOD	: ROTARY DRILLING
GROUND W. T.	: 8.00m	CASING	: 5.00m

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	TYPE OF SAMPLE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %
1.00	100 mm		Brownish Sand & Gravel with Boulders	1.00									
2.00				2.00									
	NX			2.45		SPT 1	03	03	04	--	07		
3.00			Brownish Clay with Gravel										
				3.50									
4.00				3.95		SPT 2	03	04	06	--	10		
5.00				5.00									
				5.45		SPT 3	05	07	08	--	15		
6.00				6.00									
7.00				7.00									
8.00			Brownish Weathered Rock (Fractured)	8.00									
9.00				9.00								19	NIL
10.00				10.00								22	NIL

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : CONTINUE ON NEXT PAGE.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

CLIENT	: ACME HOUSING INDIA PVT. LTD.	BOREHOLE NO. :NBH-09
PROJECT	: PROPOSED HIGH RISE BUILDINGS FENELIA & EUCALYPITA AT ACME OZONE, THANE (W)	SHEET NO. : 2 of 2

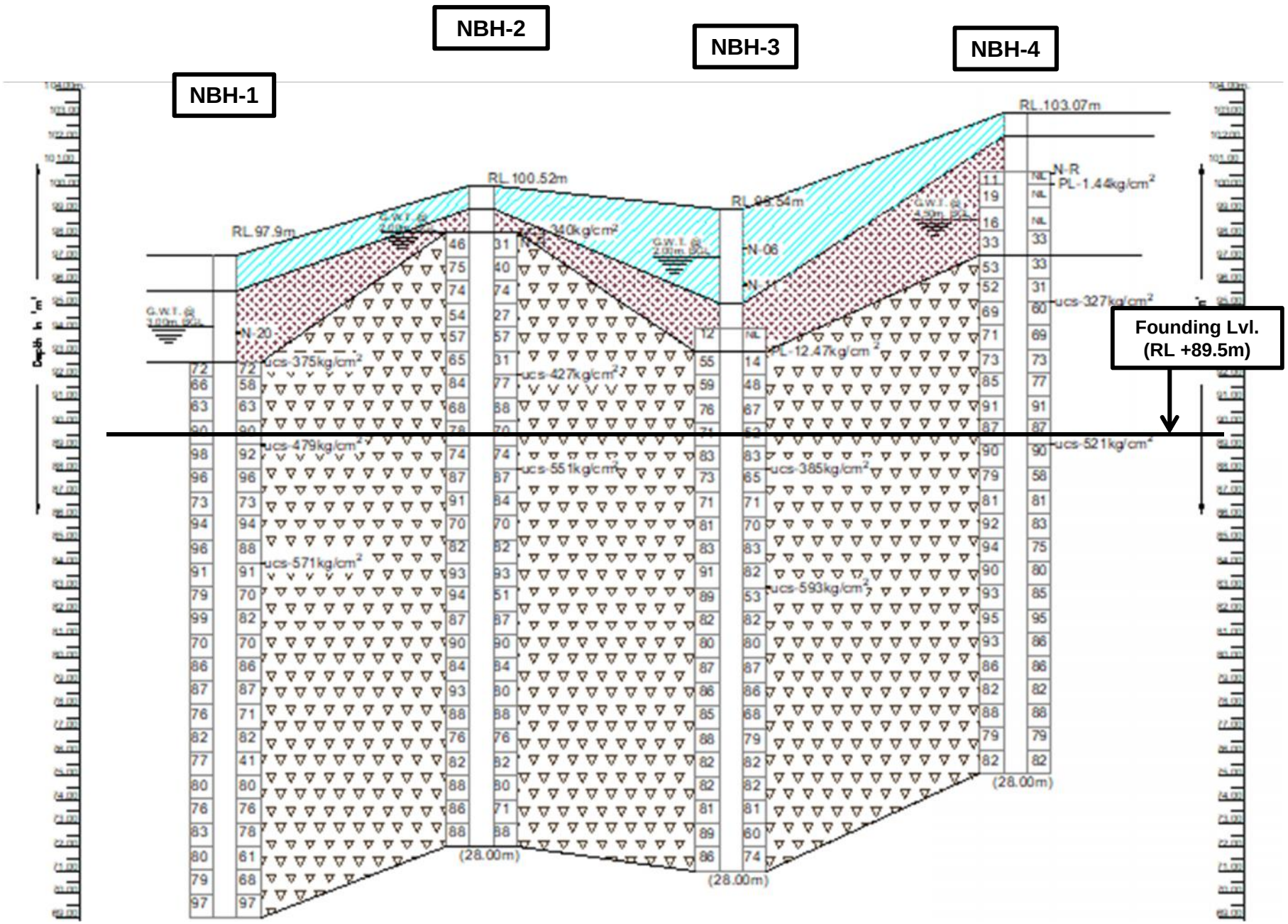
DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	DRILLING TIME (Min)	BLOWS/15cm TYPE	15	15	15	15	SPT N	C R %	RQD %
11.00	NX		Brownish Weathered Rock (Fractured)	10.00 11.00								15	NIL
12.00				12.00								41	NIL
13.00				13.00								27	NIL
14.00			Brown to Grayish BRECCIA (Fractured)	14.00								33	NIL
15.00				15.00								37	NIL
16.00				16.00								51	NIL
17.00				17.00								37	NIL
18.00				18.00								57	11
19.00			Brown to Grayish BASALT (Fractured)	19.00								68	12
20.00			Grayish BASALT (Fractured)	20.00								70	34
21.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST W/L = Water Loss

REMARKS : BOREHOLE IS TERMINATED AT 20.00 MTR BELOW EGL.

M/S. SHREE SAMARTH KRUPA GEOTECHNICS

SUB - SURFACE PROFILE



SOIL TEST DATA SHEET As per IS 2720 Part 3, 4, 5, 40

PROJECT: PROPOSED HIGH RISE BUILDINGS "FENELIA & EUCALYPITA" AT ACME OZONE, THANE (W)

CLIENT: ACME HOUSING INDIA PVT. LTD.

DATE: 25.07.2019

Bore Hole No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits				Shear Strength Test			Unconfined Compression Test Kg/cm^2	free swell index	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Shrinkage Limit %	Shrinkage Ratio	Cohesion C_u kg/cm^2	Degree			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH-01	3.00-3.60	SPT	-----	-----	-----	CH	2	15	83	----->	65	29	36		-----	-----	-----	-----	-----	-----	-----	-----	
BH-03	3.00-3.45	SPT	-----	-----	-----	CH	5	19	76	----->	57	25	32		-----	-----	-----	-----	-----	-----	-----	-----	
BH-05	3.50-3.95	SPT	-----	-----	-----	CH	0	20	80	----->	60	27	33		-----	-----	-----	-----	-----	-----	-----	-----	
BH-07	4.00-4.45	SPT	-----	-----	-----	CH	3	20	77	----->	58	26	32		-----	-----	-----	-----	-----	-----	-----	-----	
BH-09	3.50-3.95	SPT	-----	-----	-----	CH	9	22	69	----->	55	22	33		-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

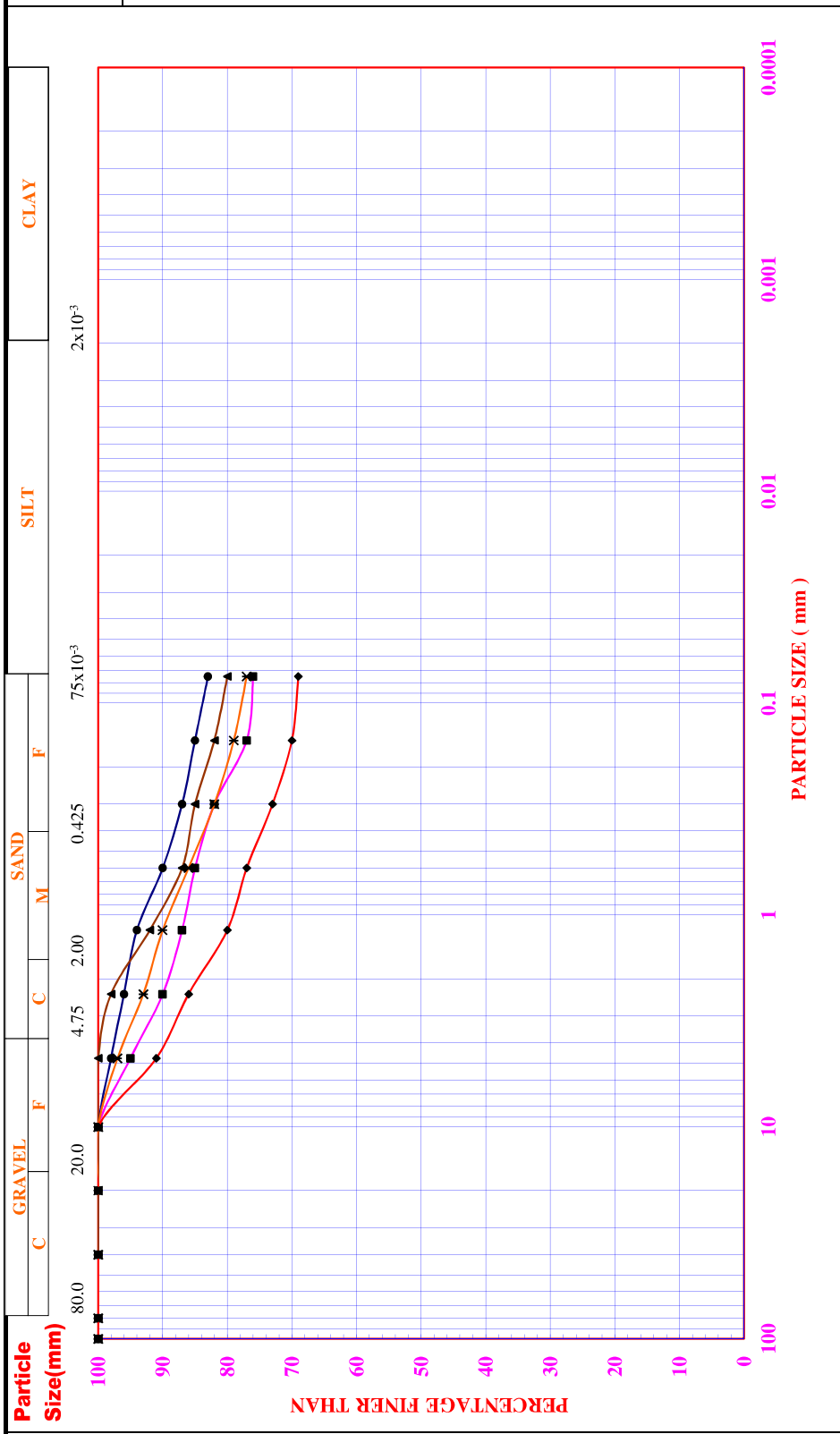
ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

GEOCON INTERNATIONAL PVT. LTD ISO 9001:2015

Job. No. : **L-19/412**

GRAIN SIZE DISTRIBUTION ANALYSIS

PROJECT:	PROPOSED HIGH RISE BUILDINGS “FENELIA & EUCALYPITA” AT ACME OZONE, THANE (W)
CLIENT:	ACME HOUSING INDIA PVT. LTD.



Symbol	Bore Hole No.	Depth in m.	Classification (IS)	Gravel %	Sand %	Silt %	Clay %	10% mm	30% mm	60% mm	Coeff. of Uniformity, C_u = D_{60} / D_{10}	Coeff. Of Curvature C_c $D_{30}^2/(D_{60} \cdot D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●	BH-01	3.00-3.60	CH	2	15	83	---->	-----	-----	-----	-----	-----	65	29	36	SPT
■	BH-03	3.00-3.45	CH	5	19	76	---->	-----	-----	-----	-----	-----	57	25	32	SPT
◄	BH-05	3.50-3.95	CH	0	20	80	---->	-----	-----	-----	-----	-----	60	27	33	SPT
✳	BH-07	4.00-4.45	CH	3	20	77	---->	-----	-----	-----	-----	-----	58	26	32	SPT
◆	BH-09	3.50-3.95	CH	9	22	69	---->	-----	-----	-----	-----	-----	55	22	33	SPT

GEOCON INTERNATIONAL PVT. LTD. MUMBAI
ISO 9001:2015

Job No. : L-19/412

TEST RESULTS OF ROCK CORES As per IS 9143, 8764, 13030

CLIENT: ACME HOUSING INDIA PVT. LTD.

PROJECT: PROPOSED HIGH RISE BUILDINGS "FENELIA & EUCALYPITA" AT ACME OZONE, THANE (W)

Date : 24.07.2019

Sr. No.	Bore Hole No.	Core No.	Depth, m	Diameter, cm	Height, cm	H : D (1:H/D)	Correction Factor	Condition of Test	Failure Load	Uniaxial Compressive Strength	Modulus of Elasticity	Point Load Index (Dimetrical)	Point Load Index (Axial)	Brazilian Test	Porosity	Water Absorption	Dry Density	Specific Gravity	Remark
				cm	cm				kN	kg/cm2	kg/cm2	kg/cm2		N/mm2	%	%	gm/cm3		
1	BH-01	1	4.50-5.00	5.40	10.94	2.03	1.00	Soaked	84.0	375	--	---	---	---	1.60	0.60	2.67		
2	BH-01	15	8.00-9.00	5.42	11.05	2.04	1.00	Soaked	108.0	479	--	--	---	---	1.18	0.43	2.71		
3	BH-01	22	13.00-14.00	5.43	11.10	2.04	1.00	Soaked	129.0	571	---	---	---	---	0.78	0.28	2.75		
4	BH-02	4	2.00-3.00	5.40	11.00	2.04	1.00	Soaked	76.0	340	--	--	---	---	-1.59	-0.60	2.66		
5	BH-02	29	8.00-9.00	5.44	11.14	2.05	1.01	Soaked	96.8	427	---	---	---	---	1.93	0.72	2.70		
6	BH-02	45	12.00-13.00	5.42	11.12	2.05	1.01	Soaked	124.0	551	--	--	---	---	0.78	0.29	2.73		
7	BH-03	5	6.00-7.00	5.40	8.05	1.49	0.95	Soaked	3.5	--	--	12.47	---	---	1.63	0.63	2.60		
8	BH-03	30	11.00-12.00	5.40	11.06	2.05	1.01	Soaked	86.0	385	--	--	---	---	2.37	0.88	2.68		
9	BH-03	44	16.00-17.00	5.43	11.15	2.05	1.01	Soaked	134.0	593	--	--	---	---	1.55	0.56	2.75		
10	BH-04	4	3.00-4.00	5.36	8.00	1.49	0.95	Soaked	0.4	--	--	1.44	---	---	4.99	2.49	2.01		
11	BH-04	25	8.00-9.00	5.40	11.03	2.04	1.00	Soaked	73.0	327	--	--	---	---	1.98	0.74	2.69		
12	BH-04	40	14.00-15.00	5.43	11.14	2.05	1.01	Soaked	117.6	521	--	--	---	---	1.16	0.42	2.74		

GEOCON INTERNATIONAL PVT. LTD. MUMBAI ISO 9001:2015

Job. No. : L-19/412

Checked by: KOMAL

TEST RESULTS OF ROCK CORES As per IS 9143, 8764, 13030

CLIENT: ACME HOUSING INDIA PVT. LTD.

PROJECT: PROPOSED HIGH RISE BUILDINGS "FENELIA & EUCALYPITA" AT ACME OZONE, THANE (W)

Date : 24.07.2019

Sr. No.	Bore Hole No.	Core No.	Depth, m	Diameter, cm	Height, cm	H : D (1:H/D)	Correction Factor	Condition of Test	Failure Load	Uniaxial Compressive Strength	Modulus of Elasticity	Point Load Index (Dimetrical)	Point Load Index (Axial)	Brazilian Test	Porosity	Water Absorption	Dry Density	Specific Gravity	Remark
				cm	cm				kN	kg/cm2	kg/cm2	kg/cm2		N/mm2	%	%	gm/cm3		
13	BH-05	2	6.00-7.00	5.34	7.90	1.48	0.94	Soaked	0.8	---	--	2.90	---	---	5.09	2.50	2.03		
14	BH-05	18	12.00-13.00	5.36	8.05	1.50	0.95	Soaked	1.0	---	--	3.60	---	---	4.40	2.13	2.07		
15	BH-05	40	17.00-18.00	5.40	11.09	2.05	1.01	Soaked	142.0	636	---	---	---	---	0.39	0.14	2.76		
16	BH-06	5	2.00-3.00	5.40	8.10	1.50	0.95	Soaked	4.0	---	--	14.26	---	---	6.47	2.45	2.64		
17	BH-06	25	7.00-8.00	5.42	11.07	2.04	1.00	Soaked	104.6	464	---	---	---	---	0.78	0.29	2.72		
18	BH-07	1	8.00-9.00	5.36	8.08	1.51	0.95	Soaked	0.5	---	--	1.80	---	---	4.94	2.36	2.09		
19	BH-07	11	12.00-13.00	5.41	11.14	2.06	1.01	Soaked	126.7	566	--	---	---	---	0.98	0.36	2.73		
20	BH-08	1	7.00-8.00	5.35	8.02	1.50	0.95	Soaked	0.5	---	--	1.81	---	---	5.55	2.76	2.01		
21	BH-08	10	15.00-16.00	5.42	11.00	2.03	1.00	Soaked	101.4	450	--	--	---	---	1.58	0.59	2.69		
22	BH-09	6	11.00-12.00	5.37	7.94	1.48	0.94	Soaked	1.3	--	--	4.67	---	---	4.45	2.09	2.12		
23	BH-09	27	17.00-18.00	5.40	11.12	2.06	1.01	Soaked	88.6	397	--	--	---	---	2.36	0.88	2.67		
24	BH-09	40	19.00-20.00	5.38	8.10	1.51	0.95	Soaked	1.1	---	--	3.94	---	---	2.72	1.30	2.10		

GEOCON INTERNATIONAL PVT. LTD. MUMBAI ISO 9001:2015

Job. No. : L-19/412

Checked by: KOMAL

CHEMICAL TEST RESULT OF GROUND WATER SAMPLES.

As per IS 3025 Part 11, 24, 32

Date: 24.07.2019

CLIENT: ACME HOUSING INDIA PVT. LTD.

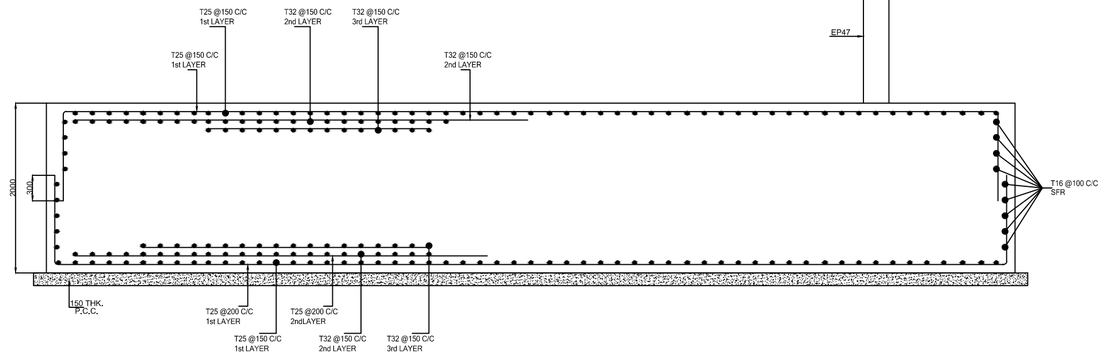
PROJECT: PROPOSED HIGH RISE BUILDINGS "FENELIA & EUCALYPITA" AT ACME OZONE, THANE (W)

SR NO.	BH NO.	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 ppm	CHLORIDE AS Cl ppm	REMARKS
				* Limit between 6.3 to 8.5	* Limit <400ppm Maximum	* Limit <2000ppm Maximum	
1	BH-01	--	Water	7.42	46.00	124.00	
2	BH-02	--	Water	7.48	57.00	148.00	
3	BH-03	--	Water	7.44	52.00	136.00	
4	BH-04	--	Water	7.50	64.00	162.00	

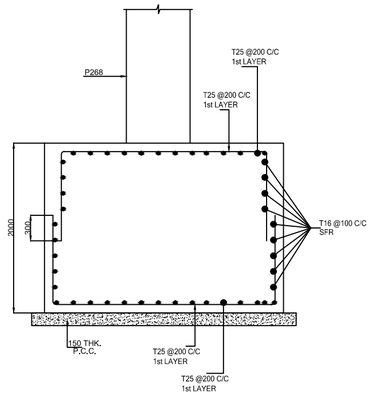
GEOCON INTERNATIONAL PVT. LTD. MUMBAI ISO 9001:2015

Job. No. :	L-19/412
Checked By	KOMAL

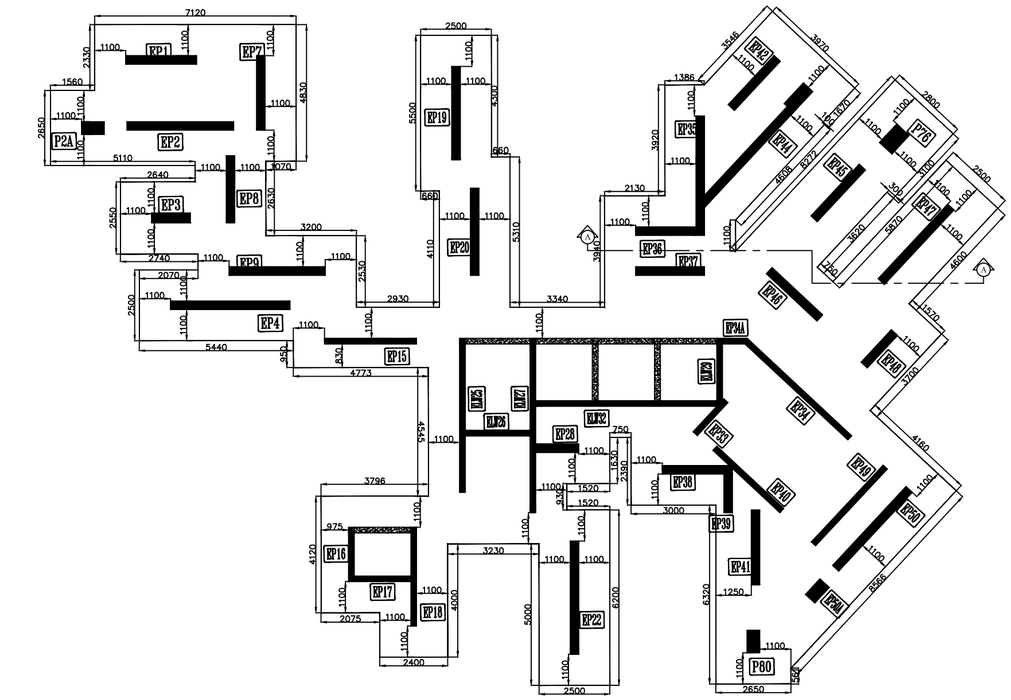
INDEX PLAN FOR RCC COLUMN FOOTING



SECTION A-A

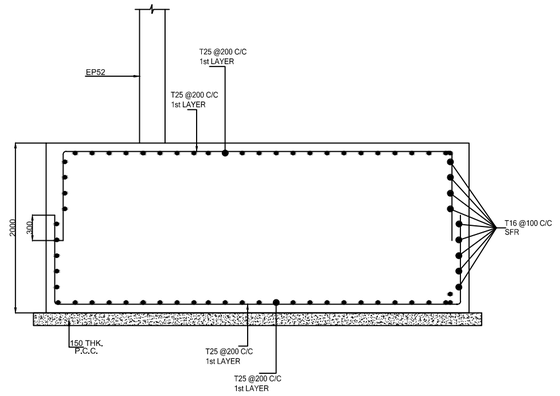


SECTION B-B

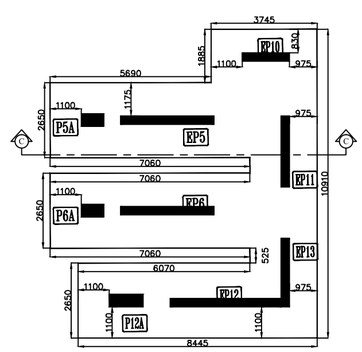


PLAN FOR COMBINED RAFT-1
DEPTH=2000mm

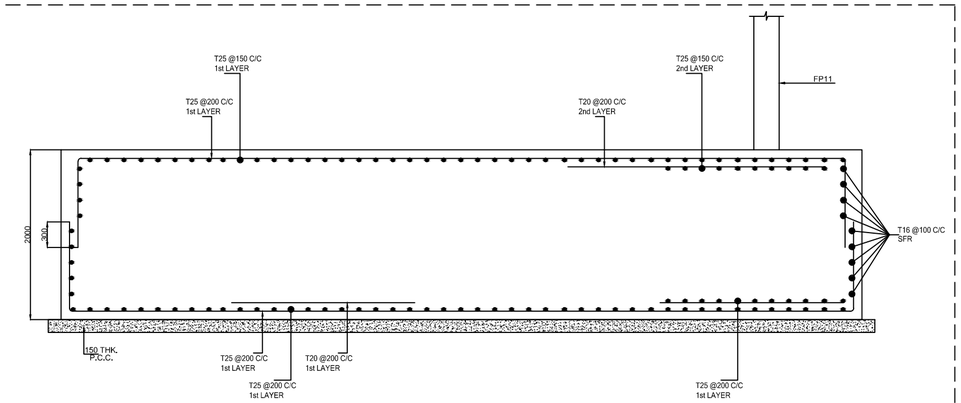
PLAN FOR COMBINED RAFT-2
DEPTH=2000mm



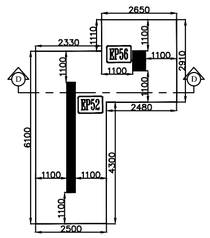
SECTION D-D



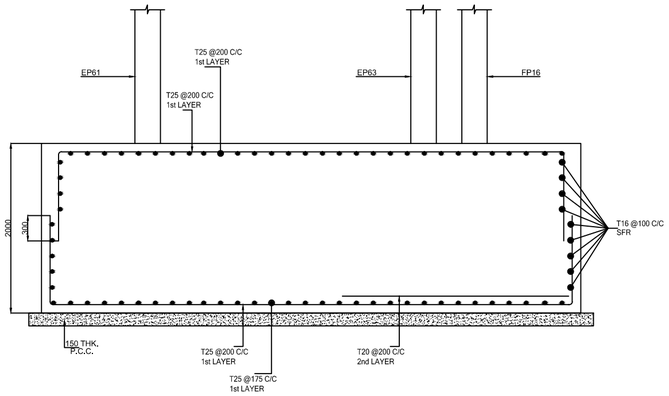
PLAN FOR COMBINED RAFT-3
DEPTH=2000mm



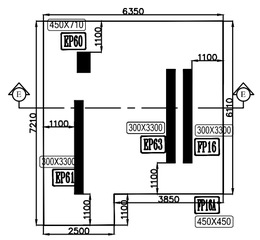
SECTION E-E



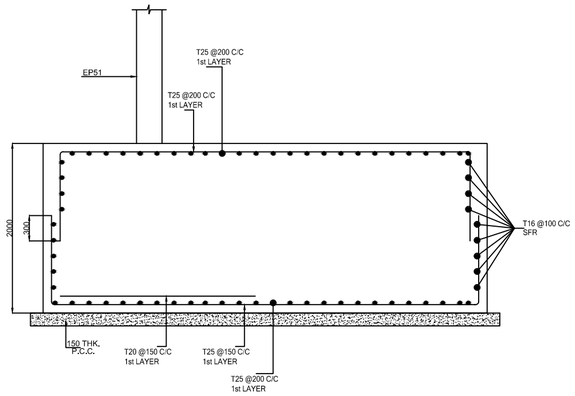
PLAN FOR COMBINED RAFT-4
DEPTH=2000mm



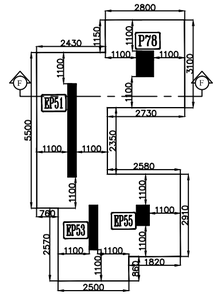
SECTION E-E



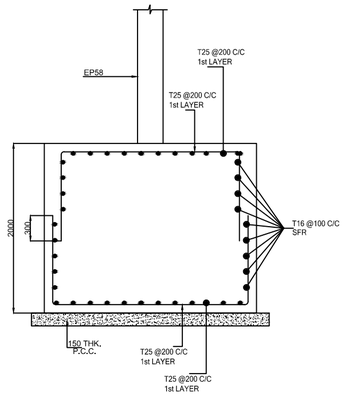
PLAN FOR COMBINED RAFT-5
DEPTH=2000mm



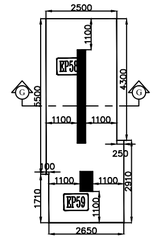
SECTION F-F



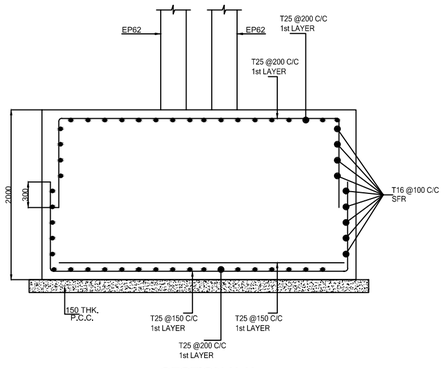
PLAN FOR COMBINED RAFT-6
DEPTH=2000mm



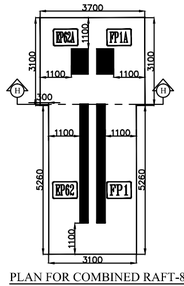
SECTION G-G



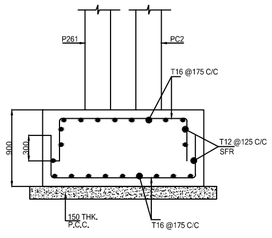
PLAN FOR COMBINED RAFT-7
DEPTH=2000mm



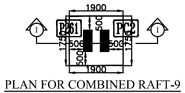
SECTION H-H



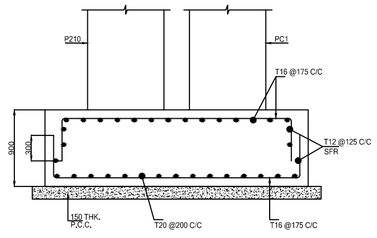
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DEPTH=2000mm



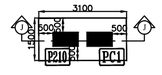
SECTION I-I



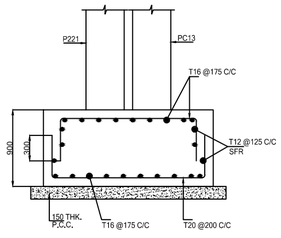
PLAN FOR COMBINED RAFT-9
DEPTH=900mm



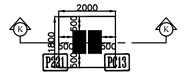
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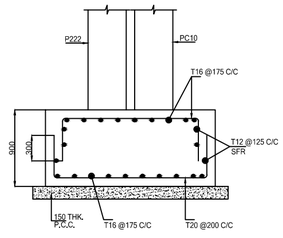
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DEPTH=900mm



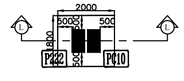
SECTION K-K



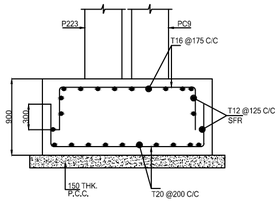
PLAN FOR COMBINED RAFT-11
DEPTH=900mm



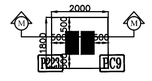
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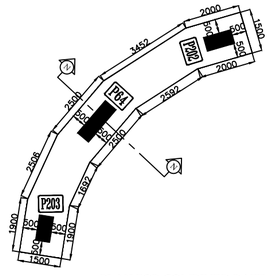
PLAN FOR COMBINED RAFT-12
DEPTH=900mm



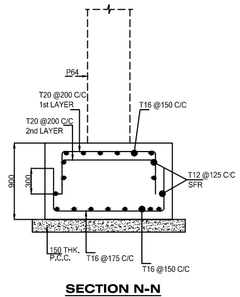
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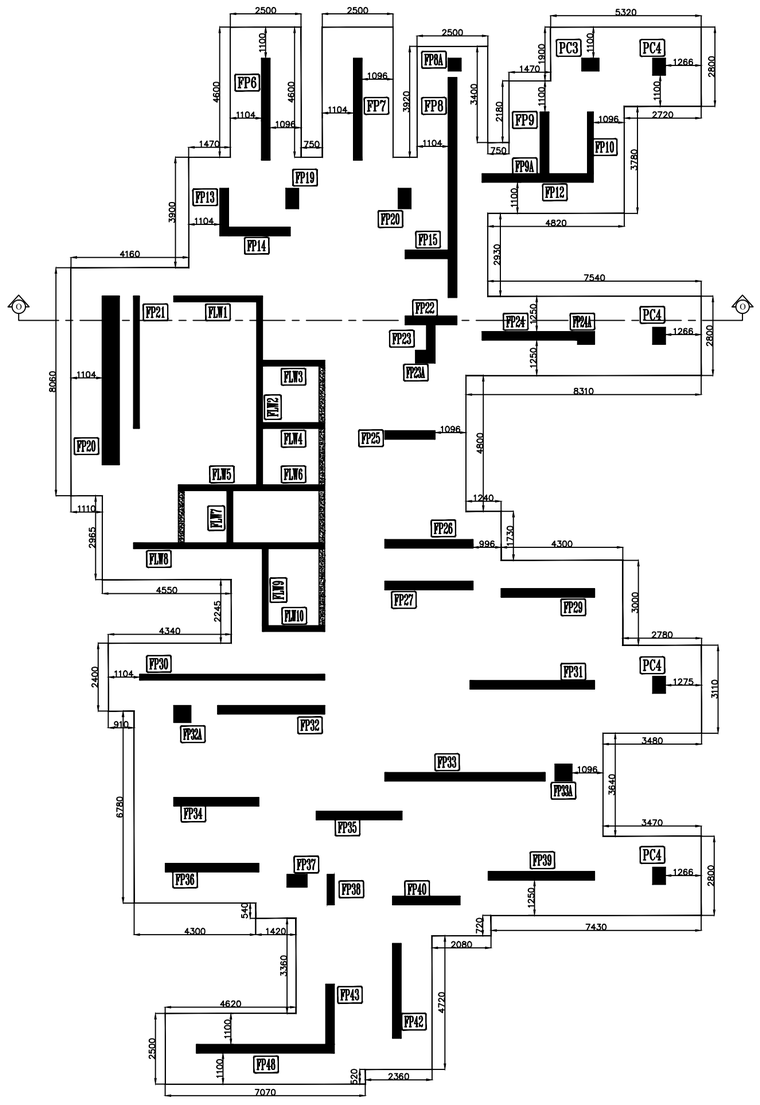
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DEPTH=900mm



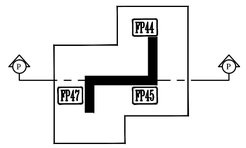
PLAN FOR COMBINED RAFT-14
DEPTH=900mm



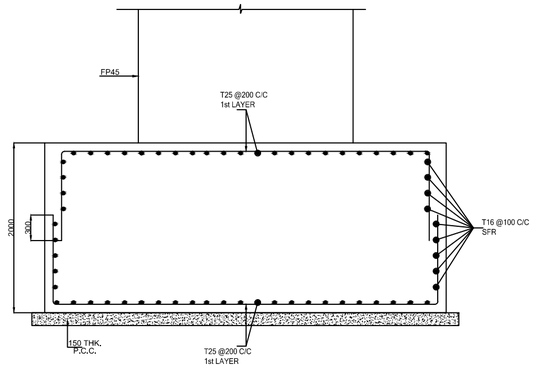
SECTION N-N



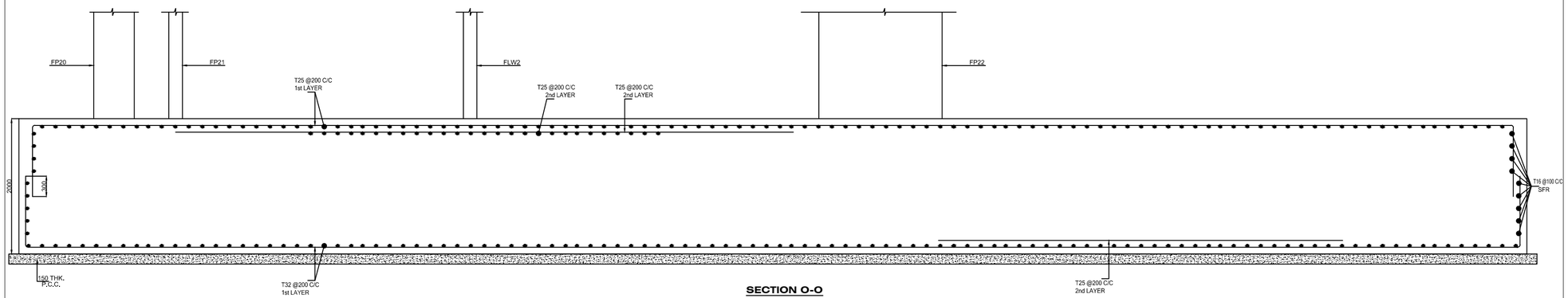
PLAN FOR COMBINED RAFT-15
DEPTH=2000mm



PLAN FOR COMBINED RAFT-16
DEPTH=2000mm



SECTION P-P



SECTION O-O

EUCALYPITA

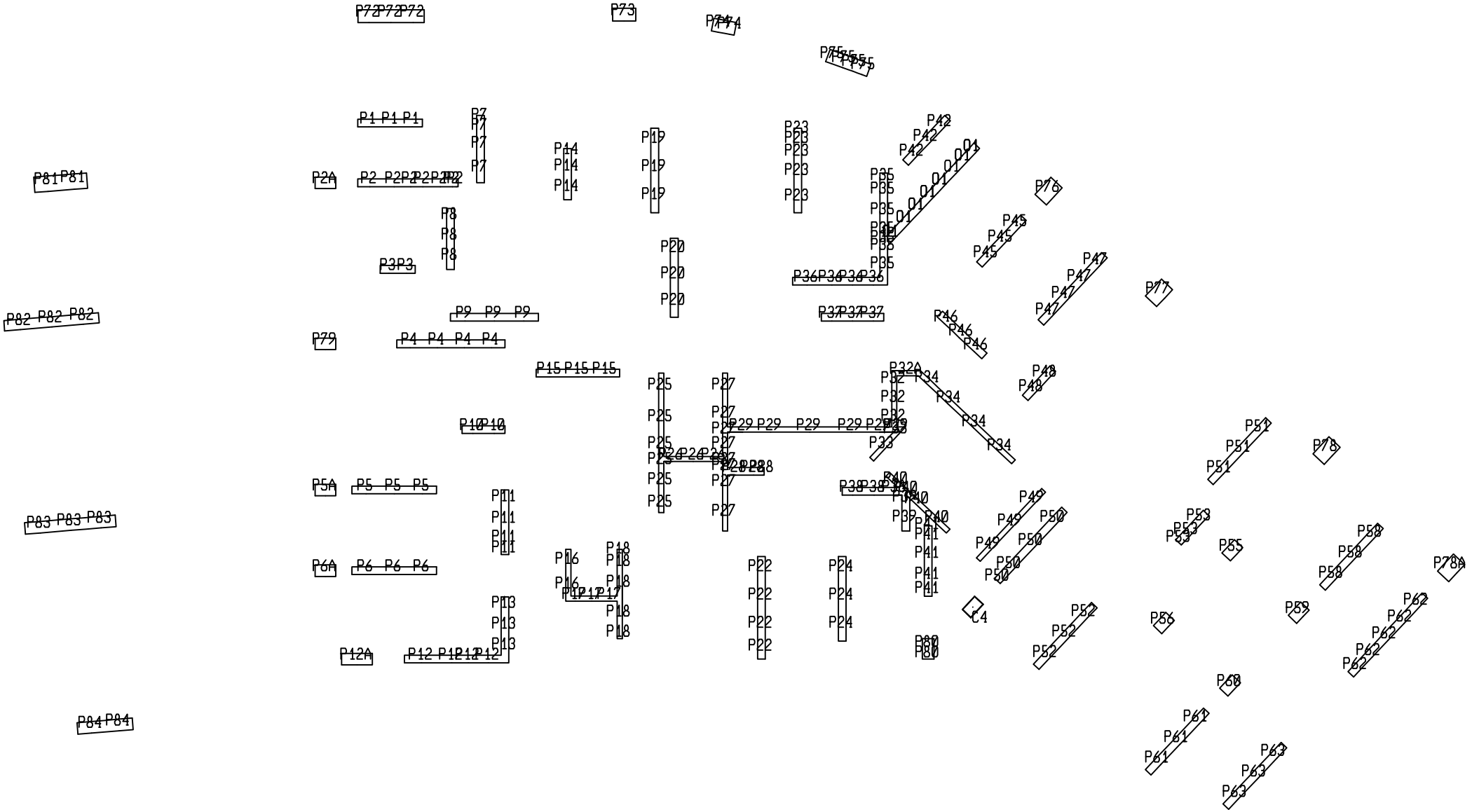


TABLE: Column Forces				
Story	Column	oad Case/Combo	Station	P
			m	kN
BASEMENT-1	C202	118.(DL+LL)	0	-1695.7404
BASEMENT-1	C203	118.(DL+LL)	0	-1596.3515
BASEMENT-1	C204	118.(DL+LL)	0	-2430.5433
BASEMENT-1	C205	118.(DL+LL)	0	-2634.521
BASEMENT-1	C206	118.(DL+LL)	0	-2568.3332
BASEMENT-1	C207	118.(DL+LL)	0	-3533.7875
BASEMENT-1	C208	118.(DL+LL)	0	-4016.6593
BASEMENT-1	C209	118.(DL+LL)	0	-4140.7058
BASEMENT-1	C210	118.(DL+LL)	0	-2269.8032
BASEMENT-1	C211	118.(DL+LL)	0	-2042.0314
BASEMENT-1	C212	118.(DL+LL)	0	-1900.7765
BASEMENT-1	C213	118.(DL+LL)	0	-3124.9182
BASEMENT-1	C214	118.(DL+LL)	0	-3595.8086
BASEMENT-1	C215	118.(DL+LL)	0	-2800.6742
BASEMENT-1	C216	118.(DL+LL)	0	-870.0536
BASEMENT-1	C217	118.(DL+LL)	0	-6203.015
BASEMENT-1	C218	118.(DL+LL)	0	-7691.6756
BASEMENT-1	C219	118.(DL+LL)	0	-9377.7625
BASEMENT-1	C220	118.(DL+LL)	0	-6558.2934
BASEMENT-1	C221	118.(DL+LL)	0	-2122.9911
BASEMENT-1	C222	118.(DL+LL)	0	-2536.0579
BASEMENT-1	C223	118.(DL+LL)	0	-4293.9121
BASEMENT-1	C224	118.(DL+LL)	0	-10888.8155
BASEMENT-1	C225	118.(DL+LL)	0	-8472.9166
BASEMENT-1	C226	118.(DL+LL)	0	-7399.6707
BASEMENT-1	C227	118.(DL+LL)	0	-6868.8697
BASEMENT-1	C228	118.(DL+LL)	0	-8810.8724
BASEMENT-1	C229	118.(DL+LL)	0	-9892.247
BASEMENT-1	C230	118.(DL+LL)	0	-5738.1221
BASEMENT-1	C233	118.(DL+LL)	0	-4105.0546
BASEMENT-1	C239	118.(DL+LL)	0	-3448.4206
BASEMENT-1	C240	118.(DL+LL)	0	-2783.0434
BASEMENT-1	C241	118.(DL+LL)	0	-3526.5722
BASEMENT-1	C242	118.(DL+LL)	0	-4170.8354
BASEMENT-1	C243	118.(DL+LL)	0	-621.2016
BASEMENT-1	C244	118.(DL+LL)	0	-1545.7068
BASEMENT-1	C245	118.(DL+LL)	0	-937.5619
BASEMENT-1	C246	118.(DL+LL)	0	-4086.2879
BASEMENT-1	C247	118.(DL+LL)	0	-1512.0672
BASEMENT-1	C248	118.(DL+LL)	0	-899.9863
BASEMENT-1	C249	118.(DL+LL)	0	-2769.2105
BASEMENT-1	C250	118.(DL+LL)	0	-3030.3762
BASEMENT-1	C251	118.(DL+LL)	0	-3063.8019
BASEMENT-1	C252	118.(DL+LL)	0	-3344.2947

TABLE: Pier Forces				
Story	Pier	Load Case/Combo	Location	P
				kN
BASEMENT-1	P1	118.(DL+LL)	Bottom	-8884.5151
BASEMENT-1	P2	118.(DL+LL)	Bottom	-12598.1341
BASEMENT-1	P3	118.(DL+LL)	Bottom	-4677.2688
BASEMENT-1	P4	118.(DL+LL)	Bottom	-13085.0968
BASEMENT-1	P5	118.(DL+LL)	Bottom	-10724.5823
BASEMENT-1	P6	118.(DL+LL)	Bottom	-8228.7561
BASEMENT-1	P7	118.(DL+LL)	Bottom	-9782.2916
BASEMENT-1	P8	118.(DL+LL)	Bottom	-7566.37
BASEMENT-1	P9	118.(DL+LL)	Bottom	-10459.5722
BASEMENT-1	P10	118.(DL+LL)	Bottom	-6548.1901
BASEMENT-1	P11	118.(DL+LL)	Bottom	-8255.3537
BASEMENT-1	P12	118.(DL+LL)	Bottom	-11359.4269
BASEMENT-1	P13	118.(DL+LL)	Bottom	-7170.3504
BASEMENT-1	P14	118.(DL+LL)	Bottom	-9694.3659
BASEMENT-1	P15	118.(DL+LL)	Bottom	-10206.9426
BASEMENT-1	P16	118.(DL+LL)	Bottom	-5394.2453
BASEMENT-1	P17	118.(DL+LL)	Bottom	-5544.3071
BASEMENT-1	P18	118.(DL+LL)	Bottom	-9892.2577
BASEMENT-1	P19	118.(DL+LL)	Bottom	-13053.6111
BASEMENT-1	P20	118.(DL+LL)	Bottom	-11559.9995
BASEMENT-1	P22	118.(DL+LL)	Bottom	-12222.2478
BASEMENT-1	P23	118.(DL+LL)	Bottom	-11316.9126
BASEMENT-1	P24	118.(DL+LL)	Bottom	-9991.0147
BASEMENT-1	P25	118.(DL+LL)	Bottom	-9331.6306
BASEMENT-1	P26	118.(DL+LL)	Bottom	-4185.7066
BASEMENT-1	P27	118.(DL+LL)	Bottom	-10828.9519
BASEMENT-1	P28	118.(DL+LL)	Bottom	-3912.4662
BASEMENT-1	P29	118.(DL+LL)	Bottom	-12342.3096
BASEMENT-1	P32	118.(DL+LL)	Bottom	-4270.8987
BASEMENT-1	P33	118.(DL+LL)	Bottom	-2975.615
BASEMENT-1	P34	118.(DL+LL)	Bottom	-10031.8059
BASEMENT-1	P35	118.(DL+LL)	Bottom	-9700.8524
BASEMENT-1	P36	118.(DL+LL)	Bottom	-7510.7986
BASEMENT-1	P37	118.(DL+LL)	Bottom	-5798.0783
BASEMENT-1	P38	118.(DL+LL)	Bottom	-6053.6103
BASEMENT-1	P39	118.(DL+LL)	Bottom	-3796.0647
BASEMENT-1	P40	118.(DL+LL)	Bottom	-5432.919
BASEMENT-1	P41	118.(DL+LL)	Bottom	-6277.5182
BASEMENT-1	P42	118.(DL+LL)	Bottom	-5996.2195
BASEMENT-1	P45	118.(DL+LL)	Bottom	-6326.76
BASEMENT-1	P46	118.(DL+LL)	Bottom	-6928.7218
BASEMENT-1	P47	118.(DL+LL)	Bottom	-14896.2379
BASEMENT-1	P48	118.(DL+LL)	Bottom	-7055.7494
BASEMENT-1	P49	118.(DL+LL)	Bottom	-6413.518

BASEMENT-1	P50	118.(DL+LL)	Bottom	-9123.1992
BASEMENT-1	P51	118.(DL+LL)	Bottom	-18949.0905
BASEMENT-1	P52	118.(DL+LL)	Bottom	-13079.0232
BASEMENT-1	P53	118.(DL+LL)	Bottom	-8255.1987
BASEMENT-1	P55	118.(DL+LL)	Bottom	-5280.2686
BASEMENT-1	P56	118.(DL+LL)	Bottom	-4962.6436
BASEMENT-1	P58	118.(DL+LL)	Bottom	-11745.4401
BASEMENT-1	P59	118.(DL+LL)	Bottom	-3818.4729
BASEMENT-1	P60	118.(DL+LL)	Bottom	-4255.8575
BASEMENT-1	P61	118.(DL+LL)	Bottom	-12983.822
BASEMENT-1	P62	118.(DL+LL)	Bottom	-9568.5736
BASEMENT-1	P63	118.(DL+LL)	Bottom	-9258.6664
BASEMENT-1	P64	118.(DL+LL)	Bottom	-2641.3549
BASEMENT-1	P65	118.(DL+LL)	Bottom	-4201.2633
BASEMENT-1	P66	118.(DL+LL)	Bottom	-3805.3201
BASEMENT-1	P67	118.(DL+LL)	Bottom	-3966.9853
BASEMENT-1	P68	118.(DL+LL)	Bottom	-2685.351
BASEMENT-1	P69	118.(DL+LL)	Bottom	-2866.4085
BASEMENT-1	P70	118.(DL+LL)	Bottom	-1943.2913
BASEMENT-1	P71	118.(DL+LL)	Bottom	-2469.2909
BASEMENT-1	P72	118.(DL+LL)	Bottom	-10640.9349
BASEMENT-1	P73	118.(DL+LL)	Bottom	-3603.8269
BASEMENT-1	P74	118.(DL+LL)	Bottom	-2260.5325
BASEMENT-1	P75	118.(DL+LL)	Bottom	-3378.0658
BASEMENT-1	P76	118.(DL+LL)	Bottom	-4808.9002
BASEMENT-1	P77	118.(DL+LL)	Bottom	-4961.7887
BASEMENT-1	P78	118.(DL+LL)	Bottom	-3979.5235
BASEMENT-1	P79	118.(DL+LL)	Bottom	-4517.9506
BASEMENT-1	P80	118.(DL+LL)	Bottom	-2736.834
BASEMENT-1	P2A	118.(DL+LL)	Bottom	-4282.3491
BASEMENT-1	P5A	118.(DL+LL)	Bottom	-4161.7853
BASEMENT-1	P6A	118.(DL+LL)	Bottom	-3099.6412
BASEMENT-1	P12A	118.(DL+LL)	Bottom	-6012.4853
BASEMENT-1	P81	118.(DL+LL)	Bottom	-9580.1379
BASEMENT-1	P82	118.(DL+LL)	Bottom	-8453.4641
BASEMENT-1	P83	118.(DL+LL)	Bottom	-9533.6876
BASEMENT-1	P84	118.(DL+LL)	Bottom	-8766.9564
BASEMENT-1	P85	118.(DL+LL)	Bottom	-12359.441
BASEMENT-1	P87	118.(DL+LL)	Bottom	-2787.0716
BASEMENT-1	P89	118.(DL+LL)	Bottom	-1897.6311
BASEMENT-1	P90	118.(DL+LL)	Bottom	-1440.2665
BASEMENT-1	P78A	118.(DL+LL)	Bottom	-2782.5268
BASEMENT-1	O1	118.(DL+LL)	Bottom	-11535.5221
BASEMENT-1	P89A	118.(DL+LL)	Bottom	-1526.5549
BASEMENT-1	P32A	118.(DL+LL)	Bottom	-1943.2258

BASEMENT-1	C253	118.(DL+LL)	0	-3422.0478
BASEMENT-1	C254	118.(DL+LL)	0	-2599.7439
BASEMENT-1	C255	118.(DL+LL)	0	-2207.4382
BASEMENT-1	C256	118.(DL+LL)	0	-5097.6018
BASEMENT-1	C257	118.(DL+LL)	0	-2096.3532
BASEMENT-1	C258	118.(DL+LL)	0	-1999.0705
BASEMENT-1	C259	118.(DL+LL)	0	-2029.9513
BASEMENT-1	C260	118.(DL+LL)	0	-1917.5567
BASEMENT-1	C261	118.(DL+LL)	0	-1125.4856
BASEMENT-1	C262	118.(DL+LL)	0	-345.5653
BASEMENT-1	C263	118.(DL+LL)	0	-415.1793
BASEMENT-1	C264	118.(DL+LL)	0	-109.5837
BASEMENT-1	C265	118.(DL+LL)	0	-95.6727
BASEMENT-1	C266	118.(DL+LL)	0	-1254.2535
BASEMENT-1	C267	118.(DL+LL)	0	-1426.5668
BASEMENT-1	C268	118.(DL+LL)	0	-1417.6959
BASEMENT-1	C5	118.(DL+LL)	0	-3837.3765
BASEMENT-1	C6	118.(DL+LL)	0	-3743.0914
BASEMENT-1	C3	118.(DL+LL)	0	-2574.3817
BASEMENT-1	C11	118.(DL+LL)	0	-2776.4122
BASEMENT-1	C13	118.(DL+LL)	0	-3283.9616
BASEMENT-1	C7	118.(DL+LL)	0	-4335.6686
BASEMENT-1	C1	118.(DL+LL)	0	-2624.3494
BASEMENT-1	C2	118.(DL+LL)	0	-2129.4701
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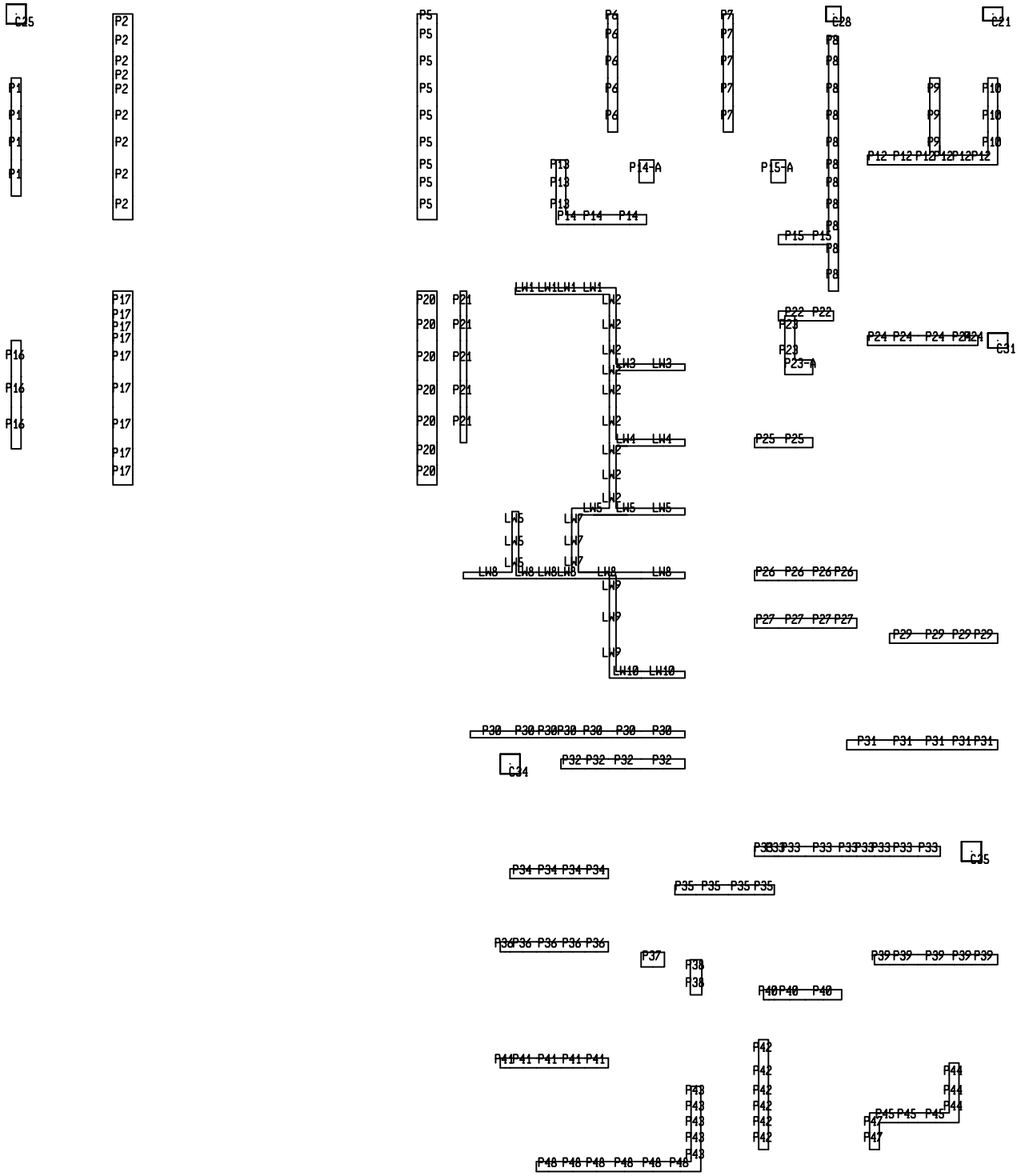
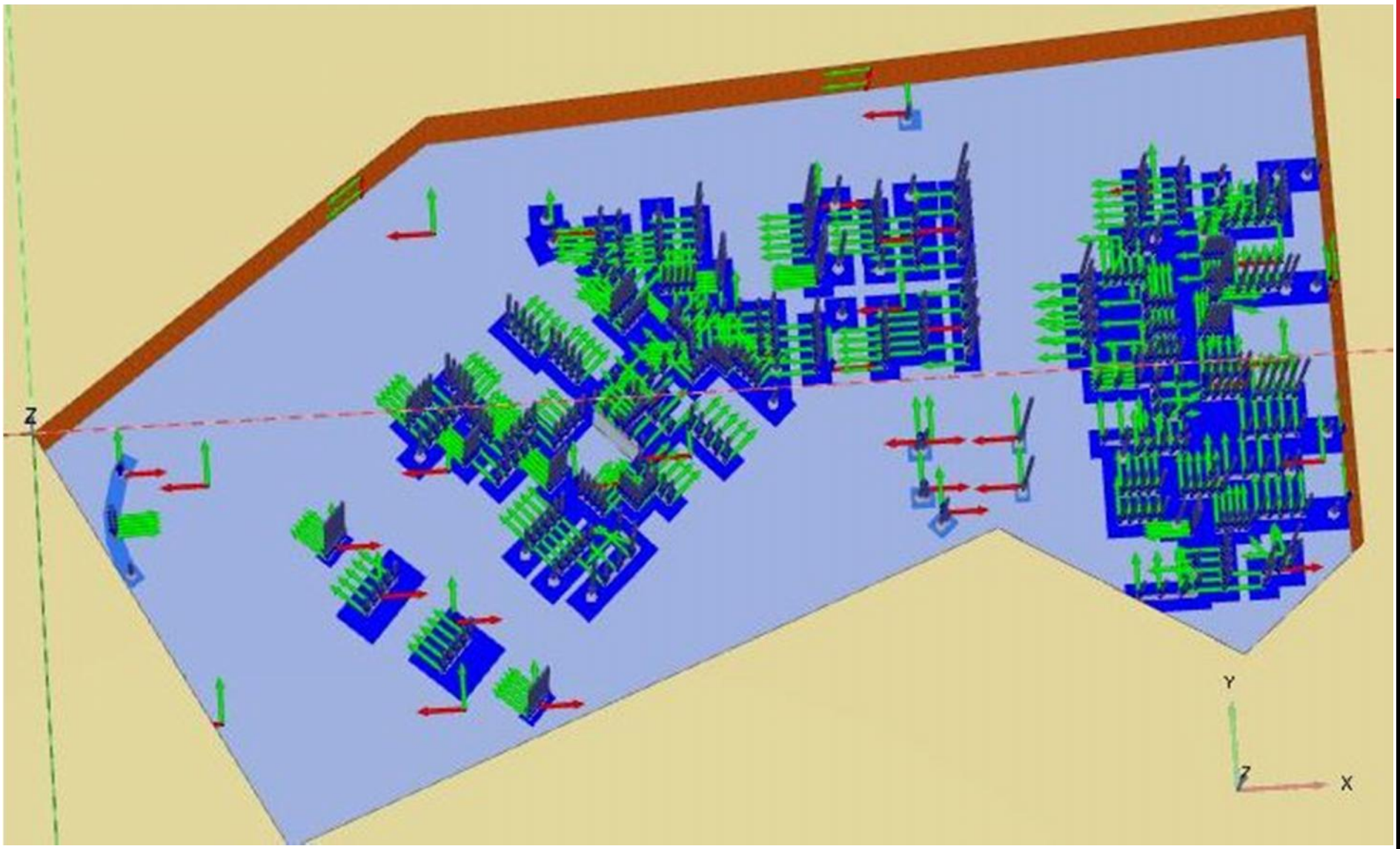


TABLE: Column Forces				
Story	Column	Load Case/Combo	Station	P
			m	kN
BASEMENT 1	C1	118.(DL+LL)	0	-2676.6868
BASEMENT 1	C2	118.(DL+LL)	0	-775.1956
BASEMENT 1	C3	118.(DL+LL)	0	-1192.9003
BASEMENT 1	C4	118.(DL+LL)	0	-2583.8411
BASEMENT 1	C5	118.(DL+LL)	0	-1691.1515
BASEMENT 1	C6	118.(DL+LL)	0	-5250.957
BASEMENT 1	C7	118.(DL+LL)	0	-2148.9683
BASEMENT 1	C8	118.(DL+LL)	0	-1562.2712
BASEMENT 1	C9	118.(DL+LL)	0	-1481.7244
BASEMENT 1	C10	118.(DL+LL)	0	-1548.962
BASEMENT 1	C11	118.(DL+LL)	0	-5473.4899
BASEMENT 1	C12	118.(DL+LL)	0	-1472.422
BASEMENT 1	C13	118.(DL+LL)	0	-3107.952
BASEMENT 1	C14	118.(DL+LL)	0	-6922.3598
BASEMENT 1	C15	118.(DL+LL)	0	-1189.9509
BASEMENT 1	C17	118.(DL+LL)	0	-2050.2909
BASEMENT 1	C21	118.(DL+LL)	0	-1753.5624
BASEMENT 1	C22	118.(DL+LL)	0	-1292.2062
BASEMENT 1	C23	118.(DL+LL)	0	-2089.2721
BASEMENT 1	C24	118.(DL+LL)	0	-4804.1199
BASEMENT 1	C26	118.(DL+LL)	0	-514.5126
BASEMENT 1	C27	118.(DL+LL)	0	-1398.5249
BASEMENT 1	C29	118.(DL+LL)	0	-1930.4936
BASEMENT 1	C30	118.(DL+LL)	0	-1820.296
BASEMENT 1	C32	118.(DL+LL)	0	-674.1177
BASEMENT 1	C33	118.(DL+LL)	0	-630.4257
BASEMENT 1	C16	118.(DL+LL)	0	-503.9303
BASEMENT 1	C18	118.(DL+LL)	0	-307.8813
BASEMENT 1	C19	118.(DL+LL)	0	-3651.9181
BASEMENT 1	C20	118.(DL+LL)	0	-1932.365
BASEMENT 1	C25	118.(DL+LL)	0	-2828.2684
BASEMENT 1	C28	118.(DL+LL)	0	-1933.1206
BASEMENT 1	C31	118.(DL+LL)	0	-4882.5141
BASEMENT 1	C34	118.(DL+LL)	0	-4103.7764
BASEMENT 1	C35	118.(DL+LL)	0	-3339.4223

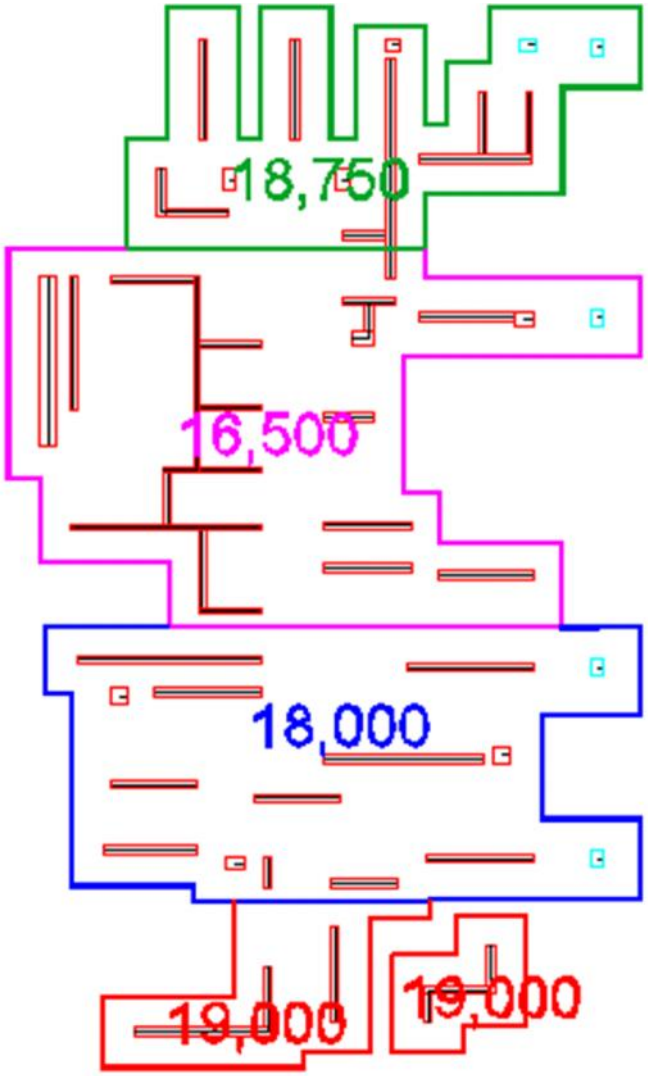
TABLE: Pier Forces				
Story	Pier	Load Case/Combo	Location	P
				kN
BASEMENT 1	P1	118.(DL+LL)	Bottom	-7716.2049
BASEMENT 1	P2	118.(DL+LL)	Bottom	-34226.8018
BASEMENT 1	P5	118.(DL+LL)	Bottom	-35638.4863
BASEMENT 1	P6	118.(DL+LL)	Bottom	-11397.0208
BASEMENT 1	P7	118.(DL+LL)	Bottom	-8902.3717
BASEMENT 1	P8	118.(DL+LL)	Bottom	-16553.9894
BASEMENT 1	P9	118.(DL+LL)	Bottom	-6512.914
BASEMENT 1	P10	118.(DL+LL)	Bottom	-6012.2067
BASEMENT 1	P12	118.(DL+LL)	Bottom	-10443.1705
BASEMENT 1	P13	118.(DL+LL)	Bottom	-5529.1386
BASEMENT 1	P14	118.(DL+LL)	Bottom	-7573.29
BASEMENT 1	P15	118.(DL+LL)	Bottom	-4005.5531
BASEMENT 1	P16	118.(DL+LL)	Bottom	-8371.4907
BASEMENT 1	P17	118.(DL+LL)	Bottom	-32804.2405
BASEMENT 1	P20	118.(DL+LL)	Bottom	-29649.3103
BASEMENT 1	P21	118.(DL+LL)	Bottom	-8367.5616
BASEMENT 1	P22	118.(DL+LL)	Bottom	-4526.7348
BASEMENT 1	P23	118.(DL+LL)	Bottom	-4472.4794
BASEMENT 1	P24	118.(DL+LL)	Bottom	-13578.6679
BASEMENT 1	P25	118.(DL+LL)	Bottom	-6634.0266
BASEMENT 1	P26	118.(DL+LL)	Bottom	-10309.0265
BASEMENT 1	P27	118.(DL+LL)	Bottom	-9647.9153
BASEMENT 1	P29	118.(DL+LL)	Bottom	-15062.86
BASEMENT 1	P30	118.(DL+LL)	Bottom	-11864.7694
BASEMENT 1	P31	118.(DL+LL)	Bottom	-11024.4579
BASEMENT 1	P32	118.(DL+LL)	Bottom	-8661.0132
BASEMENT 1	P33	118.(DL+LL)	Bottom	-14584.1893
BASEMENT 1	P34	118.(DL+LL)	Bottom	-8729.8013
BASEMENT 1	P35	118.(DL+LL)	Bottom	-8219.9271
BASEMENT 1	P36	118.(DL+LL)	Bottom	-10036.0499
BASEMENT 1	P37	118.(DL+LL)	Bottom	-3506.5565
BASEMENT 1	P38	118.(DL+LL)	Bottom	-3507.3381
BASEMENT 1	P39	118.(DL+LL)	Bottom	-10244.2895
BASEMENT 1	P40	118.(DL+LL)	Bottom	-6054.6773
BASEMENT 1	P41	118.(DL+LL)	Bottom	-11955.7487
BASEMENT 1	P42	118.(DL+LL)	Bottom	-9117.3926
BASEMENT 1	P43	118.(DL+LL)	Bottom	-4501.3467
BASEMENT 1	P44	118.(DL+LL)	Bottom	-5558.7441
BASEMENT 1	P45	118.(DL+LL)	Bottom	-8636.9745
BASEMENT 1	P47	118.(DL+LL)	Bottom	-3699.5491
BASEMENT 1	P48	118.(DL+LL)	Bottom	-11106.1909
BASEMENT 1	LW1	118.(DL+LL)	Bottom	-5337.0964
BASEMENT 1	LW2	118.(DL+LL)	Bottom	-11874.4572
BASEMENT 1	LW3	118.(DL+LL)	Bottom	-3586.2442

BASEMENT 1	LW4	118.(DL+LL)	Bottom	-3707.4379
BASEMENT 1	LW5	118.(DL+LL)	Bottom	-10096.095
BASEMENT 1	LW7	118.(DL+LL)	Bottom	-3791.2753
BASEMENT 1	LW8	118.(DL+LL)	Bottom	-13644.4471
BASEMENT 1	LW9	118.(DL+LL)	Bottom	-5911.3286
BASEMENT 1	LW10	118.(DL+LL)	Bottom	-4256.9553
BASEMENT 1	P23-A	118.(DL+LL)	Bottom	-3034.6853
BASEMENT 1	P14-A	118.(DL+LL)	Bottom	-3325.9039
BASEMENT 1	P15-A	118.(DL+LL)	Bottom	-2736.4253

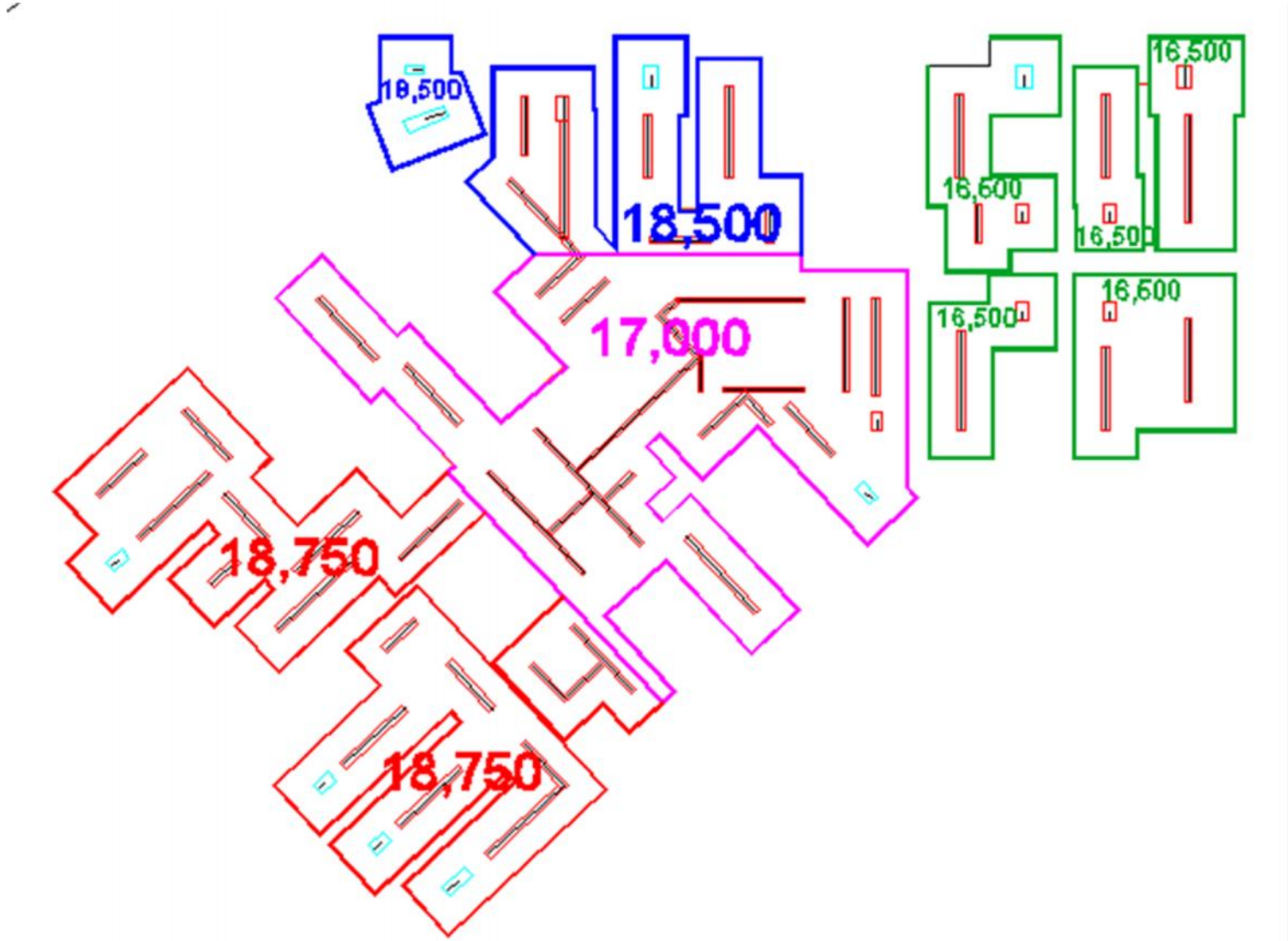
PLAXIS INPUT MODEL



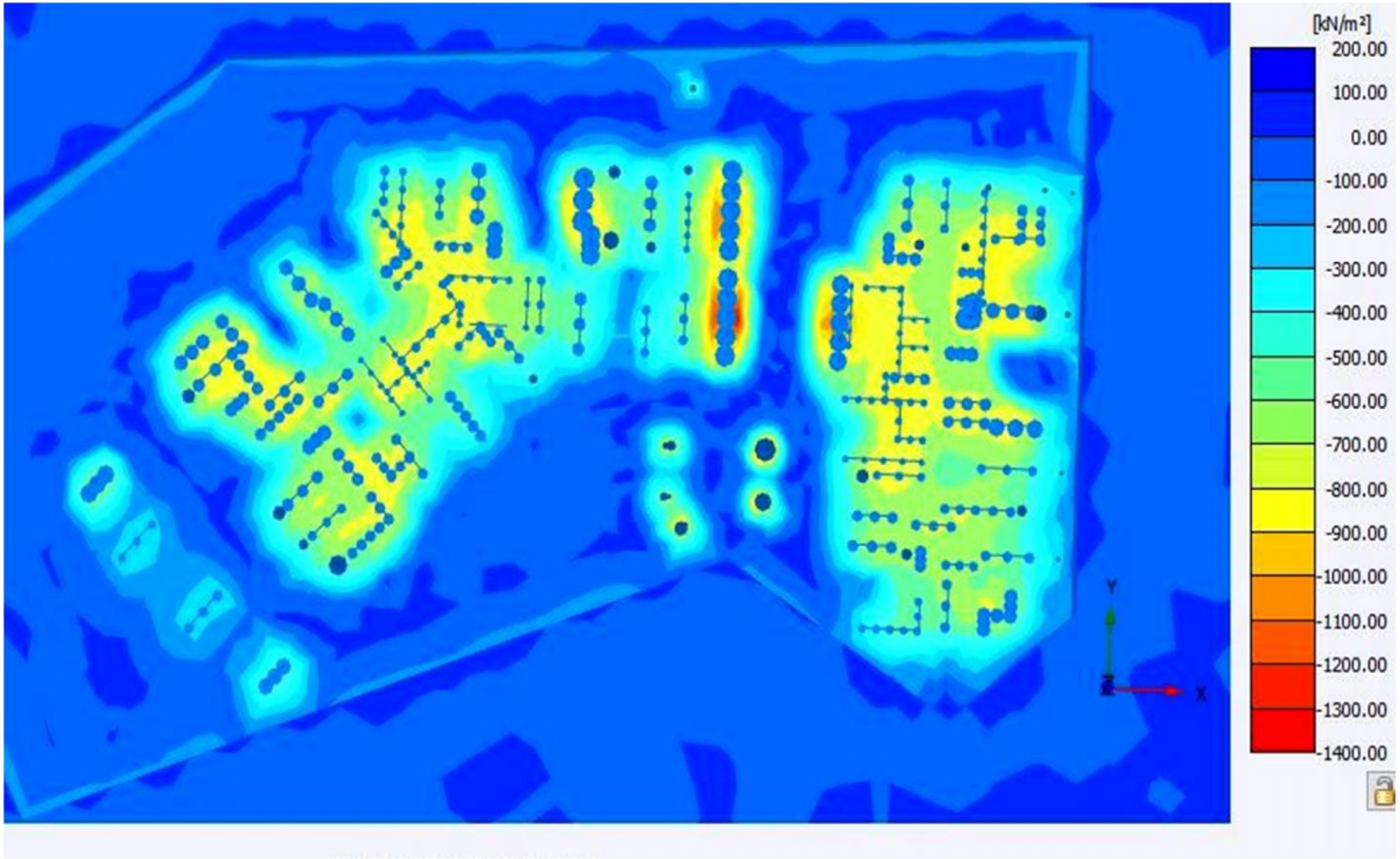
ZONED SPRING CONSTANTS (T/M3) – FENNILA BUILDING



ZONED SPRING CONSTANTS (T/M3) – EUCALYPITA BUILDING

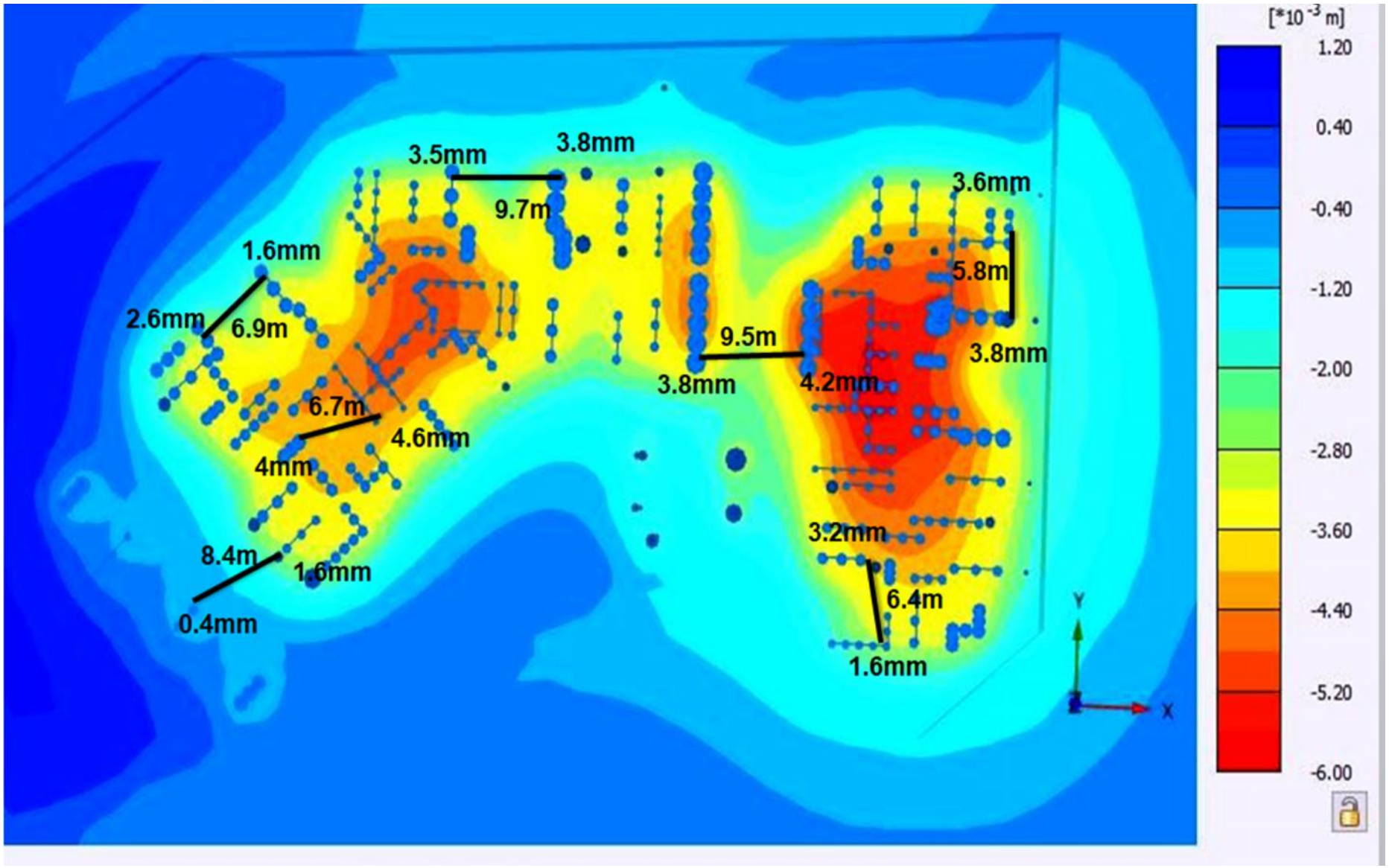


PRESSURE CONTOURS - (DL + LL CONDITION)



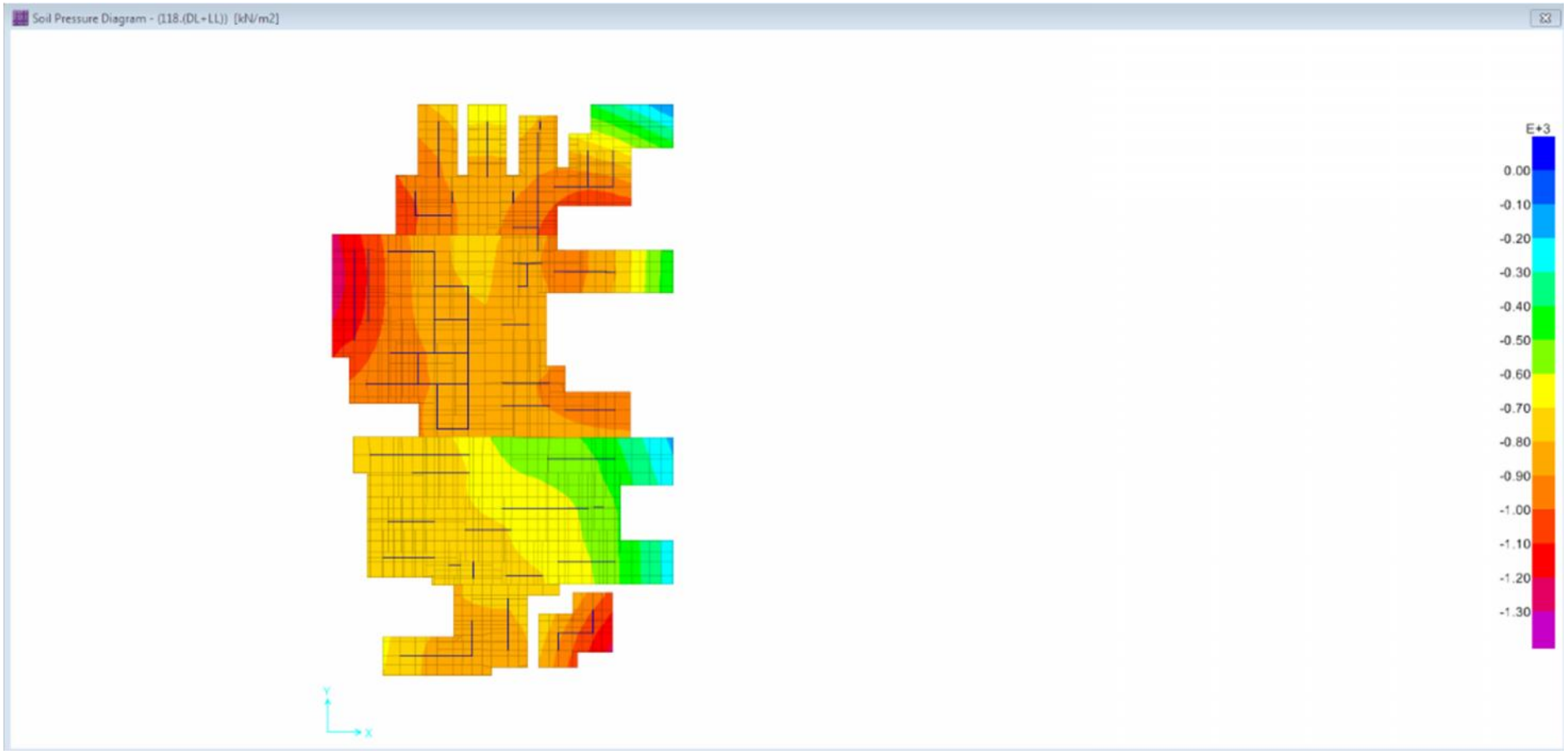
Maximum Pressure = 140 t/m2	Minimum Pressure = 20 t/m2

DIFFERENTIAL SETTLEMENT



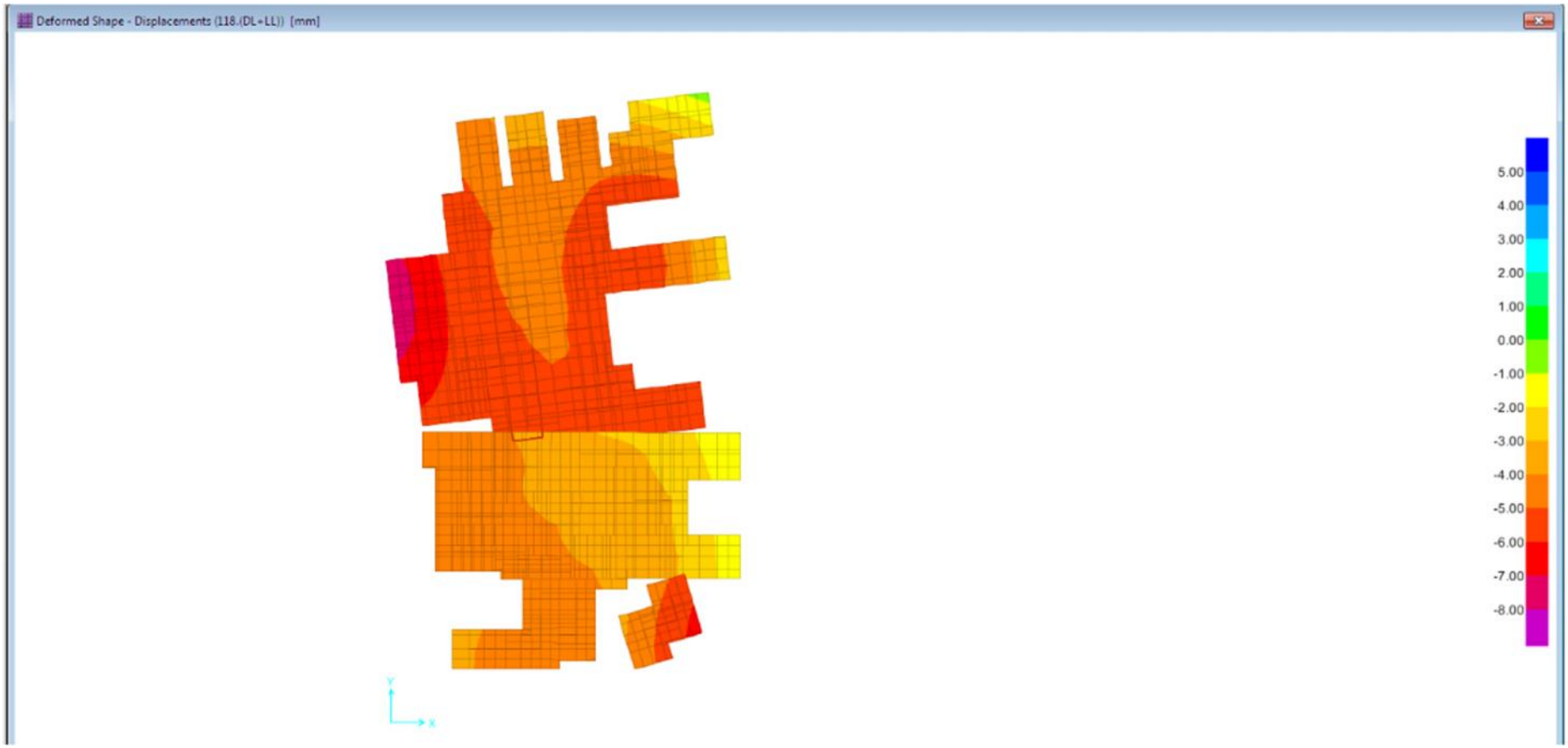
Differential Settlement = (6.4m/0.0016) = (L/4000) < (L/400)….Hence OK

PRESSURE CONTOURS - (DL + LL CONDITION)
FENNILA BUILDING



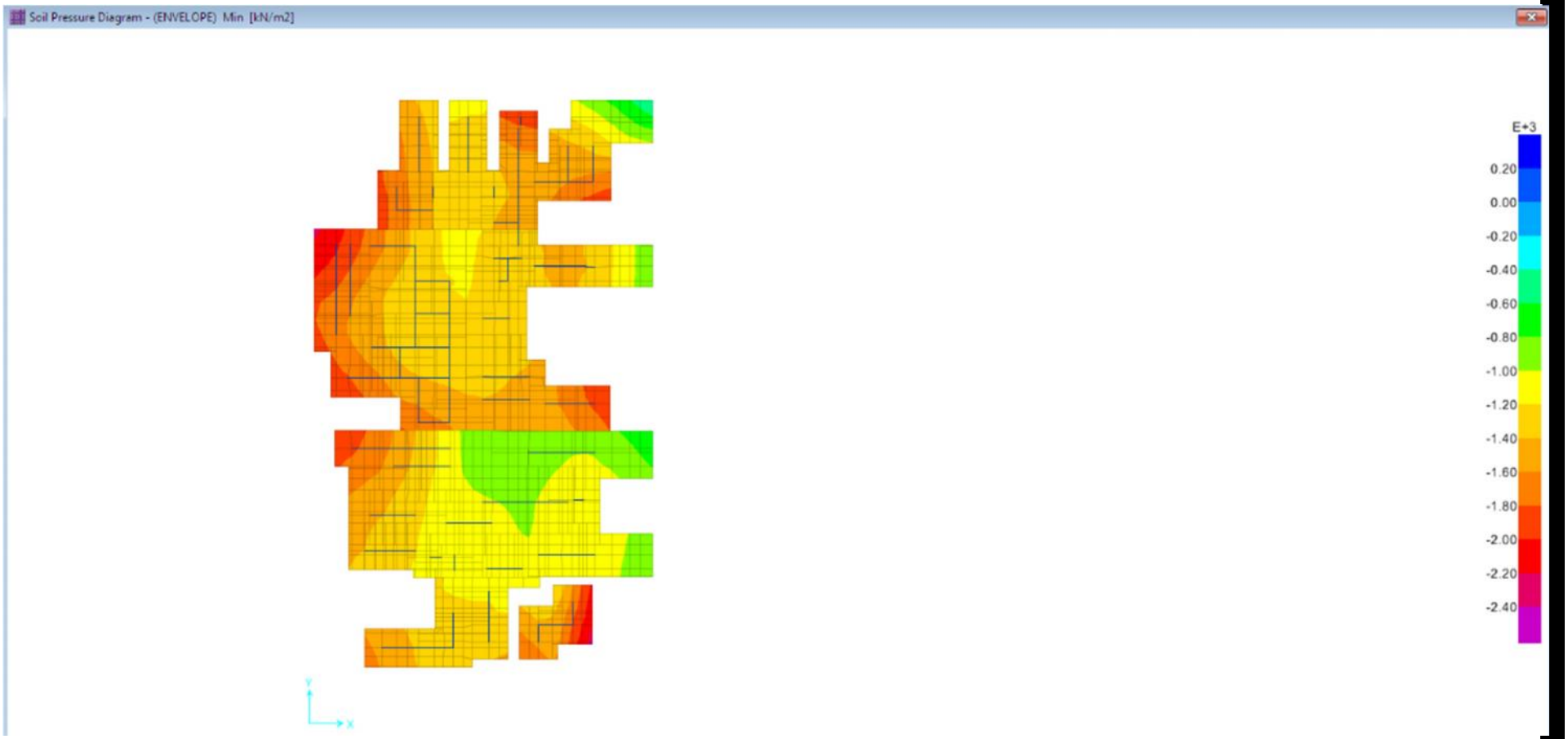
Maximum Pressure = 125 t/m2	Minimum Pressure = 10 t/m2

SETTLEMENT CONTOURS - (DL + LL CONDITION)
FENNILA BUILDING



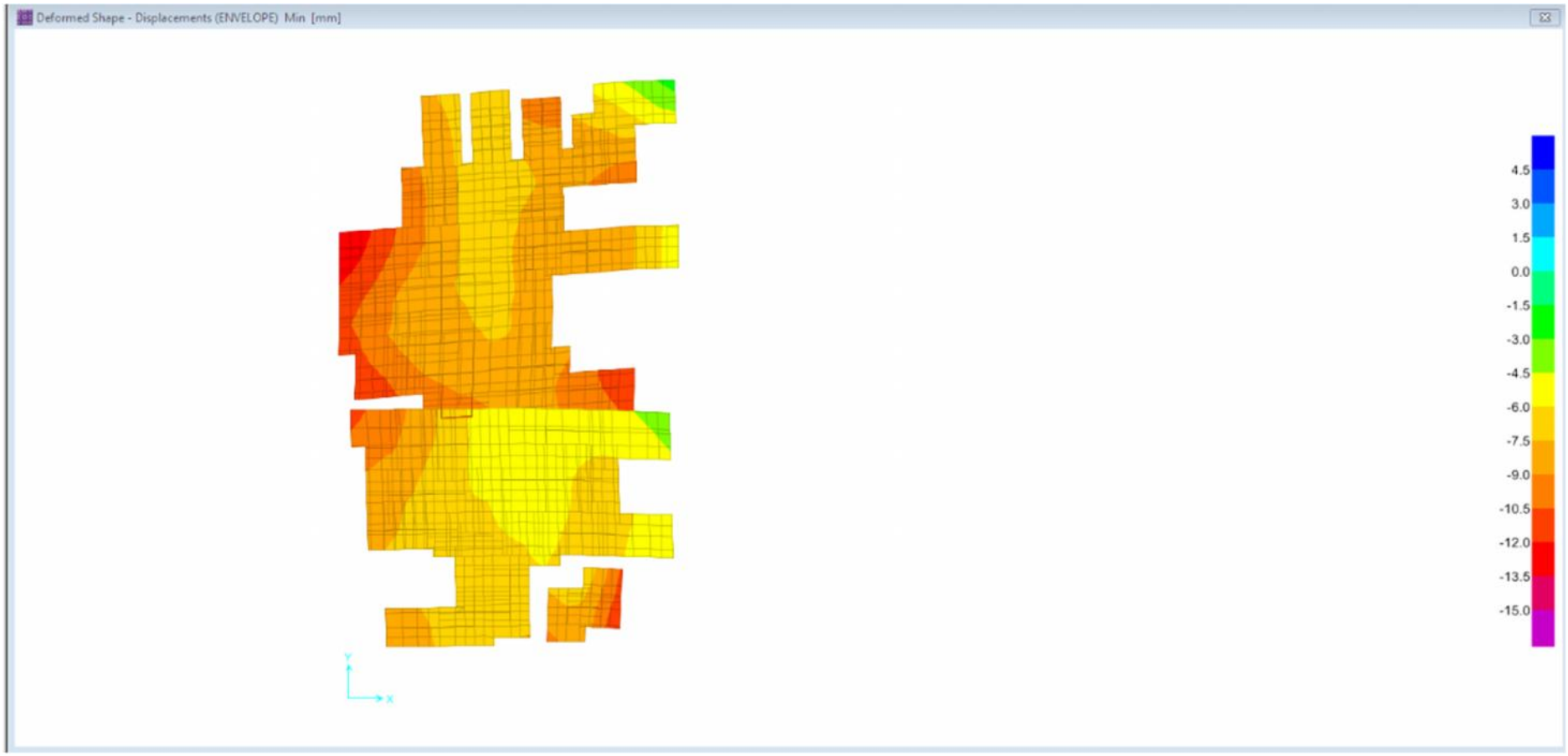
Maximum Settlement = 7.6 mm	Minimum Settlement = 1 mm

PRESSURE CONTOURS - (WIND CONDITION)
FENNILA BUILDING



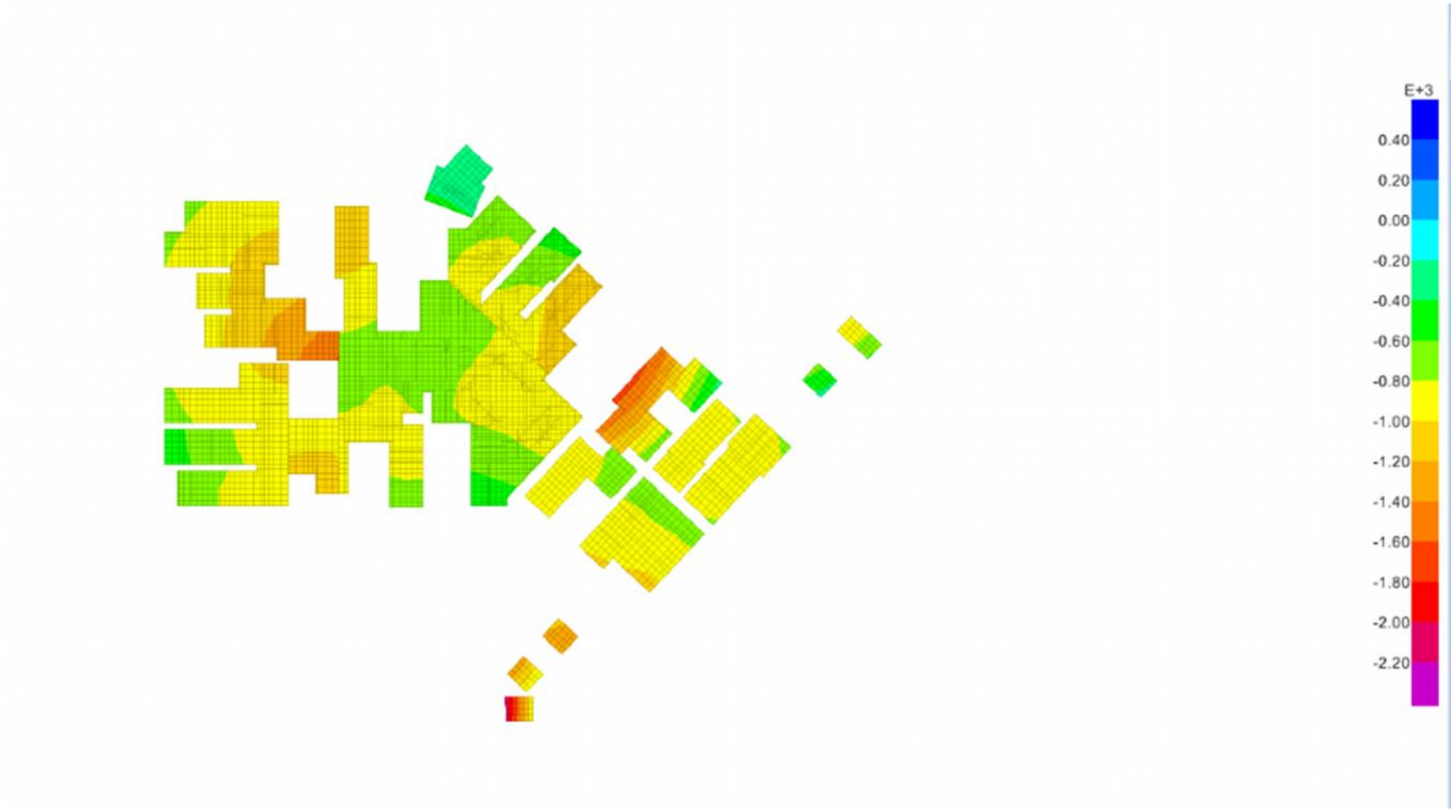
Maximum Pressure = 230 t/m2	Minimum Pressure = 40 t/m2

SETTLEMENT CONTOURS - (WIND CONDITION)
FENNILA BUILDING



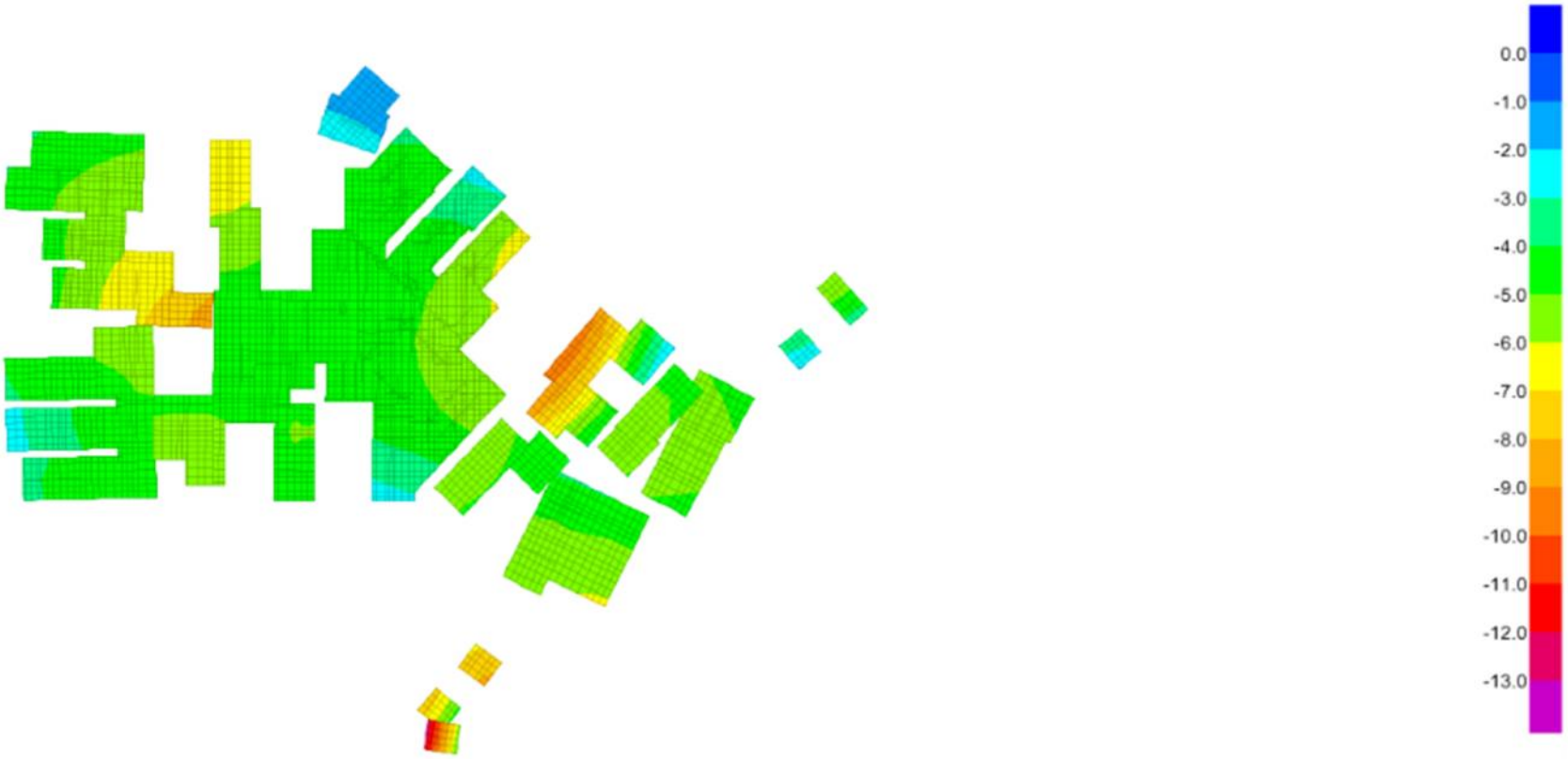
Maximum Settlement = 13.6 mm	Minimum Settlement = 3 mm

PRESSURE CONTOURS - (DL + LL CONDITION)
EUCALYPTIA BUILDING



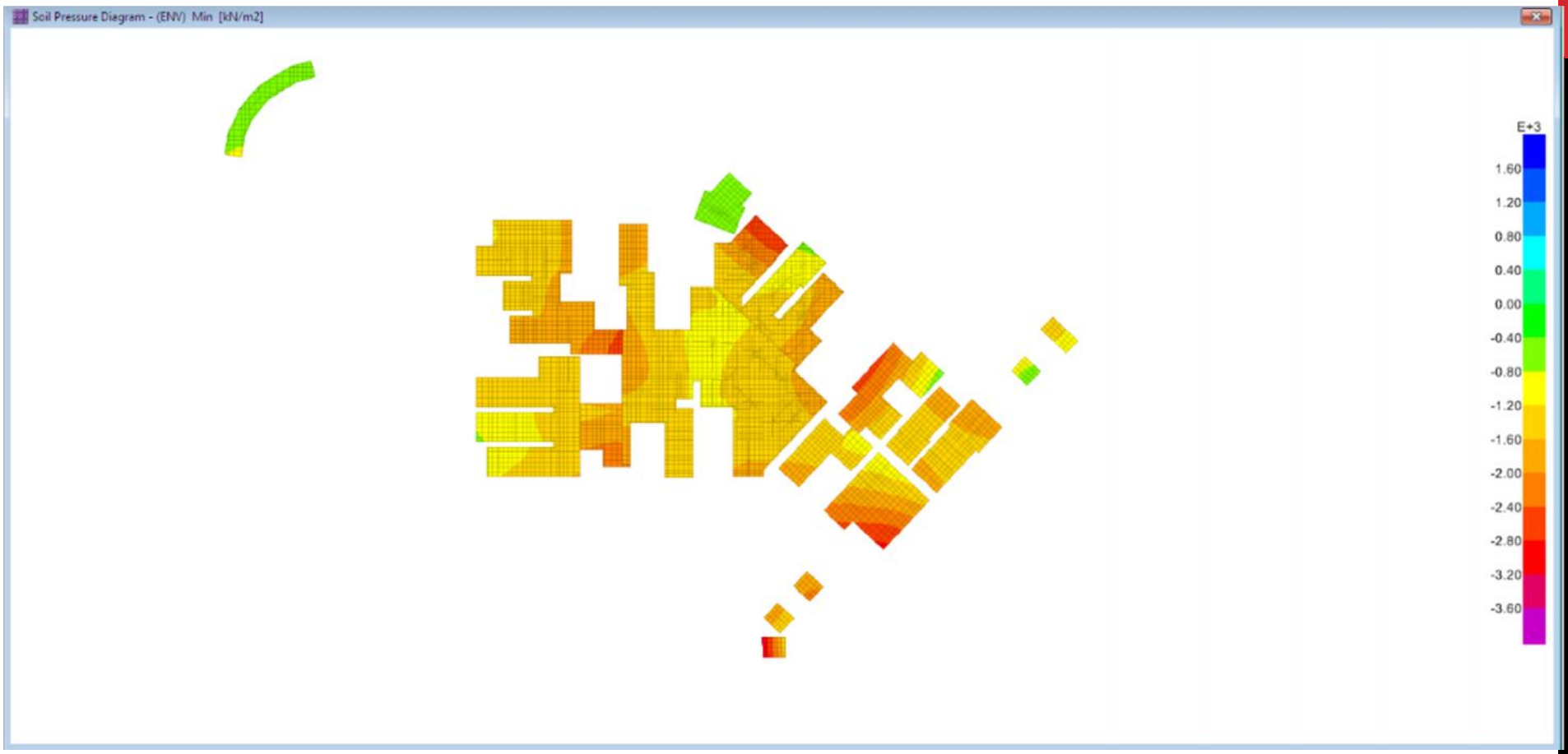
Maximum Pressure = 217 t/m2	Minimum Pressure = 20 t/m2

SETTLEMENT CONTOURS - (DL + LL CONDITION)
EUCALYPTIA BUILDING



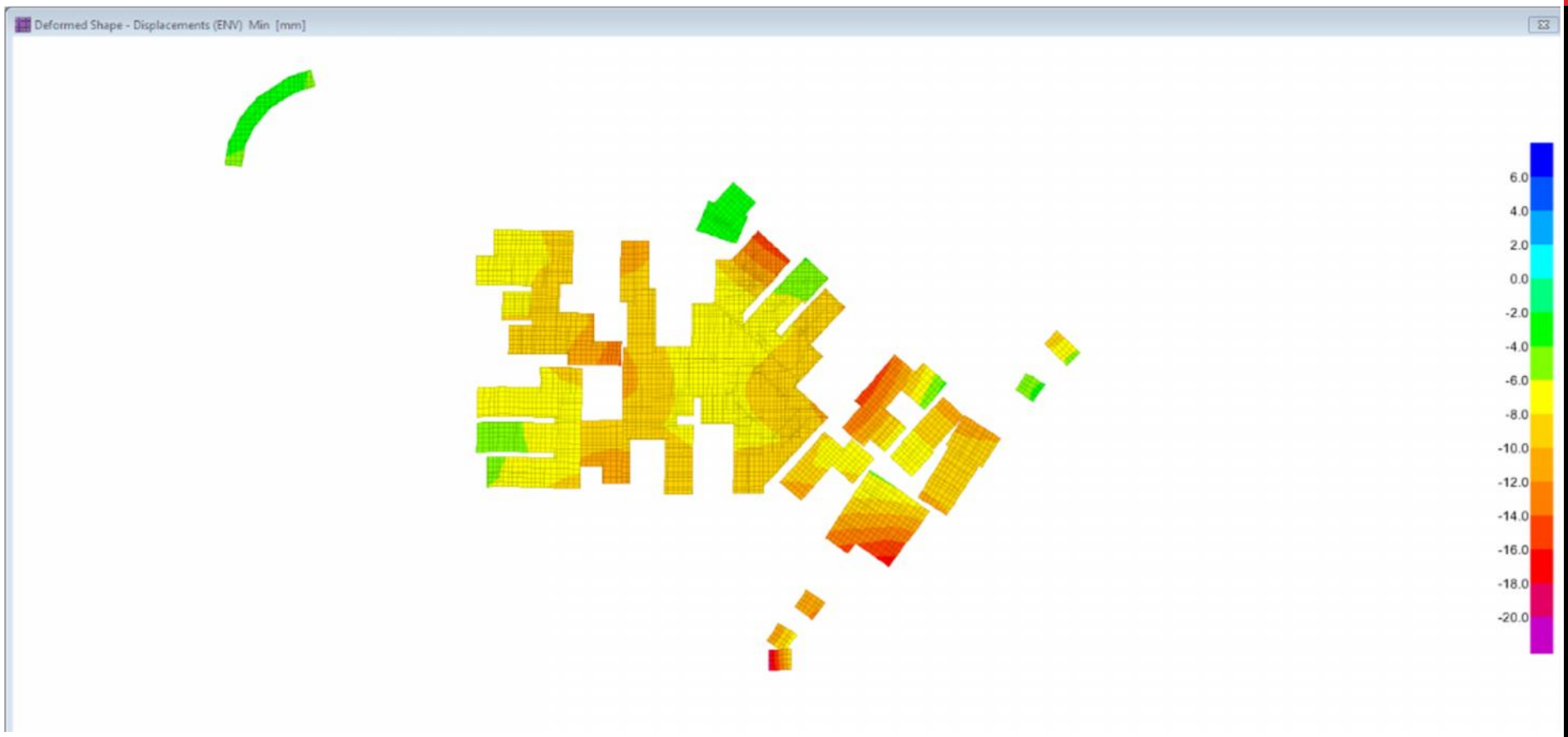
Maximum Settlement = 10 mm	Minimum Settlement = 1 mm

PRESSURE CONTOURS - (WIND CONDITION)
EUCALYPTIA BUILDING



Maximum Pressure = 335 t/m2	Minimum Pressure = 40 t/m2

SETTLEMENT CONTOURS - (WIND CONDITION)
EUCALYPTIA BUILDING



Maximum Settlement = 20 mm	Minimum Settlement = 2 mm

HYDRO-STATIC UPLIFT CALCULATIONS

CALCULATIONS FOR UPLIFT PRESSURE

TOTAL HEIGHT UP TO BASEMENT BTM RAFT	=	10.50m
WATER TABLE CONSIDERED BELOW GROUND	=	0.00m
UPLIFT PRESSURE	=	105.00 KN/M2

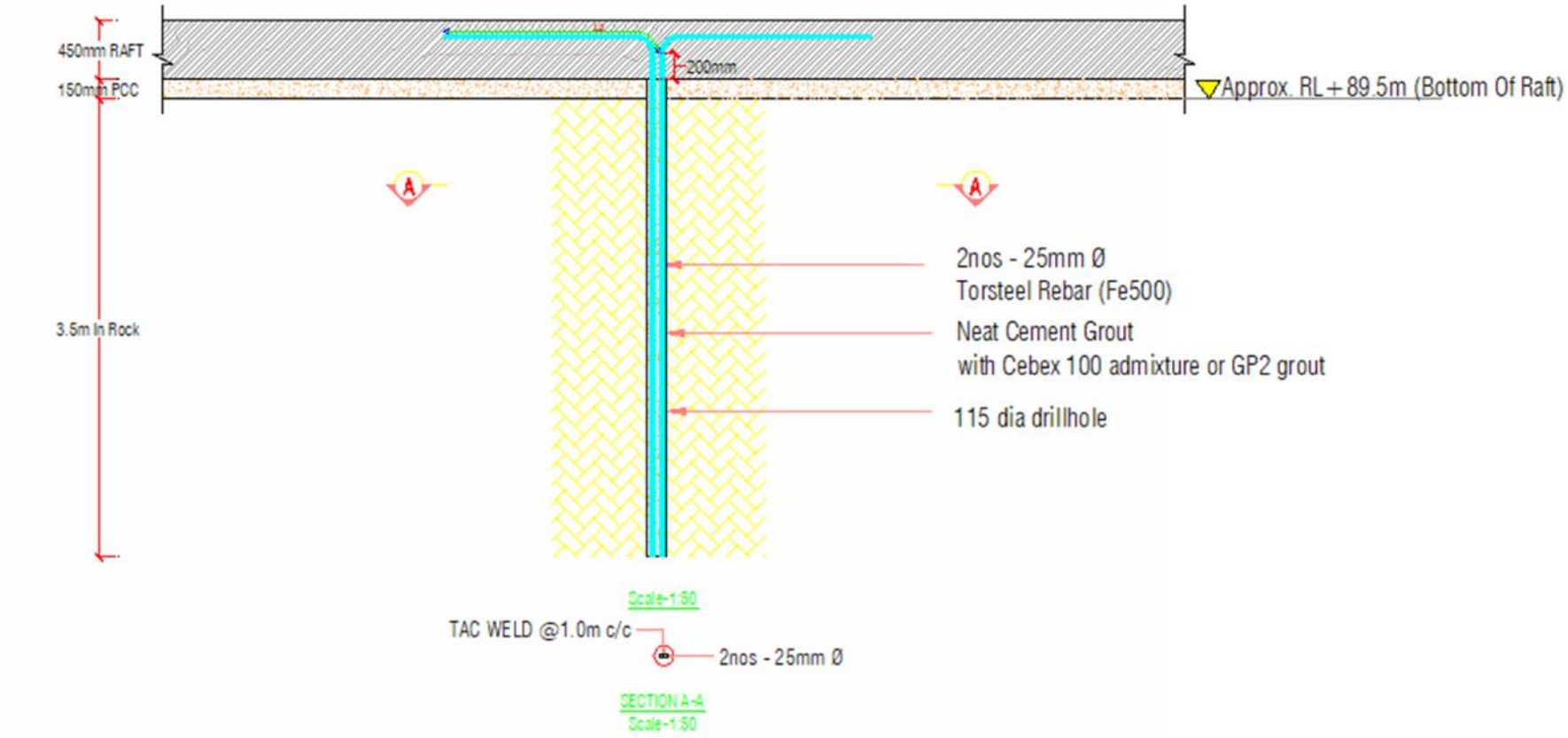
TOTAL BALANCING LOAD

SELF WEIGHT OF RAFT = 0.45x25	=	11.25 KN/M2
WEIGHT OF ALL-IN-ONE AGGREGATE FILLING = 1.85x20	=	37.00 KN/M2
TOTAL BALANCING PRESSURE	=	48.25 KN/M2
DESIGN UPLIFT PRESSURE	=	56.75 KN/M2

Anchor Spacing – 2m x 2m

Anchor Capacity – 56.75 x (2m x 2m) = 227 kN say 25 tons

PASSIVE ROCK ANCHOR DETAILS – 25 TONS



PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

Road

Road

Road

Road

20 Mts. Wide Road

Towards Khedwa Circle

20 Mts. Wide Road

Entry Gate 1

+ 101.615 Mts.

Entry Gate 2

Exit

Ramp

Gate

Compound Wall

Amenity Open Space

Compound Wall

Compound Wall

Compound Wall

Compound Wall

Compound Wall

Compound Wall

Basement Plan

+ 101.765 Mts.

Unit - 5

zone-3

zone-2

zone-1

Unit - 4

zone-4

zone-5

300mm Filling

Ramp Up To Basement Level

Ramp Up To Ground Level

STP

Ramp Up To BASEMENT 2

Ramp Up To BASEMENT 1

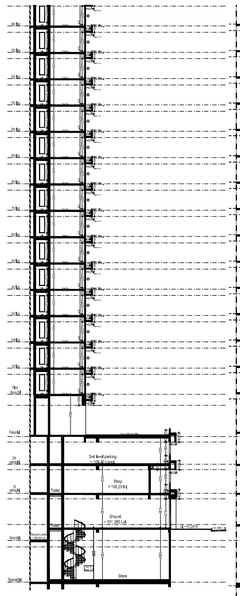
Ramp Up To GROUND LVL

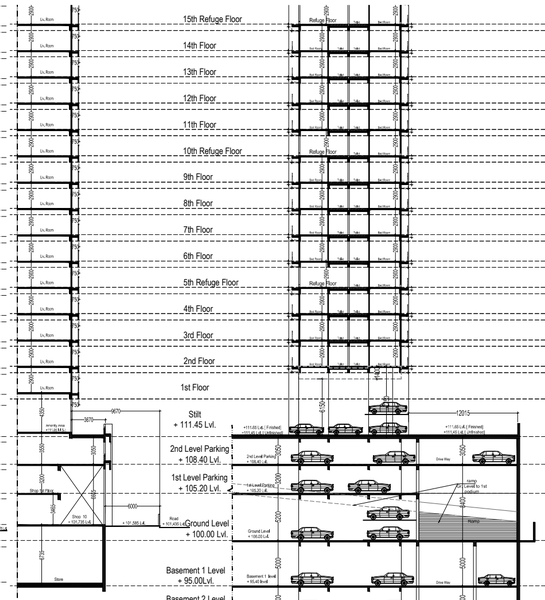
Ramp Up To 1ST FLR

Pump Room Below Basement

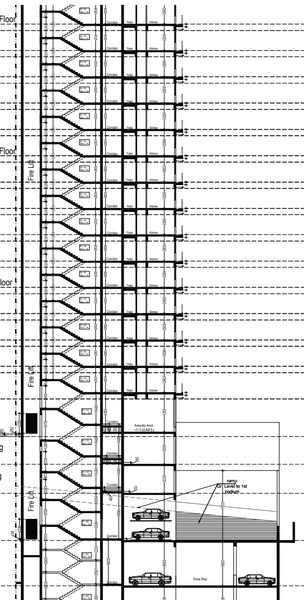
Pump Room Below Basement

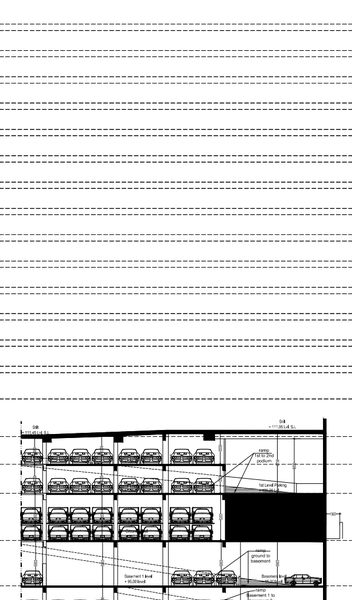
Pump Room Below Basement

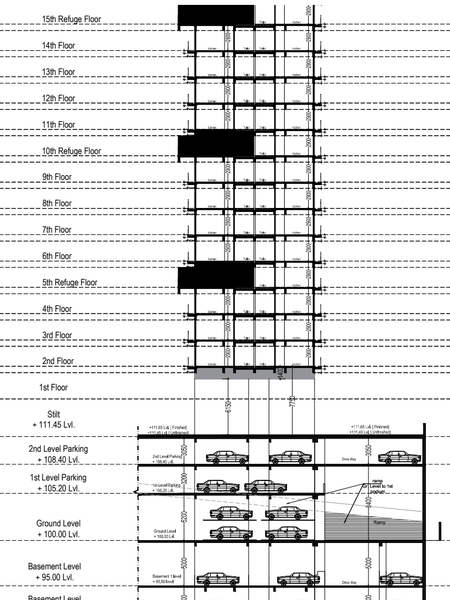

Section G-G


15th Refuge Floor
14th Floor
13th Floor
12th Floor
11th Floor
10th Refuge Floor
9th Floor
8th Floor
7th Floor
6th Floor
5th Refuge Floor
4th Floor
3rd Floor
2nd Floor
1st Floor
Stilt
+ 111.45 Lvl.
2nd Level Parking
+ 108.40 Lvl.
1st Level Parking
+ 105.20 Lvl.
Ground Level
+ 100.00 Lvl.
Basement 1 Level
+ 95.00 Lvl.
Basement 2 Level
+ 91.80 Lvl.
Section A-A

15th Refuge Floor
14th Floor
13th Floor
12th Floor
11th Floor
10th Refuge Floor
9th Floor
8th Floor
7th Floor
6th Floor
5th Refuge Floor
4th Floor
3rd Floor
2nd Floor
1st Floor
Stilt
+ 111.45 Lvl.
2nd Level Parking
+ 108.40 Lvl.
1st Level Parking
+ 105.20 Lvl.
Ground Level
+ 100.00 Lvl.
Basement 1 Level
+ 95.00 Lvl.
Basement 2 Level
+ 91.80 Lvl.
Section B-B


15th Refuge Floor
14th Floor
13th Floor
12th Floor
11th Floor
10th Refuge Floor
9th Floor
8th Floor
7th Floor
6th Floor
5th Refuge Floor
4th Floor
3rd Floor
2nd Floor
1st Floor
Stilt
+ 111.45 Lvl.
2nd Level Parking
+ 108.40 Lvl.
1st Level Parking
+ 105.20 Lvl.
Ground Level
+ 100.00 Lvl.
Basement Level
+ 95.00 Lvl.
Basement Level
+ 91.80 Lvl.
Section C-C

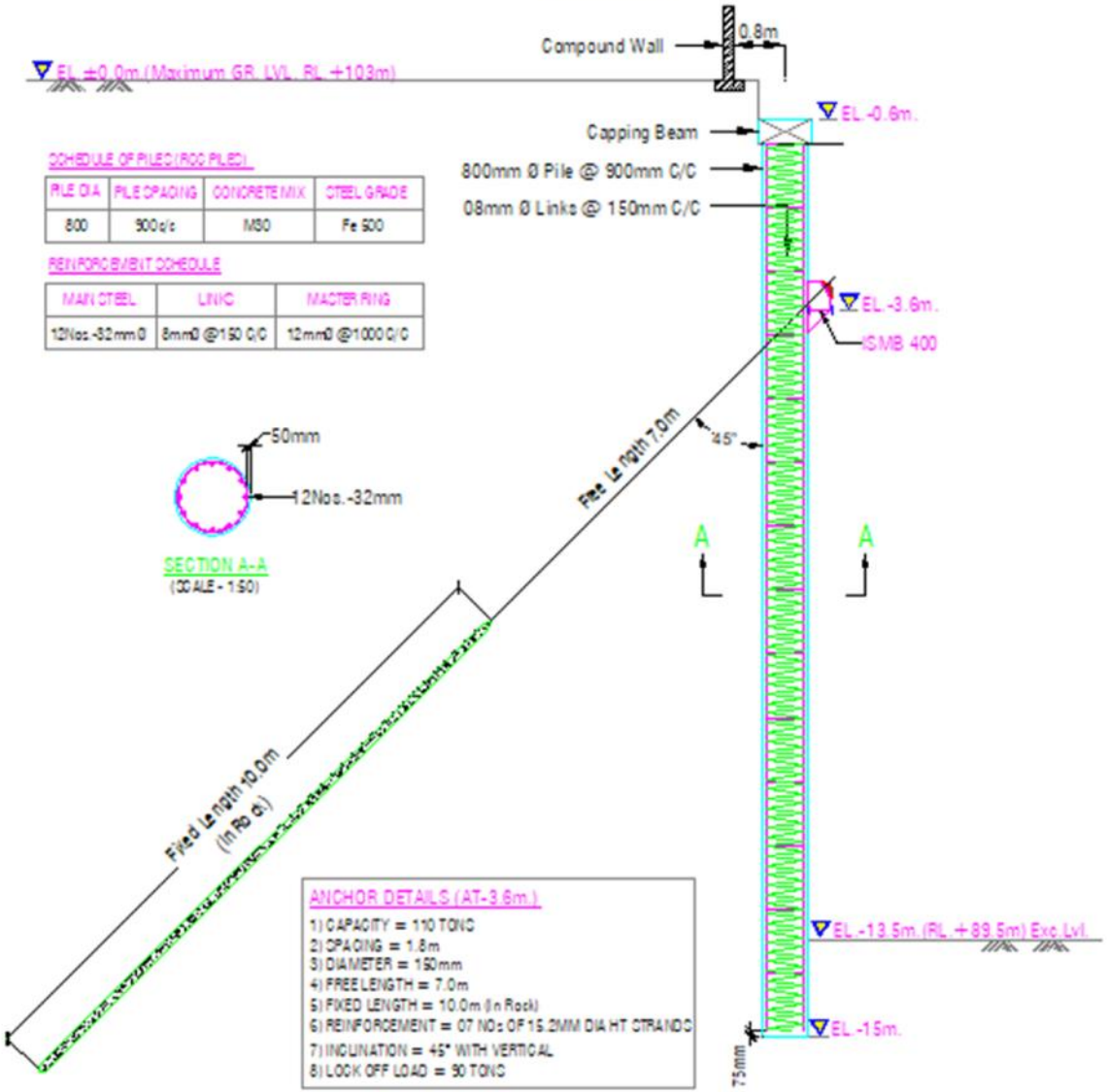

Section D-D


15th Refuge Floor
14th Floor
13th Floor
12th Floor
11th Floor
10th Refuge Floor
9th Floor
8th Floor
7th Floor
6th Floor
5th Refuge Floor
4th Floor
3rd Floor
2nd Floor
1st Floor
Stilt
+ 111.45 Lvl.
2nd Level Parking
+ 108.40 Lvl.
1st Level Parking
+ 105.20 Lvl.
Ground Level
+ 100.00 Lvl.
Basement Level
+ 95.00 Lvl.
Basement Level
+ 91.80 Lvl.
Section E-E

PILE SHORING LAYOUT



ZONE-1



SCHEDULE OF PILES (ROCK PILES)

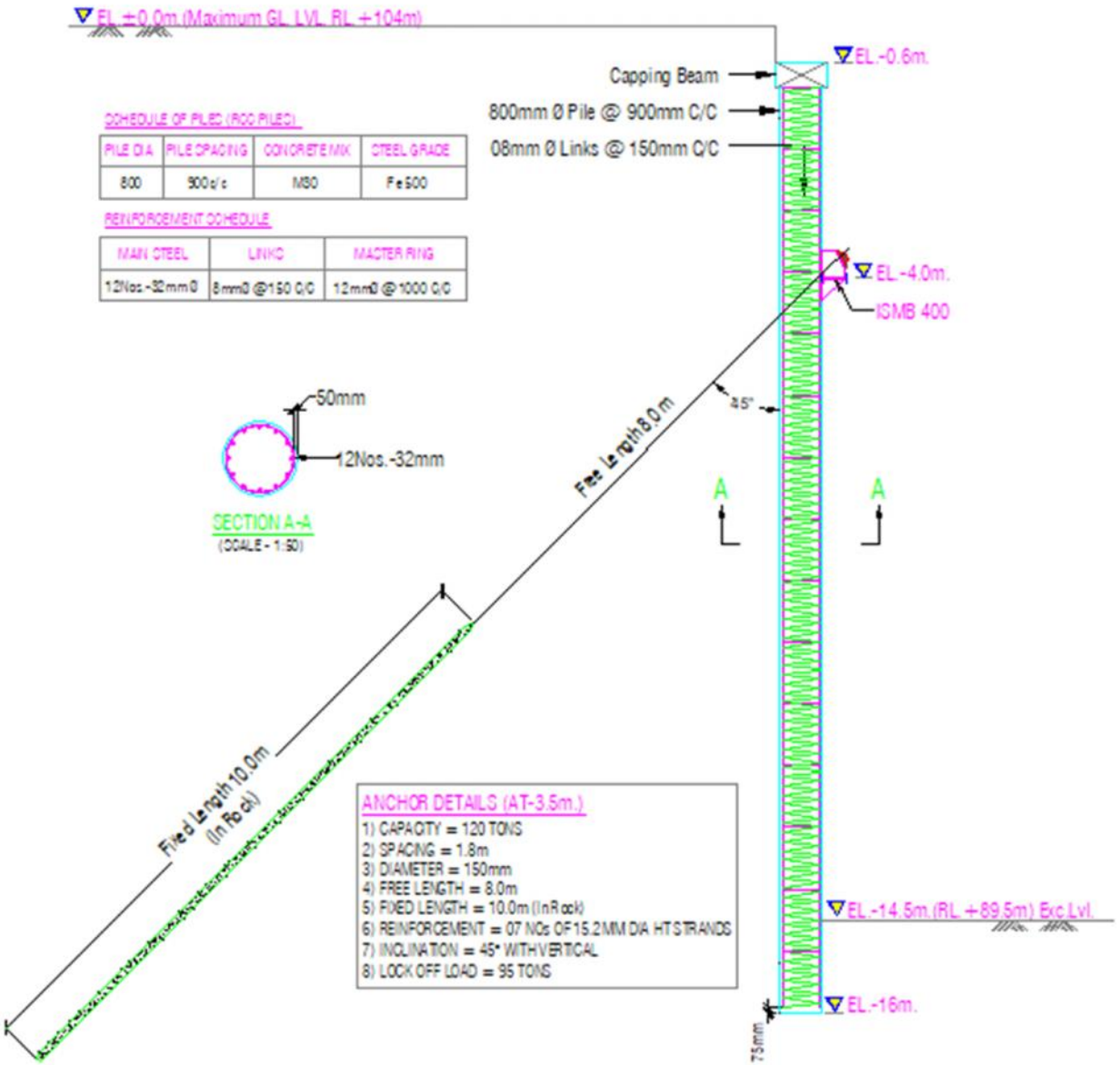
PILE DIA	PILE SPACING	CONCRETE MIX	STEEL GRADE
800	900 c/c	M30	Fe 500

REINFORCEMENT SCHEDULE

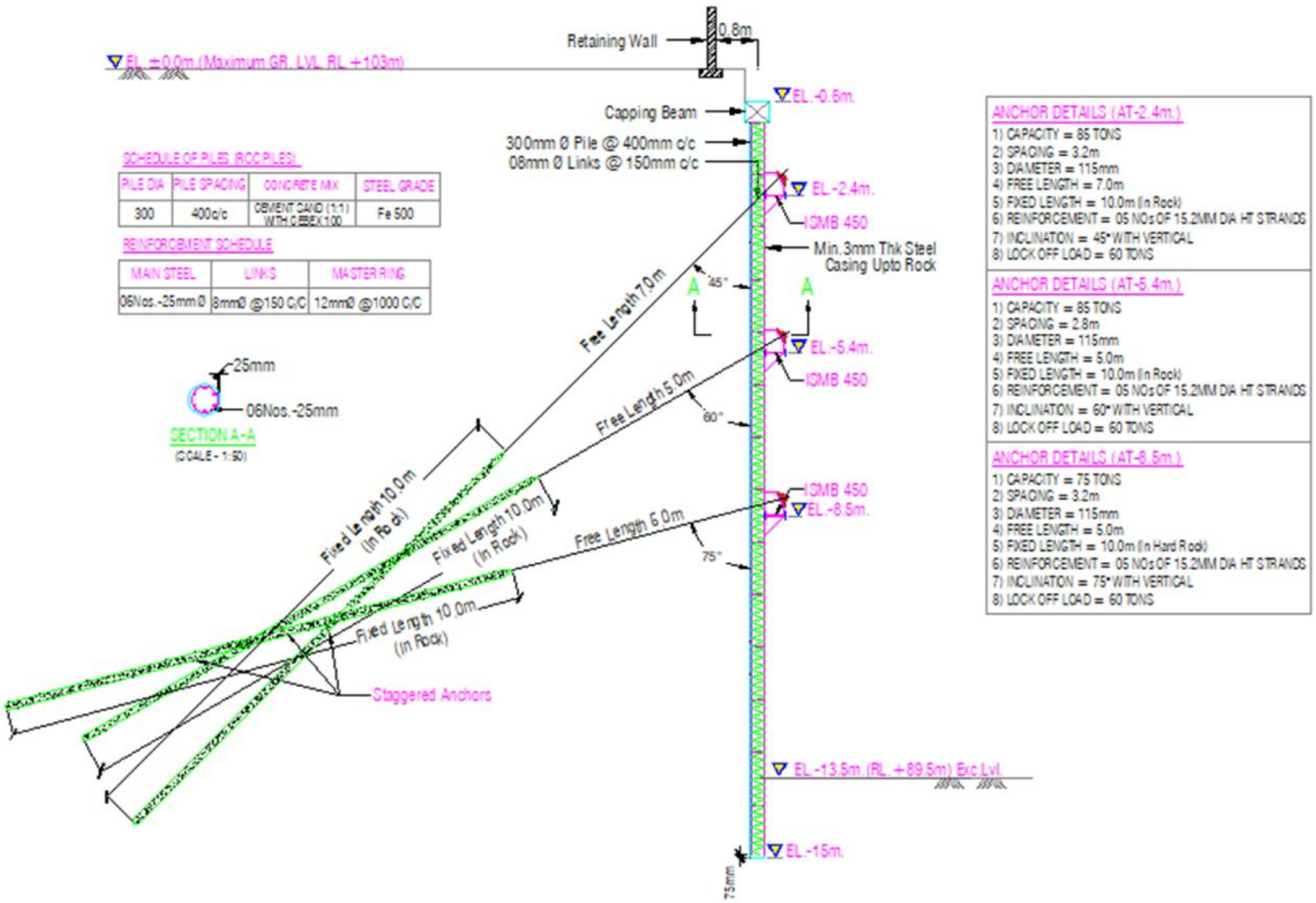
MAIN STEEL	LINKS	MASTER RING
12Nos.-32mm Ø	8mm Ø @150 C/C	12mm Ø @1000 C/C

NOTE:- HYDRAULIC ROTARY RIG OF MINIMUM 180kN.m.TORQUE CAPACITY SHOULD BE UTILIZED.

ZONE-2


EL. ±0.0m (Maximum GL. LVL. RL. +104m)
EL.-0.6m.
Capping Beam
800mm Ø Pile @ 900mm C/C
08mm Ø Links @ 150mm C/C
SCHEDULE OF PILES (ROCK PILES)
PILE DIA
PILE SPACING
CONCRETE MIX
STEEL GRADE
800
900 c/c
M30
Fe500
REINFORCEMENT SCHEDULE
MAIN STEEL
LINKS
MASTER RING
12Nos.-32mm Ø
8mmØ @150 C/C
12mmØ @1000 C/C
EL.-4.0m.
IGMB 400
50mm
12Nos.-32mm
SECTION A-A
(SCALE - 1:50)
Free Length 8.0m
45°
A
A
Fixed Length 10.0m
(In Rock)
ANCHOR DETAILS (AT-3.5m.)
1) CAPACITY = 120 TONS
2) SPACING = 1.8m
3) DIAMETER = 150mm
4) FREE LENGTH = 8.0m
5) FIXED LENGTH = 10.0m (In Rock)
6) REINFORCEMENT = 07 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 45° WITH VERTICAL
8) LOCK OFF LOAD = 95 TONS
EL.-14.5m (RL. +89.5m) Exc Lvl.
EL.-16m.
75mm

ZONE-3



SCHEDULE OF PILES (RCC PILES)

PILE DIA	PILE SPACING	CONCRETE MIX	STEEL GRADE
300	400c/c	CEMENT SAND (1:1) WITH CURBEX 1:00	Fe 500

REINFORCEMENT SCHEDULE

MAIN STEEL	LINKS	MASTER RING
06Nos.-25mm Ø	8mmØ @150 C/C	12mmØ @1000 C/C

ANCHOR DETAILS (AT-2.4m.)

1) CAPACITY = 85 TONS
2) SPACING = 3.2m
3) DIAMETER = 115mm
4) FREE LENGTH = 7.0m
5) FIXED LENGTH = 10.0m (In Rock)
6) REINFORCEMENT = 05 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 45° WITH VERTICAL
8) LOCK OFF LOAD = 60 TONS

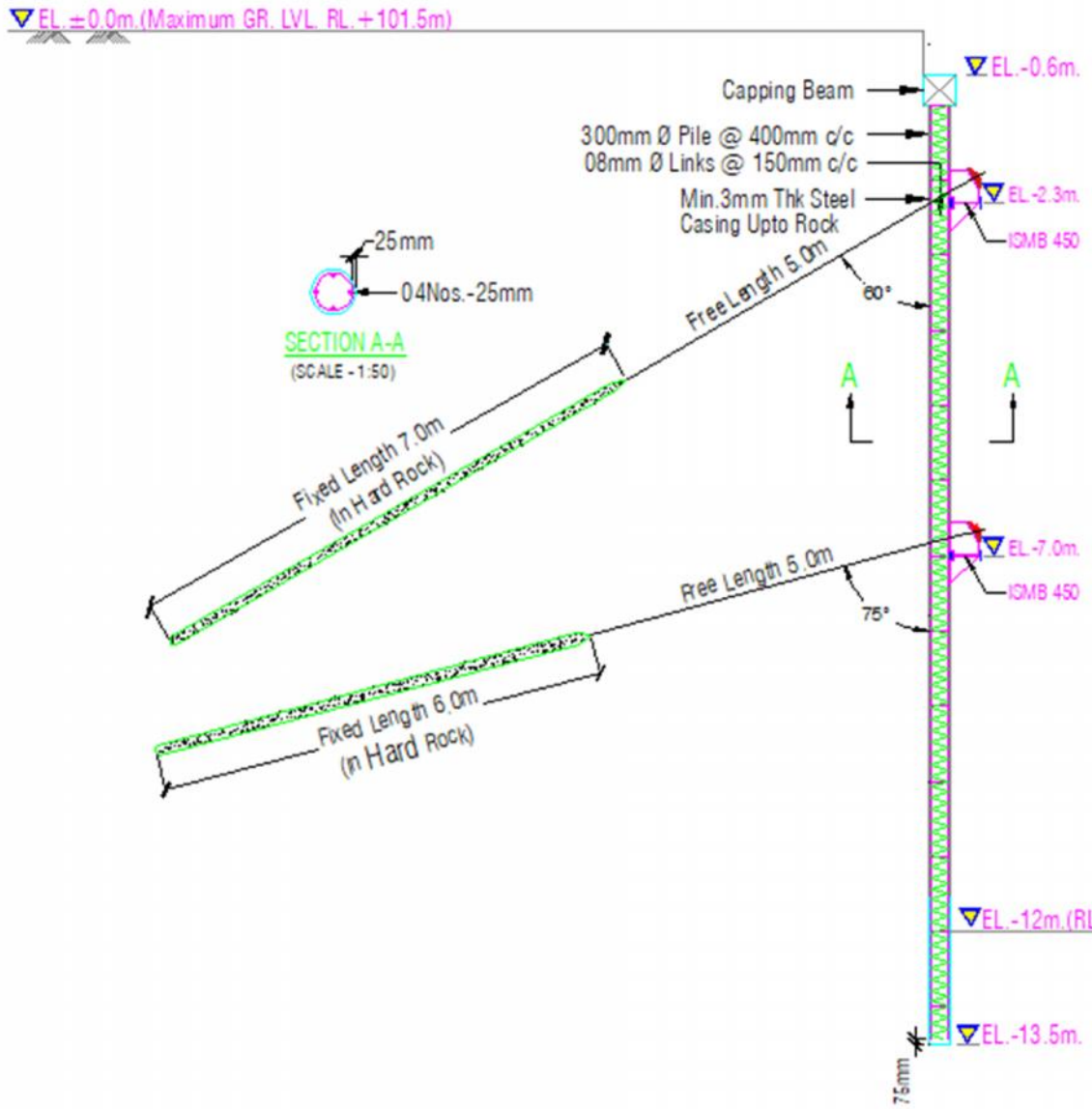
ANCHOR DETAILS (AT-5.4m.)

1) CAPACITY = 85 TONS
2) SPACING = 2.8m
3) DIAMETER = 115mm
4) FREE LENGTH = 5.0m
5) FIXED LENGTH = 10.0m (In Rock)
6) REINFORCEMENT = 05 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 60° WITH VERTICAL
8) LOCK OFF LOAD = 60 TONS

ANCHOR DETAILS (AT-8.5m.)

1) CAPACITY = 75 TONS
2) SPACING = 3.2m
3) DIAMETER = 115mm
4) FREE LENGTH = 5.0m
5) FIXED LENGTH = 10.0m (In Hard Rock)
6) REINFORCEMENT = 05 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 75° WITH VERTICAL
8) LOCK OFF LOAD = 60 TONS

ZONE-4



SCHEDULE OF PILES (RCC PILES)

PILE DIA	PILE SPACING	CONCRETE MIX	STEEL GRADE
300	400c/c	CEMENT SAND (1:1) WITH CEBEX 100	Fe 500

REINFORCEMENT SCHEDULE

MAIN STEEL	LINKS	MASTER RING
04Nos.-25mm Ø	8mmØ @150 C/C	12mmØ @1000 C/C

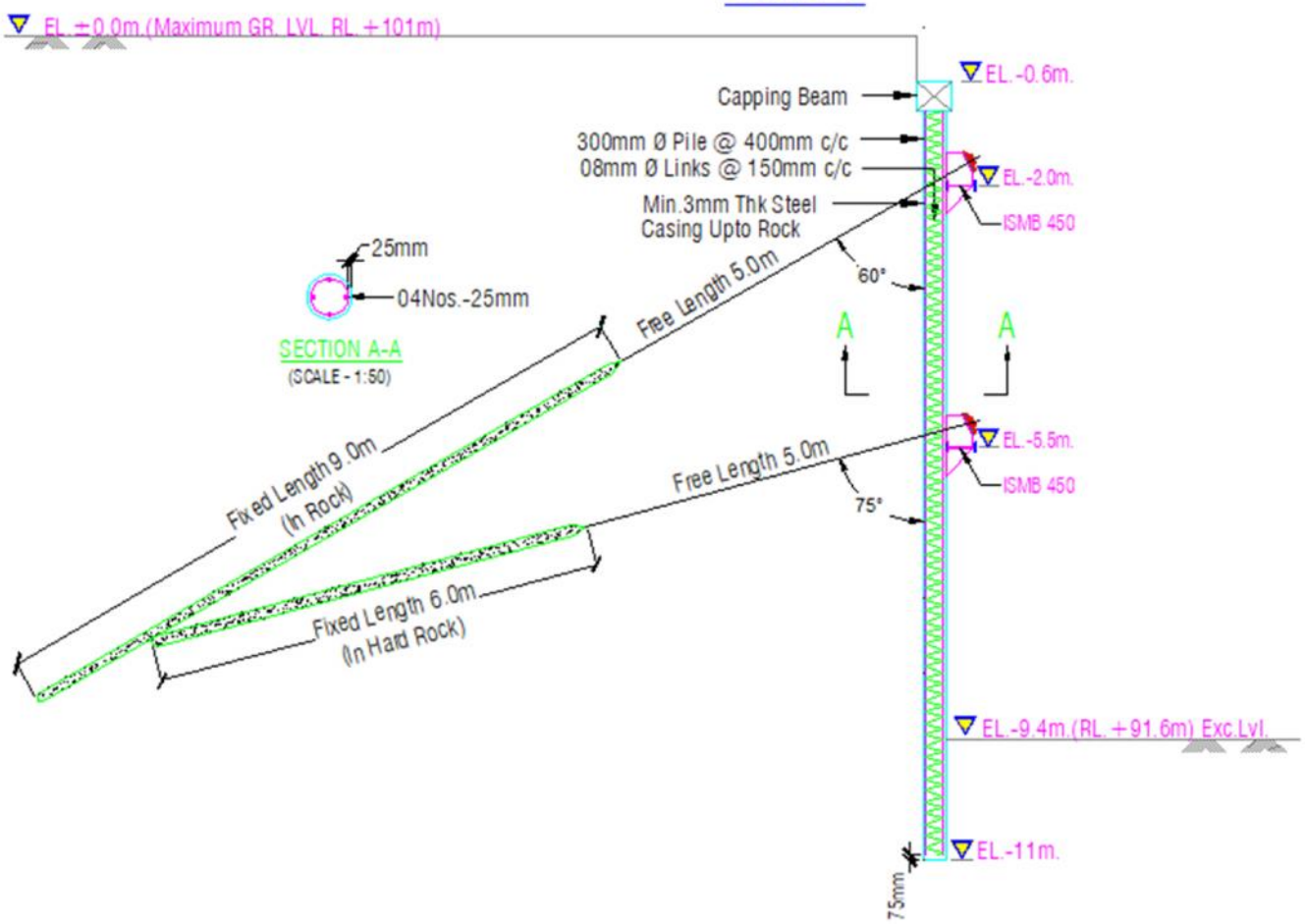
ANCHOR DETAILS (AT-2.3m.)

1) CAPACITY = 65 TONS
2) SPACING = 4.4m
3) DIAMETER = 175mm
4) FREE LENGTH = 5.0m
5) FIXED LENGTH = 7.0m (In Hard Rock)
6) REINFORCEMENT = 04 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 60° WITH VERTICAL
8) LOCK OFF LOAD = 55 TONS

ANCHOR DETAILS (AT-7.0m.)

1) CAPACITY = 65 TONS
2) SPACING = 4.4m
3) DIAMETER = 115mm
4) FREE LENGTH = 5.0m
5) FIXED LENGTH = 6.0m (In Hard Rock)
6) REINFORCEMENT = 04 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 75° WITH VERTICAL
8) LOCK OFF LOAD = 55 TONS

ZONE-5



SCHEDULE OF PILES (RCC PILES)

PILE DIA	PILE SPACING	CONCRETE MIX	STEEL GRADE
300	400c/c	CEMENT SAND (1:1) WITH CEBEX 100	Fe 500

REINFORCEMENT SCHEDULE

MAIN STEEL	LINKS	MASTER RING
04Nos.-25mm Ø	8mmØ @150 C/C	12mmØ @1000 C/C

ANCHOR DETAILS (AT-2.0m.)

1) CAPACITY = 65 TONS
2) SPACING = 4.4m
3) DIAMETER = 115mm
4) FREE LENGTH = 5.0m
5) FIXED LENGTH = 9.0m (In Rock)
6) REINFORCEMENT = 04 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 60° WITH VERTICAL
8) LOCK OFF LOAD = 55 TONS

ANCHOR DETAILS (AT-5.5m.)

1) CAPACITY = 65 TONS
2) SPACING = 4.4m
3) DIAMETER = 115mm
4) FREE LENGTH = 5.0m
5) FIXED LENGTH = 6.0m (In Hard Rock)
6) REINFORCEMENT = 04 NOs OF 15.2MM DIA HT STRANDS
7) INCLINATION = 75° WITH VERTICAL
8) LOCK OFF LOAD = 55 TONS

	Page No 1 Analysis
	Project 14210 File Name ...large dia option.pws
Acme Ozone, Thane 13.5m exc-large dia-Zone-1	Engineer Komal Date 27/08/2019

Pile geometry

Pile top Level	-.6	m
Pile Length	14.4	m
Pile toe level	-15	m
Active ground slope	0	Degrees (To horizontal)

Soils and ground water initial data (Soils data given for active and passive sides)

Initial Ground Water level -13.5

Top Level m	Description	Bulk Dens kN/m3	Sat' Dens kN/m3	Young Mod kN/m2	Young Inc. kN/m3	Cu C' kN/m2	C Inc. kN/m3	Phi Deg	Wall Shear Ratio	Ka Kp	Kac Kpc
.00	Fill	19.00	19.00	12500	0			28 28		.36 2.77	
-1.50	clay	19.00	19.00	26000	0			30 30		.33 3.00	
-5.50	m. stiff clay	19.00	19.00	49400	0			32 32		.31 3.25	
-7.00	cwr	22.00	22.00	130000	0			40 40		.22 4.60	
-13.50	cwr	22.00	22.00	130000	0	330 330				1.00 1.00	2.00 2.00

-17.00	hard rock	24.00	24.00	1000000	0	1300		1.00	2.00
						1300		1.00	2.00

Water pressure profiles

	Active Actual Level	Active Water Level	Passive Actual Level	Passive Water Level
Water pressure profile 1	-1.00	-1.00	-13.50	-13.50
	-8.00	-1.00		
	-8.00	-8.00		
	-13.50	-13.50		

Construction sequence

Stage Ref		Stage Type	Level or Angle m/deg.	Load kN(/m)	Offset m	Width m	Length m
1		Active surcharge	-0.60	30.8	.0		
2	A	Water profile 1					
3	A	Passive side excavation	-4.20				
4		Insert prop	-3.60				
5	A	Passive side excavation	-13.50				

Code of practice

Code of practice or reference document	CP2 - Code of practice on earth retaining structures
Application of pressures for stability	FOS on gross pressures
FOS on moments (stability check)	2.00
ULS factor on Tan(Phi) values	1.00
ULS fFactor on drained cohesion values	1.00
ULS factor on undrained cohesion values	1.00
ULS factor on active soil pressures	1.00
ULS factor on passive soil pressures	1.00
ULS factor on active water pressures	1.00
ULS factor on passive water pressures	1.00
ULS factor on loads applied to the soil	1.00
ULS factor on loads applied to the wall	1.00
FOS on embedment (stability check)	1.00
Correction factor on cantilever embedment	1.20

Wall analysis detail options

Nominal Phi for load distribution	30.0	Degrees
Depth of water filled tension cracks	.0	m
Density of water	10.0	kN/m3
Minimum equivalent fluid density	.0	kN/m3
Depth of passive softened soil	.0	m
Continuity model for wall analysis	Pins at second and lower props	

Deflection parameters

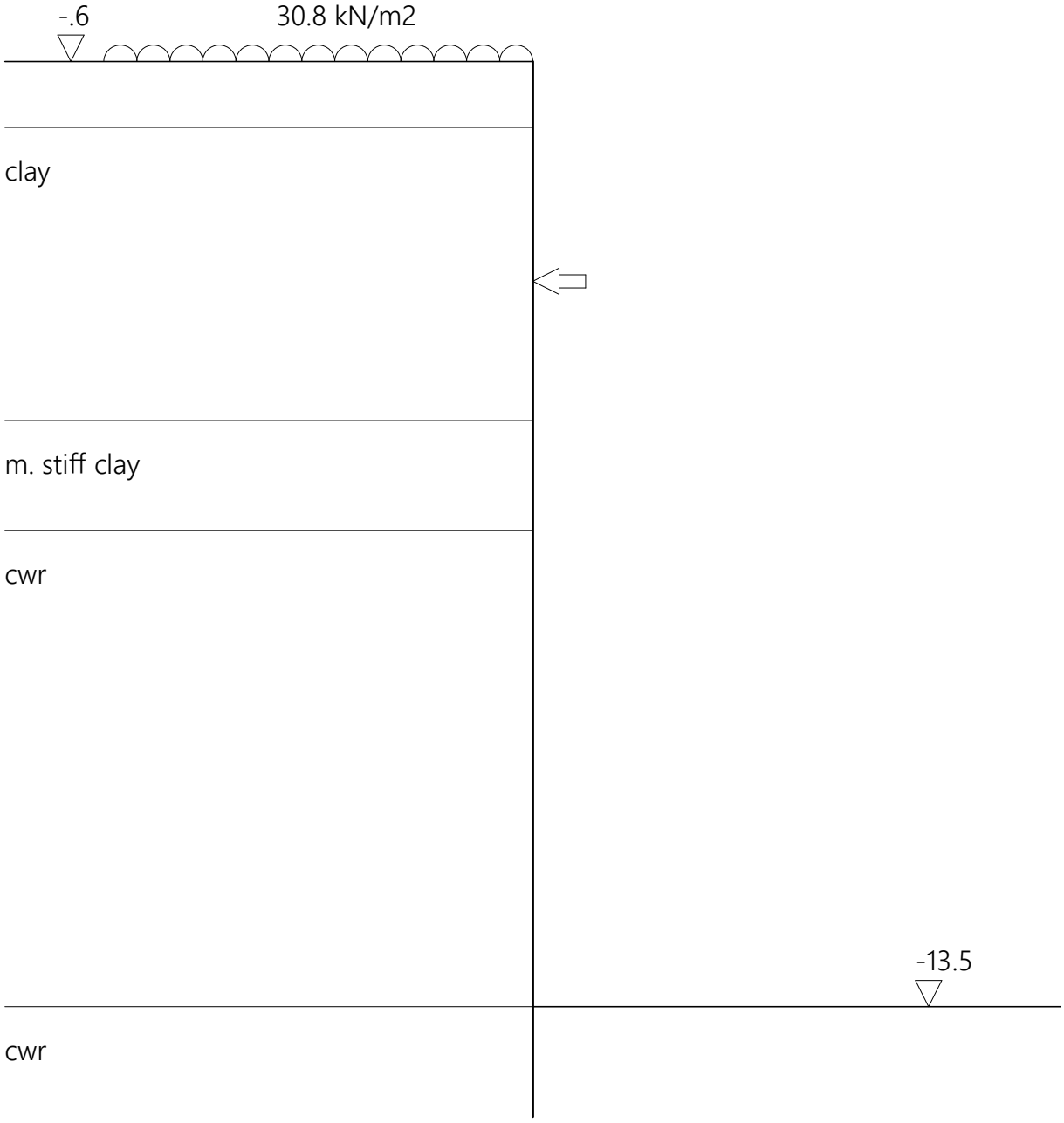
Wall moment of inertia	2234021	cm4/m
Wall Youngs modulus	27000000	kN/m2

Deflection parameters - continued

Properties for prop at -3.6

Prop/Tie cross sectional area	11	cm2 each
Prop/Tie Youngs modulus	210000000	kN/m2
Prop/Tie length	7.0	m
Prop/Tie spacing	1.8	m
Waling moment of inertia	Waling deflection not included	
Waling Youngs modulus	Waling deflection not included	
Prop/Tie preload	900	kN
Initial lack of fit	0.0	mm

Stage ref. 5
Stage type Passive side excavation



	Page No 6 Analysis
	Project 14210 File Name ...large dia option.pws
Acme Ozone, Thane 13.5m exc-large dia-Zone-1	Engineer Komal Date 27/08/2019

Tabular results from analysis of stage ref 5

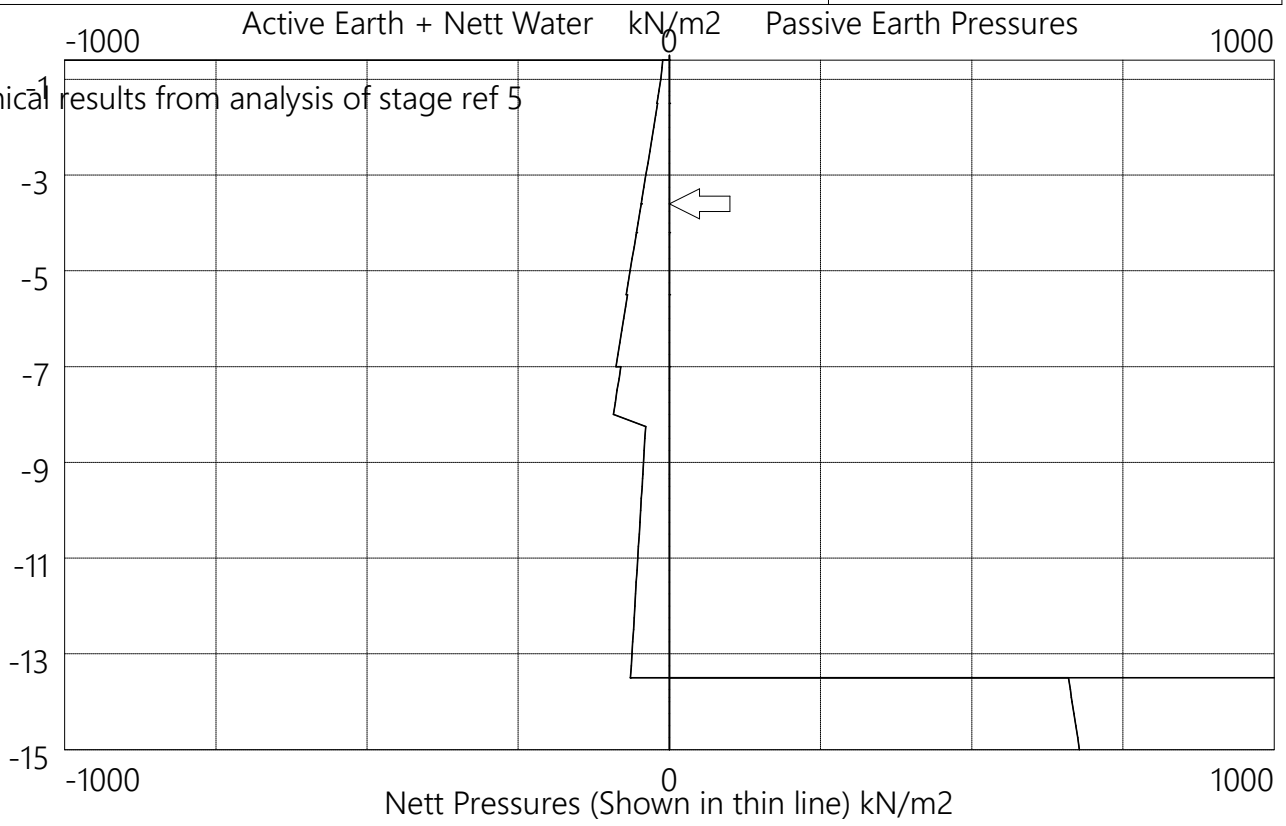
Calc Level m	Active Vert kN/m2	Active Earth kN/m2	Active Water kN/m2	Pas' Vert kN/m2	Pas' Earth kN/m2	Pas' Water kN/m2	Total Nett kN/m2	Bend. Moment kNm/m	Shear Force kN/m	Defl't mm	Prop Force kN/m	FOS
-.60	.0	.0	.0	.0	.0	.0	0	0	0	5.6		.00
-.60	30.8	11.1	.0	.0	.0	.0	11.1	0	0	5.6		.00
-1.00	38.4	13.9	.0	.0	.0	.0	13.9	1.0	-5.0	6.7		.00
-1.34	41.5	15.0	3.4	.0	.0	.0	18.4	3.6	-10.5	7.6		.00
-1.50	42.9	15.5	5.0	.0	.0	.0	20.5	5.5	-13.6	8.1		.00
-1.50	42.9	14.3	5.0	.0	.0	.0	19.3	5.5	-13.6	8.1		.00
-2.00	47.4	15.8	10.0	.0	.0	.0	25.8	15.0	-24.9	9.4		.00
-3.00	56.4	18.8	20.0	.0	.0	.0	38.8	54.9	-57.2	12.2		.00
-3.60	61.8	20.6	26.0	.0	.0	.0	46.6	96.7	-82.8	13.9	412.4	.00
-3.60	61.8	20.6	26.0	.0	.0	.0	46.6	96.7	329.6	13.9		.00
-4.00	65.4	21.8	30.0	.0	.0	.0	51.8	-31.2	309.9	15.0		.00
-4.20	67.2	22.4	32.0	.0	.0	.0	54.4	-91.6	299.4	15.6		.00
-4.20	67.2	22.4	32.0	.0	.0	.0	54.4	-92.2	299.3	15.6		.00
-5.00	74.4	24.8	40.0	.0	.0	.0	64.8	-313.1	251.6	17.8		.00
-5.50	78.9	26.3	45.0	.0	.0	.0	71.3	-430.6	217.6	19.0		.00
-5.50	78.9	24.2	45.0	.0	.0	.0	69.2	-430.8	217.6	19.0		.00
-6.00	83.4	25.6	50.0	.0	.0	.0	75.6	-530.4	181.4	20.0		.00
-7.00	92.4	28.4	60.0	.0	.0	.0	88.4	-671.9	99.4	21.4		.00
-7.00	92.4	20.1	60.0	.0	.0	.0	80.1	-672.0	99.4	21.4		.00
-8.00	104.4	22.7	70.0	.0	.0	.0	92.7	-729.1	13.0	21.6		.00
-9.00	196.4	42.7	.0	.0	.0	.0	42.7	-716.1	-34.2	20.7		.00
-9.34	204.0	44.4	.0	.0	.0	.0	44.4	-701.7	-49.2	20.1		.00
-10.00	218.4	47.5	.0	.0	.0	.0	47.5	-659.7	-79.3	18.6		.00
-11.00	240.4	52.3	.0	.0	.0	.0	52.3	-555.9	-129.2	15.4		.00
-12.00	262.4	57.1	.0	.0	.0	.0	57.1	-399.8	-183.8	11.7		.00
-13.00	284.4	61.8	.0	.0	.0	.0	61.8	-186.6	-243.3	8.0		.00
-13.50	295.4	64.2	.0	.0	.0	.0	64.2	-57.7	-274.7	6.1		.00
-13.50	295.4	64.2	.0	.0	.0	.0	64.2	-57.1	-274.8	6.1		.00
-13.50	295.4	.0	.0	.0	660.0	.0	-660.0	-56.9	-274.8	6.1		.00
-13.92	300.4	.0	4.2	5.0	665.0	4.2	-665.0	0	0	4.6		1.00

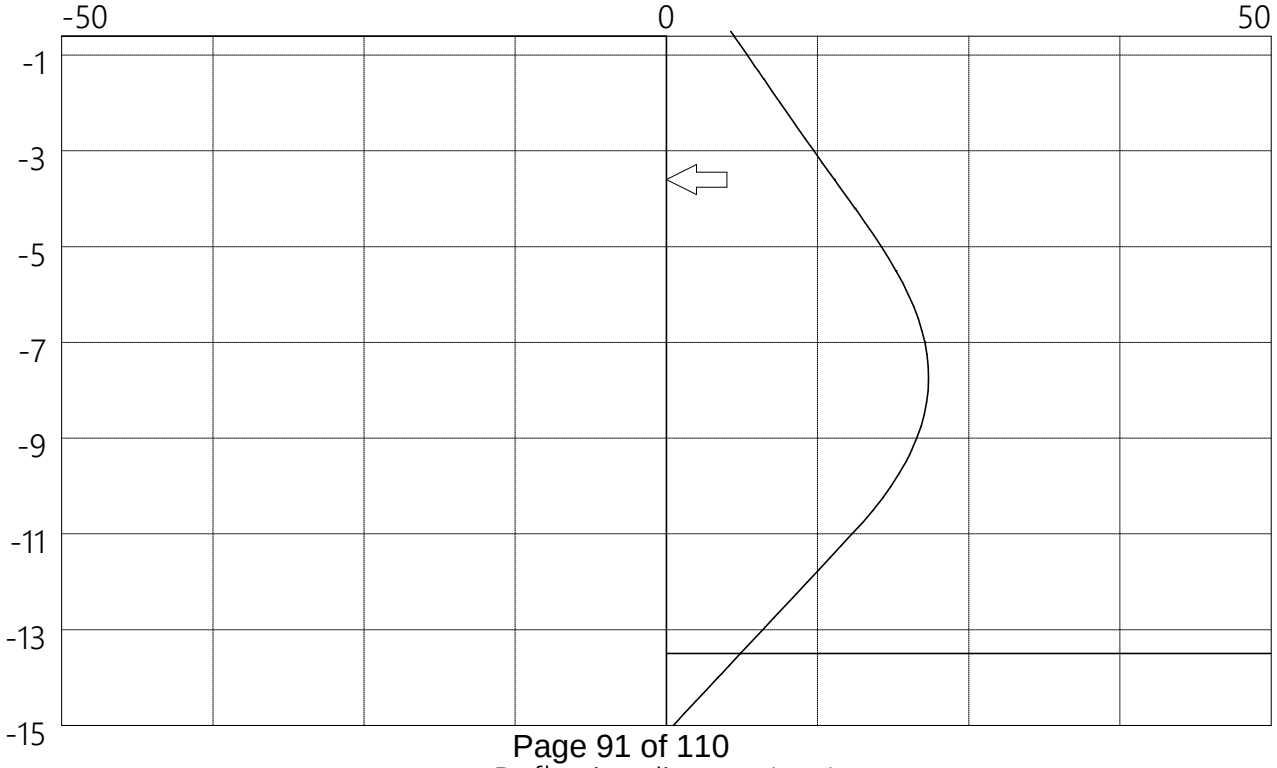
Tabular results from analysis of stage ref 5 continued...

Calc Level m	Active Vert kN/m2	Active Earth kN/m2	Active Water kN/m2	Pas' Vert kN/m2	Pas' Earth kN/m2	Pas' Water kN/m2	Total Nett kN/m2	Bend. Moment kNm/m	Shear Force kN/m	Defl't mm	Prop Force kN/m	FOS
-14.00	301.4	.0	5.0	6.0	666.0	5.0	-666.0	0	0	4.3		1.21
-15.00	313.4	.0	15.0	18.0	678.0	15.0	-678.0	0	0	.6		3.85

	Page No 8 Analysis
	Project 14210 File Name ...large dia option.pws
Acme Ozone, Thane 13.5m exc-large dia-Zone-1	Engineer Komal Date 27/08/2019

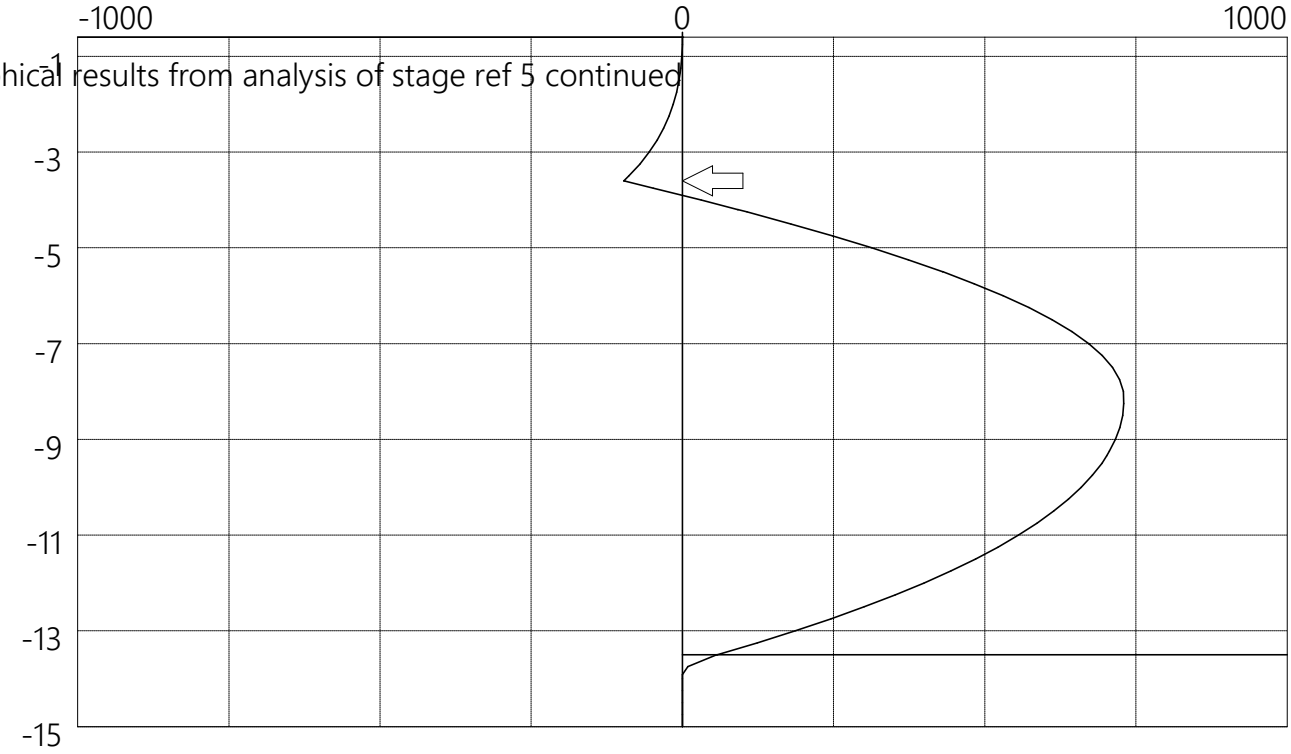
Graphical results from analysis of stage ref 5



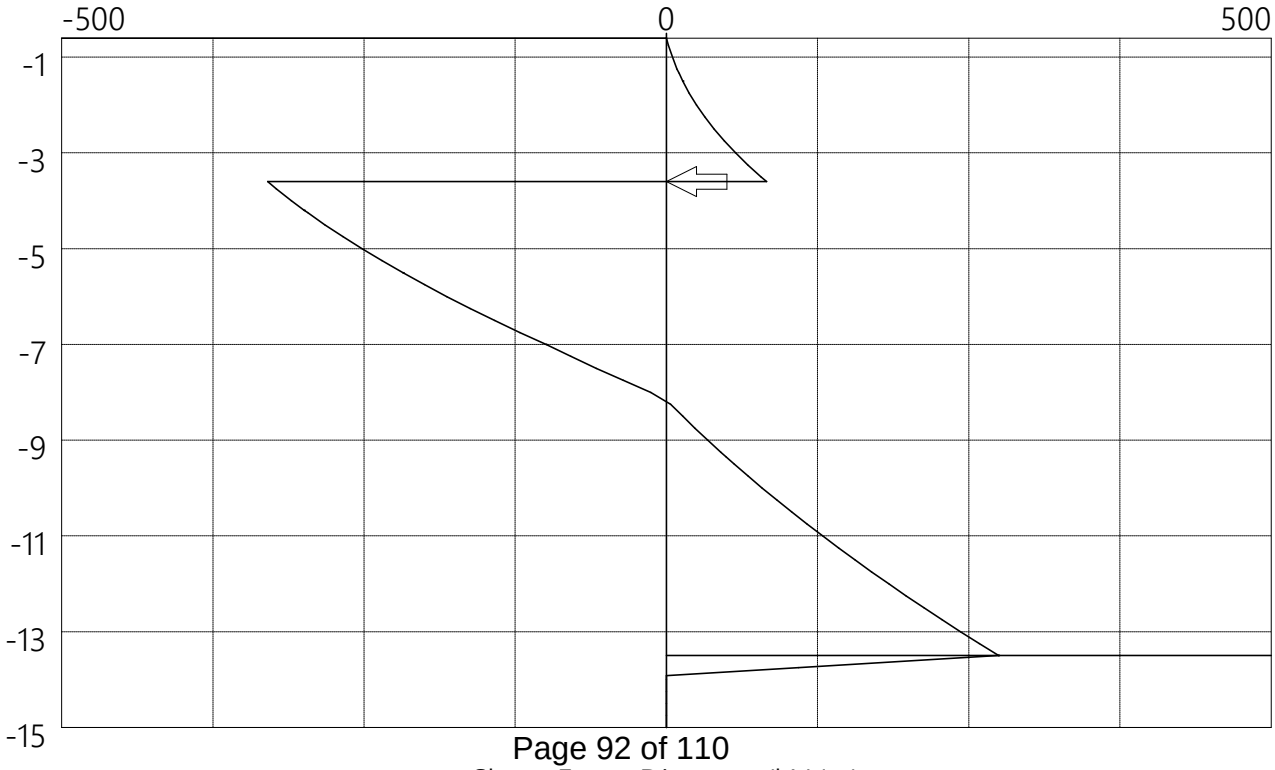


Deflection diagram (mm)

Graphical results from analysis of stage ref 5 continued



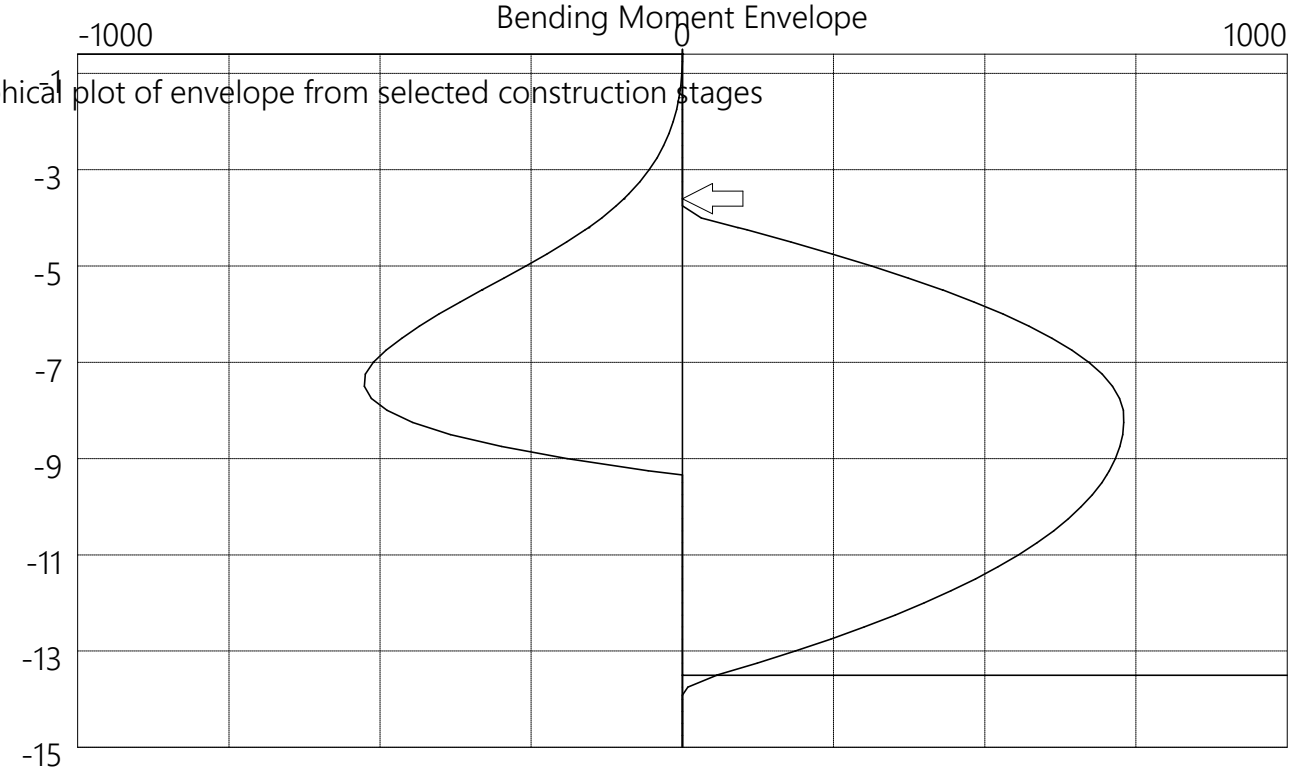
Bending Moment Diagram (kNm/m)



Shear Force Diagram (kN/m)

Bending Moment Envelope

Graphical plot of envelope from selected construction stages



Shear Force Envelope

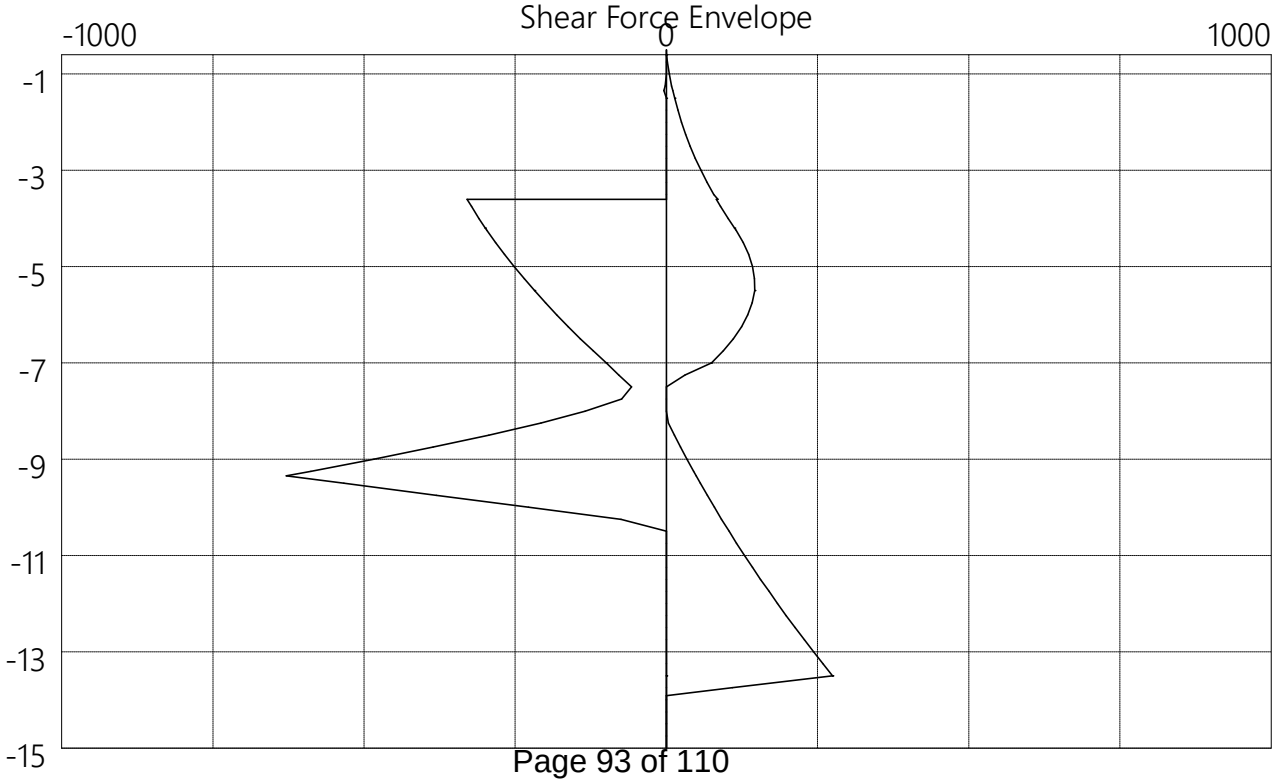


Table of envelope for wall forces

Calc Level m	Bending Minimum kNm/m	Bending Maximum kNm/m	Shear Minimum kN/m	Shear Maximum kN/m	Prop Force kN/m
-.60	.0	.0	.0	.0	
-.60	.0	.0	.0	.0	
-1.00	.0	1.0	-5.0	.0	
-1.34	.0	3.6	-10.5	4.0	
-1.50	.0	5.5	-13.6	.0	
-1.50	.0	5.5	-13.6	.0	
-2.00	.0	15.0	-24.9	.0	
-3.00	.0	54.9	-57.2	.0	
-3.60	.0	96.7	-85.1	.0	412.4
-3.60	.0	96.7	-82.6	329.6	
-4.00	-31.2	133.5	-102.2	309.9	
-4.20	-91.6	154.8	-112.7	299.4	
-4.20	-92.2	155.0	-112.9	299.3	
-5.00	-313.1	259.0	-142.3	251.6	
-5.50	-430.6	331.6	-146.4	217.6	
-5.50	-430.8	331.7	-146.4	217.6	
-6.00	-530.4	402.4	-134.7	181.4	
-7.00	-671.9	511.1	-74.5	99.4	
-7.00	-672.0	511.1	-74.5	99.4	
-8.00	-729.1	488.5	.0	134.4	
-9.00	-716.1	190.4	-34.2	483.6	
-9.34	-701.7	.0	-49.2	628.4	
-10.00	-659.7	.0	-79.3	227.7	
-11.00	-555.9	.0	-129.2	.0	
-12.00	-399.8	.0	-183.8	.0	
-13.00	-186.6	.0	-243.3	.0	
-13.50	-57.7	.0	-274.7	.0	
-13.50	-57.1	.0	-274.8	.0	
-13.50	-56.9	.0	-274.8	.0	
-13.92	.0	.0	.0	.0	

Table of envelope for wall forces, continued...

Calc Level m	Bending Minimum kNm/m	Bending Maximum kNm/m	Shear Minimum kN/m	Shear Maximum kN/m	Prop Force kN/m
-14.00	.0	.0	.0	.0	
-15.00	.0	.0	.0	.0	

Structural design of wall

Wall section properties

Primary pile diameter	800	mm
Primary pile spacing	900	mm
Infill pile diameter		mm
Main rebar bar diameter	32	mm
Main rebar number of bars	12	

Wall material properties

Concrete cube strength	30	N/mm2
Concrete cover	50	mm
Main rebar steel grade	500	N/mm2
Ultimate load factor	1.50	

Wall structural design checks

Check description	Required or Limit	Provided or Actual	Units
Max. ultimate moment BS8110, Ultimate resistance	985	1108	kNm
Maximum longitudinal steel BS8110, Max 6% by area	30159	9650	mm2
Minimum longitudinal steel BS8110, Min 0.4% by area	2010	9650	mm2

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	Project 14210 File Name ...icro pile option.pws
Acme Ozone, Thane 12.0m exc-large dia-Zone-4	Engineer Komal Date 27/08/2019

Pile geometry

Pile top Level	-.6	m
Pile Length	12.9	m
Pile toe level	-13.5	m
Active ground slope	0	Degrees (To horizontal)

Soils and ground water initial data (Soils data given for active and passive sides)

Initial Ground Water level -12

Top Level m	Description	Bulk Dens kN/m3	Sat' Dens kN/m3	Young Mod kN/m2	Young Inc. kN/m3	Cu C' kN/m2	C Inc. kN/m3	Phi Deg	Wall Shear Ratio	Ka Kp	Kac Kpc
.00	Fill	19.00	19.00	12500	0			28 28		.36 2.77	
-2.00	cwr	22.00	22.00	130000	0			40 40		.22 4.60	
-3.00	hard rock	24.00	24.00	1000000	0			50 50		.13 7.55	
-12.00	hard rock	24.00	24.00	1000000	0	1300 1300				1.00 1.00	2.00 2.00

Water pressure profiles	Active Actual Level	Active Water Level	Passive Actual Level	Passive Water Level
Water pressure profile 1	-1.00	-1.00	-12.00	-12.00
	-4.00	-1.00		
	-4.00	-4.00		
	-12.00	-12.00		

Construction sequence

Stage Ref		Stage Type	Level or Angle m/deg.	Load kN(/m)	Offset m	Width m	Length m
1		Active surcharge	-0.60	30.8	.0		
2	A	Water profile 1					
3	A	Passive side excavation	-2.90				
4		Insert prop	-2.30				
5	A	Passive side excavation	-7.60				
6		Insert prop	-7.00				
7	A	Passive side excavation	-12.00				

Code of practice

Code of practice or reference document	CP2 - Code of practice on earth retaining structures
Application of pressures for stability	FOS on gross pressures
FOS on moments (stability check)	2.00
ULS factor on Tan(Phi) values	1.00
ULS fFactor on drained cohesion values	1.00
ULS factor on undrained cohesion values	1.00
ULS factor on active soil pressures	1.00
ULS factor on passive soil pressures	1.00
ULS factor on active water pressures	1.00
ULS factor on passive water pressures	1.00
ULS factor on loads applied to the soil	1.00
ULS factor on loads applied to the wall	1.00
FOS on embedment (stability check)	1.00
Correction factor on cantilever embedment	1.20

Wall analysis detail options

Nominal Phi for load distribution	30.0	Degrees
Depth of water filled tension cracks	.0	m
Density of water	10.0	kN/m3
Minimum equivalent fluid density	.0	kN/m3
Depth of passive softened soil	.0	m
Continuity model for wall analysis	Pins at second and lower props	

Deflection parameters

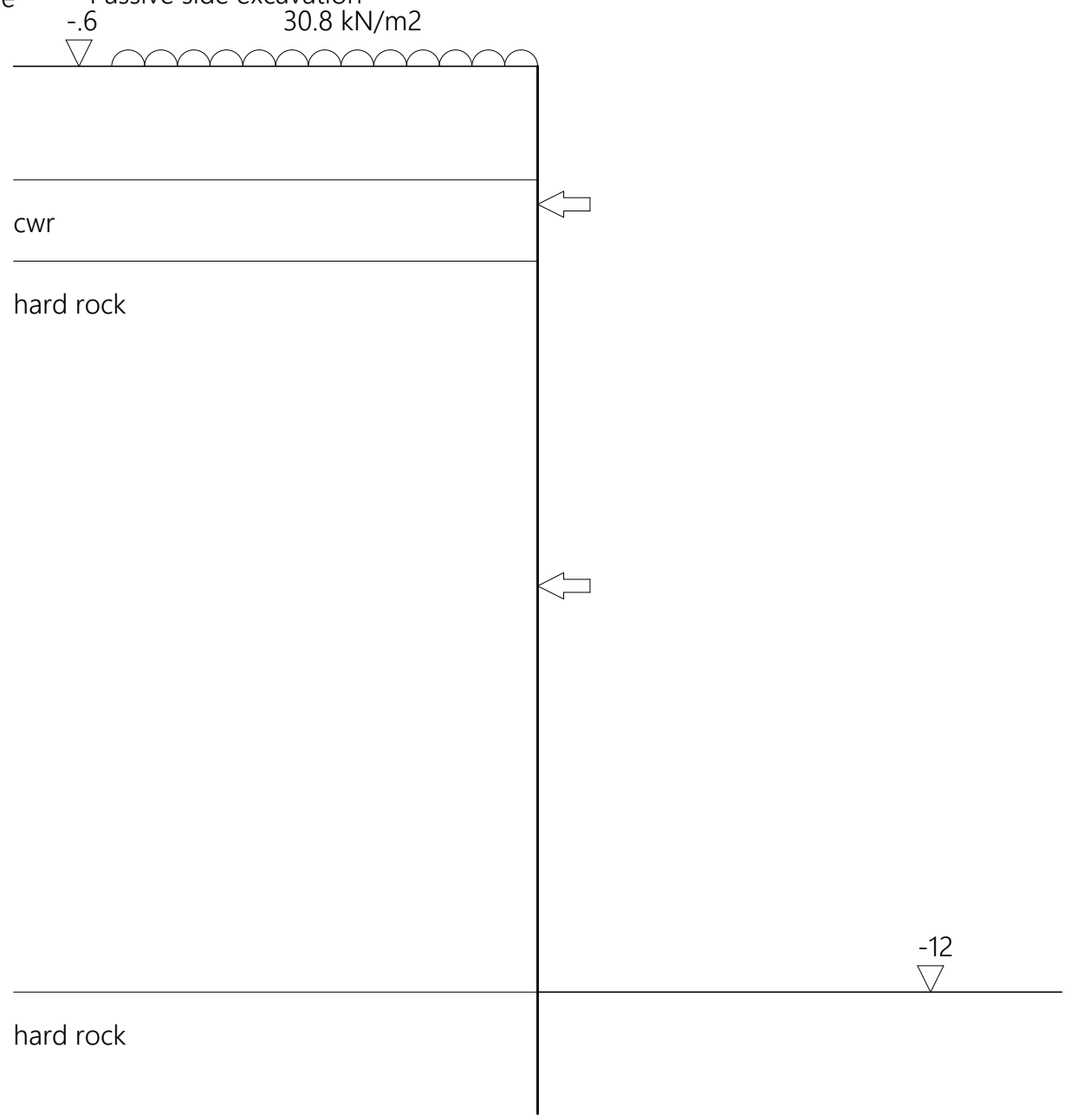
Wall moment of inertia	99402	cm4/m
Wall Youngs modulus	27000000	kN/m2

Deflection parameters - continued

Properties for prop at -2.3		
Prop/Tie cross sectional area	6	cm2 each
Prop/Tie Youngs modulus	210000000	kN/m2
Prop/Tie length	5.0	m
Prop/Tie spacing	4.4	m
Waling moment of inertia	Waling deflection not included	
Waling Youngs modulus	Waling deflection not included	
Prop/Tie preload	550	kN
Initial lack of fit	0.0	mm

Properties for prop at -7.0		
Prop/Tie cross sectional area	6	cm2 each
Prop/Tie Youngs modulus	210000000	kN/m2
Prop/Tie length	5.0	m
Prop/Tie spacing	4.4	m
Waling moment of inertia	Waling deflection not included	
Waling Youngs modulus	Waling deflection not included	
Prop/Tie preload	550	kN
Initial lack of fit	0.0	mm

Stage ref. 7
Stage type Passive side excavation



Tabular results from analysis of stage ref 7

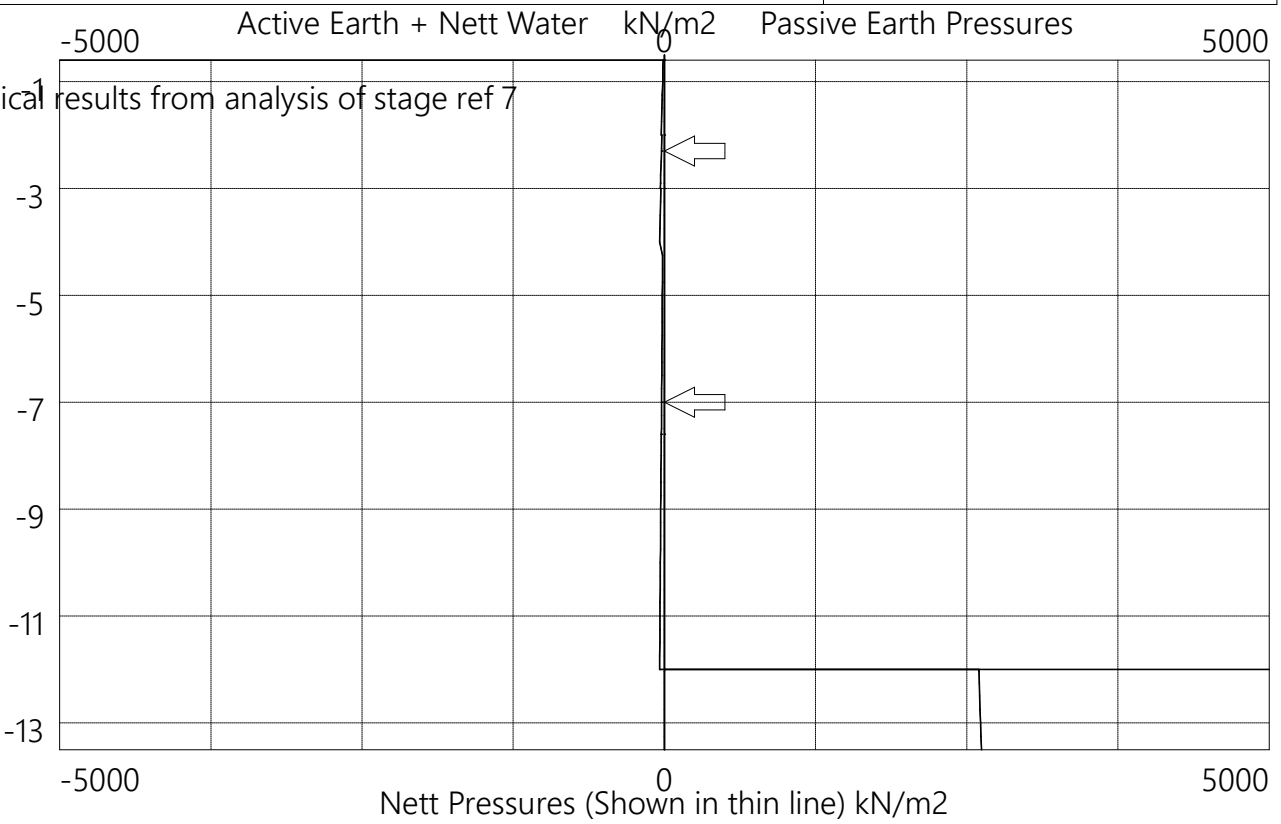
Calc Level m	Active Vert kN/m2	Active Earth kN/m2	Active Water kN/m2	Pas' Vert kN/m2	Pas' Earth kN/m2	Pas' Water kN/m2	Total Nett kN/m2	Bend. Moment kNm/m	Shear Force kN/m	Defl't mm	Prop Force kN/m	FOS
-.60	.0	.0	.0	.0	.0	.0	0	0	0	.9		.00
-.60	30.8	11.1	.0	.0	.0	.0	11.1	0	0	.9		.00
-1.00	38.4	13.9	.0	.0	.0	.0	13.9	1.0	-5.0	2.2		.00
-1.34	41.5	15.0	3.4	.0	.0	.0	18.4	3.6	-10.5	3.4		.00
-2.00	47.4	17.1	10.0	.0	.0	.0	27.1	15.1	-25.5	5.8		.00
-2.00	47.4	10.3	10.0	.0	.0	.0	20.3	15.1	-25.5	5.8		.00
-2.30	51.0	11.1	13.0	.0	.0	.0	24.1	23.7	-32.2	6.9	98.7	.00
-2.30	51.0	11.1	13.0	.0	.0	.0	24.1	23.7	66.6	6.9		.00
-2.90	58.2	12.6	19.0	.0	.0	.0	31.6	-11.3	49.9	9.3		.00
-2.90	58.2	12.7	19.0	.0	.0	.0	31.7	-11.4	49.9	9.3		.00
-3.00	59.4	12.9	20.0	.0	.0	.0	32.9	-16.2	46.6	9.8		.00
-3.00	59.4	7.9	20.0	.0	.0	.0	27.9	-16.3	46.6	9.8		.00
-4.00	73.4	9.7	30.0	.0	.0	.0	39.7	-47.0	12.8	13.2		.00
-4.76	121.6	16.1	.0	.0	.0	.0	16.1	-50.3	-1.7	14.8		.00
-5.00	127.4	16.9	.0	.0	.0	.0	16.9	-49.4	-5.7	15.1		.00
-6.00	151.4	20.1	.0	.0	.0	.0	20.1	-34.7	-24.2	15.1		.00
-7.00	175.4	23.2	.0	.0	.0	.0	23.2	0	-45.8	13.9	117.4	.00
-7.00	175.4	23.2	.0	.0	.0	.0	23.2	0	71.6	13.9		.00
-7.60	189.8	25.1	.0	.0	.0	.0	25.1	-38.5	57.2	16.2		.00
-7.60	189.8	25.1	.0	.0	.0	.0	25.1	-38.7	57.1	16.2		.00
-8.00	199.4	26.4	.0	.0	.0	.0	26.4	-59.5	46.8	17.4		.00
-8.49	211.2	28.0	.0	.0	.0	.0	28.0	-79.2	33.4	18.5		.00
-9.00	223.4	29.6	.0	.0	.0	.0	29.6	-92.5	18.8	18.8		.00
-10.00	247.4	32.8	.0	.0	.0	.0	32.8	-96.0	-12.4	16.8		.00
-11.00	271.4	36.0	.0	.0	.0	.0	36.0	-66.7	-46.8	12.0		.00
-12.00	295.4	39.1	.0	.0	.0	.0	39.1	-1.6	-84.2	7.2		.00
-12.00	295.4	39.1	.0	.0	.0	.0	39.1	-1.4	-84.3	7.2		.00
-12.00	295.4	.0	.0	.0	2600.0	.0	-2600.0	-1.3	-84.3	7.2		.00
-12.03	295.9	.0	.3	.5	2600.5	.3	-2600.5	0	0	7.0		1.07
-13.00	309.4	.0	10.0	14.0	2614.0	10.0	-2614.0	0	0	2.4		33.91

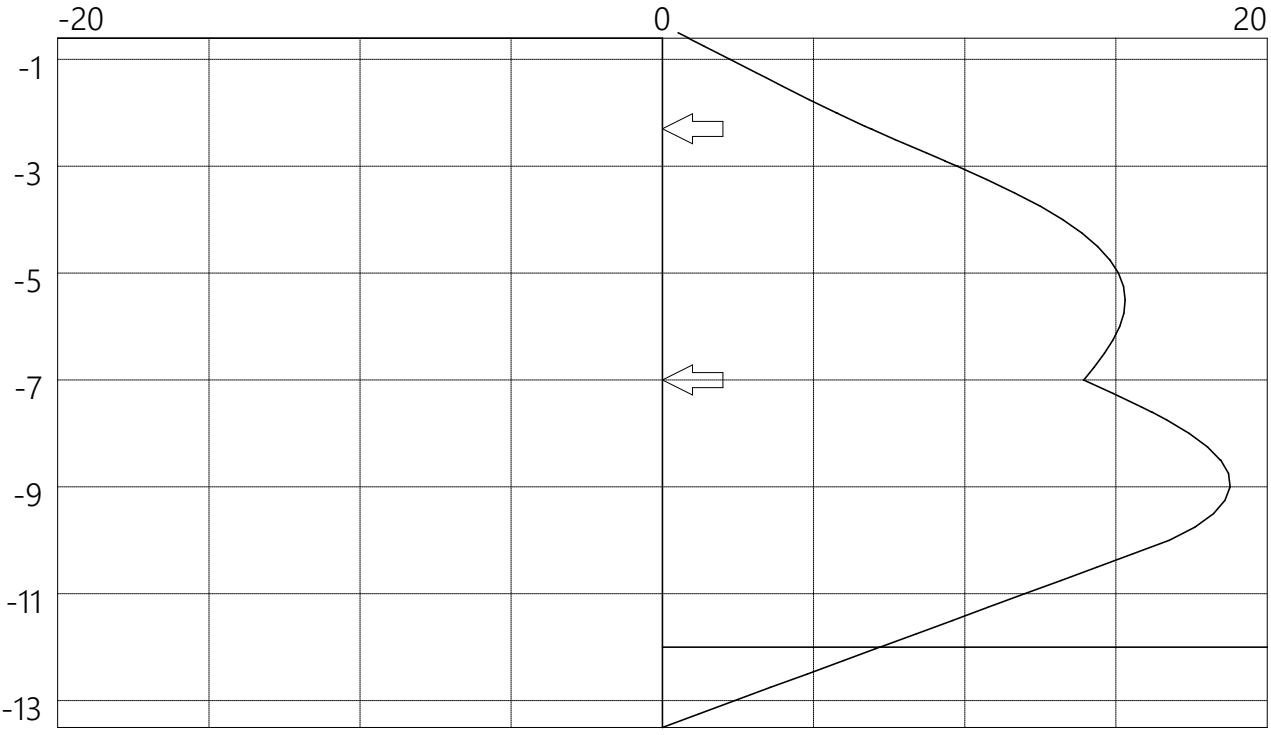
Tabular results from analysis of stage ref 7 continued...

Calc Level m	Active Vert kN/m2	Active Earth kN/m2	Active Water kN/m2	Pas' Vert kN/m2	Pas' Earth kN/m2	Pas' Water kN/m2	Total Nett kN/m2	Bend. Moment kNm/m	Shear Force kN/m	Defl't mm	Prop Force kN/m	FOS
-13.50	316.4	.0	15.0	21.0	2621.0	15.0	-2621.0	0	0	0		53.25

	Page No 8 Analysis
	Project 14210 File Name ...icro pile option.pws
Acme Ozone, Thane 12.0m exc-large dia-Zone-4	Engineer Komal Date 27/08/2019

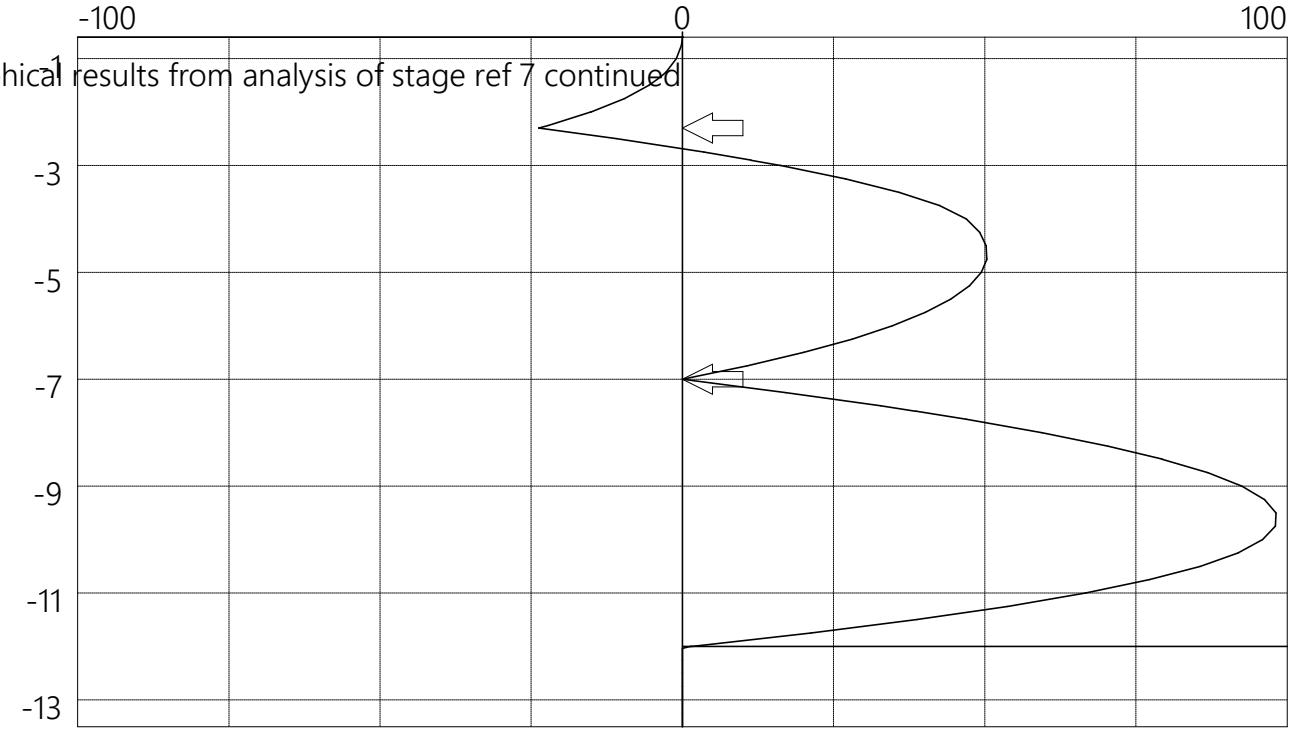
Graphical results from analysis of stage ref 7



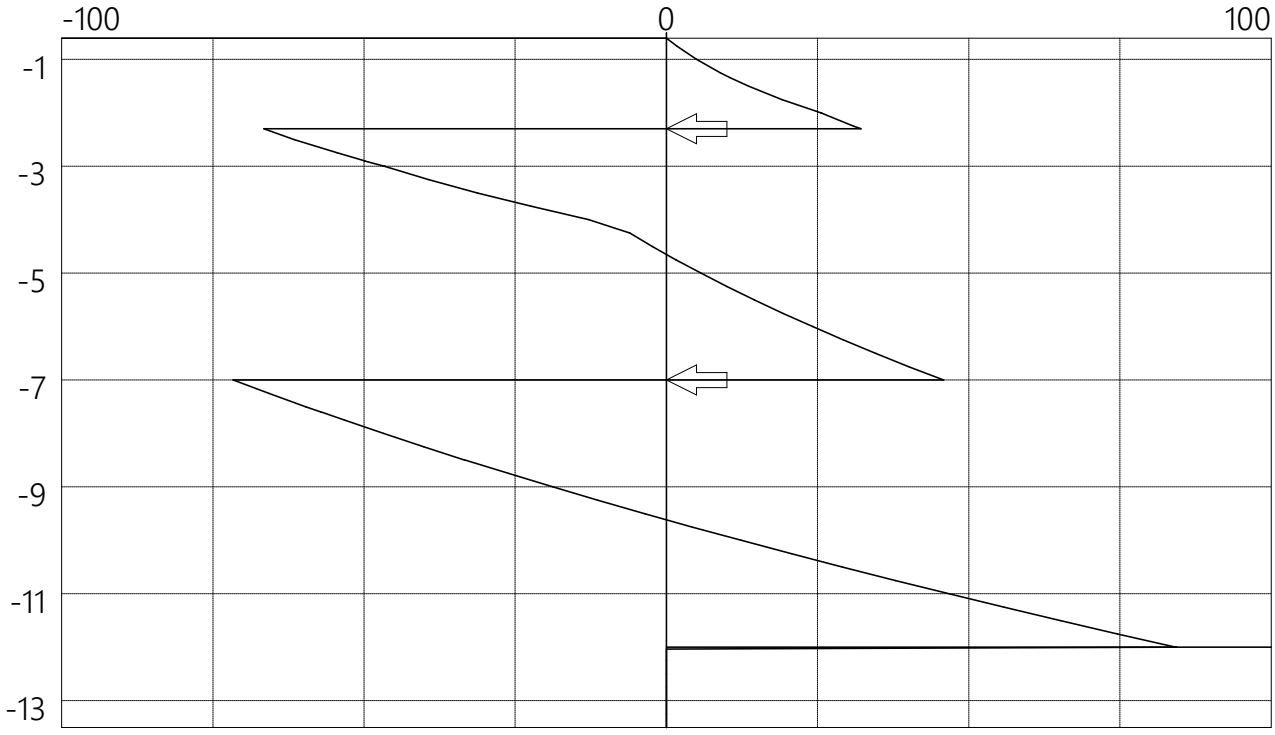


Deflection diagram (mm)

Graphical results from analysis of stage ref 7 continued



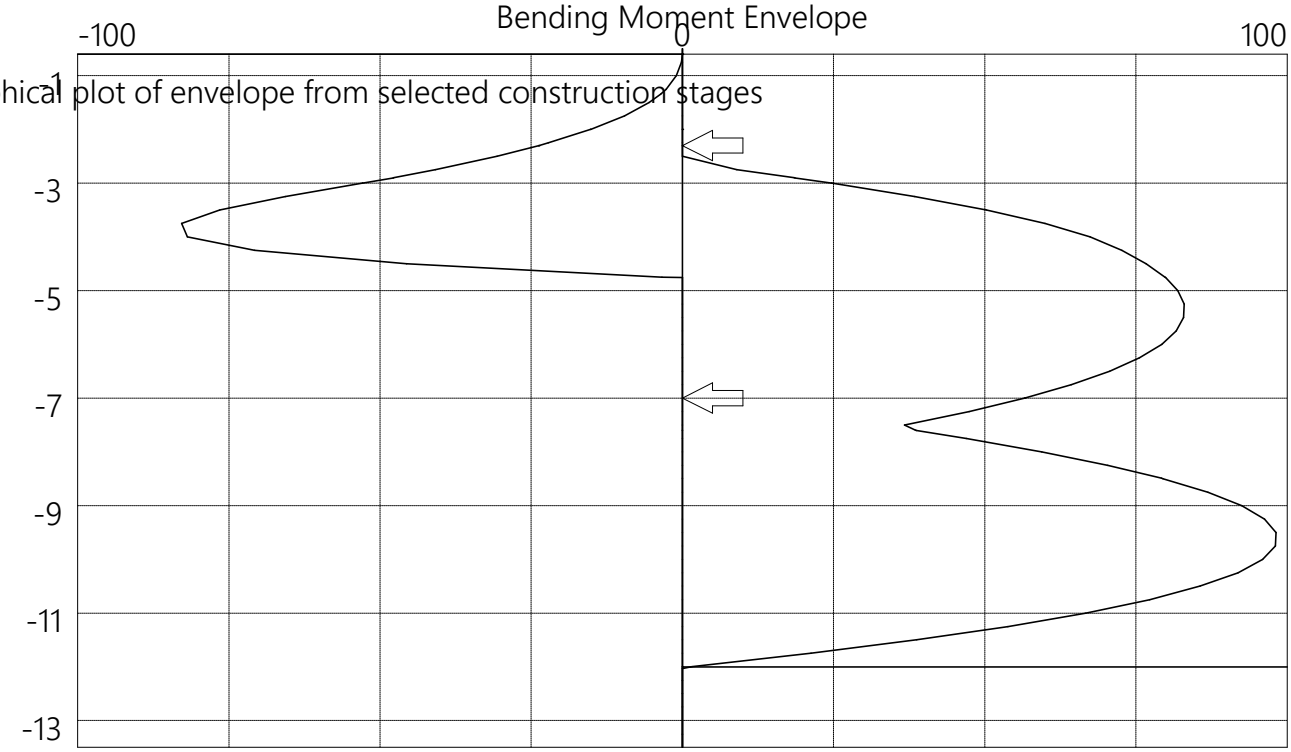
Bending Moment Diagram (kNm/m)



Shear Force Diagram (kN/m)

Bending Moment Envelope

Graphical plot of envelope from selected construction stages



Shear Force Envelope

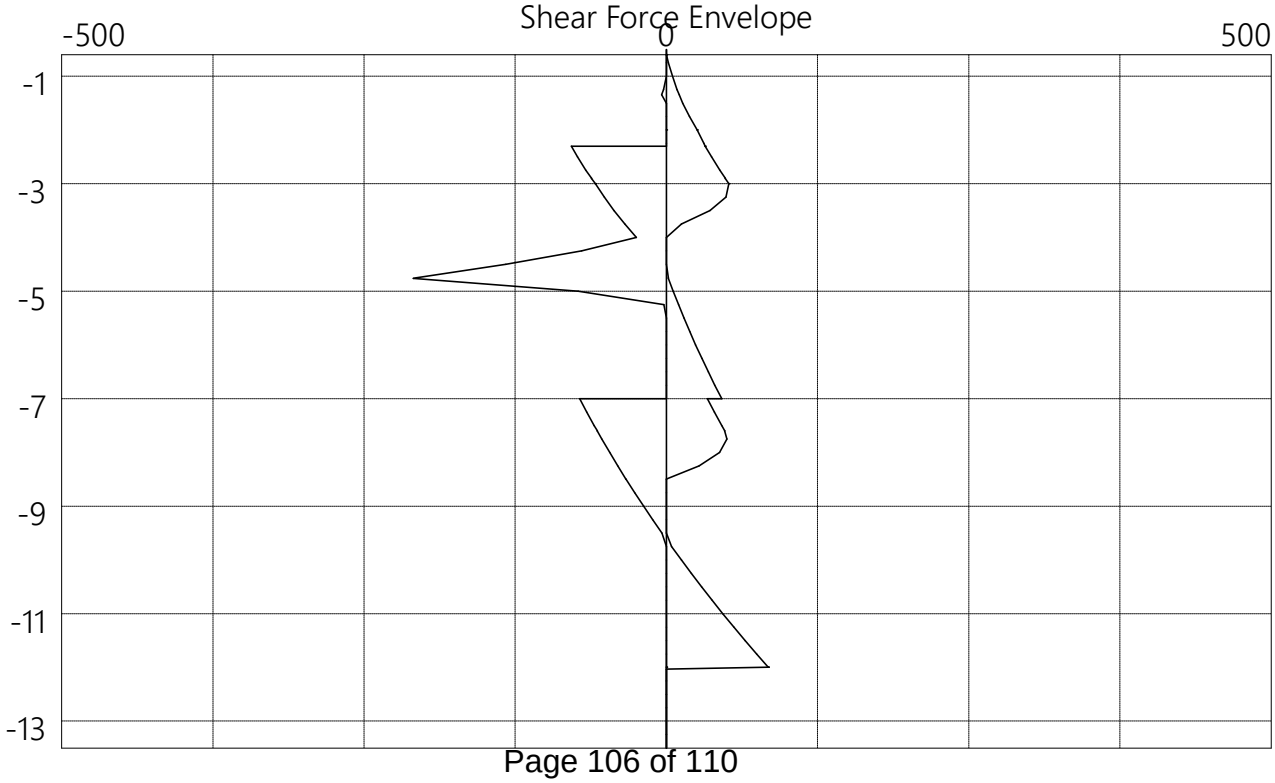


Table of envelope for wall forces

Calc Level m	Bending Minimum kNm/m	Bending Maximum kNm/m	Shear Minimum kN/m	Shear Maximum kN/m	Prop Force kN/m
-.60	.0	.0	.0	.0	
-.60	.0	.0	.0	.0	
-1.00	.0	1.0	-5.0	.0	
-1.34	.0	3.6	-10.5	4.0	
-2.00	.0	15.1	-25.5	.0	
-2.00	.0	15.1	-25.5	.0	
-2.30	.0	23.7	-32.2	.0	110.8
-2.30	.0	23.7	-32.2	78.6	
-2.90	-18.5	47.7	-48.8	62.0	
-2.90	-18.6	47.8	-48.9	61.9	
-3.00	-24.7	52.8	-51.6	58.7	
-3.00	-24.7	52.9	-51.6	58.7	
-4.00	-67.4	81.8	.0	24.9	
-4.76	-79.9	.0	-1.7	209.2	
-5.00	-81.9	.0	-5.7	73.0	
-6.00	-79.3	.0	-24.2	.0	
-7.00	-56.6	.0	-45.8	.0	117.4
-7.00	-56.6	.0	-33.8	71.6	
-7.60	-38.5	.0	-48.2	57.2	
-7.60	-38.7	.0	-48.3	57.1	
-8.00	-59.5	.0	-44.1	46.8	
-8.49	-79.2	.0	.0	33.4	
-9.00	-92.5	.0	.0	18.8	
-10.00	-96.0	.0	-12.4	.0	
-11.00	-66.7	.0	-46.8	.0	
-12.00	-1.6	.0	-84.2	.0	
-12.00	-1.4	.0	-84.3	.0	
-12.00	-1.3	.0	-84.3	.0	
-12.03	.0	.0	.0	.0	
-13.00	.0	.0	.0	.0	

Table of envelope for wall forces, continued...

Calc Level m	Bending Minimum kNm/m	Bending Maximum kNm/m	Shear Minimum kN/m	Shear Maximum kN/m	Prop Force kN/m
-13.50	.0	.0	.0	.0	

Structural design of wall

Wall section properties

Primary pile diameter	300	mm
Primary pile spacing	400	mm
Infill pile diameter		mm
Main rebar bar diameter	25	mm
Main rebar number of bars	4	

Wall material properties

Concrete cube strength	30	N/mm2
Concrete cover	25	mm
Main rebar steel grade	500	N/mm2
Ultimate load factor	1.50	

Wall structural design checks

Check description	Required or Limit	Provided or Actual	Units
Max. ultimate moment BS8110, Ultimate resistance	58	67	kNm
Maximum longitudinal steel BS8110, Max 6% by area	4241	1963	mm2
Minimum longitudinal steel BS8110, Min 0.4% by area	282	1963	mm2



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