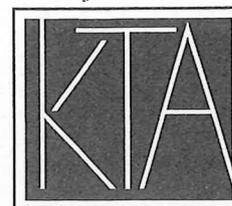


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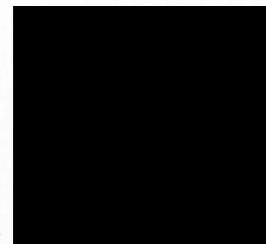
Our Ref: S3115a/MARYKNOLL_GB/25/003Lg

19 January 2026

Secretary, Town Planning Board
15/F, North Point Government Offices
333 Java Road
North Point
Hong Kong



PLANNING LIMITED
規劃顧問有限公司



Dear Sir/Madam,

**Proposed Utility Installation for Private Project,
Government Land Adjoining 44 Stanley Village Road, Stanley, Hong Kong
(Section 16 Planning Application No. A/H19/88)**

- Further Information No. 2 -

Reference is made to the captioned s.16 Planning Application scheduled for consideration by the Town Planning Board ("TPB") on 6 February 2026.

Please find the replacement pages of the Geotechnical Planning Review Report for the consideration of the relevant Government department(s).

Should you have any queries in relation to the above or attached, please do not hesitate to contact the undersigned at [REDACTED] or Mr. Benjamin Tung at [REDACTED].

Thank you for your kind attention.

Yours faithfully
For and on behalf of
KTA PLANNING LIMITED

Gladys Ng

Encl.

cc. the Applicant & Team

KT/GN/BT/vy



FS 579819

Geotechnical Planning Review Report
for
Proposed Short Term Tenancy ("STT")
for
Storm Water and Foul Water Terminal
Connections
for
Proposed Residential Redevelopment at
Maryknoll House, 44 Stanley Village Road,
Hong Kong

Oct 2025

This report is for our client and is not intended
for the use of any third party.

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Document Verification

Job title		Proposed Short Term Tenancy ("STT") for Storm Water and Foul Water Terminal Connections for Proposed Residential Redevelopment at Maryknoll House, 44 Stanley Village Road, Hong Kong			Job number SVR44
Document title		Geotechnical Planning Review Report			File reference SVR44/GPRR-STT01
Document ref					
Revision	Date	Filename			
	Oct-2025		Prepared by	Checked by	Approved by
		Name	Jacky Ip	Thomas Chui	Yau Lap Yan Terence
		Signature			
		Filename			
			Prepared by	Checked by	Approved by
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Date:	Date:	Date: Yau Lap Yan Terence Oct-2025			

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Figure

Figure 1 - Location Plan of Proposed STT

Figure 2 - Layout Plan for Footing Founding Level of Maryknoll House

Figure 3 Part Print of 1:20000 Hong Kong Geological Survey Map 15

Figure 4 GI Layout Plan

Appendix

Appendix A – SIS Report and SIMAR Records

Appendix B – Record Plans of Adjacent Structure

Appendix C – Record Plans of Adjacent Utilities

Appendix D – Ground Investigation Record

Appendix E – Schematic Architectural Drawings for Proposed STT

Appendix F – ELS Works Approval plans for Development at R.B.L. 333RP

Appendix G – Site Formation Works Approval plans for Development at R.B.L. 333RP

EXECUTIVE SUMMARY

CSI Properties Limited proposed the construction of short term tenancy (STT) for storm water and foul water terminal connections for proposed residential redevelopment at Maryknoll House, 44 Stanley Village Road, Hong Kong. For this project, the following parties are involved: -

Architect:	LWK + PARTNERS
Structural and Geotechnical Engineer:	C M Wong & Associates Ltd

This geotechnical planning review report is in support of a proposed STT application under the Town Planning Ordinance for the subject site, The proposed development is located at Maryknoll house 44 Stanley Village Road, Stanley, Hong Kong Island., Hong Kong. The application is submitted on behalf of the applicant, who currently own and occupies the site.

This report provides a review of how geotechnical features in the vicinity, such as retaining walls and/or slopes may affect, or be affected by, the proposed STT and presents an assessment of the geotechnical feasibility of the proposed development as shown on the proposed STT application.

The proposed development contains of rainwater manhole, sewage manhole, rainwater catch pit drainage services, staircase, ancillary service such as town gas , fire service, potable and flushing water pipes, utility pits and relocation of motorcycle parking space.

With reference to the discussions, it is considered that the proposed development is **geotechnically feasible**.

1. INTRODUCTION

CSI Properties Limited proposed the construction of short term tenancy (STT) for storm water and foul water terminal connections for proposed residential redevelopment at Maryknoll House, 44 Stanley Village Road, Hong Kong. For this project, the following parties are involved:-

Architect: LWK + PARTNERS
Structural and Geotechnical Engineer: C M Wong & Associates Ltd

This is the 1st submission of the “Geotechnical Planning Review Report for Proposed Short Term Tenancy (STT) for Storm Water and Foul Water Terminal Connections at Maryknoll house, 44 Stanley Village Road, Stanley, Hong Kong Island” to support the geotechnical feasibility of the proposed STT application under the Town Planning Ordinance submitted.

This report covers the followings essential contents:

- (i) A map marked up to show the site boundary, the location of the features and the details of the proposed STT.
- (ii) A review of the proposed STT that will affect or be affected by man-made slopes, retaining walls shown on the plan, and in relation to this, an assessment of the geotechnical feasibility of the proposed STT including an outline of further studies that may be required.
- (iii) A list of data sources used in compiling the report.

2. DESCRIPTION OF SITE

2.1 Site Topography

The proposed STT is located at Maryknoll house 44 Stanley Village Road, Stanley, Hong Kong Island. The working area generally located on a slope next to R.B.L. 333RP. The existing ground level approximately ranged from +28 mPD to +47 mPD. The site is surrounded by the feature No. 15NE-A/FR 189 from the west to south, residential building and the feature No. 15NE-A/C 747 at the east. The proposed STT location is shown in **Figure 1**.

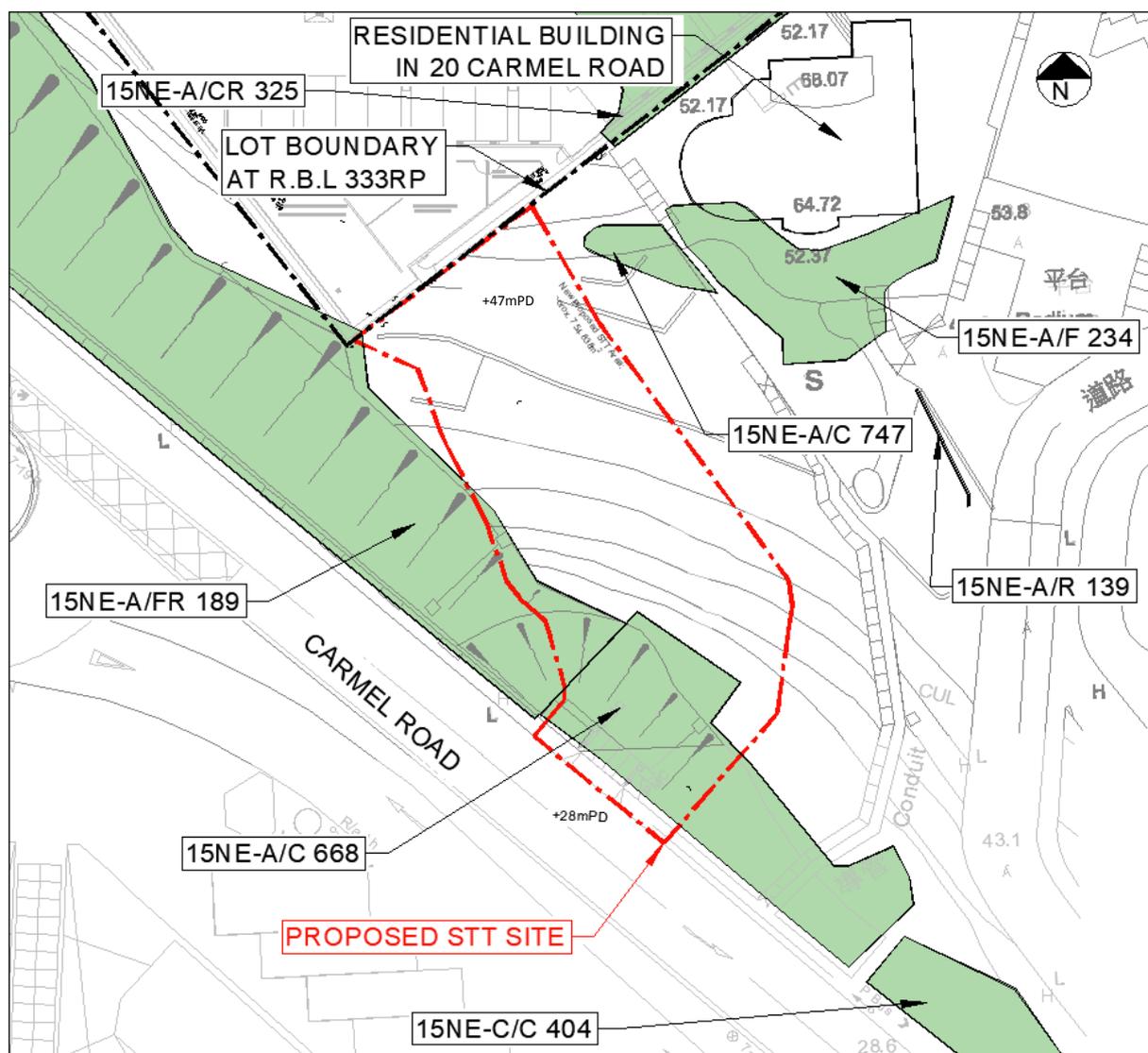


Figure 1 Location Plan of Proposed STT

2.2 Existing Registered Features

There are 7 registered features in the vicinity of the proposed STT, as shown in Figure 1, the information of the features based on Slope Information System (SIS) record are presented as follows:-

1) Feature No. 15NE-A/FR 189 (Partially within Proposed STT)

It is a slope feature located near the south-west of proposed STT, the STT encroaches the Southeastern part of this feature. This slope feature consists of slope part and wall part. Slope part is 9.5m high in maximum and 155m long with a gradient of 30 degrees while wall part has a total length of 155m, maximum height of 7m and the face angle is 90 degrees. The slope is fully covered by vegetation. Drainage channel are found along the slope, at the crest and toe of slope and wall. 80mm weepholes are provided in a spacing of 1.4m to the wall structure. There was no stage study carried out regarding the feature.

2) Feature No. 15NE-A/C 668 (Partially within Proposed STT)

Partially slope feature located at the southern within proposed STT, the STT encroaches the Northwestern part of this feature.. The Slope is 3.5m high in maximum and 30m long with a gradient of 30 degrees. The slope is fully covered by vegetation. Drainage channel are found along the slope, at the crest and toe of slope. There was no stage study carried out regarding the feature.

3) Feature No. 15NE-A/C 747 (Outside Proposed STT)

This slope feature has a total length of 10.4m, maximum height of 3.3m and an average angle of 45 degrees. The feature is located approximately 2m away from the north of STT. Drainage channel is provided along the slope. The whole slope is covered by vegetation and no weepholes are provided to the slope. There was no stage study carried out regarding the feature.

4) Feature No. 15NE-A/CR 325 (Outside Proposed STT)

This slope feature consists of slope part and wall part. Slope part has a total length of demarcated 45m, maximum height of 4.5m and an average angle of 55 degrees while wall part has a total length of 19m, maximum height of 5.5m and the face angle is 90 degrees. It is located to the south-west of proposed STT. The feature is located approximately 8m away from the north-east of STT. The slope is bare in half and covered by chunam in half. 75mm weepholes are provided

to the wall in 1.5m spacing to the wall structure. The drainage channels at the crest, toe and downpipe are provided to the wall. Stage 1 study was carried out on December 1996. Stage 2 Study was carried out for the slope in January 2001 and DH order was issued but later discharged in January 2003.

5) Feature No. 15NE-A/F 234 (Outside Proposed STT)

The feature is located near the north-east side of proposed STT. The feature is located approximately 9m away from the north-east of STT. This slope feature has a total length of 23m, maximum height of 5.8m and an average angle of 35 degrees. Drainage channel are found along the slope, at the toe of slope. The slope surface is completely covered by shotcrete. 75mm at 1.5m spacing weepholes are provided to the wall structure. There was no stage study carried out regarding the feature. The slope fulfil current safety standard and was constructed in 2006.

6) Feature No. 15NE-A/R 139 (Outside Proposed STT)

It is a wall feature located at the east of proposed STT. The feature is located approximately 15m away from the east of STT. The wall is 4.9m high in maximum and 10.3m long with a face angle of 90 degrees. 75mm weepholes are provided in a spacing of 1.5m to the wall structure. Its drainage channel can be found on the downpipe, the crest and the toe. Stage 1 study was carried out on December 1996. Stage 2 Study was carried out for the wall in April 2010, advisory letter was issued and no further action was conducted.

7) Feature No. 15NE-C/C 404 (Outside Proposed STT)

It is a slope feature located near the Southeastern side of proposed STT. The feature is located approximately 19m away from the south-east of STT. The Slope is 2.5m high in maximum and 30m long with a gradient of 30 degrees. The slope is partly covered by vegetation. Drainage channel are found along the slope, at the crest and toe of slope. There was no stage study carried out regarding the feature.

Maintenance responsibility of feature in the vicinity of the proposed development:

Feature No.	Maintenance Responsibility	Within Site Boundary
15NE-A/C 747	RBL 567	No
15NE-A/CR 325(1)	RBL 333 RP	No
15NE-A/CR 325(2)	RBL 567	No
15NE-A/CR 325(3)	RBL 1095	No
15NE-A/F 234	RBL 567	No
15NE-A/FR 189	Highways Department	Yes
15NE-A/R 139 (1)	RBL 701	No
15NE-A/R 139 (2)	RBL 1095	No
15NE-A/C 668	Highways Department	Yes
15NE-C/C 404	Highways Department	No

The records of the features are retrieved from the Slope Information System and Slope Maintenance Responsibility Information System and enclosed in **Appendix A**.

2.3 Surrounding Buildings

Maryknoll House, and a residential building in 20 Carmel Road are located in the vicinity of STT.

Maryknoll House

Maryknoll House is a 3 stores Grade I historic building. It is located at the north of proposed STT. No existing record plan can be retrieved from the Buildings Department, GI (trial pits) were carried out to verify the location and depth of the foundation. The result shows that the building is likely founded on CDG with footings. The levels of the footings are generally at +60.3 mPD based on the result of trial pits nos. TP11-17, 23, 25. The levels of the footings of the podium structure at south western portion of the building are at +57.3 mPD based on the result of trial pits nos. TP9 and TP33. Please refer to figure 3.

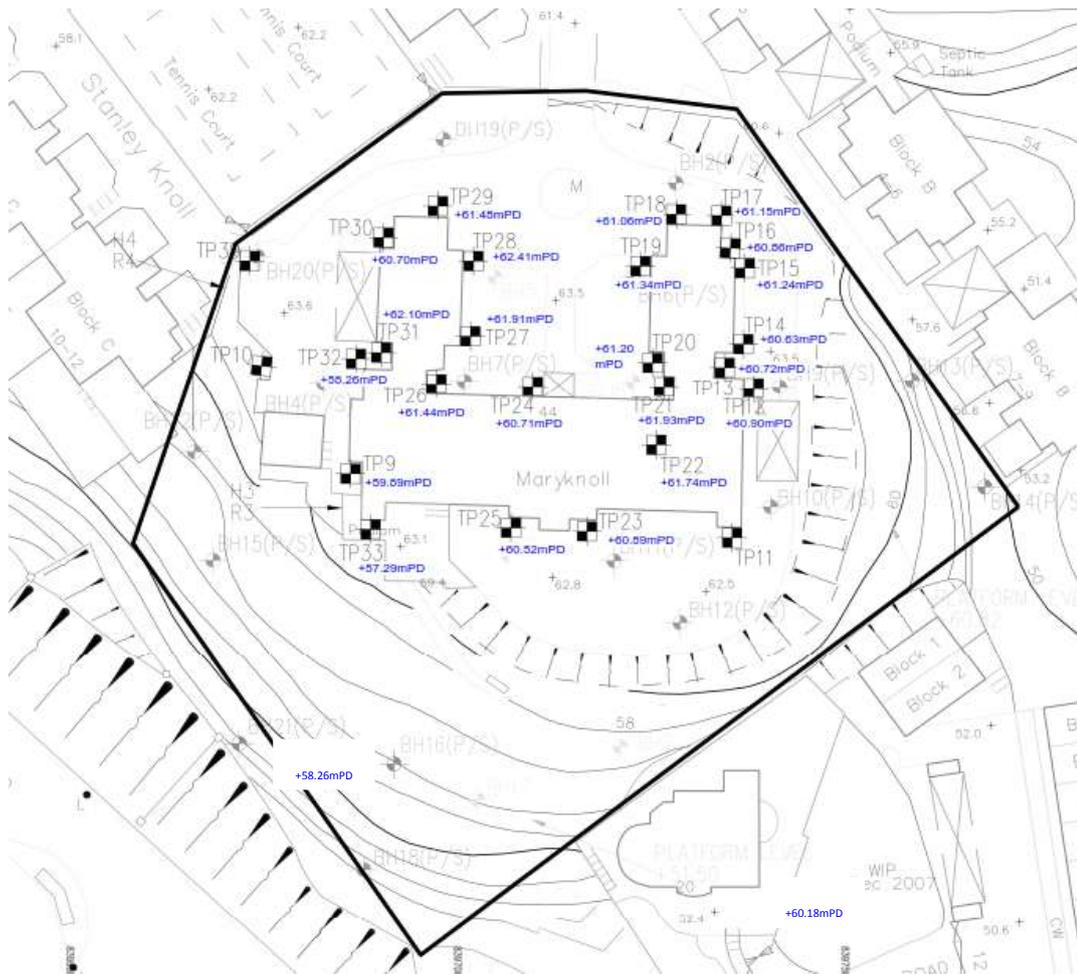


Figure 2 Layout Plan for Footing Founding Level of Maryknoll House

Residential building in 20 Carmel Road

Residential building in 20 Carmel Road, which is in R.B.L. 567, is a 4 stores residential building located at the south of the site. The building is about 10m away from the north of proposed STT. According to the record plans retrieved from the Buildings Department, the buildings are supported by footing founded on the Grade III/IV rock stratum at +45.42mPD.

The foundation record plans of these adjacent existing buildings are enclosed in **Appendix B**.

2.4 Surrounding Utilities

Relevant government departments and private utility companies have been contacted for information regarding their installation in the vicinity of proposed STT. The relevant utility records are included in **Appendix C**. The information regarding the nearby utilities is given below:

Storm Water Drain Pipe

Sewerage water drain pipe is located across the proposed STT from Northwest to Southeast along Carmel Road.

3. SITE GEOLOGY

With reference to the 1:20,000 geological map published by the Geotechnical Control Office, Hong Kong Geological Survey Map 15, the site is underlain by granite. The information obtained from the existing ground investigation results is consistent with this finding (Geological Map is enclosed in **Figure 4**).

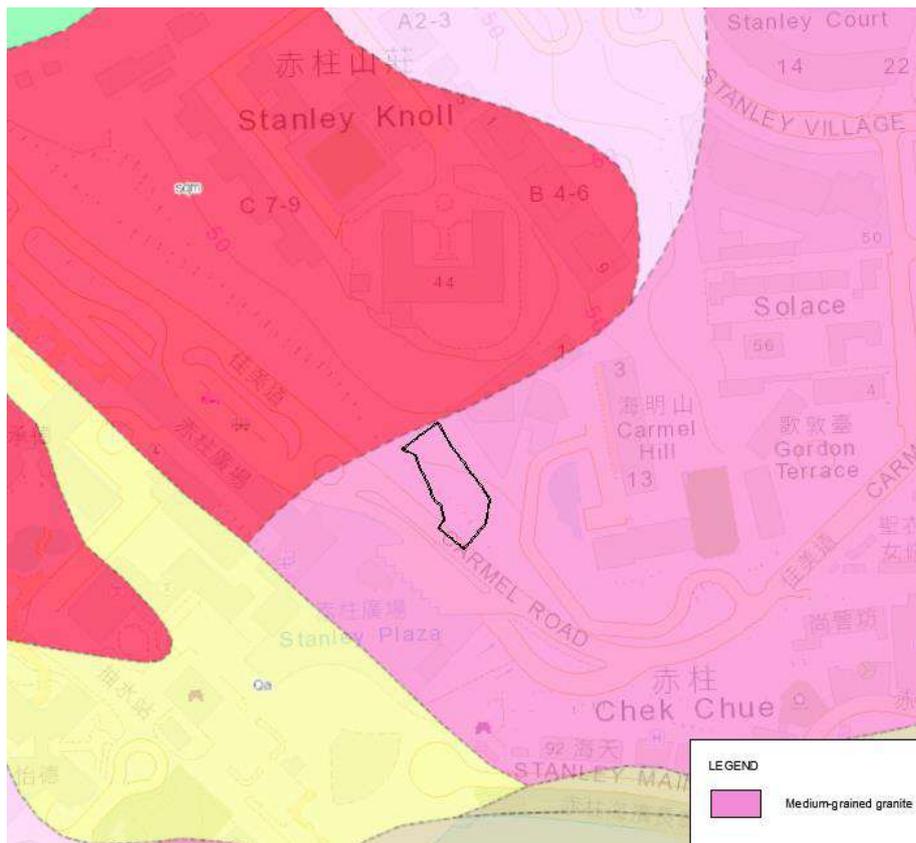


Figure 3 Part Print of 1:20000 Hong Kong Geological Survey Map 15

3.1 Ground Investigation Works

There are existing ground investigation works in surrounding area of proposed STT. The GI plan is shown in **Figure 5** and **Appendix D**. Copies of the borehole logs are attached in **Appendix D**.

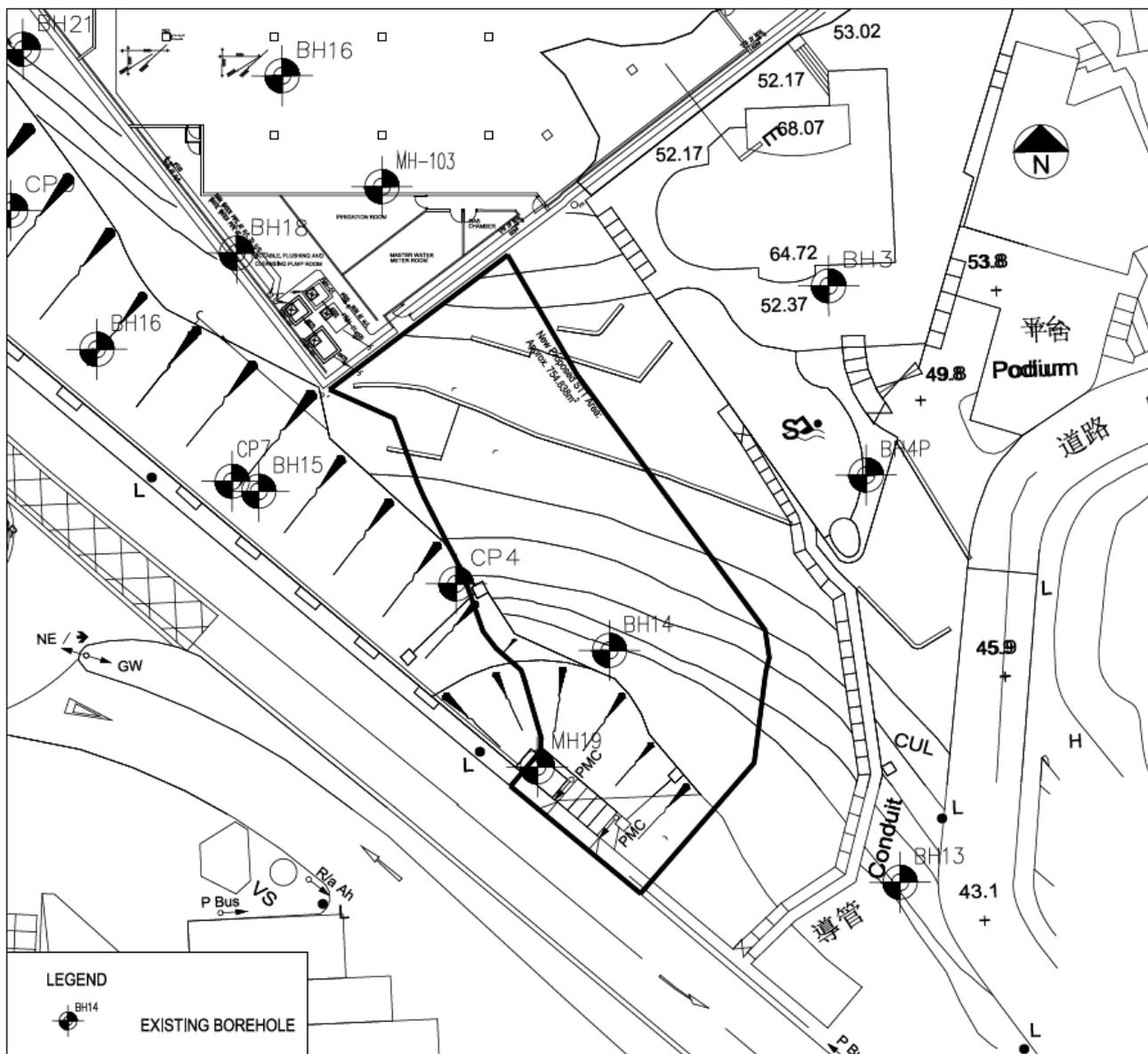


Figure 4 GI Layout Plan

A summary of findings of the existing borehole is as follows:-

GI No.	Reduced Ground Level (mPD)	Thickness of Material (m)	
		FILL	CDG
BH16	+51.22	1	10.5
BH18	+45.13	-	6.6
BH21	+42.14	0.5	13.0
CP4	+33.82	0.2	13.3
CP7	+35.41	0.2	6.4
CP9	+37.85	0.1	7.9
MH-19	+29.87	1	1.9
MH-103	+49.7	-	17.7
BH3	+46.93	1.5	7.3
BH4P	+43.42	2.5	9
BH13	+30.34	3	3.8
BH14	+32.92	0.8	9.1
BH15	+35.25	-	6.4
BH16	+37.22	-	8.5

The result of the ground investigation works revealed that the site is generally comprised of fill and completely decomposed granite. The thickness of CDG varies from 1.9 m up to 17.7 m from the bottom level of fill.

3.2 Soil and Rock

After summarizing all GI information as discussed in the previous section, it is discovered that the site is generally blanketed by a layer of FILL and COMPLETELY DECOMPOSED GRANITE (CDG), which is then underlain by GRANITE rock.

Based on the currently available results of ground investigation, general description of each stratum is outlined as below:-

- FILL– Medium dense, brownish grey, clayed silty SAND with some fine gravel sized rock fragment. Top level of FILL varies from +28.9 mPD to +51.22 mPD, and the thickness of fill layer varies from 0.2m to 3 m.
- COMPLETELY DECOMPOSED GRANITE– Extremely weak, pinkish and brownish grey, spotted with black & white, completely decomposed medium grained GRANITE. Top level of CDG varies from +50.22 mPD to +27.34 mPD, and the thickness of CDG layer varies from 4.5 m to 14.5 m.

3.3 Groundwater

5 nos. piezometer (P) were installed in various locations across the site. The water levels in piezometers were monitored in different periods. The groundwater monitoring records are summarized in the following table:-

GI No.	Existing Ground Level (mPD)	Piezometer	
		H.G.W.L. (mPD)	L.G.W.L. (mPD)
BH16	+51.22	Dry	Dry
BH18	+45.13	Dry	Dry
BH21	+42.14	Dry	Dry
CP4	+33.82	22.22	22.19
CP7	+35.41	Dry	Dry
CP9	+37.85	30.73	30.64
MH-103	+49.7	37.9	37.21
BH4P	+43.42	32.58	32.15

For design purposes, the design groundwater level is assumed to be retaining Height / 3, rockhead level + 2m or highest measured groundwater level, whichever is higher, for each design section for both serviceability limit state and ultimate limit stage. The design groundwater level for each design section shall be discussed in the detail design.

4. PROPOSED WORKS

Short Term Tenancy (STT) for Storm Water and Foul Water Terminal Connection are proposed. The proposed STT is described in the Schematic Architectural Drawings for Proposed STT, which is enclosed in **Appendix E**.

The proposed works involves construction of rainwater manhole, sewage manhole, rainwater catch pit, drainage services, ancillary service such as town gas , fire service, potable and flushing water pipes, utility pits, staircase and relocation of motorcycle parking space and excavation & lateral support. Some construction works would be carried out on the existing feature 15NE-A/C 668 and 15NE-A/FR 189 .

In view of the presence of sensitive receivers, Maryknoll House (Grade I historic building) and residential buildings in vicinity of the subject site, the proposed works, especially the ELS works, should be designed to minimize the effect to the nearby sensitive receivers.

The details of proposed works and the effects on the surrounding buildings/structure and existing features are discussed in Section 5.

5. GEOTECHNICAL CONSIDERATIONS

5.1 Founding Material

In accordance with the Code of Practice for Foundation (BD,2017), the presumed allowable bearing pressure of 100kPa (if dry) may be used for design of footing of minor structures (such as manholes, catchpits, utility pits and staircase) on flat ground and founded on granular material. Stability Checking on slope will be carried out in detailed design stage.

5.2 Proposed Excavation Works

The maximum retaining height is about 2.5m along the natural slope. It is proposed to install Sheet pile wall or channel planking to retain the level different between the existing ground and proposed excavation level at the site. The typical section for proposed STT is attached in appendix E.

The approval plan for the ELS works at R.B.L. 333RP is attached in **appendix F**.

In the design of ELS works, surcharge from the existing adjoining buildings and traffic load would be taken into account. ELS design shall be in accordance with GEO Publication No. 1/2023. The ELS works should be designed in a manner that the effect of the proposed works should be minimal and does not cause adverse effects on adjacent grounds, features and structures.

5.3 Proposed Works Carried on Feature

Construction for the proposed storm water and foul water terminal connections would be carried partly on feature 15NE-A/C 668 and 15NE-A/FR 189. The stability of slope will be carried out in detailed design stage. It is anticipated that no new slope or retaining structure would be formed. There is no significant level difference between the existing ground profile and the final formation levels for the proposed STT. The proposed works will be designed such that the effect to the existing features will be insignificant.

The approval plan for the Site Formation works at R.B.L. 333RP is attached in **appendix G**.

5.4 Effects on Existing Features

The effect to the features in the vicinity of the proposed STT are presented as follows:-

Feature No. 15NE-A/FR 189 (Partially within Proposed STT)

It is a slope feature located near the south-west of proposed STT. This slope feature consists of slope part and wall part. Slope part is 9.5m high in maximum and 155m long with a gradient of 30 degrees while wall part has a total length of 155m, maximum height of 7m and the face angle is 90 degrees. Sheet pile wall or channel planking would be installed along the alignment of the utility, drainage pipes and staircase near the feature. The feature would be modified to facilitate the building construction. Stability checking would be included in the detailed design of ELS works. The effect of the proposed works to feature will be reviewed in the detailed design stage.

According to the SIS report, Various services are present in the feature, such as cable, electricity, gas, watermains etc., are located on toe, crest and on slope. As the proposed STT encroaches the feature, utility shall be verified / detected on site prior to the proposed works, if found necessary, utility diversion / modification works would be carried out to maintain the service.

Feature No. 15NE-A/C 668 (Partially within Proposed STT)

It is a wall feature located at the south of the proposed STT. The Slope is 3.5m high in maximum and 30m long with a gradient of 30 degrees. The feature would be modified to facilitate the building construction. Stability checking would be included in the detailed design of ELS works.

According to the SIS report, Various services are present in the feature, such as cable, electricity, gas, watermains etc., are located on toe and crest. As the proposed STT encroaches the feature, utility shall be verified / detected on site prior to the proposed works, if found necessary, utility diversion / modification works would be carried out to maintain the service.

Feature No. 15NE-A/C 747 (Outside Proposed STT)

This slope feature has a total length of 10.4m, maximum height of 3.3m and an average angle of 45 degrees. The feature is located approximately 2m away from the south of the proposed STT. Sheet pile wall or channel planking would be installed along the alignment of the utility, drainage pipes and staircase near the feature. The effect of the proposed works to feature will be reviewed in the detailed design stage. The proposed works will be designed such that the effect to this feature will be insignificant.

Feature No. 15NE-A/CR 325 (Outside Proposed STT)

This slope feature consists of slope part and wall part. Slope part has a total length of demarcated 45m, maximum height of 4.5m and an average angle of 55 degrees while wall part has a total length of 19m, maximum height of 5.5m and the face angle is 90 degrees. It is located to the north outside the proposed STT. The feature is located 8m away from the proposed working area. The proposed works will be designed such that the effect to this feature will be insignificant.

Feature No. 15NE-A/R 139 (Outside Proposed STT)

It is a wall feature located at the east of the proposed STT. The wall is 4.9m high in maximum and 10.3m long with a face angle of 90 degrees. 75mm weepholes are provided in a spacing of 1.5m to the wall structure. Since the feature located at 15m away from the proposed working area, It is anticipated that the proposed work imposes negligible effect to this feature.

Feature No. 15NE-C/C 404 (Outside Proposed STT)

It is a wall feature located at the south of the proposed STT. The Slope is 2.5m high in maximum and 30m long with a gradient of 30 degrees. Since the feature located at 18m away from the proposed working area, It is anticipated that the proposed work imposes negligible effect to this feature.

Feature No. 15NE-A/F 234 (Outside Proposed STT)

The feature is located near the north-east side of the proposed STT. This slope feature has a total length of 23m, maximum height of 5.8m and an average angle of 35 degrees. Since the feature located at 10m away from the proposed working area, It is anticipated that the proposed work imposes negligible effect to this feature.

5.5 Effects on Surrounding Buildings/ Structures

Refer to the site location plan, Maryknoll House, and a residential building in R.B.L. 567 are located in the vicinity of the site.

Maryknoll House

Maryknoll House is a 3 stores Grade I historic building. The low-profile structures are likely founded on shallow foundation. 70kPa was adopted as vertical surcharge for the Marryknoll House. The distance between the site and the buildings is about 40m, which is outside the influence zone of the ELS work. It is anticipated that the proposed work imposes negligible effect

to this building.

Residential building in 20 Carmel Road

Residential building in 20 Carmel Road, which is in R.B.L. 567, is a 4 stores residential building located at the south of the proposed STT. The minimum distance between the site and the buildings is about 10m. According to the record plans retrieved from the Buildings Department, the buildings are supported by footing founded on the Grade III/IV rock stratum at +45.42mPD.

5.6 Effects on Adjacent Services and Utilities

Sewerage Water Drain Pipe

Sewerage water drain pipe is located across the proposed STT from Northwest to Southeast along Carmel Road. The proposed works will be designed such that the effect to these will be insignificant.

In addition, As the existing Sewerage water pipe encroaches the proposed works, the exact alignment, size and depth shall be verified / detected on site prior to the proposed works, if found necessary, utility diversion / modification works would be carried out to maintain the service.

5.7 Proposed relocation of motorcycle parking space works

Subject to the proposed STT, rainwater manhole, sewage manhole, rainwater catch pit drainage services, staircase, ancillary service such as town gas, fire service, potable and flushing water pipes are proposed to be constructed and 4 existing motorcycle parking space is affected. Therefore relocation of motorcycle parking space is proposed along Carmel road. The proposed.

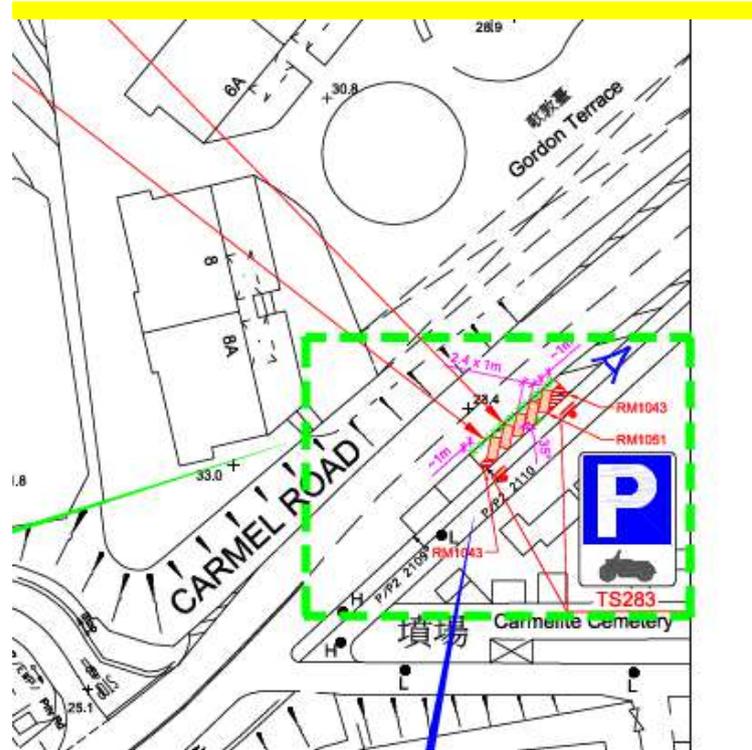


Figure 5 Part plan of relocated motorcycle parking space

The relocated motorcycle parking space is located on the toe of existing feature 15NE-C/C220 and the crest of existing feature 15NE-C/C245. As the proposed works does not involve the change of facility at crest / at toe for those features, eg. Road/footpath with moderate traffic density, and no additional surcharge is expected due to the proposed relocation, further assessment on those features are unnecessary and the geotechnical effect from propose relocation is tolerable.

6. PRECAUTIONARY MEASURE TO MINIMIZE THE IMPACT ON ADJACENT STRUCTURE

Monitoring Check Point at the wall structure and utilities

Tilting Check Points are added to the wall structures nearby to monitor the impact during the construction stage to monitor the movement of adjacent structure, which prevent excessive movement during the construction work.

7. MONITORING PROGRAMME

In order to monitor the effects of the proposed works to the adjacent ground, vibration checkpoints, utility settlement check points, ground settlement checkpoints, tilting checkpoints and standpipes are proposed to be installed around the site. The locations of these monitoring checkpoints are shown in the monitoring plan of the relevant submission. The conditions of the adjacent utilities will be closely monitored. All monitoring points should be monitored daily. The results of the monitoring shall be frequently reviewed by the Contractor and the Engineer. The initial readings of all the above monitoring points will be taken prior to the commencement of the construction works on site.

Monitoring will be carried out throughout the whole construction work period. Ground settlement, tilting, groundwater level and vibration will be closely monitored to ensure stability of existing ground, structures.

Alert, Alarm and Action Level for Monitoring

According to PNAP-137, different structures will have different tolerance in accommodating movements, acceptance of estimated ground settlements should be considered on a case-by-case basis. The AAA level would be detail discussed in the design stage of the relevant submission.

When the alert level is reached, the Engineer shall be informed. The Engineer shall review the situation and increase the monitoring frequency if found necessary.

When the alarm level is reached, the Engineer shall review the design and check whether any additional works would be required.

When the action level is reached, all works shall be ceased immediately and the Engineer shall be informed. The works shall not recommence until remedial proposal to the satisfaction of the Engineer has been implemented.

8. CONCLUSION

The report has discussed all the relevant issues regarding the geotechnical impact of the proposed STT at Maryknoll house 44 Stanley Village Road, Stanley, Hong Kong Island, Hong Kong as shown on the proposed STT application under the Town Planning Ordinance.

The proposed STT is carried on the feature 15NE-A/FR 189 and 15NE-A/C 668, the effect on **the features, structures and utilities in the vicinity** will be reviewed in the detailed design stage. If necessary, upgrading works will be proposed in detailed design stage. It is anticipated that the proposed STT imposes negligible effect to the adjacent buildings and features.

With reference to the preceding discussions, it is considered that the proposed STT is **geotechnically feasible**.

9. List of REFERENCE

- Geoguide 1 Guide to Retaining Wall Design (2017);
- GEO Publication No. 1/2023;
- Geospec 1 Model Specification for Prestressed Ground Anchors
- Code of Practice for Foundation, 2017
- CIRIA R113 Control of Groundwater for Temporary Works
- GEO's slope Information System
- 1:20000-scale geological maps

Appendix D
Ground Investigation Record



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 122 of 1990

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

CP4

SHEET 1 OF 2

JOB NO. & LOCATION: Ma Hang Phase 2 Development (W.O. 115)

METHOD: ROTARY GROUND LEVEL: 33.82 mPD

COORDS E. 839705.09

MACHINE: Long Year ORIENTATION: VERTICAL

N. 809016.70

HOLE DIA: 140mm 114mm 101mm
0.00m --- 4.50m --- 13.50m --- 18.70m

DATE: 10.3.92 TO 11.3.92

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
10/3	P		80						0.00	+33.82				
								Inspection pit	0.20	+33.62		Loose, dark brown silty SAND (COLLUVIUM)		
									1.00					
							N=16	1	2.45					
								2	3.00			Extremely weak, light brown, greyish pink, completely decomposed coarse grained GRANITE	V	
								3	3.50			(Medium dense, silty SAND)		
							N=16	4	4.00					
								5	4.45					
								6	5.00					
								7	5.50					
								8	6.00	+27.82				
								9	6.30	+27.52		Moderately decomposed coarse grained GRANITE, highly decomposed in part (CORE STONE)	III	
								10	7.00					
								11	7.50					
								12	8.00			Extremely weak to very weak, light brownish pink with some white speckle, completely decomposed coarse grained GRANITE	V	
							N=187	13	8.45			(Very dense, slightly silty SAND below 12.50m with rock fragments)		
								14	9.00					
10/3		2.85m at 18:00						15	9.50					
11/3		9.00m at 8:00						16						
10/3	H		80					17	10.00	+23.82				

- Legend
- Samples:
- Small disturbed
 - ⬇ Large disturbed
 - ▬ U76 undisturbed
 - ▬ U100 undisturbed
 - ▬ Mazier
 - Liner sample
 - ▬ Piston sample
 - Water sample
 - ↓ Standard penetration test
 - ⊥ Permeability test
 - ▲ Piezometer test
 - ⊕ Standpipe test
 - ≡ Water table

Remarks:

- Excavated an Inspection Pit from depth 0.00m-1.50m
- Installed a Piezometer at depth 13.65m, with sandpacket from depth 12.85m-14.15m

Logged by : S.P.Su
Checked by : Chan



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 122 of 1990

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

CP4

SHEET 2 OF 2

JOB NO. & LOCATION: Ma Hong Phase 2 Development (W.O. 115)

METHOD: ROTARY GROUND LEVEL: 33.82 mPD

COORDS E. 839705.09

MACHINE: Long Year ORIENTATION: VERTICAL

N. 809016.70

HOLE DIA: 0.00m ^{140mm} 4.50m ^{114mm} 13.50m ^{101mm} 18.70m

DATE: 10.3.92 TO 11.3.92

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
11/3	H		80				N=196		10.00	+23.82				
				90					10.45			Extremely weak to very weak, light brownish pink with some white speckle, completely decomposed coarse grained GRANITE	V	
									11.00					
									11.50					
									12.00			(Very dense, slightly silty SAND below 12.50m with rock fragments)		
									12.16					
									12.50					
	13.50m H			80					13.00					
									13.50	+20.32				
				100	100	3			14.00			Moderately strong, light brownish pink with white speckle, moderately decomposed coarse grained GRANITE medium to widely spaced joint dipping 0°-5° occasionally 50°	III	
									14.75					
				100	88	3			15.00					
									16.00					
				100	100	5		T2	16.43					
									17.00					
				100	93	7			17.50					
									18.00					
				100	98	8			18.70	+15.12				
11/3			80						19.00			Operation stopped at 18.70m		
									20.00					

Legend

- Samples:
- Small disturbed
 - ◄ Large disturbed
 - ▨ U76 undisturbed
 - ▩ U100 undisturbed
 - ▧ Mazier
 - Liner sample
 - ▩ Piston sample
 - Water sample
 - ↓ Standard penetration test
 - ⊥ Permeability test
 - ⊕ Piezometer test
 - ⊗ Standpipe test
 - ⊗ Water table

Remarks:

Logged by : S.P.Su
Checked by : Chan



INTRUSION - PREPAKT
(FAR EAST) LIMITED

DRILL / BORE HOLE LOG

CONTRACT NO.: 122 of 1990

CLIENT : H.K.H.A.

DRILLHOLE NO.:

CP7

SHEET 1 OF 2

JOB NO. & LOCATION: Ma Hong Phase 2 Development (W.O. 115)

METHOD: ROTARY

GROUND LEVEL: 35.41 mPD

COORDS E. 839688.83

MACHINE: Long Year (D50)

ORIENTATION: VERTICAL

N. 809024.75

HOLE DIA: 0.00m 140mm 114mm 101mm 78mm
2.50m 5.50m 8.00m 11.51m

DATE: 12.3.92 TO 13.3.92

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
12/3	P		80						0.00	+35.41		Loose, dark brown, silty SAND (FILL)		
								Inspection pit	0.15	+35.25				
									1.00			Extremely weak, light yellowish brown completely decomposed coarse grained GRANITE (Medium dense, slightly silty SAND)	V	
	2.50m P			100				T2	2.00	+33.41				
	H								2.30	+33.11		Moderately decomposed coarse grained GRANITE	III	
							N=12	1	2.95					
				85				2	3.00					
									4.00			Extremely weak, light pinkish brown, completely decomposed coarse grained GRANITE (Medium dense, slightly silty SAND)	V	
							N=15	3	4.95					
				85				4	5.00					
	6.50m H								6.00					
									6.50	+28.91				
									6.75	+28.66		Moderately decomposed coarse grained GRANITE	III	
									7.00					
				99	88	2			8.00					
12/3		3.20m at 18:00							8.00					
13/3		6.55m at 8:00							9.00			Strong, light greyish pink, slightly decomposed coarse grained GRANITE, medium to widely spaced joint dipping 10°-20°	II	
				100	100	1		TNW	9.30					
									10.00	+25.41				
13/3			80											

Legend

Samples:

- Small disturbed
- ↑ Large disturbed
- ▬ U76 undisturbed
- ▬ U100 undisturbed
- ▨ Mazier
- Liner sample
- ▨ Piston sample
- ▲ Water sample
- ↓ Standard penetration test
- ⊥ Permeability test
- ▲ Piezometer test
- ⊕ Standpipe test
- ≡ Water table

Remarks:

- 1 Excavated an Inspection Pit from depth 0.00m-1.50m
- 2 Installed a Piezometer at depth 6.65m, with sandpocket from depth 5.85m-7.15m

Logged by : S.P.Su

Checked by : Chan



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 122 of 1990

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

CP7

SHEET 2 OF 2

JOB NO. & LOCATION: Ma Hang Phase 2 Development (W.O. 115)

METHOD: ROTARY GROUND LEVEL: 35.41 mPD

COORDS E. 839688.83

MACHINE: Long Year (D50) ORIENTATION: VERTICAL

N. 809024.75

HOLE DIA: 140mm 114mm 101mm 76mm
0.00m 2.50m 5.50m 8.00m 11.51m

DATE: 12.3.92 TO 13.3.92

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
13/3			80	100	90	2			10.00	+25.41	+	Strong, light greyish pink, slightly decomposed coarse grained GRANITE, medium to widely spaced joint dipping 10'-20'	II	
								10.55		+				
				100	100	0		11.00		+				
13/3			80						11.51	+23.90	+	Operation stopped at 11.51m		
									12.00					
									13.00					
									14.00					
									15.00					
									16.00					
									17.00					
									18.00					
									19.00					
									20.00					

- Legend
- Samples:
- Small disturbed
 - ⬆ Standard penetration test
 - ⬇ Large disturbed
 - ⬇ Permeability test
 - ▬ U76 undisturbed
 - ▬ Piezometer test
 - ▬ U100 undisturbed
 - ⊕ Standpipe test
 - ⊗ Mazier
 - ⊗ Water table
 - Liner sample
 - ▭ Piston sample
 - Water sample

Remarks:

Logged by : S.P.Su
Checked by : Chan



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 122 of 1990

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

CP9

SHEET 1 OF 2

JOB NO. & LOCATION: Ma Hang Phase 2 Development (W.O. 115)

METHOD: ROTARY GROUND LEVEL: 37.85 mPD

MACHINE: Long Year (D50) ORIENTATION: VERTICAL

COORDS E. 839671.34
N. 809047.02

HOLE DIA: 140mm 114mm 101mm 76mm DATE: 14.3.92 TO 17.3.92
0.00m 3.50m 8.00m 8.80m 13.06m

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.O.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
14/3	P		80						0.00	+37.85		Loose, dark brown, silty SAND (FILL)		
									0.10	+37.75		Loose to medium dense, light pinkish brown silty SAND (RESIDUAL SOIL)		
				100	91	N.I.		T2	0.60					
									1.00	+36.70		Moderately decomposed coarse grained GRANITE (CORE STONE)		
									1.15					
							N=15		1.95			Extremely weak, light brownish pink, completely decomposed coarse grained GRANITE (Medium dense to dense, silty SAND)		
								1	2.00					
14/3		NH at 18:00						2	3.00					
16/3	3.50m P H	3.25m at 8:00					N=20		3.95					
								3	4.00					
								4	5.00					
							N=27		5.95					
								5	6.00					
								6	7.00					
							N=52		7.00					
								7	8.00	+29.85		Moderately decomposed coarse grained GRANITE		
				100	92	1		T2	8.10	+29.75				
									9.00			Strong, light greyish pink with dark green speckle, slightly decomposed coarse grained GRANITE, very widely spaced tight joint dipping 5°-10°		
									9.30					
				100	83	3			9.80					
16/3	8.00m H		80						10.00	+27.85				

Legend

Samples:

- Small disturbed
- ↓ Standard penetration test
- ↑ Large disturbed
- ↓ Permeability test
- ▬ U76 undisturbed
- ▬ U100 undisturbed
- ▬ Mazier
- ▬ Piezometer test
- ▬ Standpipe test
- ▬ Liner sample
- ▬ Piston sample
- ▬ Water sample
- ▬ Water table

Remarks:

- 1 Excavated an Inspection Pit from depth 0.00m-0.60m
- 2 Installed a Piezometer at depth 8.15m, with sandpocket from depth 7.35m-8.55m

Logged by : S.P.Su
Checked by : Chan



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 122 of 1990

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

CP9

SHEET 2 OF 2

JOB NO. & LOCATION: Ma Hang Phase 2 Development (W.O. 115)

METHOD: ROTARY GROUND LEVEL: 37.85 mPD

MACHINE: Long Year (D50) ORIENTATION: VERTICAL

COORDS E. 839671.34
N. 809047.02

HOLE DIA: 140mm 114mm 101mm 76mm
0.00m 3.50m 8.00m 9.80m 13.06m

DATE: 14.3.92 TO 17.3.92

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone	
16/3			80	100	100	0		TNW	10.00	+27.85	+	Strong, light greyish pink with dark green speckle, slightly decomposed coarse grained GRANITE, very widely spaced tight joint dipping 5'-10'			
				100	100	2			11.01		+				
				100	100	0			11.55		+				
	3.40m at 18:00			100	100	0			12.00		+				
16/3				100	100	0			12.55		+				
17/3		7.04m at 8:00	80						13.06	+24.79	+	Operation stopped at 13.06m			
17/3									14.00						
									15.00						
									16.00						
									17.00						
									18.00						
									19.00						
									20.00						

Legend

- Samples:
- Small disturbed
 - ↑ Large disturbed
 - ▬ U76 undisturbed
 - U100 undisturbed
 - ▨ Mazier
 - Liner sample
 - ▩ Piston sample
 - ▲ Water sample
 - ↓ Standard penetration test
 - ⊥ Permeability test
 - ⊕ Piezometer test
 - ⊖ Standpiv test
 - ⊗ Water table

Remarks:

Logged by : S.P.Su
Checked by : Chan



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 122 of 1990

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

MH19

SHEET 1 OF 1

JOB NO. & LOCATION: MA HANG PHASE 2 (W.O. 50)

METHOD: ROTARY

GROUND LEVEL: 29.87 mPD

COORDS E. 839710.91

MACHINE: TOHO

ORIENTATION: VERTICAL

N. 809002.27

HOLE DIA: 140mm 89mm 76mm
0.00m --- 2.92m --- 4.43m --- 9.75m

DATE: 16.11.91 TO 16.11.91

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.O.D. %	Fracture index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
16/11	H		70						0.00	+29.87		Dark yellowish brown, silty SAND with gravel (FILL)		
									1.00	+28.87		Extremely weak, light pinkish brown, Completely Decomposed medium grained GRANITE	V	
	2.95m H N						N=65	1	2.00			(Very dense, silty SAND with fine gravel)		
								TNW	2.45					
									2.92	+26.95		Moderately strong, pinkish brown spotted dark green, Moderately Decomposed medium grained GRANITE, limonite stained at medium spaced rough planar and undulating very narrow aperture joint, dipping 30° (3.94m - 4.43m grade IV)	III	
	4.43m N								3.91				IV	
									4.43	+25.44				
									5.00					
									5.83					
									6.00					
									6.83					
									7.00					
									7.33					
									8.00					
									8.65					
									9.00					
		6.30m at 18:00	70						9.75	+20.12				
16/11									10.00			Operation stopped at 9.75m		

Legend

Samples:

- Small disturbed
- ↑ Large disturbed
- U76 undisturbed
- U100 undisturbed
- ▣ Mazler
- Liner sample
- ▢ Piston sample
- ▲ Water sample
- ↓ Standard penetration test
- ⊥ Permeability test
- ▲ Piezometer test
- ⊕ Standpipe test
- ≡ Water table

Remarks:

Logged by : S.P.SU
Checked by : CHAN



Gammon Construction Limited
Geotechnical Contracting Department

CONTRACT NO.: 91 OF 1992

CLIENT : H.K.H.A.

DRILLHOLE NO.:

MH-103

SHEET 1 OF 3

JOB NO. & LOCATION: W.O. NO. 56 MA HANG VILLAGE REDEVELOPMENT PHASES 2 & 3

METHOD: ROTARY GROUND LEVEL: 49.70 mPD

MACHINE: D2G-16 ORIENTATION: VERTICAL COORDS E. 839700.19
N. 809047.86

HOLE DIA: 0.00m-141mm-4.00m-118mm-17.74m-101mm-26.38m DATE: 21/9/93 TO 23/9/93

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
21/9	PX								0.00	+49.70				
							N=7		1.00			Loose, pinkish brown, clayey silty medium to coarse SAND. (RESIDUAL SOIL)	VI	
									2.00					
									2.45					
									3.00					
									3.20	+46.50				
	4.00m PX HX								4.00					
									5.00			Extremely weak, pink to brownish pink mottled with white, completely decomposed, medium to coarse grained GRANITE. (Medium dense, clayey silty medium to coarse SAND)	V	
							N=14		6.00					
									6.45					
									7.00					
									8.00					
									9.00					
21/9	HX								10.00	+39.70				

- Legend**
- Samples:**
- Small disturbed
 - ⬆ Large disturbed
 - ▬ U76 undisturbed
 - ▬ U100 undisturbed
 - ▨ Mazier
 - Liner sample
 - ▩ Piston sample
 - Water sample
 - ⬇ Standard penetration test
 - ⬇ Permeability test
 - ▲ Piezometer
 - ⊕ Standpipe
 - ⊗ Water table

Remarks:

A standpipe was installed at 17.72m.

Logged by : KEI
Checked by : CHU



Gammon Construction Limited
Geotechnical Contracting Department

CONTRACT NO.: 91 OF 1992

CLIENT : H.K.H.A.

DRILLHOLE NO.:

MH-103

SHEET 2 OF 3

JOB NO. & LOCATION: W.O. NO. 56 MA HANG VILLAGE REDEVELOPMENT PHASES 2 & 3

METHOD: ROTARY GROUND LEVEL: 49.70 mPD

MACHINE: D2G-16 ORIENTATION: VERTICAL

COORDS E. 839700.19

N. 809047.86

HOLE DIA: 0.00m 141mm 4.00m 118mm 17.74m 101mm 26.38m

DATE: 21/9/93 TO 23/9/93

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone	
21/9	HX	1.76m at 17:30					N=27		10.00	+39.70	See sheet 1 of 3		V		
22/9		DRY at 09:00						5	10.45	+39.00					
									10.70		Extremely weak to very weak, pink mottled with white, completely decomposed, medium to coarse grained GRANITE. (Very dense, clayey silty medium to coarse SAND)		V		
									11.00						
									12.00						
									13.00						
									14.00						
							N=68		14.45						
									15.00						
									16.00						
									17.00						
									17.72						
	17.74m HX						SP at 17.72m		17.74	+31.96	See sheet 3 of 3		III		
									17.90						
									18.88						
								T2-101	19.00						
									19.16						
									19.30						
									19.67						
22/9									20.00	+29.70					

Legend	
•	Small disturbed
↓	Standard penetration test
↑	Large disturbed
⊥	Permeability test
▬	U76 undisturbed
▲	Piezometer
■	U100 undisturbed
⊕	Standpipe
⊞	Mazier
□	Liner sample
⊞	Water table
⊞	Piston sample
▲	Water sample

Remarks:

Logged by : KEI
Checked by : CHU



Gammon Construction Limited
Geotechnical Contracting Department

CONTRACT NO.: 91 OF 1992

CLIENT : H.K.H.A.

DRILLHOLE NO.:

MH-103

SHEET 3 OF 3

JOB NO. & LOCATION: W.O. NO. 56 MA HANG VILLAGE REDEVELOPMENT PHASES 2 & 3

METHOD: ROTARY GROUND LEVEL: 49.70 mPD

MACHINE: D2G-16 ORIENTATION: VERTICAL COORDS E. 839700.19

HOLE DIA: 0.00m 141mm 4.00m 119mm 17.74m 101mm 26.38m DATE: 21/9/93 TO 23/9/93

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
22/9				100	93	2.6			20.00	+29.70	+++	Moderately strong, pink spotted grey and white, moderately to slightly decomposed, medium to coarse grained GRANITE, with closely to medium spaced, extremely to very narrow, rough planar and undulating, kaolin infilled and manganese stained joints, dipping 0°-10°, 25°-35°, 50°-60° and 70°-75°.	III/II	
				100	94	3.3			20.81 21.00		+++ +++			
22/9	8.50m at 17:30								22.00		+++			
23/9	16.40m at 09:00								22.33 22.43	+27.27	+++ +++	Moderately weak, pinkish brown, moderately decomposed zone at 17.74m to 17.90m.		
				100	100	3.3		T2-101	23.00		+++ +++	Pink, APLITE DYKE at 19.16m to 19.67m.		
				100	79	7.9			23.85 24.00		+++ +++	Strong, pink spotted with white and black, slightly decomposed, medium to coarse grained GRANITE, with medium spaced and occasionally closely spaced, extremely narrow, rough planar, clean and iron stained joints, dipping 5°-15°, 25°-35°, 40°-45° and 55°-65°.	II	
				100	93	3.6			24.23		+++			
				100	100	1.9			25.00 25.35		+++ +++			
23/9									26.00		+++			
									26.38	+23.32	+++	Operation stopped at 26.38m		
									27.00					
									28.00					
									29.00					
									30.00					

- Legend**
- Samples:**
- Small disturbed
 - ↓ Standard penetration test
 - ↑ Large disturbed
 - ⊥ Permeability test
 - ▬ U76 undisturbed
 - ▬ U100 undisturbed
 - ▬ Mazier
 - Liner sample
 - ▬ Piston sample
 - Water sample
 - ↓ Piezometer
 - ⊥ Standpipe
 - ▬ Water table

Remarks:

Logged by : KEI
Checked by : CHU

THE BORING ENGINEERING LTD.

EXPLORATORY HOLE LOG

Hole No.: BH3 Sheet 1 of 2

Project: R.B.L. NO. 567, NO. 20 CARMEL ROAD, STANLEY, HONG KONG

Ground level: +46.93 m.P.D. Inclination: VERTICAL Coordinates: E 839734.58
N 809039.01

Method: ROTARY DRILL Rig type & no.: BEL-11 Operator: FU

Drilling progress	Casing depth, size	Water level (m)	Water recovery %	Tests & samples	Blow counts	Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture index	Reduced level	Legend	Description	Grade
20/2	PX	08:00				0.00					+46.93		Inspection pit.	
						1.50					+45.43		Greyish brown to brown, sandy fine to medium GRAVEL. (FILL)	
				M-101 (75%) 2,2,4,5,5,7 N=21		2.50 2.45							Very weak, light yellow to light brownish yellow, completely decomposed GRANITE. (Medium dense to very dense, sandy fine GRAVEL.)	V
	HX			M-101 (100%) 7,10,13,15,15,18 N=61		3.50 4.50 4.95								
				M-101 (90%)		5.50 5.65					+41.43		Weak to moderately weak, pink and light brown to yellowish brown, completely to highly decomposed GRANITE. (Very dense, sandy fine to coarse GRAVEL.)	V/IV
						6.50					+40.43			
						8.00	89	65	28	N.I.	+38.93		Moderately strong to moderately weak, light brown to light brownish yellow and pinkish brown, mottled with black, moderately to highly decomposed medium grained GRANITE with very closely to closely spaced, rough undulating, iron and manganese stained joints, dipping at 10°, 35°-40°, 60°.	III/IV
				T2-101		8.75	90	61	47	9.1	+38.18			
						9.20	99	99	86		+37.73			III
						9.30					+37.63			
						10.00					+36.93		See sheet 2 of 2 for detail.	III/II

Date started 20-2-2004 Logged by LEE
 Date finished 20-2-2004 Checked by LD
Date 24-2-2004

Remarks:

- Legend:
- Small disturbed
 - ◆ Large disturbed
 - ▨ SPT liner sample
 - U76 undisturbed
 - U100 undisturbed
 - ▨ Mazier sample
 - P Pressuremeter test
 - ▼ Water level
 - ↓ Standard penetration test
 - ⊙ Permeability test
 - ▲ Piezometer tip
 - ⬆ Standpipe tip
 - ∇ In-situ vane shear test

THE BORING ENGINEERING LTD.

EXPLORATORY HOLE LOG

Hole No.: BH3 Sheet 2 of 2

Project: R.B.L. NO. 567, NO. 20 CARMEL ROAD, STANLEY, HONG KONG

Ground level: +46.93 m.P.D. Inclination: VERTICAL Coordinates: E 839734.58
N 809039.01

Method: ROTARY DRILL Rig type & no.: BEL-11 Operator: FU

Drilling progress	Casing depth, size	Water level (m)	Water recovery %	Tests & samples	Blow counts	Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture index	Reduced level	Legend	Description	Grade
						10.00					+36.93		Moderately strong to strong pinkish grey to grey, mottled with black, moderately to slightly decomposed medium grained GRANITE with closely to medium spaced, rough planar and rough undulating, iron and manganese stained joints, dipping at 20°-30°, 55°-60°.	III II
						10.08	100	100	85		+36.85	++		
						10.73					+36.20	++		
						11.90	100	100	100		+35.03	++		
				T2-101		12.20	100	100	100	3.4	+34.73	++		
						13.45	100	100	100		+33.48	++		
20/2		11.03m 18:00				14.27	100	100	96		+32.66	++	Moderately strong, pink and greyish brown to brown, mottled with black, moderately decomposed medium grained GRANITE with closely to medium spaced, rough planar, iron and manganese stained and chlorite coated joints, dipping at 15°, 45°-50°, 70°.	III
													Bottom of borehole No. BH3 at depth of 14.27m.	

Date started 20-2-2004 Logged by LEE
 Date finished 20-2-2004 Checked by LO
Date 24-2-2004 Remarks:

- Legend:
- Small disturbed
 - ◆ Large disturbed
 - ☐ SPT liner sample
 - U76 undisturbed
 - U100 undisturbed
 - ☒ Mazier sample
 - P Pressuremeter test
 - ▼ Water level
 - ↓ Standard penetration test
 - ⊙ Permeability test
 - ▲ Piezometer tip
 - ⬆ Standpipe tip
 - ∨ In-situ vane shear test

THE BORING ENGINEERING LTD.

EXPLORATORY HOLE LOG

Hole No.: BH4P		Sheet 1 of 2												
Project: R.B.L. NO. 567, NO. 20 CARMEL ROAD, STANLEY, HONG KONG														
Ground level: +41.42 m.P.D.		Inclination: VERTICAL												
Method: ROTARY DRILL		Rig type & no.: BEL-11												
Operator: WONG		Coordinates: E 839737.02 N 809024.17												
Drilling progress	Casing depth, size	Water level (m)	Water recovery %	Tests & samples	Blow counts	Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture index	Reduced level	Legend	Description	Grade
4/2	PX					0.00					+41.42	⊗	Inspection pit.	
						1.50					+39.92	⊗	Brownish grey to brown, slightly silty gravelly fine to coarse SAND. (FILL)	
					M-101 (100%)	2.50					+38.92	⊗	Grey and brownish grey, silty clayey gravelly fine to coarse SAND. (COLLUVIUM)	
					3,5,6,10,16,18 N=50	2.95					+38.37	+	Very weak, yellow and light brownish yellow, completely decomposed GRANITE. (Very dense, slightly silty gravelly fine to coarse SAND.)	>
					T2-101	3.05	96	0	0	N.I.		+	Moderately weak to moderately strong, yellow and brownish yellow, fractured, highly to moderately decomposed medium grained GRANITE.	IV III
4/2 5/2	HX					4.20					+37.22	+		
					M-101 (90%)	4.50						+		
					50/70mm,100/30mm 100/30mm	5.50						+		
					M-101 (90%)	6.00						+		
					3,6,12,19,11,14 N=56	7.00						+	Very weak, yellow and pinkish yellow to light brownish yellow, completely decomposed GRANITE. (Medium dense to very dense, sandy fine to medium GRAVEL.)	>
					M-101 (95%)	7.45						+		
					2,2,4,8,10,13 N=35	7.50						+		
					M-101 (90%)	8.50						+		
						8.95						+		
						9.00						+		
					M-101 (90%)	10.00					+31.42	+		
Date started 4-2-2004		Logged by LEE		Remarks:										
Date finished 7-2-2004		Checked by LD		Piezometer installed at depth of 11.50m.										
		Date 10-2-2004												
Legend:														
●	Small disturbed	⊗	Pressuremeter test	▼	Water level									
◆	Large disturbed	↓	Standard penetration test	⊕	Permeability test									
⊠	SPT liner sample	▲	Piezometer tip	⊕	Standpipe tip									
■	U76 undisturbed	∇	In-situ vane shear test											
■	U100 undisturbed													
⊠	Mazier sample													

THE BORING ENGINEERING LTD.

EXPLORATORY HOLE LOG

Hole No.: BH4P Sheet 2 of 2

Project: R.B.L. NO. 567, NO. 20 CARMEL ROAD, STANLEY, HONG KONG

Ground level: +41.42 m.P.D. Inclination: VERTICAL Coordinates: E 839737.02
N 809024.17

Method: ROTARY DRILL Rig type & no.: BEL-11 Operator: WONG

Drilling progress	Casing depth, size	Water level (m)	Water recovery %	Tests & samples	Blow counts	Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture index	Reduced level	Legend	Description	Grade
5/2 6/2	HX				2,3,5,7,8,10 N=30 M-101 (100%)	10.00 10.45 10.50					+31.42		See sheet 1 of 2 for detail.	V
						11.50					+29.92			III
						12.07	99	95	85	7.6	+29.35			III
						12.55					+28.87		Strong, pinkish grey to grey, mottled with black, slightly decomposed medium grained GRANITE with closely to medium spaced, rough planar and rough undulating, iron and manganese stained and chlorite coated joints, dipping at 10°, 25°-30°, 55°.	III
						12.72					+28.70			II
						13.49	100	100	100	2.1	+27.93		11.50m-12.07m: Moderately decomposed medium grained GRANITE.	
6/2 7/2						14.91	100	100	98		+26.51		12.07m-12.72m: Moderately to slightly decomposed medium grained GRANITE.	II
						15.93	100	100	100		+25.49			
7/2						16.88	100	100	100		+24.54		Bottom of borehole No. BH4P at depth of 16.88m.	

Date started 4-2-2004 Logged by LEE
Date finished 7-2-2004 Checked by LD
Date 10-2-2004

Remarks:

- Legend:
- Small disturbed
 - ◆ Large disturbed
 - ▨ SPT liner sample
 - U76 undisturbed
 - U100 undisturbed
 - ▨ Mazier sample
 - P Pressuremeter test
 - ▼ Water level
 - ↓ Standard penetration test
 - ⊙ Permeability test
 - ▲ Piezometer tip
 - ⊕ Standpipe tip
 - V In-situ vane shear test



INTRUSION - PREPAKT
(FAR EAST) LIMITED

DRILL / BORE HOLE LOG

CONTRACT NO.: 143/88

CLIENT : H.K.H.A.

DRILLHOLE NO.:

BH13

SHEET 1 OF 2

JOB NO. & LOCATION: W.O. 243 Ma Hang Redevelopment

METHOD: ROTARY

GROUND LEVEL: +30.34mPD

COORDS E. 839738.75

MACHINE: D75

ORIENTATION: VERTICAL

N. 808992.18

HOLE DIA: 0.00m - 120mm - 6.75m - 101mm - 11.82m

DATE: 18/9 TO 18/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.O.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
18/9	HX								0.00	+30.34	[Cross-hatch pattern]	Loose, brown, fine to coarse SAND (FILL)		
								Inspection pit	1.00					
								1	3.00	+27.34	[Vertical line pattern]	Very dense, pink, silty coarse SAND (C.TO H.D. GRANITE)	V	IV
								2	4.90					
								3	5.90					
	6.75m HX		80						6.00					
									6.75	+23.59	[Plus sign pattern]	Strong, pink, mottled brown, coarse grained, slightly decomposed GRANITE closely to medium jointed with grade III zone at 9.10-9.30m & dip 18° & 25°	II	
									7.00					
									8.00					
									8.25					
									9.00					
									9.79	+20.55				

Legend

Samples:

- Small disturbed
- ↓ Standard penetration test
- ↑ Large disturbed
- ⊥ Permeability test
- ▬ U76 undisturbed
- ⊕ Piezometer test
- ▬ U100 undisturbed
- ⊕ Standpipe test
- ▨ Mazier
- ⊕ Water table
- Liner sample
- ▨ Piston sample
- ▲ Water sample

Remarks:

An inspection pit was excavated at 2.50m

Logged by : SOC

Checked by : BCT



INTRUSION - PREPAKT
(FAR EAST) LIMITED

DRILL / BORE HOLE LOG

CONTRACT NO.: 143/88

CLIENT : H.K.H.A.

DRILLHOLE NO.:

BH13

SHEET 2 OF 2

JOB NO. & LOCATION: W.O. 243 Ma Hong Redevelopment

METHOD: ROTARY

GROUND LEVEL: +30.34mPD

COORDS E. 839738.75

MACHINE: D75

ORIENTATION: VERTICAL

N. 808992.18

HOLE DIA: 0.00m 120mm 6.75m 101mm 11.82m

DATE: 18/9 TO 18/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
18/9			80	100	100	2.0		T2101	9.79	+20.55	+++	Strong, pink, with green spots coarse grained, slightly decomposed GRANITE medium to widely jointed	II	
				100	100	3.3			11.00		+++			
									11.29		+++			
									11.82	+18.52	+++			
												Operation stopped at 11.82m		

Legend

Samples:

- Small disturbed
- ↑ Large disturbed
- U76 undisturbed
- U100 undisturbed
- ☒ Mazier
- Liner sample
- ▨ Piston sample
- ▲ Water sample
- ↓ Standard penetration test
- ⊥ Permeability test
- ▲ Piezometer test
- ⊕ Standpipe test
- ⊗ Water table

Remarks:

Logged by : SOC

Checked by : BCT



INTRUSION - PREPAKT
(FAR EAST) LIMITED

DRILL / BORE HOLE LOG

CONTRACT NO.: 143/88

CLIENT : H.K.H.A.

DRILLHOLE NO.:

BH14

SHEET 1 OF 2

JOB NO. & LOCATION: W.O. 243 Ma Hang Redevelopment

METHOD: ROTARY

GROUND LEVEL: +32.92mPD

COORDS E. 839716.69

MACHINE: D75

ORIENTATION: VERTICAL

N. 809011.11

HOLE DIA: 0.00m ^{120mm} 9.28m ^{101mm} 14.50m

DATE: 21/9 TO 21/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
21/9	HX								0.00	+32.92	SOIL (FILL)			
								Inspection pit	0.80	+32.12				
									1.00					
									2.00					
							N=16	1	3.00					
									3.45					
									4.00			Medium dense, pink, silty coarse SAND (C.D. GRANITE)	V	
				95				2	5.00					
									5.50					
							N=43	3	5.95					
			80						6.00					
									7.00					
				95				4	8.00	+24.92		Very dense, pink, SAND & rock fragments (C.TO H.D. GRANITE)		
							50/65mm 200/75mm	5	8.14			Moderately strong to strong, pink, mottled black, coarse grained, slightly to moderately decomposed GRANITE	V / IV	
	9.28m HX								9.00					
									9.28					
				100	58	7.0			9.90	+23.02				
									10.38	+22.54		As sheet 2 of 2		

- Legend**
- Samples:**
- Small disturbed
 - ⬆ Large disturbed
 - ▬ U76 undisturbed
 - ▬ U100 undisturbed
 - ▨ Mazier
 - Liner sample
 - ▬ Piston sample
 - ▲ Water sample
 - ↓ Standard penetration test
 - ⊥ Permeability test
 - ▲ Piezometer test
 - ⊕ Standpipe test
 - ≡ Water table

Remarks:

An inspection pit was excavated at 2.50m

Logged by : SOC
Checked by : BCT



INTRUSION — PREPAKT
(FAR EAST) LIMITED

DRILL / BORE HOLE LOG

CONTRACT NO.: 143/88

CLIENT : H.K.H.A.

DRILLHOLE NO.:

BH14

SHEET 2 OF 2

JOB NO. & LOCATION: W.O. 243 Ma Hang Redevelopment

METHOD: ROTARY

GROUND LEVEL: +32.92mPD

COORDS E. 839716.69

MACHINE: D75

ORIENTATION: VERTICAL

N. 809011.11

HOLE DIA: 0.00m ^{120mm} 9.28m ^{101mm} 14.50m

DATE: 21/9 TO 21/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
21/9			80	100	33	6.0			10.38	+22.54	+	Strong, pink, coarse grained slightly decomposed GRANITE medium to widely jointed with thin moderately weathered zone at joints & with vertical joints at 10.38-12.0m		
				100	100	3.3		T2101	11.00		+			
				100	100	1.0			11.83		+			
				100	100	0			12.00		+			
				100	100	0			12.43		+			
				100	100	0			13.00		+			
									13.33		+			
									14.00		+			
									14.50	+18.42	+	Operation stopped at 14.50m		

- Legend**
- Samples:
- Small disturbed
 - ↓ Standard penetration test
 - ↑ Large disturbed
 - ⊥ Permeability test
 - U76 undisturbed
 - ⊕ Piezometer test
 - U100 undisturbed
 - ⊕ Standpipe test
 - ⊞ Mazler
 - ⊞ Water table
 - Liner sample
 - ▨ Platon sample
 - ▲ Water sample

Remarks:

Logged by : SOC
Checked by : BCT



INTRUSION — PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 143/88

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

8H15

SHEET 1 OF 2

JOB NO. & LOCATION: W.O. 243 Ma Hang Redevelopment

METHOD: ROTARY

GROUND LEVEL: +35.25 mPD

COORDS E. 839689.97

MACHINE: 075

ORIENTATION: VERTICAL

N. 809024.39

HOLE DIA: 0.00m-120mm-6.40m-101mm-11.42m

DATE: 22/9 TO 24/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
22/9	HX								0.00	+35.25				
								Inspection pit	1.00					
									2.00					
									3.00					
							N=19	1	3.45			Medium dense, pink, silty coarse SAND (C.D. GRANITE)	V	
									4.00					
									5.00					
				95					5.50					
									5.95					
							N=36	2	6.00					
									6.40	+28.85				
	6.40m HX								7.00					
									7.17					
									7.77					
		2.00m at 18:00		100	86	5.7			8.00					
24/9		Dry at 8:00		100	100	0			9.00			Strong, pink, coarse grained, slightly decomposed GRANITE medium to widely jointed	II	
				100	100	0.8		T2101	9.11					
				100	100	0.7			10.68	+24.57				

- Legend**
- Samples:**
- Small disturbed
 - ↑ Large disturbed
 - ▬ U76 undisturbed
 - ▬ U100 undisturbed
 - ▨ Mazler
 - Liner sample
 - ▬ Piston sample
 - ▲ Water sample
 - ↓ Standard penetration test
 - ⊥ Permeability test
 - ▲ Piezometer test
 - ⊕ Standpipe test
 - ≡ Water table

Remarks:

An inspection pit was excavated at 2.50m

Logged by : SOC
Checked by : BCT



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 143/88

DRILLHOLE NO.:

DRILL / BORE HOLE LOG

CLIENT : H.K.H.A.

BH15

SHEET 2 OF 2

JOB NO. & LOCATION: W.O. 243 Ma Hang Redevelopment

METHOD: ROTARY

GROUND LEVEL: +35.25 mPD

COORDS E. 839689.97

MACHINE: D75

ORIENTATION: VERTICAL

N. 809024.39

HOLE DIA: 0.00m-120mm-6.40m-101mm-11.42m

DATE: 22/9 TO 24/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
24/9				100	25	2.5		T2101	10.68 11.00 11.42	+24.57 +23.83	+ + + + + + + + +	Strong, pink, coarse grained, slightly decomposed GRANITE medium jointed with vertical joints & grade III-zone at joints Operation stopped at 11.42m	II	

Legend

Samples:

- Small disturbed
- ↑ Large disturbed
- U76 undisturbed
- U100 undisturbed
- ☒ Mazier
- Liner sample
- ▨ Piston sample
- Water sample
- ↓ Standard penetration test
- ⇕ Permeability test
- ▲ Piezometer test
- ⊕ Standpipe test
- ≡ Water table

Remarks:

Logged by : SOC

Checked by : BCT



INTRUSION - PREPAKT
(PAC EAST) LIMITED

CONTRACT NO.: 143/88

DRILLHOLE NO.: BH16

CLIENT : H.K.H.A.

BH16

DRILL / BORE HOLE LOG

SHEET 1 OF 2

JOB NO. & LOCATION: W.O. 243 Ma Hang Redevelopment

METHOD: ROTARY

GROUND LEVEL: +37.22 mPD

COORDS E. 839677.76

MACHINE: D75

ORIENTATION: VERTICAL

COORDS N. 809035.88

HOLE DIA: 0.00m ^{120mm} 8.51m ^{101mm} 13.94m

DATE: 25/9 TO 25/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
25/9	HX								0.00	+37.22				
								Inspection pit	1.00			Pinkish brown, silty coarse SAND (C.D. GRANITE)	V	
								T2101	2.50	+34.72		Moderately strong, pink, coarse grained, moderately decomposed GRANITE (CORESTONE)	III	
							N=49	1	3.45					
								2	5.50					
							N=22	3	5.95			Medium dense, pinkish brown, slightly silty coarse SAND with some rock fragments (C.TO H.D. GRANITE)	V / IV	
								4	8.00					
	8.51m HX							T2101	8.51	+28.71		Strong, pink, coarse grained, slightly decomposed GRANITE medium to widely jointed Dip 65° & 25°	II	
									9.00					
									9.96	+27.26				

Legend

Samples:

- Small disturbed
- ↑ Large disturbed
- ▬ U76 undisturbed
- ▬ U100 undisturbed
- ▨ Mazier
- Liner sample
- ▨ Piston sample
- ▲ Water sample
- ↓ Standard penetration test
- ⊥ Permeability test
- ▲ Piezometer test
- ⊕ Standpipe test
- ≡ Water table

Remarks:

An inspection pit was excavated at 2.50m

Logged by : SOC

Checked by : BCT



INTRUSION - PREPAKT
(FAR EAST) LIMITED

CONTRACT NO.: 143/88

DRILLHOLE NO.: BH16

CLIENT : H.K.H.A.

SHEET 2 OF 2

DRILL / BORE HOLE LOG

JOB NO. & LOCATION: W.O. 243 Ma Hang Redevelopment

METHOD: ROTARY

GROUND LEVEL: +37.22 mPD

COORDS E. 839677.78

MACHINE: D75

ORIENTATION: VERTICAL

N. 809035.88

HOLE DIA: 0.00m 120mm 8.51m 101mm 13.94m

DATE: 25/9 TO 25/9/90

Drilling progress	Casing depth size	Water level	Water recovery %	Core recovery %	R.Q.D. %	Fracture Index	Tests	Samples	Depth (m)	Reduced Level	Legend	Description	Grade	Zone
25/9									9.96	+27.26	+	As sheet 1 of 2	II	
				100	100	2.0			11.00		+			
			80	100	100	0			11.19		+			
				100	100	0			11.49		+			
								T2101	12.00	+25.22	+	Strong, pink, fine to coarse grained slightly decomposed GRANITE medium jointed with grade III-zone & iron stained	II	
				100	93	3.3			12.93		+			
				100	100	3.0			13.00		+			
									13.94	+23.28	+	Operation stopped at 13.94m		

- Legend**
- Samples:
- Small disturbed
 - ↑ Large disturbed
 - U76 undisturbed
 - U100 undisturbed
 - Mazler
 - Liner sample
 - ▨ Piston sample
 - ▲ Water sample
 - ↓ Standard penetration test
 - ⊥ Permeability test
 - ▲ Piezometer test
 - ⊕ Standpipe test
 - ≡ Water table

Remarks:

Logged by : SOC
Checked by : BCT



INTRUSION- PREPAKT
(FAR EAST) LIMITED

Contract No. : 122 OF 1990
Client Office: H.K.H.A.

Works Order No. : 115

PIEZOMETER MONITORING

Ground Water Level Record

LOCATION		Ma Hang Phase 2 Development (W.O.115)					
INSTRUMENT INSTALLED		Piezometer		GROUND LEVEL (mPD)		33.82	
STANDPIPE/PIEZOMETER NO.		CP4		TIP LEVEL (mPD)		20.17	
DATE OF INSTALLATION		11.3.92		RESPONSE ZONE (mPD)		From 20.97 m To 19.67 m	
PIPE TOP LEVEL (mPD)		33.74		BASE OF DRILLHOLE (mPD)		15.12	
CO-ORDINATES OF INSTRUMENT		N 809016.70 E 839705.09		DEPTH OF BUCKETS (if any)		From at m To m.bgl m spacing	
DATE	WEATHER	TIME	GROUNDWATER LEVEL		HIGHEST BUCKET WITH ENTRAPPED WATER (if any)		REMARKS
			DEPTH BELOW * Pipe Top/G.L. (m)	ELEVATION (mPD)	DEPTH BELOW * Pipe Top/G.L. (m)	ELEVATION (mPD)	
19-3-92	Fine	9:00	11.55	22.19			
20-3-92	Fine	9:10	11.53	22.21			
21-3-92	Fine	9:07	11.53	22.21			
23-3-92	Fine	9:30	11.52	22.22			
24-3-92	Fine	10:10	11.52	22.22			
25-3-92	Cloudy	9:30	11.52	22.22			
26-3-92	Cloudy	9:25	11.52	22.21			

Reported By :

Checked By :



INTRUSION - PREPAKT
(PAR EAST) LIMITED

WORKS ORDER NO.: 115

LOCATION Ma Hang Phase 2 Development (W.O.115) GROUND LEVEL : 33.82 mPD

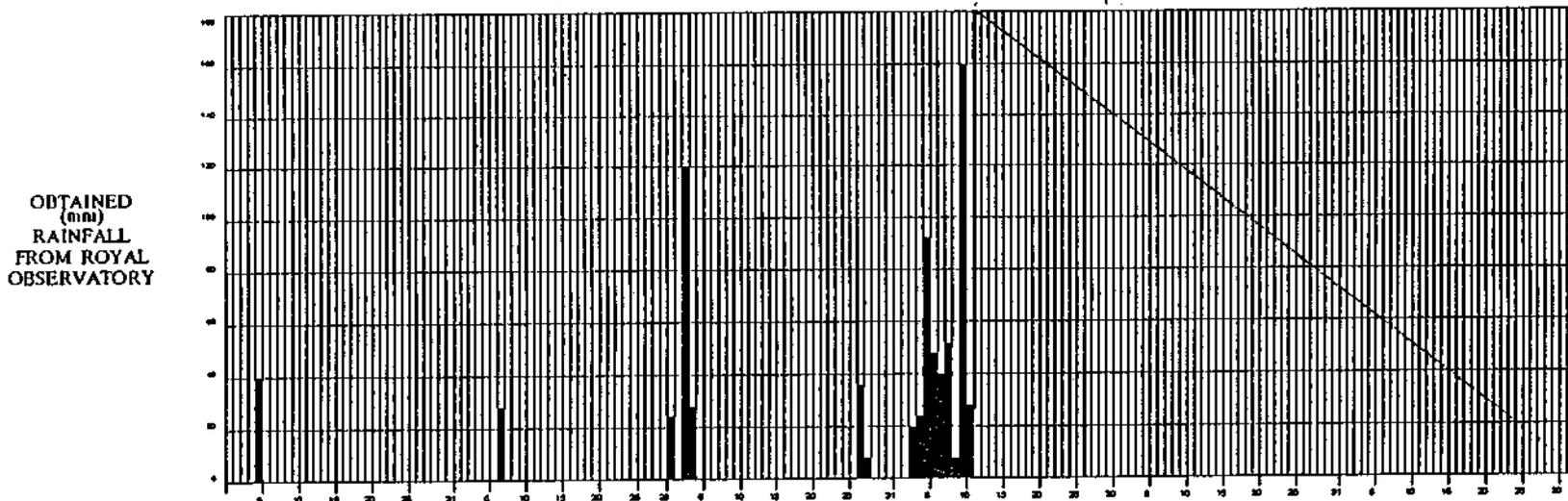
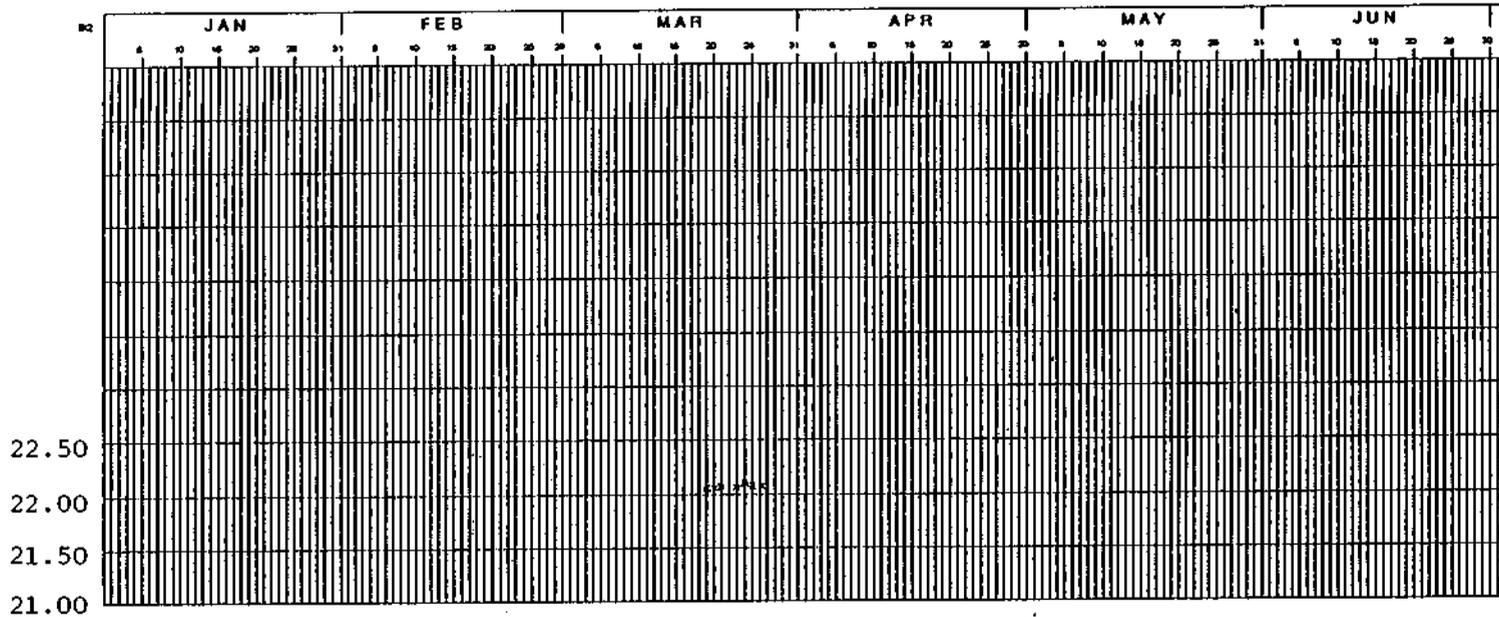
DRILLHOLE NO. : CP4

TIP DEPTH : 13.65 m

CO-ORDINATES : N 809016.70
E 839705.09

TIP LEVEL : 20.17 mPD

PIEZOMETER



STANDPIPE / PIEZOMETER MONITORING
GROUND - WATER LEVEL RECORD



INTRUSION-PREPAKT
(FAR EAST) LIMITED

Contract No. : 122 OF 1990
Client Office : H.K.H.A.

Works Order No. : 115

PIEZOMETER MONITORING

Ground Water Level Record

LOCATION		Ma Hang Phase 2 Development (W.O. 115)					
INSTRUMENT INSTALLED		Piezometer		GROUND LEVEL (mPD)		35.41	
STANDPIPE/PIEZOMETER NO.		CP7		TIP LEVEL (mPD)		28.76	
DATE OF INSTALLATION		13.3.92		RESPONSE ZONE (mPD)		From 29.56 m To 28.26 m	
PIPE TOP LEVEL (mPD)		35.36		BASE OF DRILLHOLE (mPD)		23.90	
CO-ORDINATES OF INSTRUMENT		N 809024.75 E 839688.83		DEPTH OF BUCKETS (if any)		From m To m at m spacing	
DATE	WEATHER	TIME	GROUNDWATER LEVEL		HIGHEST BUCKET WITH ENTRAPPED WATER (if any)		REMARKS
			DEPTH BELOW * Pipe Top/G.L. (m)	ELEVATION (mPD)	DEPTH BELOW * Pipe Top/G.L. (m)	ELEVATION (mPD)	
19-3-92	Fine	9:00	Dry				
20-3-92	Fine	9:10	Dry				
21-3-92	Fine	9:07	Dry				
23-3-92	Fine	9:30	Dry				
24-3-92	Fine	10:10	Dry				
25-3-92	Cloudy	9:30	Dry				
26-3-92	Cloudy	9:25	Dry				

Reported By :

Checked By :



INTRUSION - PREPAKT
(PAR EAST) LIMITED

WORKS ORDER NO.: 115

LOCATION Ma Hang Phase 2 Development (W.O.115) GROUND LEVEL : 35.41 mPD

DRILLHOLE NO. : CP7

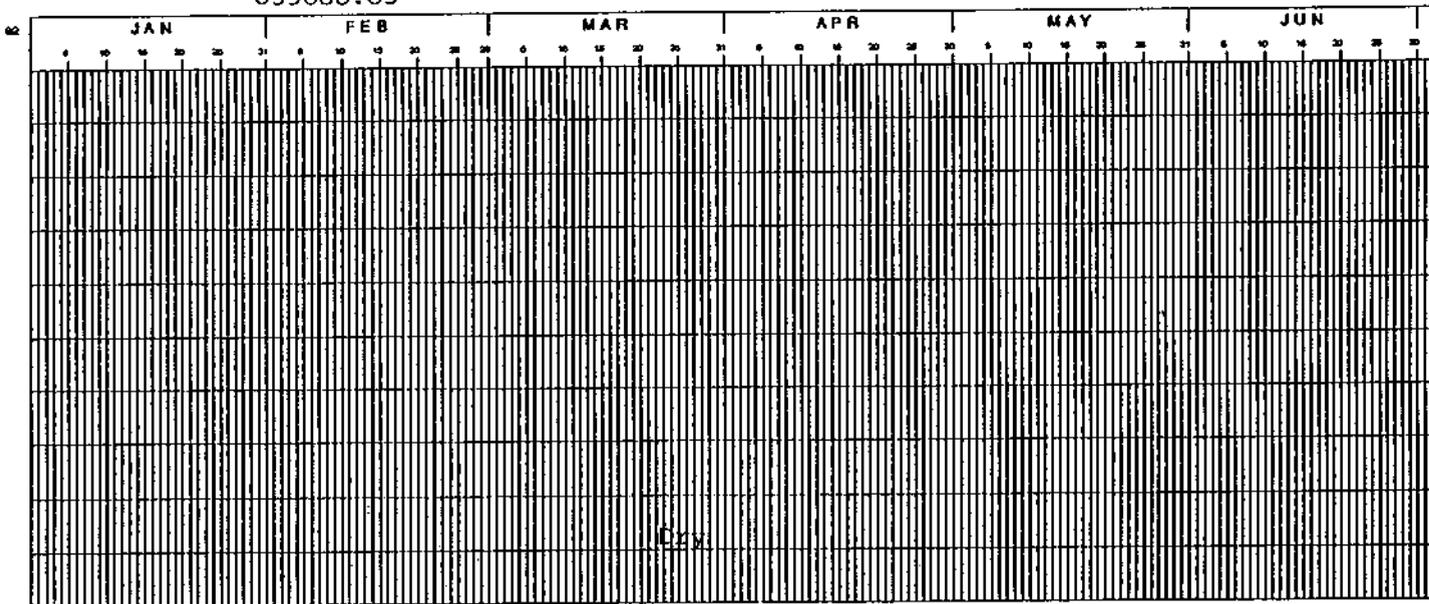
TIP DEPTH : 6.65 m

CO-ORDINATES : N 809024.75
E 839688.83

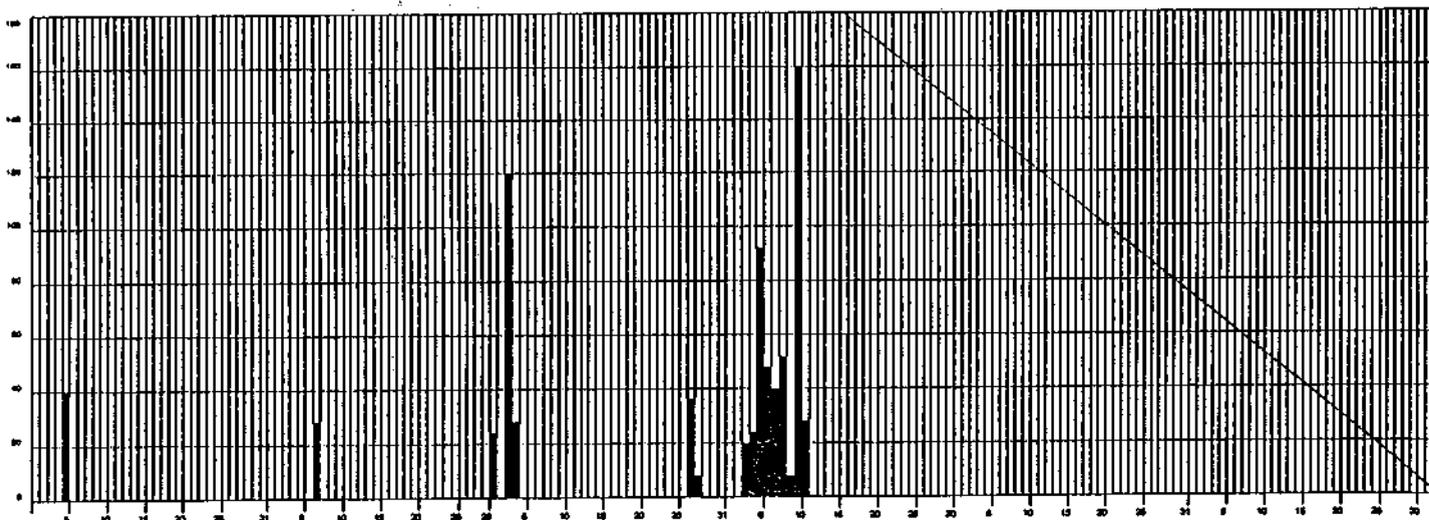
TIP LEVEL : 28.76 mPD

PIEZOMETER

WATER
LEVEL
(mPD)



OBTAINED
(mm)
RAINFALL
FROM ROYAL
OBSERVATORY



STANDPIPE / PIEZOMETER MONITORING
GROUND - WATER LEVEL RECORD



INTRUSION-PREPAKT
(FAR EAST) LIMITED

Contract No. : 122 OF 1990
Client Office : H.K.H.A.

Works Order No. : 115

PIEZOMETER MONITORING

Ground Water Level Record

LOCATION		Ma Hang Phase 2 Development (W.O. 115)					
INSTRUMENT INSTALLED		Piezometer		GROUND LEVEL (mPD)		37.85	
STANDPIPE/PIEZOMETER NO.		CP9		TIP LEVEL (mPD)		29.70	
DATE OF INSTALLATION		17.3.92		RESPONSE ZONE (mPD)		From 30.50 m To 29.30m	
PIPE TOP LEVEL (mPD)		37.78		BASE OF DRILLHOLE (mPD)		24.79	
CO-ORDINATES OF INSTRUMENT		N 809047.02 E 839671.34		DEPTH OF BUCKETS (if any)		From m To m.bgl at m spacing	
DATE	WEATHER	TIME	GROUNDWATER LEVEL		HIGHEST BUCKET WITH ENTRAPPED WATER (if any)		REMARKS
			DEPTH BELOW * Pipe Top/GL (m)	ELEVATION (mPD)	DEPTH BELOW * Pipe Top/GL (m)	ELEVATION (mPD)	
19-3-92	Fine	9:00	7.05	30.73			
20-3-92	Fine	9:10	7.05	30.73			
21-3-92	Fine	9:07	7.08	30.70			
23-3-92	Fine	9:30	7.08	30.70			
24-3-92	Fine	10:10	7.08	30.70			
25-3-92	Cloudy	9:30	7.10	30.68			
26-3-92	Cloudy	9:25	7.14	30.64			

Reported By :

Checked By :



INTRUSION - PREPAKT
(FAR EAST) LIMITED

WORKS ORDER NO.: 115

LOCATION : Ma Hang Phase 2 Development (W.O.115) GROUND LEVEL : 37.85 mPD

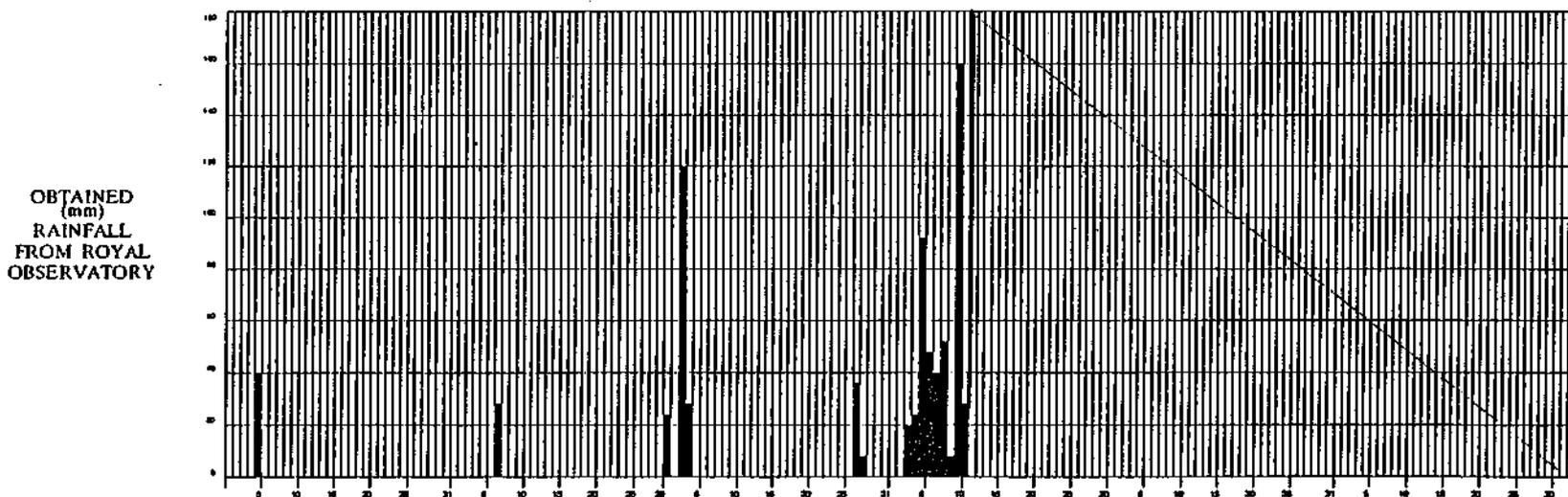
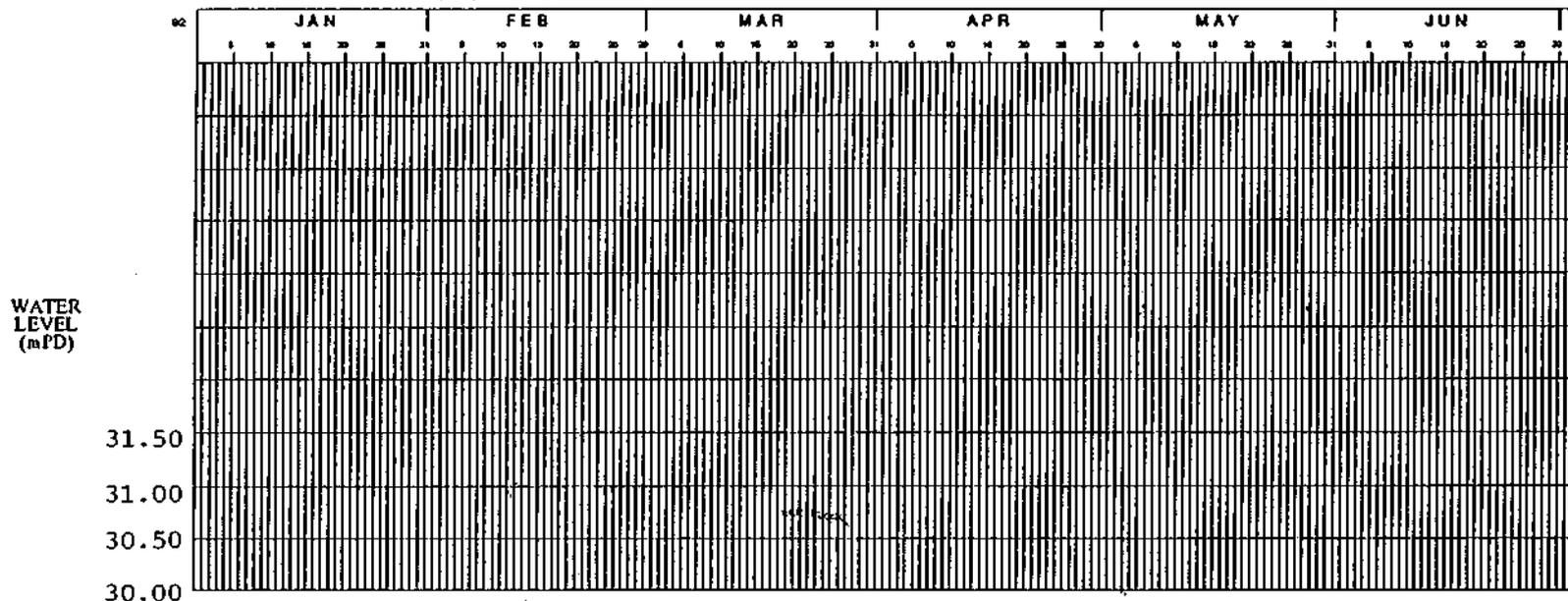
DRILLHOLE NO. : CP9

TIP DEPTH : 8.15 m

CO-ORDINATES : N 809047.02
E 839671.34

TIP LEVEL : 29.70 mPD

PIEZOMETER



STANDPIPE / PIEZOMETER MONITORING
GROUND - WATER LEVEL RECORD



Gammon Construction Limited

Contract No:

Client Office:

WORKS ORDER NO.: 56

STANDPIPE MONITORING

Ground Water Level Record

LOCATION		MA HANG VILLAGE					
INSTRUMENT INSTALLED		STANDPIPE		GROUND LEVEL (mPD)		49.70	
STANDPIPE NO.		MH 103		TIP LEVEL (mPD)		31.98	
DATE OF INSTALLATION		24 September, 1993		RESPONSE ZONE (mPD)		From +48.70m To +31.98m	
PIPE TOP LEVEL (mPD)		49.80		BASE OF DRILLHOLE (mPD)		23.32	
CO-ORDINATES OF INSTRUMENT		E 839700.19 N 809047.86		DEPTH OF BUCKETS (if any)		From m To m bgl at m spacing	
DATE	WEATHER	TIME	GROUND WATER LEVEL		HIGHEST BUCKET WITH ENTRAPPED WATER (if any)		REMARKS
			DEPTH BELOW *Pipe Top/GL (m)	ELEVATION (mPD)	DEPTH BELOW *Pipe Top/GL (m)	ELEVATION (mPD)	
5 OCT 93	FINE	AM	11.90	37.90			
6 Oct 93	FINE	AM	12.13	37.67			
7 OCT 93	FINE	AM	12.36	37.44			
8 OCT 93	FINE	AM	12.59	37.21			
9 OCT 93	FINE	AM	12.50	37.30			
10 OCT 93	FINE	AM	12.52	37.28			
11 OCT 93	FINE	AM	12.39	37.41			
12 OCT 93	FINE	AM	12.43	37.37			

Taken & Reported By:

Checked By:



Gammon Construction Limited

WORKS ORDER NO.: 56

LOCATION : MA HANG VILLAGE REDEVELOPMENT PH. 2 & 3
MA HANG

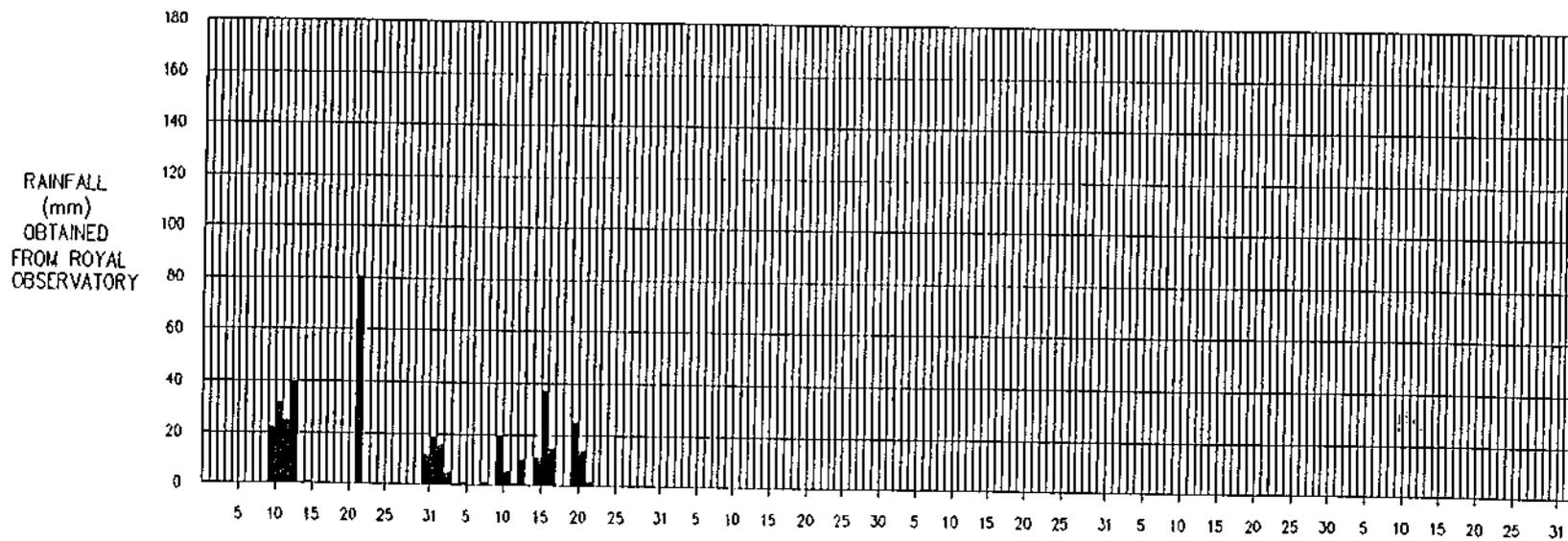
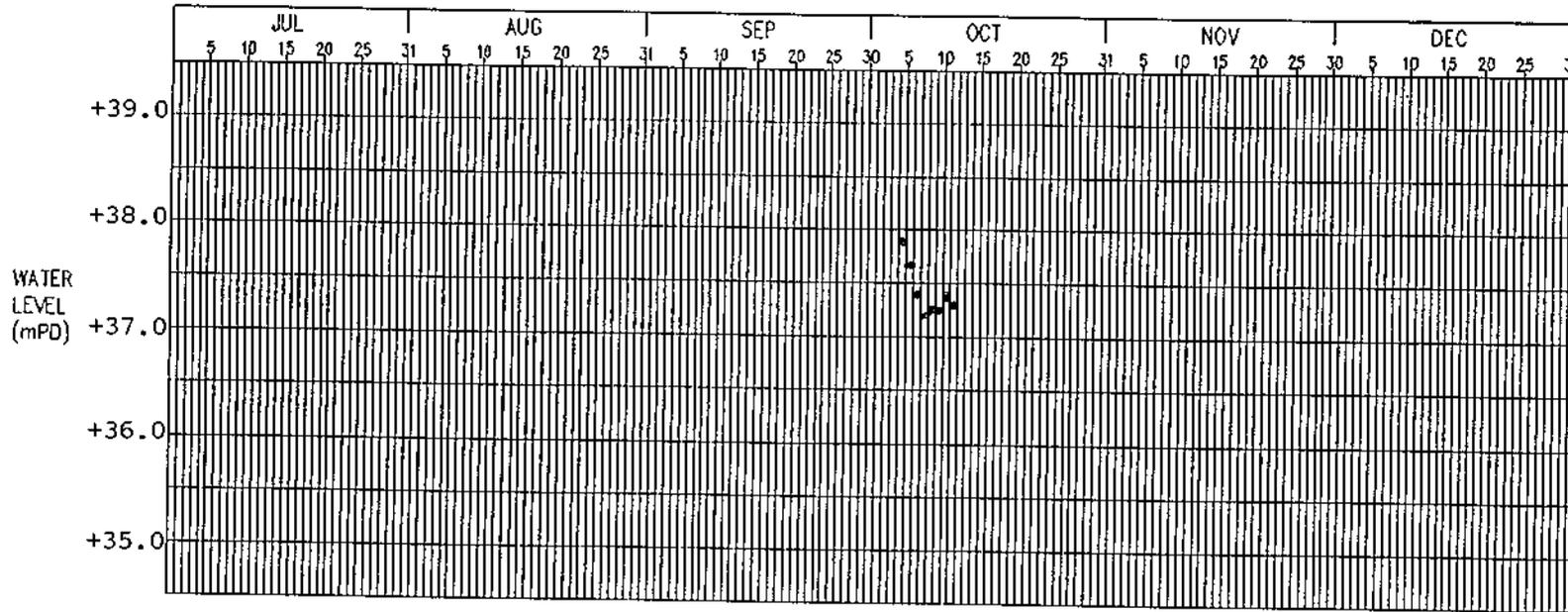
GROUND LEVEL : +49.70 mPD DRILLHOLE NO. : MH 103

TIP DEPTH : 17.72m

CO-ORDINATES : E 839700.19
N 809047.86

TIP LEVEL : +31.98 mPD

STANDPIPE MONITORING
GROUND-WATER LEVEL RECORD



THE BORING ENGINEERING LTD.

RECORD OF WATER TABLE READING	
Project: R.B.L. NO. 567, NO. 20 CARMEL ROAD, STANLEY, HONG KONG	
Borehole No.: BH4P	Date of Installation: 07/Feb/2004
Ex. Ground Level: +41.42 m.P.D.	<i>43.42 m.P.D.</i>
Borehole Depth: 16.88 m	

		<i>Piezometer</i>	
		<i>11.50 m</i>	
<i>Depth</i>			
Date	Time	Depth of Water Table Below Ground (m)	Elevation of Water Table (m.P.D.)
23/Feb/2004	9:00 a.m.	10.84	+ 30.58
24/Feb/2004	9:00 a.m.	10.89	+ 30.53
25/Feb/2004	9:00 a.m.	10.93	+ 30.49
26/Feb/2004	9:00 a.m.	10.98	+ 30.44
27/Feb/2004	9:00 a.m.	11.13	+ 30.29
28/Feb/2004	9:00 a.m.	11.21	+ 30.21
01/Mar/2004	9:00 a.m.	11.27	+ 30.15

CITY GEOTECHNICAL
ENGINEERING LTD.

DRILLHOLE
RECORD

JOB NO. : _____
HOLE NO. : BH16
SHEET : 2 OF 3
DATE : 7/1/21 TO 11/1/21

PROJECT : Proposed Residential Development at Maryknoll House, No. 44 Stanley Village Road, Stanley,
Hong Kong - Lot No. RBL 333RP. Ground Investigation Works

METHOD : ROTARY	CO-ORDINATES	ROCK COREBIT : TNW
MACHINE & NO. : XY-2B, LSY01	E 839692.694 N 809056.631	HOLE DIA. : HX/NX
FLUSHING MEDIUM : WATER	ORIENTATION : VERTICAL	GROUND LEVEL : +51.22 mPD

Drilling Progress	Casing Depth/Size	Water Level/Time	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R. Q. D.	Fracture Index	Tests	Samples			Reduced Level	Depth (m)	Legend	Grade	Zone	Description
									No.	Type	Depth						
8/1	Hx			100					19	●	10.00	10.00		V		As sheet 1 of 3.	
				58	0	0	NI		20	●	11.10	11.45		IV		Moderately weak, pinkish & brownish grey, spotted with black & white, highly decomposed medium grained GRANITE. (Subangular to subrounded, medium to coarse GRAVEL sized rock.)	
				60	60	20	9.7	▲		+	11.45	11.85		III		Moderately strong, pinkish & brownish grey, spotted with black & white, moderately decomposed medium grained GRANITE with closely spaced, rough planar & undulating, very to extremely narrow, iron stained joints, dipping at 0°-10°, 10°-20° & 20°-30°.	
8/1				100	100	61				+	12.85	13.60		IV		Moderately weak, pinkish & brownish grey, spotted with black & white, highly decomposed medium grained GRANITE. (Subangular to subrounded, fine to coarse GRAVEL sized rock.)	
9/1				38	21	21	NI			+	13.60	15.04		IV/III		Moderately weak to moderately strong, pinkish & brownish grey, spotted with black & white, highly to moderately decomposed medium grained GRANITE with closely spaced, rough planar & undulating, very to extremely narrow, iron stained joints, dipping at 0°-10° & sub-vertical.	
	Hx			69	69	28	18.8	▲		+	15.04	15.55		III		Moderately strong, pinkish & brownish grey, spotted with black & white, moderately decomposed medium grained GRANITE with closely spaced, rough planar & undulating, very to extremely narrow, iron stained joints, dipping at 0°-10° & sub-vertical.	
	15.55			47	47	0				+	15.55	16.48		III		Moderately strong, pinkish & brownish grey, spotted with black & white, moderately decomposed medium grained GRANITE with closely spaced, rough planar & undulating, very to extremely narrow, iron stained joints, dipping at 0°-10° & sub-vertical.	
				100	100	95	3.7			+	16.48	17.99		III		Moderately strong, pinkish & brownish grey, spotted with black & white, moderately decomposed medium grained GRANITE with closely spaced, rough planar & undulating, very to extremely narrow, iron stained joints, dipping at 0°-10°, 10°-20°, 20°-30°, 50°-60° & occasional sub-vertical.	
9/1				100	100	100				+	17.99	18.77		III			
11/1				100	100	94	7.5			+	18.77	19.99		III			
				100	100	66				+	19.99	20.00		III			

- Small disturbed sample
- ▲ Water sample
- ◆ Large disturbed sample
- ▼ Water table
- SPT liner sample
- ↓ Standard penetration test
- U76 undisturbed sample
- Permeability test
- U100 undisturbed sample
- ▲ Piezometer tip
- ▲ Standpipe
- ▨ Mazier sample
- ▲ Acoustic borehole
- P/S Piston sample
- ▨ Acoustic borehole

LOGGED TWP
DATE 12/1/21
CHECKED AW
DATE 13/1/21

REMARKS

CITY GEOTECHNICAL
ENGINEERING LTD.

DRILLHOLE
RECORD

JOB NO. : _____
HOLE NO. : BH16
SHEET : 3 OF 3
DATE : 7/1/21 TO 11/1/21

PROJECT : Proposed Residential Development at Maryknoll House, No. 44 Stanley Village Road, Stanley,
Hong Kong - Lot No. RBL 333RP. Ground Investigation Works

METHOD : ROTARY	CO-ORDINATES	ROCK COREBIT : TNW
MACHINE & NO. : XY-2B, LSY01	E 839692.694 N 809056.631	HOLE DIA. : HX/NX
FLUSHING MEDIUM : WATER	ORIENTATION : VERTICAL	GROUND LEVEL : +51.22 mPD

Drilling Progress	Casing Depth/Size	Water Level/Time	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R. Q. D.	Fracture Index	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Zone	Description
									No.	Type Depth						
11/1				100	100	100	3.0	ABT	TNW		+31.13	20.00	+	III		As sheet 2 of 3.
				100	100	88			TNW		20.99	20.09	+			Strong, pinkish grey, spotted with black & white, slightly decomposed medium grained GRANITE with closely to medium spaced, rough planar & undulating, very to extremely narrow, clear joints, dipping at 0°-10° & 10°-20°.
11/1									TNW		21.63	21.63	+			End of the hole at 21.63m.

- Small disturbed sample
- ◆ Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- ☒ Mazier sample
- P/S Piston sample
- ▲ Water sample
- ▼ Water table
- ↓ Standard penetration test
- Permeability test
- ▲ Piezometer tip
- ⏏ Standpipe
- ABT Acoustic borehole televiewer survey

LOGGED TWP
DATE 12/1/21
CHECKED AW
DATE 13/1/21

REMARKS

CITY GEOTECHNICAL
ENGINEERING LTD.

DRILLHOLE
RECORD

JOB NO. : _____
HOLE NO. : BH18
SHEET : 1 OF 2
DATE : 15/1/21 TO 20/1/21

PROJECT : Proposed Residential Development at Maryknoll House, No. 44 Stanley Village Road, Stanley,
Hong Kong - Lot No. RBL 333RP. Ground Investigation Works

METHOD : ROTARY	CO-ORDINATES	ROCK COREBIT : TNW
MACHINE & NO. : XY-2B, LYS01	E 839688.779 N 809042.952	HOLE DIA. : PX/HX/NX
FLUSHING MEDIUM : WATER	ORIENTATION : VERTICAL	GROUND LEVEL : +45.13 mPD

Drilling Progress	Casing Depth/Size	Water Level/Time	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R. Q. D.	Fracture Index	Tests	Samples			Reduced Level	Depth (m)	Legend	Grade	Zone	Description
									No.	Type	Depth						
15/1	Px											+45.13	0.00		V		Extremely weak, pinkish grey, spotted with black & white, completely decomposed medium grained GRANITE. (Loose, slightly clayey silty SAND.)
				100				1,2,4,6,6,8 N=24	A	INSPECTION PIT	0.50						
									B		1.00						
									C		1.50	+43.63	1.50		V		Extremely weak, pinkish & brownish grey, spotted with black & white, completely decomposed medium grained GRANITE. (Medium dense, silty SAND.)
									1		1.95						
									2		2.00						
									3								
									4		3.10						
									5		3.50						
15/1								2,3,5,8,9,9 N=31	6		3.95	+41.13	4.00		V		Extremely weak, pinkish grey, spotted with black & white, completely decomposed medium grained GRANITE. (Dense, silty SAND.)
16/1				100					7								
									8		5.10						
									9		5.50						
								5,6,8,9,11,12 N=40	10		5.95						
				40					11		6.00						
	Px 6.62								12		6.50	+38.51	6.62		III/II		Moderately strong to strong, pinkish & brownish grey, spotted with black & white, moderately to slightly decomposed medium grained GRANITE with medium to widely spaced, occasional closely spaced, rough planar & undulating, very to extremely narrow, iron stained & clear joints, dipping at 0°-10°, 20°-30° & 30°-40°.
	Hx									TNW							
16/1				100	100	100					7.40						
18/1							1.8			TNW							
				100	100	100					8.26						
										TNW							
				100	100	97	5.6				9.16						
										TNW							
				100	100	100	1.8				9.85						
				96	96	96				TNW							

- Small disturbed sample
- ◆ Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- P/S Piston sample
- ▲ Water sample
- ▼ Water table
- ↓ Standard penetration test
- Permeability test
- ▲ Piezometer tip
- ⊕ Standpipe
- ⊕ Acoustic borehole televiewer survey

LOGGED TWP
DATE 20/1/21
CHECKED AW
DATE 21/1/21

REMARKS
1. An inspection pit was excavated by hand to a depth of 1.50m.
2. A standpipe was installed at a depth of 9.91m.
3. A piezometer was installed at a depth of 12.91m.

CITY GEOTECHNICAL
ENGINEERING LTD.

DRILLHOLE
RECORD

JOB NO. : _____
HOLE NO. : BH18
SHEET : 2 OF 2
DATE : 15/1/21 TO 20/1/21

PROJECT : Proposed Residential Development at Maryknoll House, No. 44 Stanley Village Road, Stanley,
Hong Kong - Lot No. RBL 333RP. Ground Investigation Works

METHOD : ROTARY	CO-ORDINATES	ROCK COREBIT : TNW
MACHINE & NO. : XY-2B, LYS01	E 839688.779 N 809042.952	HOLE DIA. : PX/HX/NX
FLUSHING MEDIUM : WATER	ORIENTATION : VERTICAL	GROUND LEVEL : +45.13 mPD

Drilling Progress	Casing Depth/Size	Water Level/Time	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R. Q. D.	Fracture Index	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Zone	Description
									No.	Type Depth						
18/1	Hx			96	96	96	1.8		TNW			10.00	+	III/II		As sheet 1 of 2.
18/1								30,32,35,39,42,46 N=162			+34.34	10.79	+			Extremely weak, pinkish & brownish grey, spotted with black & white, completely decomposed medium grained GRANITE. (Very dense, silty SAND with some fine gravel sized rock.)
19/1				100				13 14				11.00 11.45	+	V		
	Hx 12.91								▲			12.60	+			Strong, pinkish grey, spotted with black & white, slightly decomposed medium grained GRANITE with medium to widely spaced & occasional closely spaced, rough planar & undulating, very to extremely narrow, clear joints, dipping at 0°-10°, 20°-30° & 30°-40°.
				100	100	81	9.7				+32.22	12.91	+	II		
												13.64	+			
				100	100	98	0.0					15.11	+			
19/1												16.61	+			
20/1				100	100	100	7.0					18.01	+			
20/1				100	100	100	2.1					18.01	+			End of the hole at 18.01m.

- Small disturbed sample
- ◆ Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- P/S Piston sample
- ▲ Water sample
- ▼ Water table
- ↓ Standard penetration test
- Permeability test
- ▲ Piezometer tip
- ⊕ Standpipe
- ⊕ Acoustic borehole televiewer survey

LOGGED TWP
DATE 20/1/21
CHECKED AW
DATE 21/1/21

REMARKS

CITY GEOTECHNICAL
ENGINEERING LTD.

DRILLHOLE
RECORD

JOB NO. : _____
HOLE NO. : BH21
SHEET : 1 OF 2
DATE : 8/1/21 TO 13/1/21

PROJECT : Proposed Residential Development at Maryknoll House, No. 44 Stanley Village Road, Stanley,
Hong Kong - Lot No. RBL 333RP. Ground Investigation Works

METHOD : ROTARY	CO-ORDINATES	ROCK COREBIT : TNW
MACHINE & NO. : XY-2B, LSY01	E 839672.737 N 809059.255	HOLE DIA. : HX/NX
FLUSHING MEDIUM : WATER	ORIENTATION : VERTICAL	GROUND LEVEL : +42.14 mPD

Drilling Progress	Casing Depth/Size	Water Level/Time	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R. Q. D.	Fracture Index	Tests	Samples			Reduced Level	Depth (m)	Legend	Grade	Zone	Description
									No.	Type	Depth						
8/1	Hx											+42.14	-0.00				Loose, grey, clayey silty SAND with some rootlets. (FILL)
				90						A	INSPECTION PIT	+41.64	-0.50				Extremely weak, pinkish grey, spotted with black & white, completely decomposed medium grained GRANITE. (Medium dense to very dense, slightly clayey silty SAND.)
										B							
										C							
										1							
8/1										2							
9/1								2,4,5, 5,6,6 N=22		3							
										4							
				100						5							
										6							
								4,5,6, 7,8,8 N=29		7							
										8							
				100						9							
										10							
								5,6,7, 9,11,15 N=42		11							
										12							
9/1										13							
11/1				100						14							
								7,11,12, 17,20,25 N=74		15							
										16							
				100						17							
													10.00				

- Small disturbed sample
- ◆ Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- P/S Piston sample
- ▲ Water sample
- ▼ Water table
- ↓ Standard penetration test
- Permeability test
- ▲ Piezometer tip
- ⊕ Standpipe
- ⊕ Acoustic borehole televiewer survey

LOGGED TWP
DATE 14/1/21
CHECKED AW
DATE 15/1/21

REMARKS
1. An inspection pit was excavated by hand to a depth of 1.50m.
2. A standpipe was installed at a depth of 10.77m.
3. A piezometer was installed at a depth of 13.77m.

CITY GEOTECHNICAL
ENGINEERING LTD.

DRILLHOLE
RECORD

JOB NO. : _____
HOLE NO. : BH21
SHEET : 2 OF 2
DATE : 8/1/21 TO 13/1/21

PROJECT : Proposed Residential Development at Maryknoll House, No. 44 Stanley Village Road, Stanley,
Hong Kong - Lot No. RBL 333RP. Ground Investigation Works

METHOD : ROTARY	CO-ORDINATES	ROCK COREBIT : TNW
MACHINE & NO. : XY-2B, LSY01	E 839672.737 N 809059.255	HOLE DIA. : HX/NX
FLUSHING MEDIUM : WATER	ORIENTATION : VERTICAL	GROUND LEVEL : +42.14 mPD

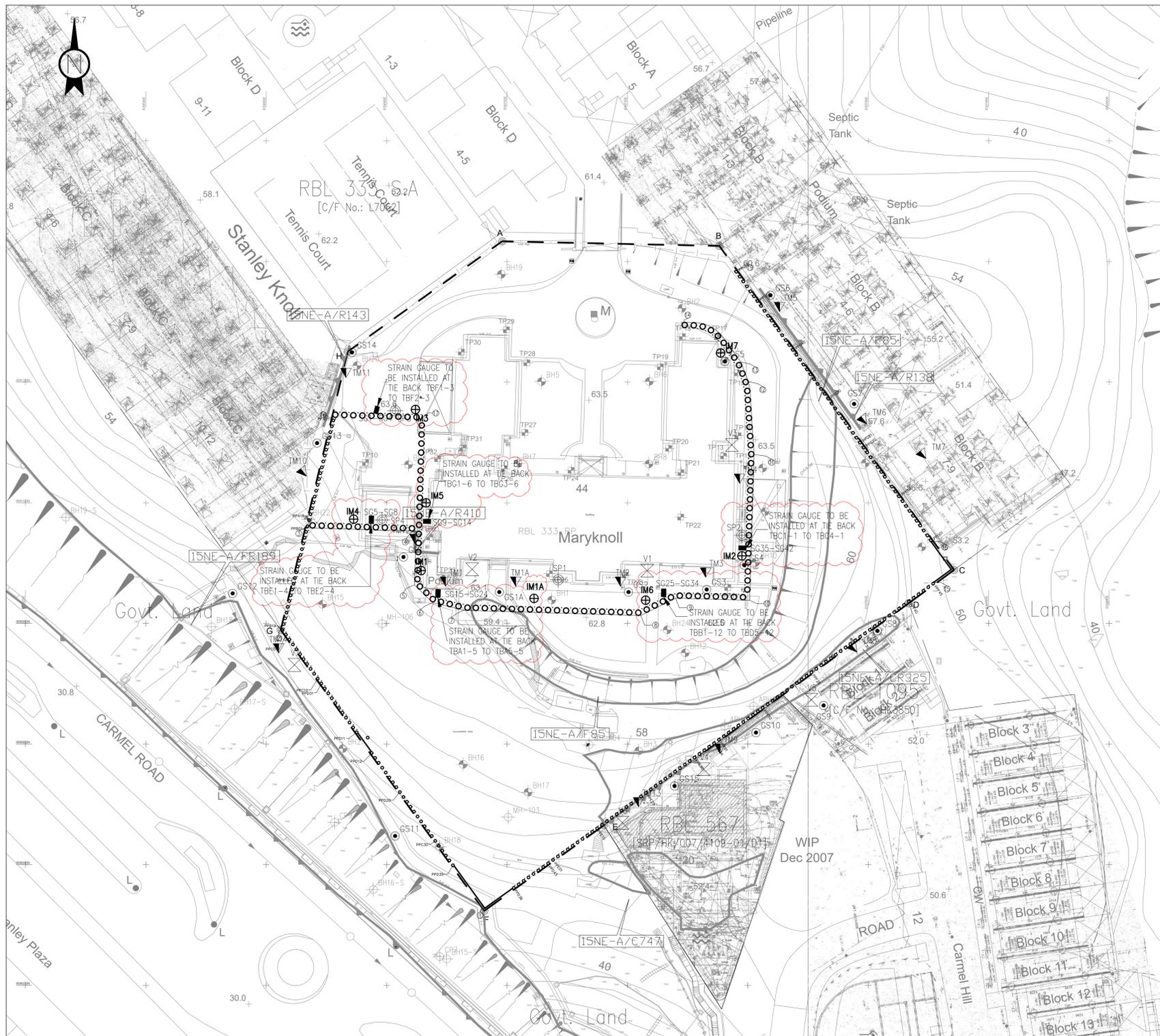
Drilling Progress	Casing Depth/Size	Water Level/Time	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R. Q. D.	Fracture Index	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Zone	Description
									No.	Type Depth						
11/1	Hx			100				7,9,16,23,26,29 N=94	17	U76		10.00		V		As sheet 1 of 2.
11/1									18	U76		10.60				
11/1									19	U76		11.05				
12/1				100				9,17,25,34,42,47 N=148	21	U76		11.50				
									22	U76		12.60				
									23	U76		13.05				
	Hx			50	0	0	NI		13.45	TNW	+28.69	13.45		IV		Moderately weak, pinkish grey, spotted with black & white, highly decomposed medium grained GRANITE.
	13.77								13.77	TNW	+28.37	13.77		III		(Subangular to subrounded, fine to medium GRAVEL sized rock.)
				100	100	91		4.8		TNW						
				100	100	74		>20		TNW		14.97				Moderately strong, pinkish grey, spotted with black & white, moderately decomposed medium grained GRANITE with closely to medium spaced, rough planar & undulating, very to extremely narrow, iron stained joints, dipping at 0°-10°, 10°-20°, 20°-30°, 30°-40° & 50°-60°.
				100	100	100	3.8			TNW		15.84				
12/1										TNW		16.90				
13/1				100	100	87		7.7		TNW		17.83				
				100	100	86				TNW		18.98				
13/1										TNW	+23.16	18.98				End of the hole at 18.98m.

- Small disturbed sample
- ◆ Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- P/S Piston sample
- ▲ Water sample
- ▼ Water table
- ↓ Standard penetration test
- Permeability test
- ▲ Piezometer tip
- △ Standpipe
- ABT Acoustic borehole televiewer survey

LOGGED TWP
DATE 14/1/21
CHECKED AW
DATE 15/1/21

REMARKS

Appendix F
ELS Works Approval Plans
for Development at R.B.L 333RP



EXISTING SITE LAYOUT AND MONITORING PLAN (SCALE 1:400)

NOTES ON EXISTING UTILITIES

1. THE POSITION OF EXISTING UTILITIES SHOWN ON THIS DRAWING IS APPROXIMATE ONLY. EXACT LOCATION AND DEPTH OF THE UTILITIES MUST BE ASCERTAINED BY TRIAL PITS ON SITE. EXTREME CARE MUST BE TAKEN DURING EXCAVATIONS IN THE PROXIMITY OF THE UTILITIES. PRECAUTIONS SHALL BE TAKEN TO PREVENT DAMAGE TO ANY OF THE UTILITIES.
2. THE INFORMATION INDICATED IS GIVEN IN GOOD FAITH AND NO GUARANTEE IS GIVEN AS TO ITS ACCURACY OR COMPLETENESS. THE USE OF THIS INFORMATION BY THE CONTRACTOR OR ANY OTHER PARTY SHALL NOT RELIEVE HIM OF ANY OF HIS OBLIGATIONS OR RESPONSIBILITY UNDER THE CONTRACT.
3. THE CONTRACTOR SHALL ARRANGE FOR ANY REALIGNMENT OF THE EXISTING UTILITIES AT THE WORKING LOCATION PRIOR TO THE CONSTRUCTION OF WORKS, IF REQUIRED.
4. THE CONTRACTOR SHALL PROVIDE TEMPORARY SUPPORT TO THE EXISTING UTILITIES DURING THE CONSTRUCTION WORKS, IF REQUIRED.
5. THE CONTRACTOR'S PARTICULAR ATTENTION IS DRAWN TO THE EXISTENCE OF UNDERGROUND SERVICE WITHIN AND AROUND THE SITE. HE SHALL PROTECT AND MAINTAIN ALL THOSE WORKS DURING THE ENTIRE CONTRACT PERIOD. NECESSARY PRECAUTIONS AND MONITORING SHALL BE TAKEN TO PREVENT DAMAGE TO THE EXISTING UPPER GROUND SERVICE.

6. THE CONTRACTOR SHALL IDENTIFY AND ESTABLISH HIMSELF THE TYPES AND EXACT LAYOUT/LOCATION OF THE EXISTING SERVICES BEFORE CARRYING OUT ANY CONSTRUCTION WORKS ON SITE. HE SHALL ALSO PLAN AND ARRANGE HIS WORKS TAKING INTO ACCOUNT THE EXISTENCE OF ALL SUCH WORKS THAT MAY AFFECT THE CONSTRUCTION SEQUENCE OF HIS WORKS. SHALL ANY SERVICES FALL WITHIN THE SITE, THE CONTRACTOR SHALL PROPOSE AND SUBMIT A METHOD STATEMENT ON PROTECTING OR DIVERTING THE EXISTING UTILITIES FOR AP/RSE APPROVAL AT NO EXTRA COST. IF NECESSARY, THE CONTRACTOR SHALL MODIFY THE DESIGN OF WORKS AND/OR PROVIDE TEMPORARY SUPPORTS FOR THE SERVICES AND SUBMIT THE METHOD STATEMENT FOR THE SERVICES AND SUBMIT THE METHOD STATEMENT FOR AP/RSE APPROVAL. SHOULD ANY DAMAGE OCCUR, NOTIFY THE AP/RSE AND RELEVANT AUTHORITIES CONCERNED IMMEDIATELY AND MAKE GOOD BY THE CONTRACTOR AT NO EXTRA COST.

NOTES ON MONITORING

1. INSTALL ALL CHECK POINTS AS SHOWN ON PLAN.
2. INITIAL READINGS OF CHECK POINTS AND BENCH MARKS SHALL BE SUBMITTED TO BUILDINGS DEPT. BEFORE COMMENCEMENT OF THE WORK.
3. ALL CHECK POINTS SHALL BE PROPERLY MAINTAINED AND MONITORED ON DAILY INTERVAL AND THE READINGS SHALL BE SUBMITTED TO THE AP/RSE AND BUILDING AUTHORITY BI-WEEKLY. ANY DEFECTIVE MONITORING DEVICES SHALL BE REPLACED ASAP.
4. THE LEVEL SHALL BE REPORTED IN mPD AND THE CHECK POINTS SHALL BE SURVEYED ACCORDING TO HONG KONG METRIC GRID.
5. PIEZOMETERS/STANDPIPES INSTALLED ON SITE SHOULD BE MONITORED ON DAILY BASIS CONTINUOUSLY THROUGHOUT THE CONSTRUCTION. THE READINGS SHOULD BE SUBMITTED TO RSE/RGE/BA ON BIWEEKLY BASIS. INITIAL READING SHOULD ALSO BE SUBMITTED BEFORE THE COMMENCEMENT OF WORKS.
6. CHECK POINT READINGS TO BE KEPT ON SITE FOR INSPECTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR APPLICATION OF EXCAVATION PERMIT FOR INSTALLATION OF MONITORING CHECK POINTS OUTSIDE SITE BOUNDARY. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR SEEKING CONSENT FROM THE ADJACENT LOT OWNERS FOR INSTALLATION OF MONITORING CHECK POINT AT ADJACENT LOTS / BUILDINGS. WHEN INSTALLATION OF CHECKPOINTS IN PRIVATE LOT IS OBJECTED, THE CONTRACTOR SHALL PROPOSE ALTERNATIVE LOCATION.
8. ACCURACY OF ALL READING SHALL BE 1.0mm FOR BOTH VERTICAL AND HORIZONTAL PLANES.
9. AGREEMENT FROM ADJACENT LOT OWNER SHALL BE OBTAINED FOR MONITORING THE CHECK POINT.

DESIGN GROUND WATER LEVEL(DGWL) SCHEDULE

STANDPIPE MARK	DESIGN GROUND WATER LEVEL
SP1	+ 50.1 mPD
SP2	+ 56.8 mPD
SP3	+ 58.7 mPD
SP4	+ 49.2 mPD

NOTE: STANDPIPE SP4 SHALL BE INSTALLED UPON FINAL EXCAVATION LEVEL IS FORMED AND WILL BE REMOVED AFTER THE CONSTRUCTION OF PILE CAP.

"ALERT LEVEL" RESPONSE ACTION:

- (i) RC TO NOTIFY AND SUBMIT WRITTEN REPORT TO RSE/RGE.
- (ii) AP/RSE/RGE TO ASSESS EFFECT OF MOVEMENT AND PREDICT FUTURE MOVEMENTS.
- (iii) AP/RSE/RGE TO AGREE WITH RC ON THE SUITABLE ACTION PLAN WHICH MAY INCLUDE THE INSTALLATION OF ADDITIONAL CHECK POINTS AND/OR INCREASING MONITORING FREQUENCY AND THE REMEDIAL/MITIGATION MEASURES TO BE TAKEN UPON REACHING THE "THE ALARM LEVEL"

"ALARM LEVEL" RESPONSE ACTION:

- (i) RC TO NOTIFY AND SUBMIT UPDATED REPORT TO AP/RSE/RGE AND NOTIFY THE BD IMMEDIATELY.
- (ii) AP/RSE/RGE AND RC TO CONDUCT JOINT SITE INSPECTION TO DETERMINE IF ANY CONSTRUCTION ACTIVITIES SHOULD BE TEMPORARILY SUSPENDED.
- (iii) RC TO IMPLEMENT THE NECESSARY REMEDIAL/MITIGATION MEASURES IN ACCORDANCE WITH THE AGREED ACTION PLAN.
- (iv) AP/RSE/RGE AND RC TO DISCUSS THE INSTRUMENT RESPONSE AND REVIEW THE EFFECTIVENESS OF THE RESPONSE ACTION.
- (v) AP/RSE/RGE TO AGREE WITH RC ON THE EMERGENCY PLAN DETAILING THE MEASURES TO BE TAKEN UPON REACHING "ACTION LEVEL".
- (vi) ANY CONSTRUCTION ACTIVITIES MAY BE SUSPENDED IF THE RESPONSE ACTION HAS BEEN IMPLEMENTED AND ON THE ADVICE OF
- (vii) AP/RSE/RGE TO REVIEW THE METHOD STATEMENTS OF PILING WORKS TO DETERMINE WHETHER MODIFICATION TO THE CONSTRUCTION METHODS IS REQUIRED TO PREVENT ACTION LEVEL FROM BEING REACHED.

"ACTION LEVEL" RESPONSE ACTION:

- (i) ALL WORKS WITH THE AFFECTED AREA ARE TO BE CEASED.
- (ii) RC TO NOTIFY AND CARRY OUT A JOINT SITE INSPECTION WITH THE AP/RSE/RGE IMMEDIATELY. THE BD AND THE RELEVANT PARTIES SHOULD BE NOTIFIED IMMEDIATELY.
- (iii) RC TO IMPLEMENT THE NECESSARY EMERGENCY MEASURES IN ACCORDANCE WITH THE AGREED EMERGENCY PLAN.
- (iv) RC TO SUBMIT AN INCIDENT REPORT TO AP/RSE/RGE AND THE BD DETAILING THE FULL HISTORY OF THE MOVEMENTS AND REMEDIAL/EMERGENCY MEASURES IMPLEMENTED.
- (v) AP/RSE/RGE TO REVIEW THE INCIDENT AND AGREE WITH RC ON FURTHER REMEDIAL AND PREVENTIVE MEASURES TO ENABLE RESUMPTION OF THE SUSPENDED WORKS.
- (vi) CONSTRUCTION ACTIVITIES SHOULD NOT BE RESUMED UNTIL THE NECESSARY REMEDIAL AND PREVENTIVE MEASURE HAVE BEEN COMPLETED TO THE SATISFACTION OF THE BD.
- (vii) IF THE TRIGGER VALUES AND RESPONSE ACTION ARE REVISED, THE AMENDED PLANS SHOULD BE SUBMITTED TO THE BD FOR APPROVAL. THE SUSPENDED CONSTRUCTION ACTIVITIES SHOULD NOT BE RESUMED UNTIL THE AMEDNED PLANS ARE APPROVED BY THE BA AND THE CONSENT IS GIVEN

REMARKS:

- (i) THE "ACTION LEVEL" RESPONSE ACTION SHOULD BE TAKEN IF ANY OF THE FOLLOWING SITUATIONS OCCUR:
 - ANY MONITORING STATION HAS A READING REACHING THE SERVICEABILITY LIMIT.
 - UNDUE SETTLEMENT AS INDICATED IN ANY CHECKPOINTS CEG: AN INCREASE OF 5MM BETWEEN TWO CONSECUTIVE DAILY READING.
 - SIGN OF DISTRESS OR DAMAGES OBSERVED IN ANY ADJACENT STRUCTURES AND/OR UTILITIES.

INSTRUMENTATION AND MONITORING

WHEN THE MONITORING VALUES RECORDED AT ANY MONITORING STATIONS REACH THE MAXIMUM PREDICTED/ CALCULATED MOVEMENTS/ GROUNDWATER FLUCTUATIONS INDUCED BY OR ASSOCIATED WITH THE PROPOSED WORKS, THE RSE/RGE SHALL INVESTIGATE THE CAUSES OF THE RECORDED UNDUE PERFORMANCE, REVIEW THE RECORDED VALUES WITH THE CONSTRUCTION SEQUENCE AND ACTIVITIES, ASSESS THE EFFECTS ON THE PROPOSED WORKS, PREDICT FURTHER MOVEMENTS/ GROUNDWATER FLUCTUATIONS AND TAKE ANY EMERGENCY ACTION ON SITE AS NECESSARY. A REVIEW REPORT COVERING THE ABOVE ASPECTS TOGETHER WITH THE DETAILED PLAN OF REMEDIAL ACTION SHALL BE PREPARED BY THE RSE/RGE AND SUBMITTED TO THE BD FOR AGREEMENT. IF REQUIRED, THE RSE/RGE SHALL SUBMIT AMENDMENT PLANS TO THE BD FOR APPROVAL.

GENERAL MONITORING CHECKPOINTS

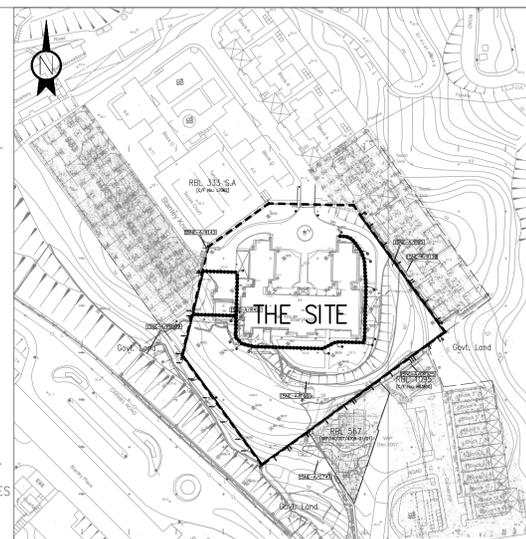
INSTRUMENT	STAGE	CRITERION	ALERT	ALARM	ACTION
GROUND SETTLEMENT CHECK POINT (GS1-GS5,GS14)	DURING AND BEFORE ELS STAGE 6	TOTAL SETTLEMENT	6mm	8mm	7mm
	AFTER ELS STAGE 6				10mm
TILTING CHECK POINT (TM1-TM4, TM1A)	DURING AND BEFORE ELS STAGE 6	ANGULAR DISTORTION	1:2000	1:1500	7mm
	AFTER ELS STAGE 6				10mm
VIBRATION CHECK POINT (V1-V7)	DURING AND BEFORE ELS STAGE 6	VIBRATION (PEAK PARTICLE VELOCITY)	3mm/s	4mm/s	5mm/s
	AFTER ELS STAGE 6				5mm/s
STANDPIPE (SP1-SP4)	DURING AND BEFORE ELS STAGE 6	GROUND WATER LEVEL	1m BELOW DGWL	0.5m BELOW DGWL	DGWL
	AFTER ELS STAGE 6				DGWL
VIBRATION CHECK POINT (V1-V7)	DURING AND BEFORE ELS STAGE 6	VIBRATION (PEAK PARTICLE VELOCITY)	7.5mm/s	10mm/s	15mm/s
	AFTER ELS STAGE 6				15mm/s
GROUND SETTLEMENT CHECK POINT(GS6-GS15)	DURING AND BEFORE ELS STAGE 6	TOTAL SETTLEMENT	12mm	18mm	25mm
	AFTER ELS STAGE 6				25mm
TILTING CHECK POINT (TMS-TM14)	DURING AND BEFORE ELS STAGE 6	ANGULAR DISTORTION	1:1000	1:750	1:500
	AFTER ELS STAGE 6				1:500
INCLINOMETER (IM1 - IM7,IM1A)	DURING AND BEFORE ELS STAGE 6	LATERAL DEFLECTION	12mm	16mm	14mm
	AFTER ELS STAGE 6				20mm
STRAIN GAUGE (SG1 - SG42)	DURING AND BEFORE ELS STAGE 6	TIE BACK FORCE	0.75 X TD	0.9 X TD	TD
	AFTER ELS STAGE 6				TD

TD DENOTES DESIGN TIE BACK FORCE AS SPECIFIED TIE BACK SCHEDULE AS SHOWN ON DRAWING BPW-10.

MONITORING OF THE STRAIN GAUGE SHALL BE CARRIED OUT MONTHLY. THE INTERPRETATION OF TIE BACK FORCE MONITORING RESULT SHALL BE INCLUDED IN T5 REPORT.

INCLINOMETER OF BORED PILE WALL SCHEDULE

INCLINOMETER MARK	BORED PILE WALL
IM1A	BPW-B04
IM1	BPW-A05
IM2	BPW-C03
IM3	BPW-F10
IM4	BPW-E05
IM5	BPW-G10
IM6	BPW-B16
IM7	BPW-D02



SITE PLAN (1:1500 IN A1)

LEGEND:

- SITE BOUNDARY
- GS1 PROPOSED GROUND SETTLEMENT CHECK POINT (GS1 TO GS15,GS14)
- TM1 PROPOSED TILTING CHECK POINT (TM1 TO TM14, TM1A)
- TP9 EXISTING TRIAL PIT
- V1 PROPOSED VIBRATION CHECK POINT (V1 TO V7)
- BH1 EXISTING BOREHOLE WITH STANDPIPE
- SP1 PROPOSED STANDPIPE (SP1-SP4)
- FW EXISTING FRESH WATER MAIN
- SW EXISTING SEWER PIPES
- STW EXISTING STORM WATER PIPES
- IM1 PROPOSED INCLINOMETERS (IM1 TO IM7,IM1A)
- SG1 PROPOSED STRAIN GAUGE (SG1 - SG42)

Revision	Date	Description	By	Chk
B	06/2025	2ND AMENDMENT	CJX	SKS
A	04/2024	1ST AMENDMENT	CJX	SKS



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title:
MONITORING PLAN

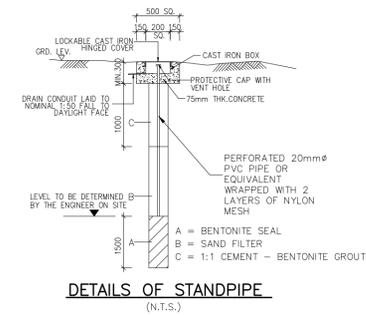
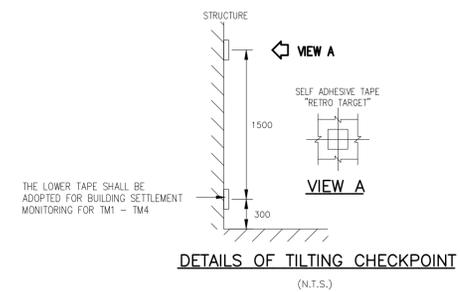
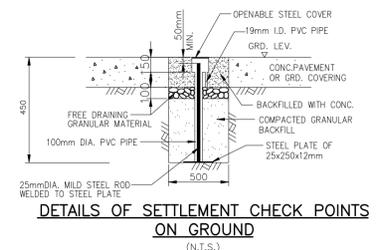
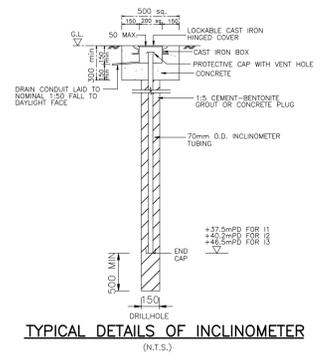
Drawing Number:
ELS-01

Revision Number:
B

TIE BACK SCHEDULE

TYPE BACK TYPE	TIE BACK NO.	INSTALLATION LEVEL (+mPD)	TIE BACK CUT OFF LEVEL (mPD)	DRILLHOLE SIZE (mm)	NUMBER OF BARS	BAR SIZE (mm)	HORIZONTAL SPACING (m)	INCLINATION FROM HORIZON (°)	FREE LENGTH (m)	DESIGN BOND LENGTH IN ROCK (m)	TOTAL BOND LENGTH IN ROCK (m)	TOTAL LENGTH (m)	OVERALL DESIGN TIE BACK FORCE (kN)	(DURING ELS STAGE 6-1) DESIGN TIE BACK FORCE (kN)
A	TBA 1 - 1	57.7	57.7	219	4	T50	3.0	45	15.6	5.0	5.3	20.9	512.4	373.8
A	TBA 1 - 2 - TBA 1 - 3	57.8	57.8	219	4	T50	3.0	45	15.8	5.0	5.3	21.1	512.4	373.8
A	TBA 1 - 4 - TBA 1 - 6	58.0	58.0	219	4	T50	3.0	45	16.0	5.0	5.3	21.3	512.4	373.8
A	TBA 1 - 7	58.3	58.3	219	4	T50	3.0	45	16.5	5.0	5.3	21.8	512.4	373.8
A	TBA 1 - 8	58.5	58.5	219	4	T50	3.0	45	16.7	5.0	5.3	22.0	512.4	373.8
A	TBA 2 - 1	55.1	55.1	219	4	T50	3.0	45	12.7	5.0	5.3	18.0	693.0	331.8
A	TBA 2 - 3	55.3	55.3	219	4	T50	3.0	45	13.0	5.0	5.3	18.3	693.0	331.8
A	TBA 2 - 2, 4 - 6	55.5	55.5	219	4	T50	3.0	45	13.3	5.0	5.3	18.6	693.0	331.8
A	TBA 2 - 7	55.8	55.8	219	4	T50	3.0	45	13.7	5.0	5.3	19.0	693.0	331.8
A	TBA 2 - 8	56.0	56.0	219	4	T50	3.0	45	14.0	5.0	5.3	19.3	693.0	331.8
A	TBA 3 - 1	52.8	52.8	219	4	T50	3.0	45	10.2	5.0	5.3	15.5	802.2	NOT INSTALLED
A	TBA 3 - 2 - TBA 3 - 6	53.0	53.0	219	4	T50	3.0	45	10.5	5.0	5.3	15.8	802.2	NOT INSTALLED
A	TBA 3 - 7	53.2	53.2	219	4	T50	3.0	45	10.8	5.0	5.3	16.1	802.2	NOT INSTALLED
A	TBA 3 - 8	53.5	53.5	219	4	T50	3.0	45	11.2	5.0	5.3	16.5	802.2	NOT INSTALLED
A	TBA 4 - 1 - TBA 4 - 6	50.5	50.5	219	4	T50	3.0	45	7.8	5.0	5.3	13.1	835.8	NOT INSTALLED
A	TBA 4 - 7	50.7	50.7	219	4	T50	3.0	45	8.1	5.0	5.3	13.4	835.8	NOT INSTALLED
A	TBA 4 - 8	51.0	51.0	219	4	T50	3.0	45	8.5	5.0	5.3	13.8	835.8	NOT INSTALLED
A	TBA 5 - 8, 1 - 6	48.0	48.0	219	4	T50	3.0	45	5.4	5.0	5.3	10.7	730.8	NOT INSTALLED
A	TBA 5 - 7	48.2	48.2	219	4	T50	3.0	45	5.7	5.0	5.3	11.0	730.8	NOT INSTALLED
B	TBB 1 - 1	60.0	60.0	219	4	T50	3.0	45	22.2	7.0	7.3	29.5	722.4	537.6
B	TBB 1 - 2 - TBB 1 - 9	60.5	60.5	219	4	T50	3.0	45	22.9	7.0	7.3	30.2	722.4	537.6
B	TBB 1 - 10	60.3	60.3	219	4	T50	3.0	45	22.6	7.0	7.3	29.9	722.4	537.6
B	TBB 1 - 11	61.5	61.5	219	4	T50	3.0	45	24.3	7.0	7.3	31.6	722.4	537.6
B	TBB 1 - 12 - TBB 1 - 13	61.0	61.0	219	4	T50	3.0	45	23.6	7.0	7.3	30.9	722.4	537.6
B	TBB 1 - 14	60.8	60.8	219	4	T50	3.0	45	23.3	7.0	7.3	30.6	722.4	537.6
B	TBB 1 - 15	60.9	60.9	219	4	T50	3.0	45	23.5	7.0	7.3	30.8	722.4	537.6
B	TBB 1 - 16	60.6	60.6	219	4	T50	3.0	45	23.1	7.0	7.3	30.4	722.4	537.6
B	TBB 2 - 1 - TBB 2 - 9	58.0	58.0	219	4	T50	3.0	45	19.4	7.0	7.3	26.7	760.2	470.4
B	TBB 2 - 10	57.4	57.4	219	4	T50	3.0	45	18.5	7.0	7.3	25.8	760.2	470.4
B	TBB 2 - 11, 15	58.5	58.5	219	4	T50	3.0	45	20.1	7.0	7.3	27.4	760.2	470.4
B	TBB 2 - 12	58.0	58.0	219	4	T50	3.0	45	19.4	7.0	7.3	26.7	760.2	470.4
B	TBB 2 - 13	58.3	58.3	219	4	T50	3.0	45	19.8	7.0	7.3	27.1	760.2	470.4
B	TBB 2 - 14, 16	58.1	58.1	219	4	T50	3.0	45	19.5	7.0	7.3	26.8	760.2	470.4
B	TBB 3 - 1	56.0	56.0	219	4	T50	3.0	45	16.5	7.0	7.3	23.8	810.6	310.8
B	TBB 3 - 2 - 8, 10 - 13, 15	55.5	55.5	219	4	T50	3.0	45	15.8	7.0	7.3	23.1	810.6	310.8
B	TBB 3 - 9, 16	55.7	55.7	219	4	T50	3.0	45	16.1	7.0	7.3	23.4	810.6	310.8
B	TBB 3 - 14	55.6	55.6	219	4	T50	3.0	45	16.0	7.0	7.3	23.3	810.6	310.8
B	TBB 4 - 1	53.5	53.5	219	4	T50	3.0	45	13.0	7.0	7.3	20.3	1029.0	NOT INSTALLED
B	TBB 4 - 2 - 10, 13 - 16	53.0	53.0	219	4	T50	3.0	45	12.3	7.0	7.3	19.6	1029.0	NOT INSTALLED
B	TBB 4 - 11	52.5	52.5	219	4	T50	3.0	45	11.6	7.0	7.3	18.9	1029.0	NOT INSTALLED
B	TBB 4 - 12	52.6	52.6	219	4	T50	3.0	45	11.7	7.0	7.3	19.0	1029.0	NOT INSTALLED
B	TBB 5 - 1	51.0	51.0	219	4	T50	3.0	45	9.5	7.0	7.3	16.8	1478.4	NOT INSTALLED
B	TBB 5 - 2 - 9, 13 - 16	50.5	50.5	219	4	T50	3.0	45	8.8	7.0	7.3	16.1	1478.4	NOT INSTALLED
B	TBB 5 - 10	50.2	50.2	219	4	T50	3.0	45	8.3	7.0	7.3	15.6	1478.4	NOT INSTALLED
B	TBB 5 - 11	50.0	50.0	219	4	T50	3.0	45	8.1	7.0	7.3	15.4	1478.4	NOT INSTALLED
B	TBB 5 - 12	50.1	50.1	219	4	T50	3.0	45	8.2	7.0	7.3	15.5	1478.4	NOT INSTALLED
C	TBC 1 - 1 - TBC 1 - 12	62.0	62.0	219	4	T50	3.0	45	18.4	5.0	5.3	23.7	634.2	592.2
C	TBC 2 - 1 - TBC 2 - 2	58.5	58.5	219	4	T50	3.0	45	15.1	5.0	5.3	20.4	932.4	819.0
C	TBC 2 - 3 - TBC 2 - 11	59.0	59.0	219	4	T50	3.0	45	15.8	5.0	5.3	21.1	932.4	819.0
C	TBC 3 - 1 - TBC 3 - 3	55.5	55.5	219	4	T50	3.0	45	12.6	5.0	5.3	17.9	945.0	684.6
C	TBC 3 - 4	56.0	56.0	219	4	T50	3.0	45	13.3	5.0	5.3	18.6	945.0	684.6
C	TBC 4 - 1 - TBC 4 - 2	52.6	52.6	219	4	T50	3.0	45	10.2	5.0	5.3	15.5	604.8	NOT INSTALLED
E	TBE 1 - 1 - TBE 1 - 6	50.0	50.0	219	4	T50	3.0	45	11.0	5.0	5.3	16.3	663.6	NOT INSTALLED
E	TBE 2 - 1 - TBE 2 - 6	47.0	47.0	219	4	T50	3.0	45	8.6	5.0	5.3	13.9	655.2	NOT INSTALLED
F	TBF 1 - 1 - TBF 1 - 5	61.0	61.0	219	4	T50	3.0	45	16.0	5.0	5.3	21.3	848.4	798.0
F	TBF 2 - 1 - TBF 2 - 5	57.0	57.0	219	4	T50	3.0	45	12.4	5.0	5.3	17.7	911.4	697.2
G	TBG 1 - 1 - TBG 1 - 6	62.0	62.0	219	4	T50	3.0	45	17.4	5.0	5.3	22.7	378.0	378.0
G	TBG 2 - 1 - TBG 2 - 6	59.0	59.0	219	4	T50	3.0	45	14.1	5.0	5.3	19.4	609.0	609.0
G	TBG 3 - 2 - TBG 3 - 6	56.0	56.0	219	4	T50	3.0	45	17.8	5.0	5.3	23.1	604.8	604.8

FOR INFORMATION ONLY



Revision	Date	Description	By	Chk
A	06/2025	2ND AMENDMENT	CJX	SKS
-	07/2024	1ST AMENDMENT	CJX	SKS



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title: TYPICAL DETAIL

Drawing Number: ELS-01A

Revision Number: A

PIPE PILE	Easting (m)	Northing (m)
PPA01	839671.128	809113.652
PPA18	839667.100	809097.136
PPB01	839666.852	809096.120
PPB19	839662.660	809078.930
PPC01	839663.238	809078.149
PPC10	839668.355	809071.099
PPD01	839668.924	809070.316
PPD11	839674.610	809062.483
PPD12	839677.495	809058.508
PPD35	839691.006	809039.895
PPD36	839701.125	809036.138
PPD43	839706.823	809040.205
PPE01	839707.636	809040.786
PPE34	839734.381	809060.118
PPF01	839735.190	809060.706
PPF31	839759.457	809078.344
PPF32	839760.266	809078.932
PPF45	839770.769	809086.592
PPG01	839770.390	809093.786
PPG20	839759.227	809109.161
PPG21	839758.640	809109.970
PPG56	839738.078	809138.293

TURNING POINT COORDINATES		
TURNING POINTS	EASTING (m)	NORTHING (m)
1	839696.35	809032.93
2	839662.91	809078.99
3	839667.02	809095.84
4	839684.88	809095.31
5	839684.62	809086.38
6	839687.63	809083.46
7	839692.80	809082.19
8	839722.23	809081.31
9	839727.98	809084.19
10	839740.30	809083.82
11	839741.02	809108.01
12	839740.09	809120.08
13	839738.86	809123.33
14	839729.44	809129.91
15	839770.63	809086.78
16	839670.92	809114.17
17	839685.45	809113.74
18	839770.33	809093.47
19	839737.76	809138.34

B.D. REF NO. : BD 3/3008/22 (HU)

LEGEND:

- BOUNDARY LINE
- BH1 AS-BUILT BOREHOLE
- P MH-103 PIEZOMETER
- + 142.1 EXISTING BOREHOLE OF NEARBY SITE
- + 142.1 EXISTING GROUND LEVEL
- H KP1 PROPOSED KING POST
- ○ ○ ○ ○ PROPOSED PIPE PILE
- ○ ○ ○ ○ GROUT CURTAIN
- ○ ○ ○ ○ PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- ○ ○ ○ ○ EXISTING SOIL NAIL TO BE DEMOLISHED
- ○ ○ ○ ○ PROPOSED MAX. 30' OPEN CUT/ SLOPE CUT EXCAVATION
- Y PROPOSED STRUT
- 50 INFERRED ROCKHEAD PROFILE (CAT (c))
- ▭ PROPOSED CHANNEL PLANKING

Revision	Date	Description	By	Chk
B	06/2025	2ND AMENDMENT	CJX	SKS
A	07/2024	1ST AMENDMENT	CJX	SKS

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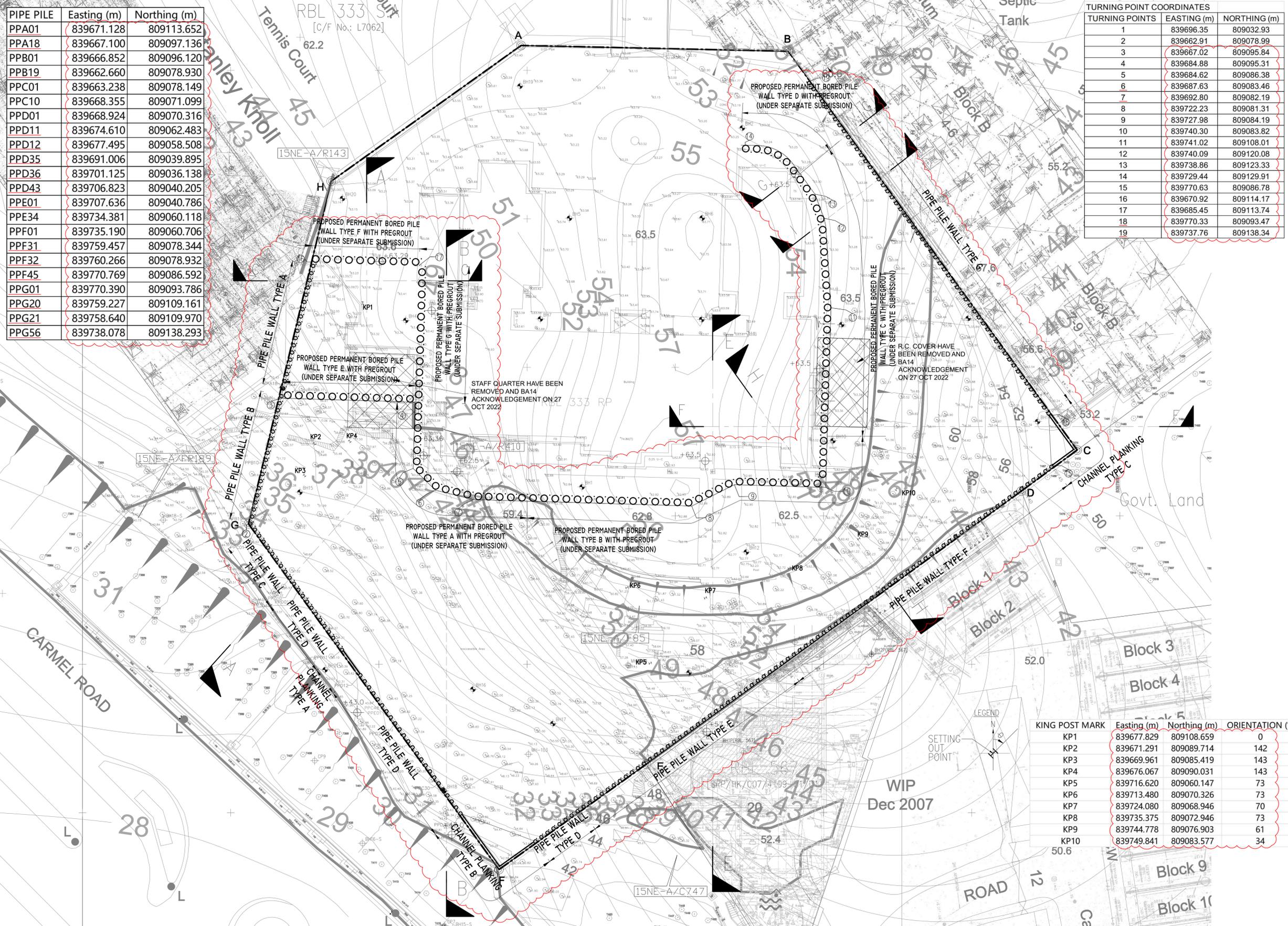
Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS
 Drawing Title: ELS PLAN (STAGE 1)

Drawing Number: ELS-02

Revision Number: B



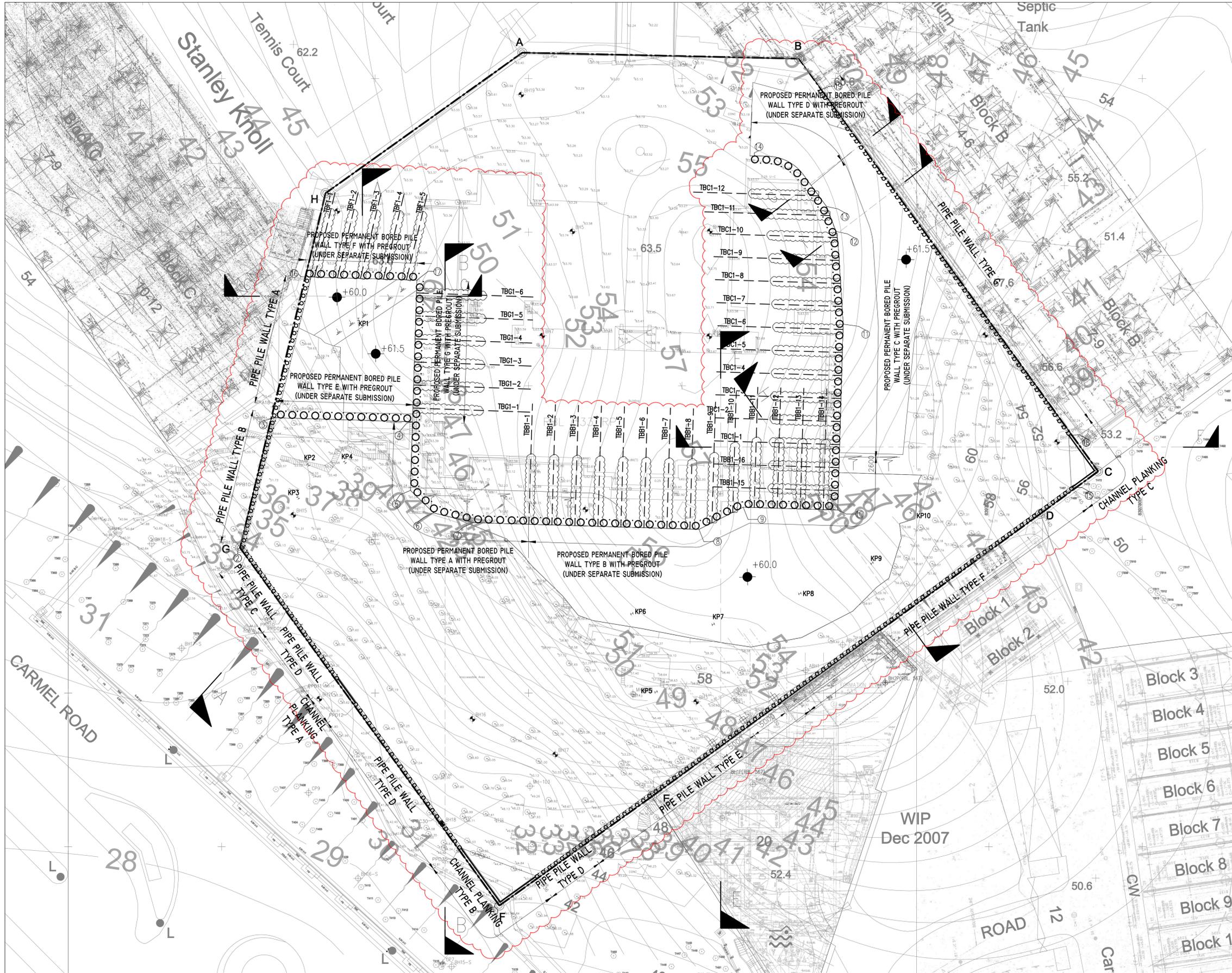
KING POST MARK	Easting (m)	Northing (m)	ORIENTATION (°)
KP1	839677.829	809108.659	0
KP2	839671.291	809089.714	142
KP3	839669.961	809085.419	143
KP4	839676.067	809090.031	143
KP5	839716.620	809060.147	73
KP6	839713.480	809070.326	73
KP7	839724.080	809068.946	70
KP8	839735.375	809072.946	73
KP9	839744.778	809076.903	61
KP10	839749.841	809083.577	34

STAGE 1
 1-1. INSTALL MONITORING CHECKPOINTS AND TAKE INITIAL READING.
 1-2. CARRY OUT PREGROUTING WORKS FOR TEMPORARY PIPE PILES, INSTALLATION OF TEMPORARY PIPE PILES, PREGROUTING WORKS FOR PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION), PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION), GROUT CURTAIN AND KING POSTS AS SHOWN ON PLAN WITH CONSENT OBTAINED.
 1-3. DESIGN GROUND WATER LEVEL TO BE REVIEWED BEFORE THE COMMENCEMENT OF EXCAVATION WORKS TO CONFIRM IF PUMPING TEST IS REQUIRED. (DETAILS REFER TO DWG NO. ELS-16A) CARRY OUT PUMPING TEST AND SUBMIT ASSESSMENT REPORT TO BUILDINGS DEPARTMENT IF REQUIRED.
 1-4. UPON COMPLETION OF PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION), TEMPORARY PIPE PILE WALL, CHANNEL PLANKING & KING POST INSTALLATION, SUBMIT FORM BA14 OF PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION), TEMPORARY PIPE PILE & KING POST TO THE BUILDINGS DEPARTMENT.
 1-5. APPLY CONSENT FOR ELS WORK STAGE 2 TO STAGE 7.

PRIOR TO CONSENT, THE AP/RSE/RGE SHALL OBTAIN RECORDS OF PIPE LEAKAGE/ BURST INCIDENTS FROM THE RELEVANT DEPARTMENTS (E.G. WSD, DSD, HYD) OCCURRED WITHIN THE AFFECTED AREA IN THE PAST 12 MONTHS. AN INVESTIGATION SHALL BE CARRIED OUT TO ASCERTAIN THE EXISTING CONDITION OF THE SURROUNDING GROUND, IN PARTICULAR THE EXISTENCE OF GROUND LOSS OR UNDERGROUND CAVITY. THE AP/RSE/RGE SHOULD APPROACH THE DEPARTMENTS FOR FURTHER INFORMATION ABOUT THE CAUSES OF THE INCIDENTS AND REMEDIAL ACTIONS TAKEN TO FACILITATE THE INVESTIGATION. A DESIGN REVIEW REPORT SHALL BE SUBMITTED TO AND FOUND ACCEPTABLE BY THE BA TO DISCUSS THE FINDINGS OF THE INVESTIGATION AND REVIEW THE ADEQUACY OF THE PROPOSED SITE FORMATION AND EXCAVATION AND LATERAL SUPPORT WORKS TAKING DUE CONSIDERATION OF THE INVESTIGATION RESULTS.

EXCAVATION AND LATERAL SUPPORT PLAN (STAGE 1)

(SCALE 1:250)



LEGEND:

- BOUNDARY LINE
- BH1 AS-BUILT BOREHOLE
- PIEZOMETER
- MH-103 EXISTING BOREHOLE OF NEARBY SITE
- 142.1 EXISTING GROUND LEVEL
- KP1 PROPOSED KING POST
- PROPOSED PIPE PILE
- GROUT CURTAIN
- PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- EXISTING SOIL NAIL TO BE DEMOLISHED
- PROPOSED MAX. 30° OPEN CUT / SLOPE CUT EXCAVATION
- PROPOSED STRUT
- PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
- +60.5mPD PROPOSED EXCAVATION LEVEL
- PROPOSED PRE DRILLING
- 50 INFERRED ROCKHEAD PROFILE (CAT (-))
- PROPOSED CHANNEL PLANKING

B	06/2025	2ND AMENDMENT	CJX SKS
A	07/2024	1ST AMENDMENT	CJX SKS
Revision	Date	Description	By Chk

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Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

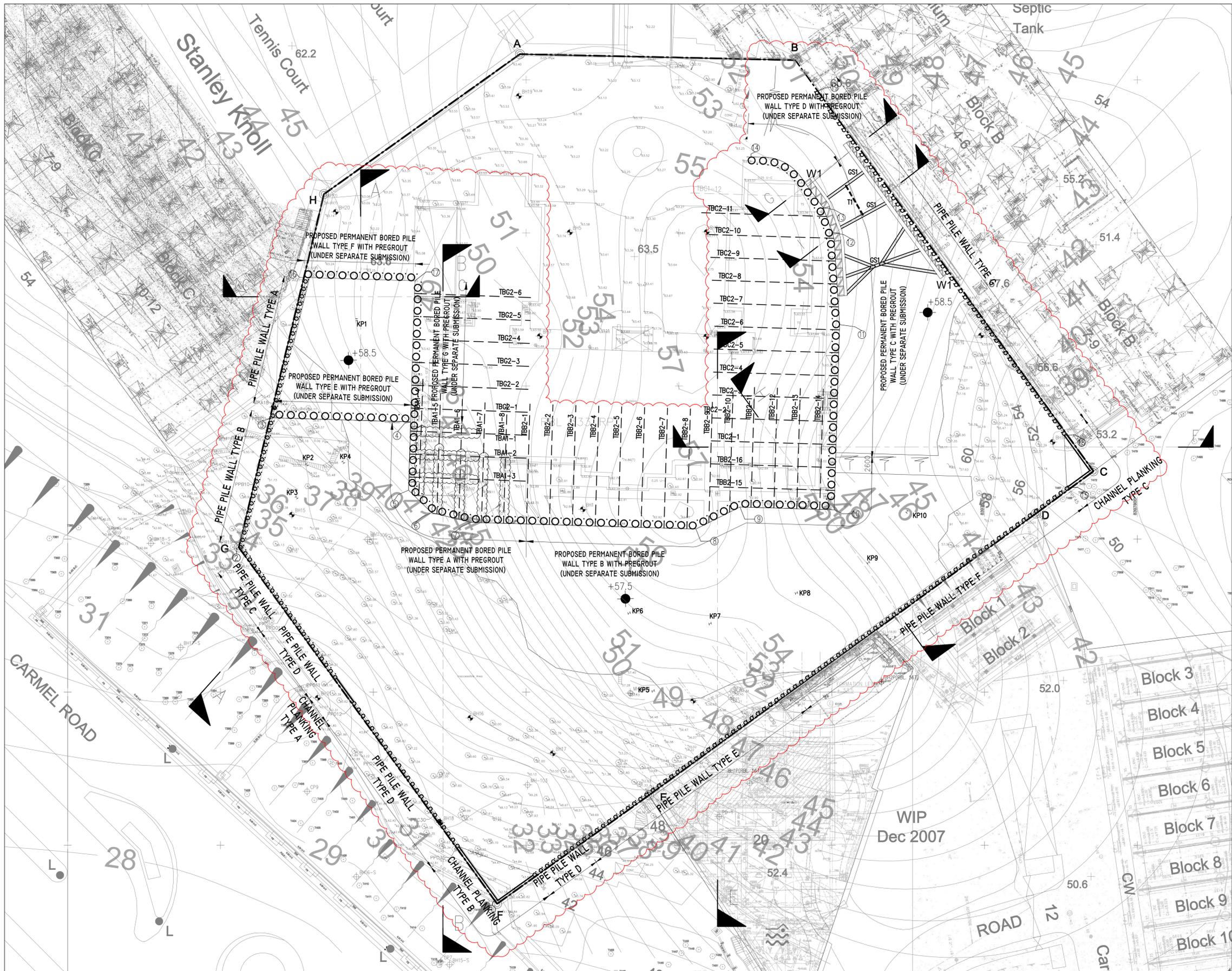
Drawing Title:
ELS PLAN (STAGE 2)

Drawing Number:
ELS-03

Revision Number:
B

STAGE 2
 2-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
 2-2. CARRY OUT PREGROUT WORK FOR TIE BACK AS SHOWN ON PLAN. (UNDER SEPARATE SUBMISSION)
 2-2. INSTALL PERMANENT TIE BACKS (TBB1-1 TO TBB1-16, TBC1-1 TO TBC1-12, TBF1-1 TO TBF1-5, TBG1-1 TO TBG1-6). (UNDER SEPARATE SUBMISSION)

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 2)
 (SCALE 1:250)



B.D. REF NO. : BD 3/3008/22 (HU)

LEGEND:

- BOUNDARY LINE
- AS-BUILT BOREHOLE
- PIEZOMETER
- EXISTING BOREHOLE OF NEARBY SITE
- EXISTING GROUND LEVEL
- PROPOSED KING POST
- PROPOSED PIPE PILE
- GROUT CURTAIN
- PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- EXISTING SOIL NAIL TO BE DEMOLISHED
- PROPOSED MAX. 30' OPEN CUT/ SLOPE CUT EXCAVATION
- PROPOSED STRUT
- PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
- +60.5mPD PROPOSED EXCAVATION LEVEL
- 50 INFERRED ROCKHEAD PROFILE (CAT (-))
- PROPOSED CHANNEL PLANKING
- W1 WALING MARK
- T1 PROPOSED TIE / BRACING
- NN PROPOSED SPACER

B	06/2025	2ND AMENDMENT	CJX SKS
A	07/2024	1ST AMENDMENT	CJX SKS
Revision	Date	Description	By
			Chk



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title: ELS PLAN (STAGE 3)

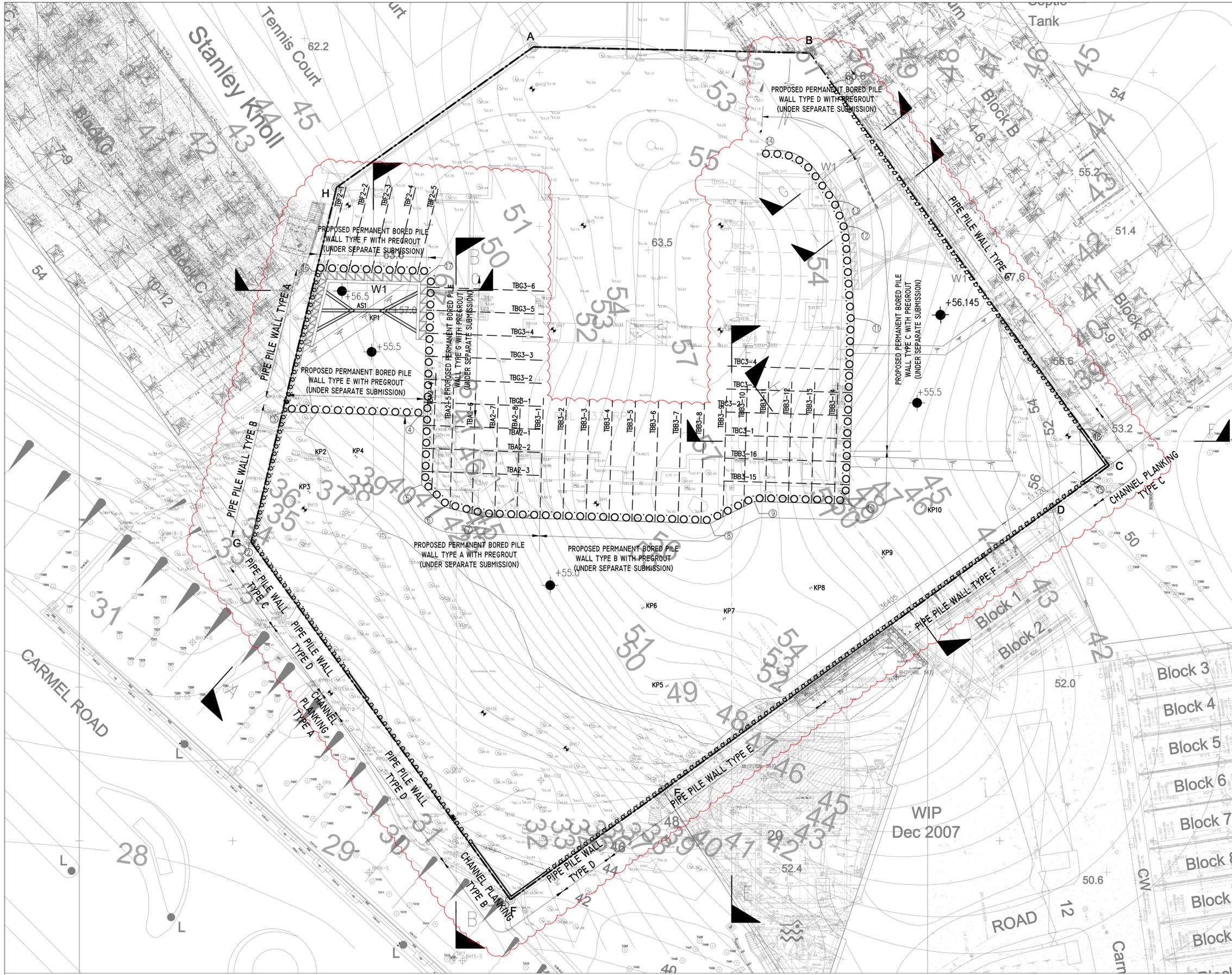
Drawing Number: ELS-04

Revision Number: B

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 3)

(SCALE 1:250)

- STAGE 3
- 3-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
 - 3-2. CARRY OUT PREGROUT WORK FOR TIE BACK AS SHOWN ON PLAN. (UNDER SEPARATE SUBMISSION)
 - 3-3. INSTALL PERMANENT TIE BACKS (TBA1-1 TO TBA1-8, TBB2-1 TO TBB2-16, TBC2-1 TO TBC2-11, TBC2-1 TO TBC2-6). (UNDER SEPARATE SUBMISSION)
 - 3-4. INSTALL STRUTS (GS1) AND CORRESPONDING WALINGS (W1), SPACERS AND BRACKETS.



LEGEND:

- BOUNDARY LINE
- BH1 AS-BUILT BOREHOLE
- P PIEZOMETER
- MH-103 EXISTING BOREHOLE OF NEARBY SITE
- +142.1 EXISTING GROUND LEVEL
- KP1 PROPOSED KING POST
- PROPOSED PIPE PILE
- GROUT CURTAIN
- PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- EXISTING SOIL NAIL TO BE DEMOLISHED
- PROPOSED MAX. 30' OPEN CUT / SLOPE CUT EXCAVATION
- Y PROPOSED STRUT
- TBE 1 PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
- +60.5mPD PROPOSED EXCAVATION LEVEL
- 50 INFERRED ROCKHEAD PROFILE (CAT (-))
- PROPOSED CHANNEL PLANKING
- W1 WALING MARK
- T1 PROPOSED TIE / BRACING
- PROPOSED SPACER

B	06/2025	2ND AMENDMENT	CJX SKS
A	07/2024	1ST AMENDMENT	CJX SKS
Revision	Date	Description	By

CMA TEL: (853) 2522 1068
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Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS
Drawing Title: ELS PLAN (STAGE 4)

Drawing Number: ELS-05

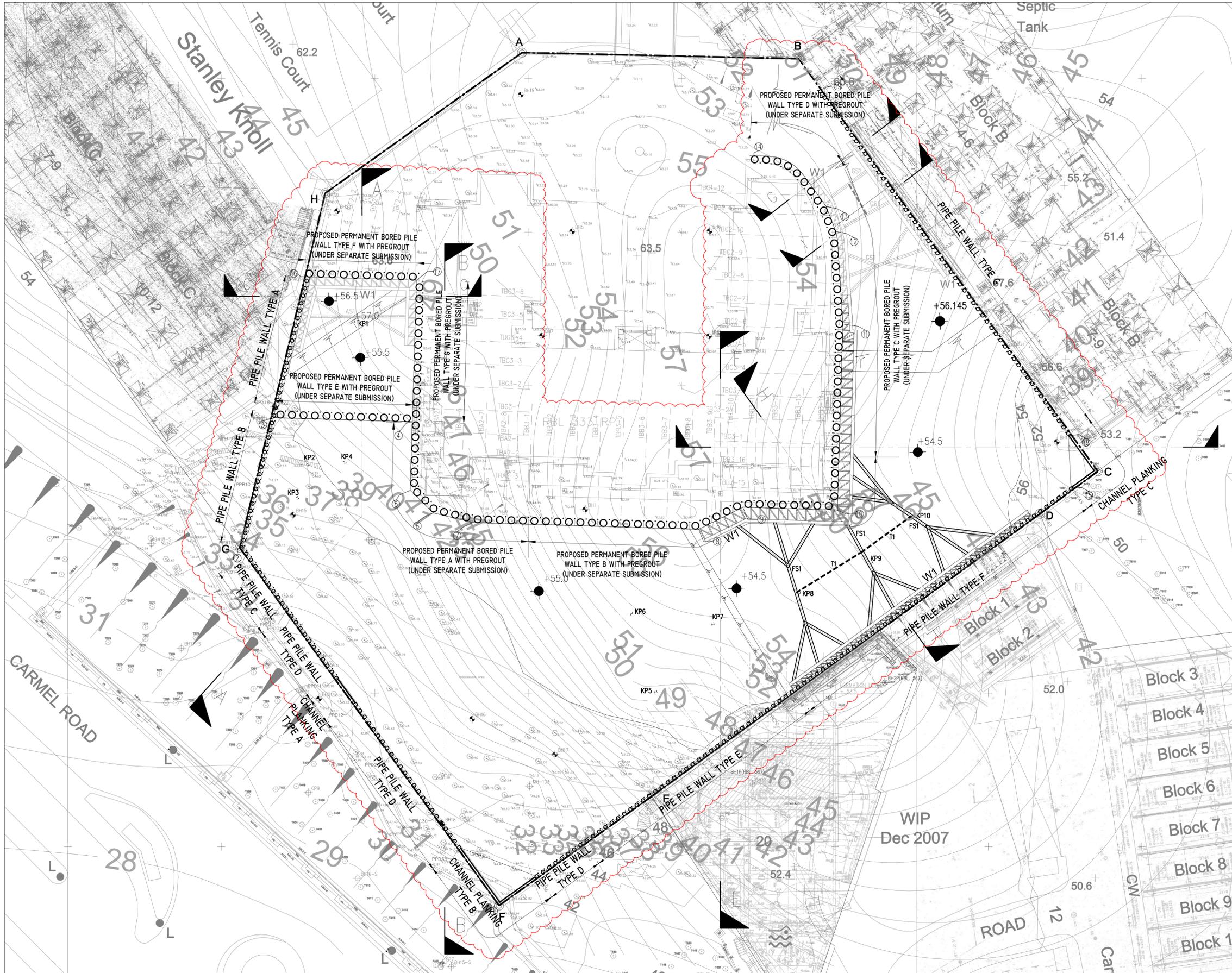
Revision Number: B

STAGE 4
 4-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
 4-2. INSTALL PERMANENT TIE BACKS (TBA2-1 TO TBA2-8, TBB3-1 TO TBB3-16, TBC3-1 TO TBC3-4, TBF2-1 TO TBF2-5 AND TBG3-1 TO TBG3-6). (UNDER SEPARATE SUBMISSION)
 4-2. INSTALL STRUTS (AS1) AND CORRESPONDING WALINGS (W1), SPACERS AND BRACKETS.

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 4)

(SCALE 1:250)

WIP
Dec 2007



LEGEND:

- BOUNDARY LINE
- BH1 AS-BUILT BOREHOLE
- P PIEZOMETER
- MH-103 EXISTING BOREHOLE OF NEARBY SITE
- +142.1 EXISTING GROUND LEVEL
- KP1 PROPOSED KING POST
- PROPOSED PIPE PILE
- GROUT CURTAIN
- PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- EXISTING SOIL NAIL TO BE DEMOLISHED
- PROPOSED MAX. 30° OPEN CUT / SLOPE CUT EXCAVATION
- PROPOSED STRUT
- TBE 1 PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
- T1 PROPOSED TIE / BRACING
- +60.5mPD PROPOSED EXCAVATION LEVEL
- PROPOSED SPACER
- W1 WALING MARK
- 50 INFERRED ROCKHEAD PROFILE (CAT (-))
- PROPOSED CHANNEL PLANKING

B	06/2025	2ND AMENDMENT	CJX SKS
A	07/2024	1ST AMENDMENT	CJX SKS

Revision	Date	Description	By	Chk
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Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

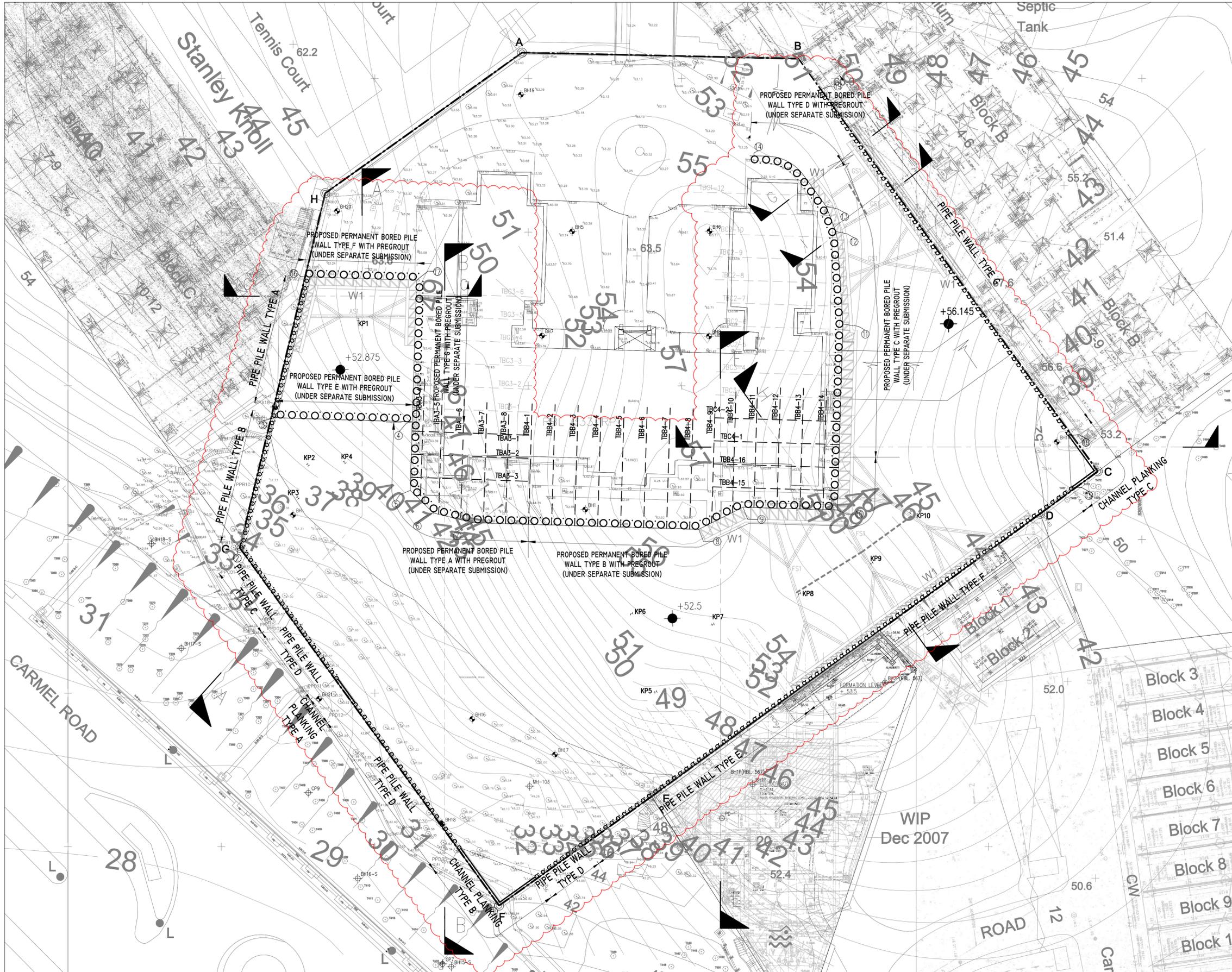
Drawing Title:
ELS PLAN (STAGE 5)

Drawing Number:
ELS-06

Revision Number:
B

STAGE 5
5-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
5-2. INSTALL STRUTS (FS1) AND CORRESPONDING WALINGS (W1), SPACERS AND BRACKETS.

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 5)
(SCALE 1:250)



LEGEND:

---	BOUNDARY LINE
BH1	AS-BUILT BOREHOLE
P	PIEZOMETER
MH-103	EXISTING BOREHOLE OF NEARBY SITE
+142.1	EXISTING GROUND LEVEL
KP1	PROPOSED KING POST
○-○-○	PROPOSED PIPE PILE
○-○-○	GROUT CURTAIN
○-○-○	PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
○-○-○	EXISTING SOIL NAIL TO BE DEMOLISHED
○-○-○	PROPOSED MAX. 30° OPEN CUT / SLOPE CUT EXCAVATION
Y	PROPOSED STRUT
TBE 1	PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
T	PROPOSED TIE / BRACING
+60.5mPD	PROPOSED EXCAVATION LEVEL
N	PROPOSED SPACER
W1	WALING MARK
50	INFERRED ROCKHEAD PROFILE (CAT (c))
○-○-○	PROPOSED CHANNEL PLANKING

B	06/2025	2ND AMENDMENT	CJX SKS
A	07/2024	1ST AMENDMENT	CJX SKS
Revision	Date	Description	By Chk

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Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS
Drawing Title: ELS PLAN (STAGE 6)

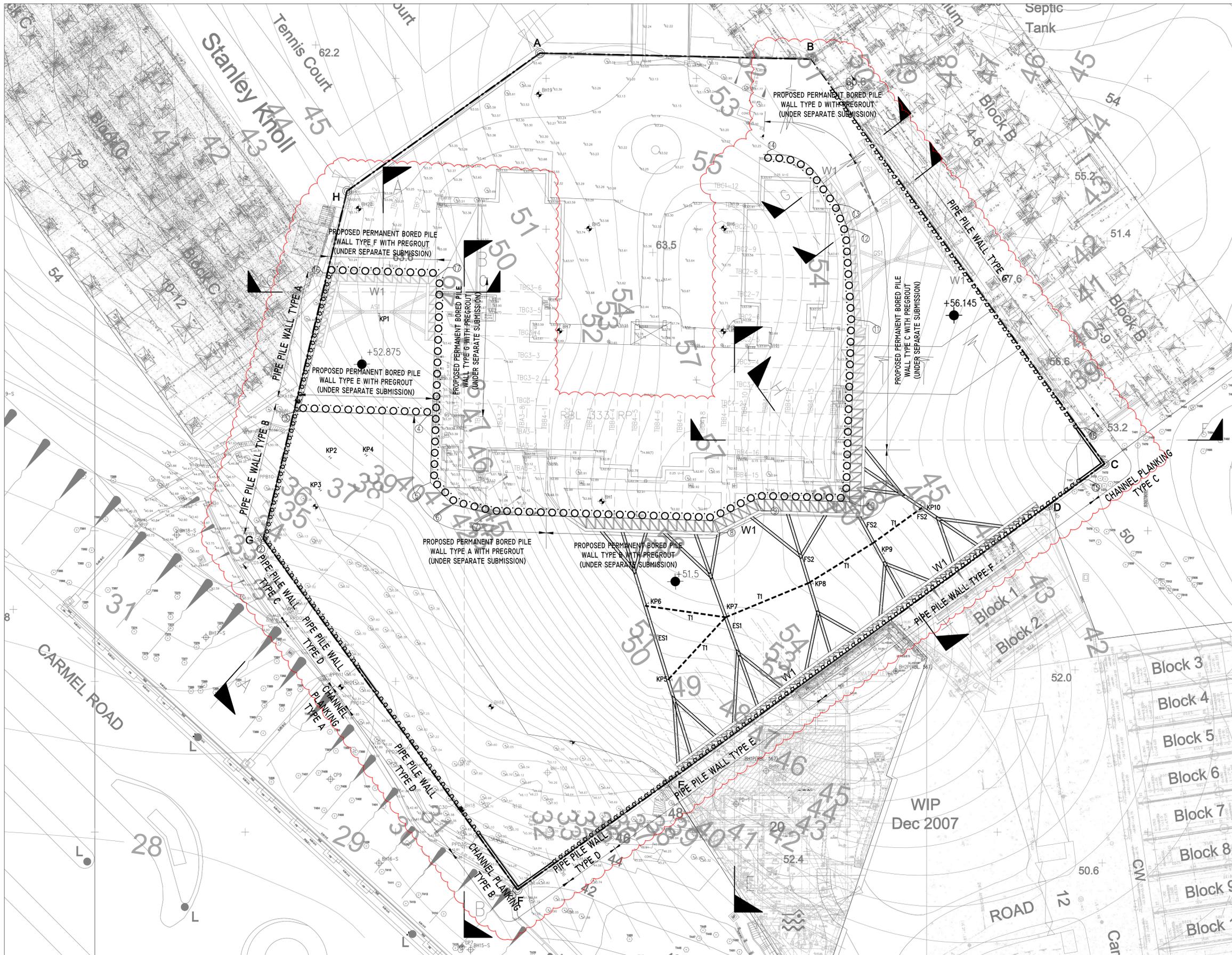
Drawing Number: ELS-07

Revision Number: B

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 6)

(SCALE 1:250)

- STAGE 6
- 6-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
 - 6-2. INSTALL TIE BACKS (TBA3-1 TO TBA3-8, TBB4-1 TO TBB4-16 AND TBC4-1 TO TBC4-2). (UNDER SEPARATE SUBMISSION)
 - 6-3. SUBMIT ELS DESIGN REVIEW OF ELS SYSTEM WITH THE MONITORING RESULTS UPON STAGE 6-1 TO THE SATISFACTION OF BD AND GEO.
 - 6-4. SUBMIT CONSENT FOR THE ELS STAGE 8 TO ELS STAGE 10.
- * NOTE THE STEP 6-3 CAN BE CARRIED OUT CONCURRENTLY WITH STEP 6-2.



LEGEND:

---	BOUNDARY LINE
BH1	AS-BUILT BOREHOLE
P	PIEZOMETER
MH-103	EXISTING BOREHOLE OF NEARBY SITE
+142.1	EXISTING GROUND LEVEL
KP1	PROPOSED KING POST
○-○-○	PROPOSED PIPE PILE
○-○-○	GROUT CURTAIN
○-○-○	PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
○-○-○	EXISTING SOIL NAIL TO BE DEMOLISHED
○-○-○	PROPOSED MAX. 30° OPEN CUT / SLOPE CUT EXCAVATION
Y	PROPOSED STRUT
TBF 1	PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
T1	PROPOSED TIE / BRACING
+60.5mPD	PROPOSED EXCAVATION LEVEL
N	PROPOSED SPACER
W1	WALING MARK
50	INFERRED ROCKHEAD PROFILE (CAT (c))
○-○-○	PROPOSED CHANNEL PLANKING

B	06/2025	2ND AMENDMENT	CJX SKS
A	07/2024	1ST AMENDMENT	CJX SKS
Revision	Date	Description	By Chk

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Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title:
ELS PLAN (STAGE 7)

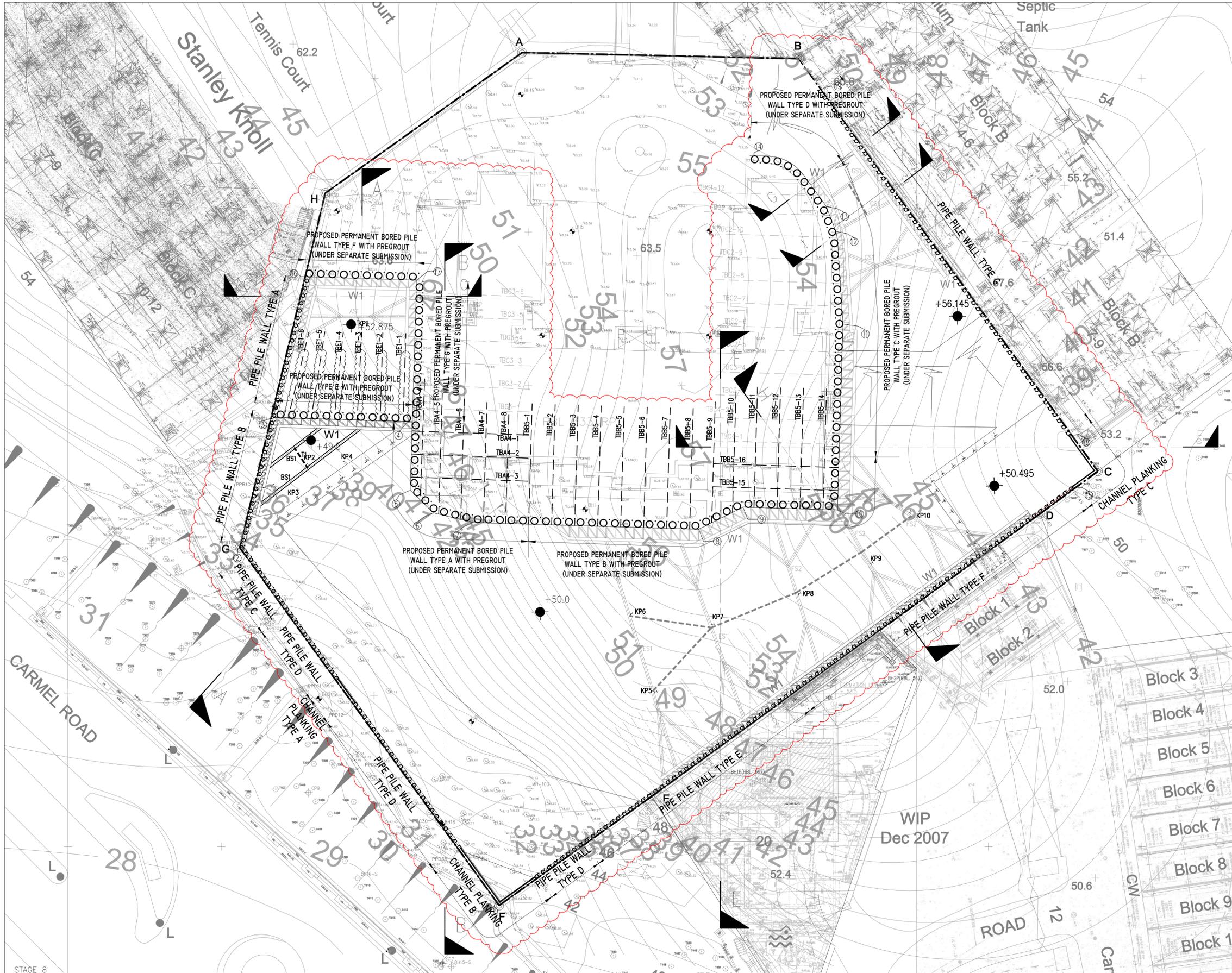
Drawing Number:
ELS-08

Revision Number:
B

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 7)

(SCALE 1:250)

STAGE 7
7-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
7-2. INSTALL STRUTS (FS2 AND ES1) AND CORRESPONDING WALINGS (W1), SPACERS AND BRACKETS.



LEGEND:

- BOUNDARY LINE
- BH1 AS-BUILT BOREHOLE
- P PIEZOMETER
- MH-103 EXISTING BOREHOLE OF NEARBY SITE
- +142.1 EXISTING GROUND LEVEL
- KP1 PROPOSED KING POST
- PROPOSED PIPE PILE
- GROUT CURTAIN
- PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- EXISTING SOIL NAIL TO BE DEMOLISHED
- PROPOSED MAX. 30° OPEN CUT/ SLOPE CUT EXCAVATION
- PROPOSED STRUT
- TBF 1 PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
- T1 PROPOSED TIE / BRACING
- +60.5mPD PROPOSED EXCAVATION LEVEL
- PROPOSED SPACER
- W1 WALING MARK
- PROPOSED CHANNEL PLANKING
- INFERRED ROCKHEAD PROFILE (CAT (c))

Revision	Date	Description	By	Chk
A	06/2025	2ND AMENDMENT	CJX	SKS
-	07/2024	1ST AMENDMENT	CJX	SKS

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Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

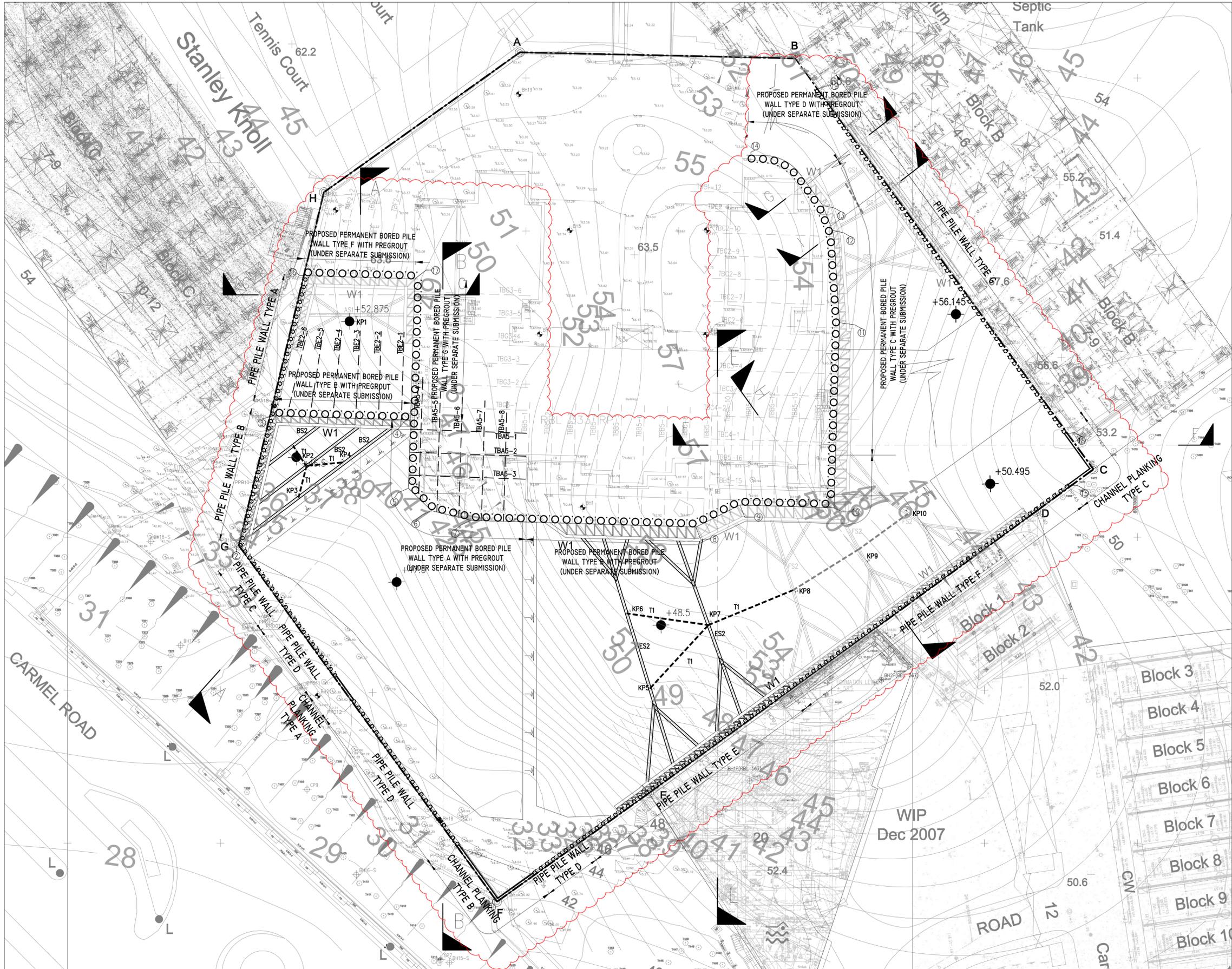
Drawing Title:
ELS PLAN (STAGE 8)

Drawing Number:
ELS-08A

Revision Number:
A

- STAGE 8
- 8-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
 - 8-2. CARRY OUT PREGROUT WORK FOR TIE BACK AS SHOWN ON PLAN. (UNDER SEPARATE SUBMISSION)
 - 8-3. INSTALL PERMANENT TIE BACKS (TBF1-1 TO TBF1-6, TBA4-1 TO TBA4-8 AND TBB5-1 TO TBB5-8). (UNDER SEPARATE SUBMISSION)
 - 8-4. INSTALL STRUTS (BS1) AND CORRESPONDING WALINGS (W1), SPACERS AND BRACKETS.

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 8)
(SCALE 1:250)



LEGEND:

- BOUNDARY LINE
- BH1 AS-BUILT BOREHOLE
- P PIEZOMETER
- MH-103 EXISTING BOREHOLE OF NEARBY SITE
- +142.1 EXISTING GROUND LEVEL
- KP1 PROPOSED KING POST
- ○ ○ ○ ○ PROPOSED PIPE PILE
- ○ ○ ○ ○ GROUT CURTAIN
- ○ ○ ○ ○ PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- ○ ○ ○ ○ EXISTING SOIL NAIL TO BE DEMOLISHED
- ○ ○ ○ ○ PROPOSED MAX. 30° OPEN CUT / SLOPE CUT EXCAVATION
- Y Y PROPOSED STRUT
- TBF 1 PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
- T T PROPOSED TIE / BRACING
- +60.5mPD PROPOSED EXCAVATION LEVEL
- N N PROPOSED SPACER
- W1 WALING MARK
- ○ ○ ○ ○ PROPOSED CHANNEL PLANKING
- ○ ○ ○ ○ INFERRED ROCKHEAD PROFILE (CAT (c))

Revision	Date	Description	By	Chk
A	06/2025	2ND AMENDMENT	CJX	SKS
-	07/2024	1ST AMENDMENT	CJX	SKS



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title:
ELS PLAN (STAGE 9)

Drawing Number:
ELS-08B

Revision Number:
A

- STAGE 9
- 9-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.
 - 9-2. INSTALL PERMANENT TIE BACKS (TBA5-1 TO TBA5-8 AND TBF2-1 TO TBF2-6). (UNDER SEPARATE SUBMISSION)
 - 9-3. INSTALL STRUTS (BS2 AND ES2), CORRESPONDING WALINGS (W1), SPACERS AND BRACKETS.

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 9)

(SCALE 1:250)



LEGEND:

- BOUNDARY LINE
- AS-BUILT BOREHOLE
- PIEZOMETER
- EXISTING BOREHOLE OF NEARBY SITE
- EXISTING GROUND LEVEL
- PROPOSED KING POST
- PROPOSED PIPE PILE
- GROUT CURTAIN
- PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- EXISTING SOIL NAIL TO BE DEMOLISHED
- PROPOSED MAX. 30' OPEN CUT/ SLOPE CUT EXCAVATION
- PROPOSED STRUT
- PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)
- PROPOSED MAX. 70' ROCK CUT SLOPE
- PROPOSED TIE / BRACING
- PROPOSED EXCAVATION LEVEL
- PROPOSED SPACER
- WALING MARK
- INFERRED ROCKHEAD PROFILE (CAT (c))

Revision	Date	Description	By	Chk
-	07/2024	1ST AMENDMENT	CJX	SKS



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title:
ELS PLAN (STAGE 11)

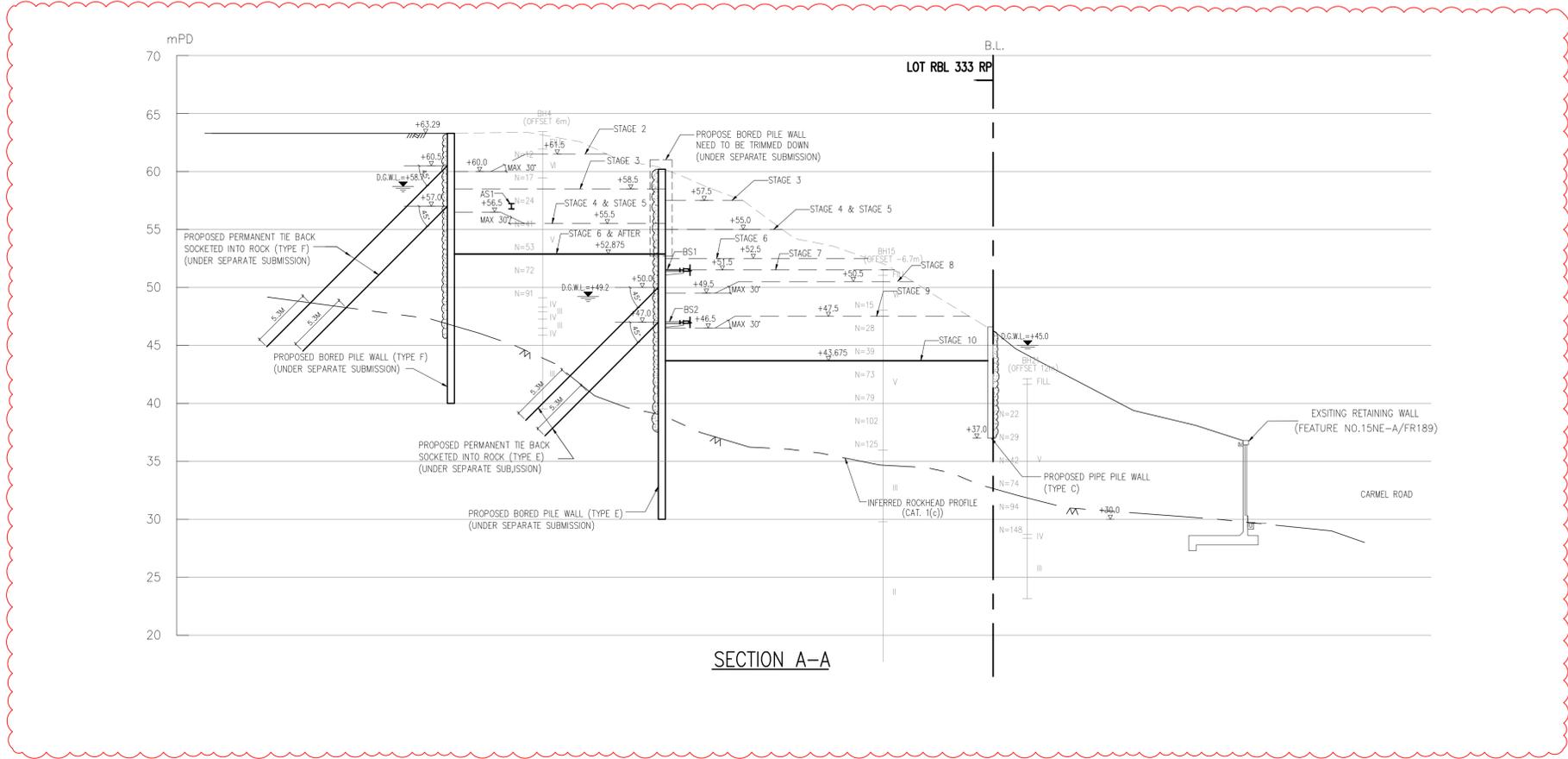
Drawing Number:
ELS-08D

Revision Number:
-

STAGE 11
11-1. EXCAVATE TO THE LEVEL AS SHOWN ON PLAN.

EXCAVATION AND LATEARL SUPPORT PLAN (STAGE 11)

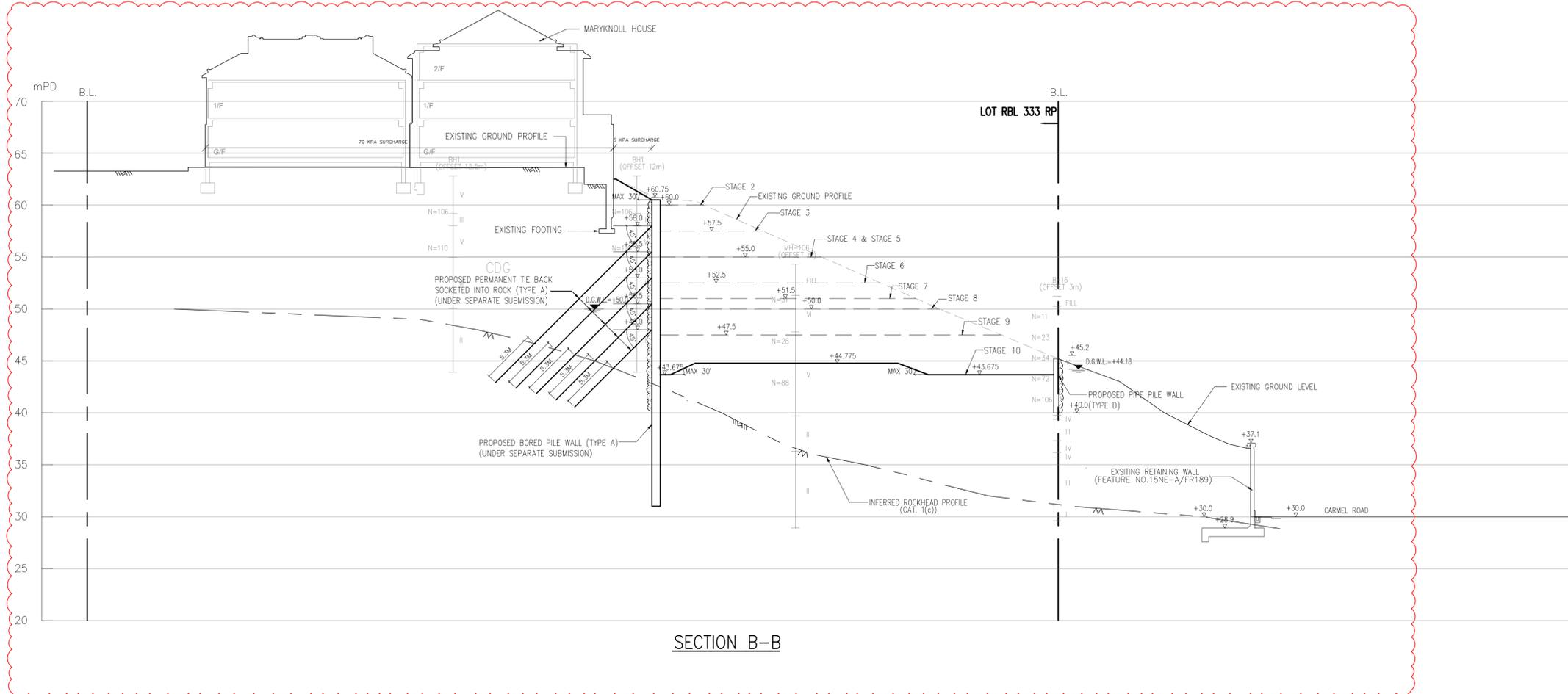
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LEGEND:

- LOT BOUNDARY
- PROPOSED PIPE PILE/
BORED PILE WALL
- EXISTING GROUND PROFILE
- EXCAVATION PROFILE FOR
INTERMEDIATE STAGES
- PROPOSED FINAL EXCAVATION PROFILE
- PROPOSED SPACER AND BRACKET
(INTERMEDIATE EXCAVATION LEVEL SHALL BE
500mm BELOW STRUT INSTALLATION LEVEL)
- PROPOSED STRUT
- STAGE 2
PROPOSED STAGE EXCAVATION
- D.G.W.L.
DESIGN GROUNDWATER TABLE
- FILL
- RS
RESIDUAL SOIL
- V
COMPLETELY DECOMPOSED GRANITE
- IV
HIGHLY DECOMPOSED GRANITE
- III
MODERATELY DECOMPOSED GRANITE
- II
SLIGHTLY DECOMPOSED GRANITE
- N=70
SPT N VALUE
- PROPOSED GROUT CURTAIN
(TOE LEVEL TO BE 1m BELOW INFERRED ROCKHEAD LEVEL
(CAT 1(C) OR FINAL EXCAVATION
LEVEL, WHICHEVER IS LOWER.)
- FT1
PROPOSED FOOTING OR PILE CAP

NOTE: THE MAXIMUM GRADIENT FOR SOIL CUT SLOPE IS 30'.
THE MAXIMUM GRADIENT FOR ROCK CUT SLOPE IS 70'.



Revision	Date	Description	By	Chk
B	06/2025	2ND AMENDMENT	CJX	SKS
A	07/2024	1ST AMENDMENT	CJX	SKS



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

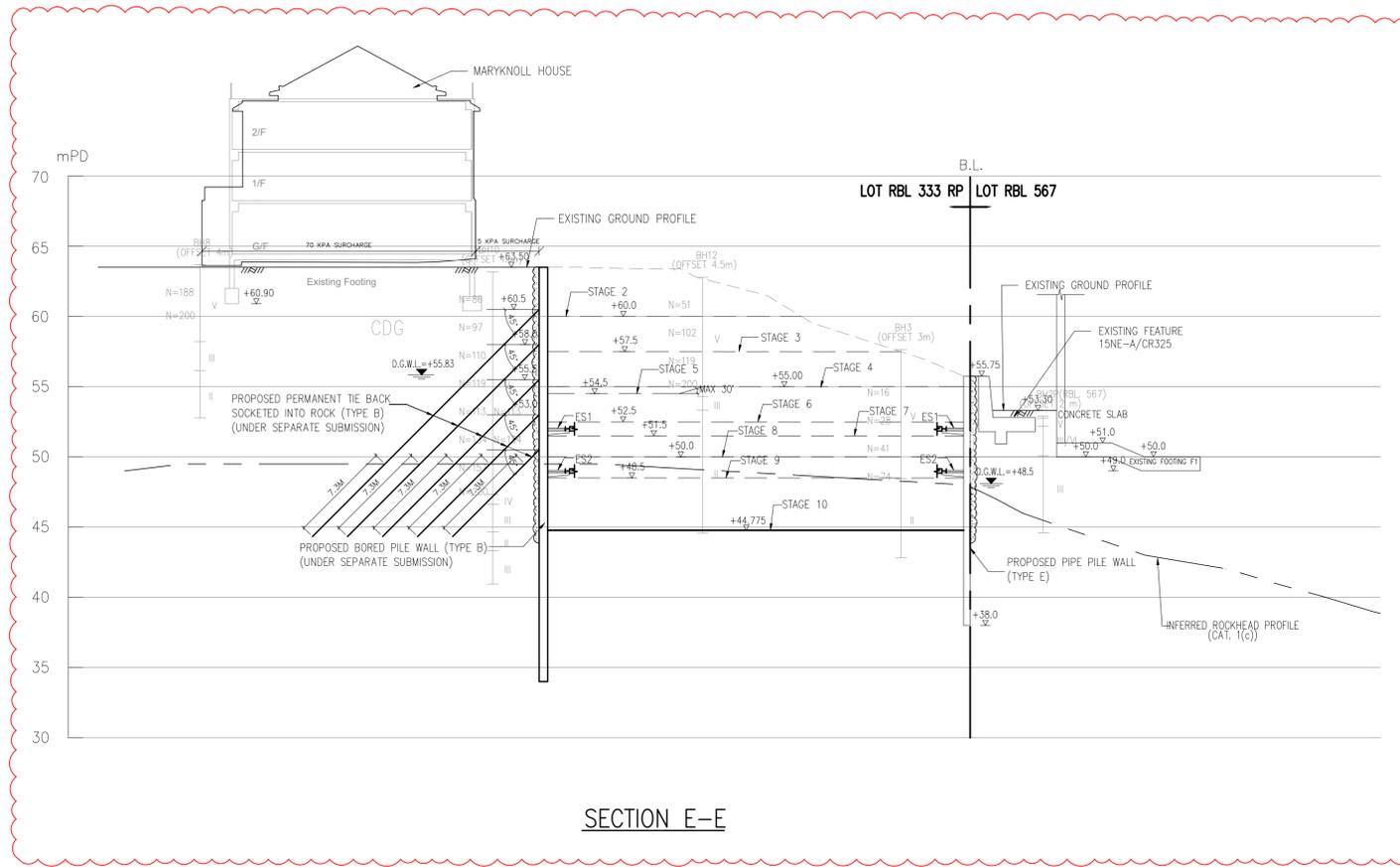
Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL
BUILDING AT 44 STANLEY VILLAGE ROAD,
STANLEY

Drawing Type:
**EXCAVATION AND LATERAL
SUPPORT WORKS**

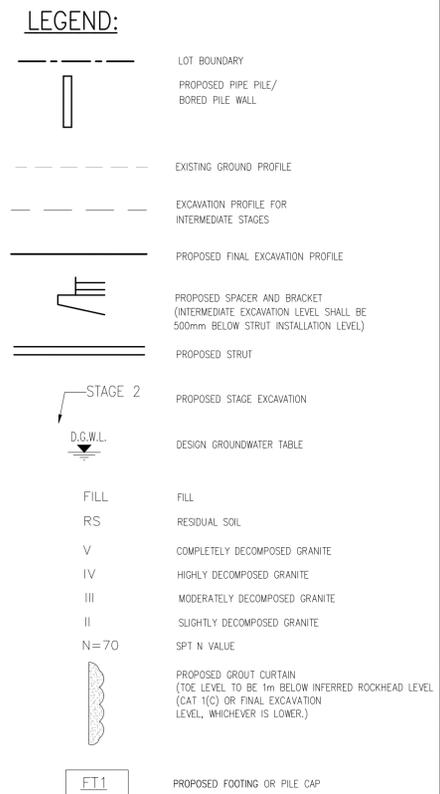
Drawing Title:
SECTION A-A, SECTION B-B

Drawing Number:
ELS-09

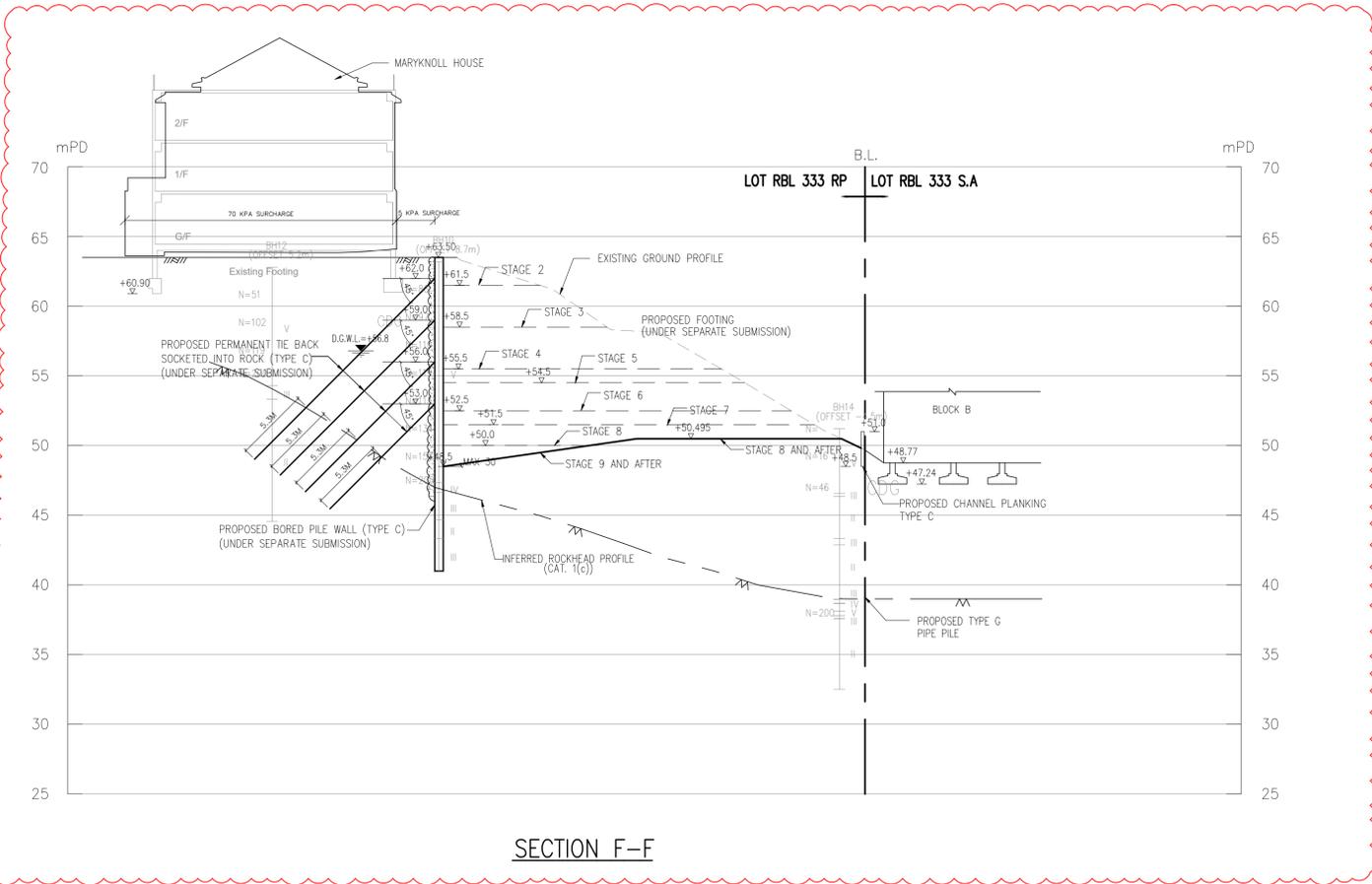
Revision Number:
B



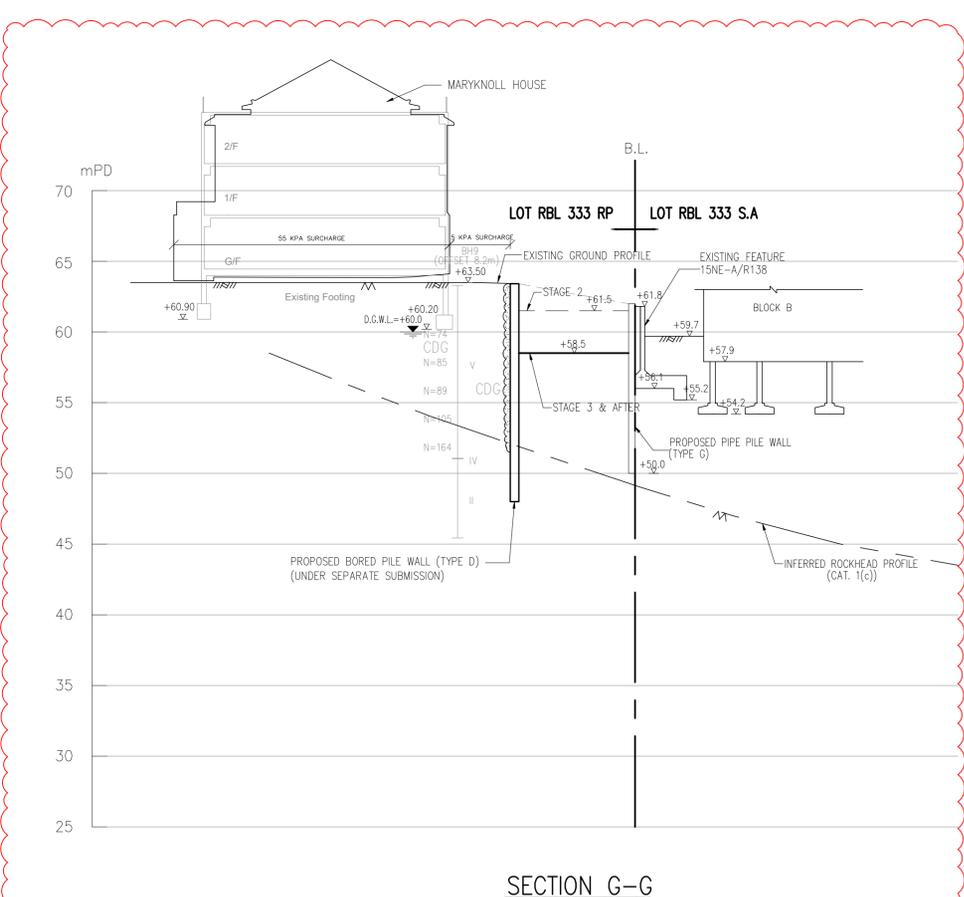
SECTION E-E



NOTE: THE MAXIMUM GRADIENT FOR SOIL CUT SLOPE IS 30%.
THE MAXIMUM GRADIENT FOR ROCK CUT SLOPE IS 70%.



SECTION F-F



SECTION G-G

Revision	Date	Description	By	Chk
B	06/2025	2ND AMENDMENT	CJX	SKS
A	07/2024	1ST AMENDMENT	CJX	SKS

Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL
BUILDING AT 44 STANLEY VILLAGE ROAD,
STANLEY

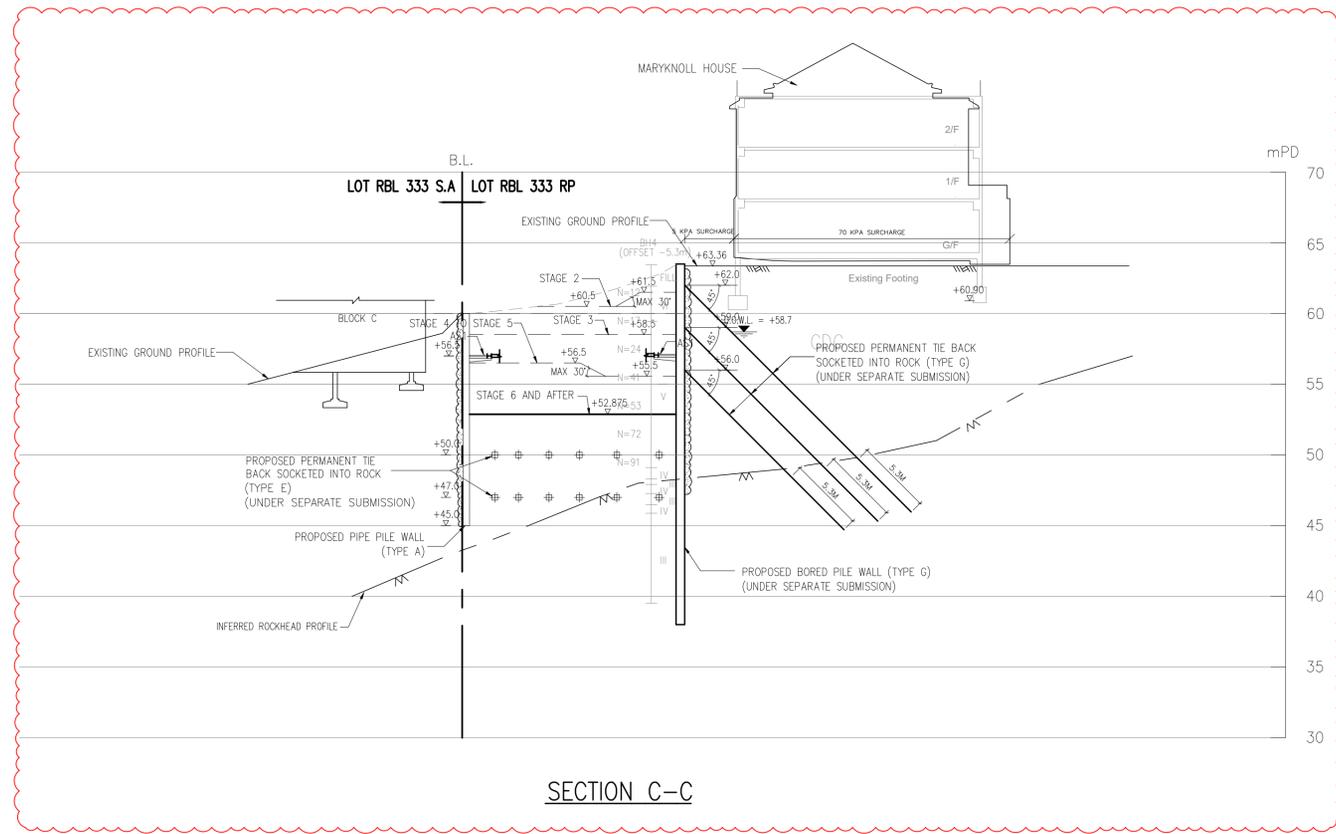
Drawing Type:
**EXCAVATION AND LATERAL
SUPPORT WORKS**

Drawing Title:
**SECTION E-E, SECTION F-F AND
SECTION G-G**

Drawing Number:
ELS-10

Revision Number:
B





SECTION C-C

LEGEND:

- LOT BOUNDARY
- PROPOSED PIPE/PILE/BORED PILE WALL
- EXISTING GROUND PROFILE
- EXCAVATION PROFILE FOR INTERMEDIATE STAGES
- PROPOSED FINAL EXCAVATION PROFILE
- PROPOSED SPACER AND BRACKET (INTERMEDIATE EXCAVATION LEVEL SHALL BE 500mm BELOW STRUT INSTALLATION LEVEL)
- PROPOSED STRUT
- PROPOSED STAGE EXCAVATION
- DESIGN GROUNDWATER TABLE
- FILL
RS RESIDUAL SOIL
- COMPLETELY DECOMPOSED GRANITE
- HIGHLY DECOMPOSED GRANITE
- MODERATELY DECOMPOSED GRANITE
- SLIGHTLY DECOMPOSED GRANITE
- SPT N VALUE
- PROPOSED GROUT CURTAIN (TOE LEVEL TO BE 1m BELOW INFERRED ROCKHEAD LEVEL, (CAT 1(C) OR FINAL EXCAVATION LEVEL, WHICHEVER IS LOWER.)
- PROPOSED FOOTING OR PILE CAP

NOTE: THE MAXIMUM GRADIENT FOR SOIL CUT SLOPE IS 30°. THE MAXIMUM GRADIENT FOR ROCK CUT SLOPE IS 70°.

Revision	Date	Description	By	Chk
A	06/2025	2ND AMENDMENT	CJX	SKS
-	07/2024	1ST AMENDMENT	CJX	SKS



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

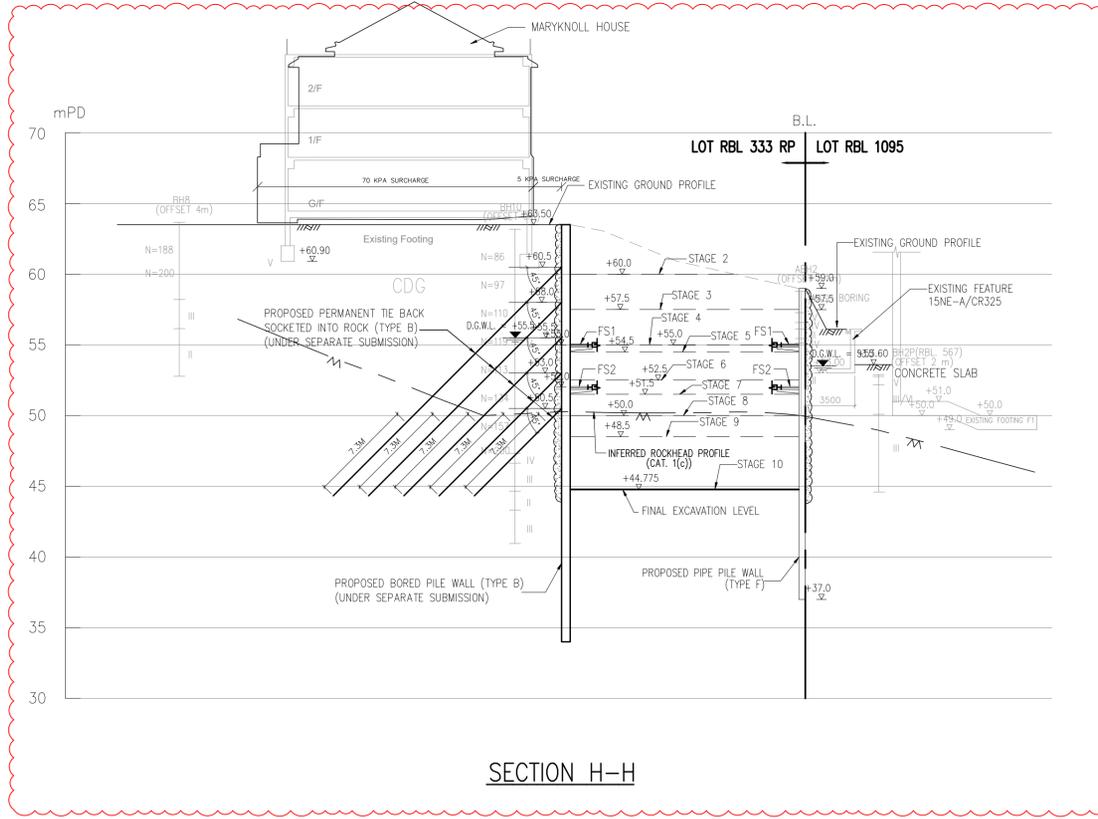
Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

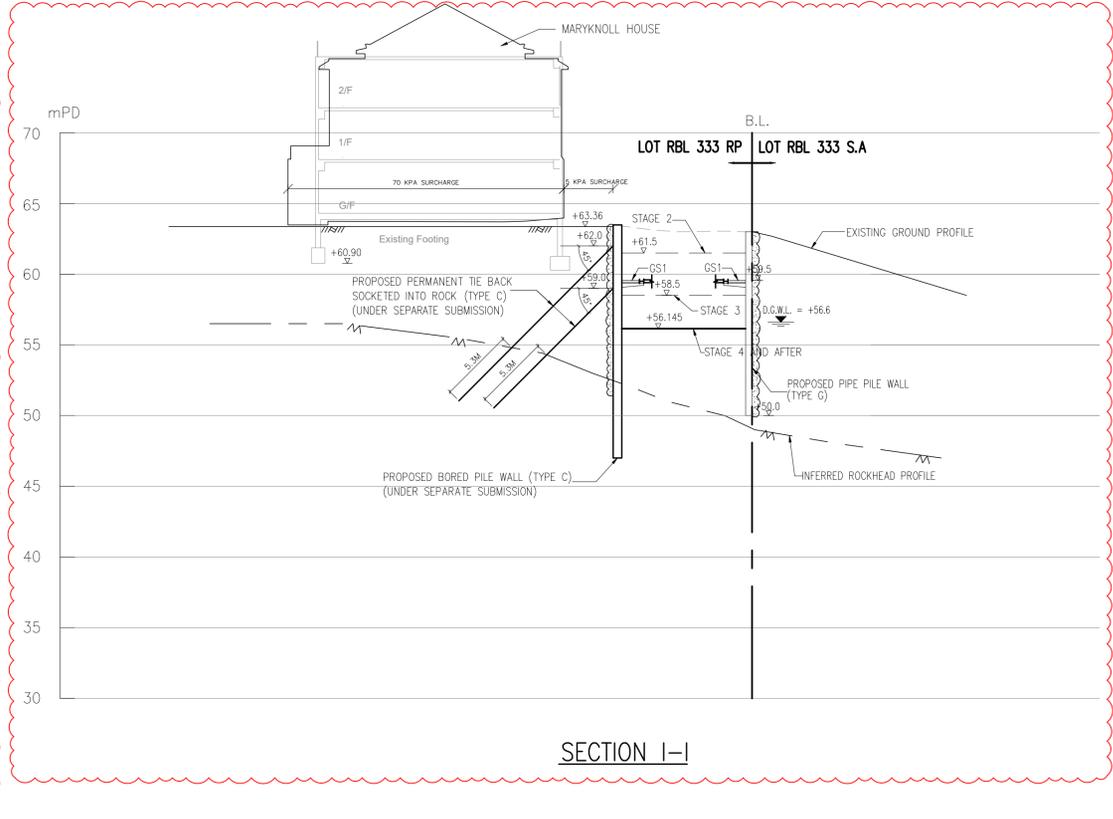
Drawing Title:
SECTION C-C, SECTION H-H, SECTION I-I

Drawing Number:
ELS-10A

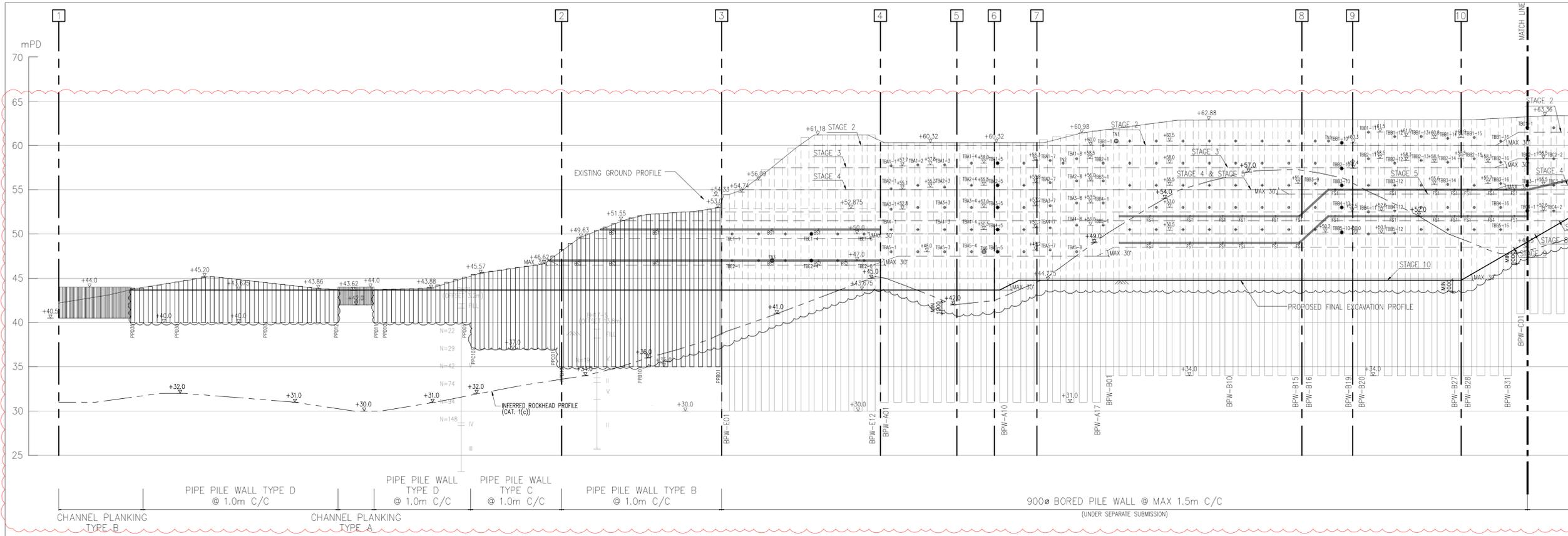
Revision Number:
A



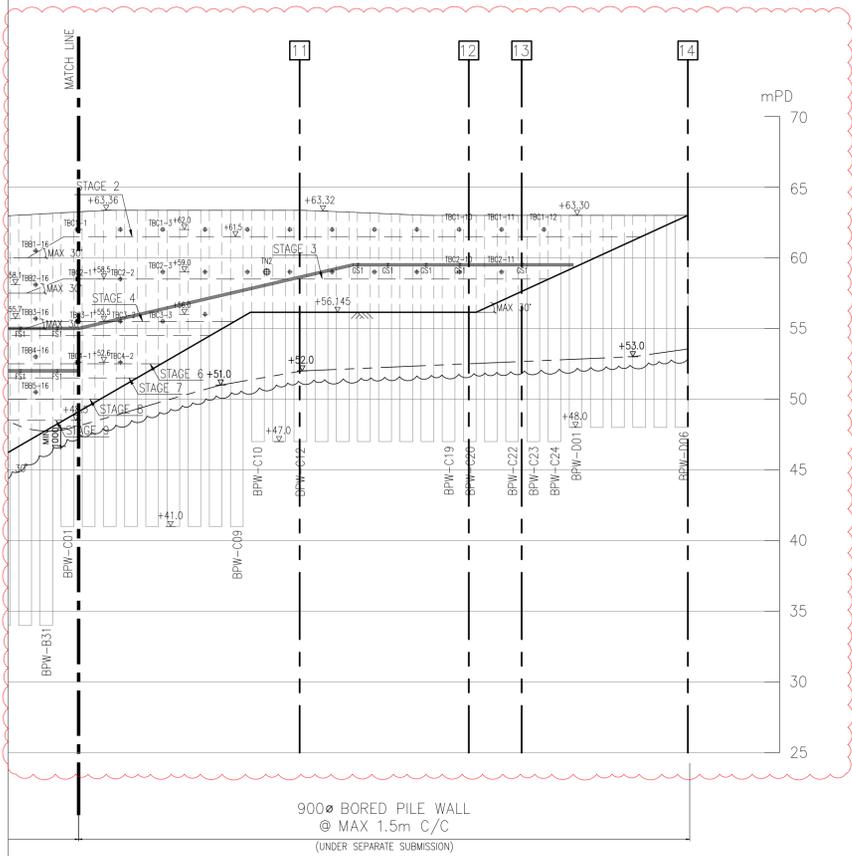
SECTION H-H



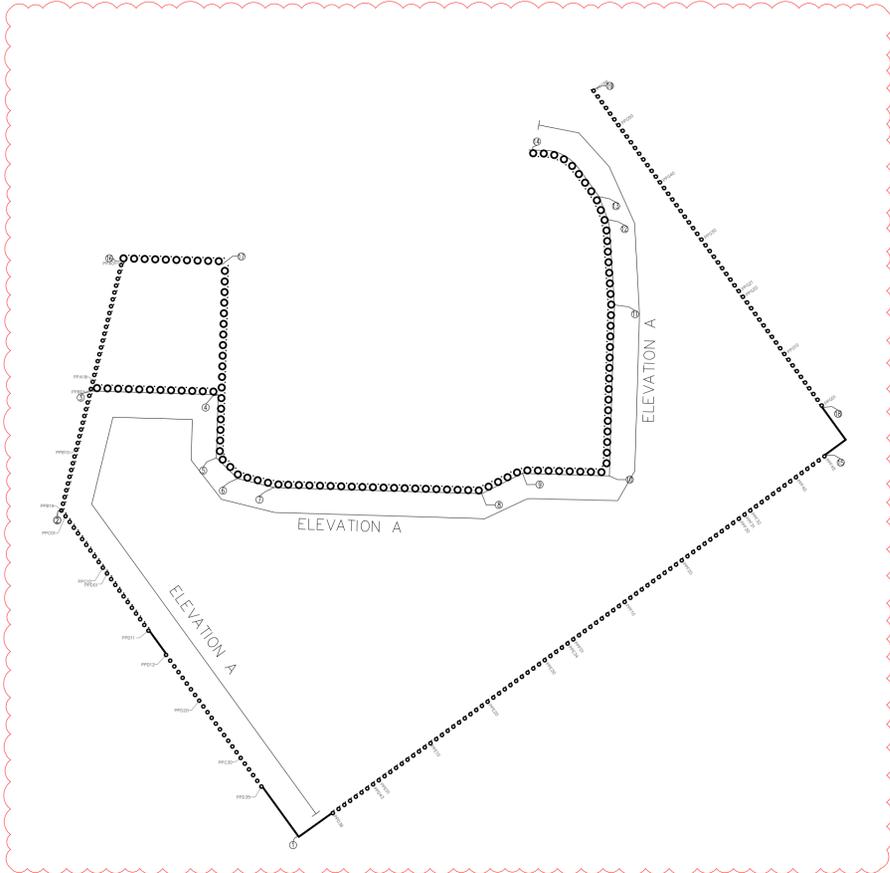
SECTION I-I



ELEVATION A



ELEVATION A



LEGEND:

- SITE BOUNDARY
- [Symbol] PROPOSED BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- [Symbol] PROPOSED PIPE PILE WALL
- [Symbol] PROPOSED GROUT CURTAIN
- [Symbol] PROPOSED PERMANENT TIE BACK SOCKETED INTO ROCK (UNDER SEPARATE SUBMISSION)
- [Symbol] PROPOSED STRUT WALING
- [Symbol] PROPOSED STRUT

Revision	Date	Description	By	Chk
A	07/2024	1ST AMENDMENT	CJX	SKS

CMA
 TEL: (852) 2522 1068
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Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:250 IN A1

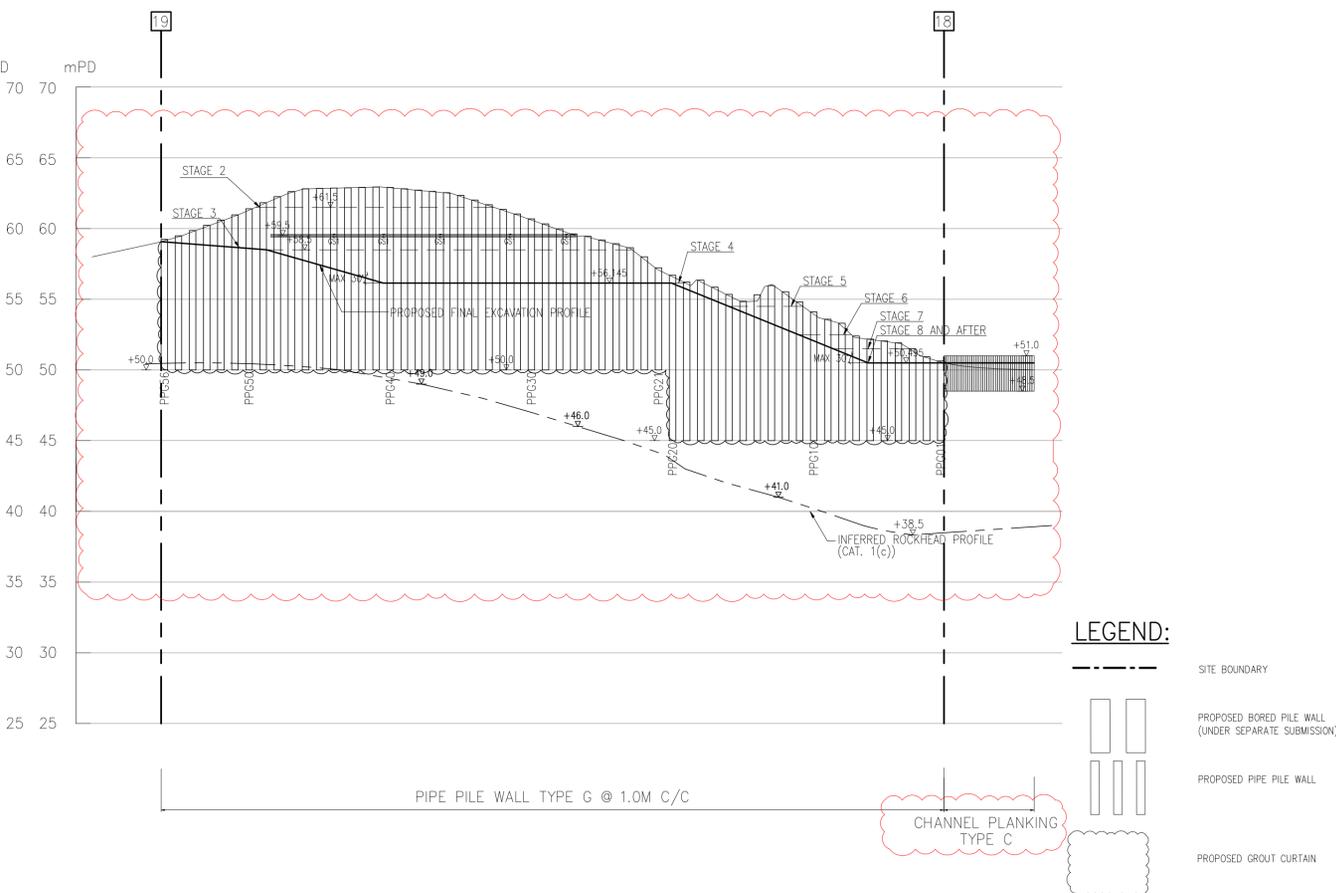
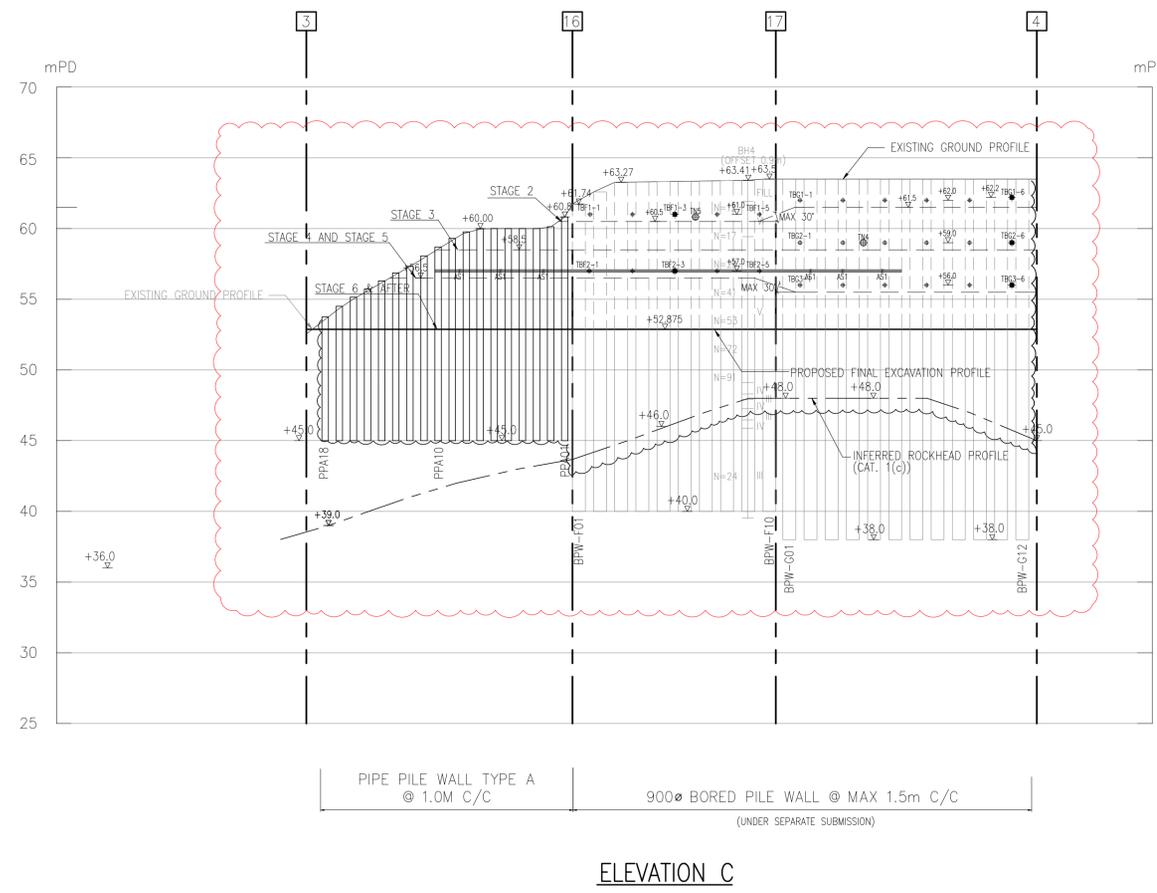
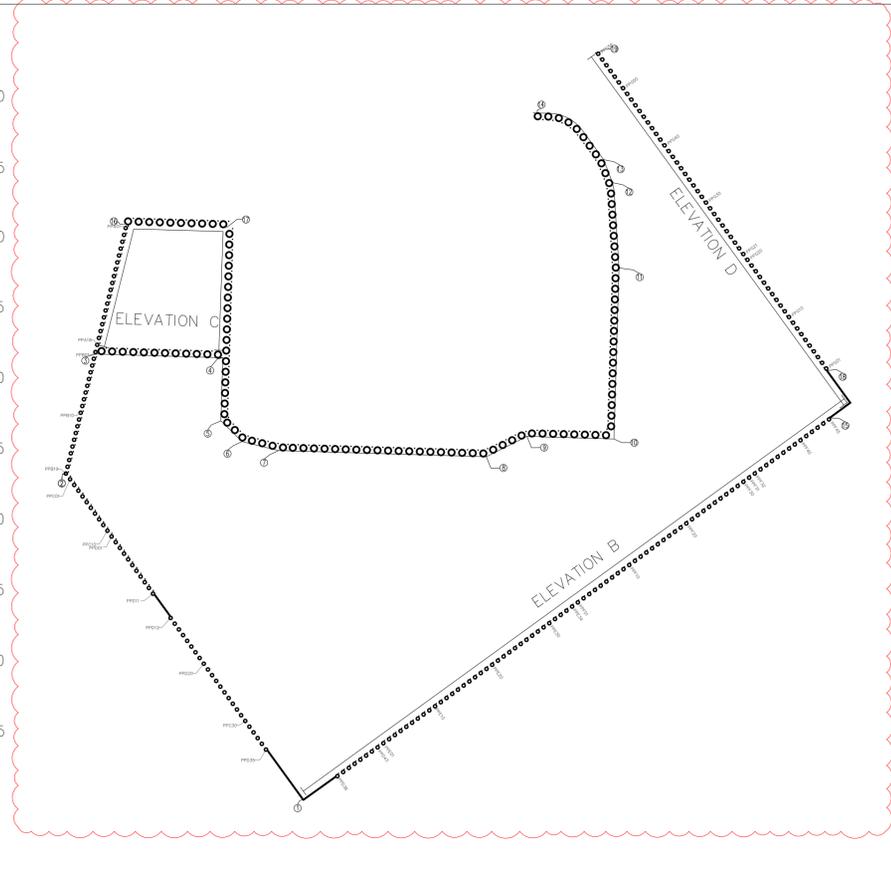
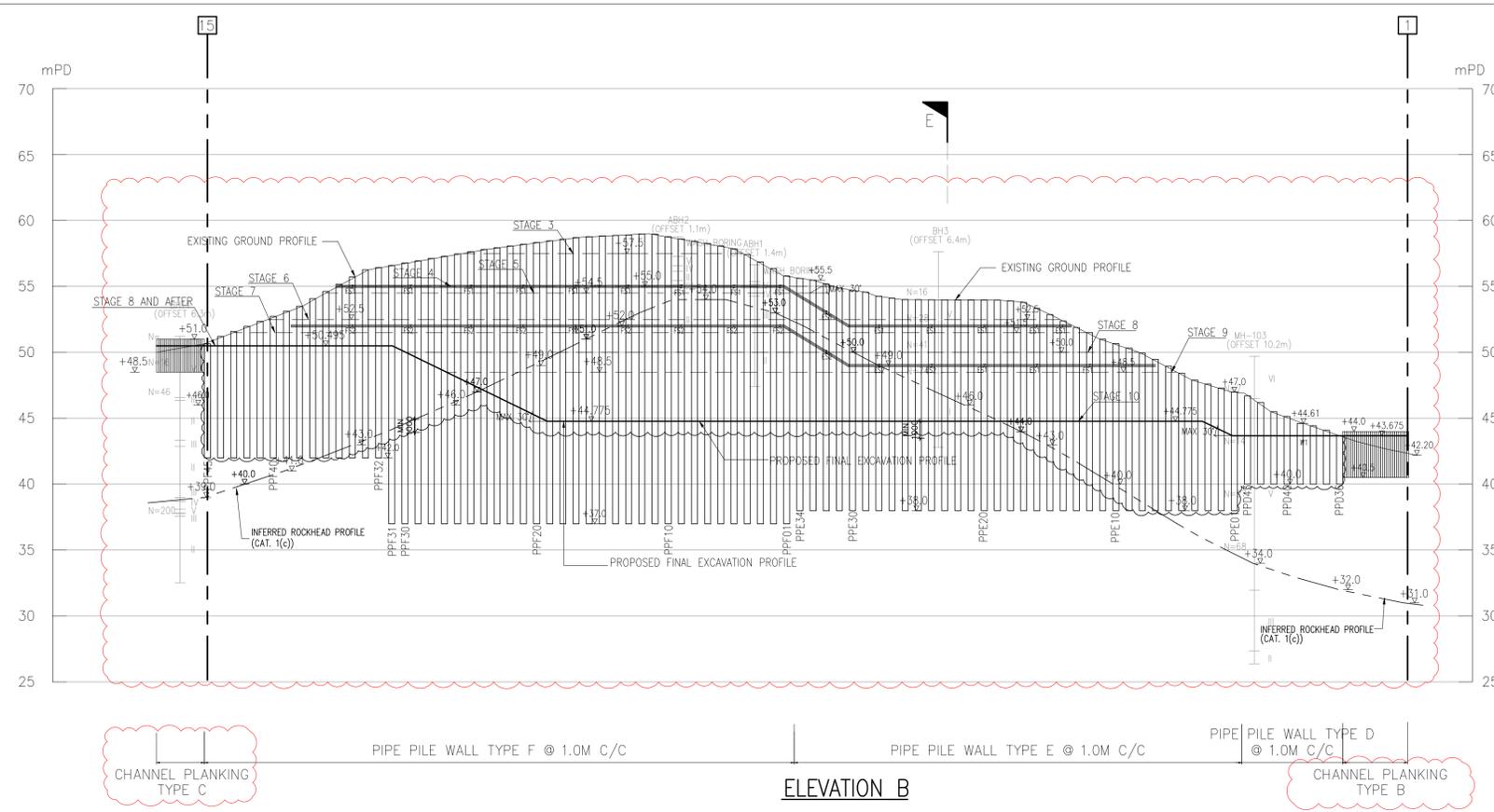
Project:
 PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title:
ELEVATION A

Drawing Number:
ELS-11

Revision Number:
A



LEGEND:

- SITE BOUNDARY
- PROPOSED BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- PROPOSED PIPE PILE WALL
- PROPOSED GROUT CURTAIN
- PROPOSED PERMANENT TIE BACK SOCKETED INTO ROCK (UNDER SEPARATE SUBMISSION)
- PROPOSED STRUT WALLING
- PROPOSED STRUT

Revision	Date	Description	By	Chk
A	07/2024	1ST AMENDMENT	CJX	CKS



Design	CCH	Date	JAN 2022
Checked	CCH <td>Drawn</td> <td>KUEN</td>	Drawn	KUEN
Approved	TY <td>Scale</td> <td>1:250 IN A1</td>	Scale	1:250 IN A1

Project:
PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type:
EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title:
ELEVATION B & ELEVATION C

Drawing Number:
ELS-11A

Revision Number:
-

GENERAL NOTES

- DO NOT SCALE DRAWINGS.
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS ISSUED UNDER THE CONTRACT. INFORM THE ENGINEER ANY DISCREPANCIES WHICH MAY BE FOUND AMONG THESE DRAWINGS.
- THE CONTRACTOR SHALL INSPECT THE CONDITIONS OF ADJOINING AREAS AND RECORD THE EXISTING LANDSCAPE FEATURES, STRUCTURES, UTILITIES, ROADS, PAVEMENTS, AND THE LIKE LYING OUTSIDE AND WITHIN A DISTANCE OF MIN. 10m FROM THE LOT BOUNDARY PRIOR TO THE COMMENCEMENT AND AFTER COMPLETION OF THE WORKS. THE CONTRACTOR SHALL SUBMIT THE CONDITION SURVEY REPORT TO THE ARCHITECT FOR RECORD BEFORE CONSTRUCTION.
- ALL EXISTING FOUNDATION INFORMATION GIVEN IS FOR REFERENCE ONLY. THE CONTRACTOR SHALL CARRY OUT HIS OWN INVESTIGATION WORKS TO VERIFY THE ACTUAL LOCATION AND LEVEL OF THE EXISTING FOUNDATION BEFORE WORK COMMENCES.
- THE CONTRACTOR SHALL CARRY OUT ALL SITE FORMATION PROCEDURES IN ACCORDANCE WITH THE DRAWINGS.
- ALL WORKS SHALL COMPLY WITH THE HONG KONG BUILDING (CONSTRUCTION) REGULATION 2020 AND RELEVANT PRACTICE NOTES FOR AUTHORIZED PERSONS AND REGISTERED STRUCTURAL ENGINEERS AND PRACTICE NOTES FOR REGISTERED CONTRACTORS.
- ALL DIMENSIONS ARE IN mm AND LEVELS IN mPD.
- PRIOR TO CONSENT, THE AP/RSE/RGE SHALL OBTAIN RECORDS OF PIPE LEAKAGE/BURST INCIDENTS FROM THE RELEVANT DEPARTMENTS OCCURRED WITHIN THE AFFECTED AREA IN THE PAST 12 MONTHS. AN INVESTIGATION SHOULD BE CARRIED OUT TO ASCERTAIN THE EXISTING CONDITION OF THE SURROUNDING GROUND, IN PARTICULAR THE EXISTENCE OF GROUND LOSS OF UNDERGROUND CAVITY.
- THE AP/RSE/RGE SHOULD APPROACH THE DEPARTMENTS FOR FURTHER INFORMATION ABOUT THE CAUSES OF THE INCIDENT AND REMEDIAL ACTIONS TAKEN TO FACILITATE THE INVESTIGATION. A DESIGN REVIEW REPORT SHALL BE SUBMITTED TO AND FOUND ACCEPTABLE BY THE BA TO DISCUSS THE FINDINGS OF THE INVESTIGATION AND REVIEW THE ADEQUACY OF THE PROPOSED SITE FORMATION AND EXCAVATION AND LATERAL SUPPORT WORKS TAKING DUE CONSIDERATION OF THE INVESTIGATION RESULTS.

NOTES FOR EXCAVATION AND LATERAL SUPPORT (ELS) WORKS (TEMPORARY)

- THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR THE ERECTION, MAINTENANCE AND REMOVAL OF ALL TEMPORARY WORKS DURING CONSTRUCTION.
- NECESSARY PRECAUTIONS SHALL BE TAKEN TO PREVENT DAMAGE TO EXISTING FOUNDATIONS, DRAINS, PAVEMENTS, FEATURES, SERVICES ETC. SHOULD ANY DAMAGE OCCUR, NOTIFY THE ARCHITECT AND RELEVANT AUTHORITIES CONCERNED IMMEDIATELY AND MAKE GOOD BY THE CONTRACTOR AT NO EXTRA COST AND NO EXTENSION OF TIME.
- ALL TEMPORARY WORKS SHALL BE WITHIN THE SITE BOUNDARY.
- DURING SUBSTRUCTURE CONSTRUCTION, THE GROUNDWATER LEVEL SHALL BE KEPT BELOW THE FINAL FORMATION LEVEL.
- THE CONTRACTOR SHALL INCREASE THE FREQUENCY OF MONITORING AS INSTRUCTED BY THE ENGINEER SHOULD ANY UNDOE GROUND MOVEMENT BE OBSERVED.
- MAX. ANGLE FOR TEMPORARY SOIL CUT SLOPE SHALL NOT EXCEED 30°. UNLESS OTHERWISE STATED.
- IF NECESSARY, THE CONTRACTOR IS RESPONSIBLE TO FURTHER EXCAVATE BELOW THE TENTATIVE FOUNDING LEVEL IN ORDER TO REACH THE SPECIFIED FOUNDING MATERIALS OR TO REMOVE ANY LOOSE MATERIALS. IF THIS HAPPENS, THE VOID BELOW THE TENTATIVE FOUNDING LEVEL SHALL BE BACKFILLED WITH MASS CONCRETE, SHORING SHALL BE MODIFIED TO FACILITATE EXCAVATION AND AMENDMENT SHALL BE MADE IF NECESSARY.

NOTES ON STRUCTURAL STEELWORK

- ALL STRUCTURAL STEELWORK SHALL BE CARRIED OUT IN ACCORDANCE WITH CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
- ALL LEVEL SHOWN ARE IN METERS AND OTHER DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- ALL STRUCTURAL STEEL SECTION SHALL BE WELDABLE STRUCTURAL STEEL TO BS EN 10025:2019 FOR STEEL OTHER THAN HOLLOW SECTION AND BS EN 10210:2019 FOR HOLLOW SECTION.
- SHOULD THE CONTRACTOR BE UNABLE TO OBTAIN THE SPECIFIED STEEL SECTION, THEY SHALL SUBMIT ALTERNATIVE SECTIONS OF AT LEAST EQUAL STRENGTH AND PROPERTIES TO THE ENGINEER. FOR APPROVAL. WHERE JOINT DETAILS HAVE TO BE MODIFIED AS A RESULT, JOINT DETAILS AND SHOP DRAWING ALSO HAVE TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE WORK IS PUT IN HAND.
- UNLESS NOTED OTHERWISE ALL STEEL GRADE SHALL BE S275 AND ALL STEEL SHALL BE CLASS 1.

NOTES ON WELDING

- THE CONTRACTOR SHALL SUBMIT TO THE ARCHITECT HIS PROPOSED PROCEDURE FOR WELDING. THIS PROCEDURE WILL BE TESTED IN ACCORDANCE WITH BS EN 1418:1998.
- THE CONTRACTOR SHALL ONLY USE QUALIFIED WELDERS WHO HAVE DEMONSTRATED THEIR COMPETENCE IN WELDING TO THE AGREED PROCEDURE. EACH WELDER WILL BE TESTED AS DESCRIBED IN BS EN 287:2011.
- PERMANENT WELDS SHALL MEET THE ACCEPTANCE CRITERIA LAID DOWN IN BS EN 1011:2009.
- UPON REQUESTED BY THE ARCHITECT WELDS WILL BE TESTED BY RADIOGRAPHIC EXAMINATION TO BS EN 1435:1997 OR ULTRASONIC EXAMINATION TO BS EN 1714:1998.
- UNLESS OTHERWISE APPROVED, ALL SPACES TO BE CONTINUOUS FULL-STRENGTH FULL PENETRATION BUTT WELDS.
- UNLESS OTHERWISE STATED, ALL FILLET WELDS SHALL BE 15mm ALL ROUND.
- ALL IMPROPER MATERIALS (e.g. SLAG, DIRT, IRREGULARITIES, OIL ETC.) TO BE REMOVED FROM JOINTS PRIOR TO WELDING.
- ALL WELDING SHALL COMPLY WITH BS EN 1011 & BS EN 756:2004.
- SAMPLES OF ALL MATERIALS USED SHALL BE TESTED & TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. ALL WORKS, MATERIALS AND TESTING SUCH AS TESTING OF STEEL BAR SHALL COMPLY WITH GENERAL SPECIFICATION FOR CIVIL ENGINEER WORKS 2006 EDITION AND HONG KONG BUILDING (CONSTRUCTION) REGULATION 2020 EDITION UNLESS OTHERWISE STATED IN THE DRAWING.

NOTES ON EXISTING SERVICES, UTILITIES AND STRUCTURES

- BEFORE CONSTRUCTION COMMENCES, THE CONTRACTOR SHALL CONSULT THE VARIOUS SERVICES AND UTILITY AUTHORITIES FOR THE EXTENT OF WORKS TO BE CARRIED OUT.
- THE CONTRACTOR SHALL EXERCISE DUE CARE DURING THE WORKS ON SITE TO AVOID CAUSING DAMAGE TO ADJACENT STRUCTURES PAVEMENT, UTILITIES/SERVICES, PRIVATE AND GOVERNMENT PROPERTIES.
- SHOULD ANY DAMAGE OCCUR TO THE ADJACENT STRUCTURES, PAVEMENT, UTILITIES/SERVICES, PRIVATE AND GOVERNMENT PROPERTIES DUE TO THE CONTRACTOR'S WORKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COST INCURRED FROM THE DAMAGE. THE CONTRACTOR SHALL REPAIR, REINSTATE AND MAKE GOOD ANY DAMAGE DUE TO THE CONTRACTOR'S WORKS TO THEIR ORIGINAL CONDITIONS OR TO THE SATISFACTION OF THE CM, UNLESS OTHERWISE SPECIFIED.

NOTES ON METHOD STATEMENT FOR KINGPOST INSTALLATION

- THE KINGPOST SHALL BE INSTALLED TO THE TOE LEVEL AS SHOWN ON TOE KINGPOST SCHEDULE

NOTES ON METHOD STATEMENT FOR TEMPORARY PIPE PILE INSTALLATION

- ALL PIPE PILES SHALL BE S275 STEEL COMPLYING WITH BS EN 10025:2019, WELDING SHALL COMPLY WITH BS EN 1011-2:2009 AND BS EN 1011-2:2001 UNLESS OTHERWISE SPECIFIED AND ELECTRODES SHALL COMPLY WITH BS EN 2560:2005.
- THE TEMPORARY PIPE PILE WALL SHALL BE INSTALLED TO THE TOE LEVEL AS SHOWN ON THE ELEVATION.
- DRILL 813mm/ 610mm/ 456mm / 356mm DIA. HOLE WITH PIPE PILE CASING USING UNDERDREAMING METHOD DOWN TO THE REQUIRED TOE LEVEL. THE HOLE VERTICALITY SHOULD BE CHECKED. FLUSH AND CLEAN UP THE HOLE BY AIR. VERTICALITY OF PIPE PILE SHALL NOT EXCEED 1:100.
- THE PIPE PILE SHALL BE GROUTED WITH CEMENT GROUT (GRADE 30)
- UPON COMPLETION OF PIPE PILE, A RECORD PLAN FOR PIPE PILE SHALL BE SUBMITTED TO THE BUILDING AUTHORITY VIA THE RSE FOR CONSENT APPLICATION.
- THE CONTRACTOR SHALL SUBMIT, 2 WEEKS PRIOR TO COMMENCE DRILLING, TO THE ENGINEER THE PROPOSED METHOD OF INSTALLATION OF PIPE PILE WHEN ENCOUNTER EXISTING THE BACK BEFORE INSTALLATION.

NOTES ON PROTECTION OF EARTHWORKS

- SURFACE WATER FLOWING INTO AND OUT OF THE SITE SHALL BE INTERCEPTED AND CONDUCTED FROM THE SITE TO AN INDICATED SAFE DISCHARGE POINT. AT EACH INTERSECTION AND ABRUPT CHANGE IN DIRECTION OF SURFACE DRAINAGE CHANNELS AND ACCESSIBLE CATCH PIT SHALL BE PROVIDED. ALL DRAINAGE WORKS SHALL BE KEPT CLEAR OF DEBRIS.
- WHERE PARTIALLY COMPLETED DRAINAGE WORKS DISCHARGE WITHIN THE SITE, A TEMPORARY CONDUIT SHALL BE PROVIDED TO THE DISCHARGE POINT.
- DURING EXCAVATION, A METHOD OF WORKING SHALL BE ADOPTED IN WHICH THE MINIMUM AMOUNT OF BARE SOIL IS EXPOSED AT ANY TIME. EXCAVATION TO FORM THE FINAL FACE SHALL BE FOLLOWED UP IMMEDIATELY WITH SURFACE PROTECTION AND DRAINAGE WORKS AND THE FACE PANEL SIZE SHALL BE SMALL ENOUGH TO PERMIT THIS.
- WHERE TEMPORARY BARE EARTH SLOPE FACES ARE UNAVOIDABLE, THEY SHALL BE PROTECTED WITH HEAVY DUTY SHEETING ADEQUATELY SECURED AT THE EDGES, SEALED AT THE CREST, AND LAPPED AT JOINTS. WHERE SLOPE FACES ARE TO BE TEMPORARILY EXPOSED FOR MORE THAN TWO WEEKS, TEMPORARY DRAINS SHALL BE INSTALLED IN ADDITION TO PROVISION OF HARD SURFACING.
- TRENCHES ON/OR ADJACENT TO SLOPES SHALL BE EXCAVATED WITH EXTREME CARE IN SHORT SECTIONS AT A TIME. PRECAUTIONS SHALL ALWAYS BE TAKEN TO PREVENT WATER ENTERING AND CONNECTING IN THE TRENCHES. ALL EARTHWORKS SHALL BE GRADED AN SEALED TO ENSURE RUN-OFF AND TO
- AVOID PONDING. EARTHWORKS SHALL BE SEALED TO THE SATISFACTION OF THE CM
- OR THE ENGINEER TO PREVENT INFILTRATION AND EROSION. ALL TEMPORARY DRAINAGE WORKS SHALL BE PROVIDED BY CONTRACTOR AND SHALL BE KEPT CLEAR OF DEBRIS.

CONSTRUCTION SEQUENCE OF TEMPORARY LAGGING WALL

- EXCAVATE THE SOIL IN FRONT OF PROPOSED PIPE PILE WALL TO PROPOSED STAGE EXCAVATION LEVEL.
- FIX THE STEEL PILE IN POSITION.
- LAGGING SHALL BE INSTALLED AS SOON AS PRACTICABLE BUT IN NO CASE EXCEED 1000mm INTERVAL FOR EXCAVATION IN SOIL.

NOTES FOR COMPACTION OF COMPACTED FILL

- BACKFILL MATERIAL SHOULD BE SUITABLE MATERIAL AS DEFINED IN GENERAL SPECIFICATION FOR ENGINEERING WORKS BY THE HONG KONG GOVERNMENT, AND COMPACTED TO 95% MAXIMUM DENSITY.
- INSITU FIELD DENSITY TEST SHALL BE PERFORMED IN ACCORDANCE WITH GEO SPEC 3 CLAUSE 11.1 TEST FREQUENCY SHALL REFER TO PMP# APP-15.
- BACKFILLING SHOULD BE CARRIED OUT IN HORIZONTAL LAYER NOT EXCEEDING 300MM THICK WELL RAMMED AND CONSOLIDATED.
- THE MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT SHALL BE DETERMINED IN ACCORDANCE WITH GEO SPEC 3 CLAUSE 10.1 & 10.2. EACH SOIL TYPE SHALL BE TEST WHEN FIRST USED.
- ALL TEST SHALL BE CARRIED OUT BY INDEPENDENT HOKLAS LABORATORY.
- COMPACTION RECORD SHALL BE SUBMITTED TO ENGINEER.

NOTES FOR GROUTING OF PIPE PILE

- CEMENT GROUT FOR GROUTING SHALL COMPLY WITH BS12.
- TESTING FOR GROUT SHALL INCLUDE BLEEDING, FLOW CONE AND CRUSHING STRENGTH.
- CEMENT GROUT SHALL HAVE A MINIMUM CRUSHING STRENGTH OF 30MPa @ 28 DAYS.
- THE CONTRACTOR USED SHALL HAVE WATER CONTENT RATIO NOT EXCEEDING 0.45. ANY ADDITIVE ADMIXTURE SHALL COMPLY WITH BS5075 AND SHALL NOT BE USED WITHOUT PRIOR AGREEMENT FROM THE STRUCTURAL ENGINEER.

NOTES FOR TOP 15 SITE SUPERVISION

- TYPICAL CONTENTS OF THE REGULAR REPORTS PREPARED BY THE TOP 15 SITE SUPERVISION PERSONNEL AND THE DSS SHOULD INCLUDE THE FOLLOWING:
 - INTERPRETATION OF MONITORING RESULTS TAKEN DURING CONSTRUCTION
 - SITE OBSERVATIONS
 - INSPECTION RECORDS
 - REVIEW
 - COMPLIANCE WITH APPROVED PLANS
- NOTE: CUMULATIVE MONITORING RESULTS WITH THE TRIGGER VALUES AND DESIGN LEVELS (ONLY IN GRAPHICAL FORM) SHOULD BE PROVIDED IN THE APPENDIX.

EACH REPORT SHALL COVER ONE CALENDAR MONTH OF SITE ACTIVITIES AND BE COMPLETED WITHIN 2 WEEKS AFTER EACH REPORTING PERIOD. THE REPORTS SHALL BE KEPT AT THE SITE OFFICE FOR INSPECTION OF THE BD/CEO.

- UPON INSTALLATION / RE-PROVISION OF MONITORING STATIONS, THE TOP 15 SITE SUPERVISION PERSONNEL SHALL CHECK THE LOCATIONS OF ALL MONITORING POINTS AND CONFIRM THAT THEY ARE IN PROPER WORKING CONDITIONS. RECORDS OF SUCH CHECKING SHOULD BE PROVIDED IN THE REGULAR REPORTS PREPARED BY THE TOP 15 SITE SUPERVISION PERSONNEL / DSS.
- DESIGN REVIEW FOR THE BACK:
UPON THE COMPLETION OF ELS STAGE 3, DESIGN REVIEW SHALL BE INCLUDED IN THE 15 REPORT TO REVIEW THE PERFORMANCE OF THE BACK. THE READING OF CHECKPOINTS (OS1-CSS, M1-M2) SHALL BE PLOTTED AGAINST THE DESIGN MOVEMENT AND DESIGN THE BACK FORCE AT CURRENT STAGE. WHEN THE MEASURED VALUE REACH THE 90% OF THE DESIGN MOVEMENT OR DESIGN THE BACK FORCE, A DESIGN REVIEW COVERING EMERGENCY MEASURES PLAN SHALL BE PREPARED BY THE RSE/RGE AND SUBMITTED TO BD FOR AGREEMENT. WHEN THE MEASURED VALUE REACH THE 100% OF THE DESIGN VALUE, ALL EXCAVATION WORKS TO BE CEASED AND THE AGREED EMERGENCY MEASURES SHALL BE IMPLEMENTED. AP/RSE/RGE TO REVIEW THE DESIGN ON FURTHER REMEDIAL AND PREVENTIVE MEASURES TO ENABLE THE RESUMPTION OF THE CEASED WORKS. EXCAVATION WORKS SHOULD NOT BE RESUMED UNTIL THE AGREED EMERGENCY MEASURES HAVE BEEN COMPLETED TO THE SATISFACTION OF THE BD.

UPON THE COMPLETION OF ELS STAGE 3, DESIGN REVIEW SHALL BE INCLUDED IN THE 15 REPORT TO REVIEW THE PERFORMANCE OF THE BACK. THE READING OF CHECKPOINTS (OS1-CSS, M1-M2) SHALL BE PLOTTED AGAINST THE DESIGN MOVEMENT AND DESIGN THE BACK FORCE AT CURRENT STAGE. WHEN THE MEASURED VALUE REACH THE 90% OF THE DESIGN MOVEMENT OR DESIGN THE BACK FORCE, A DESIGN REVIEW COVERING EMERGENCY MEASURES PLAN SHALL BE PREPARED BY THE RSE/RGE AND SUBMITTED TO BD FOR AGREEMENT. WHEN THE MEASURED VALUE REACH THE 100% OF THE DESIGN VALUE, ALL EXCAVATION WORKS TO BE CEASED AND THE AGREED EMERGENCY MEASURES SHALL BE IMPLEMENTED. AP/RSE/RGE TO REVIEW THE DESIGN ON FURTHER REMEDIAL AND PREVENTIVE MEASURES TO ENABLE THE RESUMPTION OF THE CEASED WORKS. EXCAVATION WORKS SHOULD NOT BE RESUMED UNTIL THE AGREED EMERGENCY MEASURES HAVE BEEN COMPLETED TO THE SATISFACTION OF THE BD.

PRECAUTIONARY MEASURES FOR PREBORING METHOD

- a. THE AMOUNT OF AIR SUPPLY TO LIMIT THE PRESSURE OF DRILLINGS SHOULD BE MONITORED.
- b. THE ADVANCEMENT RATE OF DRILL BIT SHOULD BE MONITORED DURING THE BORING.
- OVERBREAK SHOULD NOT BE ALLOWED.
- THE DRILL BIT SHOULD BE ADVANCED SIMULTANEOUSLY WITH THE STEEL CASING.

NOTES ON ROCK EXCAVATION (FOR ROCK CUT AT ANGLES GREATER THAN 45°)

- THE ROCK CUT SHALL BE CARRIED OUT IN 2.2m VERTICAL INTERVAL FOR THE FIRST (PANEL) BENCH AFTERWARDS AND 2.2m MAX VERTICAL INTERVAL. AFTER SEALING THE LOOSE BLOCKS ON THE ROCK SURFACE, THE CONTRACTOR IS REQUIRED TO CARRY OUT THE ROCK JOINT MAPPING BY A QUALIFIED GEOLOGIST AND SUBMIT THE MAPPING REPORT TO AP/RSE/RGE. THE CONTRACTOR IS ALSO REQUIRED TO CARRY OUT KINEMATIC STABILITY ANALYSES IN ORDER TO DETERMINE ANY STABILISATION WORKS.
- NO FURTHER EXCAVATION IS ALLOWED UNLESS THE MAPPING REPORT AND THE DESIGN OF STABILISATION WORKS IS ACCEPTED BY AP/RSE/RGE AND THE NECESSARY STABILISATION WORKS ARE CARRIED OUT.
- THE RELEVANT RECORDS AND ASSESSMENT REPORTS OF THE ROCK FACE STABILITY AND MEASURES CARRIED OUT FOR EACH PANEL SHALL BE SUBMITTED TO BE SATISFACTION OF BD BEFORE EXCAVATION FOR THE SUBSEQUENT PANEL COMMENCES. SUBMISSION FOR LAST PANEL SHALL ALSO BE REQUIRED BEFORE CARRYING OUT OF THE FOUNDATION WORKS CONCERNED.
- THE MAPPING REPORT TOGETHER WITH THE AS-BUILT STABILISATION MEASURES SHALL BE SUBMITTED TO BD.

SECTION PROPERTIES OF PIPE PILE

MEMBER SIZE	THICKNESS (mm)	MASS PER METRE (Kg)	AREA OF SECTION (cm ²)	MOMENT OF INERTIA (cm ⁴)	ELASTIC MODULUS (cm ³)	STEEL GRADE
366 x 10mm x 85 kg/m CHS	10	85	109	16200	912	S275JO
457 x 10mm x 110kg/m CHS	10	110	140	35100	1890	S275JO
610 x 12.5mm x 184kg/m CHS	12.5	184	236	104760	3436	S275JO

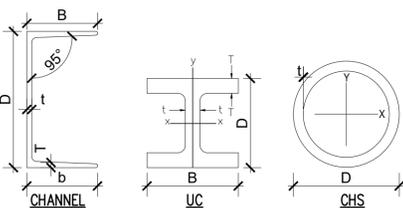
SECTION PROPERTIES OF MAIN/DIAGONAL STRUT/WALING/TIE/BARCKET/SPACER/KING POST/CHANNEL PLANKING

MEMBER	DEPTH, D (mm)	WIDTH/B (mm)	WEB THICKNESS (mm)	FLANGE THICKNESS (mm)	MOMENT OF INERTIA, I _{xx} (cm ⁴)	MOMENT OF INERTIA, I _{yy} (cm ⁴)	Sectional Area, A (cm ²)
I&H SECTIONS							
305 x 305 x 198 UC	339.9	314.1	19.2	31.4	50800	16200	252
254 x 254 x 132 UC	276.4	261	15.6	25.3	22600	7520	169
305 x 305 x 149 LBP	318.5	315.6	20.7	20.7	33000	10900	190
254 x 254 x 73 UC	254	254	8.6	14.2	11400	3870	92.9
356 x 368 x 189 LBP	346.4	376.5	12.9	12.9	50500	19000	196
356 x 368 x 174 LBP	361.5	378.1	20.4	20.4	51100	18400	222
356 x 368 x 172 UC	368.3	372.1	14.8	21.8	57200	20300	226
356 x 406 x 140 UC	406.4	403	26.5	47.9	120000	46000	433
254 x 254 x 89 UC	260.4	256.9	10.6	17.9	14100	4650	144

MEMBER	DEPTH, D (mm)	WIDTH/B (mm)	WEB THICKNESS (mm)	FLANGE THICKNESS (mm)	MOMENT OF INERTIA, I _{xx} (cm ⁴)	MOMENT OF INERTIA, I _{yy} (cm ⁴)	Sectional Area, A (cm ²)
CHANNELS							
239 x 89 x 33 Channel	239.6	88.9	8.6	15	3390	285	41.7
152 x 89 x 22 Channel	152.4	88.9	7.1	11.6	1170	215	30.4
127 x 64 x 15 Channel	127	63.5	6.4	9.2	483	67.2	19

KINGPOST SCHEDULE

KING POST MARK	MEMBER SIZE	GRADE	MIN. EMBEDMENT LENGTH (m)
KP1 - KP10	305x305x149 UB	S355JO	1.5m IN ROCK



GROUND STABLE CASING SYSTEM

IN LINE WITH THE NEW REQUIREMENTS FOR GROUND STABILITY AROUND INSTALLED CASINGS, GROUND STABLE CASING SYSTEM SHALL BE APPLIED TO INSTALL CASING WITH ABSOLUTE MINIMAL DISTURBANCE TO THE SURROUNDING GROUND / SUB-STRUCTURE OUTSIDE THE O/D OF THE CASING. TO DO THIS, THE SYSTEM SHALL HAVE THE FOLLOWING FEATURES:

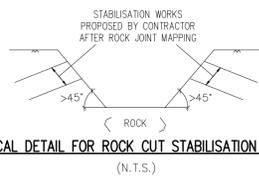
- THE CASING SHOE FORMS A SEAL AROUND THE END OF THE CASING PREVENTING AIR AND CUTTING PASSING AROUND THE OUTSIDE OF THE CASING.
- THE CASING & CASING SHOE ARE CARRIED DOWN THE HOLE AS A WHOLE AT THE SAME.
- ONLY 3.8% OF THE LIVE AIR PASSING INTO THE SYSTEM ACTUALLY TRAVELS THROUGH THE RING TO HAVE CONTACT WITH THE GROUND. THE REMAINING 96.2% OF THE AIR TRAVELS THROUGH PASSAGES IN THE BOOT AND IS THEN INJECTED INTO THE CASING AND CASING SHOE BORE. THIS AIR THEN RESULTS IN A VACUUM EFFECT, SUCKING THE CUTTING AWAY FROM THE CUTTING HEAD AND ACCELERATING THEIR "UP-HOLE VELOCITY" INSIDE THE BORE OF THE CASING.
- IN ADDITION TO THE VACUUM METHOD OF CUTTING REMOVAL THE GROUND STABLE CASING SYSTEM INCORPORATES A NEW SHAPE OF CASING SHOE THAT PREVENTS AIR ESCAPING AROUND THE CASING AND CAUSING OVER-BREAK TO THE GROUND.
- ANTICIPATED VALUES FOR BORING OPERATION

TYPE OF GROUND MATERIAL	RATE OF ADVANCEMENT IN DEPTH (m/min) PER 6m	MAXIMUM COMPRESSED AIR PRESSURE (cfm)	MAXIMUM VOLUME FOR AIR SUPPLY PER EACH COMPRESSOR (cfm)
FILL / RS	30	12	1070
CDG	30-90	15	1070
ROCK (MDG)	90	15	1070

THE OPERATING AIR VOLUME OUTPUT AND PRESSURE IS HIGHLY DEPENDENT ON THE REFERENCE THE ABOVE VALUE ARE SET FOR CONTROLLING THE OPERATION IN CASE THE ACTUAL RECORDED AND ADVANCEMENT RATE IS LOWER THAN THE ANTICIPATED VALUE, THE OPERATION SHALL BE REVIEWED TO CONTROL THE INSTALLATION OF REMAINING WORKING PILE

PRECAUTIONARY MEASURES TO PREVENT THE OCCURRENCE OF OVER-BREAK DURING PREBORING

- A PROCEDURE SHALL BE CARRIED OUT TO MONITOR THE CONDITION OF OVER-BREAK. IF THE DRILL BIT IS FOUND NOT TO PROPAGATE AFTER A CONSIDERABLE AMOUNT OF DRILLING, THE OPERATOR OF THE DRILLING RIG SHALL STOP THE DRILLING PROCESS AND INFORM THE ENGINEER IMMEDIATELY. THE RGE / RSE SHALL REVIEW THE GEOLOGY OF THE SPECIFIC LOCATION. PROPOSAL TO LIMIT ANY OVER-BREAK OF SOIL SHALL BE SUBMITTED AND AGREED BY THE RSE / RGE PRIOR TO ANY FURTHER DRILLING WORKS MAY COMMENCE.
- SHOULD ANY UNDOE OVER-BREAK OF SOIL OBSERVED DURING THE DRILLING OPERATIONS, THE DRILLING WORKS AT THAT LOCATION SHOULD BE STOPPED AND THE RSE SHALL BE INFORMED IMMEDIATELY. THE MONITORING DATA AND METHOD OF PREBORING SHALL BE REVIEWED. PROPOSAL TO LIMIT ANY FURTHER OVER-BREAK OF SOIL SHALL BE SUBMITTED AND AGREED WITH THE RSE PRIOR TO ANY FURTHER DRILLING WORKS MAY COMMENCE.



SOIL	c' (kPa)	φ (°)	DENSITY (kN/m ³)
FILL	0	35	19
RESIDUE SOIL	4	34	19
CDG (N VALUE <100)	4	36	19
CDG (N VALUE >100)	4	37	19

CHANNEL PLANKING SCHEDULE

CHANNEL PLANKING	MEMBER SIZE	GRADE
TYPE A	152 x 89 x 23 Channel	Grade S275
TYPE B	152 x 89 x 23 Channel	Grade S275
TYPE C	152 x 89 x 23 Channel	Grade S275

NOTES FOR REMOVAL OF STRUT

- PRIOR TO REMOVAL OF STRUTS, THE AP/RSE/RGE SHALL BE NOTIFIED AND PRIOR COMMENCEMENT FOR REMOVAL OF STRUTS FROM AP/RSE/RGE SHALL BE OBTAINED.
- THE STRUTS SHALL NOT BE REMOVAL UNLESS THE EXCAVATION PROFILE IS BACKFILLED TO PREVIOUS STAGE EXCAVATION PROFILE OR PERMANENT LATERAL SUPPORT IS CONSTRUCTED AND ATTAINED ADEQUATE STRENGTH.
- THE METHOD STATEMENT FOR REMOVAL OF STRUTS SHALL BE SUBMITTED TO THE AGREEMENT OF RSE/RGE PRIOR TO COMMENCEMENT OF REMOVAL OF STRUT.

GROUT CURTAIN SCHEDULE:

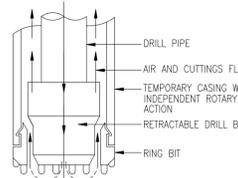
Pile Mark	TENTATIVE TOE LEVEL OF PIPE PILE (mPD)	TENTATIVE ROCKHEAD LEVEL (mPD)	LOWEST EXCAVATION LEVEL (mPD)
PPA01-PPA18	45	38.5	52.875
PPB01-PPB19	35	33.5	43.675
PPC01-PPC10	37	32	43.675
PPD01-PPD43	40	30	43.675
PPF01-PPF34	38	34.5	43.675
PPG01-PPG31	37	44	44.775
PPH01-PPH45	42	39	50.495
PPJ01-PPJ20	45	38.5	50.495
PPK01-PPK26	50	44	56.145
BPW01-BPW17	31	42	43.675
BPW01-BPW31	34	47.3	44.775
BPW01-BPW39	41	47.5	48.5
BPW01-BPW24	47	51.3	56.145
BPW01-BPW06	48	52.8	58.3
BPW01-BPW12	50	58.7	43.675
BPW01-BPW10	40	44	52.875
BPW01-BPW02	38	45	52.875

NOTES ON GROUT CURTAIN:

- GROUT HOLE
DRILL 75mm DIA HOLES AT MAXIMUM 1.2m C/C BY ROTARY METHOD ALONG PIPE PILE WALL, BORED PILE WALL AND GROUT THE SOIL AT LEVEL GIVEN IN GROUT CURTAIN SCHEDULE INSTALL 48mm O.D. TUBE-A-MANCHETTE GROUT PIPES WITH GROUTING ORIFICES COVERED WITH RUBBER MANCHETTES. THE BOTTOM END OF THE TUBES SHALL BE SEALED.
- ANNULAR SPACE BETWEEN DRILL HOLE AND TAM PIPES SHALL BE FILLED WITH CEMENT/WATER SLEEVE GROUT.
- SOIL GROUTING
THE PROCEDURE IS SEPARATED INTO TWO STAGES (BENTONITE CEMENT GROUT AS FIRST STAGE AND CHEMICAL GROUT AS SECOND STAGE).
STAGE 1 : BENTONITE CEMENT GROUT SHALL BE INJECTED INTO EACH GROUT HOLE USING A DOUBLE PACKER AT 1000mm INTERVAL FROM BOTTOM UP TO THE DESIGNED LEVEL

BENTONITE 35 kg CEMENT 350 kg WATER 870 LITRES (APPROX)
STAGE 2 : CHEMICAL GROUT
SECOND STAGE GROUTING SHALL BE UNDERTAKEN IN A SIMILAR MANNER WITH THE FOLLOWING MIX PROPORTION:
SOLUTION A SOLUTION B
SODIUM SILICATE 100 LITRES CEMENT 90 kg
WATER 100 LITRES WATER BALANCE
TOTAL 200 LITRES TOTAL 200 LITRES

- SOLUTION A AND B ARE MIXED TOGETHER BY THE RATIO 1:1 AT THE TIME OF APPLICATION GEL TIME IS 2-5 MINUTES GROUT SHALL BE STOPPED WITH ANY OF THE FOLLOW CRITERIA IS ATTAINED:
 - GROUTING PRESSURE REACHES THE OVERBURDEN PRESSURE PLUS 20kPa AND MAINTAINED FOR 2-5 MINUTES GROUT INTAKE. THE OVERBURDEN PRESSURE IS DEFINED AS 20 kPa PER METRE DEPTH.
 - BENTONITE GROUT INTAKE REACHES 150 LITRES PER METER RISE. THE ACTUAL GROUT INTAKE SHALL BE ACCEPTED BY CM ON SITE.
 - CHEMICAL GROUT INTAKE REACHES 200 LITRES PER METRE RISE. THE ACTUAL GROUT INTAKE SHALL BE ACCEPTED BY CM ON SITE.
- IN THE EVENT THAT CRITERION (B) OR (C) IS MET A PRESSURE BELOW CRITERION (A) AT ALLOW TIME FOR THE GROUT ACHIEVE AN INITIAL SET AND THEN REPEAT THE PROCEDURE CORRESPONDING PHASE OF GROUTING.
- FOLLOWING COMPLETION OF GROUTING, GROUT PIPES SHALL BE FLUSHED AND MAINTAINED FOR RE-GROUTING IF NECESSARY.
- (1) IF ROCKHEAD IS ABOVE FINAL EXCAVATION LEVEL, THE GROUT CURTAIN TOE LEVEL SHALL BE 1m BELOW FINAL EXCAVATION LEVEL.
(2) IF ROCKHEAD IS BELOW FINAL EXCAVATION LEVEL AND ABOVE PIPE PILE/ BORED PILE TOE LEVEL, THE GROUT CURTAIN TOE LEVEL SHALL BE 1m BELOW ROCKHEAD.
(3) IF ROCKHEAD IS BELOW PIPE PILE/ BORED PILE TOE LEVEL, THE GROUT CURTAIN TOE LEVEL SHALL BE PIPE PILE/ BORED PILE TOE LEVEL.
- ALL GROUT CURTAIN TOP LEVEL SHOULD BE SAME AS PIPE PILE/ BORED PILE TOP LEVEL.



SCHEMATIC DETAILS OF RING BIT DRILLING SYSTEM (N.T.S.)

MAIN STRUT AND CORNER STRUT SCHEDULE

LAYER	MEMBER SIZE	GRADE
AS1	305 x 305 x 198 UC	Grade S275
BS1-2	305 x 305 x 198 UC	Grade S275
ES1-2	305 x 305 x 198 UC	Grade S275
FS1-2	305 x 305 x 198 UC	Grade S275
GS1	305 x 305 x 198 UC	Grade S275

WALING SCHEDULE

LAYER	MEMBER SIZE	GRADE
WALING W1	305 x 305 x 198 UC	Grade S275

KING POST

KING POST MARK	MEMBER SIZE	GRADE
KP1-10	305 x 305 x 149 UB	Grade S355

SPACER SCHEDULE

LOCATION	MEMBER SIZE	GRADE
ALL LAYERS	127 x 64 x 15 Channel	Grade S275

TIE SCHEDULE

LAYER	MEMBER SIZE	GRADE
ALL LAYERS	254 x 254 x 132 UC	Grade S275

PIPE PILE SCHEDULE

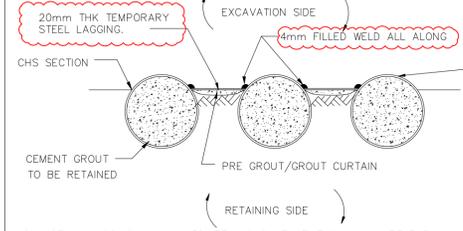
Wall Mark	Pile Size	MAX c/c spacing	Highest Wall Top Level	Maximum Retained Height	Lowest Excavation Level	Toe Level	Minimum Embedment Length	
		(m)	(m)	(m)	(mPD)	(mPD)	In Soil	In Rock
PPA01-PPA18	457X10X10CHS @ 1.0m c/c	1.00	60.80	7.93	52.85	45.00	7.88	-
PPB01-PPB19	457X10X10CHS @ 1.0m c/c	1.00	53.00	9.33	43.68	35.00	8.68	-
PPC01-PPC10	457X10X10CHS @ 1.0m c/c	1.00	47.50	3.83	43.68	37.00	6.68	-
PPD01-PPD43	457X10X10CHS @ 1.0m c/c	1.00	45.20	1.53	43.68	40.00	3.68	-
PPE01-PPE34	457X10X10CHS @ 1.0m c/c	1.00	55.61	10.84	43.68	38.00	5.68	-
PPF01-PPF31	457X10X10CHS @ 1.0m c/c	1.00	63.90	19.13	44.78	37.00	-	7.00
PPG01-PPG20	457X10X10CHS @ 1.0m c/c	1.00	56.43	5.94	50.50	42.00	8.50	-
PPH01-PPH56	457X10X10CHS @ 1.0m c/c	1.00	55.90	5.41	50.50	45.00	5.50	-
PPG01-PPG56	457X10X10CHS @ 1.0m c/c	1.00	63.00	6.86	56.15	50.00	6.15	-

NOTES ON STRUCTURAL STEELWORK

- ALL STRUCTURAL STEELWORK SHALL BE CARRIED OUT IN ACCORDANCE WITH CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL.
- ALL LEVEL SHOWN ARE IN METERS AND THEIR DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- ALL STRUCTURAL STEEL SHALL BE WELDED TO BS EN 10025 AND BS EN 10025 UNLESS OTHERWISE SPECIFIED.
- SHOULDER OR FLANGE UNABLE TO OBTAIN THE SPECIFIED STEEL SECTION, THE CONTRACTOR SHALL SUBMIT AN ALTERNATIVE SOLUTION OF AT LEAST EQUAL STRENGTH AND PROPERTIES TO THE ENGINEER FOR APPROVAL. WHERE JOINT DETAILS HAVE TO BE MODIFIED AS A RESULT, JOINT DETAILS AND SHOP DRAWING ALSO HAVE TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE WORK IS PUT IN HAND.

CONSTRUCTION SEQUENCE FOR LAGGING WALL:

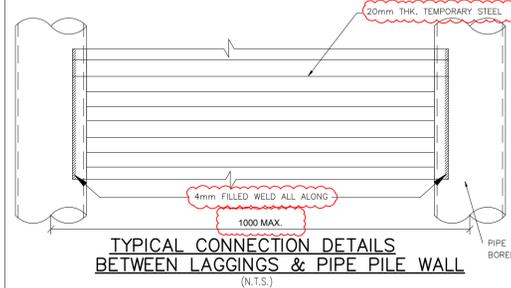
- SOIL CAN BE ALLOWED 1m LOCALLY CUT VERTICALLY BUT THE MAX. LENGTH CANNOT BE LARGER THAN 2 HORIZONTAL PANELS.



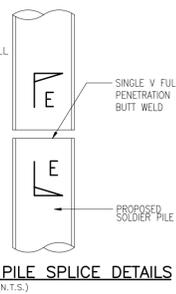
- INSTALL LAGGING WALL IMMEDIATELY SUCH THAT IT CAN MINIMIZE THE GROUND LOSS.
- REPEAT STEP 1) & 2) UNTIL ALL THE LAGGING WALL WITHIN THIS 1m DEPTH HAS BEEN COMPLETED.
- REPEAT STEP 1) TO 3) DOWN TO AT LEAST FINAL EXCAVATION LEVEL.
- IF ANY SOIL LOSS HAS BEEN OCCURRED OR VOIDS HAVE BEEN FORMED BEHIND THE LAGGING WALL, BACKFILLING WITH CEMENT GROUT SHOULD BE CARRIED OUT.

CHANNEL PLANKING SCHEDULE

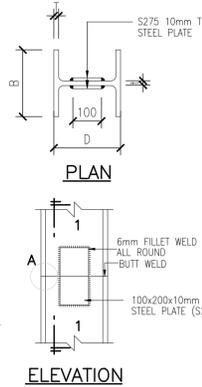
Wall Mark	Channel Planking Size	Grade	Top Level	Toe Level
			(mPD)	(mPD)
Type A	152 x 89 x 23 Channel	S275	44.00	42.00
Type B	152 x 89 x 23 Channel	S275	44.00	40.50
Type C	152 x 89 x 23 Channel	S275	51.00	48.50



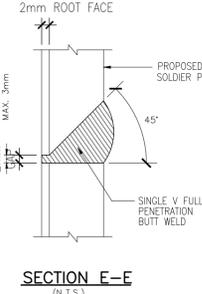
TYPICAL CONNECTION DETAILS BETWEEN LAGGINGS & PIPE PILE WALL (N.T.S.)



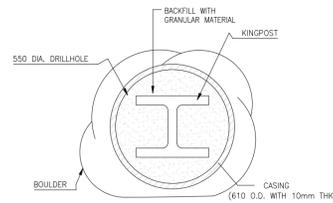
TYPICAL PIPE PILE SPLICE DETAILS (N.T.S.)



TYPICAL SPLICING DETAILS OF KING POST, WALING AND STRUT



SECTION E-E (N.T.S.)



TYPICAL KINGPOST DETAIL TO OVERCOME UNDERGROUND OBSTRUCTION

- PRE-DRILLING 610mm HOLES USING RING BIT DRILLING METHOD.
- BACKFILL THE HOLE WITH GRANULAR SAND BEFORE COMMENCING DRILLING THE ADJACENT HOLE.
- DRIVE KINGPOST TO THE REQUIRED BOTTOM LEVEL.
- REPEAT 1-3 IF ANY OTHER OBSTRUCTION BE ENCOUNTERED.

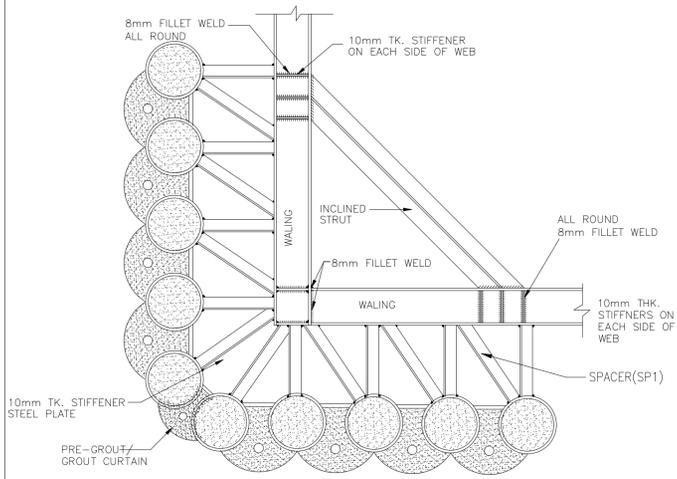
TYPICAL DETAILS FOR KING POST (N.T.S.)

NOTES ON CEMENT GROUT

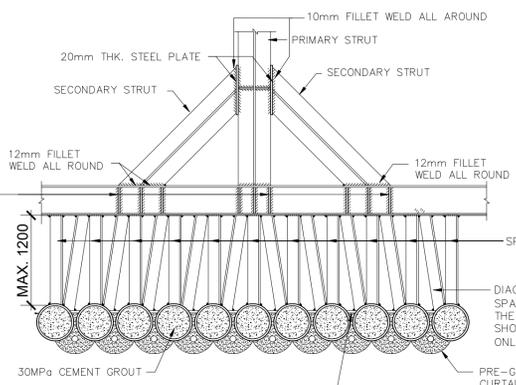
- CEMENT GROUT WITH A WATER/CEMENT RATIO OF 0.45 SHALL BE PLACED VIA GROUTING PIPES USING THE TREMIE METHOD.
- GROUT STRENGTH OF 30MPa SHALL BE VERIFIED BY CUBE TEST AND MADE IN ACCORDANCE WITH THE SPECIFICATION.

NOTES ON KING POST FOUNDING

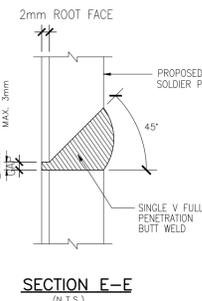
- KING POST SHALL BE SOCKETED A MINIMUM OF 1500mm INTO GRADE III OR BETTER ROCK WITH ALLOWABLE GROUND BEARING PRESSURE OR 5000kPa.
- THE FOUNDING MATERIALS SHALL BE MODERATELY DECOMPOSED STRONG ROCK OF MATERIAL WEATHERING GRADE III OR BETTER WITH A TOTAL CORE RECOVERY OR MORE THAN 85% OF THE GRADE.



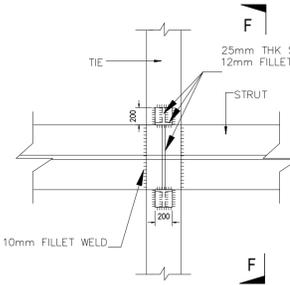
TYPICAL CONNECTION DETAILS BETWEEN WALING (N.T.S.)



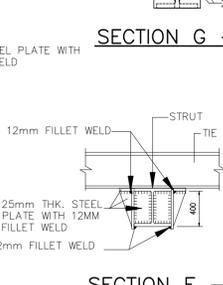
TYPICAL CONNECTION BETWEEN STRUT, WALING, SPACER AND PIPE PILE FOR SINGLE STRUT (N.T.S.)



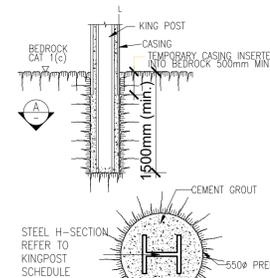
TYPICAL TEMPORARY PIPE PILE DETAIL (N.T.S.)



TYPICAL CONNECTION DETAILS BETWEEN STRUT & TIE (N.T.S.)



SECTION F-F

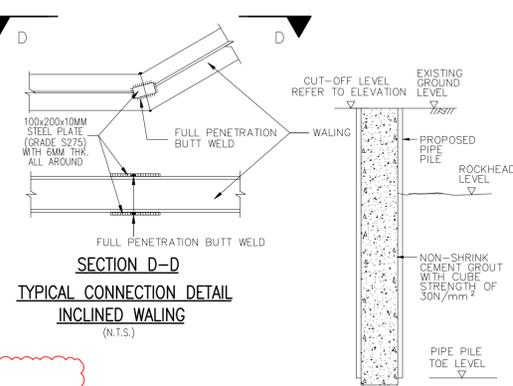


SECTION A

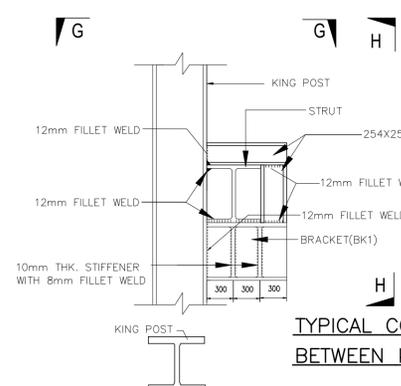
NOTES : ROCK SOCKET 550mm DIA. MIN. (TYPICAL SECTION FOR PREBORED KING POST)

MASTER CONSTRUCTION SEQUENCE

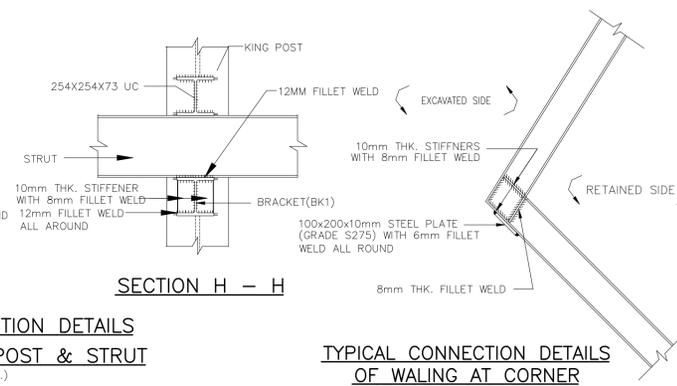
- INSTALL MONITORING CHECKPOINTS AND TAKE INITIAL READINGS.
 - CARRY OUT PREGROUTING WORKS, INSTALLATION OF TEMPORARY PIPE PILES, PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION), GROUT CURTAIN AND KING POSTS WITH CONSENT OBTAINED.
 - UPON COMPLETION OF PERMANENT BORED PILE WALL, TEMPORARY PIPE PILE AND KING POST, SUBMIT FORM BA14 OF PERMANENT BORED PILE WALL, TEMPORARY PIPE PILE, KING POST TO THE BUILDINGS DEPARTMENT.
 - DESIGN GROUND WATER LEVEL TO BE REVIEWED BEFORE THE COMMENCEMENT OF EXCAVATION WORKS TO CONFIRM IF PUMPING TEST IS REQUIRED. CARRY OUT PUMPING TEST AND SUBMIT ASSESSMENT REPORT TO BUILDING DEPARTMENT IF REQUIRED.
- APPLY CONSENT FOR ELS STAGE 2 TO ELS STAGE 7.
 - CARRY OUT ELS STAGE 2 EXCAVATION WORKS.
 - INSTALL PERMANENT TIE BACK WITH PREGROUTING WORKS (UNDER SEPARATE SUBMISSION).
 - CARRY OUT ELS STAGE 3 EXCAVATION WORKS.
 - INSTALL PERMANENT TIE BACK (UNDER SEPARATE SUBMISSION).
 - INSTALL TEMPORARY STRUTS WALING AND SPACER, IF ANY.
 - REPEAT STEP 5.4 TO 5.6 WITH ELS STAGE 3 TO STAGE 7 EXCAVATION FOR STEP 5.4
 - UPON COMPLETION OF ELS STAGE 6 EXCAVATION WORKS, SUBMIT ELS DESIGN REVIEW REPORT TO BD AND GEO FOR SATISFACTION. ELS AMENDMENT AND SITE FORMATION AMENDMENT (UNDER SEPARATE SUBMISSION) MAY BE SUBMITTED AFTER DESIGN REVIEW, IF NECESSARY.
- APPLY CONSENT FOR REMAINING ELS STAGE WORKS.
 - CARRY OUT ELS STAGE 8 EXCAVATION WORKS.
 - INSTALL TEMPORARY STRUTS WALING AND SPACER.
 - CARRY OUT ELS STAGE 9 EXCAVATION WORKS.
 - INSTALL PERMANENT TIE BACK (UNDER SEPARATE SUBMISSION).
 - INSTALL TEMPORARY STRUTS WALING AND SPACER.
 - CARRY OUT ELS STAGE 10 EXCAVATION WORKS TO THE FINAL EXCAVATION PROFILE.
 - CARRY OUT CONSTRUCTION OF FOOTING/ PILE CAP (UNDER SEPARATE SUBMISSION) WITH CONSENT OBTAINED.
 - CARRY OUT CONSTRUCTION OF CAPPING BEAM (UNDER SEPARATE SUBMISSION), SCREEN WALL (UNDER SEPARATE SUBMISSION), LAGGING WALL (UNDER SEPARATE SUBMISSION) AND SUPERSTRUCTURE (UNDER SEPARATE SUBMISSION) WITH CONSENT OBTAINED.
 - DISMANTLE ALL OF THE TEMPORARY STRUTS. (UNDER SEPARATE SUBMISSION)



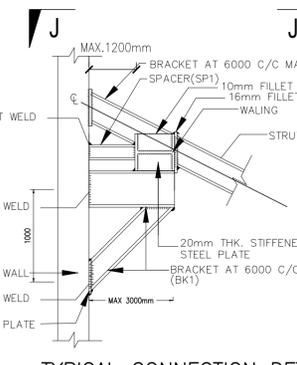
SECTION D-D TYPICAL CONNECTION DETAIL INCLINED WALING (N.T.S.)



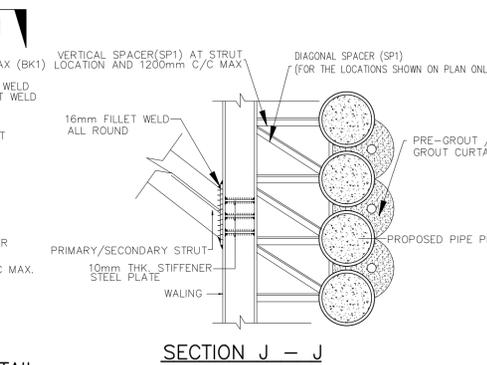
TYPICAL CONNECTION DETAILS BETWEEN KING POST & STRUT (N.T.S.)



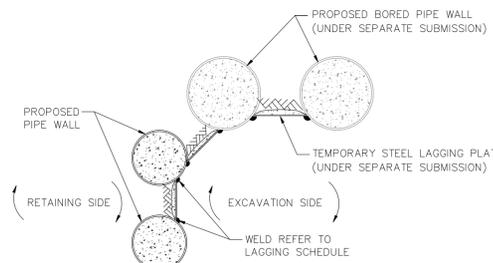
TYPICAL CONNECTION DETAILS OF WALING AT CORNER (N.T.S.)



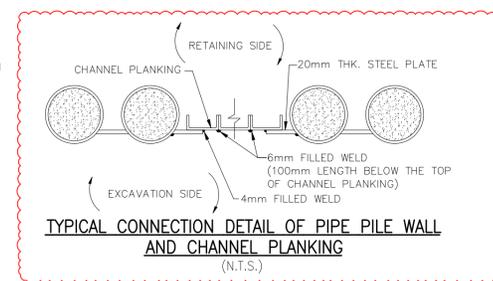
TYPICAL CONNECTION DETAIL BETWEEN BRACKET, STRUT, WALING AND PILE WALL (N.T.S.)



TYPICAL DETAILS OF LAGGING WALL BETWEEN PIPE PILE AND BORED PILE WALL



TYPICAL DETAIL OF STRAIN GAUGE INSTALLED IN PERMANENT TIE BACK (N.T.S.)



TYPICAL CONNECTION DETAIL OF PIPE PILE WALL AND CHANNEL PLANKING (N.T.S.)

Revision	Date	Description	By	Chk
B	06/2025	2ND AMENDMENT	CJX	SKS
A	07/2024	1ST AMENDMENT	CJX	SKS



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	N.T.S.

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title: GENERAL NOTES & DETAILS

Drawing Number: ELS-13

Revision Number: B

TEMPORARY PRESTRESSED GROUND ANCHOR SCHEDULE

TEMPORARY PRESTRESSED GROUND ANCHOR SCHEDULE											
PRESTRESSED GROUND TYPE A											
TEMPORARY PRESTRESSED GROUND ANCHOR MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAA1-1 - PGAA1-11	SECTION A	56	56.5	75	180	20.1	2.4	250	45	5	278
PGAA2-1 - PGAA2-11	SECTION A1	53	53.5	150	360	15.5	2.4	250	45	5	431
PGAA3-1 - PGAA3-11	SECTION C1	49	49.5	80	192	12.5	2.4	250	45	5	328
PGAA4-1 - PGAA4-11	SECTION D	42	42.5	80	192	9.5	2.4	250	45	5	260
PRESTRESSED GROUND TYPE B											
TEMPORARY PRESTRESSED GROUND ANCHOR MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAB1-1 - PGAB1-14	SECTION A	60.5	61	150	360	15.5	2.4	250	45	5	400
PGAB2-1 - PGAB2-14	SECTION A1	57.5	58	180	432	14.5	2.4	250	45	5	513
PGAB3-1 - PGAB3-14	SECTION B	52	52.5	220	528	9.5	2.4	250	45	5	592
PRESTRESSED GROUND TYPE C											
TEMPORARY PRESTRESSED GROUND ANCHOR / STRUT MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAC1-1 - PGAC1-6	SECTION D	60	60.5	100	240	17.3	2.4	250	45	5	283
PGAC2-1 - PGAC2-6	SECTION E	57	57.5	150	360	14.4	2.4	250	45	5	470
PGAC3-1 - PGAC3-6	SECTION F	54	54.5	220	528	11.6	2.4	250	45	5	656
PRESTRESSED GROUND TYPE D											
TEMPORARY PRESTRESSED GROUND ANCHOR / STRUT MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAD1-1 - PGAD1-7	SECTION A	60	60.5	200	480	17.3	2.4	250	45	5	528
PGAD2-1 - PGAD2-7	SECTION A1	57	57.5	250	600	14.4	2.4	250	45	5	688
PGAD3-1 - PGAD3-7	SECTION B	54	54.5	250	600	11.6	2.4	250	45	5	672
PRESTRESSED GROUND TYPE E											
TEMPORARY PRESTRESSED GROUND ANCHOR MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAE1-1 - PGAE1-3	SECTION A	62	62.5	250	600	17.3	2.4	250	45	5	685
PGAE2-1 - PGAE2-3	SECTION A1	59	59.5	330	792	14.4	2.4	250	45	5	932
PRESTRESSED GROUND TYPE F											
TEMPORARY PRESTRESSED GROUND ANCHOR MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAF1-1 - PGAF1-8	SECTION A	51.9	52.4	250	600	10.7	2.4	250	45	5	616
PGAF2-1 - PGAF2-8	SECTION A1	48.1	48.6	250	600	17.6	2.4	250	45	5	629
PRESTRESSED GROUND TYPE H											
TEMPORARY PRESTRESSED GROUND ANCHOR MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAH1-1 - PGAH1-11	SECTION A	60.1	60.6	250	600	10.7	2.4	250	45	5	616
PGAH2-1 - PGAH2-11	SECTION A1	57.2	57.7	250	600	17.6	2.4	250	45	5	629
PGAH3-1 - PGAH3-11	SECTION A1	50.5	51	250	600	14.6	2.4	250	45	5	629
PRESTRESSED GROUND TYPE G											
TEMPORARY PRESTRESSED GROUND ANCHOR MARK	DESIGN SECTION	INTERMEDIATE EXCAVATION LEVEL (mPD)	INSTALLATION LEVEL (mPD)	DESIGN PRESTRESSED LOAD PER m (kN/m)	PRESTRESSED LOAD PER ANCHOR (kN / ANCHOR)	TENTATIVE ANCHOR LENGTH (m)	HORIZONTAL SPACING (m)	DRILL HOLE DIAMETER (mm)	INCLIND ANGLE (DEGREE)	EFFECTIVE BOND LENGTH (m)	TENTATIVE CAT (ICI) ROCK LEVEL
PGAG1-1 - PGAG1-6	SECTION A	60.1	60.6	250	600	10.7	2.4	250	45	5	616
PGAG2-1 - PGAG2-6	SECTION A1	57.2	57.7	250	600	19	2.4	250	45	5	629

INSTALLATION SEQUENCE FOR PRESTRESSED GROUND ANCHOR

- GROUND ANCHORS SHOULD BE INSTALLED IN ALONG ROW 1 AND ROW 2 SIMULTANEOUSLY FOR STAGE 2-4 AND INSTALLED ALONG ROW 1 FOR STAGE 5, 6.
- THE ANCHOR ALONG INSTALLATION ROW 1 IS AS FOLLOWS:
 STAGE 2: PGAD1-17 TO PGAD1-1, PGAC1-3 TO PGAC1-1, PGAA1-4 TO PGAA1-1, PGAA1-1A
 STAGE 3.1: PGAD2-17 TO PGAD2-1, PGAC2-5 TO PGAC2-1, PGAB1-4 TO PGAB1-1, PGAA2-7 TO PGAA2-1
 STAGE 3.2: PGAD3-17 TO PGAD3-1, PGAC3-5 TO PGAC3-1, PGAB2-4 TO PGAB2-1, PGAA3-7 TO PGAA3-1
 STAGE 4: PGAC4-5 TO PGAC4-1, PGAB3-7 TO PGAB3-1, PGAA5-7 TO PGAA5-1
 STAGE 5: PGAC5-5 TO PGAC5-1, PGAB4-4 TO PGAB4-1, PGAA5-7 TO PGAA5-1
 STAGE 6: PGAE1-17 TO PGAE1-1, PGAE1-17
 STAGE 3.1: PGAE2-1 TO PGAE2-12
 STAGE 3.2: PGAE3-1 TO PGAE3-13
 STAGE 4: PGAE4-1 TO PGAE4-7
- THE ANCHOR ALONG INSTALLATION ROW 2 IS AS FOLLOWS:
 STAGE 2: PGAD1-1 TO PGAD1-17
 STAGE 3.1: PGAD2-1 TO PGAD2-12
 STAGE 3.2: PGAD3-1 TO PGAD3-13
 STAGE 4: PGAE4-1 TO PGAE4-7
- THE INSTALLATION SHOULD FOLLOW EACH OF THE ROWS SEQUENTIALLY. THE NEXT PRESTRESSED GROUND ANCHOR SHALL BE ALLOWED TO BE INSTALLED AT LEAST 4.8m APART.
- AFTER INSTALLATION REACH THE END OF THE PATH AND THE INSTALLATION OF BOTH PATHS ARE COMPLETED, PRESTRESSED GROUND ANCHOR INSTALLATION SHALL BE REVERSED TO INSTALL FROM END TO BEGINNING.
- ONE PRESTRESSED GROUND ANCHOR ON THE SAME ROW SHALL BE ALLOWED TO INSTALL AT THE SAME TIME.

DEFINITION OF SOUND BEDROCK

- THE SOUND BEDROCK IS DEFINED AS CATEGORY 1(C) ROCK SPECIFIED IN TABLE 2.1 OF CODE OF PRACTICE FOR FOUNDATION 2017

STRAND PROPERTIES

STRAND TYPE	15mm (EN158 OR BS5896 SUPER)
NOMINAL DIA. (mm)	15.7
NOMINAL AREA (mm ²)	150
NOMINAL MASS (kg/m)	1.18
YIELD STRENGTH (MPa)	1500 (SEE NOTE 1)
TENSILE STRENGTH (MPa)	1880
MIN. BREAKING LOAD (kN)	279
YOUNG'S MODULUS (GPa)	195
RELAXATION (%) (SEE NOTE 2)	MAX. 2.5

- NOTES ON STRAND**
- MEASURED AT 1% RESIDUAL STRAIN.
 - AFTER 1000 HOURS OF STORAGE.
 - LIMIT OF TEMPORARY CARRYING CAPACITY OF THE TENDON BREAKING.

GENERAL NOTES FOR TEMPORARY GROUND ANCHOR

- ALL THE DESIGN AND METHOD STATEMENT SHALL BE COMPLIED WITH GEOSPEC 1 AND SUBMITTED TO THE RSE/RGE FOR APPROVAL AT LEAST 7 DAYS BEFORE COMMENCEMENT.
- ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS REFERRED TO METRES ABOVE PRINCIPAL DATUM.
- SETTING OUT AND INSTALLATION LEVEL OF GROUND ANCHORS TO BE CONFIRMED ON SITE.
- THE CONTRACTOR SHALL SUBMIT A METHOD STATEMENT AND PROPOSE THE DETAILS OF THE ANCHOR SYSTEM FOR THE ENGINEER APPROVAL, INCLUDING MATERIAL CERTIFICATE, SHOP DRAWING, TEST ASSEMBLY AND EQUIPMENT, STRESSING ASSEMBLY, ANCHOR BLOCK DESIGN AND REPORT FORMAT ETC. 28 DAYS BEFORE THE COMMENCEMENT OF WORKS. ALL LOAD AND DISPLACEMENT MEASUREMENT EQUIPMENT SHALL BE CALIBRATED WITHIN ONE MONTH PRIOR TO TESTING.
- ALL ANCHORS SHALL BE SUBJECT TO ACCEPTANCE TESTS AND 2% OF ANCHORS TO SUITABILITY TESTS.
- ANCHOR BLOCKS SHOULD BE DESIGNED TO SPREAD THE ANCHOR LOAD TO AVOID OVERSTRESS ON THE PIPE PILE WALL SURFACE.
- ALL ANCHORS SHALL BE SUBJECT TO ACCEPTANCE TEST TO 1.25 TIMES DESIGN LOAD IN ACCORDANCE WITH THE SPECIFICATION, AND LOCK-OFF TO THE LOADING AS SPECIFIED ON THE ANCHOR SCHEDULE.
- ALL ANCHORS SHALL BE DESTRESSED ACCORDING TO NOTES FOR DESTRESS OF TEMPORARY GROUND ANCHORS.
- THE CONTRACTOR SHOULD SUBMIT A METHOD STATEMENT FOR THE REMOVABLE ANCHOR FOR THE ENGINEER FOR APPROVAL.
- 5 NOS. OF TRIAL ANCHOR SHOULD BE INSTALLED TO VERIFY THE GROUND CONDITION AND METHOD STATEMENT PRIOR TO THE ACTUAL GROUND ANCHOR INSTALLATION FOR THE APPROVAL BY THE ENGINEER.
- RCE SHALL VERIFY THE ROCK MASS QUALITY AGAINST THE TEMPORARY GROUND ANCHOR DESIGN ASSUMPTION AT THE CONSTRUCTION STAGE.
- THE TEMPORARY GROUND ANCHOR SHOULD BE DE-STRESSED BEFORE 2 YEARS AFTER INSTALLATION.

NOTES ON TEMPORARY GROUND ANCHOR AND INSTALLATION OF GROUING ANCHOR HOLE

- DRILL ANCHOR HOLE OF REQUIRED DIAMETER BY DOWN THE HOLE METHOD. IN SOIL OR UNSTABLE MATERIAL, THE DRILLHOLE SHALL BE LINED WITH A DRILL COLLAR TO PREVENT COLLAPSE OF THE DRILLHOLE AND TO ENSURE THAT THE TENDON AS REMAINS CLEAN-BORING INSTALLATION. THE DRILL COLLAR PRESSURE SHOULD BE HIGHER THAN ACTUAL WATER PRESSURE.
- DRILLED SOIL MATERIAL SHALL BE INSPECTED TO CONFIRM THE DESIGN. THE INSPECTION REPORT SHALL BE SUBMITTED IF SOIL VARY FROM THE DESIGN.
- DRILLHOLE FROM THE ANCHORS SHALL BE PROVIDED IN ACCORDANCE WITH THE DRAWINGS. THE DRILLHOLE ENTRY POINT SHALL BE POSITIONED WITHIN TOLERANCE OF +/- 75mm. DEVIATION ALIGNMENT SHALL NOT EXCEED 1 IN 125. DEVIATION FROM STRAIGHT SHALL NOT EXCEED 10mm IN ANY 8m DRILLHOLE LENGTH.
- CLEAN HOLE BY AIR BLOWING.
- GROUND WATER TABLE MEASURED PRIOR TO INSTALLATION OF ANCHOR. MECHANICAL PACKER TO BE USED TO MEASURE GROUND WATER TABLE AT 1m DIAMETER OR 1m.
- CARRY OUT WATER PRESSURE TEST TO MEASURE THE EFFECTIVE BOND LENGTH. INSTALLATION OF MECHANICAL PACKER SHALL BE IN ACCORDANCE WITH THE SPECIFICATION.
- PREGROUTING SHALL BE CARRIED OUT USING GROUT MIX APPROVED BY THE ENGINEER IN ADVANCE. AFTER 24 HOURS, HOLE SHALL BE REDRILLED AND WATER PRESSURE TEST SHALL BE REPEATED UNTIL WATER INTAKE IS LESS THAN MAXIMUM GROUT INTAKE SPECIFICATION.
- PROPOSED GROUT MIX PROPERTIES SHALL FOLLOW (OR EQUIVALENT) :-
 CEMENT : 100 kg
 WATER : 42 kg
 ADMIXTURE : METHOCEL OR EQUIVALENT : 0.3 kg
 GROUT STRENGTH AT 28 DAYS : 30N/mm²

STRAND ANCHOR INSTALLATION

- STRAND ANCHOR SHALL BE CAREFULLY INSPECTED BY THE CONTRACTOR AND THE ANCHOR FABRICATION PROCEDURE SHALL BE SUBMITTED IN ADVANCE TO THE ENGINEER FOR APPROVAL.
- ANCHOR IS LOWERED INTO HOLE AND FIXED INTO POSITION.
- ANCHOR SHALL BE STRESSED UNLESS THE GROUT HAS ATTAINED A STRENGTH OF 30 N/mm² OR A PERIOD OF 7 DAYS AFTER GROUING WHICHEVER IS THE LONGER.
- GROUT IS THEN PUMPED UNDER PRESSURE USING A COLLOIDAL GROUT PUMP THROUGH INTERNAL AND EXTERNAL GROUT TUBES UNTIL OVERFLOW CONSISTENCY MATCHES THE MIXTURE IN THE PUMP BOWL.
- CUBE SAMPLES ARE TAKEN FROM THE OUTFLOW MIXTURE FOR REGULATION TESTING IN ACCORDANCE WITH BUILDING (CONSTRUCTION) REGULATIONS.
- THE END CAP IS REMOVED AND THE CASING SHALL BE LEFT IN.
- EXTERNAL GROUT IS THEN FLUSHED BACK TO A LEVEL BELOW THE TRUMPET OF THE BASE PLATE AND SEALED WITH SEALANT APPROVED BY THE ENGINEER FOR STRAND ANCHOR.
- THE TOP SURFACE OF THE EXTERNAL GROUT TUBE IS SEALED WITH SEALANT APPROVED BY THE ENGINEER.
- ANCHORS SHALL BE INSTALLED AND GROUING WITHIN 24 HOURS AFTER DRILLING OF THE DRILLHOLES EXCEPT OTHERWISE AGREED WITH THE ENGINEER.

PREPARATION FOR STRESSING (STRAND ANCHOR)

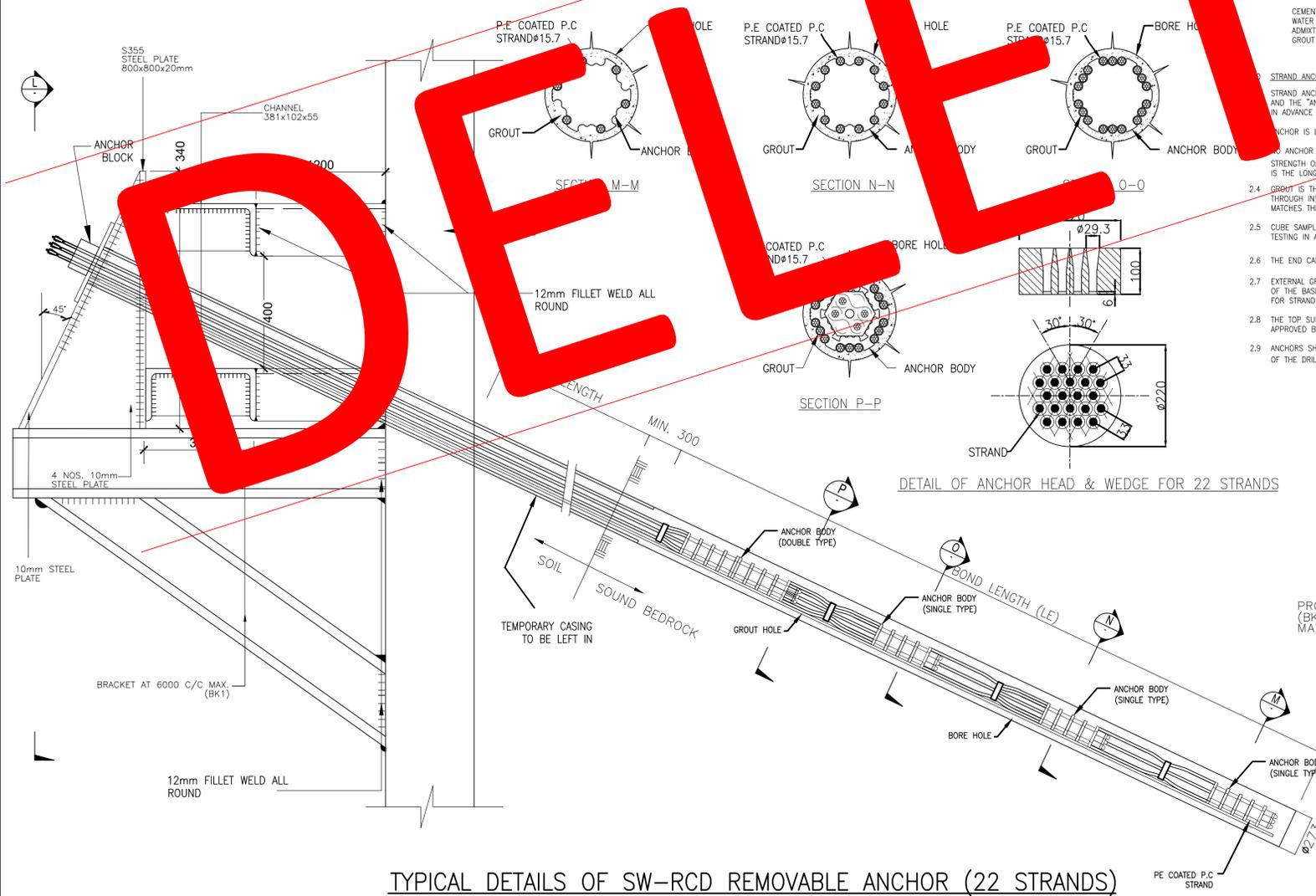
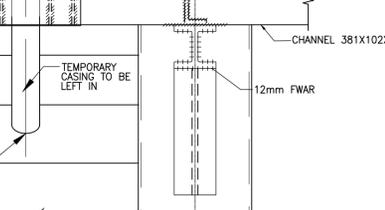
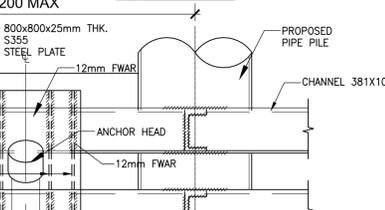
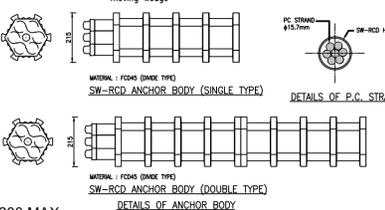
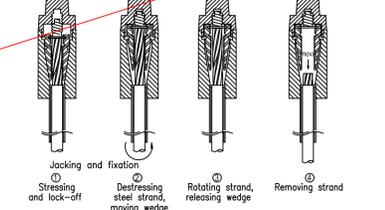
- PLACE ANCHOR BLOCK IN POSITION ON BEARING PLATE.
- PLACE WEDGES AND JACK IN POSITION.
- MARK FRONT END OF JACK TO GIVE A POINT FOR MONITORING OF MOVEMENT OF ANCHOR PAD WITH THEODOLITE OR DIAL GAUGE AS DIRECTED BY ENGINEER.
- TAPE EACH STRAND BEHIND JACK TO MONITOR DRAW-IN AND SLIPPAGE.
- WHEN GROUT HAS ATTAINED THE DESIGN STRENGTH AND CONCRETE BENEATH BEARING PLATE HAS ATTAINED ADEQUATE STRENGTH, THE ANCHOR MAY BE STRESSED.
- AFTER STRESSING, CUT OFF THE PROTRUDING STRANDS AND FILL WITH GREASE THROUGH INLET IN ANCHOR HEAD.
- FIX SCREW CAP AND FILL WITH APPROVED GREASE.
- THE ACTUAL FIXED LENGTHS WILL BE BASED ON THE BOND STRENGTHS AS SPECIFIED.
- CALIBRATION OF ALL EQUIPMENT**
- CALIBRATION OF ALL EQUIPMENT SHALL BE CARRIED OUT IN APPROVED BY THE ENGINEER. THE EQUIPMENT CALIBRATION CERTIFICATES SHALL COMPLY WITH THE REQUIREMENTS AS STATED IN GEOSPEC1.
- RECORDS**
- DRILL LOG REPORT (REFER TO FIG. 3 IN GEOSPEC 1 8/89) IS TO INCLUDE :
 A) DATE WORK CARRIED OUT
 B) ANCHOR HOLE
 C) MACHINE TYPE AND NUMBER
 D) HOLE SIZE
 E) CASING SIZE AND LENGTH USED
 F) TIME COMMENCED
 G) TIME COMPLETED
 H) TYPE OF GROUND AND VARIATIONS ENCOUNTERED
 I) OBSTACLES ENCOUNTERED AND DEPTHS
 J) INCLINATION OF THE HOLE

WATER TEST REPORT (REFER TO FIG. 3 IN GEOSPEC 1 8/89) :

- DATE WORK CARRIED OUT
 ANCHOR HOLE
 DIAMETER OF HOLE
- DATE WORK CARRIED OUT
 ANCHOR HOLE
 DIAMETER OF HOLE
- WATER TEST REPORT (REFER TO FIG. 3 IN GEOSPEC 1 8/89) :
 A) DATE WORK CARRIED OUT
 B) ANCHOR HOLE
 C) MIX PROPERTIES INCLUDING
 D) PRESSURE
 E) CALCULATED VOLUME OF GROUT
 F) ACTUAL VOLUME OF GROUT
 G) RELEVANT GROUT CUBES TESTED

FIELD STRESSING RECORDS :

- RECORDS OF STRESSING TESTS :-
 - SUITABLY TEST RECORDS AS PER 8 IN GEOSPEC 1 8/89,
 - EXTENDED ACCEPTANCE TEST RECORDS AS PER FIG. 10 & 13 IN GEOSPEC 1 8/89.
- ACCEPTANCE RECORDS AS PER GEOSPEC 1 8/89.
- MANUFACTURERS STRAND CERTIFICATE AND CALIBRATION CHARTS FOR JACK AND HYDRAULIC LOAD CELLS.
- DATE WORK CARRIED OUT
- ANCHOR HOLE, BORE HOLE AND LENGTH
- SIZE OF ANCHOR BLOCK AND LOAD
- CALCULATED AND ACTUAL VOLUMES OF GROUT
- EXTENSIONS OF STRANDS
- STRESSING SEQUENCES
- PROCESSING OF ANCHOR PAD
- IMMEDIATE LIFT-OFF TEST RESULT (BY USING HYDRAULIC JACK)



TYPICAL DETAILS OF SW-RCD REMOVABLE ANCHOR (22 STRANDS)

ALL DETAILS ON THIS PLANS HAVE BEEN DELETED

Revision	Date	Description	By	Chk
-	07/2024	1ST AMENDMENT	CJX	CKS

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Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS

Drawing Title: PRESTRESSED GROUND ANCHOR SCHEDULE

Drawing Number: ELS-14

Revision Number: A

SPECIFICATION FOR TEMPORARY ANCHOR

1. DEFINITION OF SYMBOLS

- 1.1 MATERIALS
n : NO. OF STRANDS PER ANCHOR
As : CROSS-SECTION AREA OF STRAND = 150mm²
At : CROSS-SECTIONAL AREA OF TENDON = n x As
Et : MODULUS OF ELASTICITY OF TENDON = 195 GPa
Fpu : CHARACTERISTIC STRENGTH OF TENDON = 1.66kN/mm COMPLYING WITH BS 4486 (1986)
1.2 DIMENSIONS
Lef : EFFECTIVE FREE LENGTH (mm)
Lf : DESIGN FREE ANCHOR LENGTH (mm)
Lr : FIXED ANCHOR LENGTH (mm)
1.3 FORCES
R : FRICTION DEVELOPED IN EFFECTIVE FREE LENGTH (kN)
T : ANCHOR LOAD (kN)
To : INITIAL LOAD SELECTED FOR STRESSING TEST (kN)
Td : SPECIFIED DESIGN WORKING LOAD FOR ANCHOR DESIGN (kN)
Tc : LOCK-OFF LOAD
Tm : MAXIMUM TEST LOAD FOR STRESSING TEST (kN)
Tr : RESIDUAL LOAD AS MEASURED BY A LIFT-OFF TEST AT ANY TIME AFTER LOCKING-OFF (kN)
Trc : RESIDUAL LOAD IMMEDIATELY AFTER LOCKING-OFF (kN)
Tz : Nominal failure load of tendon (kN)
Tz = At * Fpu
rf : REDUCTION FACTOR FOR REMOVABLE ANCHOR = 0.8
1.4 DEFORMATIONS
d1 : TOTAL EXTENSION OF TENDON RELATIVE TO A DATUM (mm)
dM : ELASTIC EXTENSION OF TENDON AT EACH LOAD STAGE (mm)
dLe = (Lef * T) / (A * Et)
dM : PLASTIC OR NON-RECOVERABLE EXTENSION AT EACH LOAD STAGE (mm)
dR : CALCULATED ELASTIC EXTENSION OF ANCHOR UNDER MAXIMUM TEST LOAD Tp (mm)
dR = (Lf * T) / (A * Et)
dM : TRAVEL OF PISTON OF PRESTRESSING JACK AT EACH LOAD STAGE (mm)
dM : AXIAL MOVEMENT OF ANCHOR HEAD RELATIVE TO A DATUM (mm)
dM : AXIAL MOVEMENT OF ANCHOR BASE PLATE RELATIVE TO A DATUM (mm)
1.5 FACTOR OF SAFETY
Tp = S * Td < 0.8 Tz
S = 1.6 IS THE CONFIRMED FACTOR OF SAFETY OF AN ANCHOR SUBJECT TO A SUITABILITY TEST
Tp = X * Td < 0.8 Tz
X = 1.25 IS THE CONFIRMED FACTOR OF AN ANCHOR SUBJECT TO EXTENDED ACCEPTANCE TEST AND ACCEPTANCE TEST
X = 1.4 IS THE CONFIRMED FACTOR OF AN ANCHOR SUBJECT TO PULL-OUT TEST

2. MEASURING EQUIPMENTS

DYNAMOMETERS, LOAD CELLS & DIAL GAUGES SHALL BE ACCOMPANIED BY A VALID CALIBRATION CERTIFICATE ISSUED BY AN APPROVED PERSON AND SHALL BE SUBJECT TO THE AGREEMENT OF THE ENGINEERS (RSE/RGE). THE EQUIPMENT CALIBRATION CERTIFICATES SHALL MEET THE REQUIREMENTS AS SPECIFIED IN GEOSPEC 1 - MODEL SPECIFICATION FOR PRESTRESSED GROUND ANCHORS. ALL LOAD AND DISPLACEMENT MEASUREMENT EQUIPMENT SHALL BE CALIBRATED WITHIN ONE MONTH PRIOR TO TESTING.

3. MATERIALS

ALL MATERIALS SHALL COMPLY WITH THE GEOSPEC 1 MATERIALS SHALL BE STORED IN DRY AND COOL CONDITIONS AND THAT WILL PREVENT THEIR DEGRADATION. CONTAINERS USED FOR STORING MATERIALS SHALL BE CLEAN AND COMPLETELY FREE OF ANY OTHER MATERIALS PREVIOUSLY STORED IN THEM.

4. GENERAL SPECIFICATIONS

THE PROVISION AND INSTALLATION OF ANCHOR SHOULD BE IN ACCORDANCE WITH GEOSPEC 1 - MODEL SPECIFICATION FOR PRESTRESSED GROUND ANCHORS.

- 4.1. THE DOWN THE HOLE DRILL METHOD SHALL BE USED. WHEN DRILLING IN SOIL OR UNSTABLE MATERIAL THE DRILLHOLE SHALL BE LINED WITH A DRILL CASING TO PREVENT COLLAPSE OF THE DRILLHOLE AND TO ENSURE THAT THE TENDON ASSEMBLY REMAINS CLEAR DURING INSTALLATION. THE ANCHOR HOLE SHALL BE THOROUGHLY FLUSHED WITH AIR PRIOR TO INSTALLATION OF THE TENDON ASSEMBLY.
4.2. NO INSERTION WORKS SHALL BE CARRIED OUT BEFORE THE RESULTS OF DRILLING REACH THE SPECIFIED REQUIREMENTS, AND BEFORE THE AGREEMENT OF THE ENGINEER. DURING INSERTION, THE ANCHOR SHALL BE HANDLED WITH CARE. THE SPACERS SHOULD BE KEPT IN A GOOD CONDITION AT THE PROPER LOCATION.
4.3. ANCHOR SHALL BE INSTALLED AND GROUTED WITHIN 24 HOURS AFTER DRILLING OF THE DRILL HOLE EXCEPT OTHERWISE AGREED WITH THE ENGINEER.
4.4. THE MINIMUM GROUT COVER TO STRAND SHALL BE 30mm. GROUT SHALL HAVE A WATER/CEMENT RATIO OF 0.40 - 0.45 FOR A PROJECTED STRENGTH OF 30 MPa AT 28 DAYS. THE QUANTITY OF CEMENT IN THE MIXTURE SHALL BE MEASURED BY WEIGHT AT AN APPROVED BATCHING PLANT. THE GROUTING PRESSURE ADOPTED SHALL BE THE MINIMUM CONSISTENT WITH UNDERTAKING THE OPERATION AND SHALL AVOID DAMAGE TO SURROUNDING BUILDINGS AND SERVICES. GROUTING SHALL PROCEED AT A SLOW STEADY RATE AND CONTINUE UNTIL GROUT OF THE SAME COMPOSITION AND CONSISTENCY AS THAT MIXED HAS BEEN EMERGING FROM THE OUTLET FOR AT LEAST ONE MINUTE.

- 4.5. THE ANCHOR SHALL NOT BE STRESSED UNTIL THE GROUT HAS SET. THE MONITORING SEQUENCE SHALL BE AS DEMONSTRATED BY COMPANY. THE MONITORING SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO THE SATISFACTION OF THE ENGINEER TO PROTECT AGAINST THE RISK OF A SUDDEN FAILURE.
5. CONSTRUCTION PROCEDURE FOR ANCHORS INSTALLATION
5.1. WHEN EXCAVATION WORK REACH THE PROPOSED ANCHOR LEVEL, INSTALL THE WALING AND FIX THE ANCHOR BENCH IN THE APPROVED POSITION.
6. TESTING AND STRESSING OF ANCHORS
6.1. SUITABILITY TESTS (SEE FIGURE A)
SUITABILITY TEST SHALL BE CARRIED OUT ACCORDING TO THE FOLLOWING LIMITS UP TO THE TO:
FOR THE TEST, AN INITIAL LOAD (To), 10% TO SHALL BE APPLIED. THE RANGE BETWEEN To & Tp (TABLE 2) SHALL BE DIVIDED INTO 6 APPROXIMATELY EQUAL STEPS OF MAGNITUDE (A1).
IN EACH LOAD STEP, FIXED DATUM SHALL BE ESTABLISHED. MEASURE THE EXTENSION d1 = dM + dRp AND THE TRAVEL OF JACK'S PISTON (dK). THE EXTENSION OF THIS DATUM UNDER THE INFLUENCE OF ANCHOR STRESSING SHALL NOT EXCEED THE ALLOWED LIMITS. THE LOADING AND MEASURING PROGRAMME SHALL THEN BE CARRIED OUT AT EACH LOAD STEP. OBSERVATION SHALL BE MADE OF THE LOAD DECREASE. THE EXTENSION HELD CONSTAINED. THE OBSERVATIONS TIME (t0) SHOULD BE AT LEAST 5 MINUTES FOR ROCK ANCHOR (REFER TABLE 3) AND THE CHANGE IN LOAD SHALL NOT EXCEED THE LIMITS GIVEN IN TABLE 4.

- 6.2. EXTENDED ACCEPTANCE TEST (SEE FIGURE B)
SELECTED ANCHORS SHALL BE CARRIED OUT FOR EXTENDED ACCEPTANCE TEST. SAME PROCEDURES & APPROVAL AS SUITABILITY TEST, BUT THE LOAD RANGE BETWEEN To and Tp (Tp = 1.25 Td FOR EXTENDED ACCEPTANCE TEST) IS DIVIDED UP INTO THREE APPROXIMATELY EQUAL STEPS OF MAGNITUDE (A1).
6.3. ACCEPTANCE TEST (SEE FIGURE C)
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6.4. LIFT-OFF TEST
A LIFT-OFF TEST SHALL BE USED TO DETERMINE THE RESIDUAL LOAD IN THE TENDON. THE MEASURED RESIDUAL LOAD ACCEPTANCE CRITERIA REFERS TO TABLE 6.

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7. MONITORING

- 7.1. VISUAL CHECK
THE BEARING PLATE, ANCHOR HEAD, STRAND OF ALL ANCHORS & ANCHORED STRUCTURE SHALL BE CHECKED ON WEEKLY BASIS UP TO THE END OF THE CONTRACT DEFECTS LIABILITY PERIOD.
7.2. MAINTENANCE INSPECTION & RESIDUAL LOAD MEASUREMENT REFER TO TABLE 5. FREQUENCY OF MONITORING REQUIRED REFERS TO THE NOTES OF TABLE 5.
7.3. THE MONITORING PROCEDURE SHOULD BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
7.4. MONITORING OF RESIDUAL LOAD SHALL BE CARRIED OUT IN ACCORDANCE WITH GEOSPEC 1 - MODEL SPECIFICATION FOR PRESTRESSED GROUND ANCHORS.
7.5. THE MEASURED RESIDUAL LOAD SHALL BE REGARDED AS ACCEPTABLE IF THE LOAD FALLS WITHIN THE RANGE OF 1 TO 1.2 TIMES OF THE SPECIFIED WORKING LOAD (i.e.±10% OF THE LOCK-OFF LOAD).
7.6. IF THE MEASURED RESIDUAL LOAD REACHES TO ALERT LEVEL AS SPECIFIED IN TABLE 6, THE ENGINEER SHALL BE INFORMED IMMEDIATELY. MORE ANCHORS SHOULD BE SELECTED FOR LIFT-OFF TEST AND THE ANCHOR MONITORING FREQUENCY SHOULD BE STEPPED-UP. THE ELS DESIGN SHOULD BE REVIEWED IMMEDIATELY.
7.7. SHOULD BE MEASURED RESIDUAL LOAD BE LESS THAN THE WORKING LOAD, THE REMEDIAL WORKS BY MEANS OF RE-PRESTRESSING THE ANCHOR TO THE SPECIFIED LOCK-OFF LOAD SHALL BE REQUIRED.
7.8. IF THE MEASURED RESIDUAL LOAD REACHED TO THE ACTION LEVEL AS SPECIFIED IN TABLE 6, ALL THE EXCAVATION WORKS SHALL BE CEASED IMMEDIATELY AND AP/ RSE/ RGE AND BD/ GEO SHALL BE INFORMED. THE SITE SHALL BE BACKFILLED IMMEDIATELY. THE REMEDIAL PROPOSAL/ EMERGENCY ACTION PLAN SHOULD BE SUBMITTED TO BD/ GEO FOR ACCEPTANCE PRIOR TO RESUME THE EXCAVATION WORKS.
7.9. TESTING ANCHOR LOCATIONS ARE SPECIFIED AS BELOW:
A. SUITABILITY TEST:
PGAC1-3, PGAC2-2, PGAC4-7, PGAA4-7
B. EXTENDED ACCEPTANCE TEST:
PGAA1-4, PGAD1-17, PGAD2-14, PGAB2-6, PGAD2-17, PGAA3-7, PGAC3-2, PGAC3-5, PGAC3-12, PGAC4-2, PGAB4-4, PGAA5-7
C. ACCEPTANCE TEST:
ACCEPTANCE TEST SHOULD BE CARRIED OUT ON ALL THE RESTS OF THE ANCHORS.
7.10 THE EXACT ANCHOR LOCATIONS FOR THE TESTS SHALL BE DETERMINED ON SITE AND AGREED BY THE SITE ENGINEER.
7.11 ALL MONITORING CHECKPOINT ARE TO BE KEPT UNTIL ALL ANCHOR HAVE BEEN DESTRESSED.

8. NOTES FOR SUITABILITY TESTS

- 8.1 THE INSTALLATION OF THE PROPOSED LAYER OF ANCHORS SHALL NOT BE COMMENCED UNTIL THE SUITABILITY TEST FOR THE PROPOSED LAYER OF ANCHORS HAS BEEN COMPLETED TO THE SATISFACTION OF THE ENGINEERS (RSE/RGE).
8.2 AFTER CARRYING OUT THE SUITABILITY TESTS, THE RESULTS OF SUITABILITY TEST OF EACH LAYER SHALL BE SUBMITTED TO BD AND GEO TO SHOW THE BUILDABILITY OF TEMPORARY GROUND ANCHORS OF THE TESTED LAYER.

9. NOTES FOR WATER TESTS

- 9.1 UNLESS OTHERWISE AGREED WITH THE AP/RSE/RGE, ALL DRILLHOLES SHALL BE SUBJECT TO WATER TEST AS SPECIFIED IN SECTION 5.2 OF GEOSPEC 1.
PROCEDURES OF WATER TESTS
9.2 THE TEST SHALL BE CARRIED OUT BY THE APPLICATION OF A NET WATER PRESSURE OF ONE ATMOSPHERE (100kPa), OR A LOWER PRESSURE AGREED BY THE RSE/RGE, AT THE PROXIMAL END OF FIXED LENGTH WHICH SHALL BE MAINTAINED FOR A PERIOD OF TEN MINUTES. THE WATER LOSS IN THIS PERIOD SHALL NOT EXCEED 50 LITRES.
9.3 SHOULD THE TEST FAIL, THE FIXED ANCHOR LENGTH SHALL BE GROUTED UNDER A PRESSURE NOT EXCEEDING A PRESSURE AGREED BY THE RSE/RGE. THE DRILLHOLE SHALL THEN BE FLUSHED OR DRILLED OUT, AND THE WATER TEST RE-APPLIED.

10. RECORDS

- 10.1. ALL FIELD RECORDS OF WORKS & TESTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN 48 HOURS AFTER COMPLETION OF OPERATIONS. A FULL DETAILED RECORDS OF OPERATION IN THE FORMATS (SPECIFIED IN GEOSPEC 1) SHALL BE SUBMITTED TO THE ENGINEER WITHIN 7 DAYS AFTER COMPLETION OF WORK.

11. GENERAL NOTES

- 11.1 THE PROPOSED TEMPORARY ANCHORS SHALL BE CLASSIFIED AS CLASS 3 ANCHORS.
11.2 THE DESIGN LIFE FOR ANCHORS SHALL BE 2 YEARS. IF ANY ANCHOR IS DESTRESSED WITHIN THE DESIGN LIFE, REPAIRING TESTS SHALL BE PERFORMED. ALL GREASE CHECKS SHALL BE CARRIED OUT WITHIN THE DESIGN LIFE. IF NECESSARY, SUCH AS THE TRAVEL OF JACK'S PISTON, THE ANCHOR SHALL BE RE-PRESTRESSED. THE ANCHOR SHALL BE RE-PRESTRESSED IF EXCESSIVE PRESTRESS LOSS IS FOUND.

NOTES FOR MONITORING OF TEMPORARY GROUND ANCHORS

- 1) ALL ANCHORS SHALL BE MONITORED ACCORDING TO ELS-15. THE MONITORING SEQUENCE SHALL BE AS SPECIFIED IN TABLE 5. THE MONITORING SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO THE SATISFACTION OF THE ENGINEER TO PROTECT AGAINST THE RISK OF A SUDDEN FAILURE.
2) MONITORING OF RESIDUAL LOAD SHALL BE CARRIED OUT IN ACCORDANCE WITH GEOSPEC 1 & BS 8081. THE MONITORING FREQUENCY SHOULD BE STEPPED-UP. THE ELS DESIGN SHOULD BE REVIEWED IMMEDIATELY.
3) THE MONITORING FREQUENCY SHOULD BE STEPPED-UP. THE ELS DESIGN SHOULD BE REVIEWED IMMEDIATELY.
4) WATER TESTS SHOULD BE CARRIED OUT ON ALL DRILL HOLES FOR THE ANCHORS.

DESTRESSING SEQUENCE

- 1. DESTRESS AND DISMANTLE ALL THE TEMPORARY PRESTRESSED ANCHORS AFTER THE COMPLETION OF PERMANENT STRUCTURE WITH BACKFILLING (UNDER SEPARATE SUBMISSION)
2. THE SEQUENCES OF THE DESTRESSING OF TEMPORARY GROUND ANCHORS SHALL STRICTLY FOLLOW WITH THE AGREED METHOD STATEMENT.

TABLE 1. TEST SCHEDULE

(REFER TO TABLES A3 & A4 OF GEOSPEC 1)

Table with 5 columns: SUITABILITY TEST, ACCEPTANCE TEST, ACCEPTANCE TEST, WATER TEST, TOTAL NO. OF ANCHORS. Values: 4, 12, 173, 189, 189.

NOTES:
(1) THE MINIMUM NUMBER OF SUITABILITY TESTS SHOULD BE 2% OF TOTAL NUMBER OF ANCHORS OR 3 WHICHEVER IS GREATER.
(2) THE MINIMUM NUMBER OF EXTENDED ACCEPTANCE TESTS SHOULD BE 6% OF TOTAL NUMBER OF ANCHORS OR 4 WHICHEVER IS GREATER.
(3) ACCEPTANCE TESTS SHOULD BE CARRIED OUT ON ALL REMAINING ANCHORS.
(4) WATER TESTS SHOULD BE CARRIED OUT ON ALL DRILL HOLES FOR THE ANCHORS.

TABLE 2A. SUITABILITY TEST SCHEDULE (REFER TO FIGURE 6)

Table with 7 columns: TEMPORARY PRESTRESSED GROUND ANCHOR MARK, DESIGN SECTION, DESIGN FREE ANCHOR LENGTH (Lf) (m), DESIGN BOND LENGTH IN ROCK (Lr) (m), DESIGN WORKING LOAD Td (kN), NORMAL FAILURE LOAD, Tz (kN PER ANCHOR), TEST LOAD (Tp=1.1Td) (kN PER ANCHOR), LOCK-OFF LOAD (To=1.1Td) (kN PER ANCHOR). Rows include PGAC3-3, PGAC2-2, PGAC4-7, PGAA4-7.

NOTES:
NOMINAL FAILURE LOAD Tz FOR THE SUITABILITY TEST IS DETERMINED BASED ON 3 FAILURE MODES.
(1) TENDONS STRUCTURAL FAILURE;
(2) BOND FAILURE BETWEEN ROCK AND GROUT;
(3) BOND FAILURE BETWEEN STEEL AND GROUT

TABLE 2B ACCEPTANCE TEST, EXTENDED ACCEPTANCE TEST TEST LOAD SCHEDULE (REFER TO FIGURES 10 & 12 OF GEOSPEC 1)

Table with 7 columns: TEMPORARY PRESTRESSED GROUND ANCHOR MARK, DESIGN SECTION, DESIGN FREE ANCHOR LENGTH (Lf) (m), DESIGN BOND LENGTH IN ROCK (Lr) (m), DESIGN WORKING LOAD Td (kN), TEST LOAD (Tp = 1.25Td) (kN), LOCK-OFF LOAD (To = 1.1Td) (kN per ANCHOR). Rows include PGAA1-1, PGAA2-1-PGAA2-4, PGAA3-1-PGAA3-4, PGAA4-1-PGAA4-4, PGAA5-1-PGAA5-4, PGAA1-2-PGAA1-2, PGAA2-5-PGAA2-5, PGAA3-5-PGAA3-5, PGAA4-5-PGAA4-5, PGAA5-5-PGAA5-5, PGAB1-1-PGAB1-4, PGAB2-1-PGAB2-4, PGAB3-1-PGAB3-4, PGAB4-1-PGAB4-4, PGAC1-1-PGAC1-2, PGAC2-1-PGAC2-2, PGAC3-1-PGAC3-2, PGAC4-1-PGAC4-2, PGAC5-1-PGAC5-2, PGAD1-1-PGAD1-4, PGAD2-1-PGAD2-4, PGAD3-1-PGAD3-4, PGAE1-1-PGAE1-16, PGAE2-1-PGAE2-16, PGAE3-1-PGAE3-12, PGAE4-1-PGAE4-7.

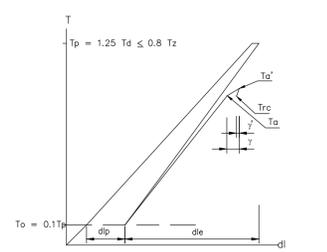
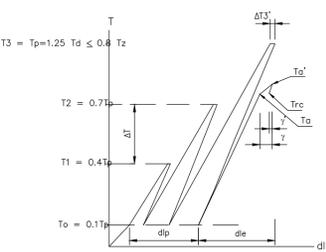
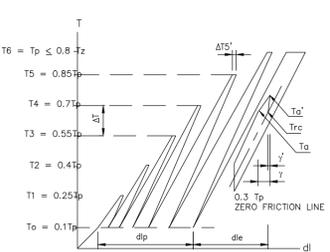


FIGURE A SUITABILITY TEST

FIGURE B EXTENDED ACCEPTANCE TEST

FIGURE C ACCEPTANCE TEST

TABLE 3 REQUIRED TIME INTERVAL (t0) (REFER TO CLAUSE 6.3(c) OF GEOSPEC 1)

Table with 6 columns: TEMPORARY PRESTRESSED GROUND ANCHOR MARK, DESIGN WORKING LOAD Td (kN), ALERT LEVEL (LOWER BOUND), ALERT LEVEL (UPPER BOUND), ALARM LEVEL (LOWER BOUND), ALARM LEVEL (UPPER BOUND), ACTION LEVEL (LOWER BOUND), ACTION LEVEL (UPPER BOUND). Rows include PGAA1-1, PGAA2-1-PGAA2-4, PGAA3-1-PGAA3-4, PGAA4-1-PGAA4-4, PGAA5-1-PGAA5-4, PGAB1-1-PGAB1-4, PGAB2-1-PGAB2-4, PGAB3-1-PGAB3-4, PGAB4-1-PGAB4-4, PGAC1-1-PGAC1-2, PGAC2-1-PGAC2-2, PGAC3-1-PGAC3-2, PGAC4-1-PGAC4-2, PGAC5-1-PGAC5-2, PGAD1-1-PGAD1-4, PGAD2-1-PGAD2-4, PGAD3-1-PGAD3-4, PGAE1-1-PGAE1-16, PGAE2-1-PGAE2-16, PGAE3-1-PGAE3-12, PGAE4-1-PGAE4-7.

- NOTES:
(1) ALERT LEVEL (LOWER BOUND): 1.05 x ANCHOR DESIGN WORKING LOAD
(2) ALERT LEVEL (UPPER BOUND): 1.21 x ANCHOR DESIGN WORKING LOAD
(3) ALARM LEVEL (LOWER BOUND): 0.9 x ANCHOR DESIGN WORKING LOAD
(4) ALARM LEVEL (UPPER BOUND): 1.25 x ANCHOR DESIGN WORKING LOAD
(5) ACTION LEVEL (UPPER BOUND): 1.3 x ANCHOR DESIGN WORKING LOAD
(6) WHEN THE ALERT LEVEL (LOWER BOUND) IS REACHED, THE AP/RSE/RGE SHALL BE INFORMED. THE AP/RSE/RGE SHALL REVIEW THE SITUATION AND INCREASE THE NUMBER AND FREQUENCY OF ANCHORS TO BE MONITORED IF FOUND NECESSARY.
(7) WHEN THE ALERT LEVEL (UPPER BOUND) IS REACHED, THE AP/RSE/RGE SHALL BE INFORMED. THE AP/RSE/RGE SHALL REVIEW THE SITUATION AND INCREASE THE NUMBER AND FREQUENCY OF ANCHORS TO BE MONITORED IF FOUND NECESSARY.
(8) WHEN THE ALARM LEVEL (LOWER BOUND) IS REACHED, THE CONTRACTOR SHALL RE-TENDON THE ANCHOR UP TO LIFT-OFF LOAD. THE AP/RSE/RGE SHALL BE INFORMED. THE AP/RSE/RGE SHALL REVIEW THE SITUATION AND INCREASE THE NUMBER AND FREQUENCY OF ANCHORS TO BE MONITORED IF FOUND NECESSARY.
(9) WHEN THE ALARM LEVEL (UPPER BOUND) IS REACHED, THE AP/RSE/RGE SHALL BE INFORMED. THE AP/RSE/RGE SHALL REVIEW THE SITUATION AND CHECK WHETHER ANY ADDITIONAL WORKS WOULD BE REQUIRED.
(10) WHEN THE ACTION LEVEL (UPPER BOUND) IS REACHED, ALL EXCAVATION WORKS SHALL BE CEASED IMMEDIATELY AND THE AP/RSE/RGE SHALL BE INFORMED. THE AP/RSE/RGE SHALL REVIEW THE SITE CONDITION AND DESIGN ASSUMPTION OF ELS. AN ASSESSMENT REPORT ON HIGH ANCHOR WORKING LOAD SHALL BE SUBMITTED TO BD/GEO. IF FOUND NECESSARY, REMEDIAL PROPOSAL SHALL BE SUBMITTED TO BD/GEO FOR APPROVAL. THE EXCAVATION WORKS SHALL NOT BE COMMENCED UNTIL REMEDIAL WORKS IS COMPLETED TO THE SATISFACTION OF THE BD/GEO.

- NOTES:
(1) THE MINIMUM NUMBER OF LIFT-OFF TEST SHOULD BE SUM OF 15% OF FIRST 50 ANCHORS, 12% OF SECOND 50 ANCHORS AND 10% OF ADDITIONAL ANCHORS.
(2) THE MINIMUM NUMBER OF GREASE CHECK SHOULD BE 3 ANCHORS.
(3) VISUAL SURVEY SHALL BE CARRIED OUT FOR ALL REMAINING ANCHORS.
(4) VISUAL SURVEY SHALL BE CARRIED OUT WEEKLY.
(5) LIFT-OFF TEST SHALL BE CONDUCTED IN 2 WEEKS, 1 MONTH, 3 MONTHS, 6 MONTHS, 9 MONTHS, 1 YEAR, 18 MONTHS, 2 YEARS AND EVERY YEAR AFTER THE INSTALLATION OF THE ANCHORS.
GREASE CHECKS SHALL BE CONDUCTED 2 YEARS, 5 YEARS AND EVERY 5 YEARS AFTER THE INSTALLATION OF THE ANCHORS.
DIFFERENT ANCHORS ARE TO BE SELECTED EACH TIME FOR GREASE CHECK.

TABLE 3 REQUIRED TIME INTERVAL (t0) (REFER TO CLAUSE 6.3(c) OF GEOSPEC 1)

Table with 2 columns: GROUND CONDITION, TIME INTERVAL (t0). Rows: PREDOMINANTLY GRADE I & II (5 MINS), III & IV (15 MINS), SIGNIFICANT PROPORTION GRADE V & VI (30 MINS - 24 HOURS).

- NOTES:
1. GRADE I - VI ARE AS DEFEND IN TABLE 2 & 3 OF GEOGUIDE 3 (1988)
2. THE EXACT t0 FOR EACH INDIVIDUAL ANCHOR WILL BE DETERMINED ON SITE BY THE ENGINEER.

TABLE 4 LIMITING VALUE OF EXTENSION (REFER TO TABLE 4 OF GEOSPEC 1)

Table with 3 columns: CONDITION, OBSERVATION PERIOD, EXTENSION INCREASE. Rows: (1a) 0-3 Df, (1b) Df-3 Df, (1c) 3 Df-10 Df.

- NOTES:
1. IF (1a) EXTENSION INCREASE LIMIT IS EXCEEDED, THE OBSERVATION PERIOD SHALL BE EXTENDED TO CONDITION (1b), IF (1b) EXTENSION INCREASE LIMIT IS EXCEEDED, THE OBSERVATION PERIOD SHALL BE EXTENDED TO CONDITION (1c).

TABLE 5 MAINTENANCE SCHEDULE (REFER TO TABLE A5 OF GEOSPEC 1)

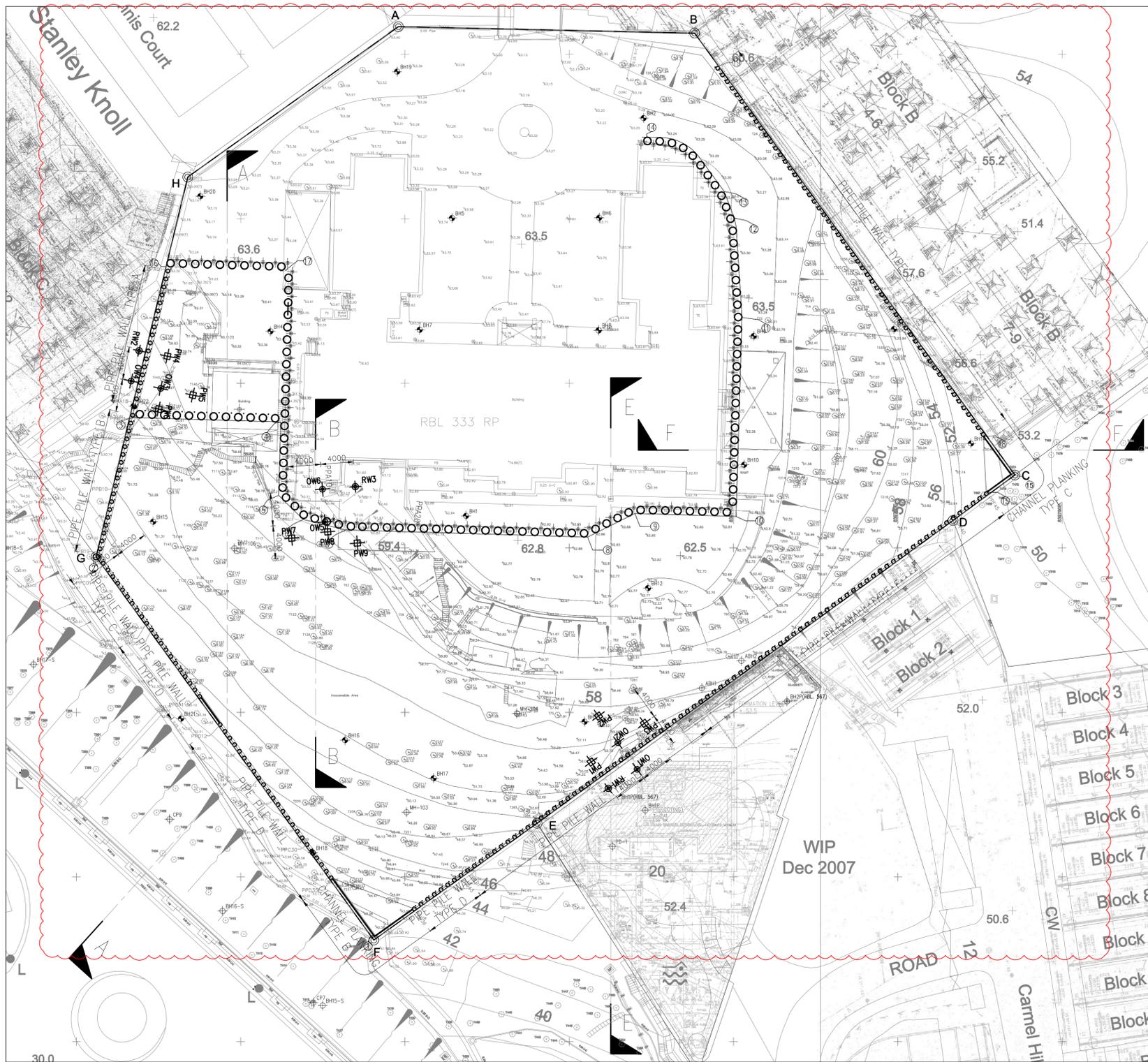
Table with 4 columns: VISUAL SURVEY, LIFT-OFF TEST, GREASE CHECK, TOTAL NO. OF ANCHOR. Values: 186, 23, 3, 189.

ALL DETAILS ON THIS PLANS HAVE BEEN DELETED

Revision table with columns: Revision, Date, Description, By, Chk.



Design table with columns: Design, CCH, Date, JAN 2022.



NOTES FOR PUMPING TEST:

I. PROCEDURES

1. INSTALL PUMP WELLS AND OBSERVATION WELLS AT LOCATIONS AS SHOWN ABOVE. THE DEPTHS OF PUMP WELLS AND OBSERVATION WELLS SHALL BE AS FOLLOWS:

PUMPING WELL	CUT-IN LEVEL (m.P.D.)	CUT-OFF LEVEL (m.P.D.)	BOTTOM LEVEL (m.P.D.)
PW1-PW3	+42.2	+41.2	+40.2
PW4-PW6	+52.7	+51.7	+50.7
PW7-PW9	+42.2	+41.2	+40.2

OBSERVATION WELL	BOTTOM LEVEL (m.P.D.)
OW1-OW6	+44.2

- BEFORE INSERTION OF THE SUBMERSIBLE PUMPS, THE DEWATERING WELLS SHALL BE CLEANED, FLUSHED AND THE DEPTH OF THE WELLS ACCURATELY MEASURED.
- THE DEWATERING WELLS SHALL BE CONNECTED TO DISCHARGE PIPES AND TESTED TO BE FUNCTIONAL.
- EACH PUMP WELL INSTALLED SHOULD HAVE A MINIMUM DISCHARGE CAPACITY OF 15m³/hr WHEN OPERATING UNDER A DELIVERY HEAD OF 10m AND BE ABLE TO LOWER WATER LEVEL TO WITHIN 1m ABOVE THE PUMP.
- RECHARGE WELL SHOULD HAVE A MINIMUM DISCHARGE CAPACITY OF 2m³/hr.
- FLOW METERS AND CHOKES VALVES TO CONTROL FLOW SHOULD BE INCORPORATED INTO EACH DEWATERING WELL.
- BEFORE COMMENCEMENT OF THE PUMPING TEST, WATER LEVELS IN ALL PUMP WELLS, OBSERVATION WELLS AND STANDPIPES SHOULD BE MEASURED AT 4 hr INTERVALS FOR A PERIOD OF 24 HRS.

II. WATER LEVEL MEASUREMENT

DURING THE TEST AND DURING THE RECOVERY PHASE AT THE END OF THE TEST, THE WATER LEVELS IN THE PUMP WELLS, OBSERVATION WELLS AND STANDPIPE SHOULD BE MEASURED AT THE FOLLOWING TIME INTERVALS:

TIME FROM PUMP ON TO PUMP OFF (MINS.)	INTERVAL BETWEEN READINGS (MINS.)
0 - 30	10
30 - 60	15
60 - 120	30
120 - 360	60
360 - END OF TEST	120

III. SETTLEMENT CHECK POINTS

DURING AND UNTIL THE PUMPING TEST IS COMPLETED, SETTLEMENT MONITORING POINTS SHALL BE MONITORED TWICE PER DAY.

- NO UNDUE SETTLEMENT OF ANY SETTLEMENT CHECK POINT, IN CASE UNDUE SETTLEMENT IS OBSERVED OUTSIDE THE SITE, RECHARGE WELLS SHALL BE SWITCHED ON IN ORDER TO REINSTATE THE GROUNDWATER TABLE OUTSIDE THE SITE TO ITS ORIGINAL LEVEL.
- THE WATER LEVEL INSIDE THE SITE CAN BE DRAWN DOWN TO THE FINAL EXCAVATION LEVEL AS INFERRED FROM THE GROUNDWATER LEVELS AT OBSERVATION WELLS WITHIN SITE.

IV. CRITERIA

THE PUMPING TEST SHOULD BE CONSIDERED ACCEPTABLE IF ALL OF THE FOLLOWING ARE SATISFIED:

- NO UNDUE SETTLEMENT OF ANY SETTLEMENT CHECK POINT, IN CASE UNDUE SETTLEMENT IS OBSERVED OUTSIDE THE SITE, RECHARGE WELLS SHALL BE SWITCHED ON IN ORDER TO REINSTATE THE GROUNDWATER TABLE OUTSIDE THE SITE TO ITS ORIGINAL LEVEL.
- THE WATER LEVEL INSIDE THE SITE CAN BE DRAWN DOWN TO THE FINAL EXCAVATION LEVEL AS INFERRED FROM THE GROUNDWATER LEVELS AT OBSERVATION WELLS WITHIN SITE.

V. WATER DRAWDOWN AS RECORD IN OBSERVATION WELLS BEHIND PILE ON RETAINED SIDE DOES NOT EXCEED 1.0m AS COMPARED WITH THE INITIAL READINGS TAKEN BEFORE THE PUMPING TEST AFTER TAKEN THE TIDAL FLUCTUATION INTO CONSIDERATION.

IF THE DRAWDOWN RECORDED IN THE OBSERVATION WELLS BEHIND THE PILE WALL EXCEEDS THE ALLOWABLE LIMIT 1.0m DRAWDOWN DURING PUMPING TEST.

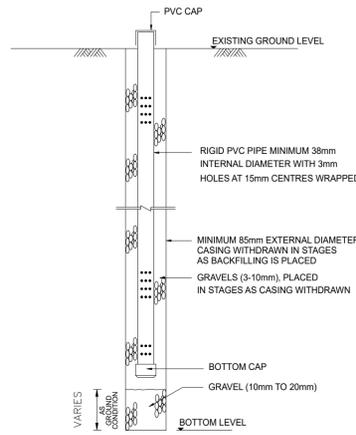
VI. ASSESSMENT REPORT

AFTER COMPLETION OF THE PUMP TEST, AN ASSESSMENT REPORT SHALL BE PREPARED TO DISCUSS THE TEST RESULTS. THE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND THE BD FOR ACCEPTANCE.

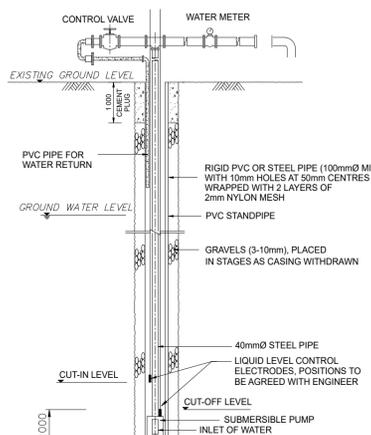
VII. GROUNDWATER MONITORING

FOR GROUNDWATER MONITORING IN THE DRAWING NO. ELS-01, GROUNDWATER DRAWDOWN SHALL REFER TO THE STANDPIPE ONLY DURING PUMPING TEST.

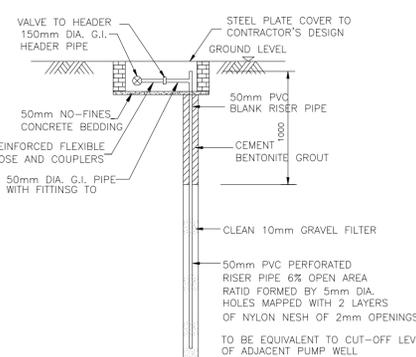
- PUMPING TEST SHALL BE CARRIED OUT AFTER INSTALLATION OF SOLDIER PILES, GROUT CURTAIN AND BEFORE COMMENCEMENT OF BULK EXCAVATION.
- PUMPING TEST SHALL BE CARRIED OUT TO VERIFY THE DESIGN ASSUMPTIONS. ALL RECHARGE WELLS AND OBSERVATION WELL SHALL BE INSTALLED PRIOR TO THE CARRYING OUT OF ALL PHASE PUMPING TEST.
- THE EXACT LOCATION OF THE PROPOSED WELLS SHOULD BE DETERMINED ON SITE.
- AN ASSESSMENT REPORT ON PUMPING TEST SHALL BE SUBMITTED TO THE SATISFACTION OF B.A.



TYPICAL DETAILS OF OBSERVATION WELLS



TYPICAL DETAILS OF PUMP WELLS



TYPICAL DETAILS OF RECHARGE WELL

N.T.S.

LEGEND:

- BOUNDARY LINE
- BH1 AS-BUILT BOREHOLE
- P MH-103 PIEZOMETER
- + 142.1 EXISTING BOREHOLE OF NEARBY SITE
- + 142.1 EXISTING GROUND LEVEL
- KP1 PROPOSED KING POST
- PROPOSED PIPE PILE
- GROUT CURTAIN
- PROPOSED PERMANENT BORED PILE WALL (UNDER SEPARATE SUBMISSION)
- EXISTING SOIL NAIL TO BE DEMOLISHED
- PROPOSED MAX. 30° OPEN CUT/ SLOPE CUT EXCAVATION
- PROPOSED STRUT
- TB# 1 PROPOSED PERMANENT TIE BACK SOCKED INTO ROCK (UNDER SEPARATE SUBMISSION)

Revision	Date	Description	By	Chk
B	06/2025	2ND AMENDMENT	CJX	KKK
A	07/2024	1ST AMENDMENT	CJX	KKK



Design	CCH	Date	JAN 2022
Checked	CCH	Drawn	KUEN
Approved	TY	Scale	1:300 IN A1

Project: PROPOSED DEVELOPMENT FOR MARYKNOLL BUILDING AT 44 STANLEY VILLAGE ROAD, STANLEY

Drawing Type: EXCAVATION AND LATERAL SUPPORT WORKS
 Drawing Title: PUMPING TEST LAYOUT PLAN

Drawing Number: ELS-16A

Revision Number: B