

PROJECT:

PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS 2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE WITH OPEN-DECK, 2 STOREY F&B HUB, 2 STOREY CAVERN, ELEVATED WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

C&S AUTHORITY SUBMISSION DRAWINGS (ST103)

ISSUE DATE: JUNE 2020

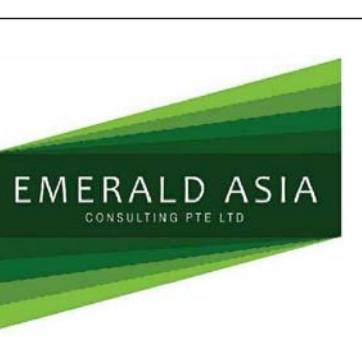


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TEL : 65336788 FAX : 65360229

EMERALD ASIA CONSULTING PTE LTD
DRAWING REGISTER-ISSUE

PROJECT TITLE	PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS 2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE WITH OPEN-DECK, 2 STOREY F&B HUB, 2 STOREY CAVERN, ELEVATED WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)
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Building and Construction
202013402 Authority



**Emerald Asia Consulting Pte Ltd
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TEL : 65336788 FAX : 65360229**

GENERAL NOTES:

1. NOTIFICATION

1.1 ALL WORKS SHALL COMPLY WITH THE APPROPRIATE CURRENT STANDARDS AND CODES OF PRACTICE. GENERALLY THE REQUIREMENTS SPelt OUT IN THE SPECIFICATION, SHALL TAKE PRECEDENCE OVER ANY RELEVANT STANDARDS, WHERE THERE ARE DIFFERENT CRITERIA FOR DESIGN STATED IN THE CONTRACT DOCUMENT, STANDARDS, CODES OF PRACTICE OR RELEVANT STATUTORY REGULATIONS, THE MOST ONEROUS SHALL APPLY.

1.2 THE TEMPORARY WORK DRAWINGS ARE NOT INTENDED TO REPLACE PROPER FABRICATION / WORKSHOP DRAWINGS FOR THE CONSTRUCTION PURPOSES. WORKSHOP DRAWINGS SHALL BE PROVIDED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

1.3 STRUT LEVEL S1 REFERS TO THE STRUT AT THE FIRST LEVEL IN A GIVEN SECTION AND LOWER LEVELS ARE NUMBERED SEQUENTIALLY DOWNWARDS.

1.4 FOR MINIMUM STIFFNESS (EA) OF STRUTS AND TYPE OF RETAINING WALL REFER TO THE RESPECTIVE DRAWINGS.

1.5 ABBREVIATION FOR WELDING:
FSBW – FULL STRENGTH BUTT WELD
PPBW – PARTIAL PENETRATION BUTT WELD

1.6 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

1.7 ALL CHAINAGES ARE IN METERS UNLESS OTHERWISE STATED.

1.8 ALL LEVELS ARE IN METERS IN ACCORDANCE WITH PUBLIC WORK DEPARTMENT DATUM.

1.9 THIS SET OF GENERAL NOTES ARE APPLICABLE TO THE EARTH RETAINING AND STABILISING STRUCTURES (ERS) AND ANY OTHER TEMPORARY STRUCTURES OF THE PROJECT.

2. CONSTRUCTION TOLERANCE

2.1 STRUTS SHALL BE INSTALLED WITH A MAXIMUM VERTICAL AND HORIZONTAL STRAIGHTNESS TOLERANCE OF 1/100.

2.2 THE MAXIMUM STRUT BOW BETWEEN POINTS OF POSITIONAL RESTRAINTS SHALL BE 1/400.

2.3 THE MAXIMUM ALLOWABLE VERTICALLY DEVIATION OF SHEET PILES WALL IS 1:75.

3. STRUCTURAL STEELWORK

3.1 ALL STEEL SHALL BE GRADE S355 FOR ALL STRUCTURAL MEMBERS UNLESS OTHERWISE STATED.

3.2 BOLTS AND NUTS SHALL BE OF GRADE 8.8 AND TO COMPLY WITH SS EN 1993 : 1-8 UNLESS OTHERWISE STATED.

3.3 UNLESS OTHERWISE STATED, ALL WELD SIZE TO BE 8 MM FILLET WELD ALL AROUND AND WELDING OF STEELWORK SHALL COMPLY WITH SS EN 1993 1-8.

3.4 ALL WELDING OPERATORS SHALL HAVE PASSED TESTS APPROPRIATE TO THE TYPE OF WORK BEING CARRIED OUT AS SPECIFIED IN BS 4872, PART 1 AND HOLD VALID CERTIFICATE ISSUED BY APPROVED ACCREDITED LABORATORY FOR THE DURATION OF PROJECT.

3.5 ALL BUTT WELD AND FILLET WELD SHALL BE VISUALLY INSPECTED AND TESTED BY APPROVED ACCREDITED LABORATORY. ALL BUTT WELDS SHALL BE SUBJECT TO TESTING BY RADIOPHASIC OR ULTRASONIC METHODS IN ACCORDANCE WITH THE SPECIFICATION. FILLET WELD SHALL BE TESTED BY MAGNETIC PARTICLE TEST OR OTHER APPROPRIATE METHOD IN ACCORDANCE WITH SPECIFICATIONS.

3.6 THE APPROVED ACCREDITED LABORATORY IS REQUIRED TO ISSUE CERTIFICATION OF SOUNDNESS AND PROPERLY DRAWN SKETCHES FOR THE WELD BEING TESTED.

3.7 ALL DIMENSIONS IN THIS DRAWING ARE NOMINAL AND SHALL BE VERIFIED.

3.8 STEEL MATERIAL SHALL BE GRADE S355 CLASS 1 TO BC 1:2012, UNLESS NOTED OTHERWISE.

4. CONCRETE

4.1 CONCRETE PACKING BETWEEN WALER AND TEMPORARY RETAINING WALL SHALL BE OF GRADE 30 UNLESS OTHERWISE STATED.

5. DESIGN LOADS

5.1 SURCHARGE BEHIND THE RETAINING WALL = 20.0kN/m² UNLESS NOTED OTHERWISE.

5.2 ACCIDENTAL LOADS OF 50kN IS APPLIED NORMAL TO THE STRUT AT ANY POSITION IN ANY DIRECTION CONSIDERED IN THE DESIGN OF STRUTS.

5.3 EFFECT FROM VARIATION IN TEMPERATURE OF STRUTS SHALL BE CONSIDERED IN THE DESIGN OF STRUTS AND TEMPORARY LOADS OF A MINIMUM TEMPERATURE DIFFERENCE OF ± 10 C.

5.4 IMPOSED LIVE LOAD FOR STEEL STRUT = 1.0kN/m

5.5 ALL STRUTTING DESIGN ARE IN ACCORDANCE WITH BS EN 1993 IN GENERAL, LOAD FACTORS FOR STEELWORK SHALL COMPLY WITH SS EN 1991.

6. LEGEND

- UNIVERSAL COLUMN SECTION SIZE :

DEPTH UC WEIGHT

EXAMPLE : 356x406x364 kg/m UC - 356UC634

- UNIVERSAL BEAM SECTION SIZE :

DEPTH x WIDTH UB WEIGHT

EXAMPLE : 406x178x74 kg/m UB - 406x178UB74

- EQUAL ANGLE : EA A x B x t
- UNEQUAL ANGLE : A x B x t L
- EQUAL ANGLE : A x B x WEIGHT RCS

7. CONSTRUCTION SEQUENCES

7.1 THE CONSTRUCTION SEQUENCE ILLUSTRATED FOR RESPECTIVE LOCATION SERVES AS IN THE PRINCIPLE GUIDE.

-UNLESS OTHERWISE STATED, CONTRACTORS SHALL SUBMIT DETAILED PROPOSAL AND METHOD STATEMENT FOR THE ACCEPTANCE OF THE SUPERINTENDING OFFICER , QP(S) AND RELEVANT AUTHORITIES.

8. WATER

8.1 METHODS SHALL BE EMPLOYED TO EFFECTIVELY COLLECT ALL WATER OCCURRING WITHIN THE SITE, BOTH WITHIN AND AROUND EXCAVATIONS, AND TO DISCHARGE THIS THROUGH A SYSTEM OF DRAINAGE CONDUITS AND SILT TRAPS TO DISCHARGE POINTS IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPROPRIATE AUTHORITIES. PUMPING OF AN APPROPRIATE CAPACITY SHALL BE PROVIDED WHENEVER REQUIRED.

8.2 EARTHWORKS SHALL BE CARRIED OUT BY MEANS THAT MITIGATE EROSION AND SLIPS AND PROVIDE SUFFICIENT GRADIENTS TO SHED WATER AVOID PONDING. PROTECTION SHALL BE PROVIDED TO ALL EXPOSED SOIL/ROCK FACES WHERE NECESSARY TO PREVENT WEATHERING, DEGRADATION, FALLS AND/ OR EROSION BY WATER.

8.3 ADEQUATE MEANS OF REGULATING THE GROUNDWATER LEVELS IN THE VICINITY OF THE SITE, BETWEEN THE LIMITS PRESCRIBED IN THE CONTRACT OR SUCH OTHER LIMITS THAT PREVENT UNACCEPTABLE SETTLEMENTS SHALL BE PROVIDED. THESE INCLUDE MAINTAINING THE WATER TIGHTNESS OF THE COFFERDAM AND THE USE OF RECHARGE SYSTEM IF NECESSARY.

8.4 ALL TENSION CRACKS FORMING AROUND THE EXCAVATION SHALL BE REGULARLY FILLED AND SURFACE SEALED.

9. MONITORING AND RECORDS

9.1 THE WORKS SHALL BE CARRIED OUT WITH THE MONITORING PROGRAMME AS SHOWN IN THE "INSTRUMENTATION" DRAWINGS.

THE "INSTRUMENTATION" DRAWINGS INCLUDE LOCATION, QUANTITY AND TYPE OF INSTRUMENTS AND MONITORING FREQUENCY. THE FREQUENCY SHALL BE INCREASED WHEN APPROPRIATE SUCH AS DURING CRITICAL ACTIVITIES AND WHEN LARGE MOVEMENTS HAVE BEEN DETECTED.

9.2 ACCURATE RECORDS SHALL BE KEPT OF ALL PRINCIPAL SITE ACTIVITIES SUCH AS DATES, INSTALLED DEPTHS AND SETS OF PILES, DATES AND DEPTHS OF EXCAVATIONS, DATE OF INSTALLATION AND PRELOADING OF STRUTS ETC. THESE SHALL BE INCLUDED IN THE RELEVANT MONTHLY MONITORING REPORTS.

9.3 ONE SET OF THE MONITORING REPORTS SHALL BE AVAILABLE FOR INSPECTION ON SITE AT ALL TIMES.

10. BACKFILLING

10.1 WHERE TEMPORARY STRUTS THAT ARE ABOVE THE COMPLETED SLAB LEVEL, AND JUST BELOW THE ROOF SLAB ARE REMOVED TO PROVIDE CLEAR WORKING SPACE FOR CASTING THE ROOF SLAB, THE GAP BETWEEN THE TEMPORARY EARTH RETAINING WALL AND THE PERMANENT WALL SHALL BE BACKILLED ABOVE THE LEVEL OF THE COMPLETED SLAB ONLY AFTER THE ROOF SLAB HAS BEEN CAST, UNLESS THE EXTERNAL WALL HAS BEEN DESIGNED TO SUPPORT LATERAL LOADING WITHOUT THE ROOF SLAB COMPLETE.

10.2 THE VOID CHAMBERS BETWEEN THE PERMANENT WALLS SHALL NOT BE BACKILLED UNTIL INTERMEDIATE SLAB HAS BEEN CAST.

10.3 "LSS" REFER TO LIQUEFIED SOIL STABILISER WITH A MINIMUM UCS OF 0.5MPa UNLESS OTHERWISE STATED.

10.4 "BACKFILL MATERIAL" CONSISTING OF WELL- GRADED GRANULAR SOILS SHALL BE USED TO BACKFILL THE GAP BETWEEN THE EARTH RETAINING STRUCTURE AND PERMANENT STRUCTURES

11. EXCAVATION

11.1 EXCAVATION SHALL ONLY PROCEED WHEN ALL NECESSARY SUPPORTS ARE IN PLACE, TOGETHER WITH ALL PACKING, PRELOADS, BERMS ETC, WHEN GROUND WATER LEVELS ARE WITHIN THE PRESCRIBED LIMITS, WHEN ANY GROUT OR CONCRETE PACKING HAS ADEQUATELY CURED AND WHEN THE QP INSPECTION HAVE BEEN COMPLETED.

11.2 EXCAVATION SHALL BE CONDUCTED ONLY TO THE PROFILES AND ELEVATIONS SPECIFIED FOR THE PARTICULAR STAGE OF THE WORK. IN GENERAL THIS IS TO THE DEPTH JUST SUFFICIENT TO INSTALL THE NEXT LOWER LEVEL OF STRUTTING OR, WHEN NO FURTHER LEVEL OF STRUTTING IS TO BE INSTALLED, TO THE DEPTH JUST SUFFICIENT FOR THE CONSTRUCTION OF THE PERMANENT WORKS.

11.3 WITHIN A PROPPED EXCAVATION THE WORK SHALL, SO FAR AS IS PRACTICAL, BE CONDUCTED SYMMETRICALLY SUCH THAT THE LOADS ON THE PROPPING SYSTEM ARE DEVELOPED EQUALLY FROM OPPOSITE SIDES. IF THIS IS NOT PRACTICAL THEN THE DESIGNER SHALL BE ADVISED IN ADVANCE SO THAT THE ADEQUACY OF THE SYSTEM MAY BE CHECKED. IN SUCH CASE IT MAY BE NECESSARY TO INCREASE THE STRENGTH OF THE SYSTEM OR PROVIDE ADDITIONAL SUPPORT. SAFE ACCESS SHALL BE PROVIDED TO ALL PARTS OF THE EXCAVATION WHEREVER AND WHENEVER WORK AND/OR INSPECTIONS ARE REQUIRED.

ABBREVIATION:

FEL - FINAL EXCAVATION LEVEL
T.O.SLAB - TOP OF SLAB
T.O.BEAM - TOP OF BEAM

01 sheet of 14

BUILDING AND CONSTRUCTION AUTHORITY

APPROVED UNDER SECTION 5 / SECTION 5A OF THE

BUILDING CONTROL ACT (CHAPTER 29)

Project Ref No : A1775-00001-2018-ST103

Building and Construction Authority

For Commissioner of Building Control

STANDARD CERTIFICATION BY THE QUALIFIED PERSON FOR GEOTECHNICAL ASPECTS OF GEOTECHNICAL BUILDING WORKS

1. In accordance with Regulation 10A of the Building Control Regulations

I, Lau Wei Hing, the Qualified Person for the geotechnical aspects of the geotechnical building works carried under section 8(1)(a) or 11(1)(d)(ii) of the Building Control Act, hereby submit the detailed structural plans and design calculations prepared by me and certify that, to the best of my knowledge and belief, they have been prepared in accordance with the provisions of the Building Control Regulations, the Building Control Act and any other written law pertaining to buildings and construction for the time being in force.

2. I further certify that these geotechnical building works plans and design calculations are in reference to Project Ref. No: A1775-00001-2018-ST103.

3. Total no. of geotechnical building works plans submitted : 14.

Total no. of pages of design calculations in this book : 170.



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date : _____

Standard Certification By The Qualified Person For Structural Works

1. In accordance with Regulation 9 of the Building Control Regulations,

I, Chin Kheng Ming, the Qualified Person for structural works appointed under section 8(1)(a) or 11(1)(d)(i) of the Building Control Act, hereby submit the detailed structural plans and design calculations prepared by me and certify that they have been prepared in accordance with the provisions of the Building Control Regulations, the Building Control Act and any other written law pertaining to buildings and construction for the time being in force.

2. I further certify that these detailed structural plans and design calculations are in reference to Project Ref. No: A1775-00001-2018-ST103.

3. Total number of structural plans submitted : 14, and total number of pages of design calculations in this book : 170.



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date : _____

NO DATE BY AMENDMENTS

CLIENT:

Mandai

MANDAI PARK DEVELOPMENT PTE LTD
80 MANDAI LAKE ROAD, SINGAPORE 729826
TEL: 6360 2191 EMAIL: PHILIP.YM@MANDAI.COM

ARCHITECT:

DP ARCHITECTS PTE LTD
6 RAFFLES BOULEVARD
#02-249 MARINA SQUARE
SINGAPORE 039594
TEL: 63383988 FAX: 63379989

PROJECT TITLE:
PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE WITH OPEN-DECK, 2 STOREY F&B HUB, 2 STOREY CAVERN, ELEVATED WALKWAY AND ANCILLARY FACILITIES ON LOT #1890C PT MK14 AT MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

STANDARD CERTIFICATION BY THE SPECIALIST ACCREDITED CHECKER

1. I, Leung Wai Man, being a registered specialist accredited checker, hereby certify that I have, in accordance with the Building Control (Accredited Checkers and Accredited Checking Organizations) Regulations carried out an evaluation, analysis and review of the detailed structural plans and design calculations presented herein and am satisfied that there are no inadequacies in the key structural elements.

2. I further certify that these detailed structural plans and design calculations are in reference to Project Ref. No: A1775-00001-2018-ST103.

3. Total number of structural plans checked : 14.

4. I hereby declare that I have no professional or financial interest in the building works shown in the plans as defined in section 18 of the Building Control Act (Cap 29).

SPECIALIST ACCREDITED CHECKER

No: 1139

LEUNG WAI MAN
in AC Organisation
Registration No: A036

BUILDING CONTROL ACT

SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

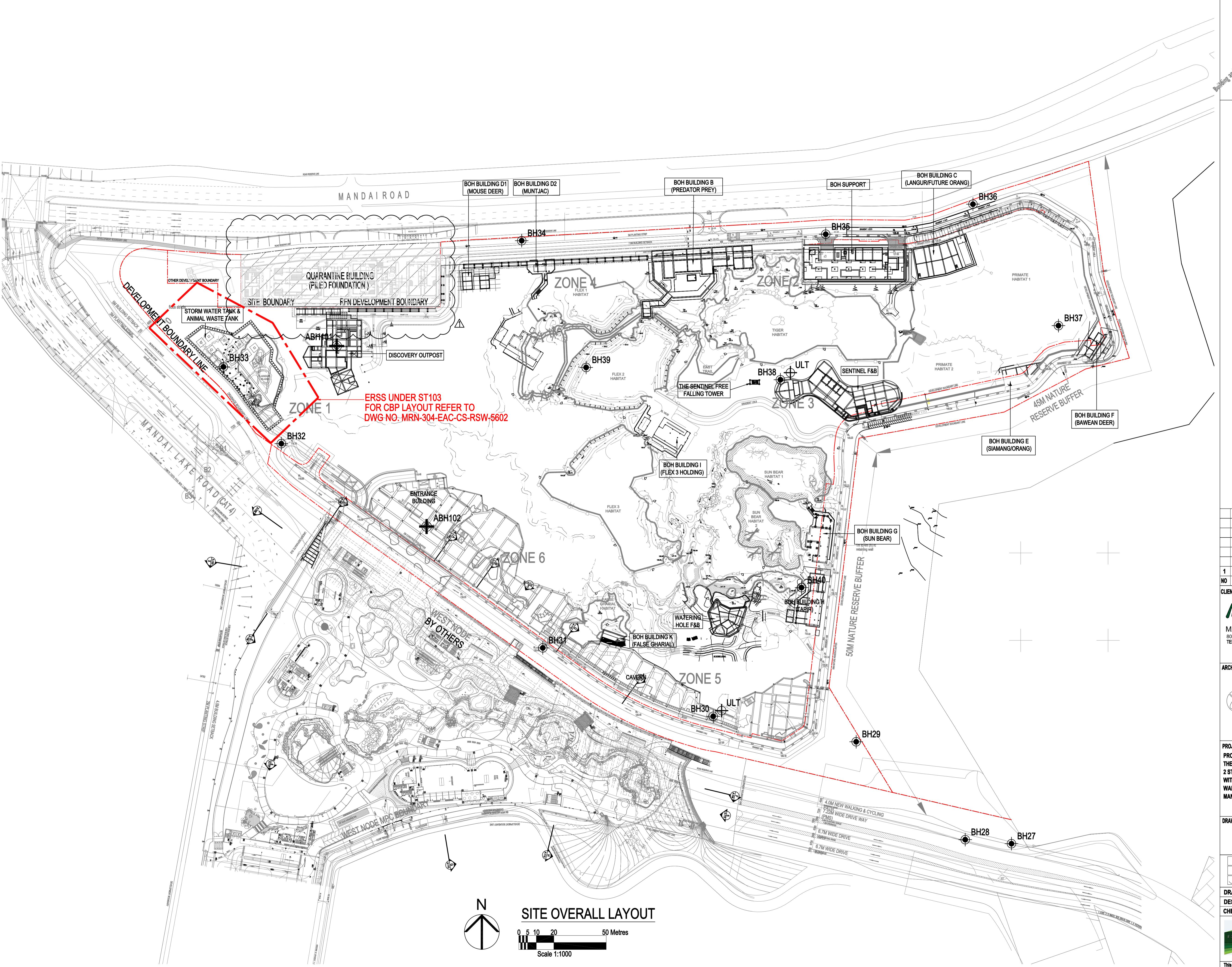
DRAWING TITLE:
RAINFOREST NORTH:
ERS
GENERAL NOTES

PRELIMINARY INFORMATION AUTHORITY SUBMISSION

DRAWN BY : CT/GL DATE : AS SHOWN REV.
DESIGN BY : CW DATE : JUNE 2020
CHECKED BY : CKM MRN-304-EAC-CS-RFN-5601

Emerald Asia Consulting Pte Ltd
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sheet of 14

**ED UNDER SECTION 5 / SECTION 5A OF THE
BUILDING CONTROL ACT (CHAPTER 29)**

ject Ref No : A1775-00001-2018-ST103

Commissioner of Building Control

ACCREDITED CHECKER
No: 1139
LEUNG WAI MAN in AC Organisation Registration No: A036
BUILDING CONTROL ACT SINGAPORE

EDITED CHECKER'S STAMP & SIGNATURE)

<p>SPECIALIST ACCREDITED CHECKER</p> <p>No: 7019</p>
<p>YEO LILY</p>
<p>BUILDING CONTROL ACT SINGAPORE</p>

EDITED CHECKER'S STAMP & SIGNATURE)

A circular stamp with the following text:

PROFESSIONAL
GEOTECHNICAL
LAU WEI HING
3670
SINGAPORE

TO PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE

A circular nameplate with the following text arranged in a circle:
PROFESSOR
CIVIL
ENGINEER
CHIN KHENG MING
SINGAPORE
4447

DO PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE

04/06/20	CT	AS CLOUDED
DATE	BY	AMENDMENTS

IT:
 MANDAI PARK DEVELOPMENT PTE LTD
MANDAI LAKE ROAD, SINGAPORE 729826
L: 6360 2191 EMAIL: PHILIP.YIM@MANDAI.COM

DP ARCHITECTS PTE LTD
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#02-249 MARINA SQUARE
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H OPEN-DECK, 2 STOREY F&B HUB, 2 STOREY CAVERN, ELEVATED
LKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
NDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)**

WING TITLE: RAINFOREST NORTH: ERSS SITE OVERALL LAYOUT

<input type="checkbox"/>	PRELIMINARY	<input type="checkbox"/>	TENDER
<input type="checkbox"/>	INFORMATION	<input type="checkbox"/>	CONSTRUCTION
<input checked="" type="checkbox"/>	AUTHORITY SUBMISSION	<hr/>	

AWN BY : CT/GL	SCALE : AS SHOWN
SIGN BY : CW/MC	DATE : JUNE 2020
ECHECKED BY : CKM	MRN-304-EAC-CS-RFN-5000

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For Commissioner of Building Control

ACCREDITED CHECKER
No: 1139

LEUNG WAI MAN
in AC Organisation
Registration No: A036
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :

SPECIALIST
ACCREDITED CHECKER
No: 7019

YEO LILY
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :

PROFESSIONAL ENGINEER
GEOTECHNICAL
LAU WEI HING
3670
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

PROFESSIONAL ENGINEER
CIVIL
CHIN KHENG MING
4447
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

1 04/06/20 CT AS PER BCA'S COMMENTS
NO DATE BY AMENDMENTS

CLIENT:

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WITH OPEN-DECK, 2 STOREY F&B HUB, 2 STOREY CAVERN, ELEVATED
WALKWAY AND ANCILLARY FACILITIES ON LOT 0189C PT NK14 AT
MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

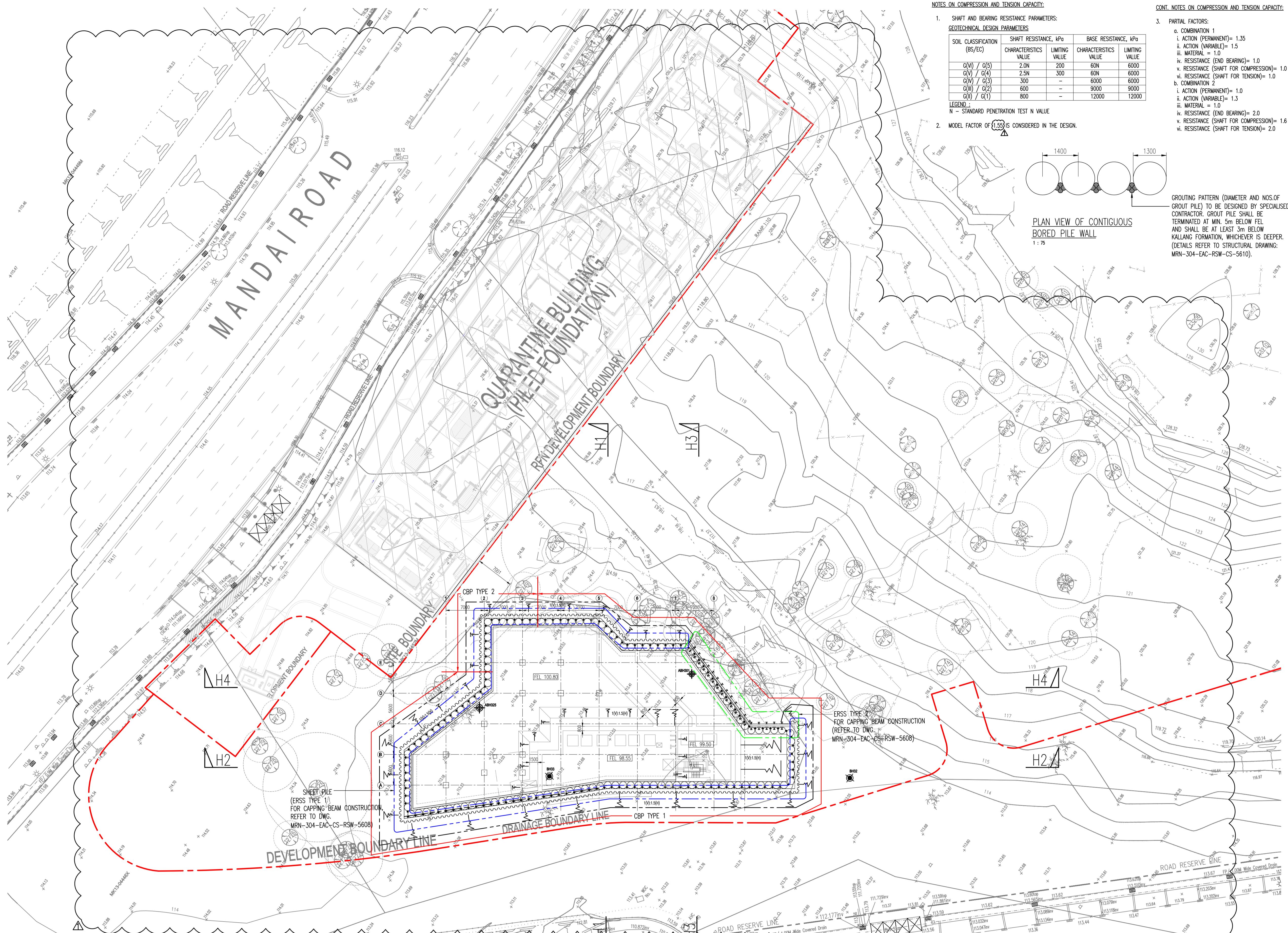
DRAWING TITLE:
RAINFOREST NORTH:
STORMWATER & ANIMAL WASTE TANK
ERS: CBP LAYOUT

PRELIMINARY INFORMATION	TENDER CONSTRUCTION
AUTHORITY SUBMISSION	

DRAWN BY : CT/G/L	SCALE : AS SHOWN	REV.
DESIGN BY : CW/MC	DATE : JUNE 2020	1
CHECKED BY : CKM		MRN-304-EAC-CS-RSW-5602

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TYPE	DIAMETER (mm)	PILE SPACING (mm)	REFERENCE BOREHOLE	MIN. PILE LENGTH FROM COL. (M)	MIN. EMBEDMENT LENGTH INTO SPT-N=100(m) (UNLESS OTHERWISE STATED)	COMPRESSION CAPACITY (kN/PER PILE)		TENSION CAPACITY (kN/PER PILE)		REINFORCEMENT		LINK	
						DA1C1	DA1C2	STR	DA1C1	DA1C2	STR		
TYPE 1	1300	1400	BH32/BH33	20.6	-	1.0	3200	2400	21870	10010	3170	-	-
TYPE 2						2.0						5230	1330 660
												27H40	FULL LENGTH H16-150

NOTE:
1. PILE CUT-OFF LEVEL IS ASSUMED TO BE AT 110.325mRL.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. MRN-304-EAC-CS-RFN-0110

1. PILE CUT-OFF LEVEL IS ASSUMED TO BE AT 110.325mRL.

2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. MRN-304-EAC-CS-RFN-0110

LEGEND:
 BH - DENOTES EXISTING BOREHOLE LOCATION
 ABH - DENOTES ADDITIONAL NEW BOREHOLE LOCATION
 SOLDIER PILE
 SHEET PILE
 TEMPORARY SLOPE
 TREE WITH TREE PROTECTION ZONE
 REINFORCEMENT
 LINK

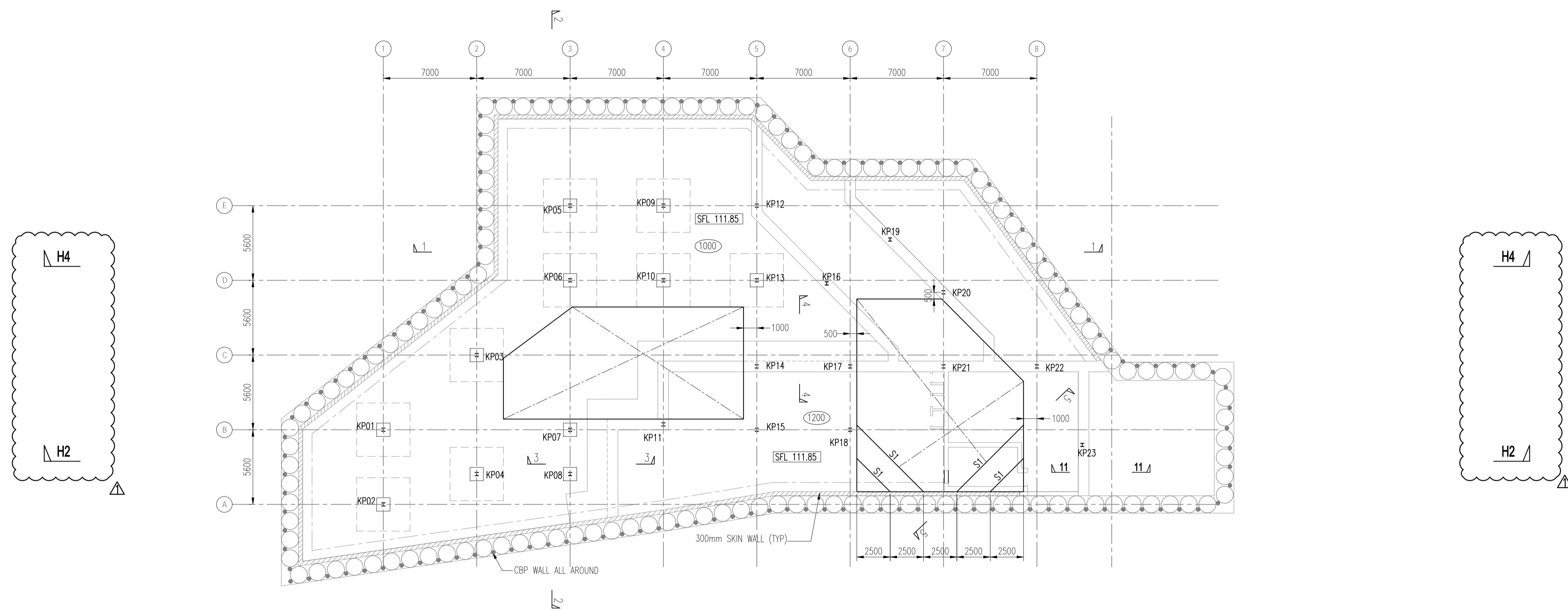
STORMWATER & ANIMAL WASTE TANK (SWT & AWT)
CBP LAYOUT
1 : 350
NOTE: UNLESS NOTED OTHERWISE (UNO)
1. DEVIATION OF INSTALLED LOCATIONS OF PILES AND PLUNGE COLUMN SHALL BE WITH THE FOLLOWING TOLERANCES:
FOR PILE: +/-75mm IN PLAN AT GROUND LEVEL AND 1/100 VERTICITY AT ANY DEPTH.
PLUNGE COLUMN: +/-100mm IN PLAN AT GROUND LEVEL AND 1/200 VERTICITY AT ANY DEPTH.
2. ALL KINGPOST SHOWN ARE OF TEMPORARY WORKS UNLESS OTHERWISE STATED.
3. ALL TEMPORARY SLOPE TO BE 1(V):1.5(H) UNLESS OTHERWISE STATED.

Building and Construction Authority
2013

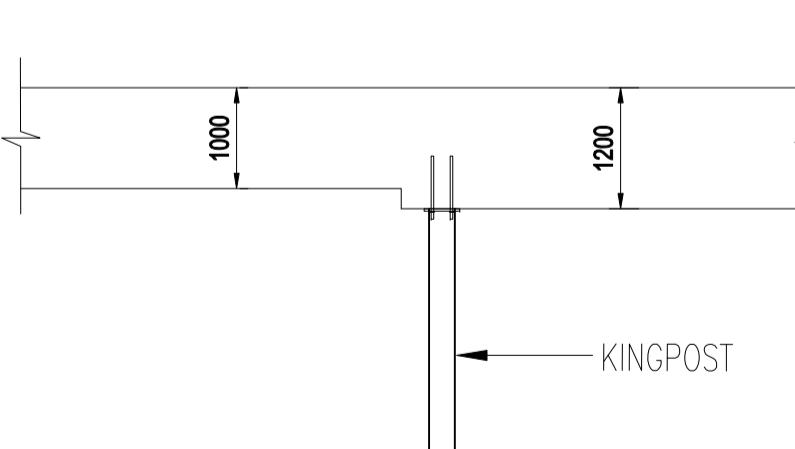
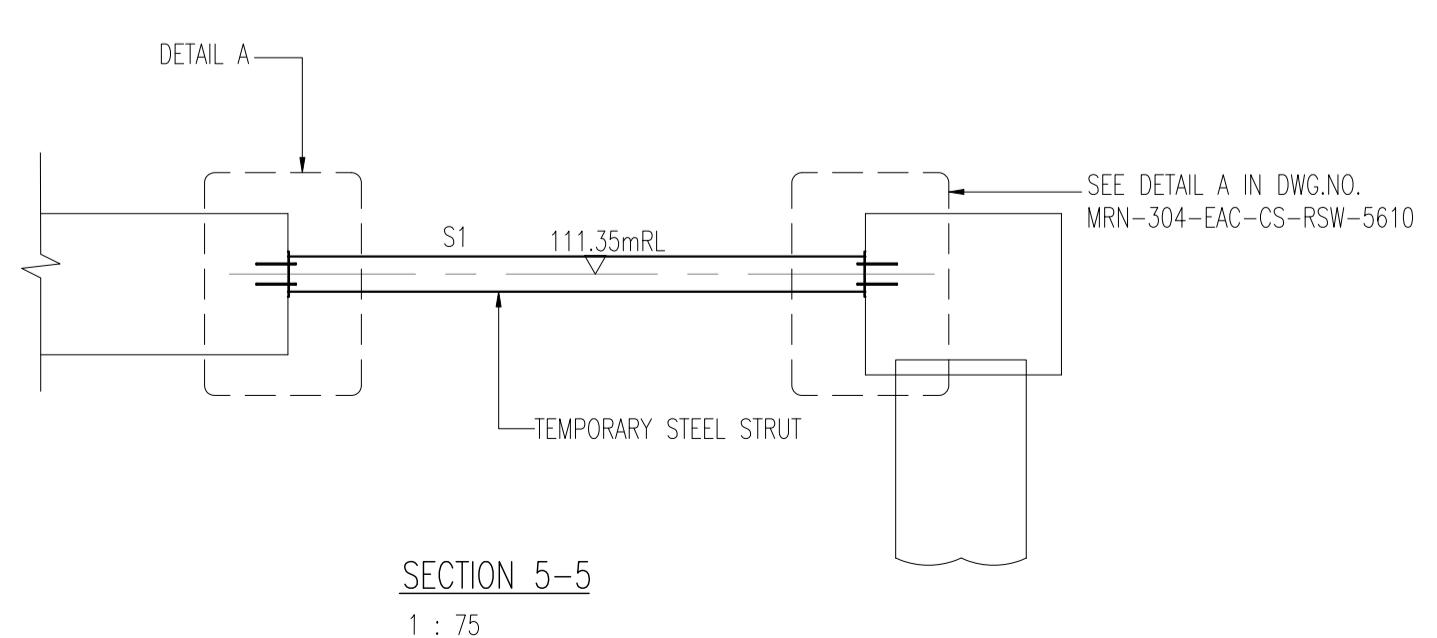
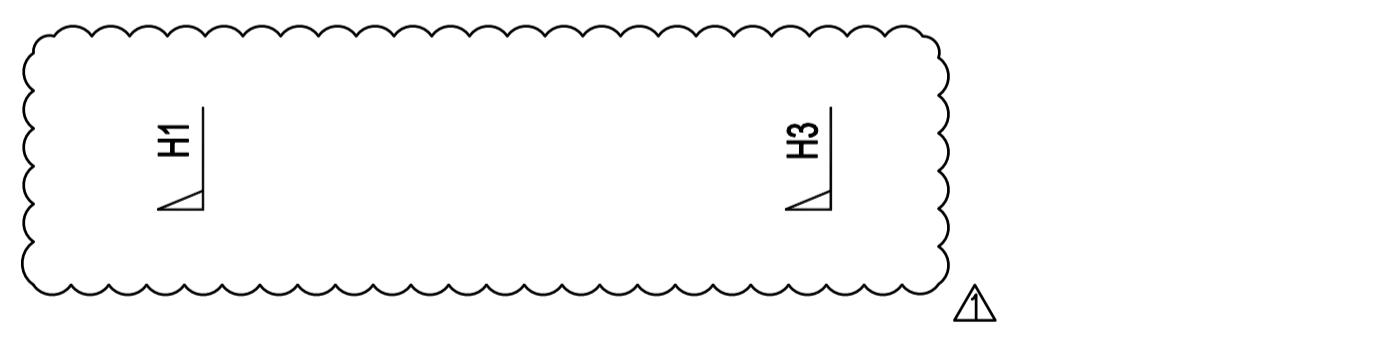
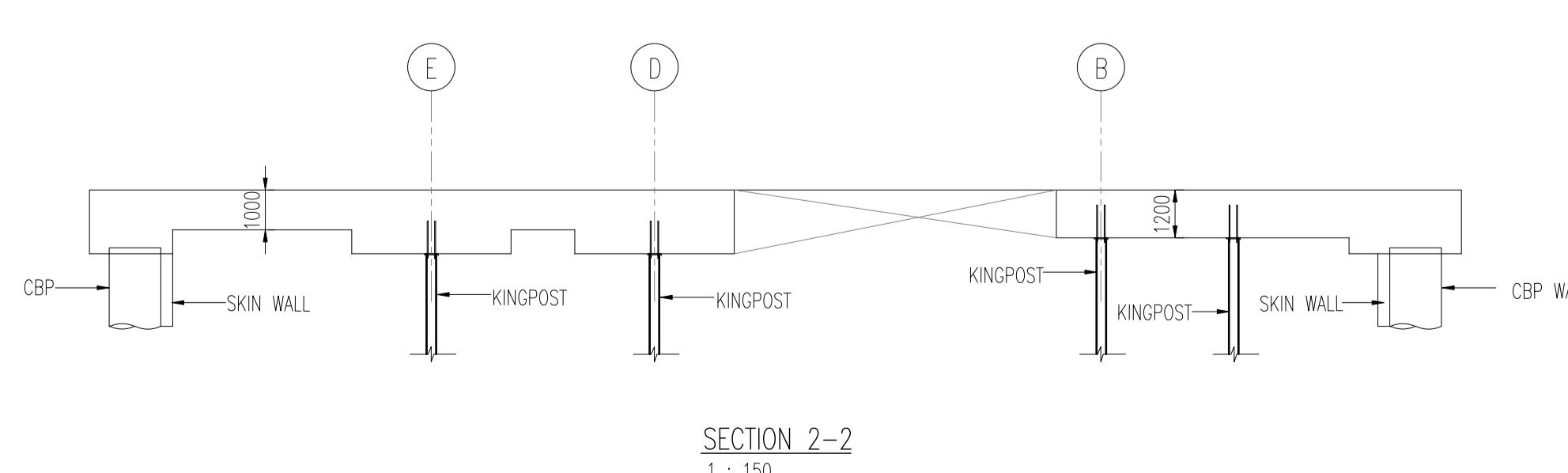
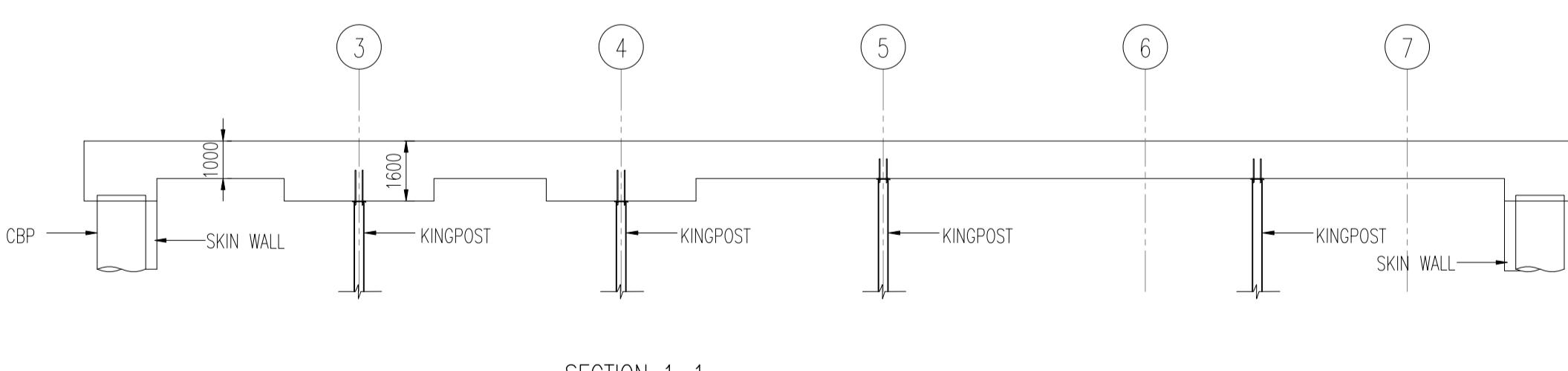
For Commissioner of Building Control

SCHEDULE OF TEMPORARY STEEL STRUT

STRUT ID	SIZE	REMARKS
S1	UC 356 x 368 x 147 kg/m	S355, MAX. SPACING 3m

LEGENDS:
x - KINGPOSTSRC STRUTTING LAYOUT @ ROOF LEVEL
1 : 200

- NOTE: UNLESS NOTED OTHERWISE (UNO)
 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT ARCHITECTURAL & STRUCTURAL DRAWINGS.
 2. SCHEDULE OF KINGPOSTS SHALL REFER TO DRAWING NO MRN-304-EAC-CS-RSW-5611.
 3. DESIGN LOADING IS AS FOLLOWS:
 CONSTRUCTION LIVE LOAD: 25kPa.



ACCREDITED CHECKER
No: 1139

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Registration No: A036
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SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date : _____

SPECIALIST
ACCREDITED CHECKER
No: 7019

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(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date : _____

PROFESSIONAL ENGINEER
GEOTECHNICAL
LAU WEI HING
3670
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS STAMP & SIGNATURE)
Date : _____

PROFESSIONAL ENGINEER
CIVIL
CHIN KHENG MING
4447
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS STAMP & SIGNATURE)
Date : _____

1 04/06/20 CT AS PER BCA'S COMMENTS
NO DATE BY AMENDMENTS

CLIENT:
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6 RAFFLES BOULEVARD
#02-249 MARINA SQUARE
SINGAPORE 039594
TEL: 63383988 FAX: 63379989

PROJECT TITLE:
PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING
THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE
WITH OPEN-DECK, 2 STOREY FAB HUB, 2 STOREY CAVERN, ELEVATED
WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

DRAWING TITLE:
RAINFOREST NORTH:
STORMWATER & ANIMAL WASTE TANK
ERS: RC STRUTTING LAYOUT AT ROOF LEVEL

PRELIMINARY INFORMATION	TENDER CONSTRUCTION
<input checked="" type="checkbox"/> AUTHORITY SUBMISSION
DRAWN BY : CT/GL	SCALE : AS SHOWN
DESIGN BY : CW	DATE : JUNE 2020
CHECKED BY : CKM	MRN-304-EAC-CS-RSW-5603

Emerald Asia Consulting Pte Ltd
16 Jalan Klang
#03-03 Hoi Hup Building Singapore 159416
TEL : 65336788 FAX : 65360229

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Building and Construction Authority
2020/2021

For Commissioner of Building Control

ACCREDITED CHECKER
No: 1139

LEUNG WAI MAN
in AC Organisation
Registration No: A036
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :

SPECIALIST
ACCREDITED CHECKER
No: 7019

YEO LILY
BUILDING CONTROL ACT
SINGAPORE(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :

PROFESSIONAL ENGINEER
GEOTECHNICAL
LAU WEI HING
3670
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

PROFESSIONAL ENGINEER
CIVIL
CHIN KHENG MING
4447
SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

1 04/06/20 CT AS PER BCA'S COMMENTS
NO DATE BY AMENDMENTS

CLIENT:



MANDAI PARK DEVELOPMENT PTE LTD
80 MANDAI LAKE ROAD, SINGAPORE 729826
TEL: 6360 2181 EMAIL: PHILIP.YIM@MANDAI.COM

ARCHITECT:



DP ARCHITECTS PTE LTD
6 RAFFLES BOULEVARD
#02-249 MARINA SQUARE
SINGAPORE 039594
TEL: 63383988 FAX: 63379989

PROJECT TITLE:
PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING
THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE
WITH OPEN-DECK, 2 STOREY FAB HUB, 2 STOREY CAVERN, ELEVATED
WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

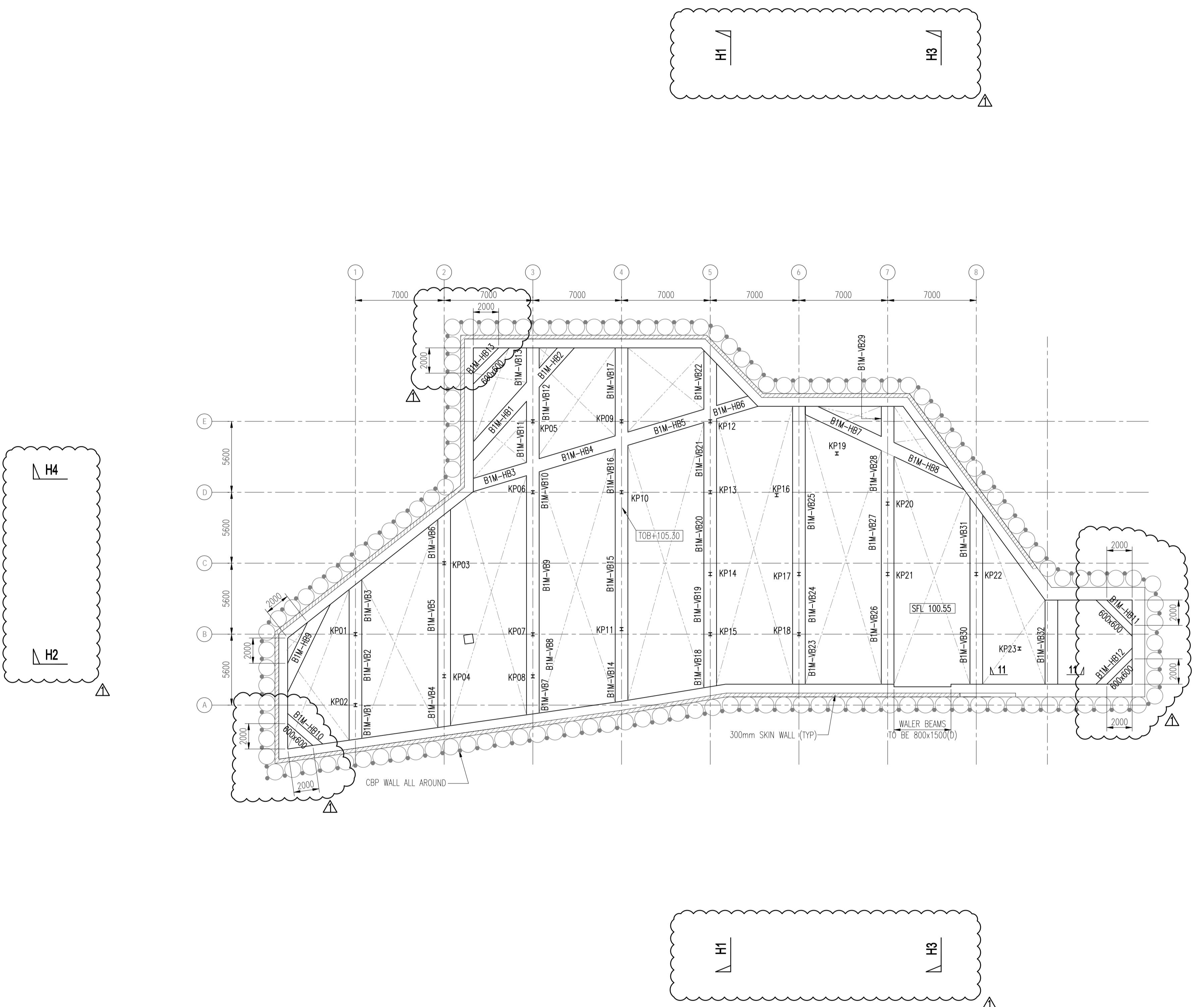
DRAWING TITLE:

Rainforest North:
Stormwater & Animal Waste Tank
ERS: RC Strutting Layout at B1 Level

<input type="checkbox"/> PRELIMINARY	<input type="checkbox"/> TENDER
<input type="checkbox"/> INFORMATION	<input type="checkbox"/> CONSTRUCTION
<input checked="" type="checkbox"/> AUTHORITY SUBMISSION

DRAWN BY : CT/GL	SCALE : AS SHOWN	REV.
DESIGN BY : CW	DATE : JUNE 2020	
CHECKED BY : CKM	MRN-304-EAC-CS-RSW-5604	

Emerald Asia Consulting Pte Ltd
16 Jalan Klang
#03-03 Hoi Hup Building Singapore 159416
TEL: 65336788 FAX: 65360229

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1 : 200

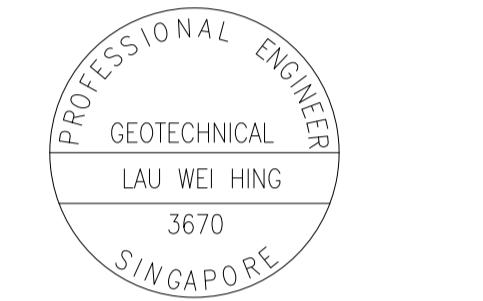
NOTE: UNLESS NOTED OTHERWISE (UNO)
1. ALL RC STRUTS SHALL BE 1000x1000.
2. WALER BEAMS TO BE 1800x1500(D) ALL AROUND.
UNLESS OTHERWISE STATED

LEGENDS:
x - KINGPOSTS

ACCREDITED CHECKER
No: 1139
LEUNG WAI MAN in AC Organisation Registration No: A036
BUILDING CONTROL ACT SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :

SPECIALIST ACCREDITED CHECKER
No: 7019
YEO LILY
BUILDING CONTROL ACT SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

1	04/06/20	CT	AS PER BCA'S COMMENTS
NO	DATE	BY	AMENDMENTS

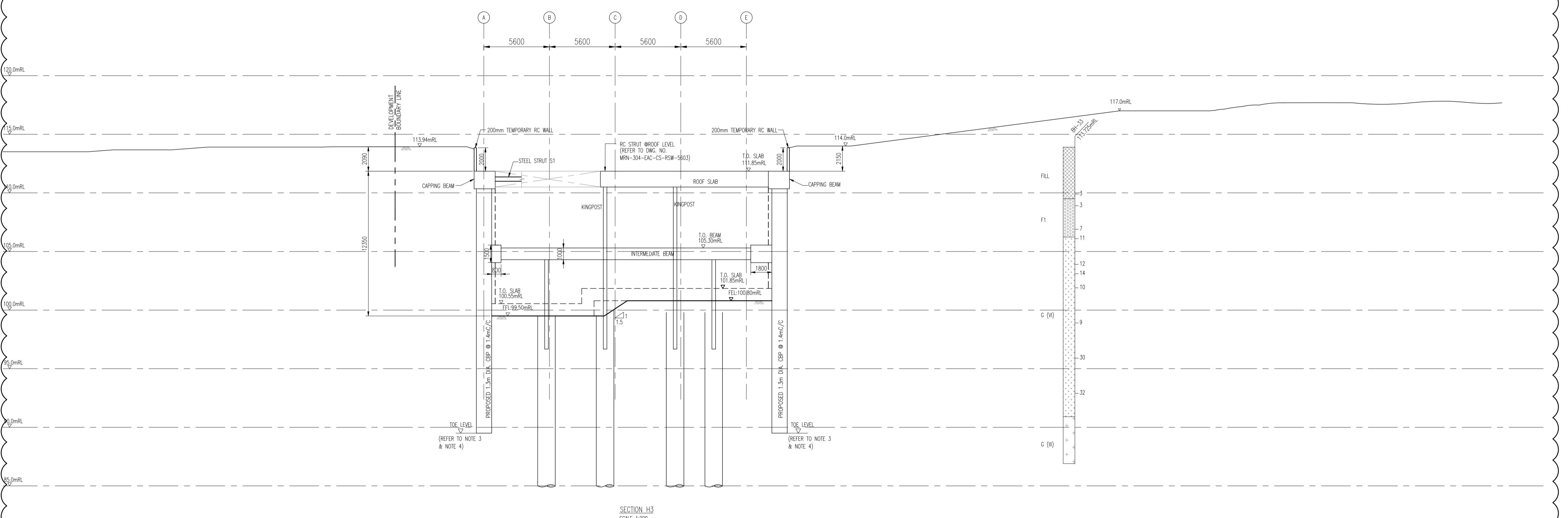
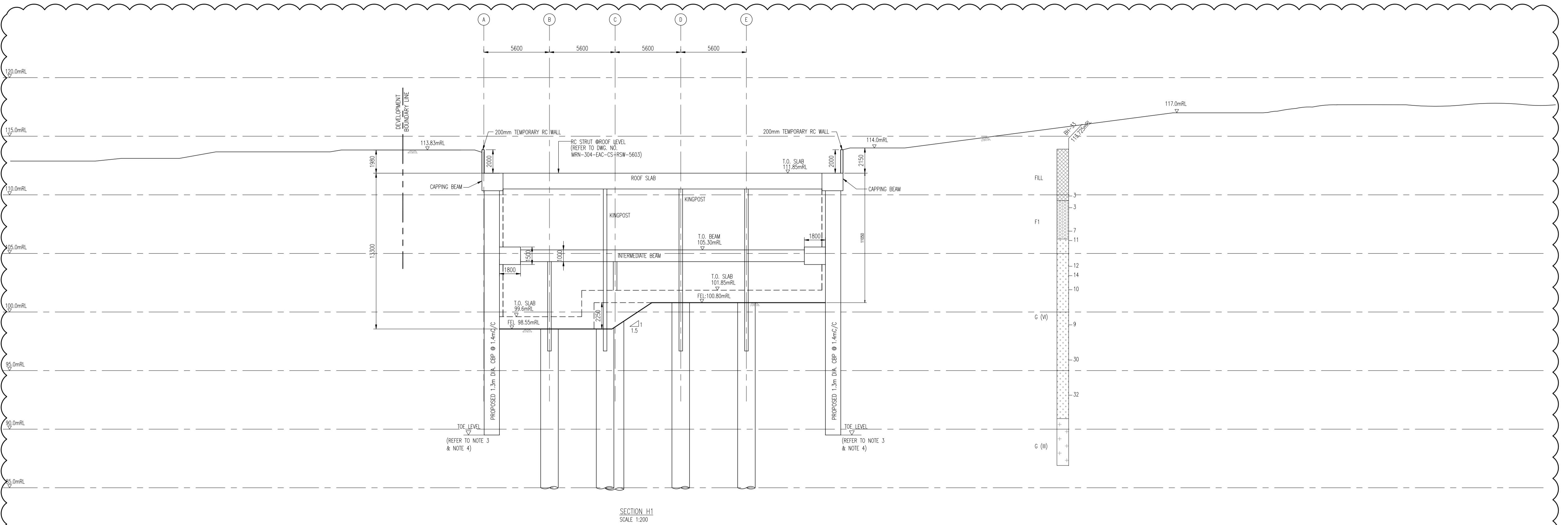
CLIENT:
Mandai
MANDAI PARK DEVELOPMENT PTE LTD
80 MANDAI LAKE ROAD, SINGAPORE 729826
TEL: 6360 2191 EMAIL: PHILIP.YIM@MANDAI.COMARCHITECT:
DP ARCHITECTS PTE LTD
6 RAFFLES BOULEVARD
#02-249 MARINA SQUARE
SINGAPORE 039594
TEL: 63383988 FAX: 63379989PROJECT TITLE:
PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING
THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
2 STOREY ANIMAL BACK OF HOUSE, 2 STOREY EDUCATION CENTRE
WITH OPEN-DECK, 2 STOREY F&B HUB, 2 STOREY CAVERNS, ELEVATED
WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)DRAWING TITLE:
RAINFOREST NORTH:
STORMWATER & ANIMAL WASTE TANK
ERS: SECTION H1 & H3

<input type="checkbox"/> PRELIMINARY	<input type="checkbox"/> INFORMATION	<input checked="" type="checkbox"/> AUTHORITY SUBMISSION	<input type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION
--------------------------------------	--------------------------------------	--	---------------------------------	---------------------------------------

DRAWN BY : CT/GL SCALE : AS SHOWN REV.

DESIGN BY : CW DATE : JUNE 2020 1

CHECKED BY : CKM MRN-304-EAC-CS-RSW-5605

Emerald Asia Consulting Pte Ltd
16 Jalan Keling
#03-03 Hoi Hup Building, Singapore 159416
TEL: 65336788 FAX: 65336229This drawing is copyright and remains the property of Emerald Asia Consulting Pte Ltd
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- GENERAL NOTES SHALL BE REFERRED TO DWG NO. MRN-304-EAC-CS-RSW-5601
- LOCATIONS OF SECTION H1 & H3 SHALL BE REFERRED TO DWG NO. MRN-304-EAC-CS-RSW-5602
- INFORMATION REFERRED TO IN THIS DRAWING SHALL REFER TO "SCHEDULE OF CBP" IN DWG NO. MRN-304-EAC-CS-RSW-5602
- IF ACTUAL ROCKHEAD LEVEL IS SIGNIFICANTLY HIGHER THAN ASSUMED IN DESIGN, QPD SHALL BE CONSULTED FOR REVIEW DESIGN.

Building and Construction Authority
2013

For Commissioner of Building Control

ACCREDITED CHECKER
No: 1139LEUNG WAI MAN
in AC Organisation
Registration No: A036
BUILDING CONTROL ACT
SINGAPORE(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :SPECIALIST
ACCREDITED CHECKER
No: 7019YEO LILY
BUILDING CONTROL ACT
SINGAPORE(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :1 04/06/20 CT AS PER BCA'S COMMENTS
NO DATE BY AMENDMENTS

CLIENT:

Mandai
MANDAI PARK DEVELOPMENT PTE LTD
80 MANDAI LAKE ROAD, SINGAPORE 729826
TEL: 6360 2181 EMAIL: PHILIP.Y@MANDAI.COM

ARCHITECT:

~~DP ARCHITECTS PTE LTD~~
6 RAFFLES BOULEVARD
#02-249 MARINA SQUARE
SINGAPORE 039594
TEL: 63383988 FAX: 63379989

PROJECT TITLE:
PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING
THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE
WITH OPEN-DECK, 2 STOREY FAB HUB, 2 STOREY CAVERN, ELEVATED
WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

DRAWING TITLE:

Rainforest North:
STORMWATER & ANIMAL WASTE TANK
ERS: SECTION H2 & H4

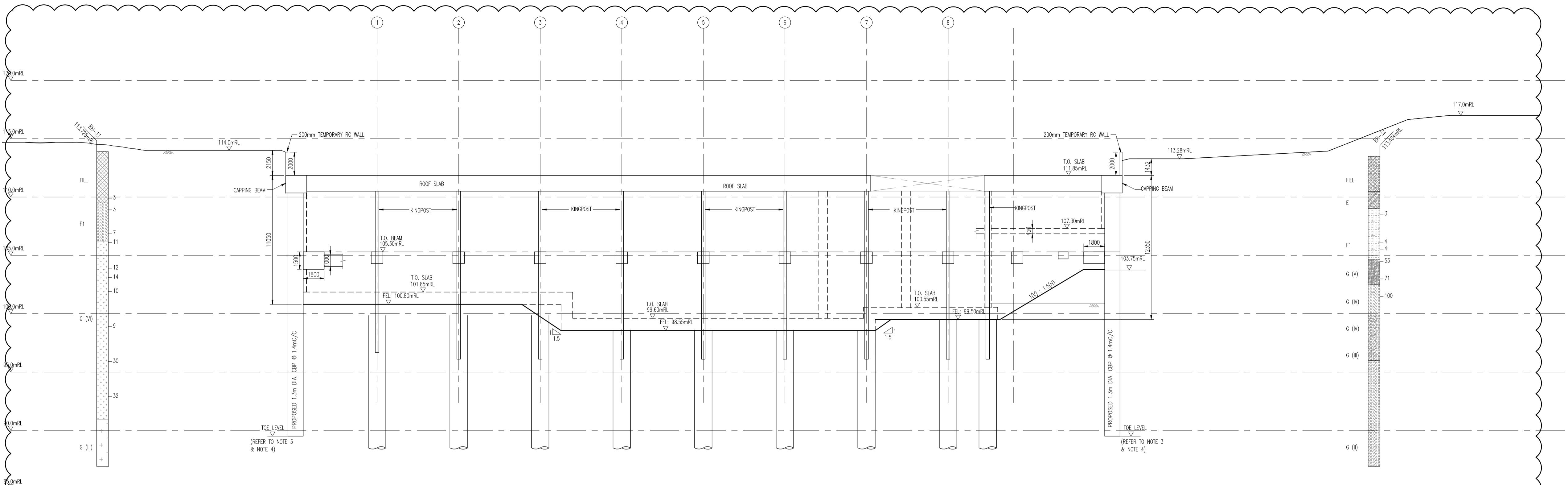
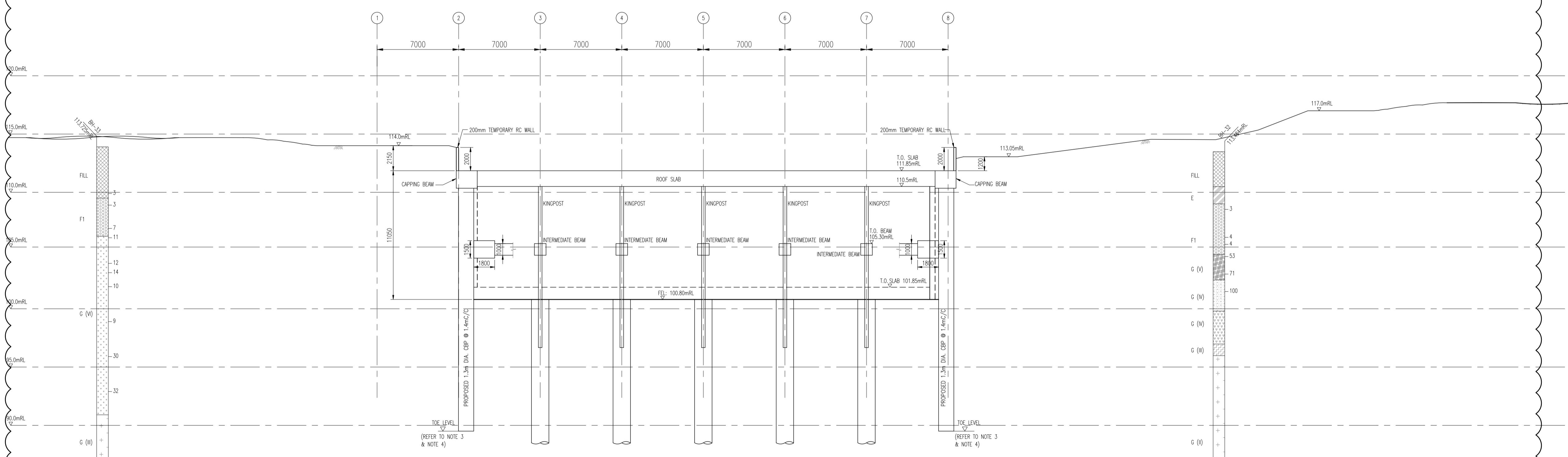
PRELIMINARY INFORMATION	TENDER CONSTRUCTION
<input checked="" type="checkbox"/>	<input type="checkbox"/>

DRAWN BY : CT/GL	SCALE : AS SHOWN
DESIGN BY : CW	DATE : JUNE 2020
CHECKED BY : CKM	MRN-304-EAC-CS-RSW-5606

REV.

1

Emerald Asia Consulting Pte Ltd
16 Jalan Keling
#03-03 Hoi Hup Building Singapore 159416
TEL : 65336788 FAX : 65360229

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SCALE 1:200SECTION H4
SCALE 1:200

- NOTES:
- GENERAL NOTES SHALL BE REFERRED TO DWG NO. MRN-304-EAC-CS-RSW-5601
 - LOCATION OF SECTION H2 & H4 SHALL BE REFERRED TO DWG NO. MRN-304-EAC-CS-RSW-5602.
 - DEPARTMENT REQUIREMENT OF CBP SHALL REFER TO "SCHEDULE OF CBP" IN DWG NO. MRN-304-EAC-CS-RSW-5602.
 - IF ACTUAL ROCKHEAD LEVEL IS SIGNIFICANTLY HIGHER THAN ASSUMED IN DESIGN, QPO SHALL BE CONSULTED FOR REVIEW DESIGN.

Building and Construction Authority
 2020/2021

For Commissioner of Building Control

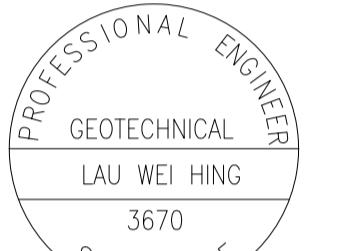
ACCREDITED CHECKER
No: 1139
LEUNG WAI MAN
in AC Organisation
Registration No: A036
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
 Date :

SPECIALIST
ACCREDITED CHECKER
No: 7019

YEO LILY
 BUILDING CONTROL ACT
 SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
 Date :



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
 Date :



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
 Date :

1 04/06/20 CT AS PER BCA'S COMMENTS
 NO DATE BY AMENDMENTS

CLIENT:



MANDAI PARK DEVELOPMENT PTE LTD
 80 MANDAI LAKE ROAD, SINGAPORE 729826
 TEL: 6360 2181 EMAIL: PHILIP.YIM@MANDAI.COM

ARCHITECT:



PROJECT TITLE:
 PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING
 THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
 2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE
 WITH OPEN-DECK, 2 STOREY FAB HUB, 2 STOREY CAVERN, ELEVATED
 WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
 MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

DRAWING TITLE:

Rainforest North:
 Stormwater & Animal Waste Tank
 ERSS: Typical Construction Sequence

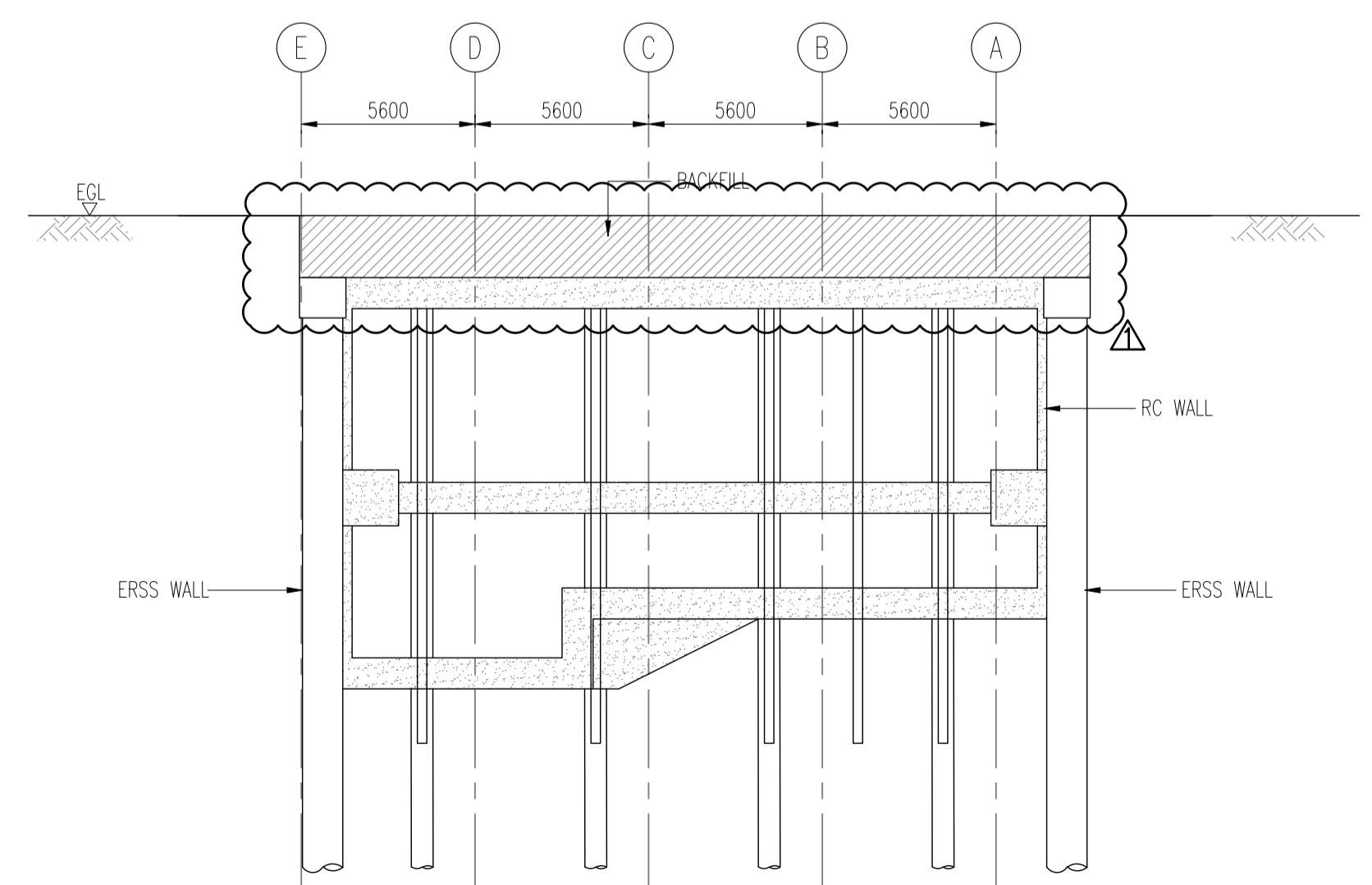
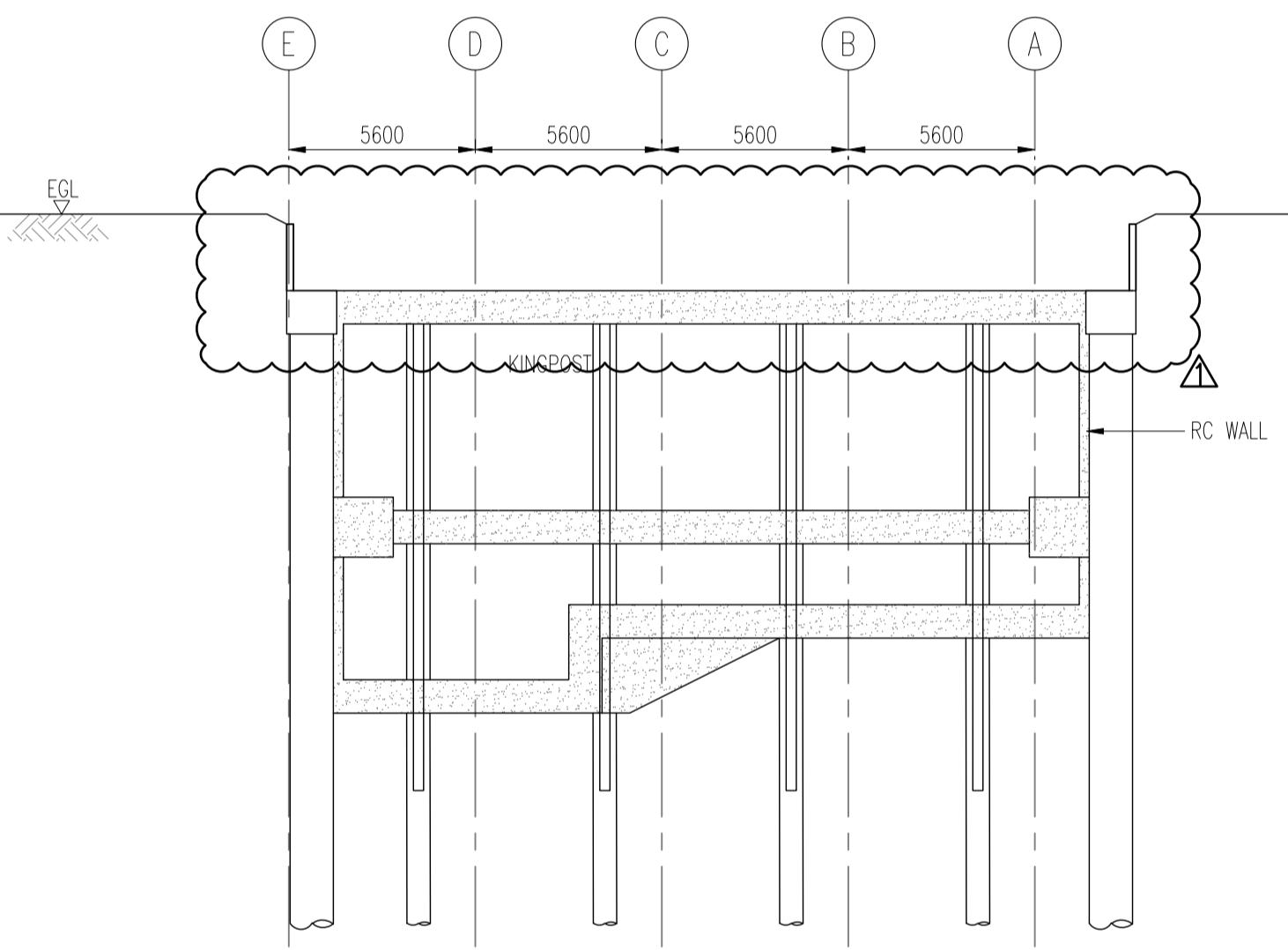
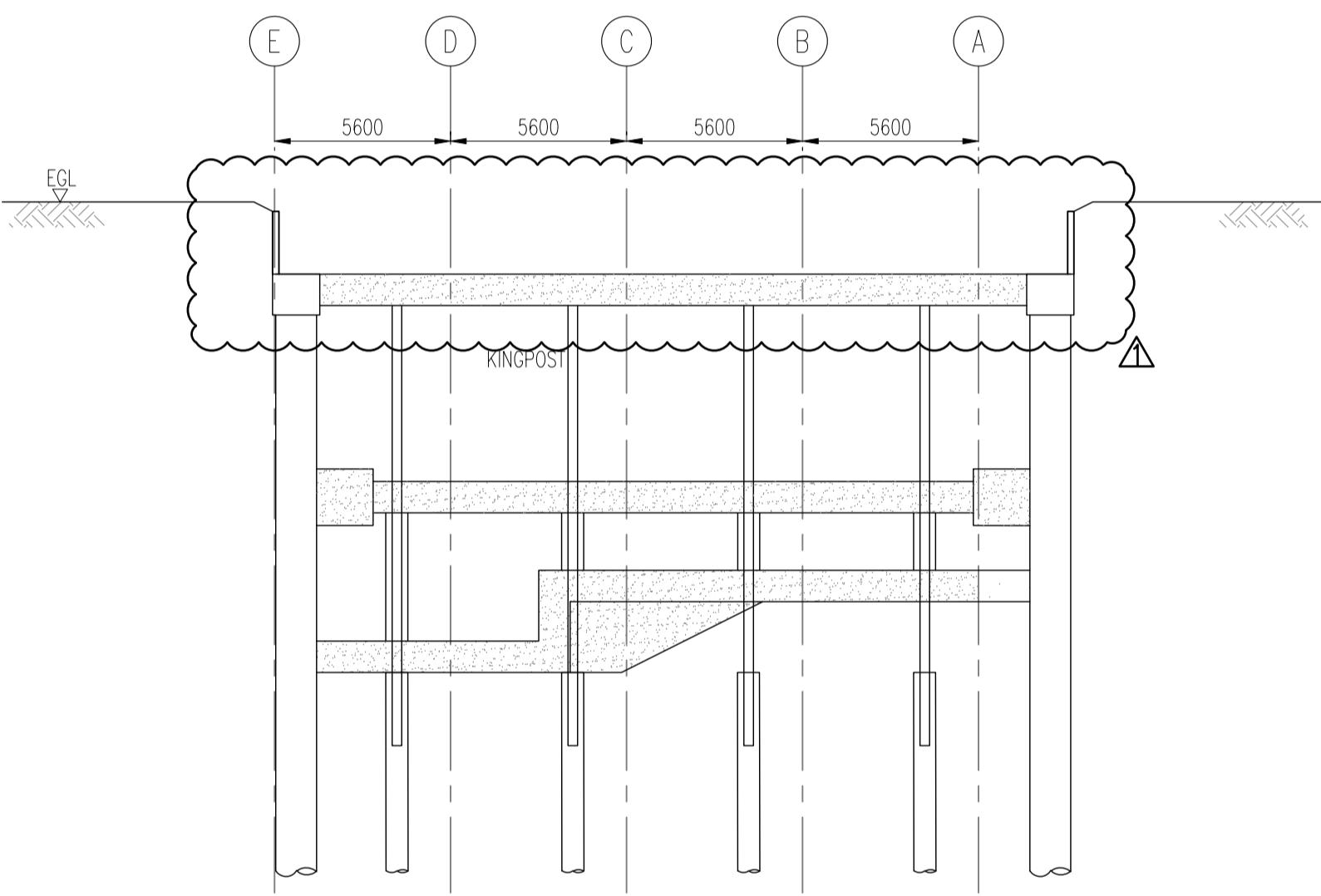
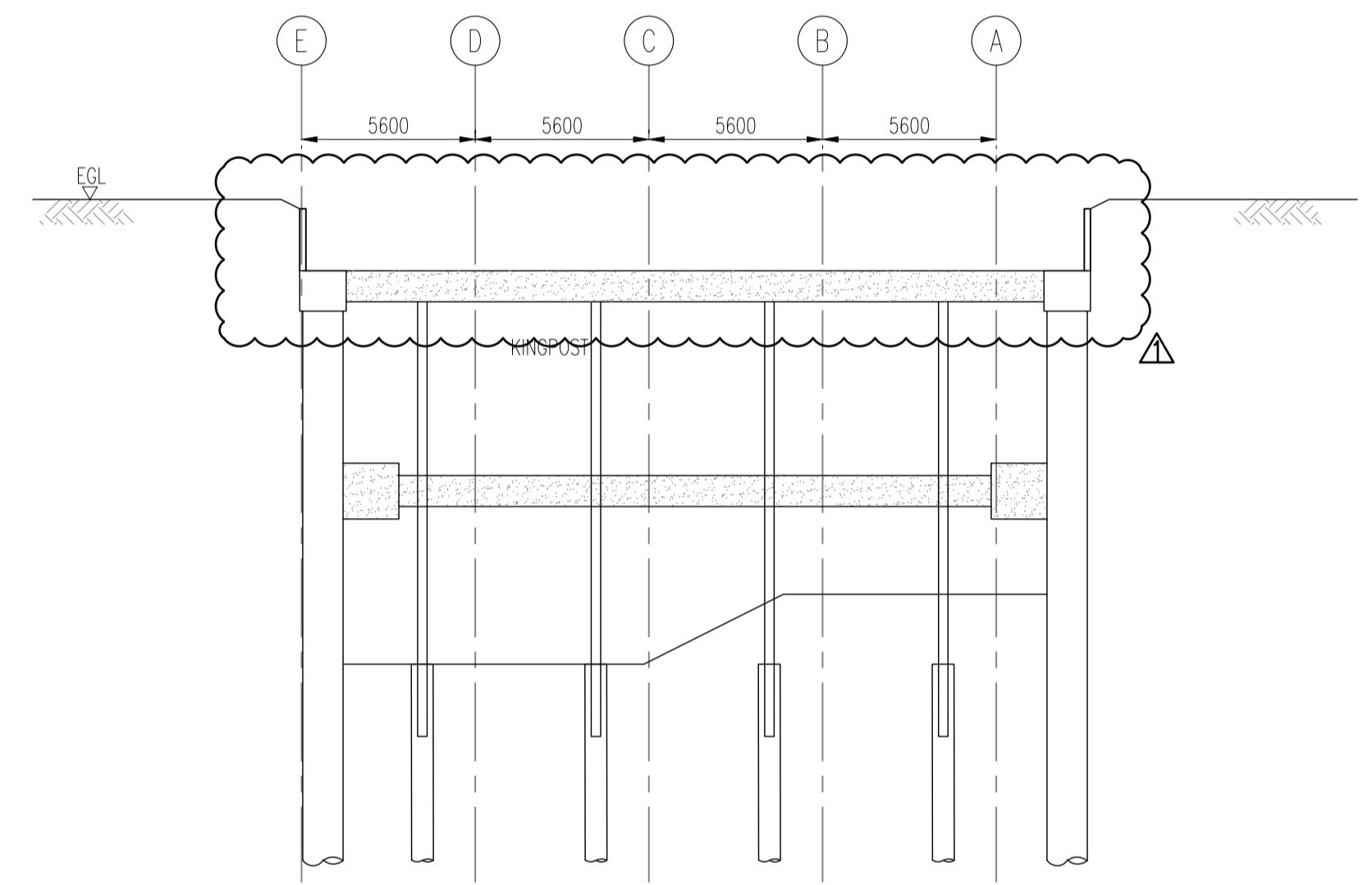
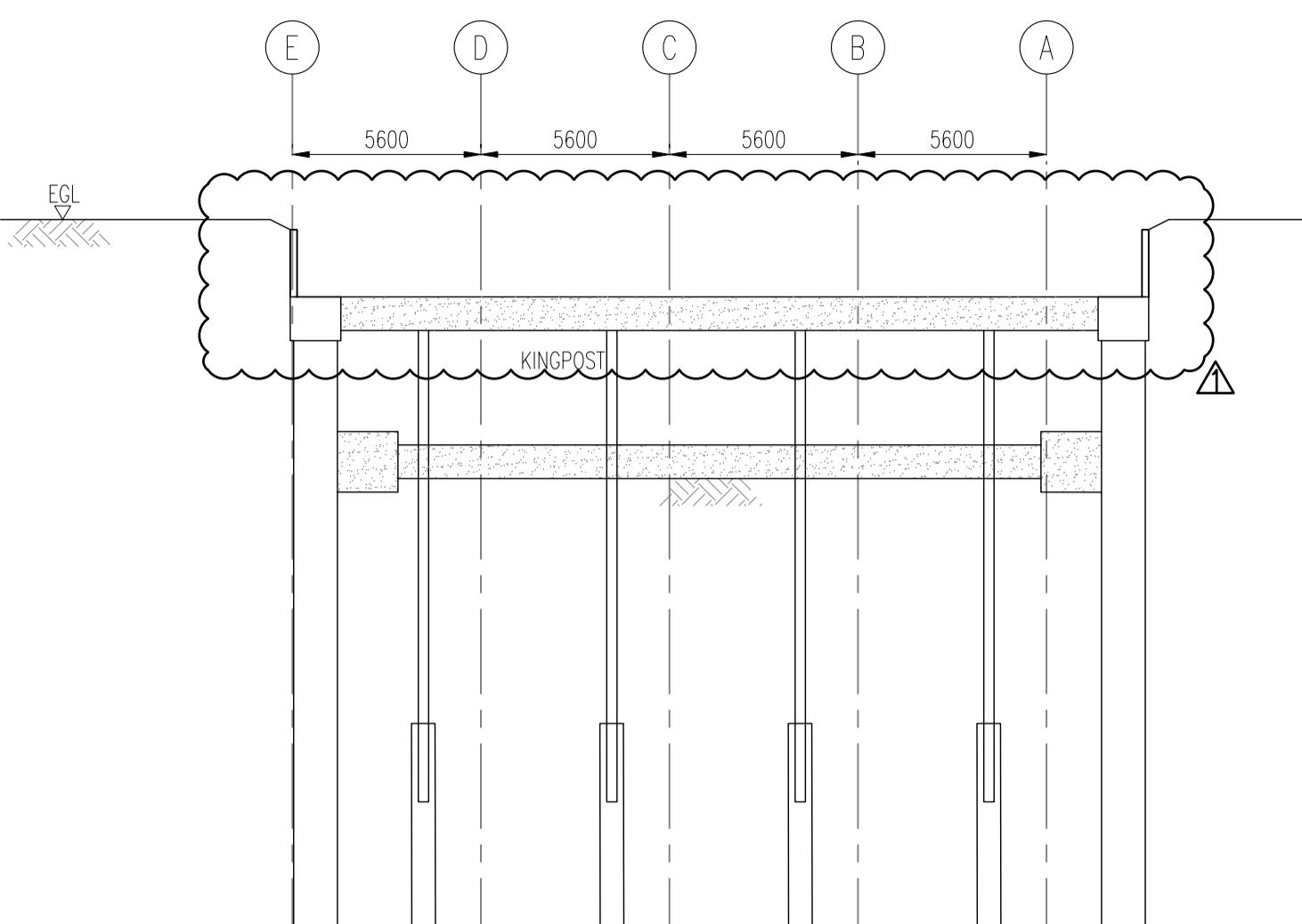
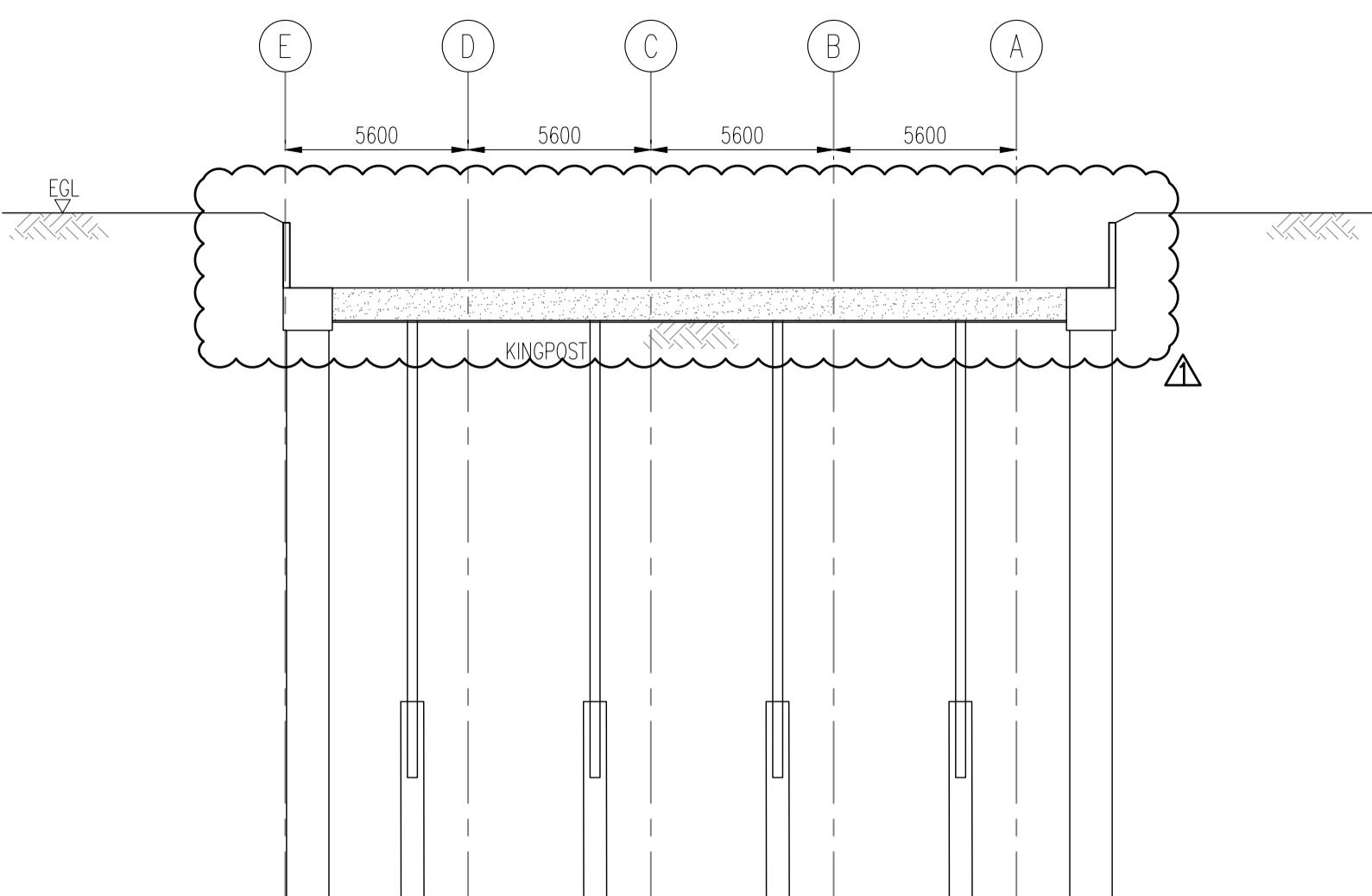
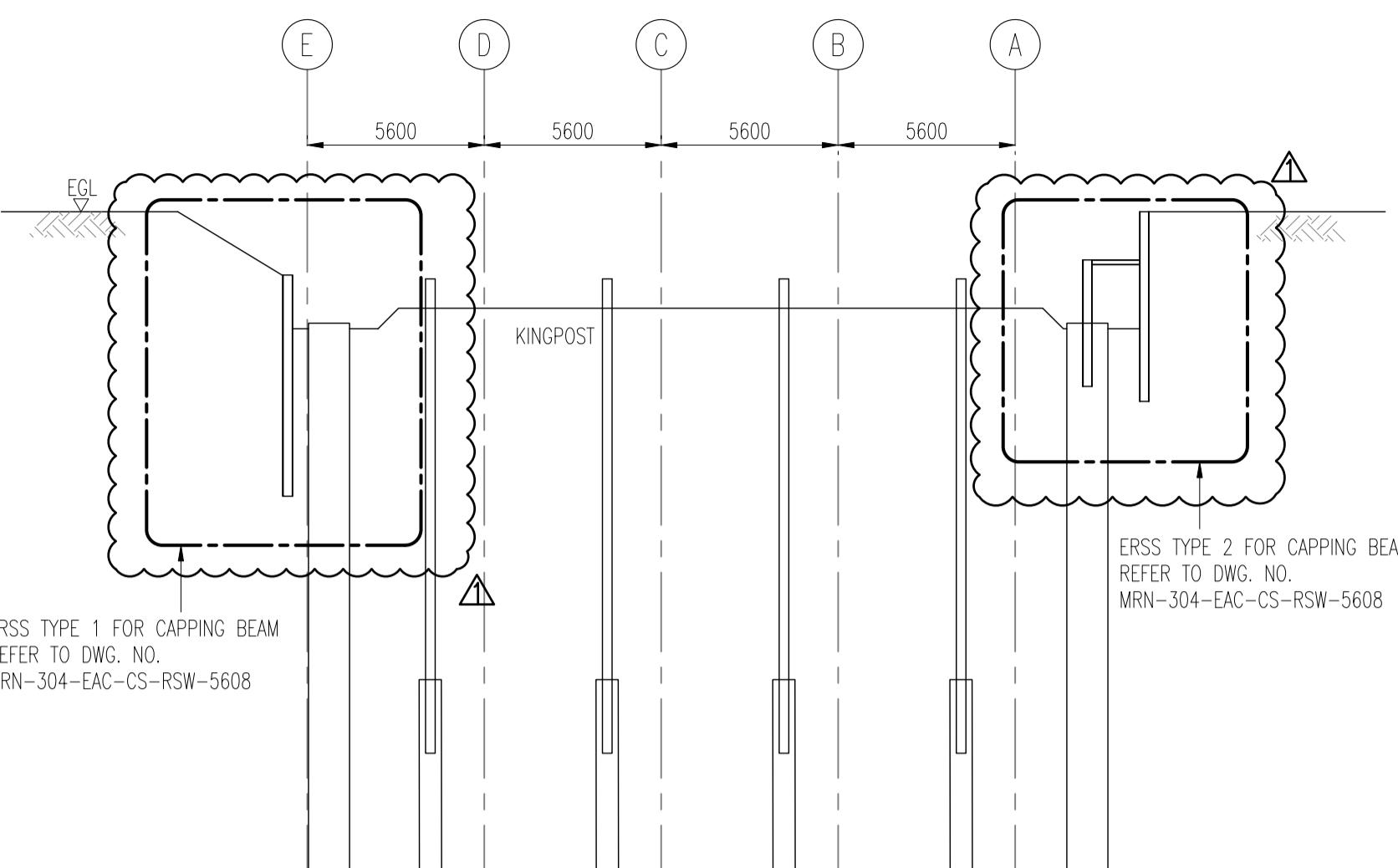
PRELIMINARY INFORMATION	TENDER CONSTRUCTION
<input checked="" type="checkbox"/> AUTHORITY SUBMISSION

DRAWN BY : CT/GL DATE : AS SHOWN
 DESIGN BY : CW DATE : JUNE 2020
 CHECKED BY : CKM MRN-304-EAC-CS-RSW-5607

REV. 1

Emerald Asia Consulting Pte Ltd
 16 Jalan Keling #03-03 Hoi Hup Building Singapore 159416
 TEL : 65336788 FAX : 65360229

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7.1 BACKFILL TO FINISHED GROUND LEVEL.

- NOTES:
 1. ALL EXPOSED SLOPE AND BARE SURFACE IF ANY, BEYOND TOP SLOPE
 SHALL BE COVERED BY 50mm LEAN CONCRETE OR EQUIVALENT.

ACCREDITED CHECKER

No: 1139

LEUNG WAI MAN
 in AC Organisation
 Registration No: A036
**BUILDING CONTROL ACT
 SINGAPORE**

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :

SPECIALIST ACCREDITED CHECKER

No: 7019

YEO LILY
**BUILDING CONTROL ACT
 SINGAPORE**

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)

Date :



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)

Date :

1	04/06/20	CT	AS PER BCA'S COMMENTS
NO	DATE	BY	AMENDMENTS
CLIENT: Mandai MANDAI PARK DEVELOPMENT PTE LTD 80 MANDAI LAKE ROAD, SINGAPORE 729826 TEL: 6360 2181 EMAIL: PHILIP.YIM@MANDAI.COM			

ARCHITECT: 			
DP ARCHITECTS PTE LTD 6 RAFFLES BOULEVARD #02-249 MARINA SQUARE SINGAPORE 039594 TEL: 63383988 FAX: 63379989			

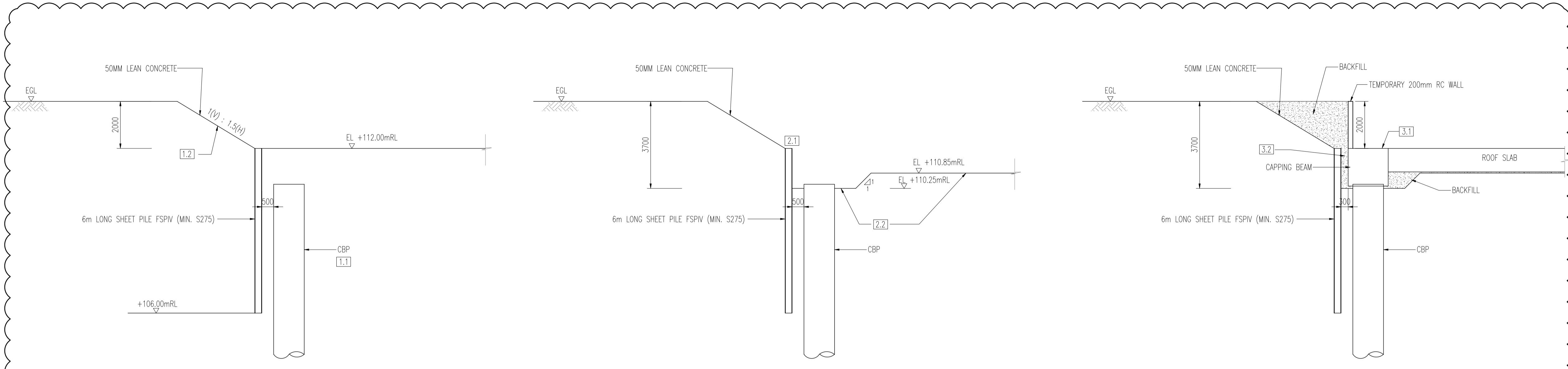
PROJECT TITLE: PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS 2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE WITH OPEN-DECK, 2 STOREY FAB HUB, 2 STOREY CAVERN, ELEVATED WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)			
--	--	--	--

DRAWING TITLE: RAINFOREST NORTH: STORMWATER & ANIMAL WASTE TANK ERS: TYPICAL CONSTRUCTION SEQUENCE FOR CAPPING BEAM			
--	--	--	--

<input type="checkbox"/> PRELIMINARY	<input type="checkbox"/> TENDER
<input type="checkbox"/> INFORMATION	<input type="checkbox"/> CONSTRUCTION
<input checked="" type="checkbox"/> AUTHORITY SUBMISSION

DRAWN BY : CT/GL	SCALE : AS SHOWN
DESIGN BY : CW	DATE : JUNE 2020
CHECKED BY : CKM	MRN-304-EAC-CS-RSW-5608

	Emerald Asia Consulting Pte Ltd 16 Jalan Keling #03-03 Hoi Hup Building Singapore 159416 TEL: 65336788 FAX: 65360229
--	---

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STAGE 1

- 1.1 INSTALL CBP,
- 1.2 OPEN CUT TO +112.00mRL

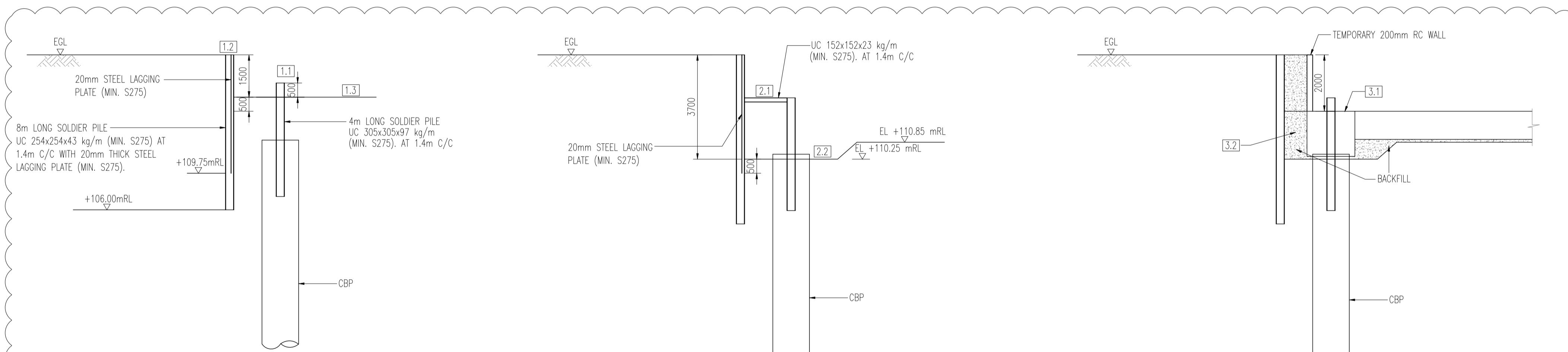
STAGE 2

- 2.1 INSTALL SHEET PILE WALL.
- 2.2 EXCAVATE TO SOFFIT LEVEL OF CAPPING BEAM/SOFFIT OF ROOF SLAB.

STAGE 3

- 3.1 CONSTRUCT CAPPING BEAM AND ROOF SLAB.
- 3.2 BACKFILL THE GAP BETWEEN CAPPING BEAM, RC WALL AND SHEET PILE WALL.
- 3.3 EXTEND THE SHEET PILE TO GL TO FACILITATE REMOVAL IF NECESSARY. REMOVE SHEET PILES.

ERSS TYPE 1
FOR CAPPING BEAM CONSTRUCTION



STAGE 1

- 1.1 INSTALL CBP WITH UC ON TOP OF PILES.
- 1.2 INSTALL SOLDIER PILE WALL WITH PLATES AS LAGGING.

STAGE 2

- 2.1 INSTALL PROP.
- 2.2 EXC TO SOFFIT OF CAPPING BEAM/SOFFIT OF ROOF SLAB.

STAGE 3

- 3.1 CONSTRUCT CAPPING BEAM, TOP SLAB AND RC WALL ON CAPPING BEAM.
- 3.2 BACKFILL THE GAP BETWEEN CAPPING BEAM, RC WALL AND SOLDIER PILE WALL.
- 3.3 REMOVE SOLDIER PILES AND LAGGING PLATE.

ERSS TYPE 2
FOR CAPPING BEAM CONSTRUCTION

ACCREDITED CHECKER

No: 1139

LEUNG WAI MAN
in AC Organisation
Registration No: A036BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :

SPECIALIST ACCREDITED CHECKER

No: 7019

YEO LILY
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :

(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

NO DATE BY AMENDMENTS

CLIENT:

MANDAI PARK DEVELOPMENT PTE LTD
80 MANDAI LAKE ROAD, SINGAPORE 729826
TEL: 6380 2181 EMAIL: PHILIP.YIM@MANDAI.COM

ARCHITECT:



PROJECT TITLE:
PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING
THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE
WITH OPEN-DECK, 2 STOREY FAB HUB, 2 STOREY CAVERN, ELEVATED
WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

DRAWING TITLE:
RAINFOREST NORTH:
STORMWATER & ANIMAL WASTE TANK
ERS: CONTIGUOUS BORED PILE DETAILS

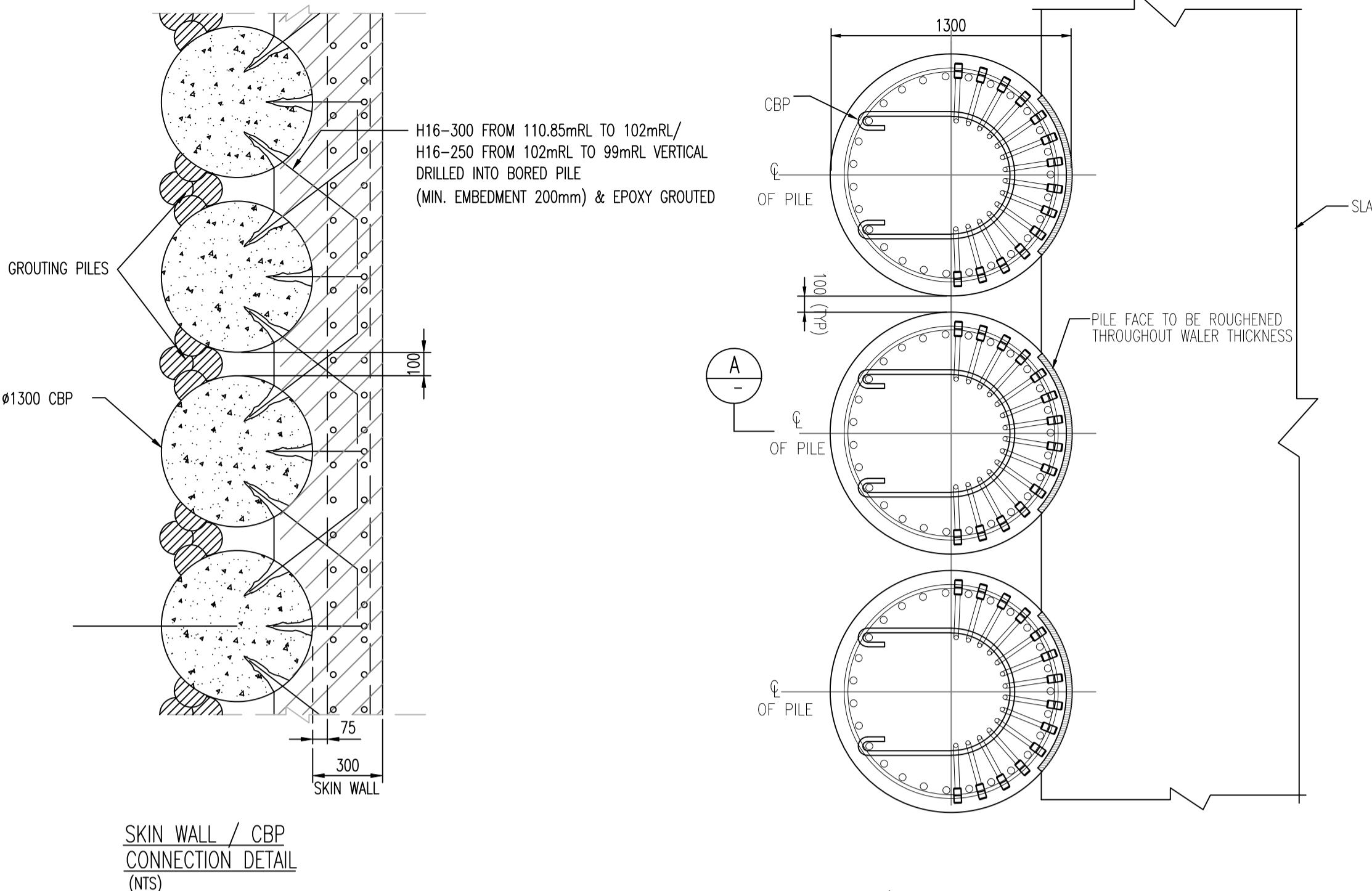
PRELIMINARY	TENDER
INFORMATION	CONSTRUCTION
AUTHORITY SUBMISSION

DRAWN BY : CT/GL DATE : AS SHOWN REV.
DESIGN BY : CW DATE : JUNE 2020
CHECKED BY : CKM MRN-304-EAC-CS-RSW-5810

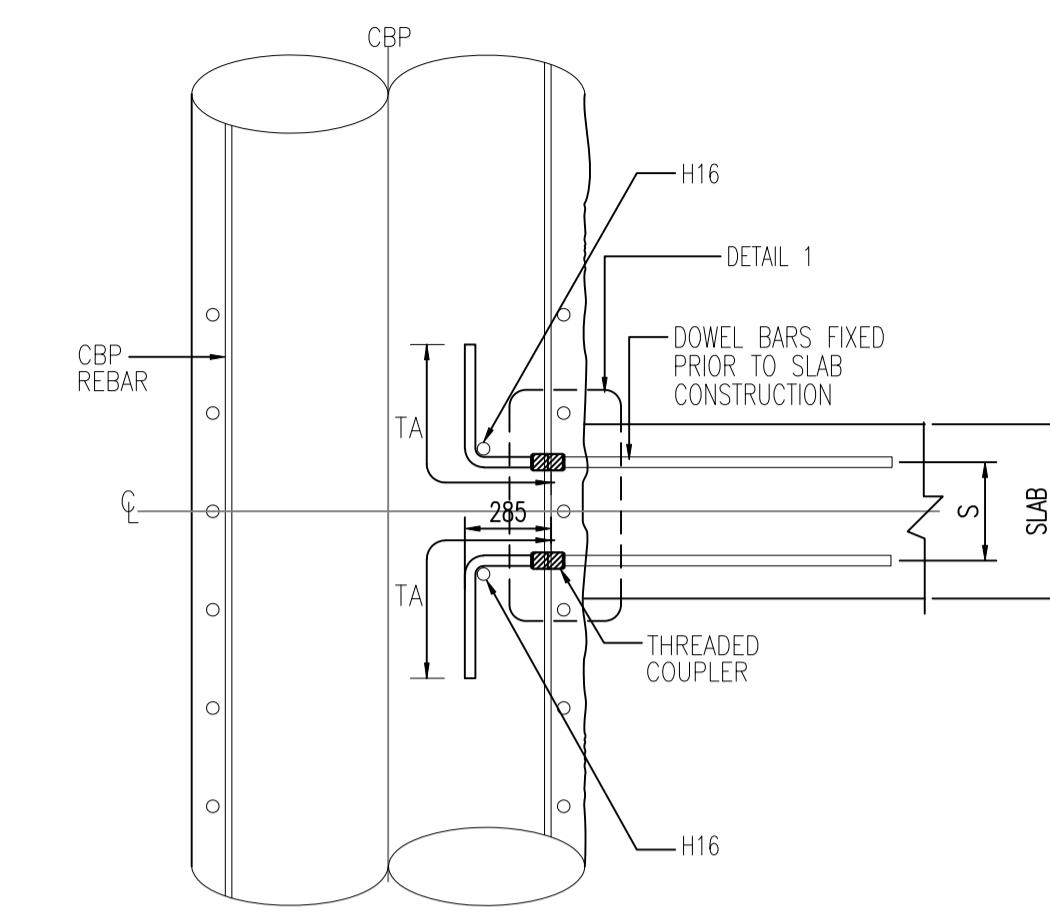


16 Jalan Klang
#03-03 Hoi Hup Building Singapore 159416
TEL : 65336788 FAX : 65360229

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**SKIN WALL / CBP
CONNECTION DETAIL**
(NTS)

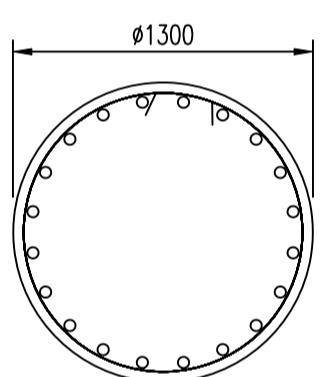


DETAIL A-A
1 : 25

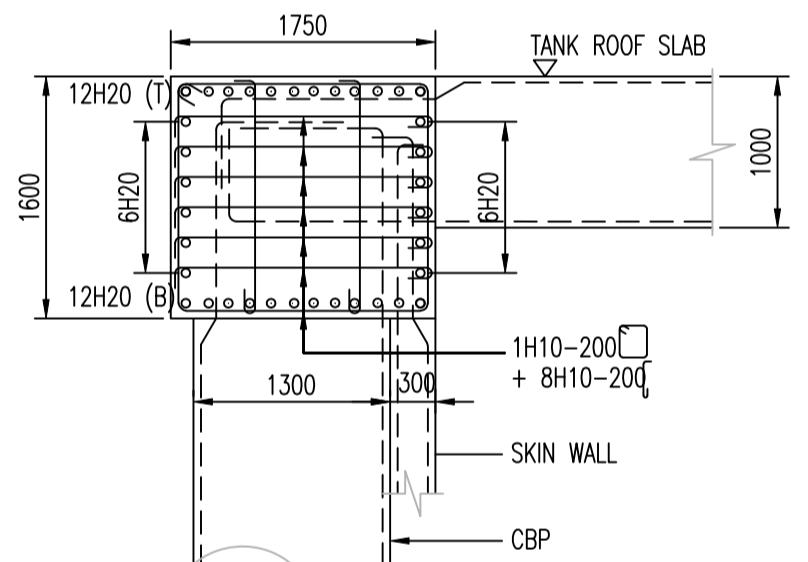
SLAB / CBP CONNECTION DETAIL
1 : NTS

NOTES:

1. CBP REBAR IN THE DETAILS IS INDICATIVELY SHOWN ONLY.
2. COUPLERS SHOWN OUTSIDE SLAB AREA ARE PROVISIONAL ONLY.
3. ALL COUPLERS SHALL BE PLACED AFTER CONCRETE COVER, AS SHOWN IN DETAIL 1.

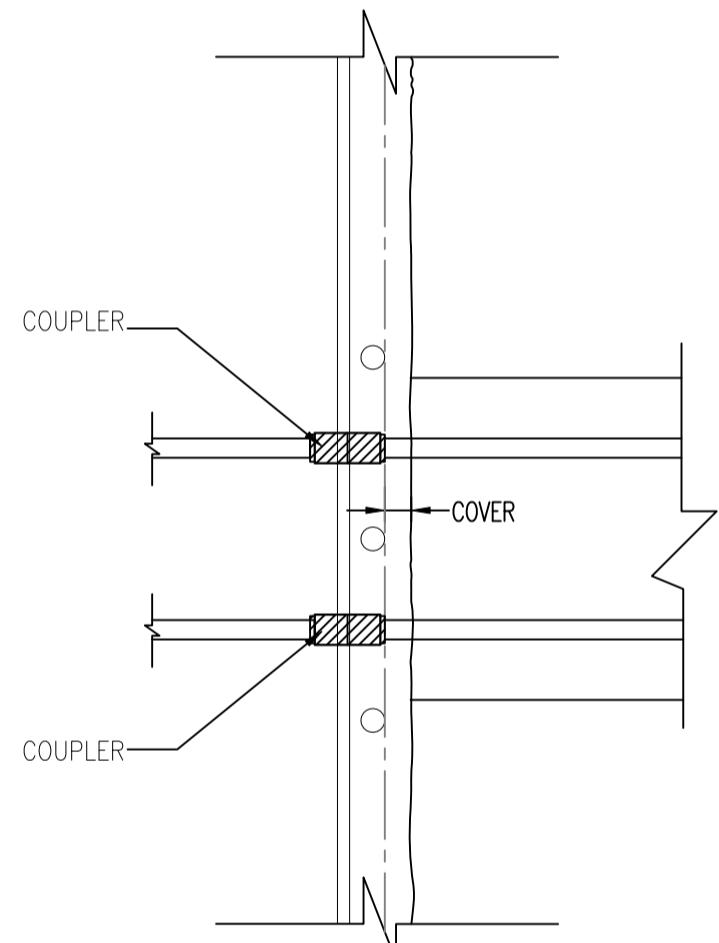


CBP CROSS SECTION DETAIL
(NTS)



NOTE :
SLAB, CBP, AND SKIN WALL REINFORCEMENT
REFER TO RESPECTIVE DETAIL DRAWINGS

CAPPING BEAM DETAIL
1 : 50



DETAIL 1

NOTES:
REINFORCEMENT DETAIL REFER TO SCHEDULE OF CBP ON
DWG NO. MRN-304-EAC-CS-RSW-5802.

ACCREDITED CHECKER
No: 1139

LEUNG WAI MAN
in AC Organisation
Registration No: A036
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :

SPECIALIST
ACCREDITED CHECKER
No: 7019

YEO LILY
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

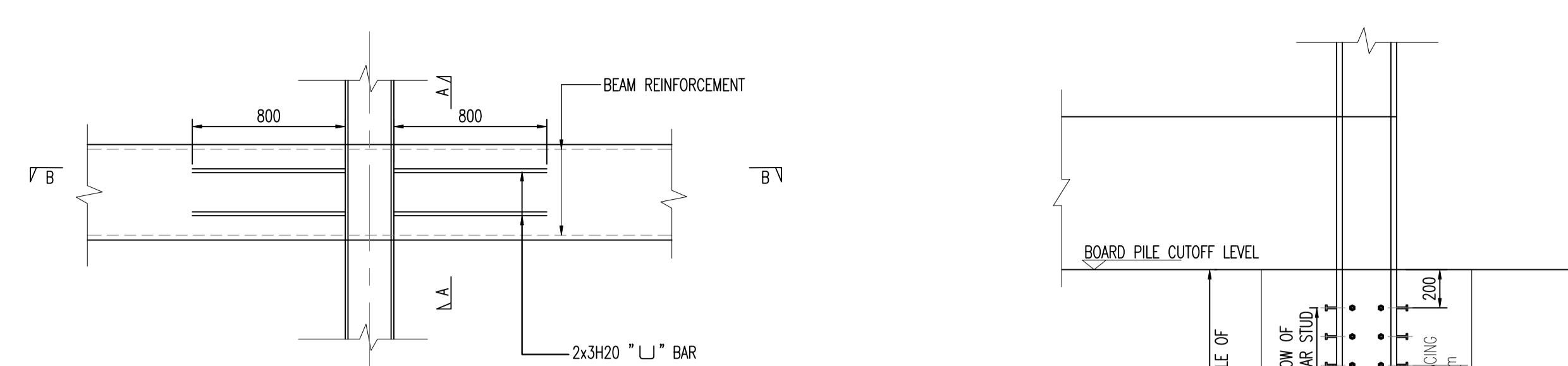


(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

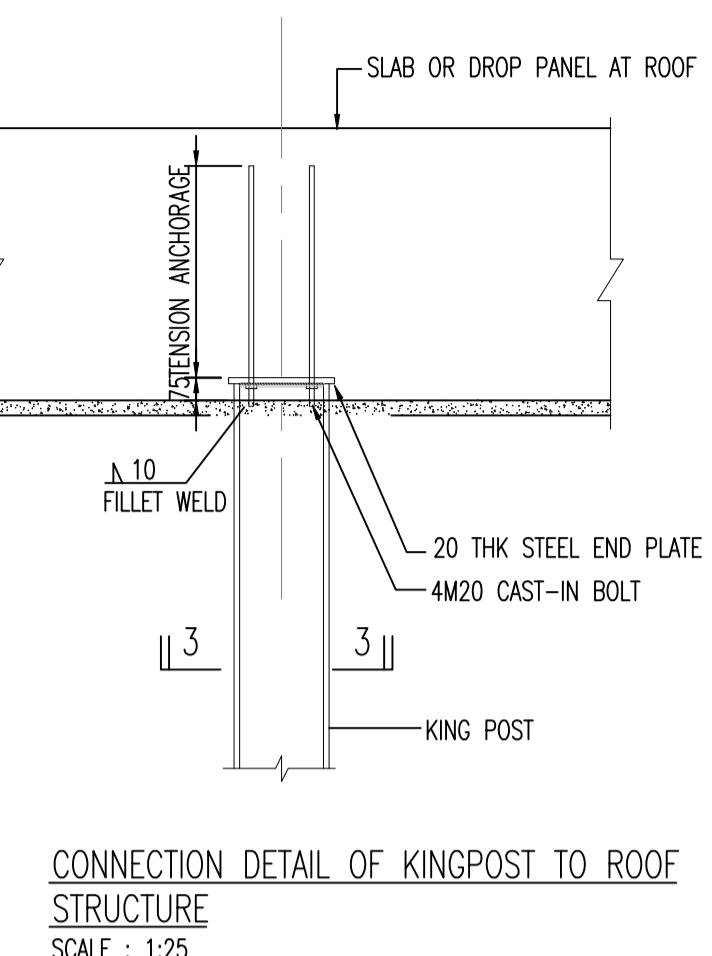
NO	DATE	BY	AMENDMENTS
CLIENT:			
 Mandai MANDAI PARK DEVELOPMENT PTE LTD 80 MANDAI LAKE ROAD, SINGAPORE 729826 TEL: 6380 2181 EMAIL: PHILIP.YIM@MANDAI.COM			
ARCHITECT:			
 DP ARCHITECTS PTE LTD 6 RAFFLES BOULEVARD #02-249 MARINA SQUARE SINGAPORE 039594 TEL: 63383988 FAX: 63379989			
PROJECT TITLE: PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS 2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE WITH OPEN-DECK, 2 STOREY FAB HUB, 2 STOREY CAVERN, ELEVATED WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)			
DRAWING TITLE: RAINFOREST NORTH: STORMWATER & ANIMAL WASTE TANK ERS: TYPICAL KINGPOST DETAILS			
<input checked="" type="checkbox"/> PRELIMINARY <input type="checkbox"/> INFORMATION <input checked="" type="checkbox"/> AUTHORITY SUBMISSION			
<input type="checkbox"/> TENDER <input type="checkbox"/> CONSTRUCTION			
DRAWN BY : CT/GL	SCALE : AS SHOWN	REV.	
DESIGN BY : CW	DATE : JUNE 2020		
CHECKED BY : CKM	MRN-304-EAC-CS-RSW-5011		

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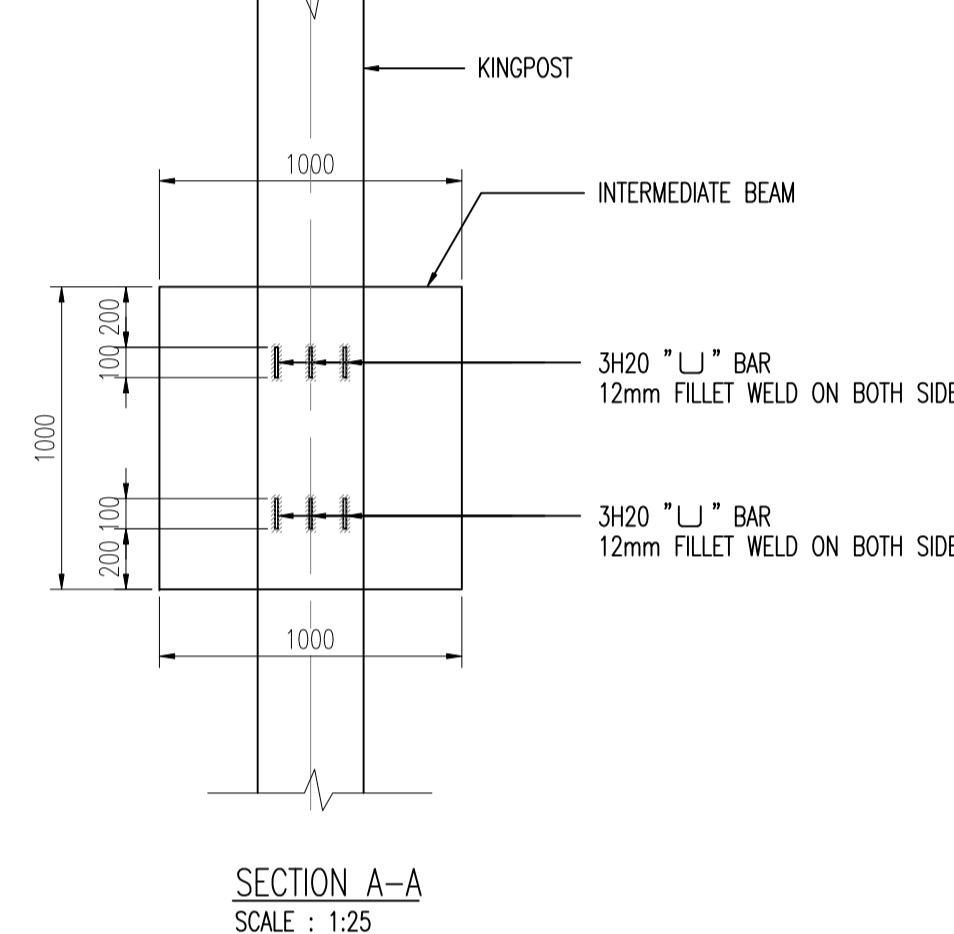
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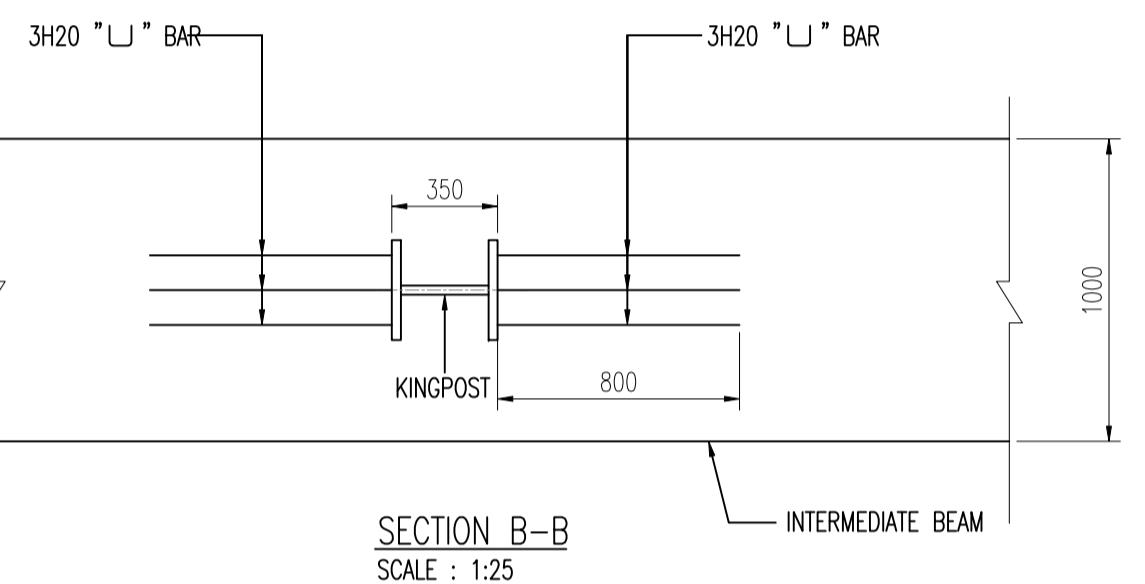
KINGPOST TO INTERMEDIATE
BEAM CONNECTION
SCALE : 1:25



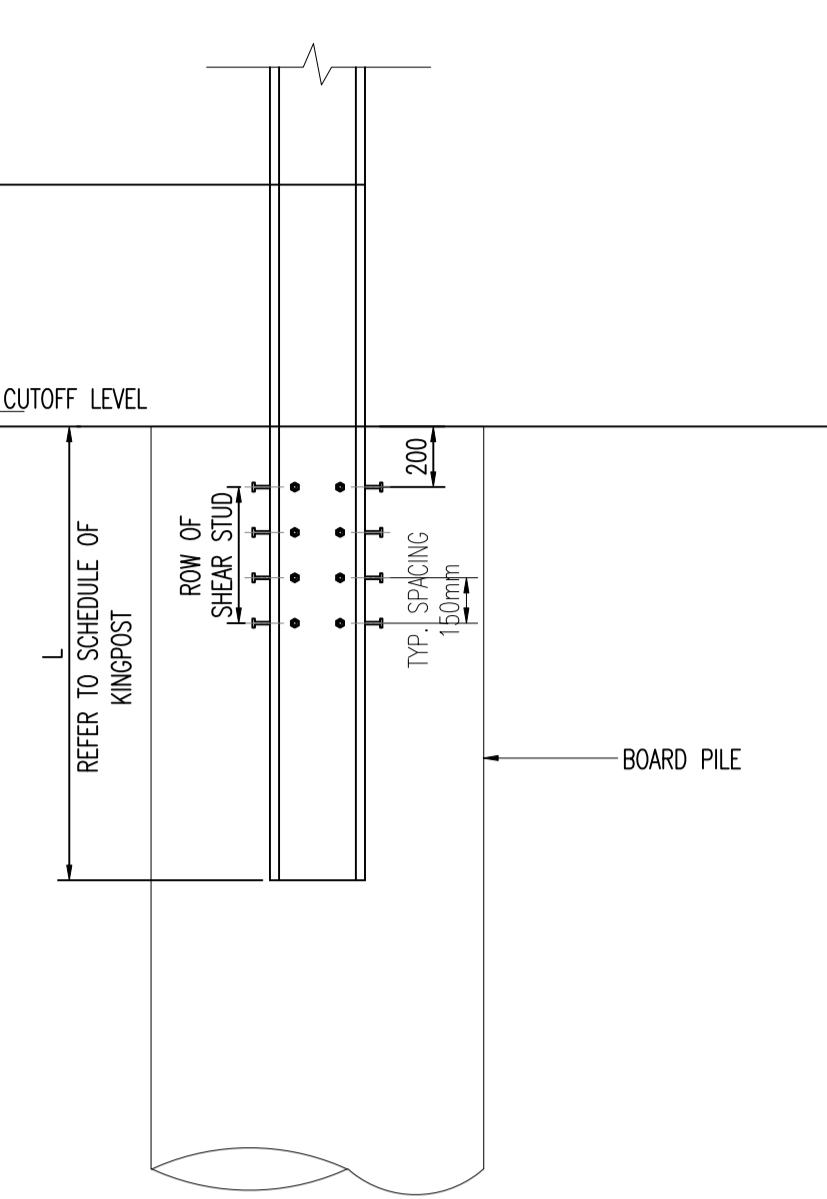
CONNECTION DETAIL OF KINGPOST TO ROOF
STRUCTURE
SCALE : 1:25



SECTION A-A
SCALE : 1:25

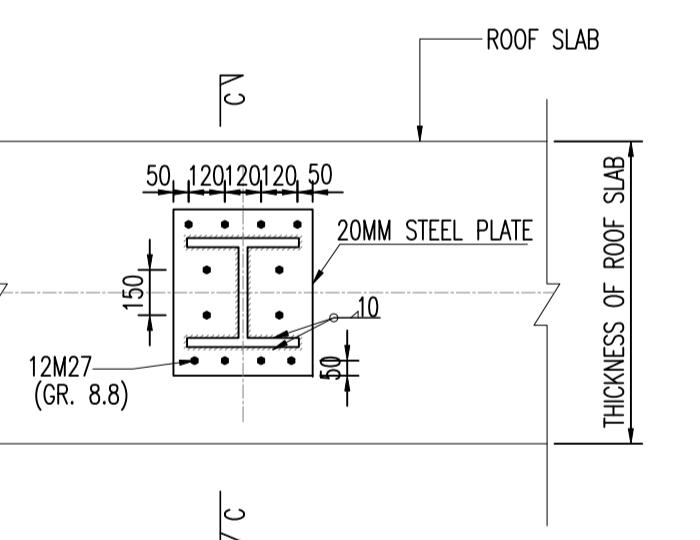


SECTION B-B
SCALE : 1:25

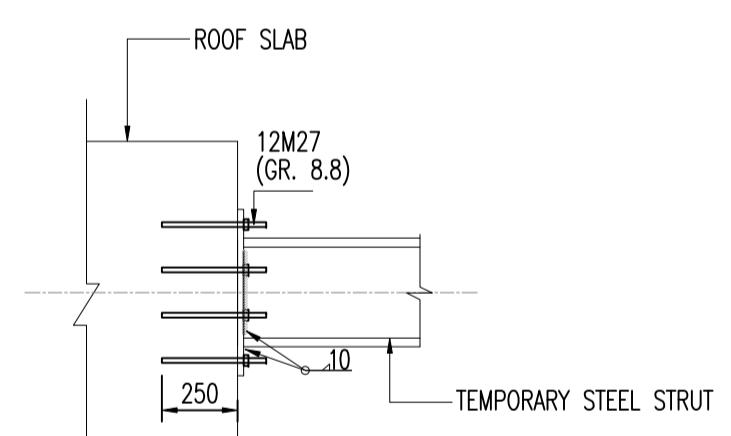


TYPICAL SHEAR STUD ARRANGEMENT
ON KINGPOST INTO BORED PILES

TYPICAL KINGPOST TO
FOUNDATION CONNECTION
SCALE : 1:25



DETAIL A
CONNECTION DETAIL OF TEMPORARY STEEL
STRUT TO ROOF SLAB
SCALE : 1:25



SECTION C-C
SCALE : 1:25

TABLE B: SCHEDULE OF KINGPOST

KINGPOST ID	SIZE	DESIGN ULTIMATE COMPRESSION LOADING (kN)	MAXIMUM ALLOWED ULTIMATE LOADING (kN)	EMBEDMENT INTO BORED PILE (m)	NUMBER OF SHEAR STUD	
					ROW	NUMBER PER ROW
KP01	UC 356 x 406 x 176kg/m	1400	2000	1.50	3	8
KP02	UC 356 x 406 x 176kg/m	1100	2000	1.50	3	8
KP03	UC 356 x 406 x 216kg/m	2200	3000	1.50	5	8
KP04	UC 356 x 406 x 216kg/m	2100	3000	1.50	5	8
KP05	UC 356 x 406 x 176kg/m	1900	2000	1.50	3	8
KP06	UC 356 x 406 x 235kg/m	3300	3500	1.50	6	8
KP07	UC 356 x 406 x 235kg/m	3100	3500	1.50	6	8
KP08	UC 356 x 406 x 176kg/m	1900	2000	1.50	3	8
KP09	UC 356 x 406 x 216kg/m	2900	3000	1.50	5	8
KP10	UC 356 x 406 x 288kg/m	4400	4500	1.50	8	8
KP11	UC 356 x 406 x 235kg/m	3100	3500	1.50	6	8
KP12	UC 356 x 406 x 216kg/m	2300	3000	1.50	5	8
KP13	UC 356 x 406 x 262kg/m	3700	4000	1.50	7	8
KP14	UC 356 x 406 x 262kg/m	3700	4000	1.50	7	8
KP15	UC 356 x 406 x 216kg/m	2400	3000	1.50	5	8
KP16	UC 356 x 406 x 216kg/m	2900	3000	1.50	5	8
KP17	UC 356 x 406 x 235kg/m	3500	3500	1.50	6	8
KP18	UC 356 x 406 x 176kg/m	2000	2000	1.50	3	8
KP19	UC 356 x 406 x 176kg/m	1700	2000	1.50	3	8
KP20	UC 356 x 406 x 216kg/m	2300	3000	1.50	5	8
KP21	UC 356 x 406 x 176kg/m	1300	2000	1.50	3	8
KP22	UC 356 x 406 x 176kg/m	1900	2000	1.50	3	8
KP23	UC 305x305 x 97kg/m	800	1000	2.00	-	-

NOTE:

- ALL KINGPOSTS SHALL BE S355.
- SHR STUD SHALL BE 19mm DIA. OF 76mm HEIGHT.
ULTIMATE TENSILE STRENGTH SHALL BE 500N/mm².

GENERAL NOTES:

1. THE CONTRACTOR SHALL ENGAGE AN INSTRUMENTATION & MONITORING CONTRACTOR(MC CONTRACTOR) TO CARRY OUT THE WORKS IN COMPLIANCE WITH THE INSTRUMENTATION REQUIREMENTS SPECIFIED IN THESE DRAWINGS. THE INSTRUMENTATION SHOWN IS OF MINIMUM PROVISION. THE CONTRACTOR SHALL ASSESS OR PROPOSE ADDITIONAL INSTRUMENTATION DEEMED NECESSARY IN ORDER TO ADEQUATELY MONITOR THE BEHAVIOR OF HIS STRUCTURES AND SURROUNDING STRUCTURES DURING CONSTRUCTION, SUBJECT TO THE APPROVAL OF THE S.O.
2. THE INSTRUMENT LOCATIONS AND MONITORING FREQUENCY SHOWN IN THESE DRAWINGS ARE INDICATIVE ONLY. THE FREQUENCY OF MONITORING SHALL BE VARIED DEPENDING ON THE TYPE OF INSTRUMENT AND THE RELATIONSHIP BETWEEN THE INSTRUMENT AND AREAS OF CURRENT ACTIVITY SUBJECT TO THE ACCEPTANCE OF THE S.O. AND QP(S). THE LOCATION OF THE INSTRUMENTS SHALL BE DETERMINED AT THE SITE AND SUBJECT TO THE ACCEPTANCE OF THE S.O. AND QP(S). THE INSTRUMENTATION PLANS AND DRAWINGS PREPARED BY THE ENGINEER ARE NOT INTENDED TO REPLACE WORKING/SHOP DRAWINGS. WORKING/SHOP DRAWINGS, AND AS-BUILT DRAWINGS SHALL BE PREPARED BY THE CONTRACTOR, AND SUBJECT TO THE ACCEPTANCE OF THE S.O. AND QP(S).
3. THE CONTRACTOR SHALL MONITOR AT LEAST 15% OF ALL STRUTS WITH MINIMUM OF 6 NUMBERS OF VIBRATING WIRE STRAIN GAUGES AND/OR LOAD CELLS. AT LEAST 25% OF THE STRUTS WITH MINIMUM OF 3 NUMBERS MONITORED USING VIBRATING WIRE STRAIN GAUGES SHALL ALSO BE MONITORED USING LOAD CELLS. THE MINIMUM NUMBER OF VIBRATING WIRE STRAIN GAUGES BUILT IN A LOAD CELL SHALL BE OF 6, WHERE VIBRATING WIRE STRAIN GAUGES ARE USED, A MINIMUM OF TWO STRAIN GAUGES COUPLED WITH TEMPERATURE MONITORING SHALL BE INSTALLED AT EACH MONITORING LOCATION. THE STRUT AND ANCHOR MONITORING LOCATIONS SHOULD BE SELECTED SO THAT:
 - EVERY STRUT/ANCHOR LEVEL AT THE SELECTED LOCATIONS IS MONITORED.
 - THE STRUT/ANCHOR MONITORING LOCATION COINCIDES WITH MONITORING ARRAY.
 - MINIMUM NUMBER OF VIBRATING WIRE STRAIN GAUGE BUILT IN A LOAD CELL SHALL BE OF 6.
4. ALL UTILITIES IN SERVICE IN THE MONITORING ZONE WHETHER SUPPORTED OR NOT SHALL BE MONITORED WITH SETTLEMENT MARKERS PLACED JUST ABOVE THE UTILITY, AS SHOWN BY MONITORING AT INTERVALS NOT MORE THAN 25m. THE CONTRACTOR SHALL NOTE THAT THE UTILITY MONITORING SHOWN ON THESE DRAWINGS IS MINIMUM REQUIREMENT ONLY. ALL CONNECTIONS OF UTILITIES SERVICING BUILDINGS WITH DEEP FOUNDATIONS WITHIN THE ZONE OF MONITORING SHALL ALSO BE MONITORED.
5. ALL BUILDINGS (UNLESS NOTED OTHERWISE) COMPLETELY OR PARTIALLY WITHIN THE MONITORING ZONE SHOULD BE MONITORED WITH:
 - 4 BUILDING SETTLEMENT MONITORING POINTS, ONE EACH AT THE CORNERS OF THE BUILDING (TYPE OF POINTS TO BE INSTALLED ON THE STRUCTURES SHALL BE ACCEPTABLE TO THE AUTHORITY) WHERE ANY SIDE OF THE BUILDING IS MORE THAN 25m LENGTH, ADDITIONAL SETTLEMENT MONITORING POINTS SHALL BE INSTALLED AT EVERY 25m.
 - 2 TILTETERS OR ELECTRO LEVEL SENSORS.
 - CRACKMETERS TO MEASURE EXISTING OR NEW CRACKS (TELL-TALE TYPE).
 - TENSILE STRAINS SHALL BE MONITORED BY EXTENSOMETERS OR BY OPTICAL SURVEY FOR ALL BUILDINGS WITH PREDICTED TENSILE STRAIN GREATER THAN 0.1% AND FOR ANY BUILDING SUBJECTED TO PROTECTION WORKS.
 - FOR BUILDINGS ON MIXED FOUNDATIONS, SETTLEMENT POINT SHALL BE PLACED ON BOTH SIDE OF THE JUNCTION BETWEEN DIFFERENT FOUNDATION TYPES.
6. PRIOR TO THE START OF ANY WORKS ON SITE, A SATISFACTORY SET OF BASE READINGS COMPRISING THE MEAN OF AT LEAST THREE SEPARATE INDEPENDENT SURVEYS SHALL BE OBTAINED FOR ALL MONITORING POINTS. EACH SURVEY SHALL BE TIED TO REFERENCE DEEP LEVELING DATUM.
7. INSTRUMENT READINGS / DATA TAKEN WITHIN A DAY SHALL BE PROCESSED AND SUBMITTED BY 1600 HOURS ON THE SAME DAY TO THE S.O. AND QP(S), REGARDLESS OF THE MONITORING FREQUENCY. READINGS TAKEN AFTER 4PM HOURS SHALL BE SUBMITTED BEFORE 09:00 HOURS OF THE FOLLOWING DAY.
8. ALL PRECISE LEVELING DATA SHALL BE CRITICALLY ANALYZED PRIOR TO SUBMISSION OF THE S.O. TO ELIMINATE SUPPLY OF INCORRECT, CONFUSING OR CONFLICTING INFORMATION.
9. ALL INSTRUMENTATION SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION PERIOD AND IMMEDIATELY REPLACED/REINSTATED IF DAMAGE / DEFECTIVE OR UNREADABLE.
10. CRITICAL INSTRUMENTATION SHALL BE CONNECTED TO DATA LOGGING EQUIPMENT AND THE DATA SHALL BE CONTINUOUSLY ACCESSIBLE ON THE COMPUTER IN THE QPS AND QPD SITE OFFICE. THE DATA LOGGERS, COMPUTERS, CABLING OR OTHER LINKS AND THE NECESSARY SOFTWARE TO VIEW THE DATA IN THE S.O., QPS OFFICE SHALL FORM PART OF THE INSTRUMENTATION SYSTEM TO BE PROVIDED BY THE CONTRACTOR.
11. THE FOLLOWING SHALL BE CONSIDERED AS CRITICAL INSTRUMENTATION:
 - ALL STRAIN GAUGES AND LOAD CELLS.
 - SURVEY PRISMS, ELECTROLEVEL BEAMS AND BUILDING SETTLEMENT MARKERS ON, OR ADJACENT TO BUILDINGS, SUBJECT TO PROTECTION MEASURES, WITHIN THE ZONE OF MONITORING.
 - SURVEY PRISMS AND ELECTROLEVEL BEAMS ON BUILDINGS / STRUCTURES.
12. FOR MONITORING ARRAYS CONTAINING HEAVE STAKES AND / OR PIEZOMETERS WITHIN THE EXCAVATION, THE HEAVE STAKES AND PIEZOMETERS SHALL BE INSTALLED AT THE LEVEL OF EVERY EXCAVATION STAGE, FOR EXAMPLE AT SUCCESSIVE EXCAVATION LEVELS FOR STRUTTING.

13. CRACKMETER ARE TO BE INSTALLED AND MONITORED IF CRACKS ARE OBSERVED AT STRUCTURES WITHIN MONITORING ZONE OR NEW CRACKS OCCUR DURING THE WORKS.

14. ALL MONITORING WORKS SHALL BE MADE REFERENCE TO SURVEY CONTROL POINTS (COORDINATES AND ELEVATION), OF WHICH THE INFORMATION SHALL BE PURCHASED/OBTAINED FROM RELEVANT GOVERNMENTAL AUTHORITIES.

15. THE CONTRACTOR SHALL INCLUDE MEANS OF ACCESS TO THE SITES, BUILDINGS AND STRUCTURES WHERE THE INSTRUMENTATION ARE TO BE INSTALLED, INCLUDING BUT NOT LIMITED TO ACCESS TO TOP OF PIPE RACK AND BUILDING TO INSTALL OPTICAL PRISMS, TILTMETERS ETC.

16. CASAGRANDE AND PNEUMATIC PIEZOMETER SHALL NOT BE USED.

17. CONTRACTOR SHALL CARRY OUT AT LEAST 3 NOS. OF SPT 3m ABOVE PROPOSED TERMINATION LEVEL OF BOREHOLE INSTRUMENTATION AT 1.5m c/c (VERTICAL). CONTRACTOR SHALL CONTINUE THE DRILLING OF THE BOREHOLE IF THE SPT OBTAINED DOES NOT COMPLY WITH THE TERMINATION CRITERIA STATED HEREIN.

18. IF ANY READING EXCEEDS THE WORK SUSPENSION LEVEL (WSL). THE RELATED PART OF THE WORK SHALL BE MADE SAFE AND SHALL BE CEASED BY RESIDENT ENGINEER AND THE MAIN CIVIL CONTRACTOR, UNTIL A FULL RE-ASSESSMENT OF THE ORIGINAL DESIGN BY QP(D).

19. IF THE ALERT LEVEL (AL) IS REACHED, THE RELATED INSTRUMENTATION DATA AND TEMPORARY WORKS SHALL BE REVIEWED BY QP(D). IF THE REVIEW CONCLUDES THAT THE RETAINING WALL PERFORMS AS PER DESIGN, WORK CAN PROCEED. IF THE REVIEW SHOWS THAT THE WORK SUSPENSION LEVEL IS LIKELY TO BE EXCEEDED, THE DESIGN SHALL BE RE-ASSESSED BY QP(D) AND ADDITIONAL MEASURES WILL BE IMPLEMENTED WHICH IS TO BE SUPERVISED BY RESIDENT ENGINEER.

MONITORING FREQUENCY:

EXCAVATIONS:

INSTRUMENT	MONITORING FREQUENCY			
	PRIOR TO EXCAVATION	DURING EXCAVATION/STRU REMOVAL	BACKFILLING	AFTER BACKFILLING
1 GROUND SETTLEMENT MARKER	WEEKLY	2x PER WEEK	WEEKLY	MONTHLY
2 HEAVE STAKE	WEEKLY	2x PER WEEK	NIL	NIL
3 V.W. PIEZOMETER	WEEKLY	2x PER WEEK	WEEKLY	MONTHLY
4 WATER STAND PIPE	WEEKLY	2x PER WEEK	WEEKLY	NIL
5 INCLINOMETER IN WALL	WEEKLY	2x PER WEEK	WEEKLY	MONTHLY
6 INCLINOMETER/EXTENSOMETER IN SOIL	WEEKLY	2x PER WEEK	WEEKLY	MONTHLY
7 CRACKMETERS	WEEKLY	2x PER WEEK	WEEKLY	MONTHLY
8 BUILDING SETTLEMENT MARKERS	WEEKLY	2x PER WEEK	WEEKLY	MONTHLY
9 TILTMETERS	WEEKLY	2x PER WEEK	WEEKLY	MONTHLY
7 STRUTTING MONITORING	-	2x PER WEEK	2x PER WEEK	-

ALL MONITORING SHALL CONTINUE FOR THREE (3) CONSECUTIVE READINGS AFTER THE CIVIL WORKS UNTIL READINGS SHOW NEGLIGIBLE OR AS INSTRUCTED BY THE S.O.

NOTES:

- THE FREQUENCY OF MONITORING SHALL BE INCREASED IF THE OCCURRENCE OF UNDESIRABLE PHENOMON SUCH AS:
EXCESSIVE GROUND LOSS/SETTLEMENT FOR EXCAVATION OR BASE HEAVE OR BASE BLOW OUT IS DETECTED.
- READING SHALL BE REPEATED IN THE SAME DAY IF CONSIDERED ERRONEOUS BY THE S.O.

REVIEW LEVELS FOR BUILDING INSTRUMENTS (WHERE APPLICABLE):

GENERAL REVIEW LEVEL FOR BUILDINGS INSTRUMENTS			
INSTRUMENTS	ALERT LEVEL	PREDETER MINED LEVEL	WORK SUSPENSION LEVEL
BUILDING SETTLEMENT MARKERS (SHALLOW FOUNDATION)	17 mm	-	25 mm
BUILDING SETTLEMENT MARKERS (PILED FOUNDATION)	11 mm	-	15 mm
TILTMETERS	1:700	-	1:500
CRACKMETERS	3 mm	-	5 mm
OPTICAL PRISMS	10 mm	-	15 mm
VIBRATION MONITORING	5 mm/s	-	10 mm/s

Building and Construction Authority
2018-03-01
For Commissioner of Building Control

ACCREDITED CHECKER

No: 1139

LEUNG WAI MAN
in AC Organisation
Registration No: A036

BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :

SPECIALIST ACCREDITED CHECKER

No: 7019

YEO LILY

BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :

PROFESSIONAL ENGINEER

LAU WEI HING

3670

SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)

Date :

PROFESSIONAL ENGINEER

CIVIL

CHIN KHENG MING

4447

SINGAPORE

(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)

Date :

NO DATE BY AMENDMENTS

CLIENT:

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80 MANDAI LAKE ROAD, SINGAPORE 729826
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ARCHITECT:

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PROJECT TITLE:
PROPOSED MANDAI RAINFOREST PARK NORTH COMPRISING
THEMED ANIMAL NORTH COMPRISING THEMED ANIMAL HABITATS
2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE
WITH OPEN-DECK, 2 STOREY F&B HUB, 2 STOREY CAVERNS, ELEVATED
WALKWAY AND ANCILLARY FACILITIES ON LOT 01890C PT MK14 AT
MANDAI LAKE ROAD (CENTRAL WATER CATCHMENTS PLANNING AREA)

DRAWING TITLE:
RAINFOREST NORTH:
INSTRUMENTATION & MONITORING
GENERAL NOTES 1

PRELIMINARY
 INFORMATION
 AUTHORITY SUBMISSION

TENDER
 CONSTRUCTION

DRAWN BY : CT/GL DATE : AS SHOWN REV.
DESIGN BY : CW DATE : JUNE 2020
CHECKED BY : CKM MRN-304-EAC-CS-RSW-5616

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Registration No: A036
BUILDING CONTROL ACT
SINGAPORE

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Date :

SPECIALIST ACCREDITED CHECKER
No: 7019

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BUILDING CONTROL ACT
SINGAPORE(ACCREDITED CHECKER'S STAMP & SIGNATURE)
Date :(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)
Date :

NO	DATE	BY	AMENDMENTS
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TEL: 6390 2181 EMAIL: PHILIP.YIM@MANDAI.COM			

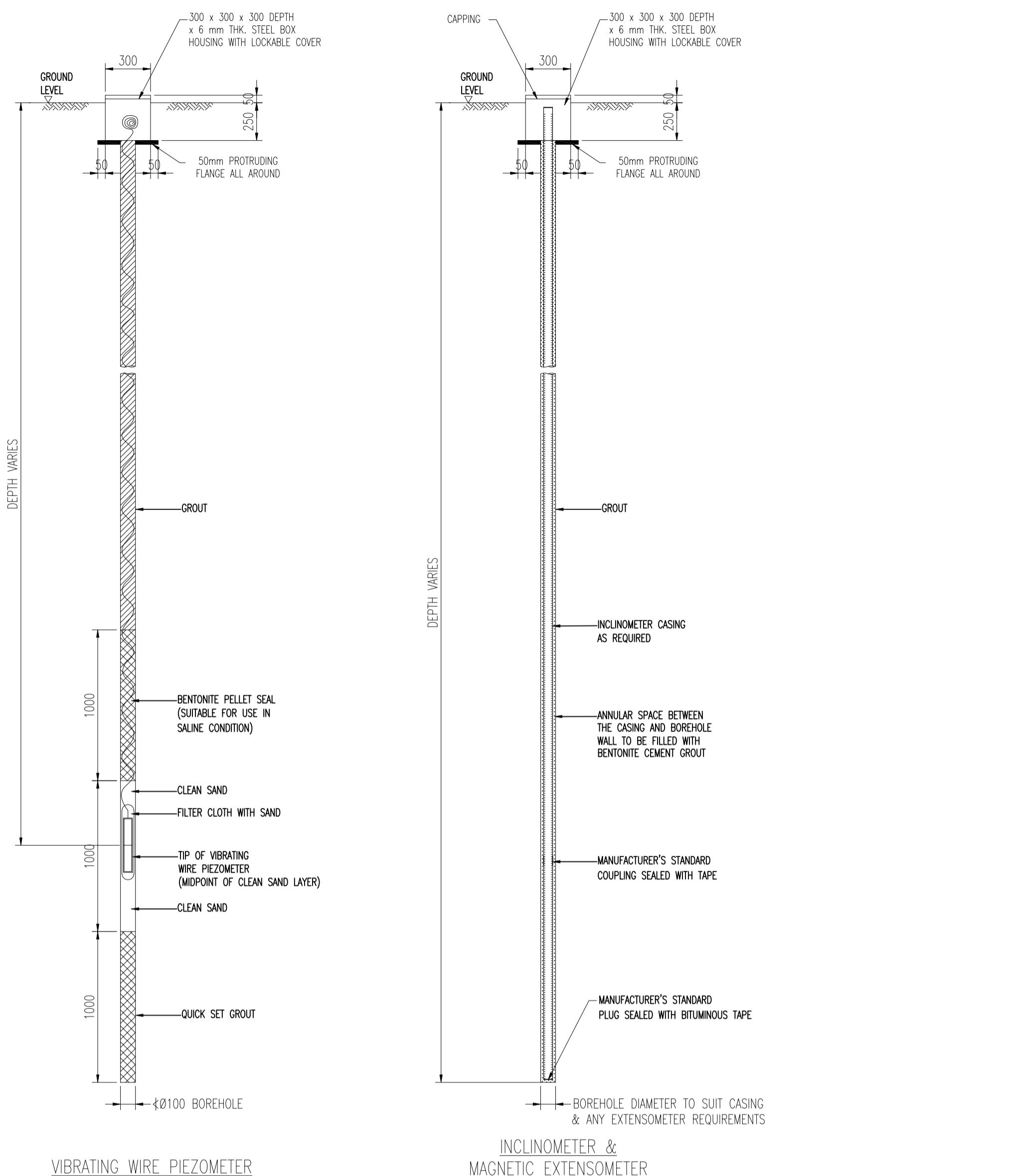
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PROJECT TITLE:
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2 STOREY ANIMAL BACK OF HOUSE, 3 STOREY EDUCATION CENTRE
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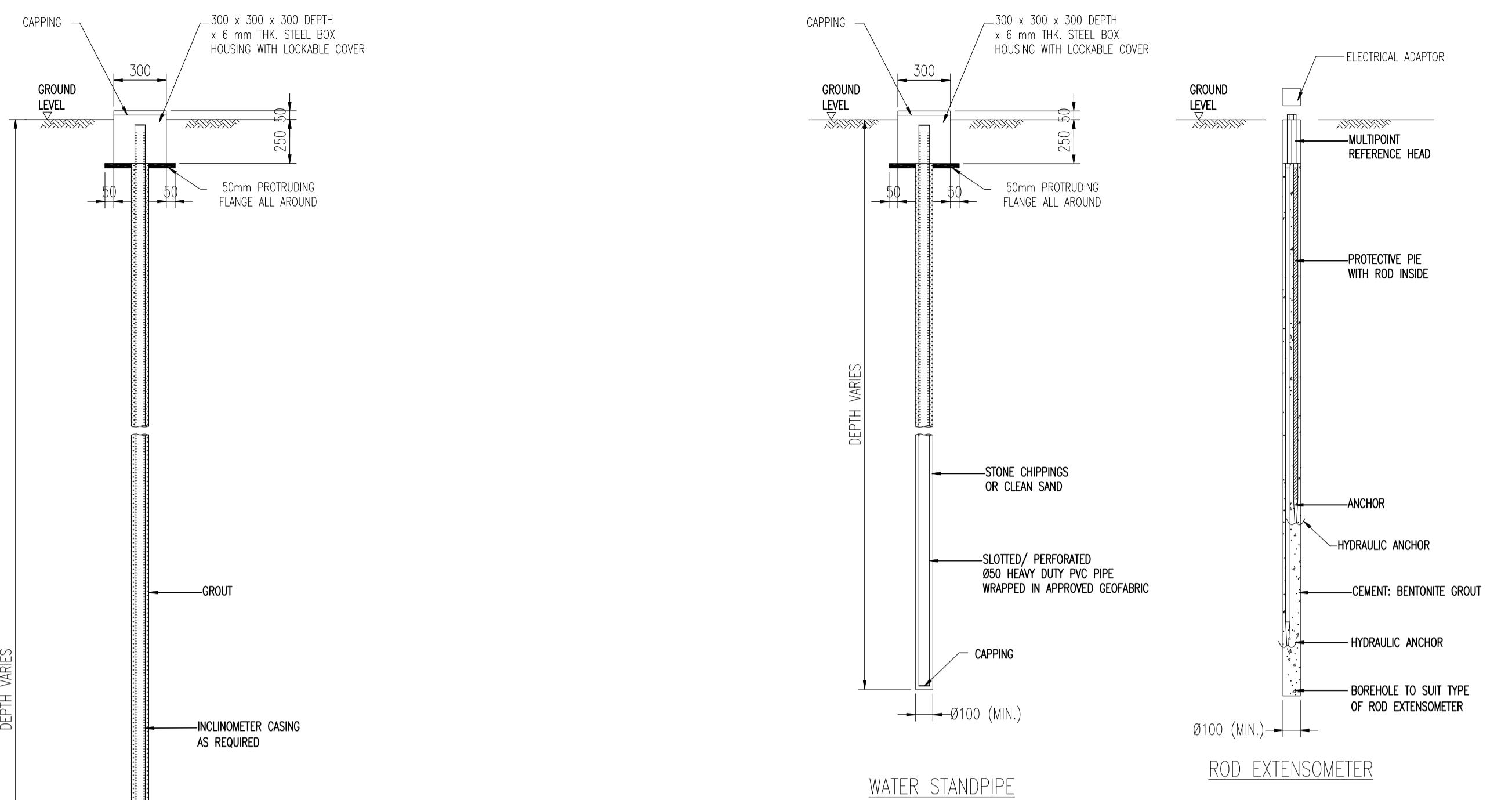
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RAINFOREST NORTH:
INSTRUMENTATION & MONITORING
INSTALLATION DETAILS

PRELIMINARY INFORMATION	TENDER CONSTRUCTION
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DESIGN BY : CW	DATE : JUNE 2020
CHECKED BY : CKM	MRN-304-EAC-CS-RSW-5618

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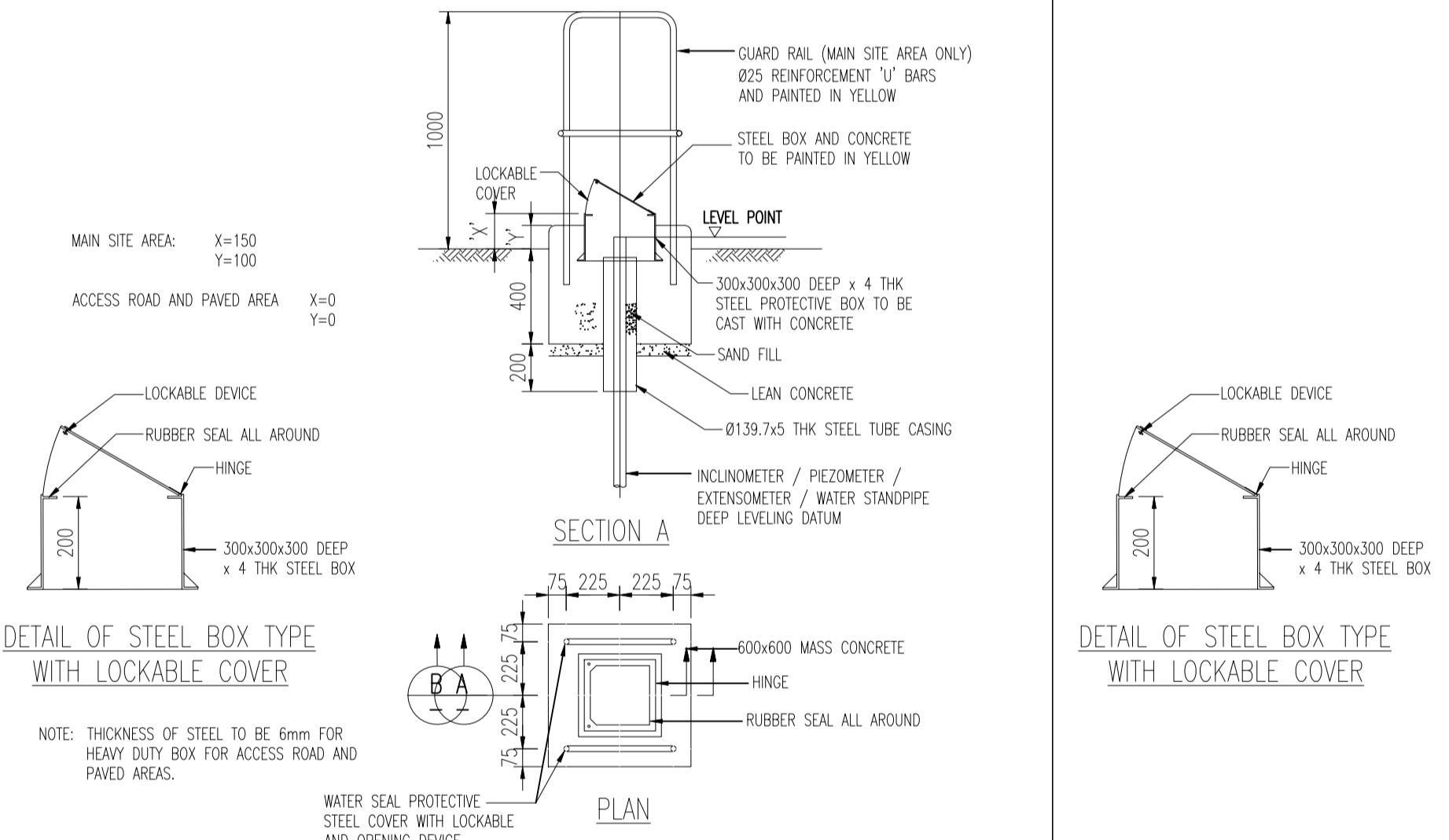
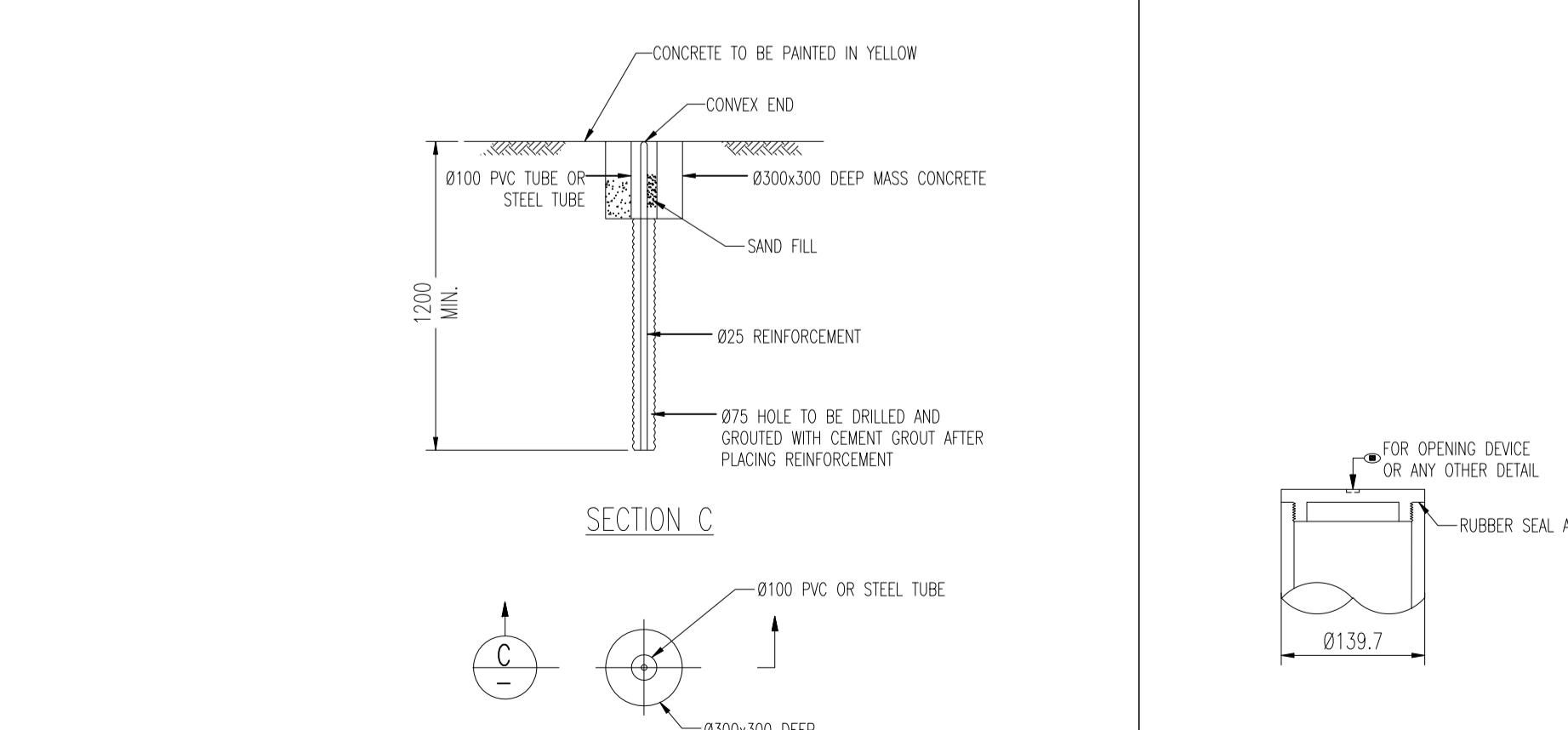
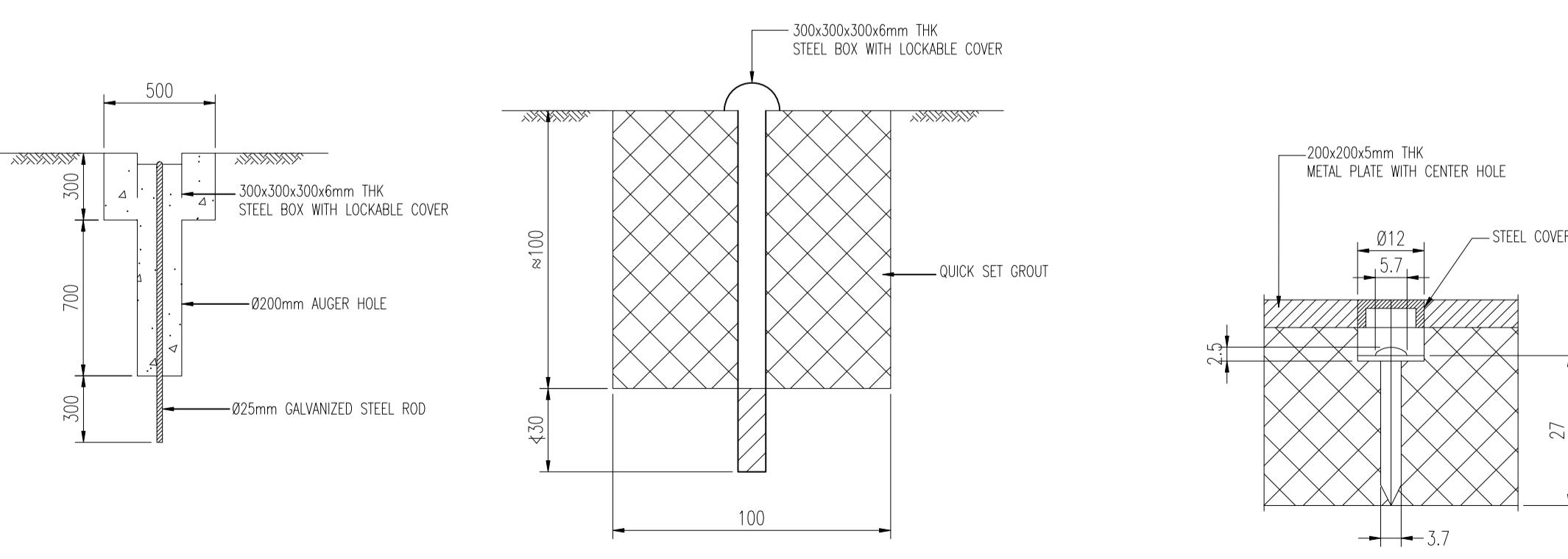
NOTES:

1. COVER MAY BE CHANGED TO SUIT TRENCHING/CABLING ARRANGEMENTS.

ROD EXTENSOMETER

NOTES:

1. ONLY TWO ANCHORS SHOWN FOR CLARITY UP TO 6 ANCHORS SHALL BE INSTALLED IN ANY ONE BOREHOLE.
-
2. COVER MAY BE CHANGED TO SUIT TRENCHING/CABLING ARRANGEMENTS.

PROTECTION SYSTEM TYPE A B C AND AAPROTECTION SYSTEM TYPE 'A' FOR GEOTECHNICAL INSTRUMENT IN OPEN AREA WITH MOVING VEHICLESPROTECTION SYSTEM TYPE 'AA' FOR GEOTECHNICAL INSTRUMENT FOR PUBLIC ROAD / PAVEMENTPROTECTION SYSTEM TYPE 'AA' FOR GEOTECHNICAL INSTRUMENT FOR PUBLIC ROAD / PAVEMENT

Building and Construction
2018/10/22

For Commissioner of Building Control

STANDARD CERTIFICATION BY THE QUALIFIED PERSON FOR GEOTECHNICAL ASPECTS OF
GEOTECHNICAL BUILDING WORKS

- In accordance with Regulation 10A of the Building Control Regulations, I, Lau Wei Hing, the Qualified Person for the geotechnical aspects of the geotechnical building works appointed under section 8(1)(g) or 11(1)(g) of the Building Control Act, hereby submit the detailed structural plans and design calculations prepared by me and certify that, to the best of my knowledge and belief, they have been prepared in accordance with the provisions of the Building Control Regulations, the Building Control Act and any other written law pertaining to buildings and construction for the time being in force.
- I further certify that these geotechnical building works plans and design calculations are in reference to Project Ref. No: A1775-00001-2018-ST103.
- Total no. of geotechnical building works plans submitted : 14.
- Total no. of pages of design calculations in this book : 170.



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)

Date :

Standard Certification By The Qualified Person For Structural Works

- In accordance with Regulation 9 of the Building Control Regulations, I, Chin Kheng Ming, the Qualified Person for the structural aspects of the structural building works appointed under section 8(1)(g) or 11(1)(g) of the Building Control Act, hereby submit the detailed structural plans and design calculations prepared by me and certify that they have been prepared in accordance with the provisions of the Building Control Regulations, the Building Control Act and any other written law pertaining to buildings and construction for the time being in force.
- I further certify that these detailed structural plans and design calculations are in reference to Project Ref. No: A1775-00001-2018-ST103.
- Total number of structural plans submitted : 14, and total number of pages of design calculations in this book : 170.



(QUALIFIED PERSON FOR STRUCTURAL WORKS' STAMP & SIGNATURE)

Date :

1 04/06/20 CT AS PER BCA'S COMMENTS

NO DATE BY AMENDMENTS

CLIENT:

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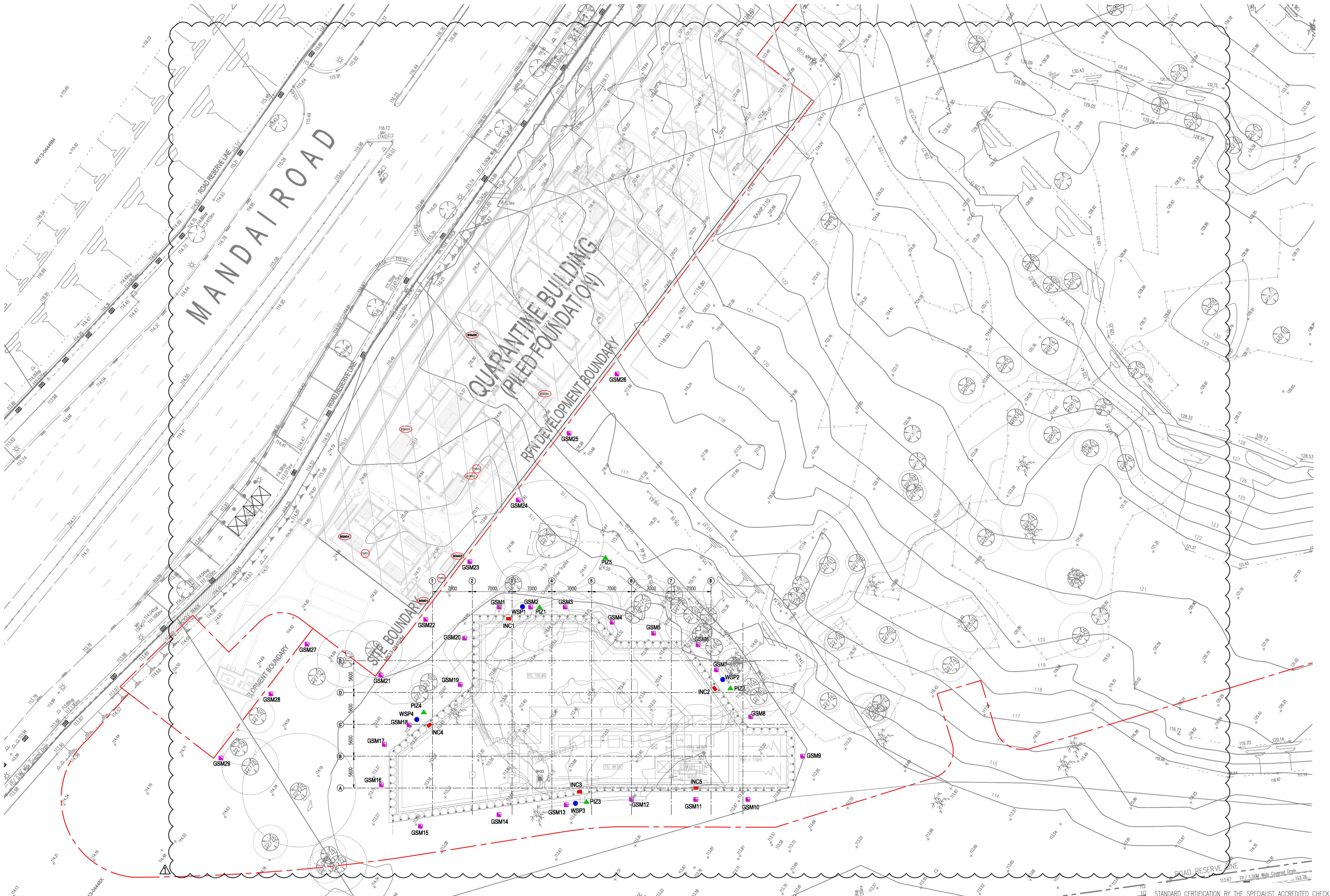
DRAWING TITLE:
RAINFOREST NORTH: INSTRUMENTATION & MONITORING ANIMAL WASTE & STORMWATER TANK LAYOUT

PRELIMINARY INFORMATION	TENDER CONSTRUCTION
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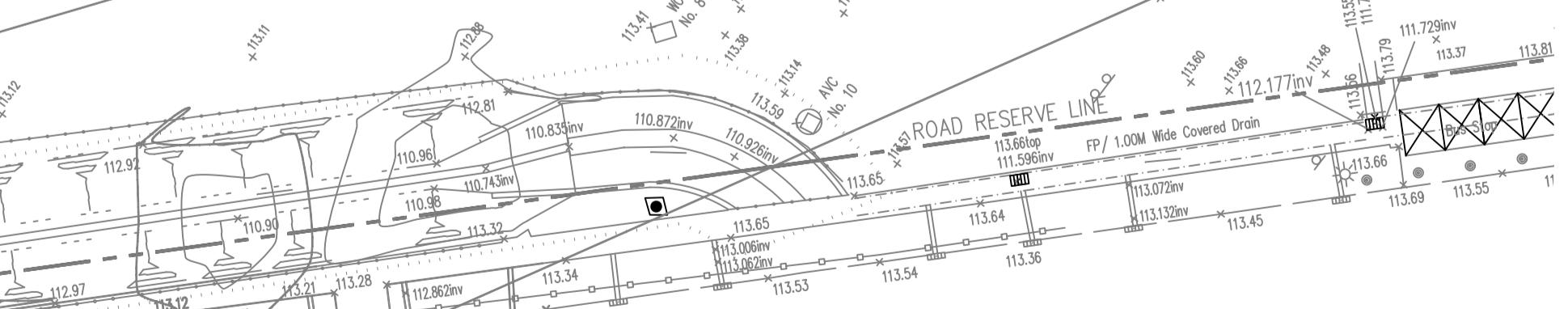
DRAWN BY : CT/GL SCALE : AS SHOWN REV.
 DESIGN BY : CW/MC DATE : JUNE 2020
 CHECKED BY : CKM MRN-304-EAC-CS-RSW-5619 1

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INSTRUMENT	LOCATION	DEPTH	ALERT LEVEL	PREDETERMINED LEVEL	WORK SUSPENSION LEVEL
INCINOMETER INC1 & INC4	IN WALL	28m (MIN. 1m INTO GILL OR BETTER)	32mm	-	45mm (0.3%)
INCINOMETER INC2 & INC3	IN WALL	28m (MIN. 1m INTO GILL OR BETTER)	42mm	-	60mm (0.39%)
WATER STANDPIPE	-	8m	1.5m	2m	-
PIEZOMETER	-	8m	15kPa	20kPa	-
GROUND SETTLEMENT MARKER	-	-	30mm	40mm	-
BUILDING SETTLEMENT MARKER BSM01-06	-	-	11mm	-	15mm
TIET METER TM01-03	-	-	1:700	-	1:500
VIBRATION METER	-	-	3mm/s	-	5mm/s



STANDARD CERTIFICATION ON STRUCTURAL PLANS AND DESIGN CALCULATIONS BY THE ACCREDITED CHECKER

I, LEUNG WAI MAN, (ACCREDITED CHECKER) hereby certify that I have carried out an evolution, analysis and review of the detailed structural plans and design calculations presented herein and am satisfied that there are no inadequacies in the key structural elements.

2. I further certify that these detailed structural plans and design calculations are in accordance with Project Ref. No: A1775-00001-2018-ST103.

3. Total number of structural plans submitted : 14.

4. I hereby declare that I have no professional or financial interest in the building works shown in the plans as defined in section 18 of the Building Control Act (Cap 29).

SPECIALIST ACCREDITED CHECKER
No: 1139
LEUNG WAI MAN
in AC Organisation
Registration No: A036
BUILDING CONTROL ACT
SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :

SPECIALIST ACCREDITED CHECKER

No: 7019

YEOL LILY

BUILDING CONTROL ACT

SINGAPORE

(ACCREDITED CHECKER'S STAMP & SIGNATURE)

Date :