Robert Bird Group

Basis of Design Report
Early Works (Shoring) Package
Liverpool Civic Place

Issue: G

11th September 2020

Prepared For: Built Pty Ltd

Project No.: 19280

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bsi. ISO 9001 Quality Management

Report Amendment Register

Issue	Section & Page No.	Issue / Amendment Details	Author	Reviewer	Date
A	All	1st Issue – For review	M. Moghaddasi	G. Andrianakos	25/11/2019
B	All	2nd Issue – Includes comments from Built received on 27.11.2019	M. Moghaddasi	G. Andrianakos	28/11/2019
C	All	3rd Issue - Final	M. Moghaddasi	G. Andrianakos	11/12/2019
D	All	4th Issue – Includes latest design development as of 25.05.2020	M. Moghaddasi	G. Andrianakos	25/05/2020
E	All	5th Issue – Includes latest design development as of 27.08.2020	N. Kalavritinos	G. Andrianakos	27/08/2020
F	1.0 / 5.2	6th Issue – Includes updates to reference Section 4.55 1A.	N. Kalavritinos	G. Andrianakos	09/09/2020
G	Appendix	7th Issue – includes updates to Appendix.	N. Kalavritinos	G. Andrianakos	11/09/2020

ISSUE / AMENDMENT AUTHOR:

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Signing for and on behalf of
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REVIEWER:

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GEORGE ANDRIANAKOS
Reviewer of Issue / Amendment
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1.0 Introduction

This **RBG Basis of Design Report – Early Works (Shoring) Package** is submitted to Liverpool City Council (Council) in support of a Section 4.55(1A) Modification Application to Development Consent DA-906/2019 for site preparation and early works at 52 Scott Street, Liverpool (the site) also known as the Liverpool Civic Place. Development Application DA-906/2019 was approved by the Sydney Western City Planning Panel on 29 June 2020. The development consent relates to:

- Demolition of all existing structures and site improvements; and
- Bulk earth works including shoring using piles.

The original DA relates to the broader Liverpool Civic Place site redevelopment plan which is detailed within the Concept DA (DA/485/2019) submitted to Council on 17 September 2019. Specifically, the Concept Proposal seeks approval for various uses within proposed building envelopes, including:

- A building envelope with a maximum height of RL 43.45 for the purpose of an information and education facility (public library) use.
- A building envelope with a maximum height of RL 84.25 for the purpose of a public administration building use, and either (or a combination of) commercial premises or child-care centre uses.
- A building envelope with a maximum height of RL 118.85 which will accommodate either (or a combination of) commercial premises, educational establishments, tourist and visitor accommodation or boarding house (student accommodation) uses.
- A landscaping and public domain concept including the provision of a public through-site link running north to south through the site, connecting Scott Street to the north through to Terminus Street to the south; and
- A building envelope for a three-level shared basement car park across the entire site to accommodate parking for all future uses (approximately 413 spaces, to be determined as part of future detailed DAs) and accommodating a public car park to be owned by Council.

Following determination of DA-906/2019, development partners Built Development Group and Liverpool City Council recognised there was additional demand for public car parking within Liverpool Civic Place project. In addition, the original excavation works did not consider excavation to accommodate future pad footings. As such, this has necessitated a Section 4.55(1A) Modification Application to seek consent for deeper excavation and associated structure to accommodate an additional half level of basement.

The Modification Application also seeks consent for a minor extension of the demolition works to existing planters and ramps on the adjoining lot to the west (Lot 201 in DP 1224084 also owned by Liverpool City Council).

The detailed design of the Liverpool Civic Place will be subject of separate Stage 2 DA(s). The benefits of this approach would allow the expedited local assessment and determination of an application for these additional ‘early works’, which are key to ensuring the development can be delivered in a timely manner.

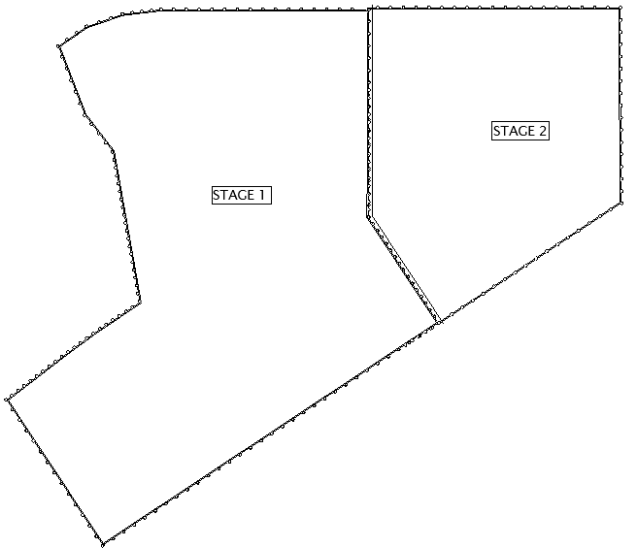


Figure 1 – Zonal break-up of Stage 1 and 2.

2.0 Scope and Limitations

The purpose of this report is to outline the design assumptions and requirements adopted by RBG for the structural design of the retention system and provide the structural scheme design/advice for the Early Works Development Application (DA) Submission. This report and details herein are relevant to Stage 1 works only. Note this is intended to provide basis of design for review by the design team. It does not supersede the project design brief and specifications that should be referred to for all general assumptions and requirements.

Furthermore, it should be stated that at this point of time, the design has been developed to the level of a preliminary design only. Further information and analysis are required to be confirmed with Built.

3.0 Reference Documents

- FJMT Architectural Drawings dated 7th July 2020, Rev C
- RBG Structural Drawings
- Golder Geotechnical and Environmental Investigation Report, Reference No. 19125312-001-R-Rev4, dated 17 April 2020
- Golder Preliminary Geotechnical Assessment Report, Reference No. 19125312-002-L-Rev2 dated 17 April 2020

4.0 Geotechnical Conditions

Refer to *"Golder Geotechnical and Environmental Investigation Report"* referenced in Section 3 for site geotechnical conditions and constraints. RBG notes that further geotechnical analysis and design may be required as the project progresses.

Below is a summary of our understanding:

4.1 Groundwater

In accordance with the *"Golder Preliminary Geotechnical Assessment Report"*, the groundwater level measured in August 2019 is generally at RL +17.5m AHD, approximately 11m higher than the proposed bulk excavation level (BEL) at RL +6.75 m AHD.

4.2 Proposed Retention System

A drained basement has been identified as applicable for this development and is the basis of structural design, as confirmed by the client.

Consequently, Golder have recommended to use a retention system consisting of anchored soldier piles with shotcrete infill walls and vertical cuts in the underlying competent rock (i.e. Unit 3b and 4). It has been also suggested to use pattern bolting and shotcrete facing for Unit 3a.

Golder have also recommended to control the seepage into the excavation during construction and in the long-term case by perimeter and subfloor drainage connecting into a pump and sump system for a drained basement.

5.0 Design Criteria

5.1 Stage of Design

The proposed design is preliminary only and may subject to change upon review.

5.2 Bulk Excavation

The original development proposal had a Bulk Excavation Level (BEL) of RL +10.35 m AHD. However, due to increased public parking demand the extent of excavation is required to increase to BEL RL +6.75 m AHD to accommodate an additional basement level, which will be subject to subsequent development consent. RBG have understood that the development consists of a five-level basement carpark and a bulk excavation level (BEL) to RL +6.75 m AHD. Refer to Figure for a section of the masterplan envelope.

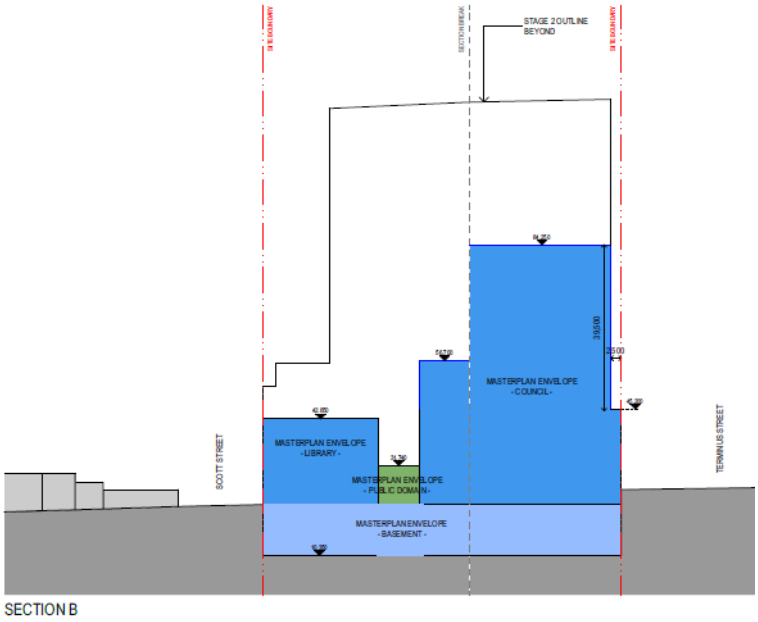


Figure 2 - Masterplan Envelope - Section A

The existing ground level along the southern part of the site (along the Terminus Street) is approximately at RL +26 m AHD, about 3 m higher than the ground level along the northern part of the site (along the Scott Street).

5.3 Excavation Staging

The work included in this report is relevant to Stage 1 works only. Thus, excavation of Stage 1 is only considered. During detailed design of the Early Works package, there will be further development of the interface details between Stage 1 and 2 if required.

- As a drained basement option is considered, temporary drainage would need to be provided during construction to manage estimated water inflows. Water would need to

be managed from excavation walls and an allowance shall be made for pumping and disposal of this water.

- Current design is based on the results from two analysis sections adopted by Golder and presented in *"Golder Preliminary Geotechnical Assessment Report"*. Refer to Figure 3 for the layout of these analysis sections.

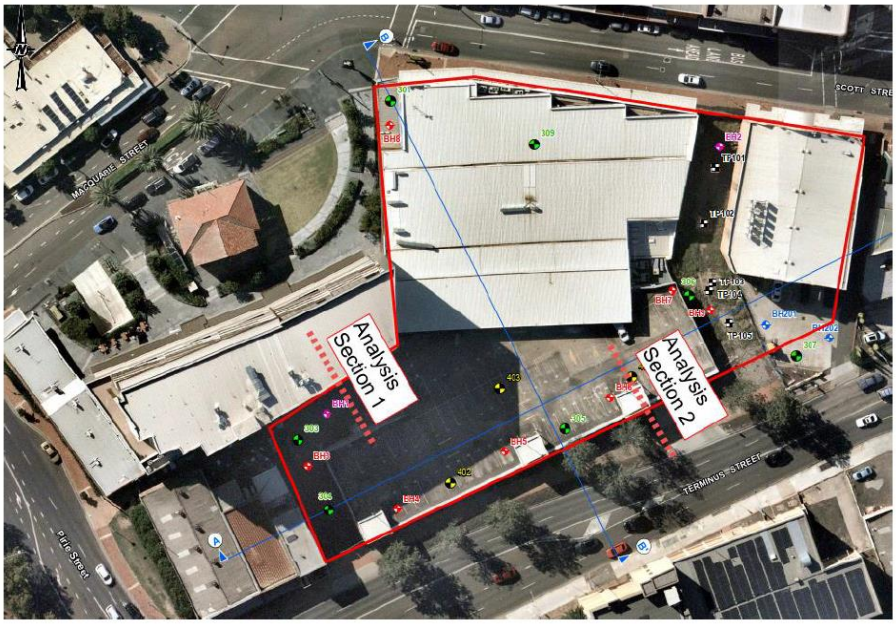


Figure 3 – Geotechnical Analysis Section layout adopted by Golder

- No long-term loadings from vertical structural elements are considered to load the retention system. This has been a direction from the client team.
- All ground anchors are assumed to provide temporary support only and be destressed as the construction of basement floor slabs progresses.
- In the permanent condition, the floor slabs of the basement structure are assumed to provide lateral support to the retention system.
- The foundation loads from Matchworks building (adjacent building to Analysis Section 1) are considered as an equivalent strip load. They are presented in Section 5.5.3.3. This design assumption has also been discussed with the Geotechnical Engineers at a design meeting hold on 5th November 2019.
- The maximum displacement of the retention walls is limited to 10 mm for sections adjacent to Matchworks building and to 15 mm for typical sections.
- As recommended by Golder, soldier piles of the retention system adjacent to Matchworks building are extended to have a socket of 0.5 m in Unit 4. In addition, an allowance for rock bolts at 0.5 m below the pile toe is made.
- Soldier piles of the typical retention system are extended to have a socket of 0.5 m in Unit 3a.
- As identified by Golder, soldier piles do not need to be extended to RL below BEL and can stop short, approximately, at the RLs specified on RBG Early Works (Shoring) Package Drawings. These RLs to be finalised/confirmed by geotechnical engineers following more detailed design and analysis in the next stage. Furthermore, having a rock face with rock bolting as required is an acceptable retention solution by Golder.
- Where the rock facing is considered as the retention system, further columns/walls are required to support basement slabs and beams.

5.4 Design Standards and Guidelines

The structural design for the proposed retention system is in accordance with the current revision of all relevant Australian/New Zealand Standards. These standards will include, but are not limited to:

- **AS/NZS 1170.0: 2002**: Structural design actions – Part 0: General principles

- **AS/NZS 1170.1:2002**: Structural design actions – Part 1: Permanent, imposed and other actions
- **AS 3600:2018**: Concrete structures
- **AS/NZS 4671:2001**: Steel reinforcing materials
- **AS 4678:2002**: Earth-retaining structures

5.5 Design Input Information

5.5.1 Design Parameters for Ground Unit

The geotechnical parameters adopted in this design are based on what have been provided in *"Golder Preliminary Geotechnical Assessment Report"*.

Table 1. Design parameters for ground units

Ground Unit	γ (kN/m³)	C' (kPa)	ϕ' (°)	E_{50} (MPa)	E_{ur} (MPa)	K_o (-)
Unit 1 Filling	17	0	30	10	20	0.5
Unit 2 St-H Residual clay	18	5	28	20	40	1
Unit 3a L-M Laminite	24	50	38	200	400	1
Unit 3b M-H Laminite	24	200	40	1,200	2,400	2[1]
Unit 4 H-VH Sandstone	24	400	43	2,000	4,000	6[1]

[1] –K_o is elevated to generate the estimated locked-in horizontal stress

Source: Golder

5.5.2 Material Properties for Structural Elements

Unless noted otherwise, the following minimum values will be used for material properties:

- Material density:
  - Concrete: 24.5 kN/m^3
  - Steel: 76.9 kN/m^3
- Material strength:
  - Concrete – piles, capping beam, shotcrete: f'c = 40 MPa
  - Reinforcement: fsy = 500 MPa
- Modulus of Elasticity (based on 28 days concrete strength):
  - Concrete – piles, capping beam, shotcrete: 32,800 MPa
  - Reinforcement: 200,000 MPa

5.5.3 Design Loads

Refer to RBG Early Works (Shoring) Package Drawings – ST-01550 [P1] for shoring loading plan. The design loads considered are briefly discussed in the following:

5.5.3.1 Dead Loads

The dead loads considered in the design of retention system are calculated from self-weight and super-imposed dead load from the upper structure. Dead loads are assumed to be applied on the capping beam as a line load.

5.5.3.2 Live Loads

The live loads considered in the design of retention system are calculated from the imposed live load from the ground floor slab. Live loads are assumed to be applied on the capping beam as a line load.

5.5.3.3 Surcharge Loads

- Scott Street: 20kPa
- Just Sport – Liverpool: 15kPa
- Terminus Street: 20 kPa
- The Window Tinting Centre: 15 kPa
- Match works Building:
  - 355kN/m line load on neighbouring building capping beam
  - 650kPa surcharge under the 1st row of neighbouring building columns
  - 470kPa surcharge under the 2nd row of neighbouring building columns

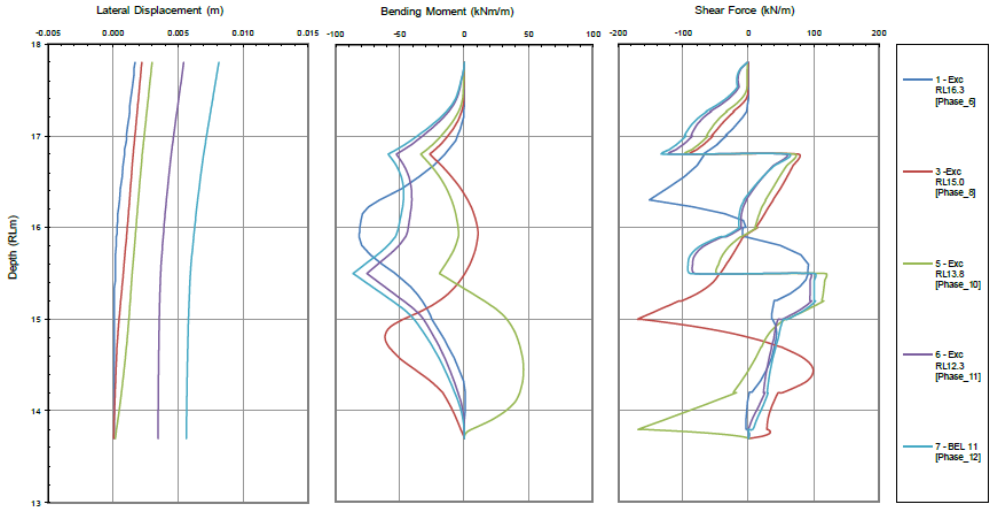
5.5.3.4 Earth Pressure

A lateral pressure of 20 kPa is adopted for designing the shotcrete walls as suggested by Golder.

5.5.3.5 Forces in Soldier Piles

Analysis Section 1 – Adjacent to Matchworks Building

600 diameter soldier piles at 1.5 m spacing have been considered. The design forces computed for Analysis Section 1 according to Golder report, are shown below. Note that the analysis has been conducted using the original BEL +10.35 m. However, as there remains no shoring wall below RL +13.60 m, the now adopted lower BEL (+6.750 m) is assumed not to have a significant effect on the retention system currently documented. Final design and geotechnical analysis are to be completed by D & C contractor.



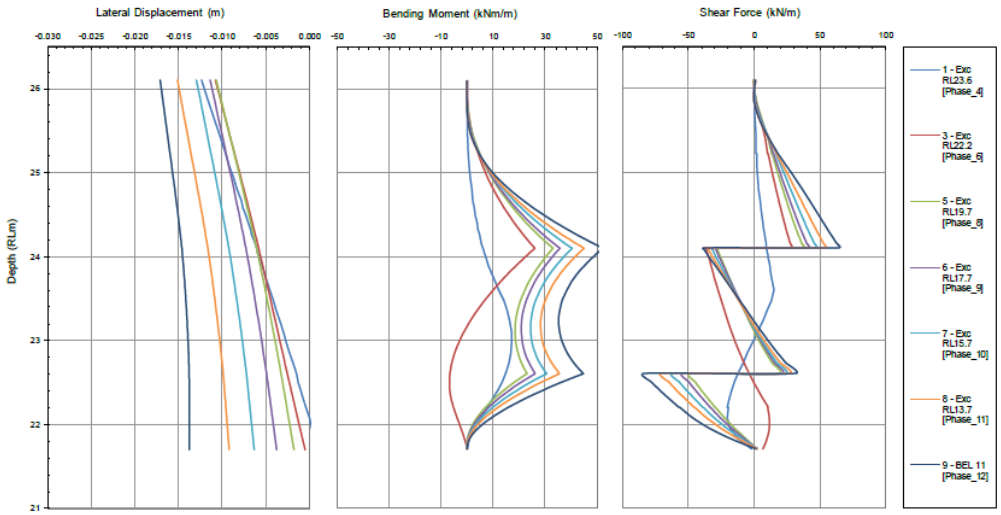
Construction Stage	Wall Lateral Displacement (mm)	Maximum Bending Moment[1] (kNm)	Maximum Shear Force[1] (kN)
Excavate to RL16.3	2	122	229
Excavate to RL15.0	2	91	256
Excavate to RL13.8	3	69	254
Excavate to RL12.3	5	113	183
Excavate to RL10.35	8	132	202

Source: Golder

Figure 4 – Lateral displacement and forces induced in the proposed soldier pile wall (adjacent to Matchworks Building)

Analysis Section 2 – Typical Section

600 diameter soldier piles at 2.4 m spacing have been considered. According to Golder report, the design forces computed for Analysis Section 2 are shown below.



Construction Stage	Wall Lateral Displacement (mm)	Maximum Bending Moment[1] (kNm)	Maximum Shear Force[1] (kN)
Excavate to RL23.6	13	41	49
Excavate to RL22.2	11	62	88
Excavate to RL19.7	11	79	118
Excavate to RL17.7	11	86	131
Excavate to RL15.7	13	97	150
Excavate to RL13.7	15	108	170
Excavate to RL10.35	18	126	207

Source: Golder

Figure 5 – Lateral displacement and forces induced in the proposed soldier pile wall (typical section).

5.5.3.6 Forces in Temporary Anchors

Analysis Section 1 – Adjacent to Matchworks Building

According to Golder report, the design parameters considered for temporary anchors of Analysis Section 1 are as follows:

Table 2. Design parameters considered for temporary anchors of Analysis Section 1.

Row	Spacing (m)	Inclination (°)	Anchor Prestress Load[1] (kN/anchor)	Maximum Axial Force[1] (kN/anchor)
R1	1.5	15	250	350
R2	1.5	15	250	300

[1] – Value shown is unfactored and a waler is required to distribute the load equally in a row.

Source: Golder

In addition, a minimum anchor free-length of 4.0 m is considered.

Analysis Section 2 – Typical Sections

According to Golder report, the design parameters considered for temporary anchors of Analysis Section 2 are as follows:

Table 3. Design parameters considered for temporary anchors of Analysis Section 2.

Row	Spacing (m)	Inclination (°)	Anchor Prestress Load[1] (kN/anchor)	Maximum Axial Force[1] (kN/anchor)
R1	2.4	15	150	250
R2	2.4	15	150	300

[1] – Value shown is unfactored.

Source: Golder

In addition, the anchor fixed-length should be located beyond a plane projected at an angle of 45 degrees from horizontal from the base of Unit 3a.

5.5.3.7 Design Load Combination

Ultimate Limit State:

– 1.35 G (total)
– 1.2 G (total) + 1.5 Q (total)

Serviceability Limit State:

– G (SW) + G (SDL) + 0.4Q (total) + H (LT, service)

5.5.3.8 Durability and Crack Control Methodology

- Design life = 50 years
- Concrete grade = 40MPa
- Concrete cover:
  - Piles = 65mm
  - Capping beam = 50mm
  - Shotcrete - retained soil side = 65mm
  - Shotcrete – excavation side = 30mm
- Crack width limit = moderate crack control as required by AS 3600:2009

5.6 Temporary Batter Slope Between Construction Stage 1 and Stage 2

Refer to *"Golder Preliminary Geotechnical Assessment Report"* referenced in Section 2 for temporary batter slopes that may be adopted between Stage 1 and 2.

6.0 Conclusion

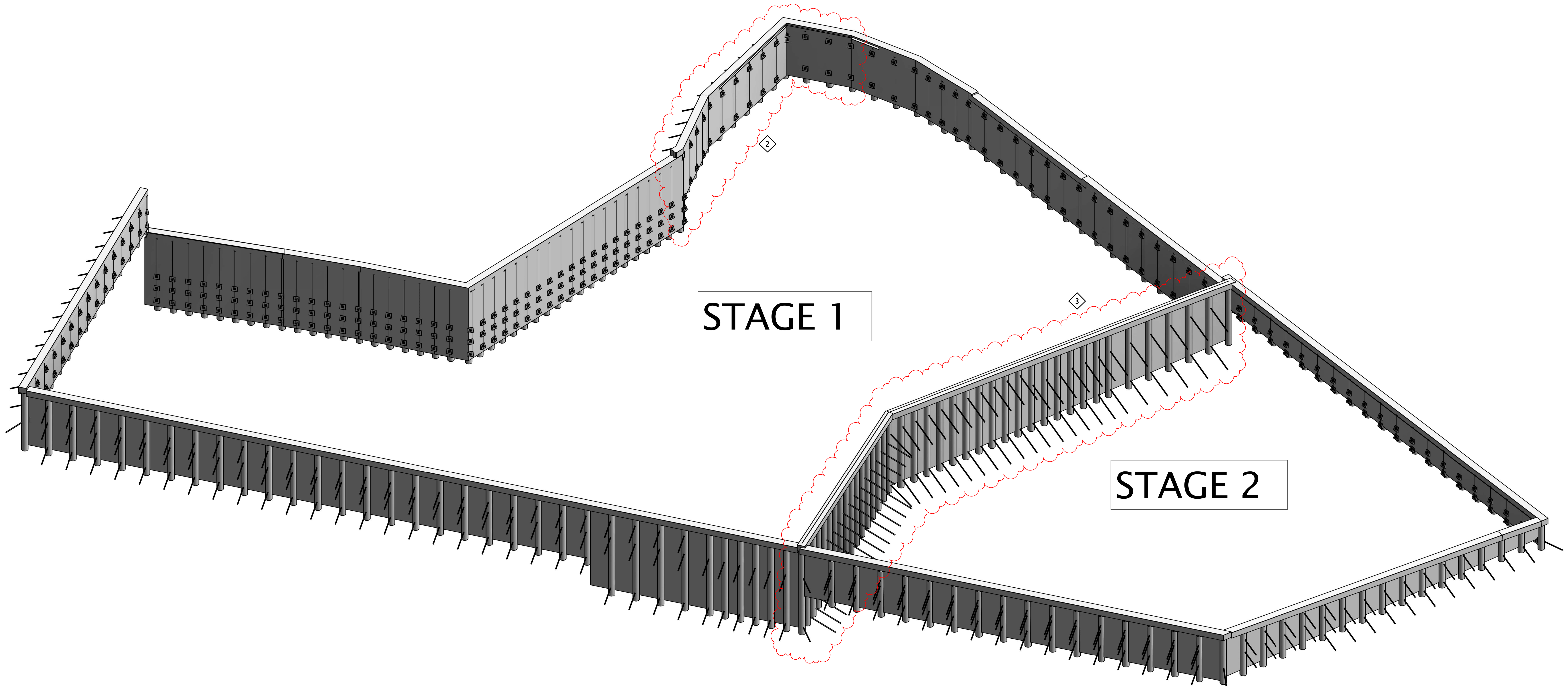
During Early Works DA design development, RBG have provided advice and input into the design of retention system (early works shoring package) by producing preliminary structural drawings (Appendix A) for the design team to incorporate into the design and attending weekly design coordination meetings.

Appendix A

RBG Early Works (Shoring) Package Drawings

LIVERPOOL CIVIC PLACE

52 SCOTT STREET, LIVERPOOL, NSW, 2170
EARLY WORKS PACKAGE
(STAGE 1 WORKS ONLY)



DRAWING LIST

SHEET No.	SHEET NAME
00005	COVER SHEET
00010	NOTES SHEET 1
01500	SHORING SURVEY PLAN
01511	SHORING GENERAL ARRANGEMENT PLAN STAGE 1
01550	SHORING LOADING PLAN
01611	SHORING WALL ELEVATIONS SHEET 1
01612	SHORING WALL ELEVATIONS SHEET 2
01711	TYPICAL SHORING DETAILS SHEET 1
01712	TYPICAL SHORING DETAILS SHEET 2
01713	TYPICAL SHORING DETAILS SHEET 3
01721	SHORING SECTIONS SHEET 1

SCHEDULE OF MODIFICATONS TO EARLY WORKS DA (DA-906/2019)

MARK	DESCRIPTION
1	ADDITIONAL HALF LEVEL OF BASEMENT EXCAVATION PHASE 1. BULK EXCAVATION LEVEL DEEPER.
2	NORTH WEST CORNER ADDITIONAL EXTENDED AREA FOR EXCAVATION (WEDGE).
3	REPLACING BATTER RETENTION SYSTEM AT STAGING LINE WITH SHORING WALL AT STAGING LINE.
4	DETAILED EXCAVATION FOR PAD FOOTINGS, LIFT OVERRUNS, CORE PADS SHOWN.

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
P1	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	27.08.20

SCALE	1	2	3	4	5	6	7	8

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

Structural, Civil & Construction
Engineering Consultant

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Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

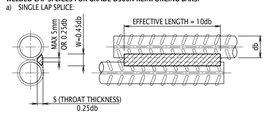
Title
COVER SHEET

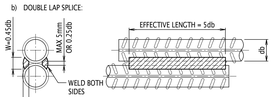
Date: 01.11.19	Drawn: S.TRIMARCHI
Scale at A0: 1:200	Designer: N.KALAVRITINOS
	Design Checker: C.FURNESS
Job Number: 19280	Approved: G.ANDRIANAKOS

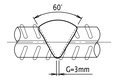
FOR TENDER - NOT FOR CONSTRUCTION

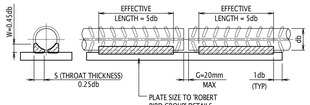
Drawing Number: RBG-XX-XX-DR-ST-00005 Revision: P3

09/11/2020 3:24:27 PM









GENERAL NOTES

1. THESE ENGINEERING DRAWINGS ARE TO BE READ IN CONJUNCTION WITH PROJECT SPECIFICATIONS AND OTHER CONSULTANTS DRAWINGS ON THE PROJECT.
2. THESE ENGINEERING DRAWINGS HAVE BEEN PREPARED FROM INFORMATION AVAILABLE AT THE TIME OF ISSUE. AS THIS INFORMATION MAY BE THE SUBJECT OF CHANGE PRIOR TO OR DURING CONSTRUCTION THE CONTRACTOR IS TO ADVISE THE ENGINEER WHERE DISCREPANCIES OCCUR.
3. THE STRUCTURE HAS BEEN DESIGNED FOR THE IN-SERVICE LOADS ACTING WHEN THE STRUCTURE IS COMPLETE ONLY. LOADS OR ACTIONS DUE TO CONSTRUCTION AND INSTALLATION METHODOLOGIES AND/OR EQUIPMENT HAVE NOT BEEN CONSIDERED UNLESS CLEARLY STATED OTHERWISE.
4. THESE DRAWINGS SHALL NOT BE USED FOR FINAL SETOUT OF THE PROJECT UNLESS SPECIFICALLY STATED.
5. WHERE STRUCTURAL CERTIFICATION IS REQUIRED, INSPECTIONS ARE TO BE PERFORMED BY A DULY APPOINTED INSPECTOR FROM 'ROBERT BIRD GROUP'. THESE INSPECTIONS ARE TO BE PERFORMED IN ACCORDANCE WITH THE INSPECTION & TEST PLANS PREPARED BY 'ROBERT BIRD GROUP.' THE INSPECTOR IS TO BE GIVEN A MINIMUM OF 48 HOURS NOTICE THAT AN INSPECTION IS REQUIRED.
6. PRIOR TO THE COMMENCEMENT OF WORKS THE CONTRACTOR IS TO IDENTIFY ALL EXISTING SERVICES. ANY SERVICES SHOWN ON 'ROBERT BIRD GROUP' DRAWINGS ARE INDICATIVE ONLY.
7. THE CONTRACTOR SHALL CHECK OR OBTAIN ALL DIMENSIONS RELEVANT TO SETTING OUT OF SITE WORKS, AND THE PROVISION OF ANY TEMPORARY BRACING, INCLUDING DESIGN, IN ACCORDANCE WITH THE SPECIFICATION.
8. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STABILITY OF THE WORKS AND ENSURE NO PART IS OVERSTRESSED. THE DESIGN AND CERTIFICATION OF ALL FORMWORK AND BACKPROPPING IS TO BE THE RESPONSIBILITY OF THE CONTRACTOR. (REFER TO CONCRETE NOTES FOR STRIPPING PROCEDURES FOR IN-SITU CONCRETE).
9. THE CONTRACTOR IS TO OBTAIN DESIGN ADVICE FROM A SUITABLY QUALIFIED ENGINEER REGARDING DEMOLITION, RETROFITTING, TEMPORARY WORKS, HEALTH & SAFETY AND NUISANCE. THIS HAS BEEN REFERRED TO AS THE "CONTRACTORS ENGINEER" THROUGHOUT THE REMAINING NOTES.
10. WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT AUSTRALIAN STANDARDS AND NCC STATUTORY REQUIREMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT SUFFICIENT TOLERANCES ARE PROVIDED AND INTEGRATED THROUGHOUT ALL ELEMENTS OF THE WORKS.
12. ALL NON-LOAD BEARING ELEMENTS SHALL BE KEPT CLEAR OF THE STRUCTURE SOFFIT BY AN ALLOWANCE DETERMINED FROM SPAN/250 OR CANTILEVER/125 BUT NOT LESS THAN 20mm, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
13. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
14. SUPERIMPOSED DEAD LOADS AND LIVE LOADS HAVE BEEN DETERMINED IN ACCORDANCE WITH AS1170 AND ARE SHOWN ON THE GENERAL ARRANGEMENT DRAWINGS.
15. WIND AND EARTHQUAKE LOADS HAVE BEEN DETERMINED IN ACCORDANCE WITH AS1170 BASED ON THE FOLLOWING DESIGN CRITERIA :-

NCC STRUCTURAL IMPORTANCE LEVEL: ☐

WIND LOADS:		**EARTH QUAKE LOADS:**	
ANNUAL PROBABILITY OF EXCEEDANCE		ANNUAL PROBABILITY OF EXCEEDANCE	
REGION		PROBABILITY FACTOR Kp	
TERRAIN CATEGORY		HAZARD FACTOR	
REGIONAL WIND SPEED V_R (m/s)		SITE SUB-SOIL CLASS	
SHIELDING M_S		STRUCTURAL DUCTILITY FACTOR u	
TOPOGRAPHIC Mt		STRUCTURAL PERFORMANCE FACTOR Sp	
		EARTHQUAKE DESIGN CATEGORY	

A WIND LOADING REPORT HAS BEEN PERFORMED BY:

REPORT NO :

DATE :

16. THE GEOTECHNICAL ENGINEERING INVESTIGATION HAS BEEN PERFORMED BY

	REPORT NO :	DATE :
DOUGLAS AND GOLDERS	19125312-002-L-Rev2	17.04.20
DOUGLAS AND GOLDERS	19125312-001-R-Rev4	17.04.20

HEALTH & SAFETY

1. THE CONTRACTOR SHALL DEVELOP, IMPLEMENT AND ADMINISTER A WORKPLACE HEALTH AND SAFETY PROGRAM THAT WILL ENSURE THAT ALL CONSTRUCTION ACTIVITIES ARE PERFORMED TO THE RELEVANT WORKPLACE HEALTH AND SAFETY REQUIREMENTS AND ANY OTHER RELEVANT STATUTORY REQUIREMENTS.
2. THE WORKPLACE HEALTH AND SAFETY PROGRAM MUST BE CO-ORDINATED WITH ADJOINING PROPERTY OWNERS AND ALL RELEVANT PARTIES AS NECESSARY TO ENSURE A SAFE BUILDING ENVIRONMENT AT ALL TIMES.

NUISANCE

1. THE CONTRACTOR SHALL DEVELOP, IMPLEMENT, AND ADMINISTER A PLAN THAT WILL ENSURE THE MANAGEMENT OF NOISE AND VIBRATION RESULTING FROM CONSTRUCTION WORKS. REFER TO SPECIFICATIONS FOR REQUIRED LIMITS, OTHERWISE, CONTACT ENGINEER FOR GUIDANCE.
2. THE CONTRACTOR WILL NEED TO ENSURE ALL ADJOINING PROPERTY REQUIREMENTS RELATING TO NOISE AND VIBRATION ARE MET.
3. IF IT IS ESTABLISHED THAT THERE ARE NO SITE SPECIFIC REQUIREMENTS, THEN THE CONTRACTOR SHALL REFER TO MINIMUM REQUIREMENTS FOR ABATEMENT OF NOISE AND VIBRATION NOMINATED BY RELEVANT STATUTORY REQUIREMENTS
4. THE CONTRACTOR WILL NEED TO PREPARE AND ADVISE ON MONITORING AND MANAGEMENT OF NOISE AND VIBRATION BASED ON PROFESSIONAL ADVICE FROM SUITABLY QUALIFIED PERSON OR PERSONS.

TEMPORARY WORKS

1. THE CONTRACTOR SHALL ALLOW FOR IN THEIR PRICE ALL COSTS ASSOCIATED WITH THE DESIGN, SUPPLY, INSTALLATION AND REMOVAL OF ALL TEMPORARY BACK PROPPING, SAFETY SCREENS, SCAFFOLDING AND OTHER REQUIREMENTS OF THE CONSTRUCTION PROCESS. THE CONTRACTOR SHALL ENGAGE SUITABLY QUALIFIED ENGINEER REFEREED TO AS "CONTRACTORS ENGINEER". TO DESIGN INSPECT AND CERTIFY ALL TEMPORARY WORKS, AND DEMOLITION WORKS.
2. THE CONTRACTOR IS TO PROVIDE ALL TEMPORARY WORKS CONTRACTOR ENGINEERING DRAWINGS TO THE STRUCTURAL ENGINEER FOR INFORMATION.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THE OVERALL STABILITY OF THE STRUCTURE AND NO PART IS OVERSTRESSED DUE TO CONSTRUCTION & INSTALLATION METHODOLOGIES AND/OR EQUIPMENT DURING CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ADVICE FROM THE CONTRACTORS ENGINEER.
4. THE CONTRACTOR IS TO HAVE CONSTRUCTION METHODOLOGY STATEMENTS PREPARED AND SUBMITTED FOR GENERAL REVIEW TO ENSURE IT IS IN ACCORDANCE WITH THE DESIGN INTENT.
5. ALL VERTICAL DISPLACEMENTS AND MOVEMENTS ARE TO BE LIMITED TO ENSURE THE STRUCTURE IS NOT SUBJECTED TO LOADS OR MOVEMENTS CAUSING STRUCTURAL DISTRESS TO ANY ELEMENT WHILE THE STRUCTURE IS BEING TEMPORARILY SUPPORTED.
6. DEPENDING ON THE CONTRACTORS PREFERRED CONSTRUCTION SEQUENCE, PRE-LOADING OF STRUCTURAL ELEMENTS MAY BE REQUIRED TO LIMIT TOTAL VERTICAL DISPLACEMENTS.
7. STRUCTURE TO BE ADEQUATELY BRACED TO PREVENT ANY HORIZONTAL MOVEMENT OR DEFLECTIONS.

LEGEND/ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
HORIZ	HORIZONTAL	N/S	NEAR SIDE
VERT	VERTICAL	F/S	FAR SIDE
CENT	CENTRALLY PLACED	B/S	BOTH SIDES
CRS	CENTRES	U/S	UNDER SIDE
B or BTM	BOTTOM FACE	LG	LENGTH/LONG
T	TOP FACE	w	WIDTH/WIDE
T&B	TOP & BOTTOM	h	HEIGHT/HIGH
NF	NEAR FACE	d	DEPTH/DEEP
FF	FAR FACE	NOM	NOMINAL
EF	EACH FACE	REQ'D	REQUIRED
EW	EACH WAY	REINF	REINFORCEMENT
EQ	EQUAL	OPP	OPPOSITE
NSOP	NOT SHOWN ON PLAN	SIM	SIMILAR
NSOE	NOT SHOWN ON ELEVATION	GA	GENERAL ARRANGEMENT
UNO	UNLESS NOTED OTHERWISE	PT	POST TENSION
TYP	TYPICAL	DWG	DRAWINGS
CL	CENTRE LINE	NTS	NOT TO SCALE
PL	PLATE	LL	LIVE LOAD
CFW	CONTINUOUS FILLET WELD	SIDL	SUPERIMPOSED DEAD LOAD
FSBW	FULL STRENGTH BUTT WELD	THRU	THROUGH
FPBW	FULL PENETRATION BUTT WELD	NLB	NON LOAD BEARING

CONCRETE NOTES

GENERAL

1. CONCRETE WORK & MATERIALS SHALL BE IN ACCORDANCE WITH AS3600, AS3610 AND WITH THE PROJECT SPECIFICATIONS.
2. CONSTRUCTION JOINTS SHALL BE PROPERLY FORMED, SCABBLED, CLEANED AND USED ONLY WHERE SHOWN ON 'ROBERT BIRD GROUP' DRAWINGS OR SPECIFICALLY APPROVED BY 'ROBERT BIRD GROUP'.
3. ALL THICKNESSES SHOWN ARE MINIMUM STRUCTURAL REQUIREMENTS, NO REDUCTION IN THICKNESS DUE TO FALLS OR TOPPING IS PERMITTED. REFER ARCHITECT DRAWINGS FOR ALL SLAB FALLS AND CONFIRMATION OF SLAB STEPS.
4. UNLESS A GROOVE LINE ALLOWANCE HAS BEEN NOTED ON THE DRAWINGS, NO GROOVE LINES ARE PERMITTED, EXCEPT AT SLAB LINES. ALL GROOVE LINES ARE TO BE SUBMITTED TO 'ROBERT BIRD GROUP' FOR APPROVAL.
5. THE FACE OF ALL CONCRETE AGAINST WHICH NEW CONCRETE IS TO BE CAST IS TO BE THOROUGHLY ROUGHENED TO PROVIDE A SURFACE ROUGHNESS OF NOT LESS THAN 3mm FULLY EXPOSING THE AGGREGATE MIX. ALL LOOSE AGGREGATE PARTICLES AND LIAITANCE SHALL BE REMOVED.
   THE ROUGHENING OF THE SURFACE CAN BE ACHIEVED BY:
   5.a. SAND BLASTING
   5.b. WIRE BRUSHING, PNEUMATIC OR HAND HELD TOOLS
   5.c. GREEN CUTTING OF THE PARTIALLY HARDENED CONCRETE
   - SURFACE RETARDING AGENTS, IF USED, SHALL BE FOLLOWED BY ANY OF 5a. TO 5c. ABOVE
   - MEMBRANE CURING AGENTS SHALL NOT BE USED
   - PRIOR TO PLACING THE ADJOINING CONCRETE THE FACE OF THE CONSTRUCTION JOINT AND THE PROJECTING REINFORCEMENT SHALL BE CLEANED AND THE CONCRETE SURFACE SHALL BE DAMPENED WITH WATER.
   - ALL EXCESS WATER AND LOOSE MATERIAL SHALL BE REMOVED PRIOR TO PLACING THE ADJOINING CONCRETE.
6. NO PENETRATIONS GREATER THAN 150mm DIAMETER, OR EMBEDMENT OF PIPES GREATER THAN 40mm DIAMETER OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE SLABS. FOR ALL OTHER CONCRETE MEMBERS NO PENETRATIONS, CHASES OR EMBEDMENTS SHALL BE MADE WITHOUT PRIOR APPROVAL BY 'ROBERT BIRD GROUP'.
7. CONDUITS GREATER THAN 25mm DIAMETER CAST INTO CONCRETE MEMBERS SHALL BE SPACED AT A MAXIMUM DISTANCE POSSIBLE AND UNDER NO CIRCUMSTANCES CLOSER THAN A CLEAR SPACING OF TWICE THE LARGER CONDUIT DIAMETER FROM PARALLEL REINFORCEMENT OR ANY OTHER CONDUIT.
8. CONCRETE SURFACE FINISHES TO BE IN ACCORDANCE WITH THE ARCHITECTURAL OR OTHER PROJECT DRAWINGS OR SPECIFICATIONS

CONCRETE

1. THE CHARACTERISTIC COMPRESSIVE STRENGTH (f'c) AT 28 DAYS OF IN PLACE CONCRETE SHALL BE AS NOTED ON THE DRAWINGS.
2. MAXIMUM AGGREGATE SIZE.....20mm
3. SLUMP....................................80mm
4. ALL CONCRETE SHALL BE VIBRATED.
5. ALL CONCRETE SHALL BE CURED IN ACCORDANCE WITH THE SPECIFICATION
6. ALL CONCRETE SHALL BE SAMPLED AND TESTED IN ACCORDANCE WITH AS1012 AND THE PROJECT SPECIFICATION.
7. ALL FORM WORK SHALL COMPLY WITH SECTION 17.6 OF AS3600 AND AS3610
8. FORMWORK STRIPPING:
   UNLESS SPECIFIED OTHERWISE IN THE PROJECT DOCUMENTATION, MINIMUM STRIPPING TIMES FOR IN-SITU CONCRETE FORMWORK SHALL COMPLY WITH THE MORE STRINGENT REQUIREMENTS OF SECTION 17.6 OF AS3600 & SECTION 5.4.3 (TABLE 5.1.1) OF AS3610.
9. REMOVAL OF FORMWORK SUPPORTS FROM SLABS AND BEAMS NOT SUPPORTING STRUCTURES ABOVE:
   UNLESS SPECIFIED OTHERWISE IN THE PROJECT DOCUMENTATION AND FORMWORK DOCUMENTATION APPROVED BY 'ROBERT BIRD GROUP', THE REMOVAL OF FORMWORK SUPPORTS FOR SLABS AND BEAMS NOT SUPPORTING STRUCTURES ABOVE SHALL COMPLY WITH SECTION 17.6 OF AS 3600
10. MULTISTOREY FORMWORK:
    UNLESS SPECIFIED OTHERWISE IN THE PROJECT DOCUMENTATION AND FORMWORK DOCUMENTATION APPROVED BY 'ROBERT BIRD GROUP', THE MINIMUM NUMBER OF LEVELS OF SUPPORT TO BE IN PLACE DURING THE TIME OF EACH POUR ON A FLOOR SHALL BE IN ACCORDANCE WITH SECTION 5.4.4 (TABLE 5.4.3) OF AS3610.

CONCRETE NOTES CONTINUED

REINFORCEMENT

1. REINFORCEMENT IS TO BE MANUFACTURED IN ACCORDANCE WITH AS4671 AND SHALL BE FIXED AS SHOWN ON DRAWINGS.
2. MATERIAL IS INDICATED BY THE FOLLOWING SYMBOLS:-

Y	DEFORMED BAR GRADE 400
N	DEFORMED BAR GRADE 500 (NORMAL DUCTILITY)
R	PLAIN ROUND BAR GRADE 250
W	PLAIN WIRE GRADE 450
SL	SQUARE FABRIC GRADE 500
RL	RECTANGULAR FABRIC GRADE 500

3. THE BAR SIZE IS INDICATED BY A NUMBER AFTER THE SYMBOL, WHICH INDICATES THE BAR DIAMETER IN MILLIMETRES.
4. REINFORCEMENT SPACING NOMINATED ON DRAWINGS IS TO ASSIST SCHEDULER AND STEEL FIXER TO ASSESS TOTAL NUMBER OF BARS REQUIRED. WHERE BARS PLACED IN ACCORDANCE WITH SPACING NOMINATED FOUL WITH OTHER STRUCTURAL REQUIREMENTS, PREFERENCE IS TO BE GIVEN TO RELOCATING BARS BY LOCALLY ADJUSTING SPACING TO ENABLE ASSEMBLY OF REINFORCEMENT TO BE COMPLETED. ENGINEER IS TO BE CONTACTED IN THE EVENT THAT REINFORCEMENT IS NEEDED TO BE CUT ON SITE PRIOR TO CONTINUING.
5. SPLICING OF REINFORCEMENT SHALL BE MADE ONLY WHERE SHOWN ON THE DRAWINGS OR OTHERWISE APPROVED BY THE ENGINEER. LAP LENGTHS AND DEVELOPMENT LENGTHS FOR REINFORCEMENT BARS TO BE AS NOTED ON THE RELEVANT DRAWINGS.
6. LAP FABRIC REINFORCEMENT THUS:

7. COVER SHALL BE AS NOTED ON THE RELEVANT DRAWINGS.
8. CONCRETE COVERS NOTED ARE MEASURED FROM THE FORM WORK OR GROUND FACE TO THE OUTERMOST REINFORCEMENT COMPONENT. i.e.. IN COLUMNS AND BEAMS TO THE OUTSIDE OF TIES OR LIGATURES.
9. COVER TO BE MAINTAINED DURING POURING BY THE USE OF PLASTIC CHAIRS OR PLASTIC TIPPED METAL CHAIRS WHICH ARE TO BE LOCATED AT 800mm MAX CRS BOTH WAYS. BARS TO BE TIED WITH TIE WIRE AT ALTERNATIVE INTERSECTIONS. ALL REINFORCEMENT BAR CHAIRS TO CONFORM TO THE REQUIREMENTS OF AS/NZS2425 AND TO BE STRENGTH GRADE 120 MINIMUM. NO TIE WIRE REINFORCEMENT TO PROTRUDE INTO THE CONCRETE COVER.
10. WHERE NO REINFORCEMENT IS SHOWN ON THE DRAWING AT RIGHT ANGLES TO THE MAIN REINFORCEMENT DISTRIBUTION REINFORCEMENT IS TO BE PROVIDED.
11. UNLESS NOTED OTHERWISE ON THE DRAWINGS, DISTRIBUTION REINFORCEMENT SHALL NOT BE LESS THAN:
    a) DISTRIBUTION REINFORCEMENT IN ONE LAYER FOR SLABS NOT EXCEEDING 150mm THICKNESS
    b) DISTRIBUTION REINFORCEMENT IN TOP & BOTTOM LAYER FOR SLABS LARGER THAN 150mm THICKNESS
    DISTRIBUTION REINFORCEMENT SHALL BE FULLY ANCHORED BY THE DEVELOPMENT LENGTH EXTENDING PAST THE POINT WHERE IT IS NO LONGER REQUIRED.
    WHERE DISTRIBUTION REINFORCEMENT IS TO BE LAPPED, THE LAP LENGTHS SHALL BE IN ACCORDANCE WITH THE LAP TABLES
12. BENDING & STRAIGHTENING
    COLD BENDING: BARS CANNOT BE COLD BENT WITHOUT PRIOR APPROVAL FROM THE PROJECT STRUCTURAL ENGINEER. CORRECT MINIMUM DIAMETER FORMERS ARE TO BE USED IN ACCORDANCE WITH AS3600.
    HOT BENDING: HOT BENDING MAY ONLY BE CONDUCTED WITH THE APPROVAL OF THE PROJECT STRUCTURAL ENGINEER. HOT BENDING CAN ONLY BE PERFORMED BY A CERTIFIED WELDER. TEST CERTIFICATE OF AFFECTED AREA TO BE OBTAINED.
    STRAIGHTENING: WHEN RE-STRAIGHTENING PARTIALLY EMBEDDED BARS, DO NOT BEND OVER FORMERS OF SMALLER DIAMETER THAN PERMITTED IN AS 3600. DO NOT SUBJECT REINFORCEMENT BARS TO IMPACT IN ORDER TO STRAIGHTEN.
13. **NO WELDING OF REINFORCEMENT, INCLUDING TACK WELDING, ALLOWED UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER.**

CONCRETE NOTES CONTINUED

WELDING OF REINFORCEMENT <u>WHERE APPROVED BY 'ROBERT BIRD GROUP' INSTRUCTION</u>:

1. ALL WELDING OF REINFORCEMENT, INCLUDING TACK WELDING, TO BE IN ACCORDANCE WITH AS/NZS 1554.3
2. HYDROGEN CONTROLLED ELECTRODES TO BE USED
3. ALL WELDS TO BE CATEGORY SP
4. NO WELDS TO BE LOCATED WITHIN 2 BAR DIAMETERS FROM THE START OF A BEND OR ANY PART OF A BAR THAT HAS BEEN BENT AND SUBSEQUENTLY STRAIGHTENED
5. EARTHING OR LIGHTNING PROTECTION RODS SHALL NOT BE WELDED TO THE REINFORCEMENT UNLESS APPROVED BY THE ENGINEER

WELDED LAP SPLICES FOR GRADE D500N REINFORCING BARS:

a) SINGLE LAP SPLICE:

b) DOUBLE LAP SPLICE:

WELDED BUTT SPLICES FOR GRADE D500N REINFORCING BARS:

a) DIRECT BUTT SPLICE:

b) INDIRECT BUTT SPLICE - TYPE 1:

c) INDIRECT BUTT SPLICE - TYPE 2:

GENERAL SHORING NOTES

1. ROCK LEVELS WHICH HAVE BEEN PROVIDED ARE INDICATIVE AND EXTRAPOLATED FROM THE GEOTECHNICAL REPORT.
2. REFER TO THE GEOTECHNICAL REPORT FOR A DETAILED DESCRIPTION OF ANTICIPATED STRATA.
3. IT IS THE SUBCONTRACTORS RESPONSIBILITY TO ENSURE THAT ALL SHORING WALLS INSTALLED DO NOT DAMAGE ADJACENT STRUCTURES OR SERVICES.
4. A VIBRATION & MOVEMENT MONITORING PLAN MUST BE PREPARED AND MONITORING RESULTS ARE TO BE REPORTED REGULARLY TO THE MANAGING CONTRACTOR.
5. WHERE MONITORING RESULTS ARE BEYOND ACCEPTABLE CRITERIA, AS OUTLINED WITHIN THE ENGINEERING DOCUMENTS, THE ENGINEER SHALL BE IDENTIFIED IMMEDIATELY.
6. THE SUBCONTRACTOR'S GEOTECHNICAL ENGINEER SHALL ADVISE ON ALLOWABLE TEMPORARY BATTER ANGLES AS EXCAVATION PROCEEDS.
7. NOTIFY THE ENGINEER IF ANY REINFORCED PILE IS DAMAGED IN ANY WAY.
8. REFER TO RELEVANT SERVICE CONSULTANTS DRAWINGS FOR SIZE AND POSITION OF ALL SERVICE PENETRATIONS. UNLESS DIRECTED BY THE HEAD CONTRACTOR.
9. THE PRESENCE OF UNCONTROLLED FILL (REFER SOILS REPORT) MAY CONTAIN ELEMENTS WHICH WILL NEED TO BE REMOVED AND REPLACED BEFORE SHORING INSTALLATION CAN PROCEED.
10. THE SHORING CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS OF THE SHORING WALLS FOR THE ANCHORING SUBCONTRACTOR'S USE IN PREPARING THE ANCHOR SETOUT SHOP DRAWINGS. THE AS BUILT DRAWINGS ARE TO BE PROVIDED WITHIN 2 WEEKS OF COMPLETION OF SHORING AND ARE TO CONTAIN ALL INFORMATION AS DESCRIBED IN THE SPECIFICATION. ALL RECORDS ARE TO BE SUBMITTED BEFORE EXCAVATION PROCEEDS.
11. AN ENCROACHMENT SURVEY INCLUDING FOOTING TEST PITS IS TO BE CARRIED OUT PRIOR TO SHORING INSTALLATION.
12. THE SHORING CONTRACTOR IS TO CONFIRM CLEARANCE AND TOLERANCE REQUIREMENTS.
13. REFER GEOTECHNICAL REPORT FOR ACTUAL ROCK TYPES AND DESCRIPTION TO JUDGE EASE OF EXCAVATION.
14. IT IS THE SUBCONTRACTORS RESPONSIBILITY TO ENSURE THAT EXCAVATION STAGING ACROSS THE SITE DOES NOT OVERLOAD ANY STRUCTURAL MEMBER TO BOTH THE EXISTING SURROUNDING STRUCTURES AND THE NEW STRUCTURE BEING CONSTRUCTED.

BORED PIER NOTES

1. BORED PIERS SHALL BE IN ACCORDANCE WITH AS2159 AND WITH THE PROJECT SPECIFICATIONS.
2. REFER TO THE GEOTECHNICAL ENGINEERING REPORT SPECIFIED IN THE GENERAL NOTES FOR SITE SPECIFIC GEOTECHNICAL INFORMATION.
3. ALL BORED PIERS SHALL FOUND IN MATERIAL HAVING AN ALLOWABLE BEARING CAPACITY OF 1000 kPa. TO BE CONFIRMED BY D&C CONTRACTOR.
4. THE CONTRACTOR SHALL ENGAGE AND PAY FOR A GEOTECHNICAL ENGINEER TO VERIFY THE BEARING CAPACITY OF THE FOUNDING MATERIAL AND BORED PIER CAPACITY PRIOR TO THE PLACEMENT OF REINFORCEMENT OR POURING OF CONCRETE.
5. REFER TO THE FOOTING DRAWING FOR BORED PIER DIAMETERS AND DESIGN LOADS.
6. BORED PIERS SHALL BE DESIGNED TO CARRY THE DESIGN LOADS AT 75mm ECCENTRICITY TO MAKE ALLOWANCE FOR CONSTRUCTION TOLERANCE. ALL PIER CENTRELINES ARE TO BE CHECKED BEFORE ANY CONCRETE IS POURED. IF A VECTOR ECCENTRICITY GREATER THAN 75mm IS MEASURED `ROBERT BIRD GROUP' ARE TO BE CONTACTED IMMEDIATELY.
7. UNLESS NOTED OTHERWISE THE CENTRELINE OF THE BORED PIER IS TO COINCIDE WITH CENTRELINE OF COLUMN ABOVE. REFER TO THE ARCHITECTURAL DRAWINGS FOR COLUMN SETOUT DETAILS.
8. BORED PIERS SHALL BE DRILLED USING A RIG CAPABLE OF BORING A HOLE WITH A VERTICAL TOLERANCE OF 1:100 INCLINATION.
9. NOTIFY `ROBERT BIRD GROUP' IMMEDIATELY OF ANY OBSTRUCTIONS ENCOUNTERED DURING BORING, OTHER THAN THOSE INDICATED IN THE SITE INVESTIGATION.
10. THE BORED PIERS MAY HAVE TO BE LINED TO RETAIN LOOSE FILL.
11. REMOVE ALL LOOSE OR DISTURBED MATERIAL FROM THE SHAFT AND BASE OF THE BORED PIER.
12. BORED PIERS NOT CONCRETE FILLED BY THE END OF THE DAY WILL REQUIRE RE-DRILLING TO REMOVE ANY LOOSE MATERIAL.
13. PLACE CONCRETE TO ENSURE A SOUND MONOLITHIC COMPACTED CONCRETE SHAFT OF THE FULL DIAMETER REQUIRED TO CUT-OFF LEVEL. TAKE ADEQUATE MEASURES TO AVOID SEGREGATION, BLEEDING AND GROUT DEFICIENCY OF THE PIER.
14. EACH PIER SHALL BE TRIMMED TO ±25mm OF THE CUT-OFF LEVEL. ANY DAMAGE CAUSED TO THE BORED PIER DURING TRIMMING AND CAPPING IS TO BE REMOVED AND ADEQUATELY REPAIRED.

SHORING WORKS ANCHORING NOTES

1. ALL ANCHORS UNLESS NOTED OTHERWISE ARE TO BE TEMPORARY AND DESTRESSED FOLLOWING THE COMPLETION OF ALL BASEMENT LEVELS AND GROUND LEVEL STRUCTURES INCLUDING ALL RAMPS AS PER STANDARD NOTES BELOW AND THE SPECIFICATION.
2. ALL STRAND TO BE 15.2mm UNO
3. ALL ANCHORS TO BE TESTED, THEN STRESSED AND LOCKED OFF TO THEIR NOMINATED WORKING LOAD BEFORE EXCAVATION TO THE NEXT BENCH LEVEL CAN PROCEED.
4. A SURVEYOR SHALL BE USED TO VERIFY ANCHOR SETOUT.
5. SERVICES AND NEIGHBOURING BUILDING FOUNDATIONS THAT ARE SHOWN ARE INDICATIVE ONLY, SUBCONTRACTOR SHALL VERIFY THE LOCATION AND SETOUT OF THESE ELEMENTS PRIOR TO WORK COMMENCING ON SITE.
6. ANCHORS MAY NEED TO BE ANGLED IN PLAN OR SHIFT RELATIVE TO THE INDICATIVE POSITIONS SHOWN TO ENSURE THEY DO NOT HIT EXISTING BUILDING FOOTINGS OR SERVICES. IT IS THE SUBCONTRACTORS RESPONSIBILITY TO ENSURE THAT ANCHORS ARE INSTALLED IN SUCH A MANNER SO AS TO MISS THESE ELEMENTS AND ASSESS ALL ANCHORS FOR POSSIBLE CLASHES WITH EXISTING SERVICES AND/ OR STRUCTURE AS SUCH ALL ANCHOR POSITIONS AND WHALER SIZES WHERE PROVIDED ARE INDICATIVE ONLY AND MAY BE SUBJECT TO CHANGE.
7. THE ANCHORING CONTRACTOR WILL BE RESPONSIBLE FOR COMPLETING ALL SHOP DRAWINGS AND CALCULATIONS GIVING ANCHOR SETOUT, GEOMETRY AND DESIGN, TAKING INTO ACCOUNT ALL INTERFACES WITH EXISTING SERVICES AND NEIGHBOURING BUILDING FOUNDATIONS. THE SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION A MINIMUM OF 3 WEEKS BEFORE WORK STARTS ON SITE.
8. UNLESS NOTED OTHERWISE ALL ANCHORS ARE TO BE INSTALLED PERPENDICULAR TO THE SHORING FACE AND DECLINED TO THE HORIZONTAL AT THE ANGLE SPECIFIED. IF THIS NEEDS TO BE ALTERED THE HEAD CONTRACTOR IS TO BE NOTIFIED IMMEDIATELY.
9. THE CONTRACTOR IS TO ENGAGE AND PAY A GEOTECHNICAL ENGINEER TO INSPECT AND CERTIFY GEOTECHNICAL ASPECTS OF THE EXCAVATION AND SHORING WORKS INCLUDING:
   - ANCHOR LOCATIONS, LENGTHS (FIXED & FREE) AND CAPACITIES
   - TEMPORARY STABILITY AND EXCAVATION STAGING.
   - GEOTECHNICAL CAPACITY OF PILES AND FOOTINGS.
   - CHANGES TO SHORING SEQUENCE OR DETAILS TO SUIT SITE CONDITIONS.
   - BATTER SLOPES AND STABILITY.
   - ANCHORING AND ROCK PIN REQUIREMENTS IN CUT ROCK FACES AND EXTENT OF REQUIRED SHOTCRETE FOR GEOTECHNICAL RESTRAINT OF CUT ROCK FACES.
10. EXCAVATION AND INSTALLATION OF ALL ROCK ANCHORS SHALL OCCUR AS DIRECTED BY THE CONTRACTOR'S GEOTECHNICAL ENGINEER. THE CONTRACTOR'S GEOTECHNICAL ENGINEER SHALL ALSO ADVISE ON ALLOWABLE TEMPORARY BATTER ANGLES WHERE REQUIRED.
11. THE SUBCONTRACTOR'S GEOTECHNICAL ENGINEER IS TO VERIFY THE SAFE WORKING LOADS OF ALL ANCHORS AS SPECIFIED AND HENCE VERIFY ALL ANCHOR EMBEDMENTS.
12. APPROVALS FOR ANCHORING AND EXCAVATION FROM ADJOINING OWNER & AUTHORITIES IS REQUIRED BEFORE ANY WORKS WHICH TRAVERSE PROPERTY BOUNDARIES IS UNDERTAKEN.

EARLY WORKS - NOTES

1. DESIGN AND CERTIFICATION OF EARLY WORKS IS THE RESPONSIBILTY OF THE D&C CONTRACTOR. RBG PROJECT CERTIFICATION WILL RELY ON THIS BEING PROVIDED BY THE RELEVANT D&C CONTRACTOR.
2. THESE DRAWINGS ARE ISSUED AS AN INDICATION OF THE EXTENT OF WORKS ONLY. THEY ARE NOT A COMPLETE CONSTRUCTION SET OF DRAWINGS. I.E. FINAL CONSTRUCTION DESIGN AND DETAILS BY D&C CONTRACTOR.
3. TO DETERMINE THE FULL EXTENT OF WORK, THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ARCHITECTURAL DRAWINGS AND OTHER CONTRACT DOCUMENTS. ALLOW FOR ALL ITEMS SHOWN ON ARCHITECTURAL AND OTHER DRAWINGS AS NOT ALL ITEMS ARE SHOWN ON THE STRUCTURAL DRAWINGS.
4. SHOULD ANY AMBIGUITY, ERROR, OMISSIONS, DISCREPANCY, INCONSISTENCY OR OTHER FAULT EXIST OR SEEM TO EXIST IN THE DOCUMENTS, IMMEDIATELY NOTIFY THE SUPERINTENDENT IN WRITING.
5. REINFORCEMENT/ELEMENT SIZING RATES SHOWN ON THE DRAWINGS ARE FOR INFORMATION ONLY AND WILL BE CONFIRMED IN SUBSEQUENT STAGES OF DESIGN.
6. REFER TO RBG BASIS OF DESIGN REPORT - EARLY WORKS (SHORING) PACKAGE - ISSUE E - DATED 27th AUGUST 2020 FOR BASIS OF DESIGN

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
P1	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	27.08.20

SCALE	1	2	3	4	5	6	7	8

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

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Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

Title
STRUCTURAL NOTES

Date
01.11.19
Scale at A0

Drawn
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Designer
N.KALAVRITINOS
Design Checker
C.FURNESS
Approved
G.ANDRIANAKOS

Job Number
19280

FOR TENDER - NOT FOR CONSTRUCTION

Drawing Number
RBG-XX-XX-DR-ST-00010

Revision
P3

09/11/2020 3:24:34 PM

SHORING SURVEY PLAN
SCALE 1 : 150

NOTES:

- SURVEY OVERLAY AS PER VERIS AUSTRALIA PTY LTD
  SURVEY PLAN REF: 201512 ISSUED 06.09.2019

SCHEDULE OF MODIFICATONS TO EARLY WORKS DA (DA-906/2019)	
MARK	DESCRIPTION
1	ADDITIONAL HALF LEVEL OF BASEMENT EXCAVATION PHASE 1. BULK EXCAVATION LEVEL DEEPER.
2	NORTH WEST CORNER ADDITIONAL EXTENDED AREA FOR EXCAVATION (WEDGE).
3	REPLACING BATTER RETENTION SYSTEM AT STAGING LINE WITH SHORING WALL AT STAGING LINE.
4	DETAILED EXCAVATION FOR PAD FOOTINGS, LIFT OVERRUNS, CORE PADS SHOWN.

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
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SCALE 1 2 3 4 5 6 7 8

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Project
LIVERPOOL CIVIC PLACE

Title
SHORING SURVEY PLAN

Date	Drawn
01.11.19	S.TRIMARCHI
Scale at A0	Designer
1:150	N.KALAVRITINOS
	Design Checker
	C.FURNESS
Job Number	Approved
19280	G.ANDRIANAKOS

FOR TENDER - NOT FOR CONSTRUCTION

Drawing Number	Revision
RBG-XX-XX-DR-ST-01500	P3

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SHORING GENERAL ARRANGEMENT PLAN - STAGE 1

SCALE 1 : 150

NOTES:

1. CRANE BASE EXCAVATION TO FUTURE ADDENDUM.
2. ~~TEMPORARY DRAINAGE PITS TO FUTURE ADDENDUM.~~
3. ALLOW FOR DETAILED EXCAVATION OF COLUMN FOOTINGS BEL 6.400.
4. ALLOW FOR DETAILED EXCAVATION OF LIFT OVERRUNS AS SHOWN.

4

BULK EARTHWORKS & RETENTION LEGEND:

- DENOTES SHOTCRETE WALL
- DENOTES BORED PIER AND TEMPORARY GROUND ANCHORS
- SW# DENOTES SHORING WALL NUMBER
- MP DENOTES MONITORING POINT FOR NEW RETAINING WALL (TBC)
- MP* DENOTES MONITORING POINT TO AJOINING BUILDING PARAPET (TBC)
- BH# DENOTES APPROXIMATE LOCATION OF BOREHOLE & REFERENCE NUMBER REFER GEOTECHNICAL REPORT (TBC)
- BEL DENOTES BULK EXCAVATION LEVEL BASED ON ARCH LEVELS MINUS SUBGRADE AND SLAB DEPTH.

REFER DRAWING SERIES S00 FOR ALL RELEVANT SITE RETENTION AND EARTHWORKS NOTES

EXCAVATION NOTES:

1. LOCAL EXCAVATION FOR COLUMNS, PILE CAPS, AND STRIP FOOTINGS NOT SHOWN.
2. ALLOW FOR 2500 (W) x 2500 (L) x 1100 (D) PAD FOOTINGS UNDER ALL COLUMNS.
3. EXCAVATION SEQUENCE AND REQUIREMENTS TO BE CONFIRMED BY GEOTECHNICAL ENGINEER.
4. GEOTECHNICAL ENGINEER TO INSPECT EXCAVATION.
5. INSPECTION PLAN TO BE CONFIRMED BY GEOTECHNICAL ENGINEER.

GENERAL NOTES:

1. REFER TO ARCHITECTURAL DRAWINGS FOR CAPPING BEAM RL AND ALL STEPS IN CAPPING UNO.
2. ALL IN GROUND SERVICES LOCATIONS AND EXISTING FOOTINGS TO BE CONFIRMED BY BUILDER PRIOR TO ANY ANCHOR INSTALLATION WORKS. CONTRACTOR TO ENSURE THAT ALL ANCHOR LOCATIONS ARE CLEAR OF EXISTING SERVICES AND FOOTINGS.CLEARANCE TO BE 1600 MIN. AND/OR IN ACCORDANCE WITH THE RELEVANT SERVICES AUTHORITIES SPECIFICATIONS.
3. PILE AND TEMPORARY ANCHORS SYSTEM DESIGN TO BE ADJUSTED TO PREVENT CLASH WITH ANY ADJACENT FOOTINGS AND SERVICES.
4. REFER TO SHORING WALL ELEVATION DRAWINGS FOR RELEVANT SCHEDULES.

CONCRETE NOTES :
-REFER NOTES ON COVER SHEET
-MIN CONC. STRENGTH AT 28 DAYS

LOCATION	f'c
SHOTCRETE	40MPa
BORED PIER	40MPa
CAPPING BEAM	40MPa

-CONCRETE COVER

LOCATION	COVER
BORED PIER	65mm
CAPPING BEAM	50mm
SHOTCRETE:	
- RETAINED SOIL SIDE	65mm
- EXCAVATION SIDE	30mm

STAGING NOTES:

RBG UNDERSTANDS THAT THE BULK EXCAVATION CONSIDERED BY BUILT INCLUDES TWO STAGES I.E. STAGE 1 EXCAVATION UNDER THE LIBRARY AND COUNCIL BUILDINGS.

4

PAD FOOTING EXCAVATION SCHEDULE

MARK	LENGTH	WIDTH	DEPTH	BULK EXCAVATION LEVEL
PF1	2500	2500	1200	6.40
PF2	5450	3080	1350	6.25

SCHEDULE OF MODIFICATONS TO EARLY WORKS DA (DA-906/2019)

MARK	DESCRIPTION
1	ADDITIONAL HALF LEVEL OF BASEMENT EXCAVATION PHASE 1. BULK EXCAVATION LEVEL DEEPER.
2	NORTH WEST CORNER ADDITIONAL EXTENDED AREA FOR EXCAVATION (WEDGE).
3	REPLACING BATTER RETENTION SYSTEM AT STAGING LINE WITH SHORING WALL AT STAGING LINE.
4	DETAILED EXCAVATION FOR PAD FOOTINGS, LIFT OVERRUNS, CORE PADS SHOWN.

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
P1	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	27.08.20

SCALE 1 2 3 4 5 6 7 8

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

Structural, Civil & Construction Engineering Consultant

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Fax: (02) 8246 3201
Email: sydney@robertbird.com.au
Web: www.robertbird.com
ACN 010 580 248

Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

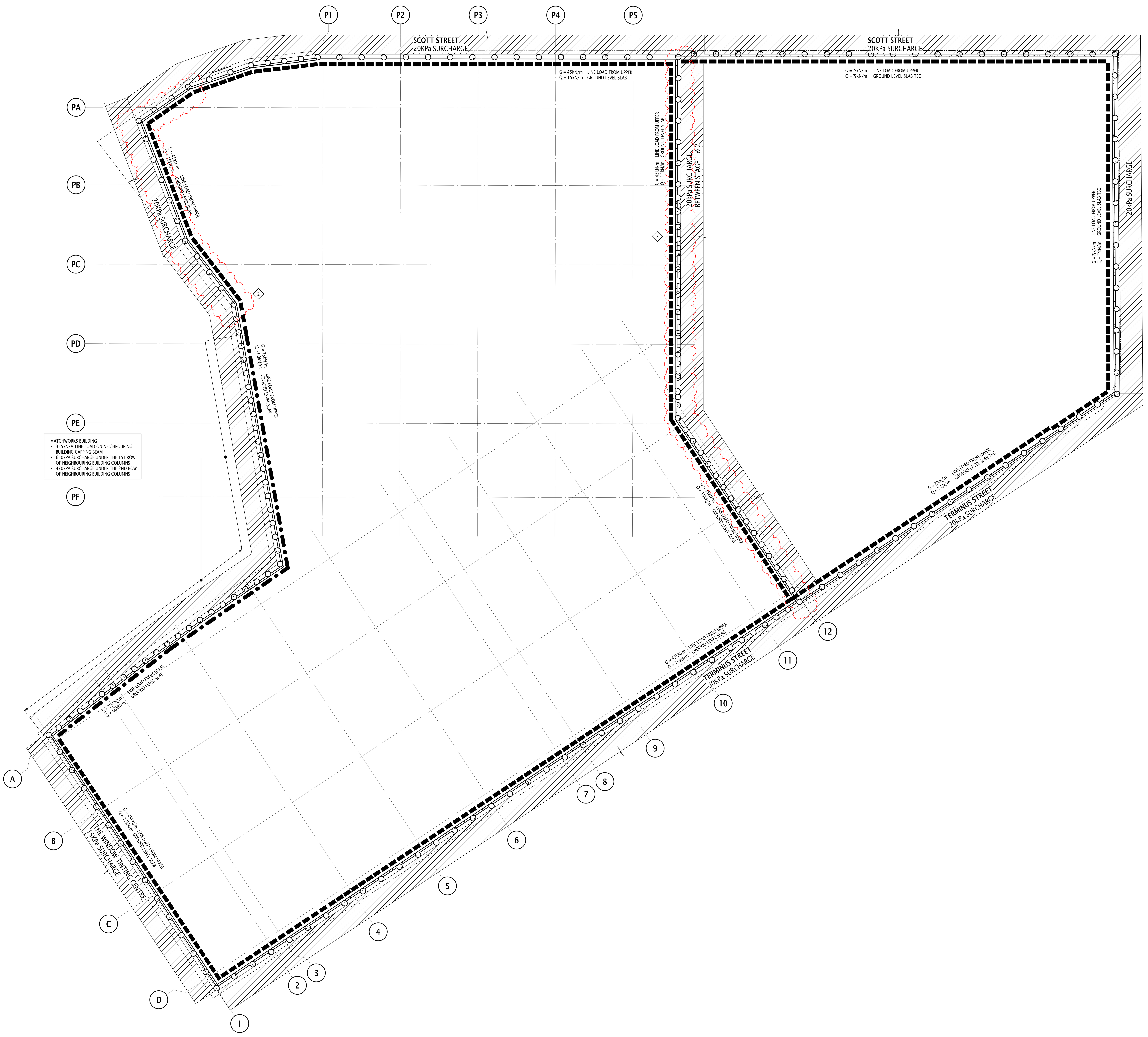
Title
SHORING GENERAL ARRANGEMENT PLAN STAGE 1

Date	Drawn
01.11.19	S.TRIMARCHI
Scale at A0	Designer
1:150	N.KALAVRITINOS
	Design Checker
	C.FURNESS
Job Number	Approved
19280	G.ANDRIANAKOS

FOR TENDER - NOT FOR CONSTRUCTION

Drawing Number	Revision
RBG-XX-XX-DR-ST-01511	P3

09/11/2020 3:25:29 PM



SHORING LOADING PLAN

SCALE 1 : 150

NOTES :

1. NO LONG TERM LOADING FROM VERTICAL STRUCTURAL ELEMENTS ARE CONSIDERED TO LOAD THE RETENTION SYSTEM. THIS HAS BEEN A DIRECTION FROM THE CLIENT TEAM
2. THE FOUNDATION LOADS FROM MATCHWORKS BUILDING HAVE BEEN DISCUSSED WITH THE GEOTECHNICAL ENGINEERS AT A DESIGN MEETING HELD ON THE 5th NOVEMEBER 2019

LEGEND :

- DENOTES SURCHARGE LOAD (KPa)
- DENOTES LINE LOAD (kN/m)

SCHEDULE OF MODIFICATONS TO EARLY WORKS DA (DA-906/2019)	
MARK	DESCRIPTION
1	ADDITIONAL HALF LEVEL OF BASEMENT EXCAVATION PHASE 1. BULK EXCAVATION LEVEL DEEPER.
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3	REPLACING BATTER RETENTION SYSTEM AT STAGING LINE WITH SHORING WALL AT STAGING LINE.
4	DETAILED EXCAVATION FOR PAD FOOTINGS, LIFT OVERRUNS, CORE PADS SHOWN.

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
P1	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	27.08.20

SCALE 1 2 3 4 5 6 7 8

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ACN 010 580 248

Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

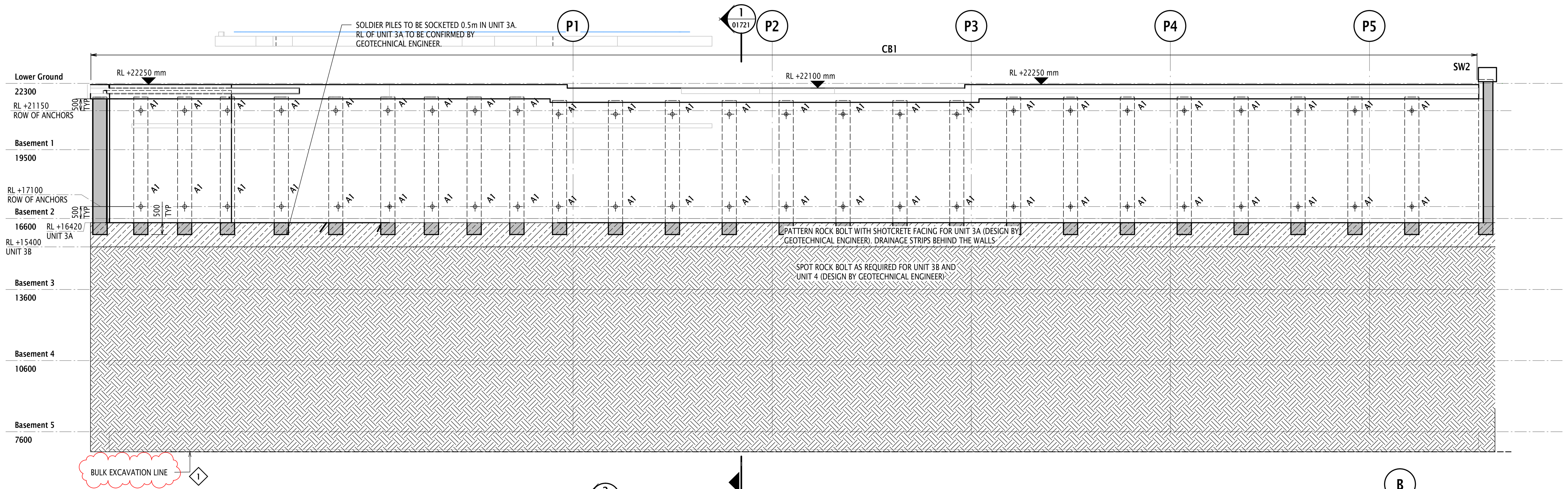
Title
SHORING LOADING PLAN

Date 01.11.19	Drawn S.TRIMARCHI
Scale at A0 1:150	Designer N.KALAVRITINOS
	Design Checker C.FURNESS
Job Number 19280	Approved G.ANDRIANAKOS

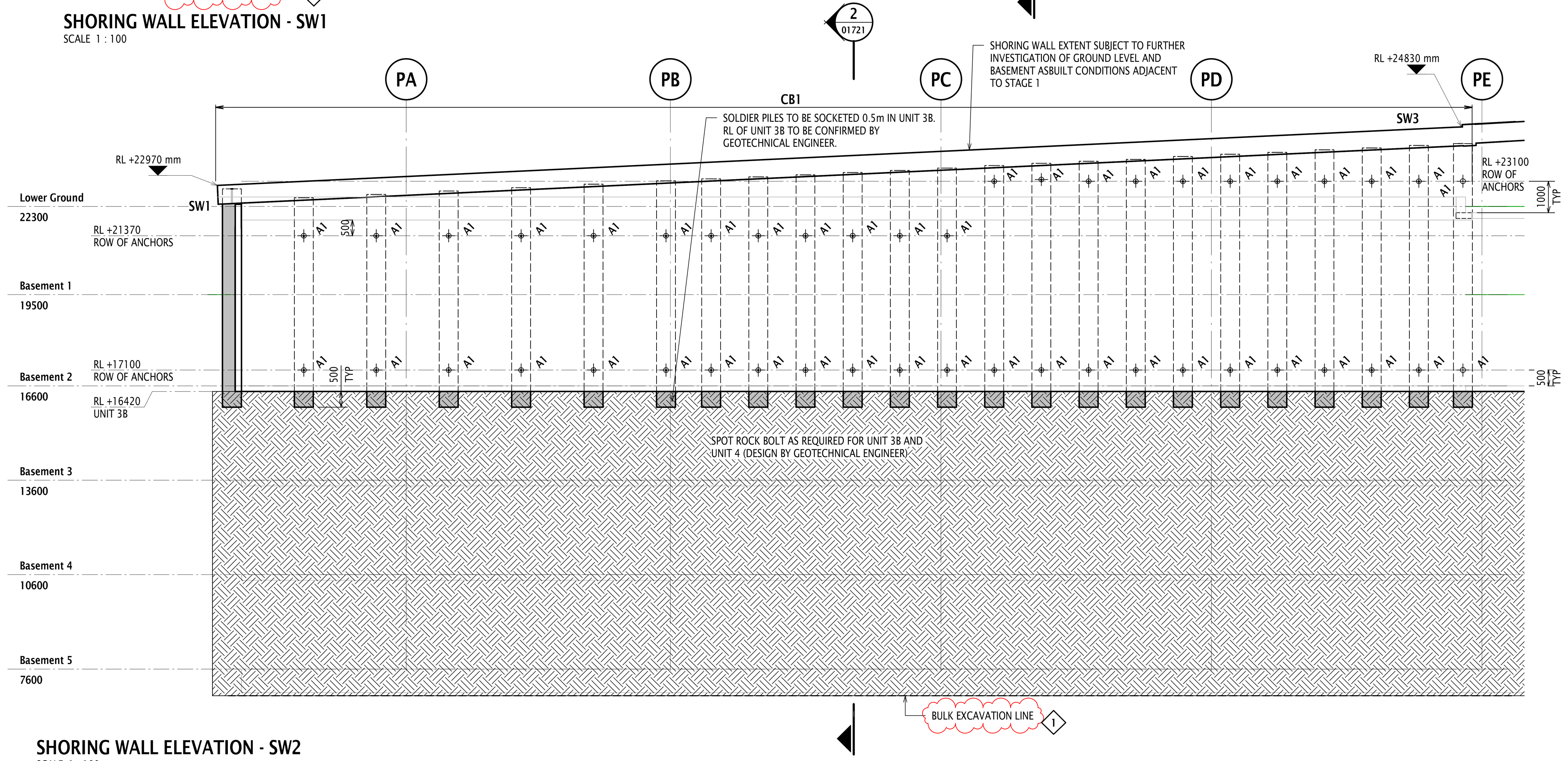
FOR TENDER - NOT FOR CONSTRUCTION

Drawing Number	Revision
RBG-XX-XX-DR-ST-01550	P3

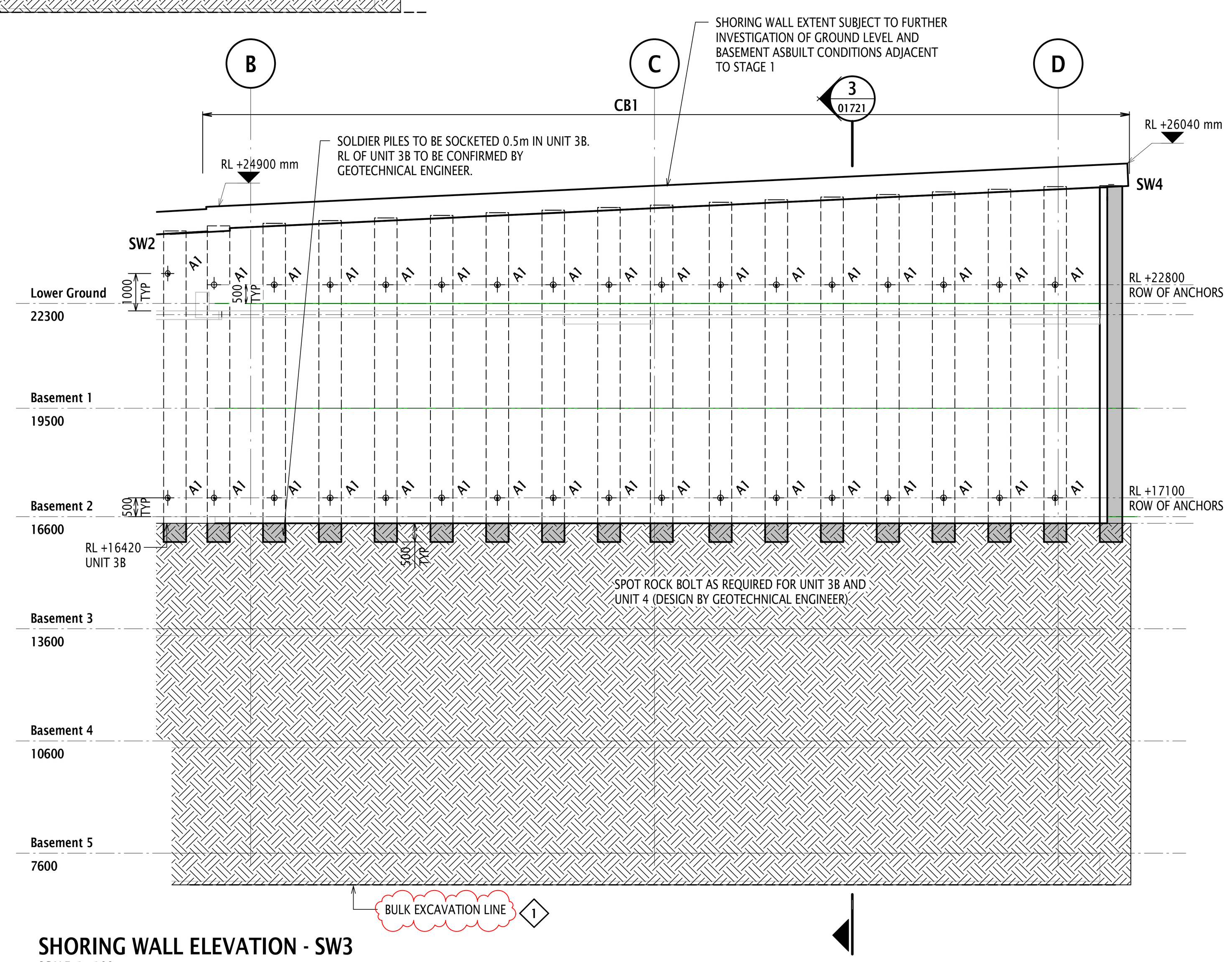
09/11/2020 3:25:43 PM



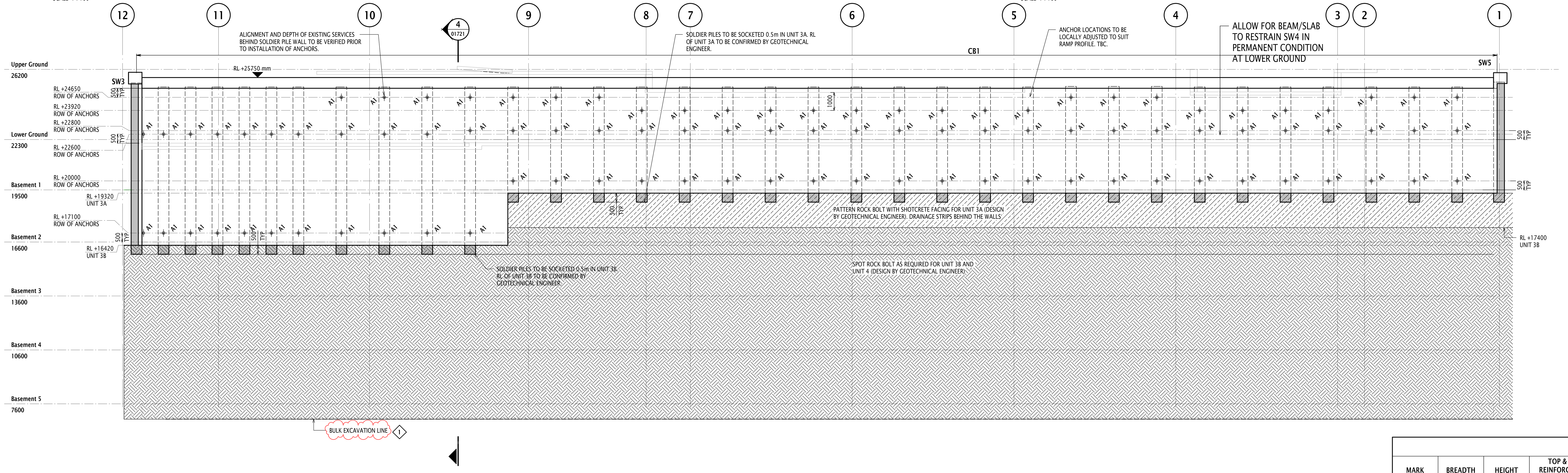
SHORING WALL ELEVATION - SW1
SCALE 1 : 100



SHORING WALL ELEVATION - SW2
SCALE 1 : 100



SHORING WALL ELEVATION - SW3
SCALE 1 : 100



SHORING WALL ELEVATION - SW4
SCALE 1 : 100

CONCRETE NOTES :
-REFER NOTES ON COVER SHEET
-MIN CONC. STRENGTH AT 28 DAYS

LOCATION	f'c
SHOTCRETE	40MPa
BORED PIER	40MPa
CAPPING BEAM	40MPa

-CONCRETE COVER

LOCATION	COVER
BORED PIER	65mm
CAPPING BEAM	50mm
SHOTCRETE:	
- RETAINED SOIL SIDE	65mm
- EXCAVATION SIDE	30mm

EXCAVATION NOTES:

1. LOCAL EXCAVATION FOR COLUMNS, PILE CAPS, AND STRIP FOOTINGS NOT SHOWN.
2. ALLOW FOR 2500 (W) x 2500 (L) x 1100 (D) PAD FOOTINGS UNDER ALL COLUMNS.
3. EXCAVATION SEQUENCE AND REQUIREMENTS TO BE CONFIRMED BY GEOTECHNICAL ENGINEER.
4. GEOTECHNICAL ENGINEER TO INSPECT EXCAVATION.
5. INSPECTION PLAN TO BE CONFIRMED BY GEOTECHNICAL ENGINEER.

SCHEDULE OF MODIFICATONS TO EARLY WORKS DA (DA-906/2019)

MARK	DESCRIPTION
1	ADDITIONAL HALF LEVEL OF BASEMENT EXCAVATION PHASE 1. BULK EXCAVATION LEVEL DEEPER.
2	NORTH WEST CORNER ADDITIONAL EXTENDED AREA FOR EXCAVATION (WEDGE).
3	REPLACING BATTER RETENTION SYSTEM AT STAGING LINE WITH SHORING WALL AT STAGING LINE.
4	DETAILED EXCAVATION FOR PAD FOOTINGS, LIFT OVERRUNS, CORE PADS SHOWN.

CAPPING BEAM SCHEDULE

MARK	BREADTH	HEIGHT	TOP & BTM REINFORCEMENT	SIDE REINFORCEMENT	LIGATURES	COMMENTS
CB1	750	600	4N24	4N24	2 LEGS N12-300	INDICATIVE ONLY, TBC WITH DETAILED DESIGN.
CB2	750	600	4N24	4N24	4 LEGS N12-300	INDICATIVE ONLY, TBC WITH DETAILED DESIGN.

BORED PIER SCHEDULE

MARK	DIA	VERTICAL	HELIX TIES	COMMENTS
BP1	600	12N20	N12-300	
BP2	600	12N20	N16-300	

SHOTCRETE WALL SCHEDULE

THICKNESS	HORIZONTAL	VERTICALS	Comments
200	SL102 MESH EF		

ANCHOR SCHEDULE

MARK	SAFE WORKING LOAD (kN)	ANGLE FROM HORIZONTAL	DIAMETER (mm)	NO OF STRANDS	MIN.FREE LENGTH (mm)	INDICATIVE BOND IN SHALE/LAMINATE (m)	INDICATIVE TOTAL ANCHOR LENGTH ROCK (m)	PRE-STRESS LOAD (kN)
A1	300	15	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	150
A2	450	15	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	250

NOTES:

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- LOW PRE-STRESS LOADS ARE RECOMMENDED TO NOT INDUCE EXCESSIVE BENDING MOMENT AND SHEAR IN THE PILES.
- ANCHOR DETAILS IN ACCORDANCE WITH GOLDER ASSOCIATES GEOTECHNICAL REPORT. REFER TO GENERAL NOTES.

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
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SCALE 1 2 3 4 5 6 7 8

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Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

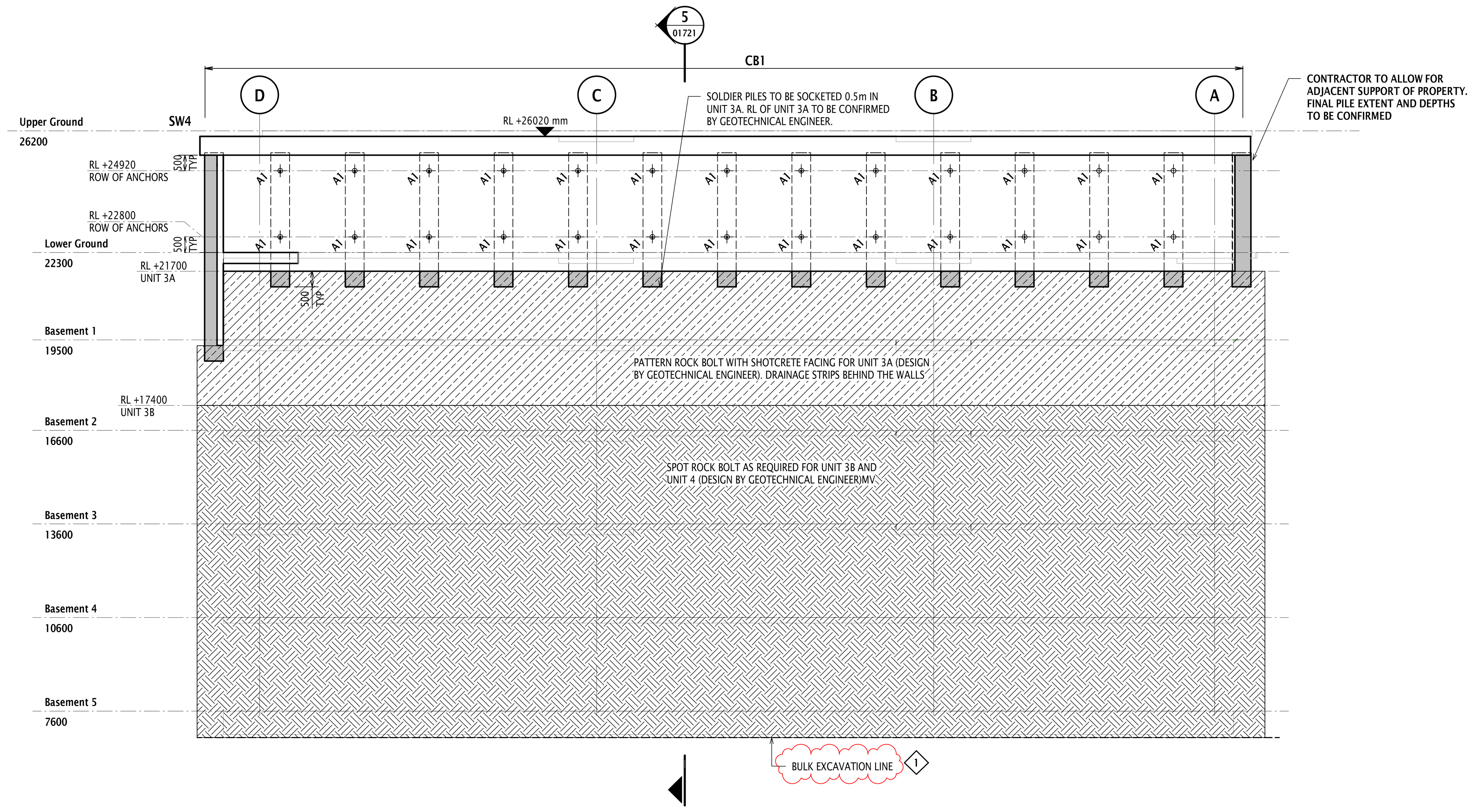
Title
SHORING WALL ELEVATIONS SHEET 1

Date	Drawn
01.11.19	S.TRIMARCHI
Scale at A0	Designer
1:100	N.KALAVRITINOS
	Design Checker
	C.FURNESS
Job Number	Approved
19280	G.ANDRIANAKOS

FOR TENDER - NOT FOR CONSTRUCTION

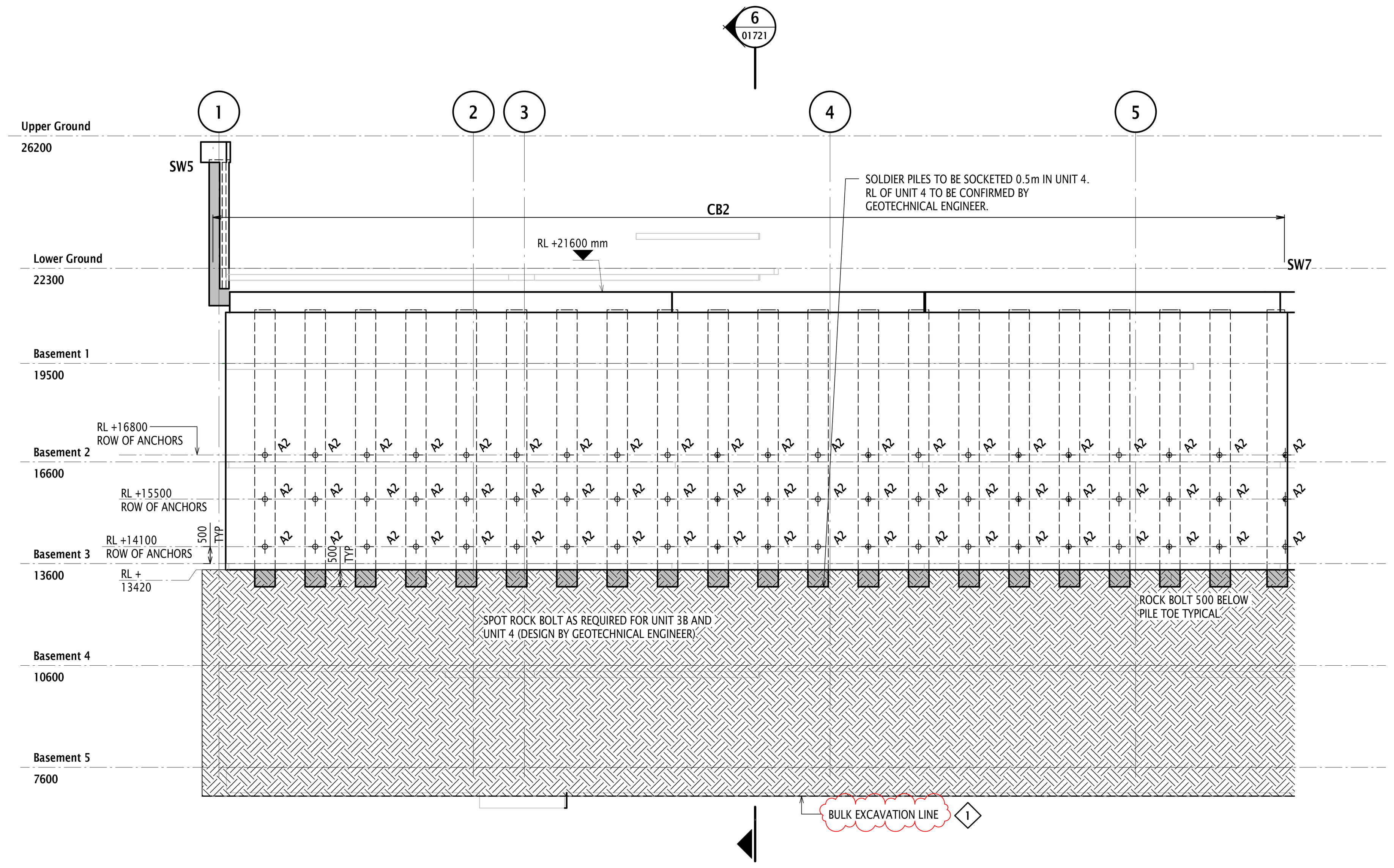
Drawing Number: RBG-XX-XX-DR-ST-01611
Revision: P3

09/11/2020 3:26:08 PM



SHORING WALL ELEVATION - SW5

SCALE 1 : 100



SHORING WALL ELEVATION - SW6

SCALE 1 : 100

CONCRETE NOTES :

-REFER NOTES ON COVER SHEET

-MIN CONC. STRENGTH AT 28 DAYS

LOCATION	f'c
SHOTCRETE	40MPa
BORED PIER	40MPa
CAPPING BEAM	40MPa

-CONCRETE COVER

LOCATION	COVER
BORED PIER	65mm
CAPPING BEAM	50mm
SHOTCRETE:	
- RETAINED SOIL SIDE	65mm
- EXCAVATION SIDE	30mm

EXCAVATION NOTES:

1. LOCAL EXCAVATION FOR COLUMNS, PILE CAPS, AND STRIP FOOTINGS NOT SHOWN.
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SCHEDULE OF MODIFICATONS TO EARLY WORKS DA (DA-906/2019)

MARK	DESCRIPTION
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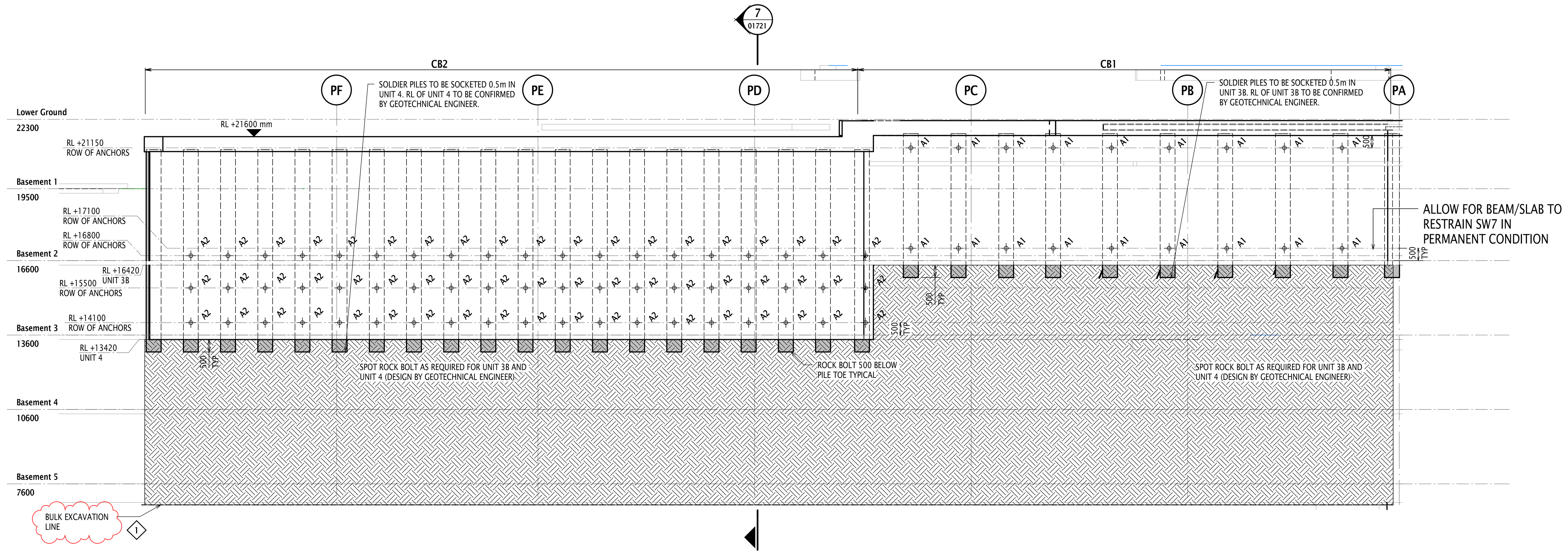
4	DETAILED EXCAVATION FOR PAD FOOTINGS, LIFT OVERRUNS, CORE PADS SHOWN.



SHORING WALL ELEVATION - SW7

SCALE 1 : 100

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
P1	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	27.08.20

SCALE 1 2 3 4 5 6 7 8

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ACN 010 580 248

Client
BUILT PTY LTD

CAPPING BEAM SCHEDULE						
MARK	BREADTH	HEIGHT	TOP & BTM REINFORCEMENT	SIDE REINFORCEMENT	LIGATURES	COMMENTS
CB1	750	600	4N24	4N24	2 LEGS N12-300	INDICATIVE ONLY, TBC WITH DETAILED DESIGN.
CB2	750	600	4N24	4N24	4 LEGS N12-300	INDICATIVE ONLY, TBC WITH DETAILED DESIGN.

BORED PIER SCHEDULE				
MARK	DIA	VERTICAL	HELIX TIES	COMMENTS
BP1	600	12N20	N12-300	
BP2	600	12N20	N16-300	

SHOTCRETE WALL SCHEDULE			
THICKNESS	HORIZONTAL	VERTICALS	Comments
200	SL102 MESH EF		

ANCHOR SCHEDULE								
MARK	SAFE WORKING LOAD (kN)	ANGLE FROM HORIZONTAL	DIAMETER (mm)	NO OF STRANDS	MIN.FREE LENGTH (mm)	INDICATIVE BOND IN SHALE/LAMINATE (m)	INDICATIVE TOTAL ANCHOR LENGTH ROCK (m)	PRE-STRESS LOAD (kN)
A1	300	15	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	150
A2	450	15	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	250

NOTES:

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- ANCHOR DETAILS IN ACCORDANCE WITH GOLDER ASSOCIATES GEOTECHNICAL REPORT. REFER TO GENERAL NOTES.

Project
LIVERPOOL CIVIC PLACE

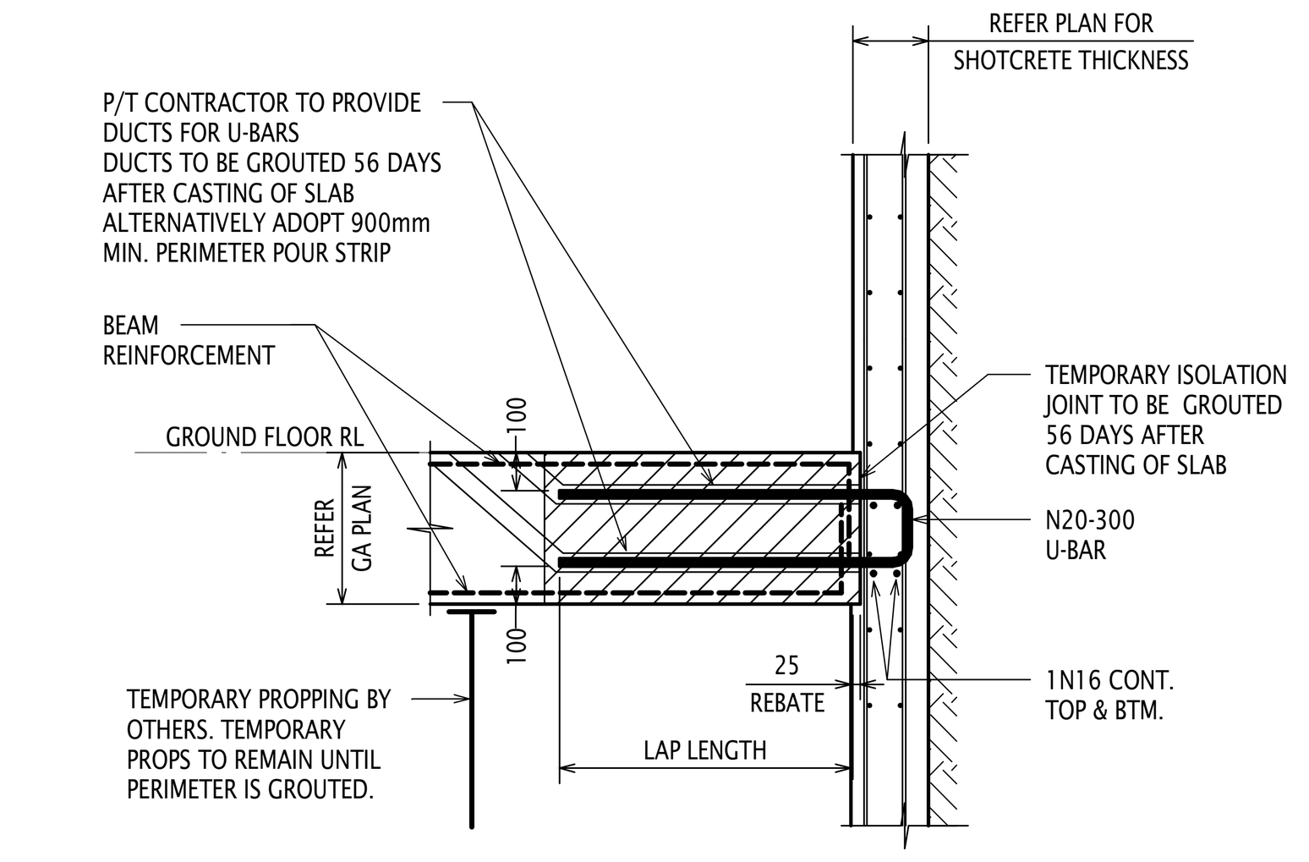
Title
SHORING WALL ELEVATIONS SHEET 2

Date: 01.11.19	Drawn: S.TRIMARCHI
Scale at A0: 1:100	Designer: N.KALAVRITINOS
	Design Checker: C.FURNESS
Job Number: 19280	Approved: G.ANDRIANAKOS

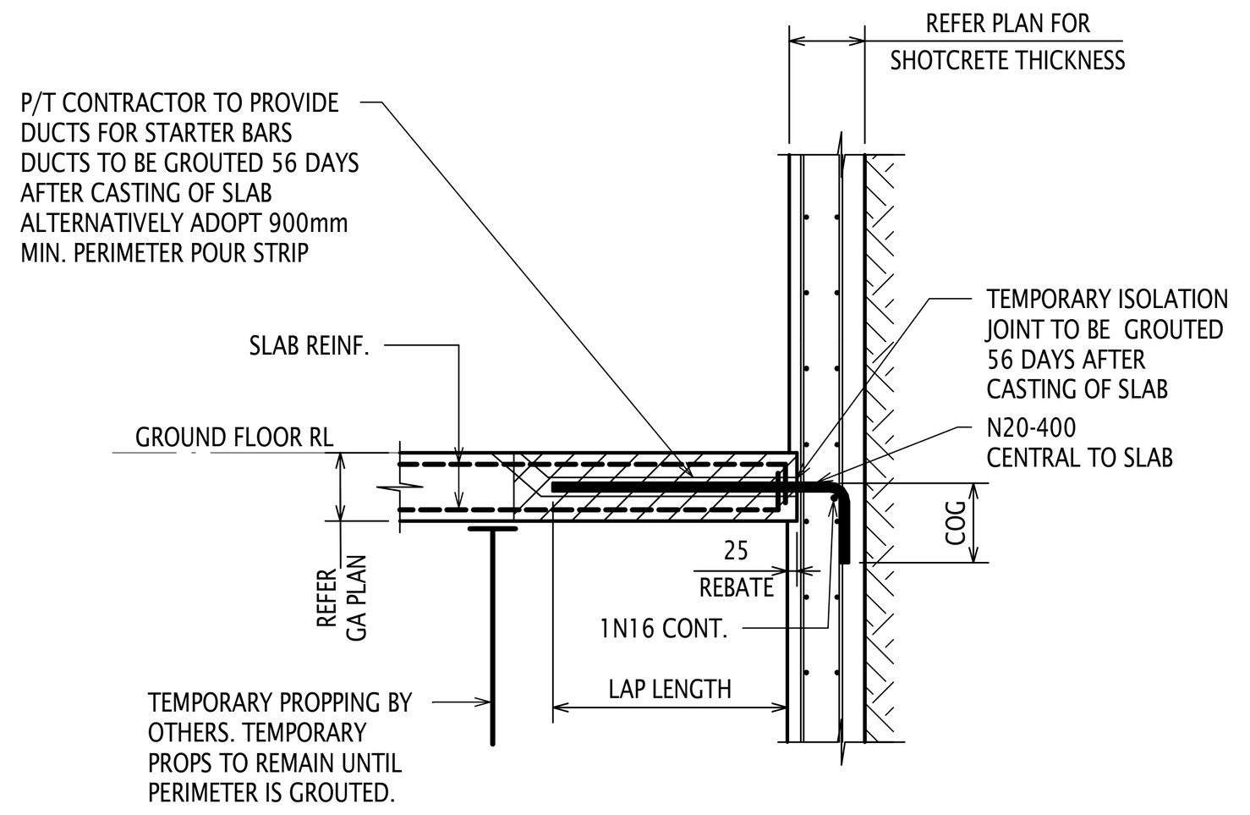
FOR TENDER - NOT FOR CONSTRUCTION

Drawing Number: RBG-XX-XX-DR-ST-01612
Revision: P3

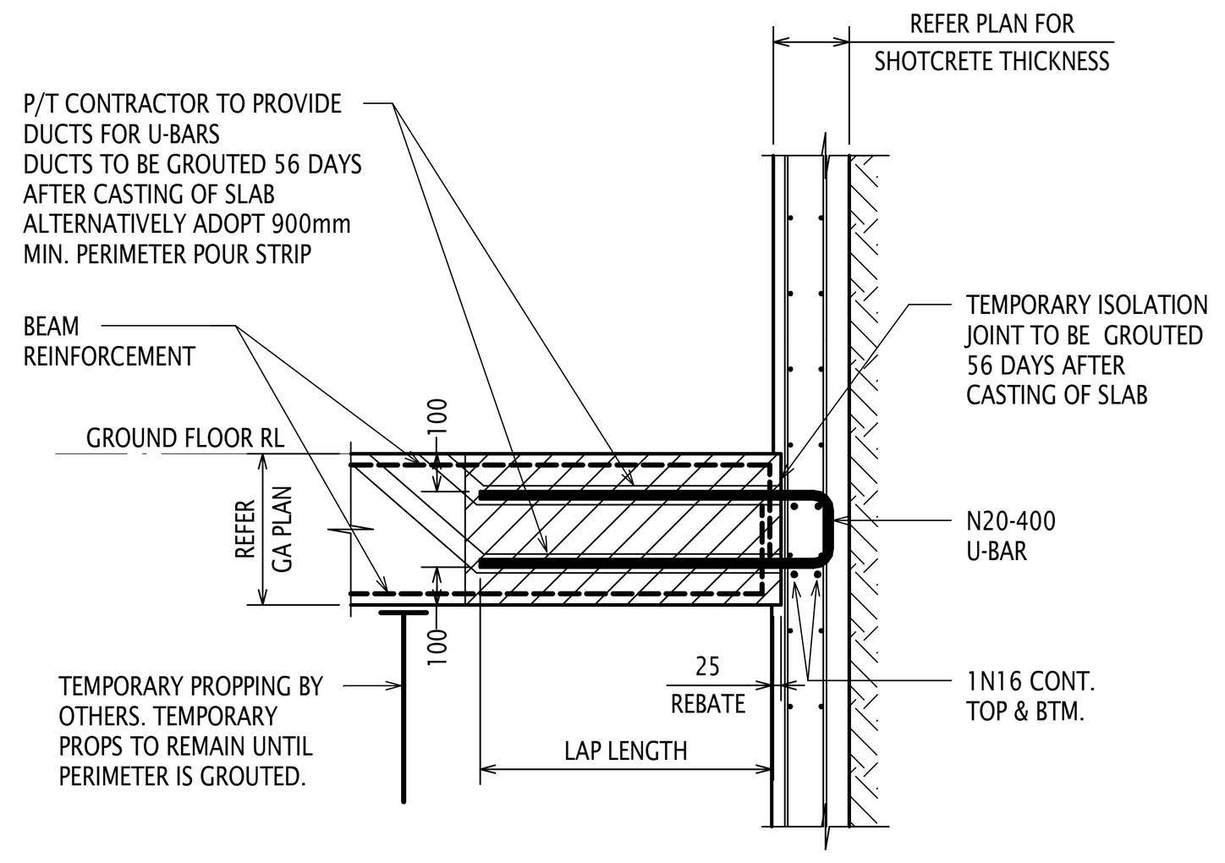
09/11/2020 3:26:25 PM



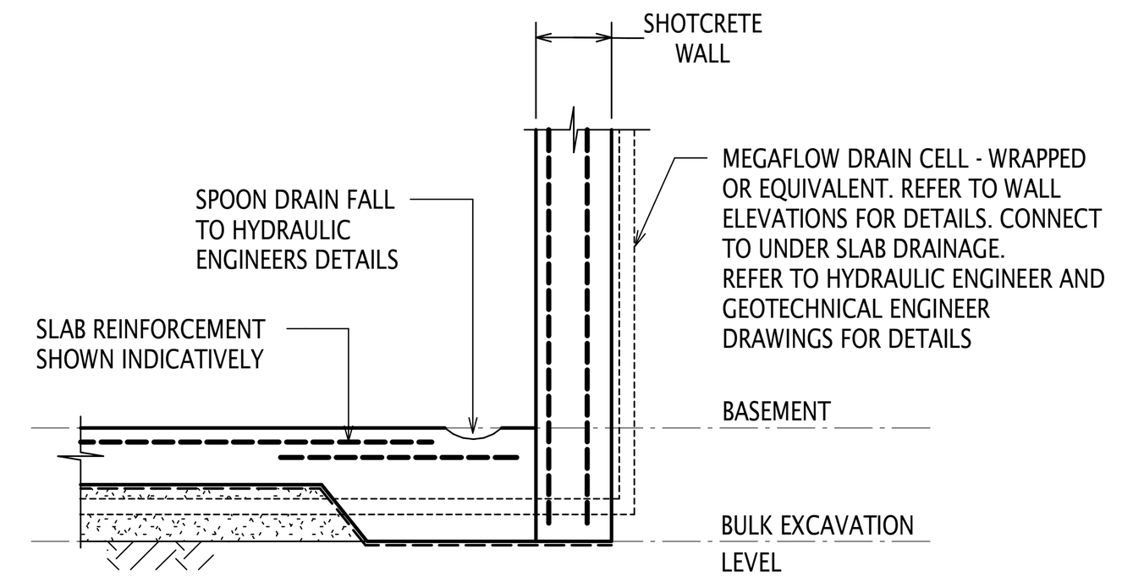
TYPICAL BEAM TO SHOTCRETE WALL DETAIL
SCALE 1:20
NOTE: DETAIL REQUIRED AT CONTIGUOUS AND SOLDIER PILE WALLS



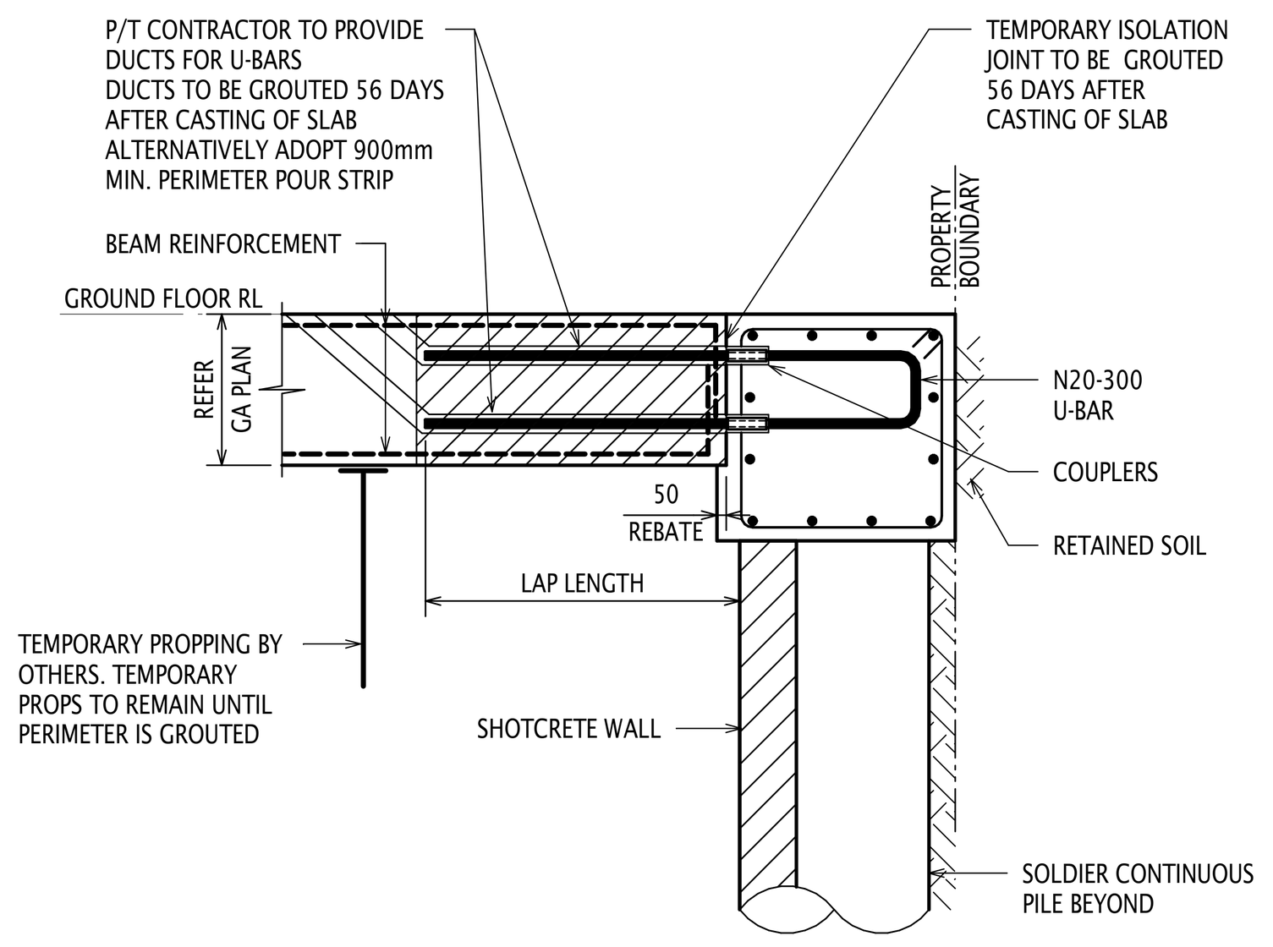
TYPICAL SLAB (DEPTH≤350) TO SHOTCRETE WALL DETAIL
SCALE 1:20
NOTE: DETAIL REQUIRED AT CONTIGUOUS AND SOLDIER PILE WALLS



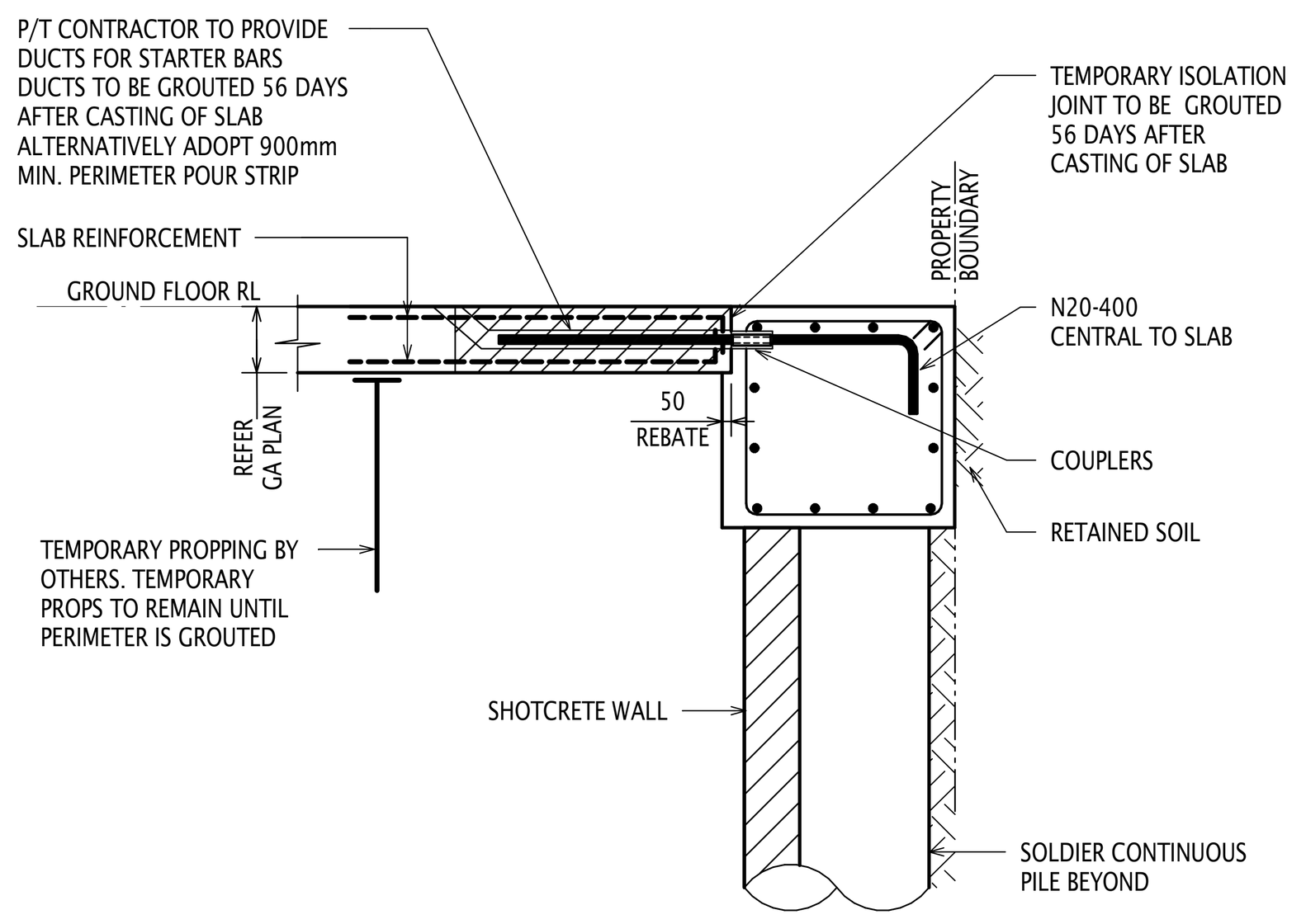
TYPICAL SLAB (DEPTH>350) TO SHOTCRETE WALL DETAIL
SCALE 1:20
NOTE: DETAIL REQUIRED AT CONTIGUOUS AND SOLDIER PILE WALLS



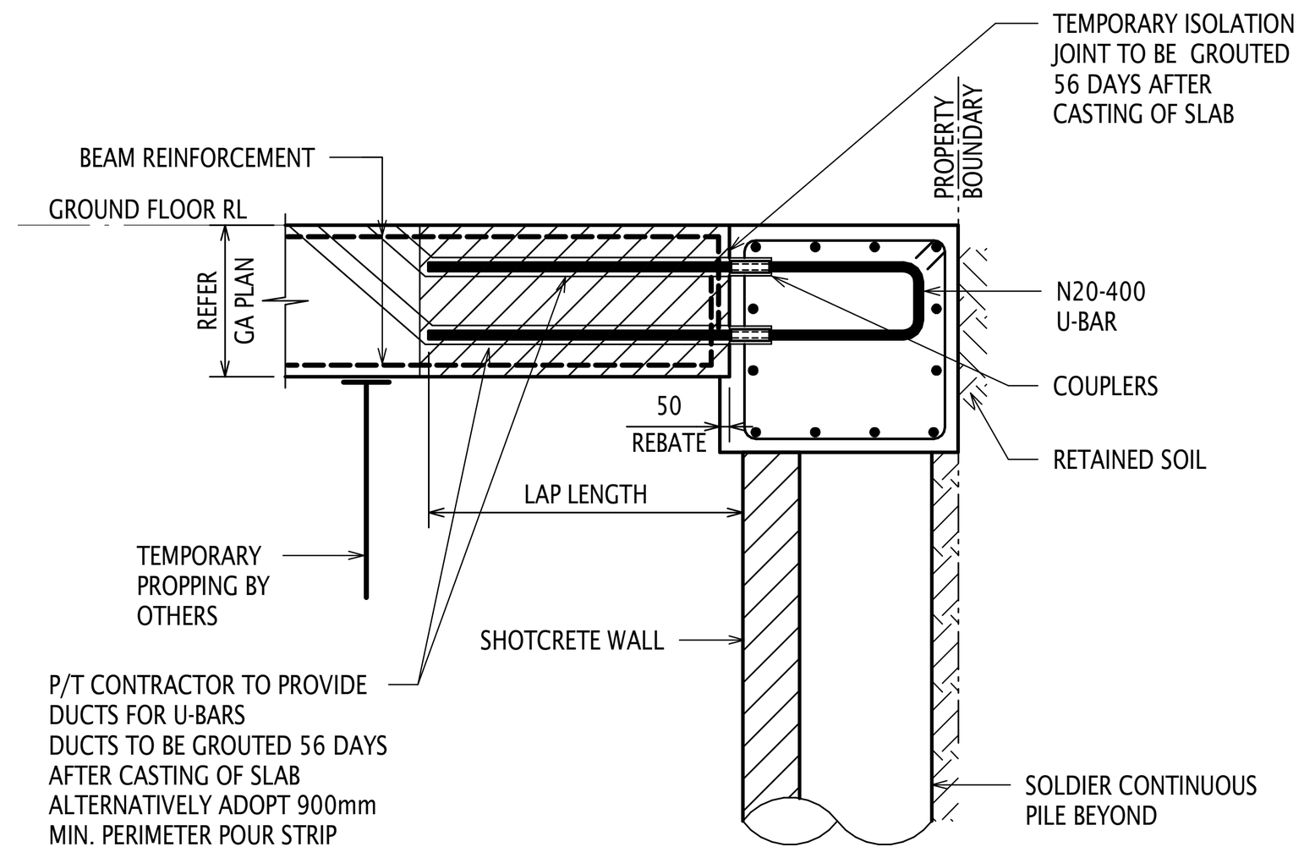
TYPICAL SLAB TO SHOTCRETE WALL DRAINAGE DETAIL AT BASE
SCALE 1:20



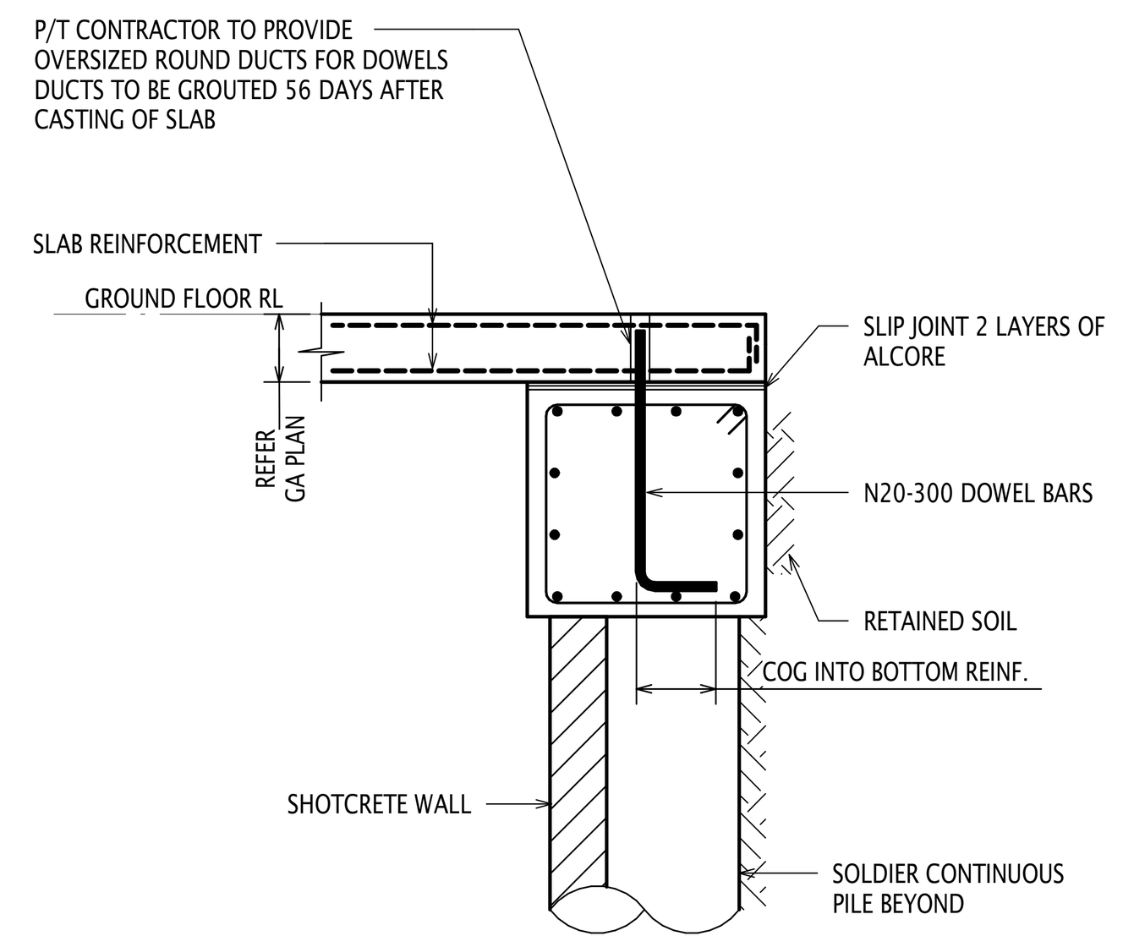
TYPICAL BEAM TO CAPPING BEAM DETAIL
SCALE 1:20



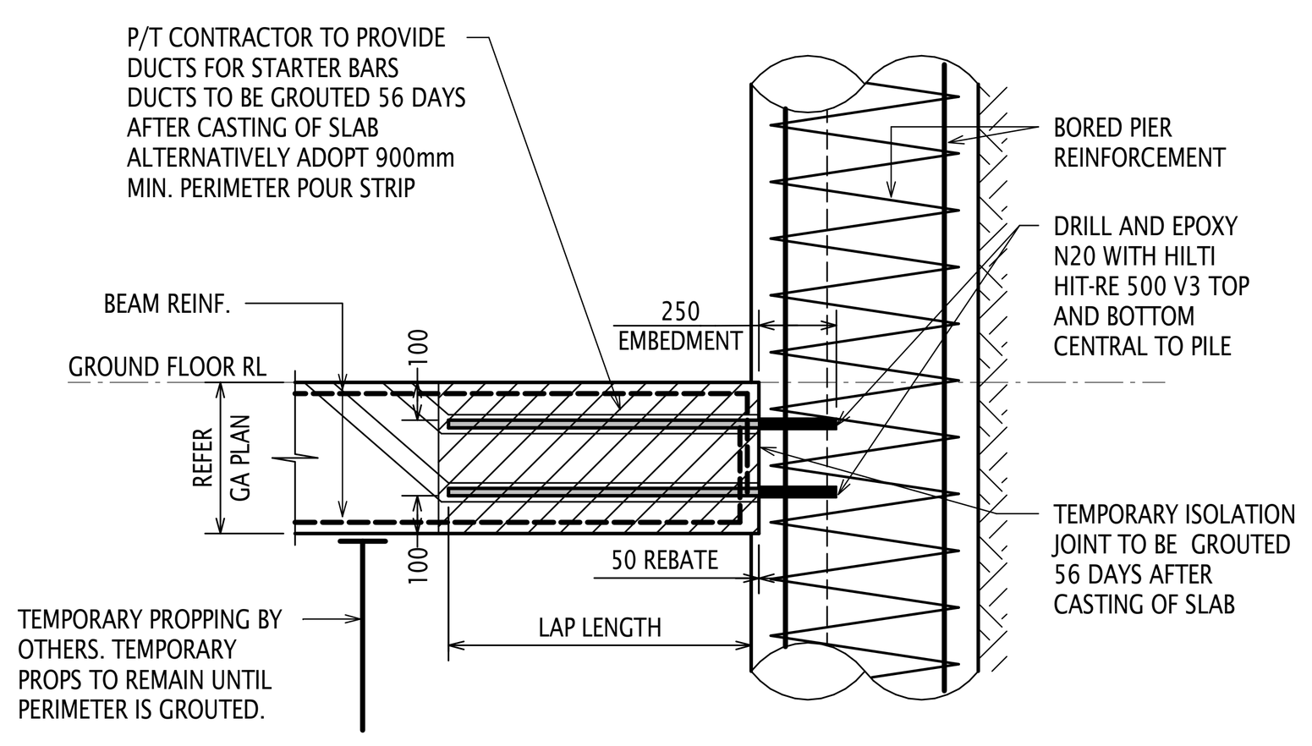
TYPICAL SLAB (DEPTH ≤350) TO CAPPING BEAM DETAIL
SCALE 1:20



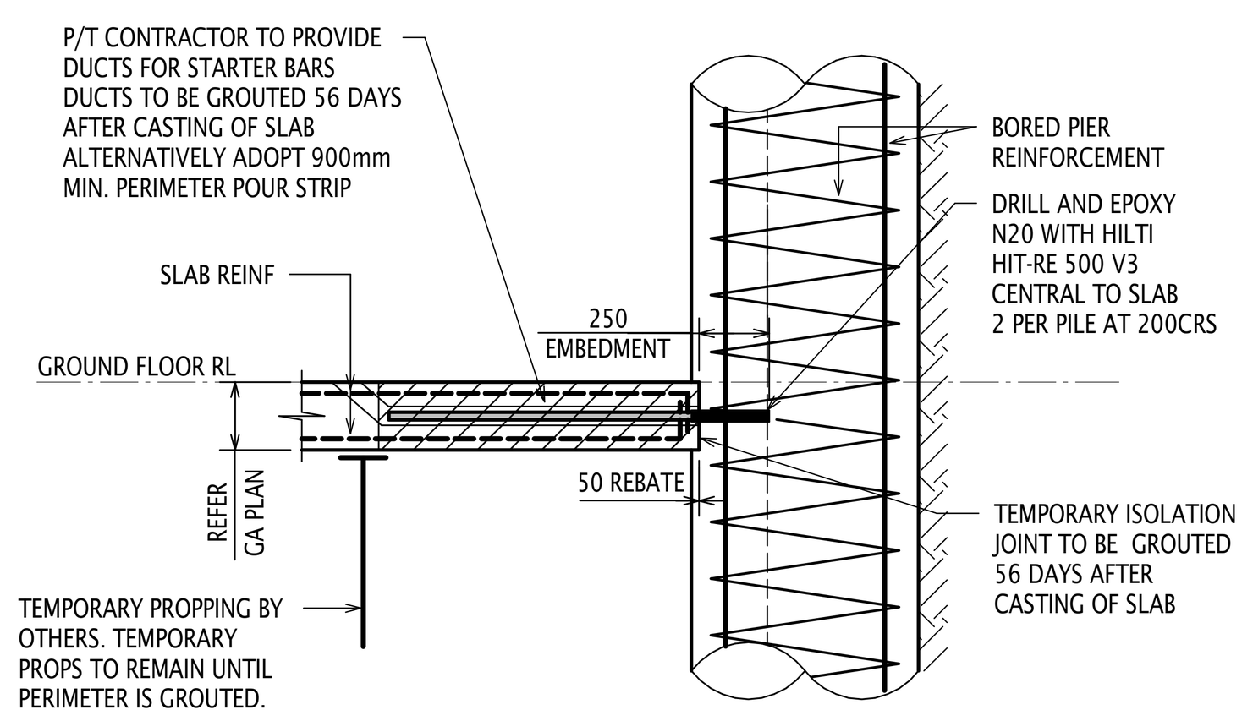
TYPICAL SLAB (DEPTH >350) TO CAPPING BEAM DETAIL
SCALE 1:20



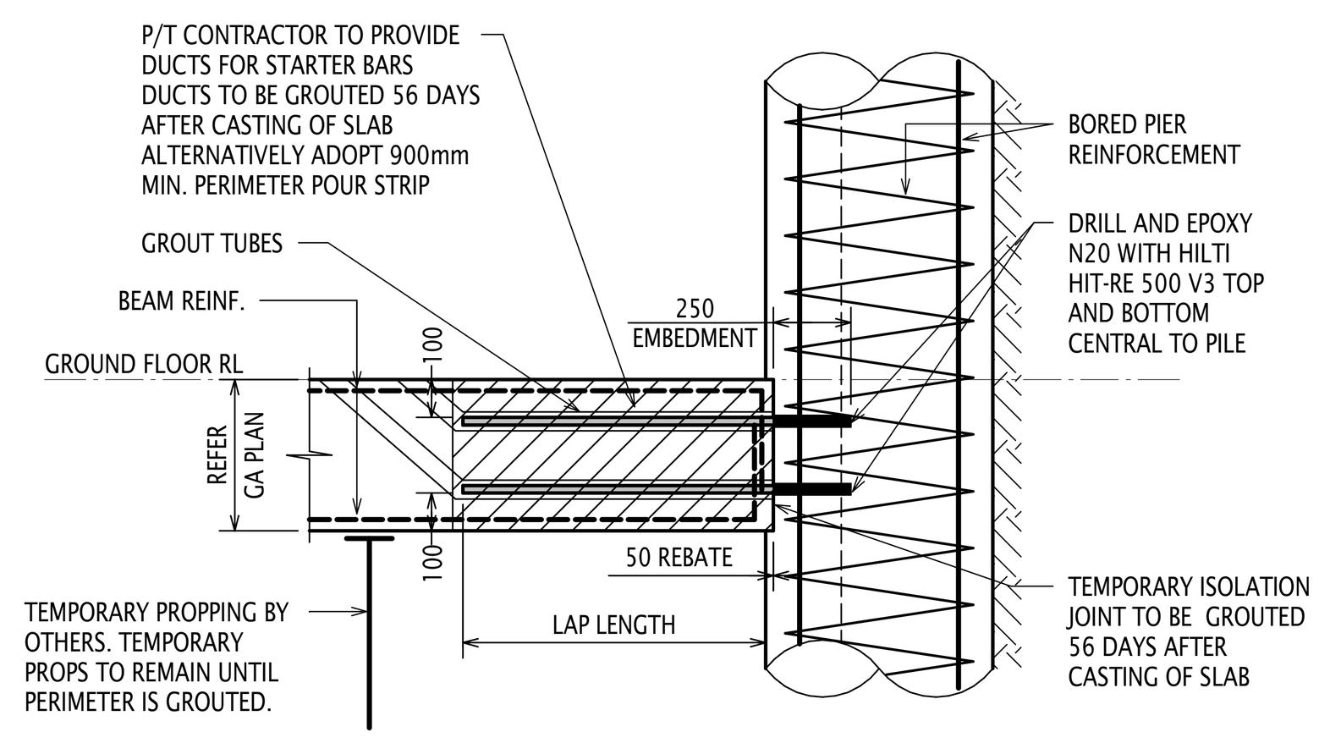
TYPICAL SLAB OVER CAPPING BEAM DETAIL
SCALE 1:20



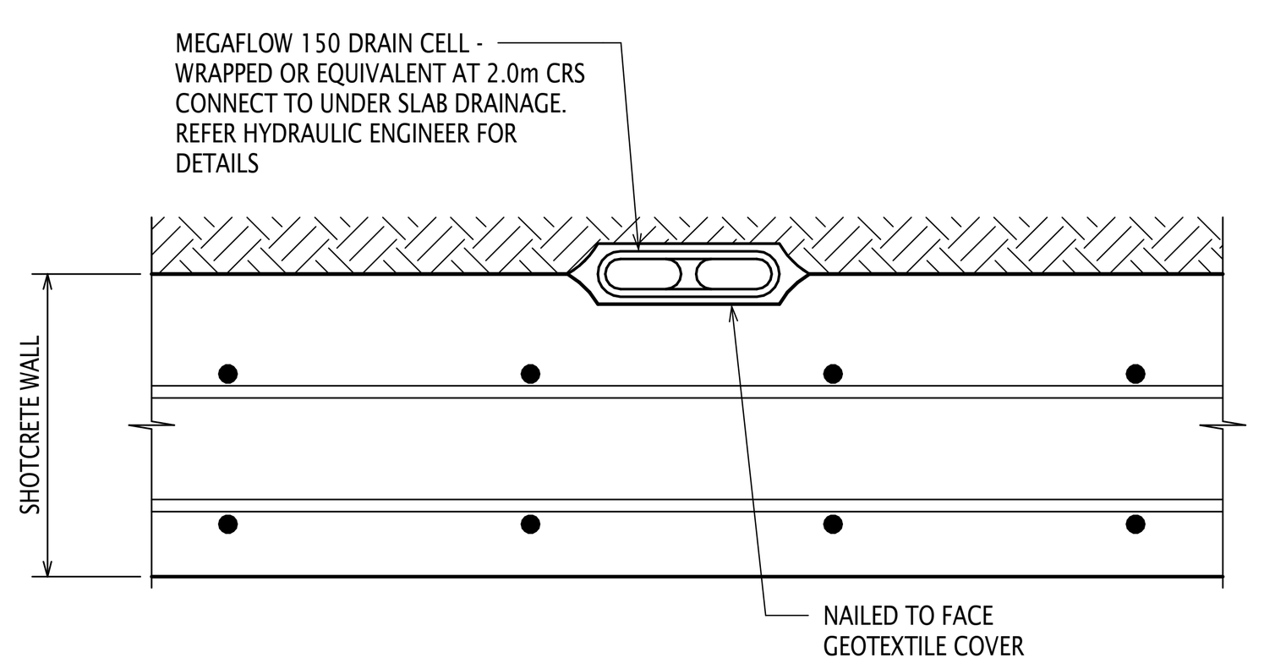
TYPICAL BEAM TO CONTIGUOUS OR SOLDIER PILE DETAIL
SCALE 1:20



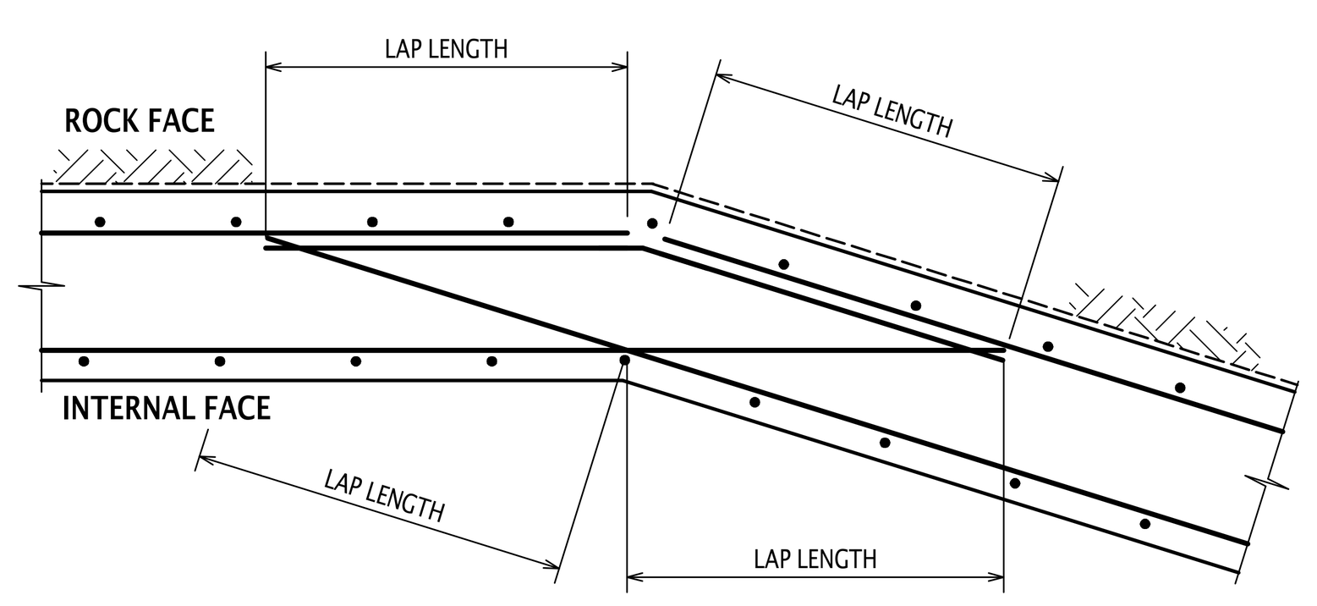
TYPICAL SLAB (DEPTH ≤350) TO CONTIGUOUS OR SOLDIER PILE DETAIL
SCALE 1:20



TYPICAL SLAB (DEPTH>350) TO CONTIGUOUS OR SOLDIER PILE DETAIL
SCALE 1:20



TYPICAL WALL DRAINAGE DETAIL
SCALE 1:5



TYPICAL SHORING WALL CRANK DETAIL - REINFORCING BARS
SCALE 1:10

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
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SCALE 1 2 3 4 5 6 7 8

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Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

Title
TYPICAL SHORING DETAILS
SHEET 1

Date: 01.11.19
Scale at A0: 1:5, 1:10, 1:20
Job Number: 19280
Drawn: S.TRIMARCHI
Designer: N.KALAVRITINOS
Design Checker: C.FURNESS
Approved: G.ANDRIANAKOS

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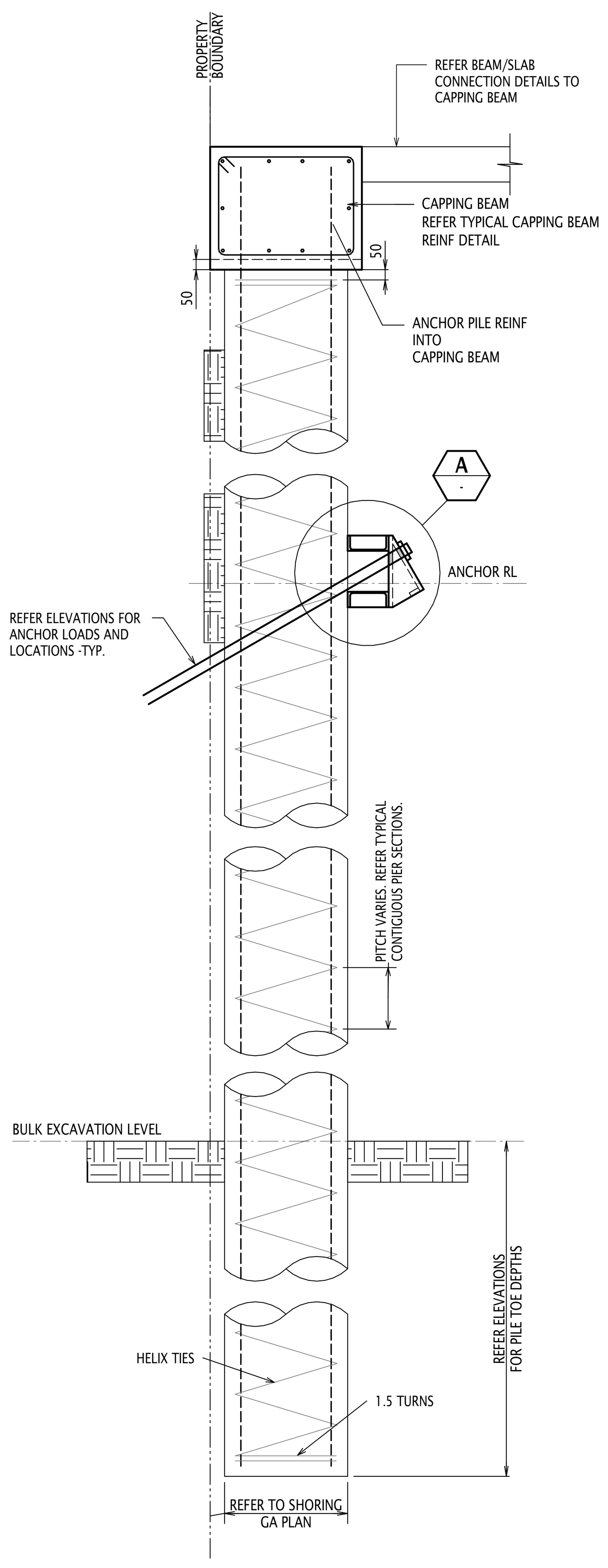
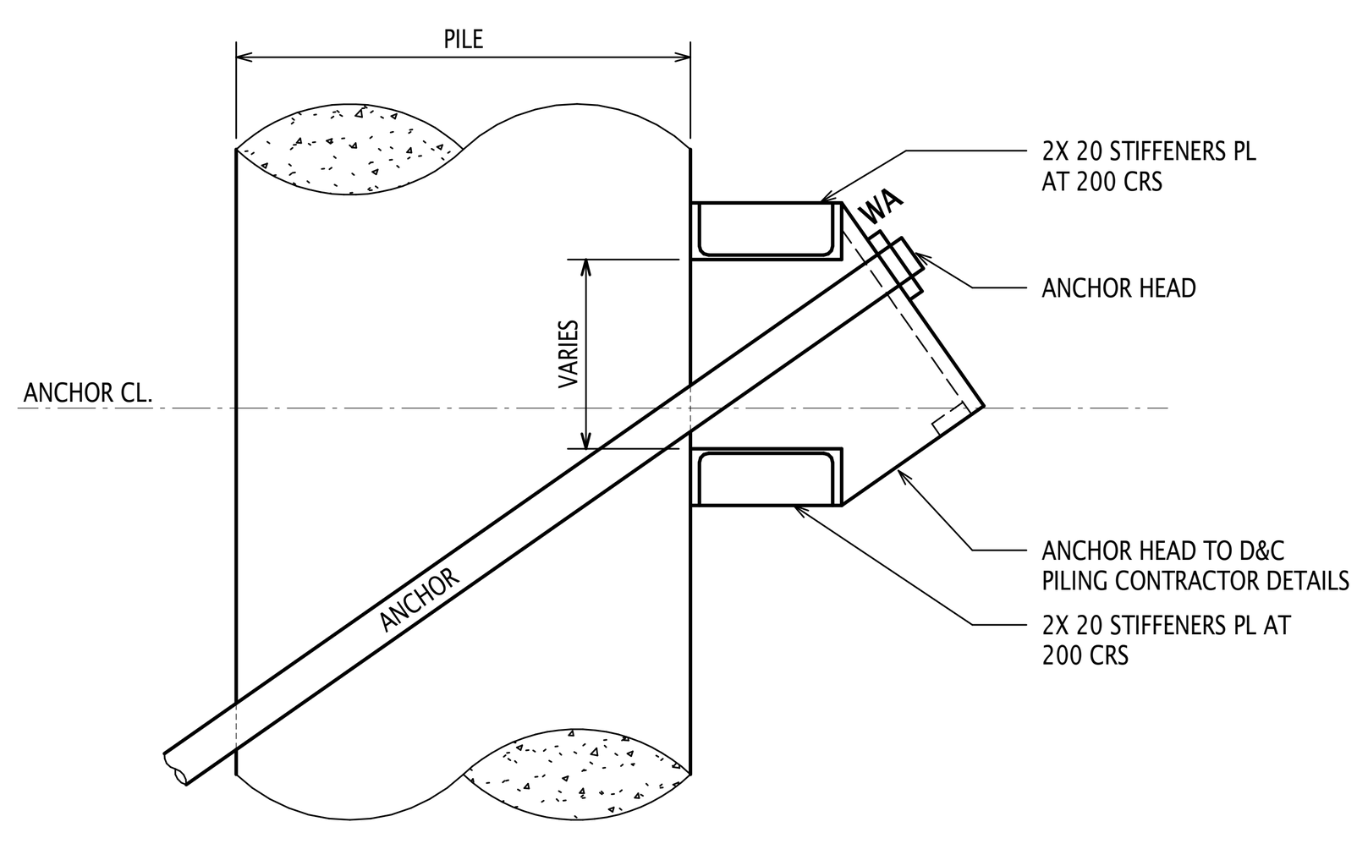
Drawing Number: RBG-XX-XX-DR-ST-01711
Revision: P3

09/11/2020 3:26:42 PM

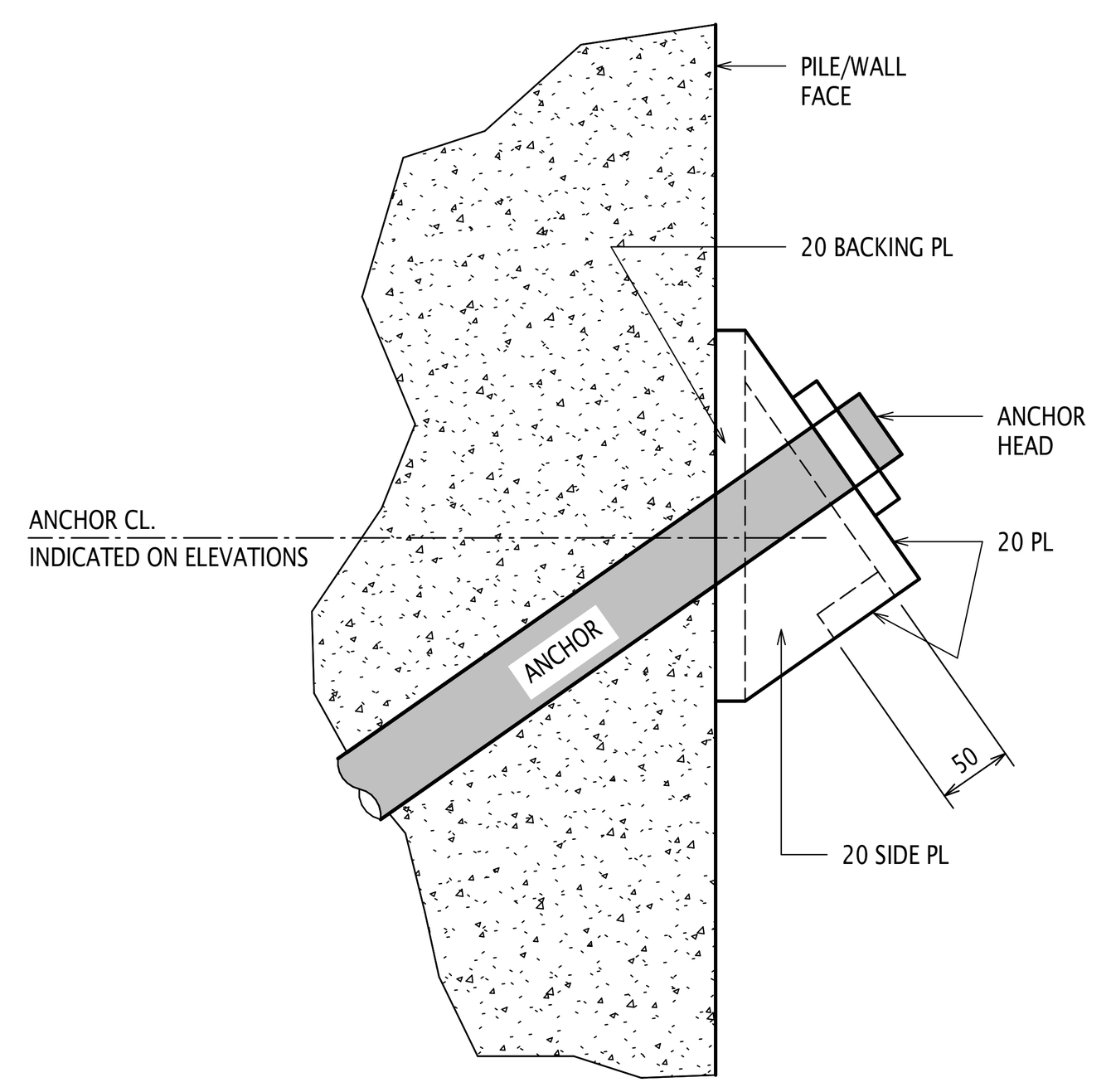


TYPICAL CONTIGUOUS OR SOLDIER PILE WITH ANCHOR
SCALE 1:20
READ IN CONJUNCTION WITH TYPICAL BORED PIER DETAILS & WALL ELEVATIONS

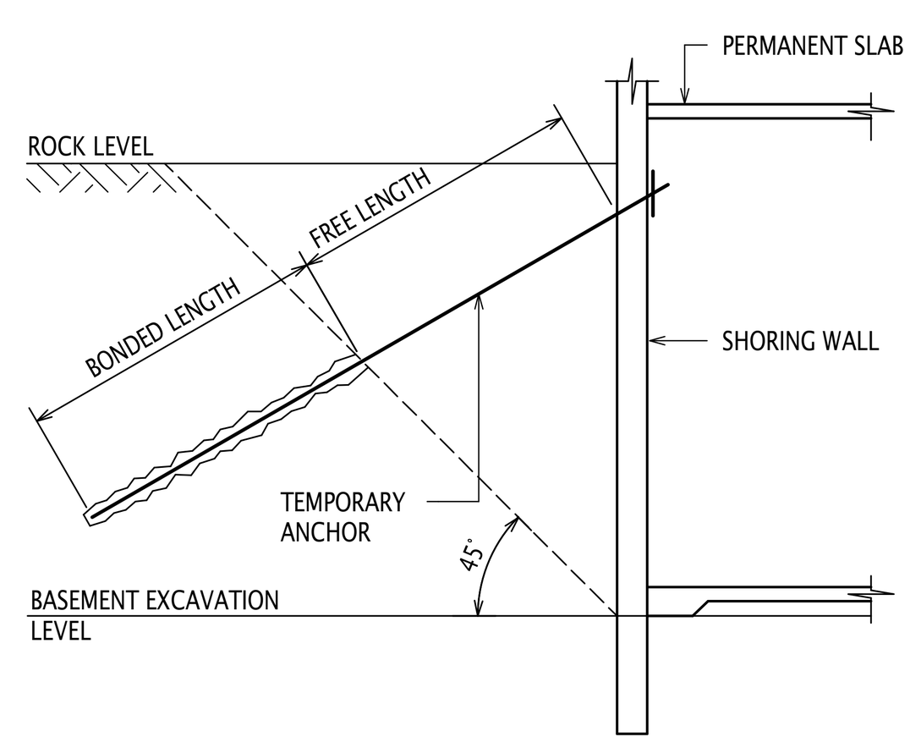


WALER BEAM (AT ANCHOR)

DETAIL A
SCALE 1:10



TYPICAL ANCHOR HEAD DETAIL
SCALE 1:10



1. FREE LENGTH IS TO BE GROUTED AFTER ANCHOR IS STRESSED
2. REFER GEOTECHNICAL REPORT AND ADVICE FOR CALCULATION OF THE REQUIRED BONDED LENGTH
3. ALL BASEMENT ANCHORS TO BE DESTRESSED AFTER THE GROUND LEVEL SLAB CONNECTIONS HAVE BEEN GROUTED/ POUR STRIPS HAVE BEEN CONSTRUCTED AND HAVE ACHIEVED DESIGN STRENGTH

TYPICAL ANCHOR NOTES

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
P1	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	27.08.20

SCALE 1 2 3 4 5 6 7 8

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

Structural, Civil & Construction Engineering Consultant

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ACN 010 580 248

Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

Title
TYPICAL SHORING DETAILS
SHEET 2

Date

Scale at A0
1:1, 1:10, 1:20

Job Number
19280

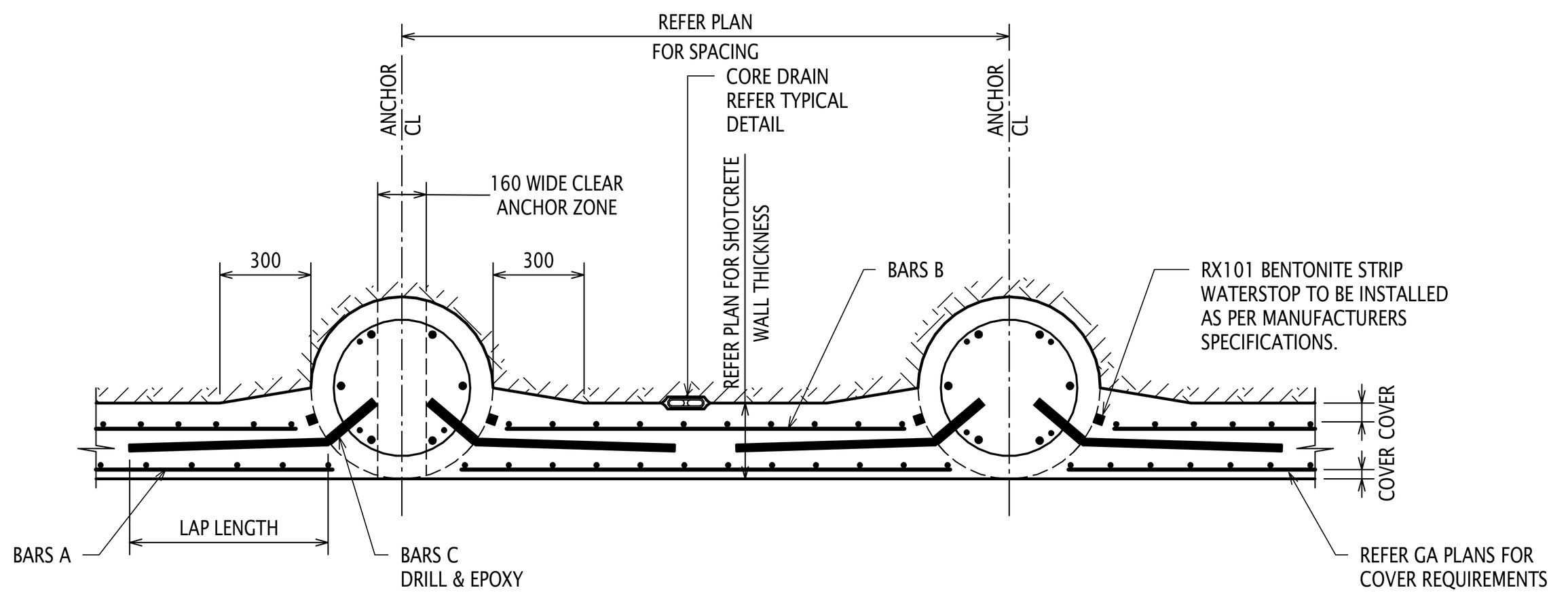
Drawn
S.TRIMARCHI
Designer
N.KALAVRITINOS
Design Checker
C.FURNESS
Approved
G.ANDRIANAKOS

FOR TENDER - NOT FOR CONSTRUCTION

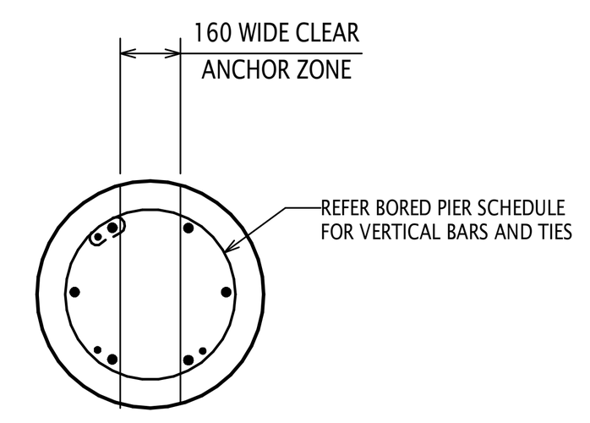
Drawing Number
RBG-XX-XX-DR-ST-01712

Revision
P3

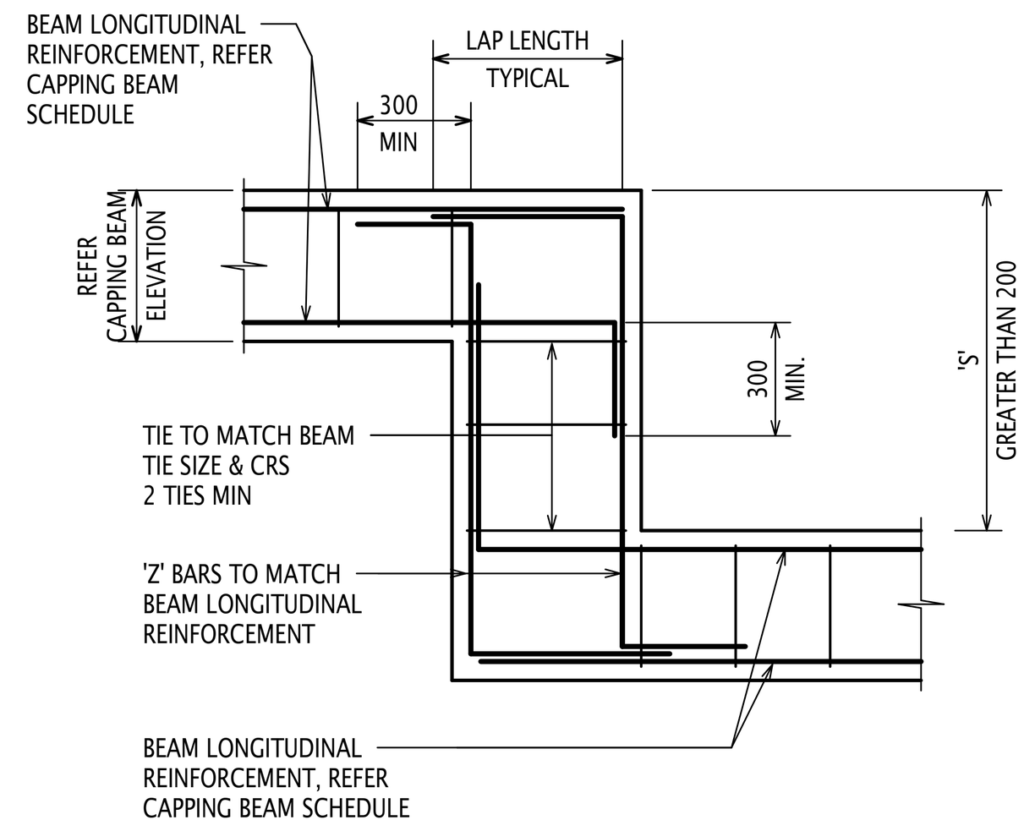
09/11/2020 3:26:49 PM



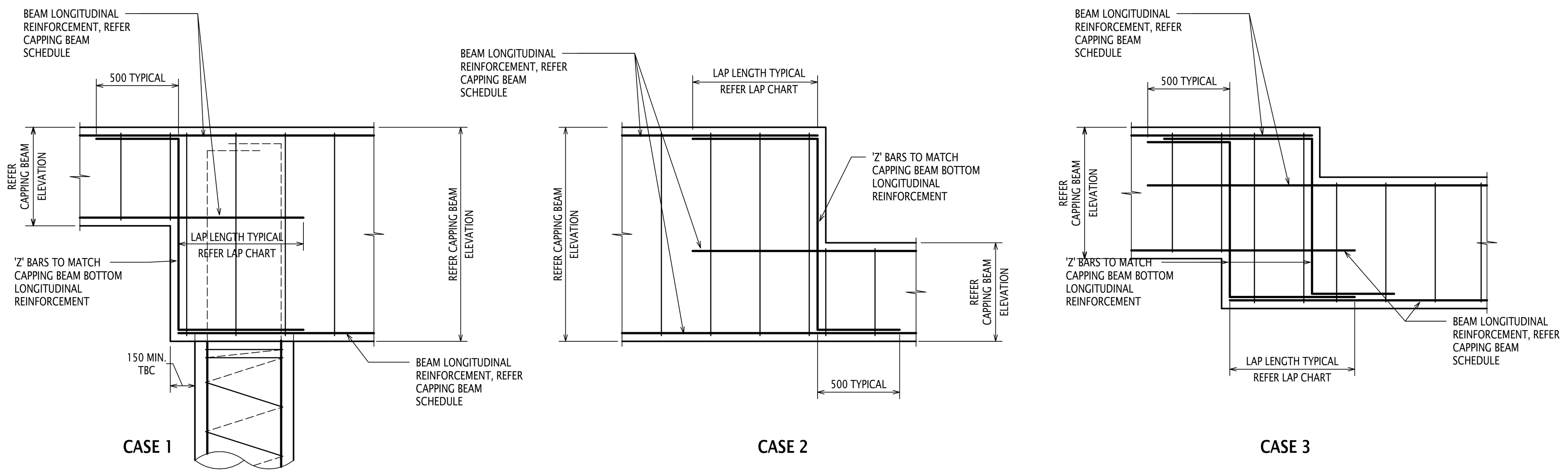
TYPICAL SOLDIER PIER WALL DETAIL
SCALE 1:20



TYPICAL BORED PIER DETAIL



TYPICAL CAPPING BEAM FOLD SECTION
SCALE 1:20
ALL FOLDS 1200 UNO ON ELEVATIONS



CASE 1 CASE 2 CASE 3

TYPICAL CHANGE IN CAPPING BEAM DEPTH
SCALE 1:20

NOTE: SIDE BARS NOT SHOWN FOR CLARITY
REFER TO CAPPING BEAM SCHEDULE

Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
P1	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	27.08.20

SCALE 1 2 3 4 5 6 7 8

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Structural, Civil & Construction
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Web: www.robertbird.com
ACN 010 580 248

Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

Title
TYPICAL SHORING DETAILS
SHEET 3

Date
01.11.19
Scale at A0
1:20
Job Number
19280

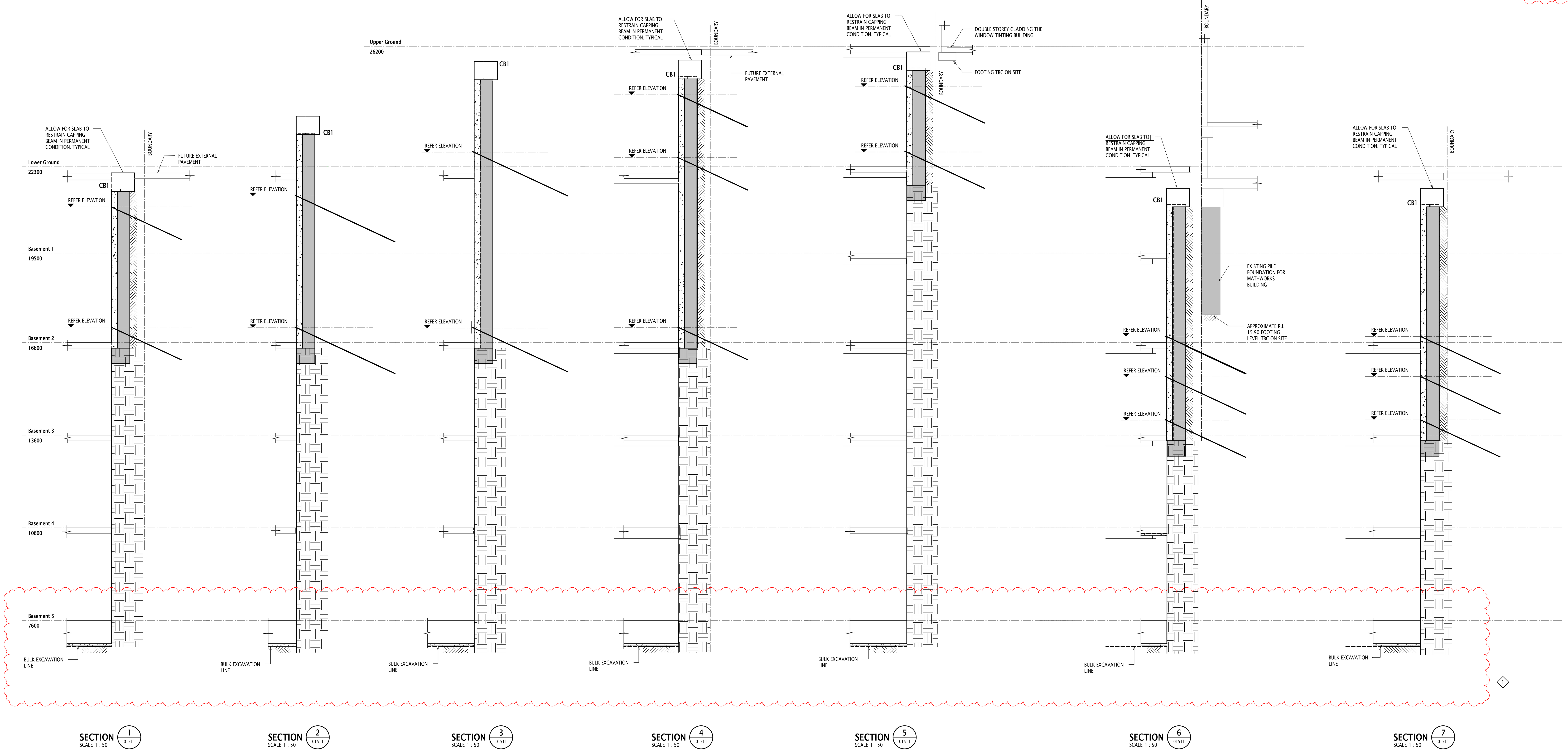
Drawn
S.TRIMARCHI
Designer
N.KALAVRITINOS
Design Checker
C.FURNESS
Approved
G.ANDRIANAKOS

FOR TENDER - NOT FOR CONSTRUCTION

Drawing Number
RBG-XX-XX-DR-ST-01713
Revision
P3

09/11/2020 3:26:58 PM

SCHEDULE OF MODIFICATONS TO EARLY WORKS DA (DA-906/2019)	
MARK	DESCRIPTION
1	ADDITIONAL HALF LEVEL OF BASEMENT EXCAVATION PHASE 1. BULK EXCAVATION LEVEL DEEPER.
2	NORTH WEST CORNER ADDITIONAL EXTENDED AREA FOR EXCAVATION (WEDGE).
3	REPLACING BATTER RETENTION SYSTEM AT STAGING LINE WITH SHORING WALL AT STAGING LINE.
4	DETAILED EXCAVATION FOR PAD FOOTINGS, LIFT OVERRUNS, CORE PADS SHOWN.



Rev	Revision Description	By	App	Date
P3	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	11.09.20
P2	ISSUED FOR INFORMATION (SECTION 455)	ST	GA	09.09.20
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SCALE 1 2 3 4 5 6 7 8

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Client
BUILT PTY LTD

Project
LIVERPOOL CIVIC PLACE

Title
SHORING SECTIONS
SHEET 1

Date	Drawn
01.11.19	S.TRIMARCHI
Scale at A0	Designer
1:50	N.KALAVRITINOS
	Design Checker
	C.FURNESS
Job Number	Approved
19280	G.ANDRIANAKOS

FOR TENDER - NOT FOR CONSTRUCTION

Drawing Number: RBG-XX-XX-DR-ST-01721
Revision: P3

09/11/2020 3:27:18 PM

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