

HYDROGEOLOGICAL ASSESSMENT REPORT

Property Address

357-363 Crown Street and 2-4 Gladstone Avenue,
Wollongong NSW 2500

Prepared for

Wollongong Investments No. 5 Pty Ltd

Date

4 June 2025

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Reviewer		Ben Buckley	4/06/2025

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1.0 INTRODUCTION

1.1 General

Wollongong Investments No. 5 Pty Ltd (the client) appointed Foundation Earth Sciences Pty Ltd (FES) to conduct a Hydrogeological Assessment (HGA) for the proposed development located at 57-363 Crown Street and 2-4 Gladstone Avenue, Wollongong NSW 2500 (the site). The purpose of the HGA report is to estimate potential groundwater inflow to the proposed bulk excavation, and to achieve compliance with the local city council and Water New South Wales (WaterNSW) requirements related to the proposed basement design and future dewatering activities. The report has been prepared to address the requirements provided in the WaterNSW guideline titled “Minimum requirements for building site groundwater investigations and reporting” issued by the Department of Planning and Environment (DPE), referenced as number PUB20/940, revision V02.2210, dated October 2022, within the context of the groundwater- related risks associated with the project site.

1.2 Scope of work

The following scope of work was carried out for the HGA:

- Prepared a Safe Work Method Statement (SWMS) tailored to the site conditions.
- Reviewed Before-You-Dig-Australia (BYDA) plans and conducted a service locating.
- Mechanically drilled one borehole, identified as BH201, to approximate depths of 20m.
- Installed groundwater monitoring well, identified as GW201, in drilled borehole.
- Assessed and adopted the existing groundwater wells, identified as BH102M and BH103M, which was installed by EI Australia during the geotechnical investigation.
- Conducted raising head permeability test in three groundwater wells.
- Conducted a weekly assessment of the standing groundwater level in all groundwater wells for three months.
- Conducted groundwater modelling using the Finite Element Analysis (FEA) method to estimate the potential groundwater inflow into the proposed bulk excavation.
- Prepared an HGA report (this report) for the proposed development.

The following appendices are annexed together with this report:

- Appendix A – A site plan showing approximate locations of the boreholes (groundwater wells) and sections of the groundwater modelling sections.
- Appendix B – The borehole logs and their explanatory note from the hydrogeological assessment.
- Appendix C – Plots of Groundwater Level and Daily Rainfall.
- Appendix D – Results of the Groundwater Inflow Analysis.
- Appendix E – Necessary Architectural Drawings.
- Appendix F – Site Survey Plan.

1.3 Provided Information

The client provided the following information to FES during the preparation of this report:

- The architectural drawings, project titled “2-4 Gladstone Ave / 357-363 Crown St Wollongong NSW”, prepared by BKA Architecture, reference to project No. 22003, and dated January 2025. This includes the drawing numbers A007, A101-A104, A204-A208, and A301-A303.
- The survey plans, titled “Topographical Survey Plan Showing Detail and Levels No.357-363 Crown Street, No.2 & No.4 Gladstone Street SP16167, 2 DP201949, 100 DP1214547, 6 DP14480, 7 DP661845”, prepared by Geosurv, reference to drawing number 220013-DT-02 [A]-ACAD (1), and dated 24 February 2022.
- Groundwater Take Assessment, addressed “2-4 Gladstone Avenue & 357-363 Crown Street, Wollongong, NSW”, prepared by EI Australia, reference to project No. E25862.G12, and dated 27 March 2024.
- Geotechnical Investigation addressed “2-4 Gladstone Ave & 357-363 Crown St, Wollongong NSW”, prepared by EI Australia, reference to report No. E25862.G03, and dated 13 January 2024.

2.0 BACKGROUND

2.1 Site Description

The site is located within Illawarra region area, approximately 27km south of the Wollongong CBD. Details of the site are summarised in Table 1 below.

Table 1: The Site Details

Site	Details
Location	357-363 Crown Street and 2-4 Gladstone Avenue, Wollongong NSW 2500
Lot/DP	Lot 1 and Lot 2 in DP 201949, and Lot 6 and Lot 7 in DP 14480
Local Government Area	Wollongong City Council
Shape and Area	Irregular shape land with approximate area of 6,514m ²
Slope	Moderately sloping towards to the east and southeast
Existing Structures	Commercial buildings and carpark with associated structures in Crown Street. Two single-storey residential dwellings and associated structures in Gladstone Avenue
Neighbouring Properties	North Crown Street's carriageway and road reserve East Gladstone Avenue's carriageway and road reserve South Multi-storey mixed-use building and commercial buildings West Multi-storey mixed-use building

2.2 Proposed Development

The architectural drawings listed above indicate that the proposed development involves the construction of a high-raised mixed-use building with lower ground level to Level 1 are partially below the natural ground level due to sloping nature of the ground. The Reduced Level (RL) of Lower Ground floor level ranges from 25.2m to 26.7m Australian Height Datum (AHD). Due to the sloping natural ground level, it is inferred that approximately 1.0m to 11.5m of excavation is required for the proposed development.

2.3 Local Geology

The local geology was assessed using the geological map Wollongong 1:250,000 Geological Series Sheet SI 56-9, Second Edition, 1966, from the Geological Survey of New South Wales. The map indicates that the site lies on Psb geology, belong to the Shoalhaven Group, Berry formation, of Permian age. The Psb is described as 'Siltstone, shale, sandstone'. The description of local geology does not account for any fill or soil that may be present at the site.

2.4 Geotechnical Investigation

The geotechnical assessment report prepared by EI Australia indicates that the proposed development is 6-storey mixed-use buildings with two ground level partially underground and three basement levels. Furthermore, the report specifies that approximately 20.5m of bulk earthwork is required at the southwest portion of the site for the proposed development.

Summary of the subsurface condition outlined in the report are provided below:

- Fill materials, thickness ranging from 0.2m to 2.3m.
- Residual Soil, described as Sandy CLAY, thickness ranging from 0.17m to 1.75m.
- Fractured-Sandstone, distinctly to slightly weathered, low to high strength, thickness ranging from 0.3m to 2.5m.
- Fresh-Sandstone, fresh, high to very high strength.

No groundwater seepage was observed during the augering of the boreholes. However, standing groundwater levels were recoded within the installed groundwater wells.

3.0 GROUND CONDITIONS

A summary of the encountered ground profiles within the borehole BH201 during the hydrogeological assessment by FES is provided in Table 2 below. However, reference should be made to the logs annexed in Appendix B for details. Furthermore, the subsurface conditions of the boreholes from the geotechnical investigation incorporated. Reference should be made to geotechnical investigation report to understand the drilling and testing methodology and assessment process.

Table 2: Summary of Ground Profile

Units	Details	Depth (m)						
		BH201	BH101	BH102	BH103	BH104	BH105	BH106
	Top of the Borehole (RL m AHD)	36.8	29.1	30.5	27.6	35.9	37.0	36.5
Unit 1	Fill materials, concrete	0.0 – 1.0	0.0 – 0.7	0.0 – 0.4	0.0 – 0.2	0.0 – 1.2	0.0 – 2.3	0.0 – 0.8
Unit 2	Clayey SAND, with some sandstone	–	0.7 – 1.2	–	–	–	–	–
	Silty Sandy CLAY, with some sandstone	–	–	–	–	1.2 – 2.2	2.3 – 3.6	0.8 – 2.6
Unit 3	SANDSTONE, extremely weathered	–	–	0.4 – 0.6	0.2 – 0.5	2.2 – 3.4	3.6 – 4.8	–
Unit 4	SANDSTONE, distinctly weathered	1.0 – 4.0	1.2 – 3.6	0.6 – 0.9	0.5 – 2.7	–	–	–
Unit 5	SANDSTONE, fresh	4.0 – 20.0	3.6 – 7.1	0.9 – 4.8	2.7 – 7.2	3.4 – 6.7	4.8 – 8.7	2.6 – 7.9

Groundwater seepages were observed during the augering of the borehole BH201 at approximate depths of 6.5m and 10.5m.

Standing groundwater levels were recorded within the installed groundwater wells during the monitoring periods.

4.0 GROUNDWATER ASSESSMENT

FES installed one groundwater well, identified as GW201, as part of the hydrogeological assessment. Furthermore, FES adopted the two groundwater wells, identified as BH102M and BH103m, from the geotechnical investigation conducted by EI Australia.

4.1 Groundwater Wells

The following information was considered for the groundwater well BH201 installation, and details of the wells are provided in Table 3 below:

- Ground conditions encountered within the borehole during the drilling.
- Groundwater seepage levels in the existing wells at the site.
- Proposed bulk excavation level of the development.

Table 3: Groundwater Well Construction Details

Well	Total Depth (m)	Screened Length (m)	Surface Level (RL m AHD)	Water Bearing
GW201	20.0	1.0 – 20.0	36.8	Sandstone
BH102M	4.83	1.6 – 4.6	30.5	Sandstone
BH103M	7.22	3.8 – 6.8	27.6	Sandstone

The following installation methodology was adopted for groundwater well BH201:

- 50mm diameter, Class 18PVC threaded and flush joined casing, and 0.45 machine-slotted screens were used.
- Coarse, washed sand and gravel placed in the annulus surrounding the piping to a height of the screen.
- Bentonite pellets were placed in the annulus to form an impermeable plug near the top of the well to prevent surface runoff from entering directly into the well.
- Bentonite pellets placed in the annulus to form an impermeable plug near the top encountered bedrock.
- PVC cap was placed on the casing.

- 100mm diameter stainless steel flushed covers used for all well finishes and concreted onto the ground surface.

4.2 Groundwater Levels

Weekly standing groundwater levels within three wells were measured for three months. The readings are summarised in Table 4 below.

Table 4: Standing Groundwater Levels

Date	Depth (m)		
	GW201	BH102M	BH103M
4/03/2025	19.5	1.5	1.9
10/03/2025	19.4	1.5	1.3
17/03/2025	19.1	1.5	1.5
24/03/2025	19.0	1.5	1.3
31/03/2025	14.4	1.2	1.3
3/04/2025	14.0	1.5	1.3
9/04/2025	14.4	2.2	1.3
14/04/2025	14.6	2.1	1.7
22/04/2025	14.6	2.0	1.4
28/04/2025	14.3	1.4	1.3
5/05/2025	14.4	1.5	1.3
12/05/2025	14.5	1.4	1.6
19/05/2025	14.5	1.5	1.3
26/05/2025	14.3	1.5	1.3
2/06/2025	14.4	1.5	1.4

4.3 Daily Rainfall Survey

A daily rainfall survey was conducted using publicly available data from the Bureau of Meteorology (BOM). The rainfall data was collected from the closest station, located at Albion Park (Shellharbour Airport, Station ID 68241), during the groundwater assessment period and listed in Table 5 below.

Table 5: Daily Rainfall Survey

Date	Rainfall (mm)	Date	Rainfall (mm)	Date	Rainfall (mm)
4/03/2025	4.4	15/04/2025	1.6	11/05/2025	0.4
7/03/2025	5.8	22/04/2025	2.8	12/05/2025	0.2
8/03/2025	1.0	23/04/2025	26.0	13/05/2025	0.6
9/03/2025	1.6	24/04/2025	1.6	14/05/2025	0.6
11/03/2025	6.0	25/04/2025	0.6	16/05/2025	8.0
12/03/2025	14.4	27/04/2025	6.8	19/05/2025	3.8
17/03/2025	0.6	28/04/2025	14.6	20/05/2025	0.8
22/03/2025	5.8	29/04/2025	2.0	21/05/2025	6.4
24/03/2025	0.2	30/04/2025	7.6	22/05/2025	46.0
26/03/2025	0.2	1/05/2025	5.2	23/05/2025	93.4
29/03/2025	49.4	2/05/2025	9.8	24/05/2025	30.8
30/03/2025	25.8	3/05/2025	0.2	27/05/2025	1.2
31/03/2025	32.6	6/05/2025	0.2	4/06/2025	0.6
1/04/2025	0.2	10/05/2025	0.2	–	–

A plot of the daily rainfall and groundwater levels recorded is presented in Appendix C of this report.

4.4 Hydraulic Conductivity

A raising head hydraulic conductivity test was carried out within the wells on 3 April 2025 to evaluate the hydraulic conductivity (k) of the site's subsurface condition. The hydraulic conductivity at each well was calculated from the field test results using the Hvorslev Slug Test method and is summarised in Table 6 below.

Table 6: Results of Hydraulic Conductivity Test

Groundwater Well	Hydraulic Conductivity, k (m/s)	Water Bearing
GW201	4.60×10^{-9}	Sandstone
BH102M	1.93×10^{-7}	Sandstone
BH103M	1.17×10^{-7}	Sandstone

5.0 GROUNDWATER INFLOW ANALYSIS

5.1 Methodology

Based on the provided architectural drawings, FES selected three sections, identified as Section 1 to Section 4, to carry out the groundwater inflow analysis. The analysis consisted of two-dimensional (2D) Finite Element Analysis (FEA) using a commercial application called “Plaxis 2D Ultimate” to estimate potential groundwater inflow into the bulk excavation of the proposed development. A Site Plan, annexed as Appendix A, presents those nominated sections.

The FEA of the designated sections was performed employing a "Plane Strain" 2-dimensional model with "15-Noded" triangular elements. Within this model, the proposed bulk excavation is modelled as a "Trench Excavation" assuming an infinite extension in the third dimension (z-axis). The Mohr-Coulomb Model was used to describe the behaviours of the soils and rocks adopted for the FEA.

The natural ground level of the site and area immediately adjacent to the site has been adopted from the survey plan, which is annexed as Appendix F in this report. Since the local natural ground levels are gently and consistently sloping, areas outside the site are extrapolated to a maximum distance of 15m from each excavation boundary in all sections. Furthermore, the subsurface conditions, including the groundwater levels for the extrapolated areas, are adopted with consistency with the excavation boundary in the FEA. Given that the site has reasonably shallow bedrock geology, the 15m distance is inferred to be adequate, and FEA will assume that no drawdown effect will be found at this 15m distance.

The excavation boundaries will normally be support by shoring wall system to ensure their stability. However, to enhance the groundwater assessment, the FEA is modelled with “Flow Only” option and no displacement of the ground has been considered in this assessment. Furthermore, the bulk excavation area has been adopted as a “Dry Condition” in the FEA to computer the groundwater inflow.

5.2 Subsurface Conditions

The subsurface conditions, as provided in the boreholes from the geotechnical investigation report by EI Australia and the hydrogeological assessment, along with details of the installed groundwater wells, have been reviewed to determine the appropriate subsurface conditions for the FEA. Due to significant geological variations between the western and eastern portions, two sections, identified as Section 1 and Section 2, have been adopted to represent the site conditions, respectively. The depths and elevations of the subsurface conditions for each section are summarised in Table 7 below.

Table 7: Adopted Ground Conditions

Units	Depth (m)							
	Section 1		Section 2		Section 3		Section 4	
	1A	1B	2A	2B	3A	3B	4A	4B
Existing Ground Level (RL m AHD)	36.8	27.8	33.0	36.8	30.5	31.5	32.6	25.4
Unit 1	0.0 – 0.8	0.0 – 0.5	0.0 – 0.6	0.0 – 1.8	0.0 – 0.7	0.0 – 1.2	0.0 – 1.2	0.0 – 0.2
Unit 2	0.8 – 2.6	0.5 – 0.7	0.6 – 0.8	1.8 – 2.9	0.7 – 1.2	–	1.2 – 2.2	–
Unit 3	–	0.7 – 1.0	0.8 – 1.0	2.9 – 4.1	–	1.2 – 2.2	2.2 – 3.4	0.2 – 0.5
Unit 4	–	1.0 – 3.0	1.0 – 1.5	–	1.2 – 3.6	2.2 – 3.4	–	0.5 – 2.7
Unit 5	2.6 – 7.9	3.0 – 7.2	1.5 – 6.0	4.1 – 7.7	3.6 – 7.1	3.4 – 6.7	3.4 – 6.7	2.7 – 7.2

5.3 Groundwater

The groundwater assessment revealed that the highest groundwater level was recorded at a depth of 14.3m, 0.5m, and 0.4m below the existing ground level within the groundwater wells GW201, BH102m, and BH103m, respectively. In accordance with WaterNSW guideline, the highest groundwater level was adopted as the groundwater table across the site for the FEA. The adopted groundwater levels to each section are provided in Table 8 below.

Table 8: Adopted Groundwater Conditions

Units	Depth (m)							
	Section 1		Section 2		Section 3		Section 4	
	1A	1B	2A	2B	3A	3B	4A	4B
Existing Ground Level (RL m AHD)	36.8	27.8	33.0	36.8	30.5	31.5	32.6	25.4
Groundwater	14.3	1.2	14.3	14.3	1.2	1.3	14.3	1.3

The Slug Test results from the fieldwork testing were found to be consistent to the subsurface condition encountered. Therefore, typical recommended hydraulic conductivity values were adopted for the FEA, and they are summarised in Table 9 below.

Table 9: Adopted Hydraulic Conductivity

Units	Hydraulic Conductivity, k (m/s)		k_y/k_x
	k_x	k_y	
Unit 1	5×10^{-4}	5×10^{-4}	1
Unit 2	1×10^{-8}	1×10^{-8}	1
Unit 3	2×10^{-7}	2×10^{-7}	1
Unit 4	2×10^{-7}	1×10^{-7}	0.5
Unit 5	1×10^{-7}	5×10^{-8}	0.5

Groundwater flow in the bedrock primarily occurs through defects, which are typically horizontal. As a result, the horizontal permeability of slightly weather to fresh bedrock is significantly higher than their vertical permeability.

5.4 Proposed Basement

No structural drawings or briefs were available during the preparation of this report. However, it is understood that the “Drained Basement” system is the preferred option for the proposed development. Therefore, a soldier pile wall with a shotcrete infill system can be considered for the encountered subsurface condition.

The architectural drawings indicate that the proposed Lower Ground floor level will be from RL 25.2m to RL 26.7m, AHD. Considering that an additional 0.5m excavation is required for the floor slab and drainage system, the inferred proposed Bulk Excavation Level (BEL) at each section is provided in Table 10 below. Furthermore, the adopted basement length along each section is provided in Table 10 below.

Table 10: Adopted Excavation Details

Units	Sections							
	Section 1		Section 2		Section 3		Section 4	
	1A	1B	2A	2B	3A	3B	4A	4B
Existing Ground Level (RL m AHD)	36.8	27.8	33.0	36.8	30.5	31.5	32.6	25.4
Bulk Excavation Level (RL m AHD)	25.6	25.6	25.6	25.6	25.6	26.2	26.2	24.7
Basement Length (m)	35	35	52	52	30	30	30	30

6.0 RESULTS

The analysis was conducted for three sections, identified as Section 1 to Section 3, to ensure coverage of all excavation boundaries. Sections 1 and 2 encompass the excavation boundaries to the North, South, and Bottom, while Section 3 includes the excavation boundaries to the West, East and Bottom. The results of the analysis are summarised in Table 9 below.

Table 11: Results of the Analysis

Section	Excavation Boundary	Boundary Length (m)	Inflow (m ³ /s/m)	Inflow (L/s)	Boundary Adopted	Inflow (L/s)
Section 1	1A	35	0.0	–	Yes	–
	1B	35	1.02×10^{-8}	0.001	Yes	0.001
	Bottom	85	2.48×10^{-8}	0.003	Yes	0.003
Section 2	2A	52	0.0	–	Yes	–
	2B	52	0.0	–	Yes	–
	Bottom	35	0.0	–	Yes	–
Section 3	3A	30	5.75×10^{-8}	0.002	Yes	0.002
	3B	30	8.80×10^{-8}	0.003	Yes	0.003
	Bottom	66	3.67×10^{-7}	0.025	Yes	0.025
Section 4	4A	30	0.0	–	Yes	–
	4B	30	0.0	–	Yes	–
	Bottom	30	0.0	–	Yes	–
Total						0.034

Based on the results it is found that a total inflow of the **0.034L/s** groundwater can seep into the basement excavation in the worst-case scenario. This is estimated to be **1.07ML/year** of the groundwater inflow into the basement excavation, which is less than the 3ML/year. If the construction of the development extends to approximately six months, the estimated groundwater removal during the construction stage is around **0.53ML/180 days**.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This report presents the findings of the hydrogeological assessment at the nominated sections, identified as Section 1 to Section 4, for the proposed development at 57-363 Crown Street and 2-4 Gladstone Avenue, Wollongong NSW 2500. The groundwater inflow analysis concludes that the proposed development with a “Drained Basement” option is feasible on the site using industry-standard design and construction techniques. The analysis is based on the groundwater assessment and the likely hydraulic conductivity of the encountered subsurface conditions. There will certainly be variations in the adopted parameters and assumptions, and it is found that the results of the analysis can be within one order of the magnitude. Since the parameters are adopted with higher-end value, based on our experience, the actual groundwater inflow into the basement is more likely to be less than what is estimated in this report. However, if large open water-bearing defects are encountered within the basement excavation, they can be controlled by grouting the defects. The analysis indicates that a “Soldier Pile” wall with a shotcrete infill system is feasible for the encountered groundwater. This report does not justify that the adopted shoring wall system is adequate for the ground movement. It is recommended to assess and confirm the potential ground movement for the adopted shoring wall system before the construction stage.

The above conclusion is valid subject to the adoption of the followings and should constitute a “Hold Point”:

- **Water Quality Testing:** Prior to completing the design, it is recommended to conduct laboratory testing on collected groundwater samples to ensure they comply with WaterNSW groundwater quality requirements. Furthermore, this testing procedure is required during the construction stage to confirm the groundwater quality is still within the acceptable limit.
- **Drainage System:** The basement design and construction should incorporate an adequate drainage system to prevent groundwater inflow into the basement and mitigate potential adverse effects.
- **Dewatering Management Plan:** During the construction stage, groundwater inflow into the basement excavation should be monitored. If present, dewatering of

groundwater can be conducted using the sump and pump method until the drainage system is completed. The volume of dewatered groundwater should be measured to verify that the designed drainage system is sufficient to manage the groundwater inflow throughout the building's design life. Additionally, the quality of the groundwater before disposal should be tested prior to disposal to ensure compliance with WaterNSW guidelines. A Dewatering Management Plan should be prepared in accordance with WaterNSW guideline and implement during both the construction phase and the building's design life.

For and on behalf of Foundation Earth Sciences

Prepared by



Chandrasekaran Muralitharan

Principal Geotechnical Engineer

Reviewed By



Ben Buckley

Director

8.0 LIMITATIONS

The assessment of the sub-surface profile within the proposed development area and the recommendations presented in this report are based on limited information available to date.

The recommendations and advice presented in this report on soil and rock condition is considered to be indicative only as only very limited areas were assessed on site to date. Site inspection by a consulting Geotechnical Engineer or Engineering Geologist are to be undertake when further investigation works are to be carried out to confirm the condition of founding materials in which this geotechnical assessment recommends.

Anecdotal evidence and Information provided by client is assumed to be relevant and to the best of knowledge be appropriate for its interpretation.

There is a possibility that the actual geotechnical and groundwater conditions across the site could differ from the inferred geotechnical assumptions and derivations on which our recommendations are presented in this report. In that case, Foundation Earth Sciences should be contacted for further advise and review of the information provided in this report. Foundation Earth Sciences does not accept any liabilities for the conditions not provided and/or accessible during the preparation of this report. Any ensuring liability resulting from use of this report by third parties cannot be transferred to Foundation Earth Sciences.

9.0 REFERENCES

1. Water NSW guideline titled “Minimum requirements for building site groundwater investigations and reporting” was issued by Department of Planning and Environment (DPE), with referenced to number PUB20/940, revision V02.2210, and dated October 2022
2. Australian Standard – AS1726-2017 “Geotechnical Site Investigation”.
3. Australian Standard – AS 1170.4-2024 “Structural Design Actions – Part 4: Earthquake actions in Australia”.
4. Australian Standard – AS 2870-2011 “Residential slabs and footings”.
5. Australian Standard – AS 2159-2009 “Piling - Design and installation”.
6. Pells, P.J.N, Mostyn, E and Walker, B F – Foundations on Sandstone and Shale in the Sydney Region, Australian Geomechanics Journal, Dec 1998.
7. Pells, P.J.N, Douglas D.J, Rodway, B, Thorne C, McManon B.K – Design Loadings for Foundations on Shale and Sandstone in the Sydney Region. Australian Geomechanics Journal, 1978.

Appendix A

Site Plan



Key

- Approximate borehole locations

Not to scale
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Ref #

G771-1

MM

Site Plan

Wollongong Investments No. 5 Pty Ltd

357-363 Crown St and 2-4 Gladstone Ave, Wollongong NSW 2500

Appendix B

Boreholes Logs

UTM	: 56H	Drill Rig	: Comacchio geo 205	Job Number	: G771-1
Latitude	: -34.42589	Driller Supplier	: Pace	Client	: Wollongong Investments No. 5 Pty Ltd
Longitude	: 150.88694	Logged By	: KV	Project	: Hydrogeological Assessment
Ground Elevation	: 36.8 (m)	Reviewed By	: MM	Location	: 357-359 Crown St, Wollongong NSW 2500, Australia
Total Depth	: 20 m BGL	Date	: 13/02/2025	Loc Comment	:

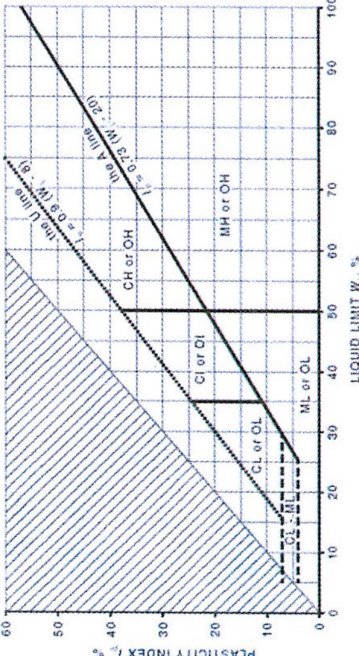
Drilling Method	Water	Well Diagram	Elevation (m)	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency	Sample Tests Remarks	Additional Observations	Depth (m)
Auger			36.8	1		MH	Fill: Gravelly Silt, medium plasticity, brown, moist				Fill	1
			35.5	2		SST	Rock; SANDSTONE, highly weathered, low to medium strength, dark grey, fine grained,		LS-MS		Rock	2
			34.5	3								3
			33.5	4								4
			32.5	5								5
			31.5	6								6
			30.5	7								7
			29.5	8								8
			28.5	9								9
			27.5	10								10
			26.5	11								11
			25.5	12								12
			24.5	13								13
			23.5	14								14
			22.5	15								15
			21.5	16								16
			20.5	17								17
			19.5	18								18
			18.5	19								19
			17.5									
							BH201/GW201 Terminated at 20m					

METHODS OF SOIL DESCRIPTION USED ON BOREHOLE LOGS

 FILL	 ORGANIC SOILS (OL, OH, Pt)	 CLAY (CL, CI, or CH)
 COUBLES or BOULDERS	 SILT (ML or MH)	 SAND (SP or SW)
 GRAVEL (GP or GW)	Combinations of these basic symbols may be sued to indicate mixed materials	

CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in borehole logs using the preferred method given in AS 1726:2017, section 6.1 soil descriptions and classification.

GROUP SYMBOLS				PARTICLE SIZE CHARACTERISTICS			
MAJOR DIVISIONS		SYMBOL	DESCRIPTION	Fraction	Components	Subdivision	Size mm
COARSE GRAINED SOILS More than 65% of the soil excluding oversize fraction is greater than 0.075mm	GRAVEL More than 50% of the coarse fraction is >2.36mm	GW	Well graded gravel and gravel-sand mixtures, little or no fines.	Oversize	BOULDERS		>200
					COBBLES		63-200
		GP	Poorly graded gravel and gravel-sand mixtures, little or no fines.		GRAVEL	Coarse	19-63
						Medium	6.7-19
						Fine	2.36-6.7
	SAND More than 50% of the coarse fraction is <2.36mm	GM	Silty gravel, gravel-sand-clay mixtures.		SAND	Coarse	0.6-2.36
						Medium	0.21-0.6
						Fine	0.075-0.21
		GC	Clayey gravel, gravel-sand-clay mixtures.		SILT		0.002-0.075
					CLAY		<0.002
FINE GRAINED SOILS More than 35% of the soil excluding oversize fraction is less than 0.075mm	Liquid limit less <50%	SW	Well graded sand and gravelly sand, little or no fines.	PLASTICITY PREOPERTIES 			
		SP	Poorly graded sand and gravelly sand, little or no fines.				
		SM	Silty sand, sand- silt mixtures.				
		SC	Clayey sand, sandy -clay mixtures.				
	Liquid limit > than 50%	ML	Inorganic silts of low plasticity, very fine sands, rock flour, silty or clayey fine sands.				
		CL, CI	Inorganic slays of low to medium plasticity, gravelly clays, sandy clays, silty clays				
		OL	Organic silts and organic silty clays of low plasticity.				
		MH	Inorganic silts of high plasticity.				
		CH	Inorganic clays of high plasticity.				
		OH	Organic clays of medium to high plasticity.				
	Highly organic Soil	PT	Peat muck and other highly organic soils.				

ABBREVIATIONS AND DESCRIPTIONS FOR ROCK MATERIAL AND DEFECTS

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Non-cohesive and free running
M	Moist	Soils feel cool, darkened in colour. Soil tends to stick together.
W	Wet	Soils feel cool, darkened in colour. Soil tends to stick together, free water forms when handling.

Moisture content of cohesive soils shall be described in relation to plastic limit (PL) or liquid limit (LL) for soils with higher moisture content as follows: Moist, dry of plastic limit ($w < PL$); Moist, near plastic limit ($w = PL$); Moist, wet of plastic limit ($w < PL$); Wet, near liquid limit ($w = LL$), Wet, wet of liquid limit ($w > LL$),

CONSISTENCY				DENSITY			
Symbol	Term	Undrained Shear Strength (kPa)	SPT "N" #	Symbol	Term	Density Index %	SPT "N" #
VS	Very Soft	< 12	<2	VL	Very Loose	<15	0 to 4
S	Soft	>12 to <25	>2 to <4	L	Loose	>15 to <35	4 to 10
F	Firm	>25 to <50	>4 to <8	MD	Medium Density	>65 to <85	10 to 30
St	Stiff	>50 to <100	>8 to 15	D	Dense	>65 to <85	30 to 50
H	Hard	>200	>30				
Fr	Friable	-					

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material. #SPT correlations are not stated in AS1726:2017 and may be subject to corrections for overburden pressure and equipment type.

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION BY MASS
Trace	Presence just detectable by feel or eye but soil properties little or no difference to general properties of primary component	Coarse grained soils: <5% Fine grained soils: <15%
With	Presence easily detectable by feel or eye but soil properties little or no difference to general properties of primary component	Coarse grained soils: 5-12% Fine grained soils: 15-30%
Prefix	Presence easily detectable by feel or eye in conjunction with the general properties of primary component	Coarse grained soils: >12% Fine grained soils: >30%

CLASSIFICATION AND INFERRED STRATIGRAPHY

Rock is broadly classified and described in borehole logs using the preferred method given in AS 1726:2017, section 6.2 Rock identification, descriptions, and classification.

ROCK MATERIAL DESCRIPTION

Layering		Structure	
Term	Description	Term	Spacing (mm)
Massive	No Layering apparent	Thinly Laminated	<6
		Laminated	6-20
Poorly Developed	Layering just visible; little effect on properties	Very thinly bedded	20-60
		Thinly bedded	60-200
Well Developed	Layering (bedding, foliation, cleavage) distinct; rock breaks more easily parallel to layering	Medium bedded	200-600
		Thickly bedded	600-2,000
		Very thickly bedded	>2,000

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT TYPES		
Defect Type	Abbr.	Description
Joint	JT	Surface of a fracture or parting, formed without displacement, across which the rock has little or no tensile strength. May be closed or filled by air, water, soil, or rock substance, which acts as cement.
Bedded Parting	BP	Surface of fracture or parting, across which the rock has little or no tensile strength, parallel or sub-parallel to layering/bedding. Bedding refers to the layering or stratification of a rock, indicating orientation during deposition, resulting in planar anisotropy in the rock material.
Foliation	FL	Repetitive planar structure parallel to the shear direction or perpendicular to the direction of higher pressure, especially in the metamorphic rock, e.g., schistosity (SH) and Gneissosity.
Contact	CO	The surface between two types or ages of rock.
Cleavage	CL	Cleavage planes appear as parallel, closely spaced, and planar surfaces resulting from mechanical fracturing of rock through deformation or metamorphism, independent of bedding.
Sheared Seam/ Zone (Fault)	SS/SZ	Seam or zone with roughly parallel almost planar boundaries of rock substance cut by closely spaced (often <50mm) parallel and usually smooth or slickensided joints or cleavage planes.
Crushed seam/ Zone (Fault)	CS/CZ	Seam or zone composed of disoriented usually angular fragments of the host rock substance, with rough parallel near-planar boundaries. The brecciated fragments may be of clay, silt, sand or gravel sizes or mixtures of these.
Decomposed seam/Zone	DS/DZ	Seam of soil substance, often with gradational boundaries, formed by weathering of the rock material in places.
Infilled Seam	IS	Seam of soil substance, usually clay or clayey, with very distinct roughly parallel boundaries, formed by soil migrating into joint or open cavity.
Schistosity	SH	The foliation in schist or other coarse grained crystalline rock due to the parallel arrangement of platy or prismatic mineral grains, such as mica.
Vein	VN	Distinct sheet-like body of minerals crystallised within rock through typically open-space filling or crack-seal growth.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT SHAPE AND ROUGHNESS					
Shape	Abbr.	Description	Roughness	Abbr.	Description
Planar	PI	Consistent Orientation	Polished	Pol	Shiny smooth surface
Curved	Cu	Gradual change in orientation	Slickensided	SL	Grooved or stained surface, usually polished
Undulating	Un	Wavy surface	Smooth	S	Smooth to touch. Few or no surface irregularities
Stepped	St	One or more well defined steps	Rough	RF	Many small surface irregularities, amplitude generally <1mm. Feels like fine to coarse sandpaper
Irregular	Ir	Many sharp changes in orientation	Very Rough	VR	Many large surface irregularities, amplitude generally >1mm. Feels like very coarse sandpaper.

Orientation: **Vertical Boreholes-** The dip (inclination from horizontal) of the defect.

Inclined Boreholes- The inclination is measured as the acute angle to the core axis.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT COATING			DEFECT APERTURE		
Coating	Abbr.	Description	Aperture	Abbr.	Description
Clean	CN	No Visible coating or infilling	Closed	CL	Closed.
Stain	SN	No visible coating but surfaces are discoloured by staining, often limonite (orange-brown)	Open	O	Without any infill material
Veneer	VNR	A visible coating of soil or mineral substances, usually too thin to measure (<1mm); may be patchy	Infilled	-	Soil or rock i.e., clay, talc, pyrite, quartz, etc.

TERMS FOR ROCK MATERIAL STRENGTH AND WEATHERING

CLASSIFICATION AND INFERRED STRATIGRAPHY

Rock is broadly classified and described in borehole logs using the preferred method given in AS 1726:2017, section 6.2 Rock identification, descriptions, and classification.

ROCK MATERIAL STRENGTH CLASSIFICATION

Symbol	Term	Point Load Index Is (50) (MPa)#	Field Guide
VL	Very Low	0.03 To 0.01	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut triaxial sample by hand. Pieces up to 30mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with knife; indentations 1mm to 3mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	0.3 – 1	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty
H	High	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken with a pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

#Rock Strength Test Results



Point Load Strength Index, Is (50) Axial Test (MPa)

Point Load Strength Index, Is (50), Diametral test (MPa)

Relationship between rock strength test result (Is (50)) and unconfined compressive strength (UCS) will vary with rock type and strength and should be determined on a site-specific basis. However, UCS is typically 20 x Is (50)

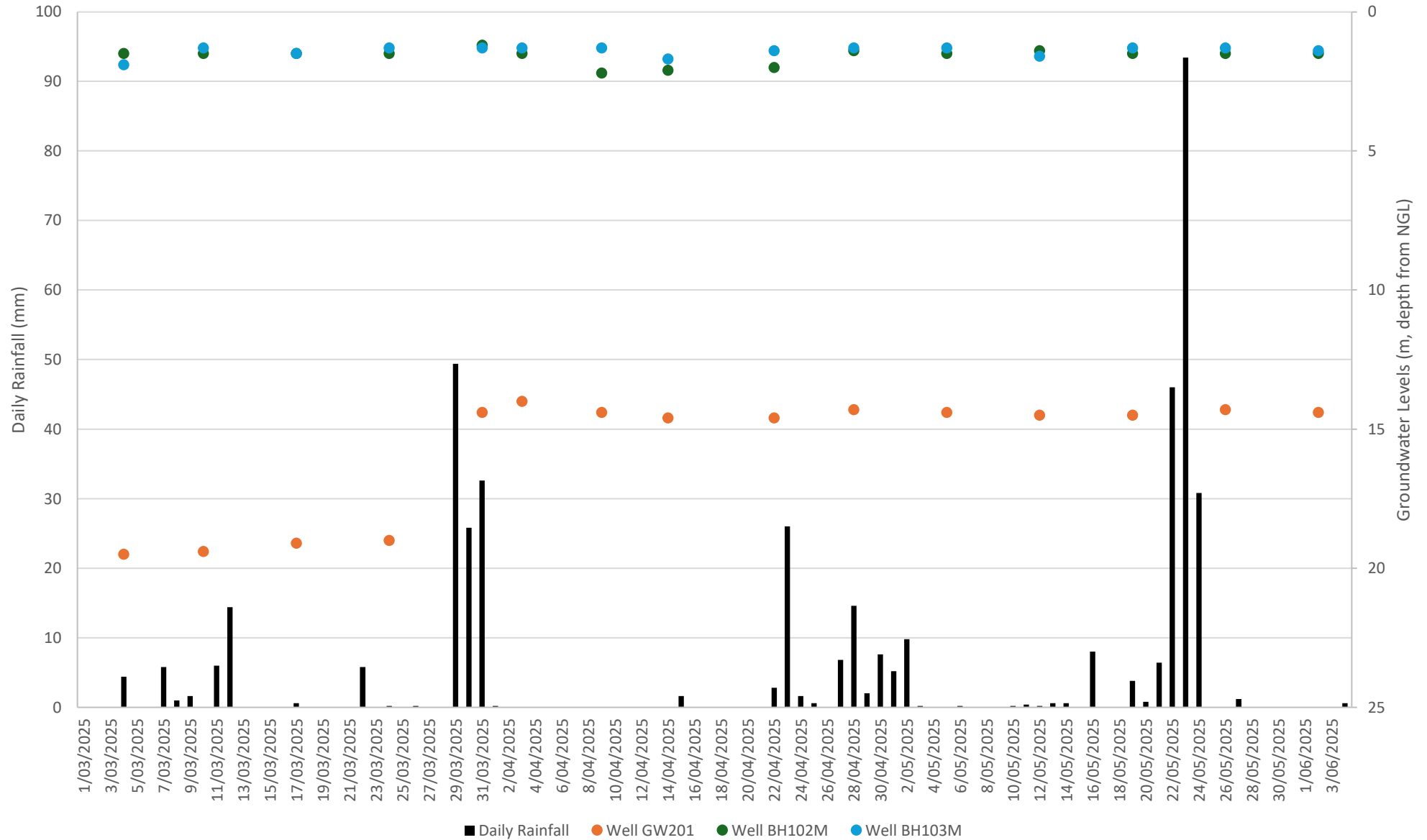
ROCK MATERIAL WEATHERING CLASSIFICATION

Symbol	Term	Field Guide
RS	Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric no longer evident; there is a large change in volume, but the soil has not been significantly transported.
XW	Extremely Weathered	Rock is weathered to such an extent that it has soil properties- i.e., it either disintegrates or can be remoulded, in water.
DW	HW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to decomposition of weathered product in pores. In some environments it is convenient to subdivide into highly weathered and moderately weathered, with the degree of alteration typically less for MW
	MW	
SW	Slightly Weathered	Rock slightly discoloured but shows little to no change of strength relative to fresh rock.
FR	Fresh	Rock shows no sign of decomposition or staining.

Appendix C

Groundwater Level and Daily Rainfall

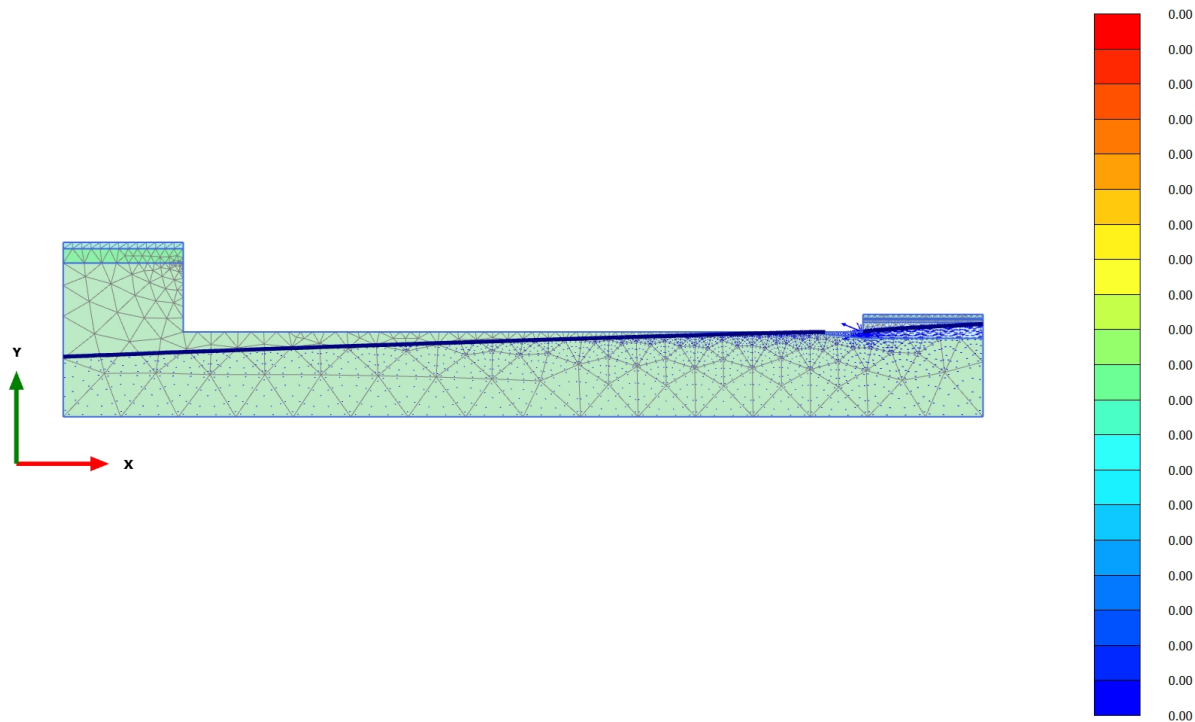
Graphs of Daily Rainfall and Groundwater Levels



Appendix D

Groundwater Inflow Analysis

4.1.1 Calculation results, Excavation [Phase_1] (1/1), Groundwater flow |q|

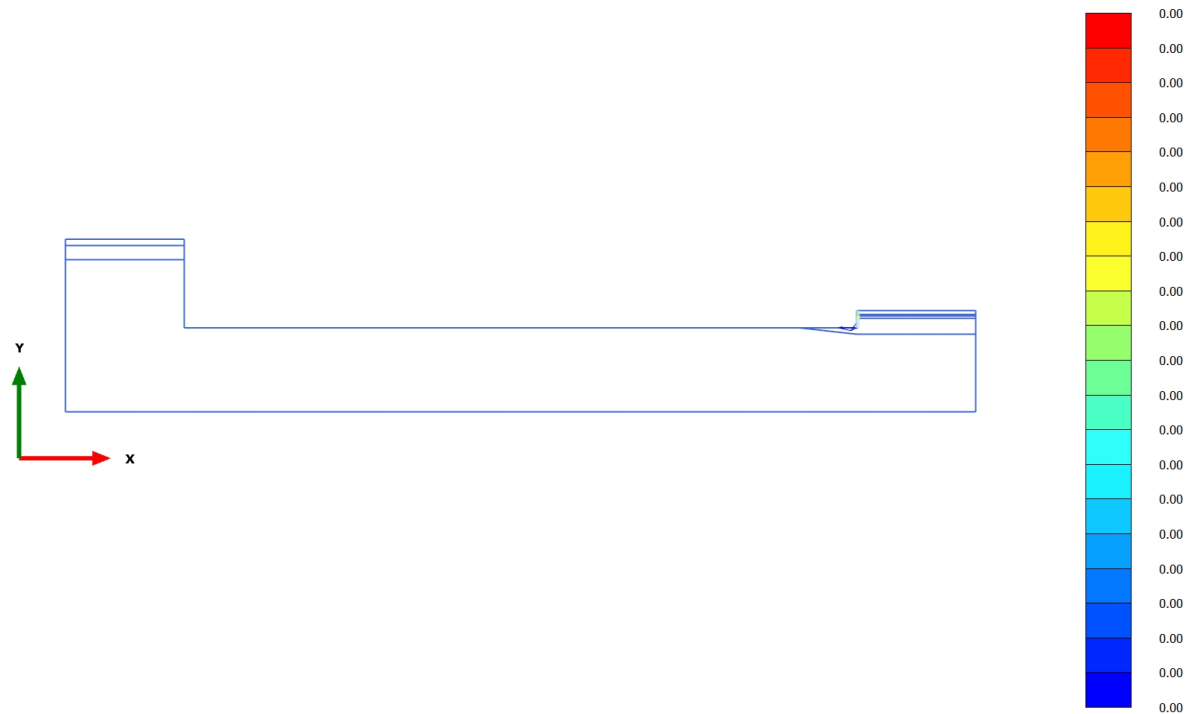


Groundwater flow |q| (scaled up 50.0×10^6 times) (Time 0.000 s)

Maximum value = 0.06227×10^{-6} m/s (Element 6036 at Stress point 72422)

Minimum value = 0.6011×10^{-15} m/s (Element 41 at Stress point 488)

4.2.1 Calculation results, cross section A-A*, Excavation [Phase_1] (1/1), Groundwater flow $|q|$



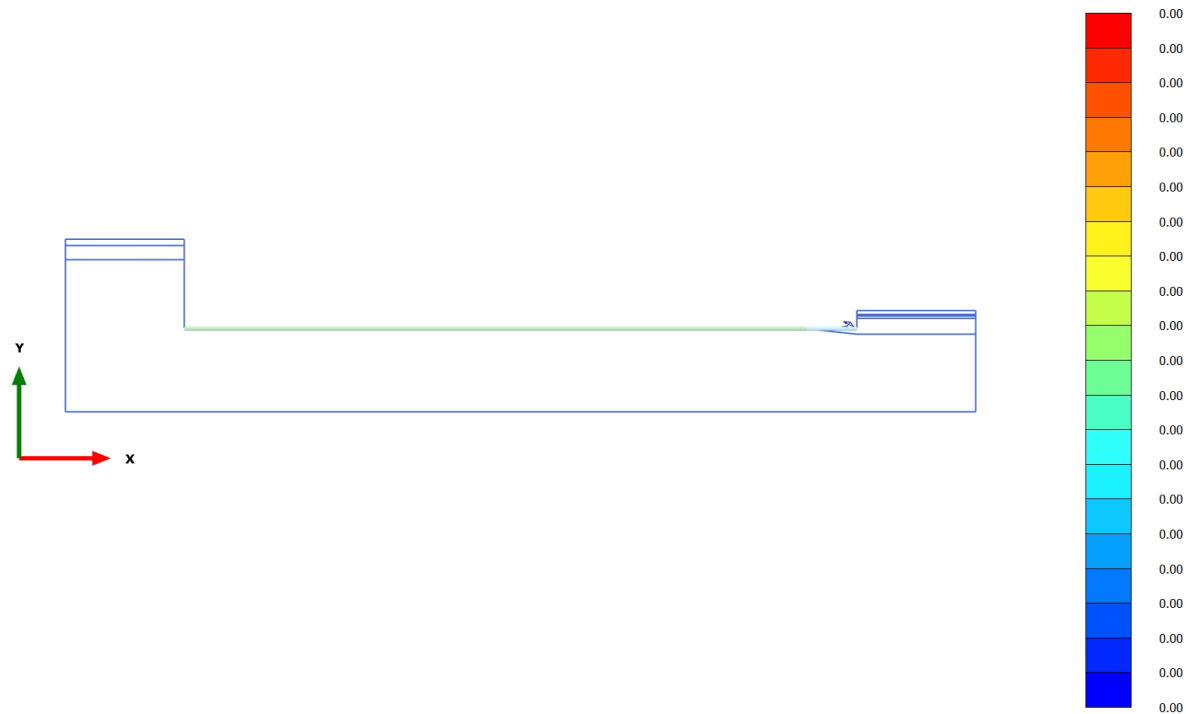
Groundwater flow $|q|$ (scaled up 50.0×10^6 times) (Time 0.000 s)

Maximum value = 0.04930×10^{-6} m/s

Minimum value = 2.220×10^{-12} m/s

Total discharge is -0.01018×10^{-6} m³/s/m

4.1.1 Calculation results, cross section A-A*, Excavation [Phase_1] (1/1), Groundwater flow $|q|$



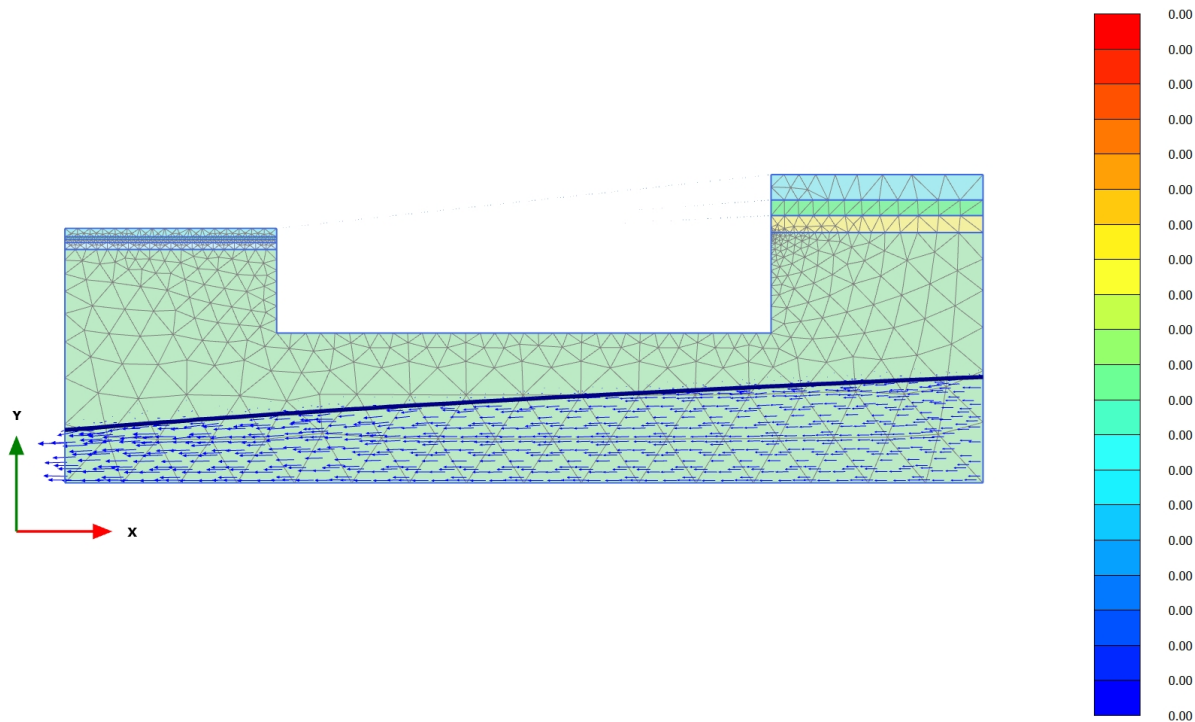
Groundwater flow $|q|$ (scaled up 50.0×10^6 times) (Time 0.000 s)

Maximum value = 0.03913×10^{-6} m/s

Minimum value = 0.000 m/s

Total discharge is 0.02477×10^{-6} m³/s/m

4.1.1 Calculation results, Excavation [Phase_1] (1/1), Groundwater flow |q|

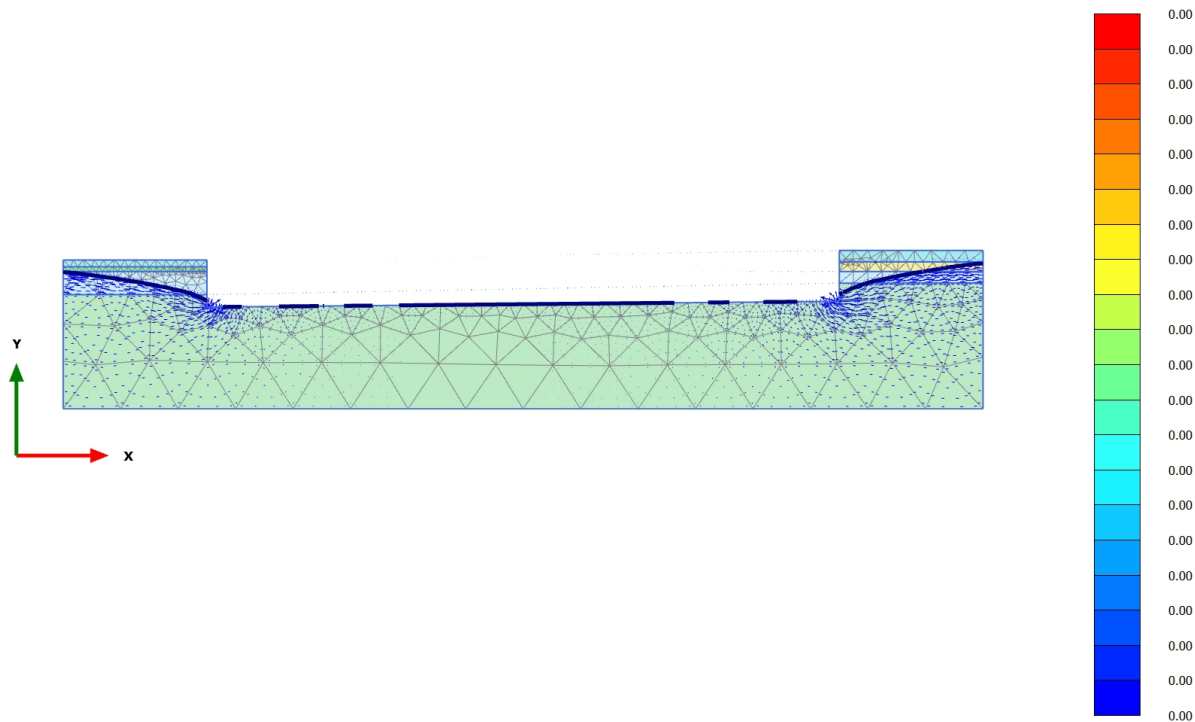


Groundwater flow |q| (scaled up 200×10^6 times) (Time 0.000 s)

Maximum value = 0.01060×10^{-6} m/s (Element 2799 at Stress point 33585)

Minimum value = 0.3570×10^{-15} m/s (Element 212 at Stress point 2543)

4.1.1 Calculation results, Excavation [Phase_1] (1/1), Groundwater flow |q|

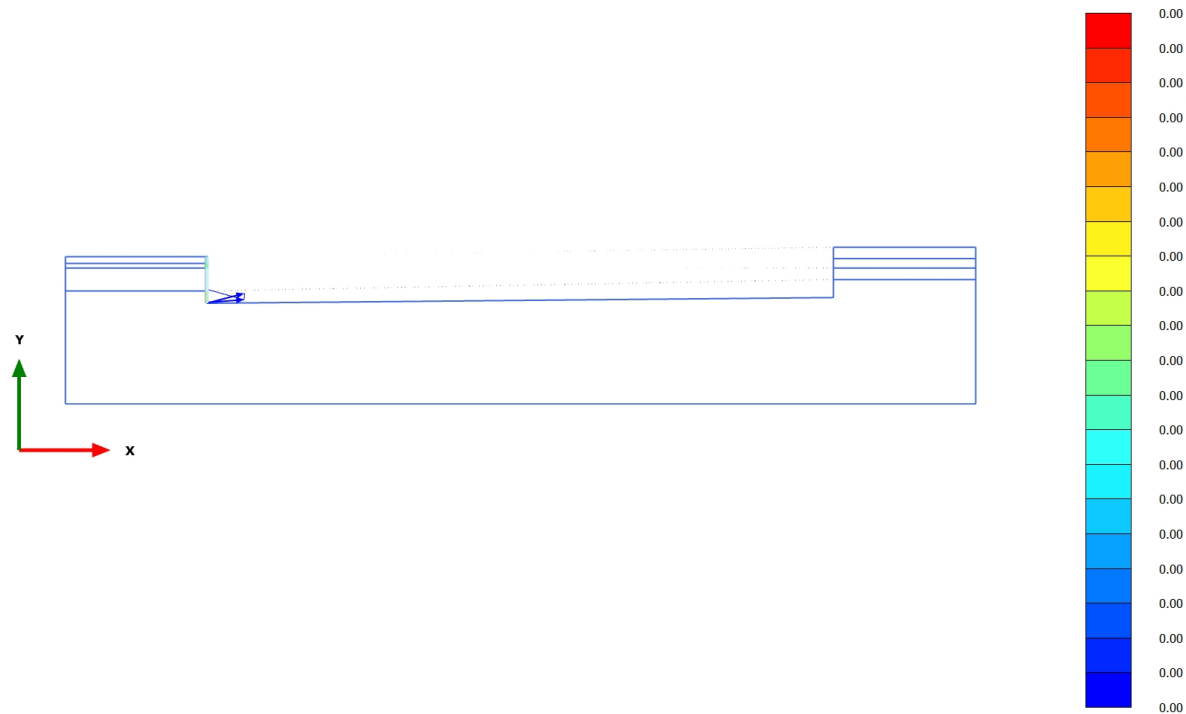


Groundwater flow |q| (scaled up 20.0×10^6 times) (Time 0.000 s)

Maximum value = 0.1275×10^{-6} m/s (Element 2557 at Stress point 30675)

Minimum value = 0.2677×10^{-12} m/s (Element 1815 at Stress point 21777)

4.2.1 Calculation results, cross section A-A*, Excavation [Phase_1] (1/1), Groundwater flow $|q|$



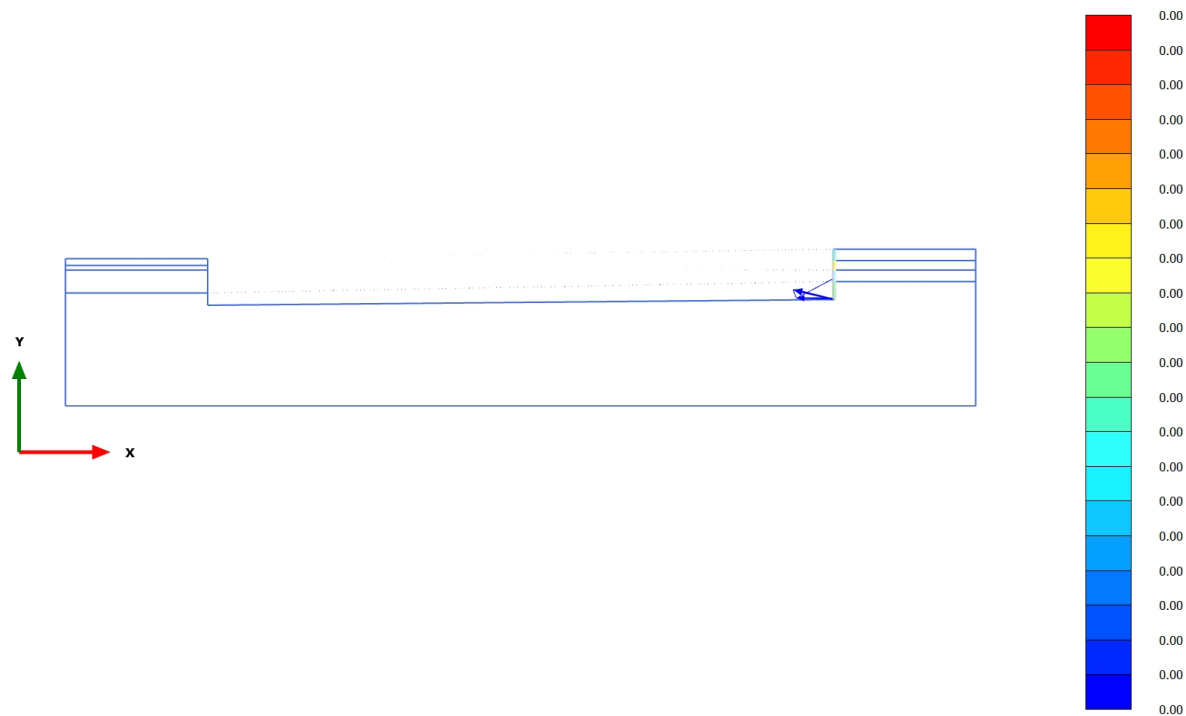
Groundwater flow $|q|$ (scaled up 50.0×10^6 times) (Time 0.000 s)

Maximum value = 0.08597×10^{-6} m/s

Minimum value = 2.042×10^{-12} m/s

Total discharge is 0.05745×10^{-6} m³/s/m

4.1.1 Calculation results, cross section A-A*, Excavation [Phase_1] (1/1), Groundwater flow $|q|$



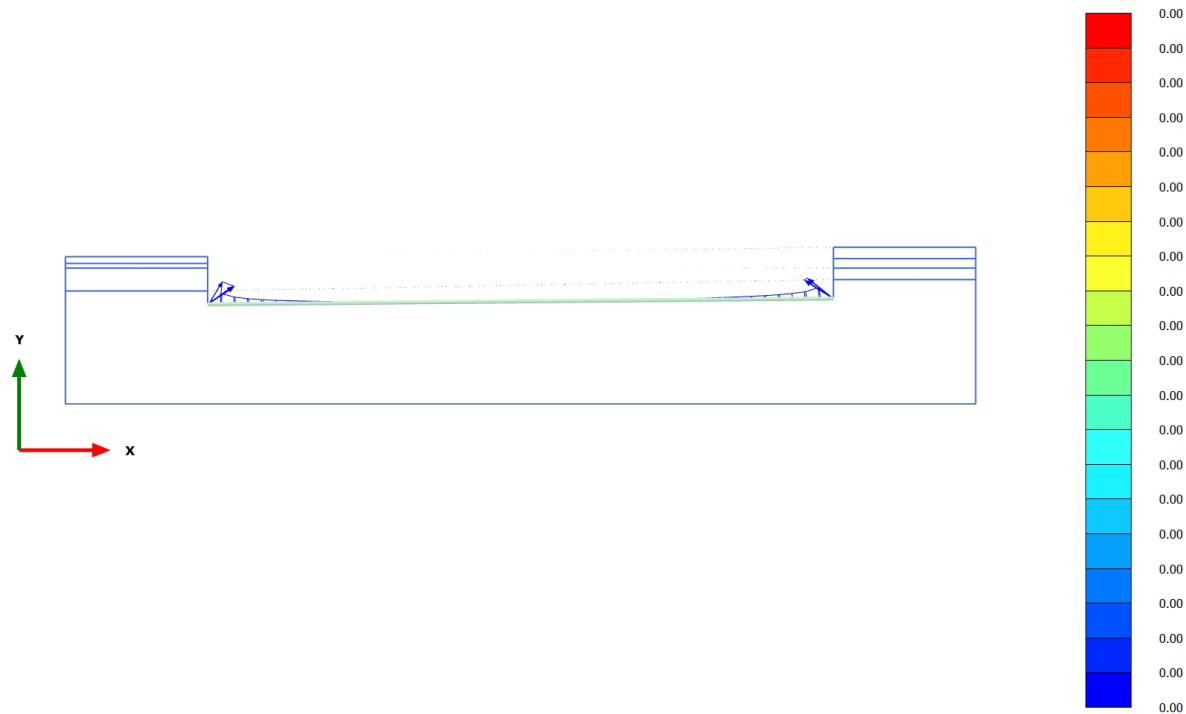
Groundwater flow $|q|$ (scaled up 50.0×10^6 times) (Time 0.000 s)

Maximum value = 0.09073×10^{-6} m/s

Minimum value = 2.007×10^{-12} m/s

Total discharge is -0.08798×10^{-6} m³/s/m

4.1.1 Calculation results, cross section A-A*, Excavation [Phase_1] (1/1), Groundwater flow $|q|$

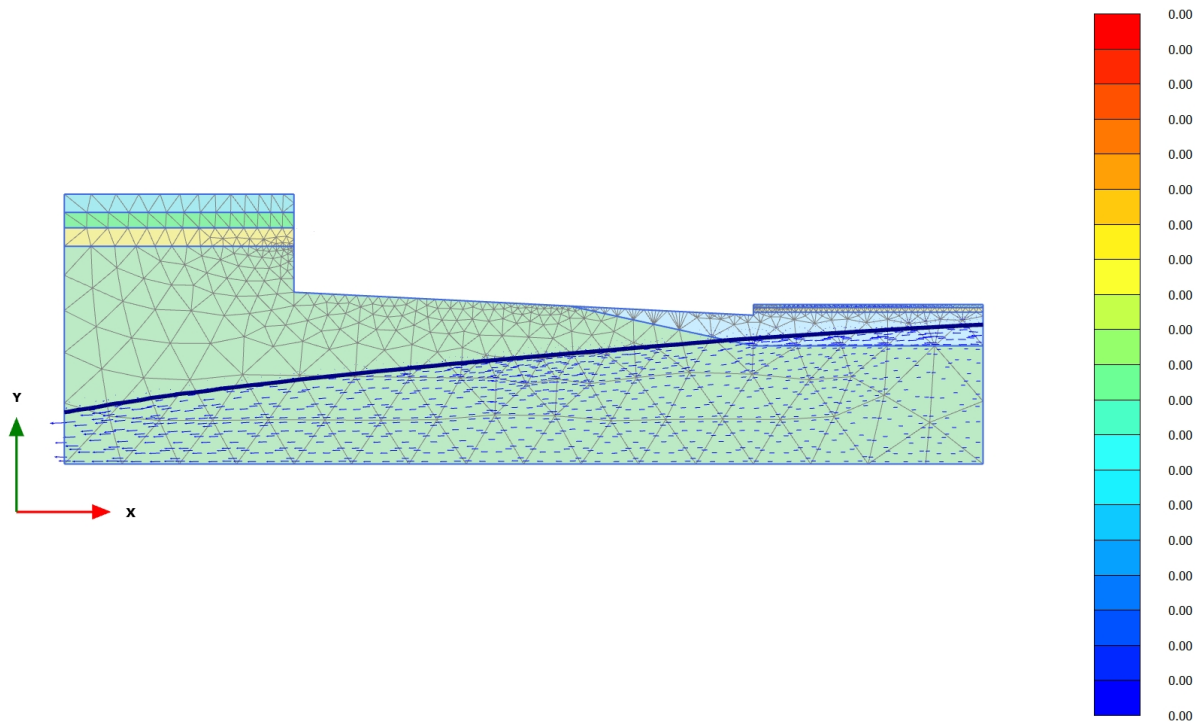


Groundwater flow $|q|$ (scaled up 50.0×10^6 times) (Time 0.000 s)

Maximum value = 0.07609×10^{-6} m/s

Minimum value = 1.287×10^{-9} m/s

Total discharge is 0.3672×10^{-6} m³/s/m

4.1.1 Calculation results, Excavation [Phase_1] (1/1), Groundwater flow $|q|$ 

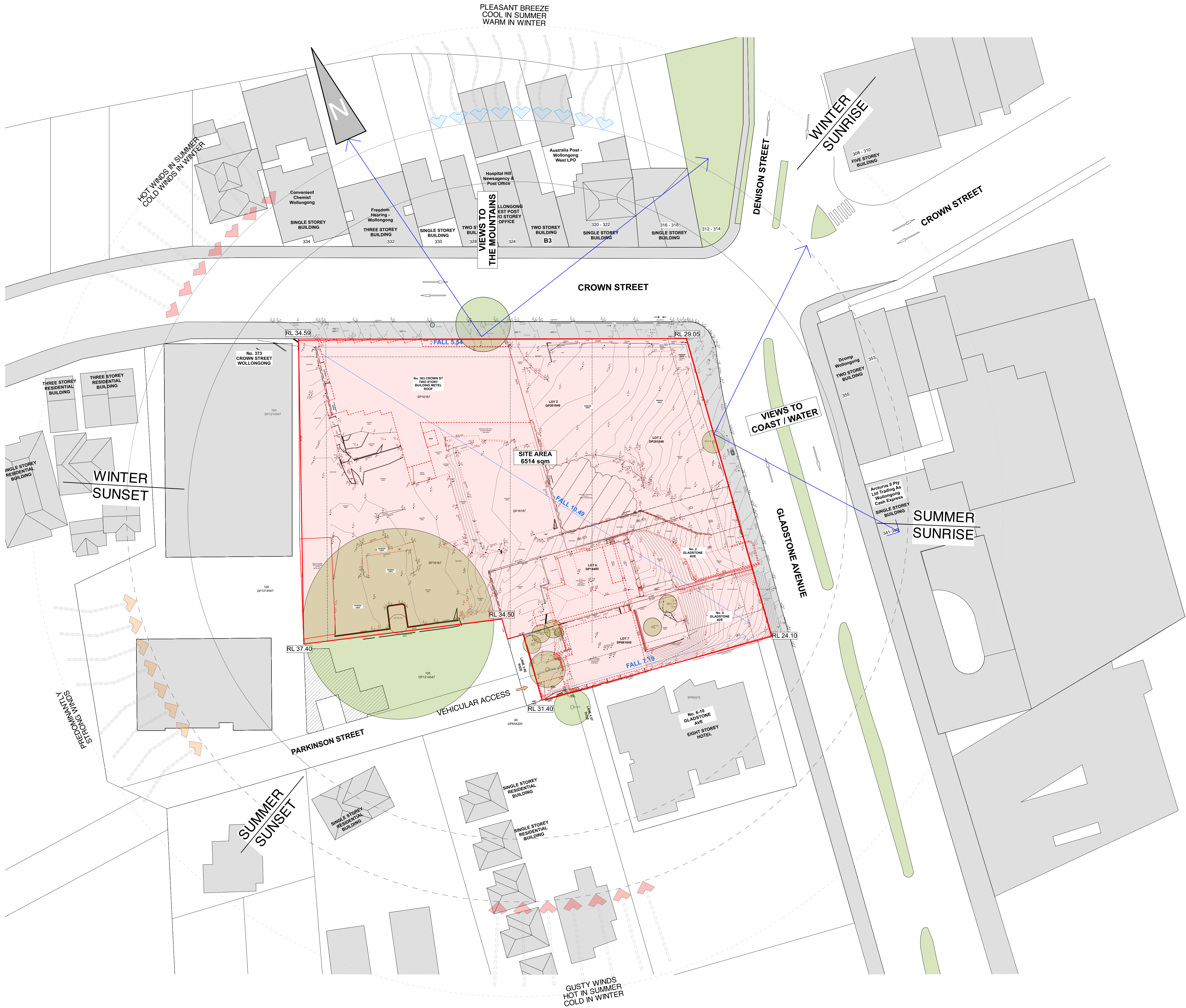
Groundwater flow $|q|$ (scaled up 50.0×10^6 times) (Time 0.000 s)

Maximum value = 0.02222×10^{-6} m/s (Element 2863 at Stress point 34353)

Minimum value = 1.798×10^{-15} m/s (Element 40 at Stress point 470)

Appendix E

Architectural Drawings



General Notes

DO NOT SCALE FROM DRAWING. USE FIGURED DIMENSIONS ONLY.
CHECK ALL DIMENSIONS ON SITE BEFORE ANY MANUFACTURE OR CONSTRUCTION

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Nominated Architects (NSW) - John Baker 3552, John Kavanagh 5999

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**20/1/2025 - DRAFT
DISCUSSION
DRAWINGS**

ACCESS
JAZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC
DOMENIKI TSAGARIS, MOUSSA ZAHOOR - ACOUSTIC NOISE
AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreereconsulting.com.au

BCA
ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL
Kamyar Elvazadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartsstructs.com.au

GEOTECH
Joel Heinger
Suite 101, Level 1, 1 Burelli Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heinger@elaustralia.com.au

HERITAGE
Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2521 E: ankita@heritage21.com.au

PHOTOMONTAGE
Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com

PLANNER
TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS
Rafael Bozonelos / ARCHI QS
Shop 31 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR
GEOSURV / SAEID TAHIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC
Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

WASTE
Tobias McPherson / ELEPHANTS FOOT
T: 0237803510
E: tobias.mcpherson@elephantsfoot.com.au

WIND
ERIC YUEN / VIPAC
279 Normanby Road, Port Melbourne VIC 3207 Australia
T: 0447 895 144 E: eric@vipac.com.au

Client

LEVEL 33

LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect

BKA Architecture

SYDNEY
Suite 1.04,
77 Dunning Ave,
Newcastle
NSW 2018
T: +61 2 9319 9200
E: bka@bka.com.au
W: www.bka.com.au

NEWCASTLE
Unit 4
19 Bolton St,
Newcastle
NSW 2300
T: +61 2 4926 5563

NORTH COAST
Unit 1
10 Station St,
Bangalow
NSW 2479
T: +61 2 6687 2712

North

Status

Date

Project

Scale at A1

1:400

Drawn

AC, AK, JY

Checked

JG

Drawing

SITE ANALYSIS

Project No.

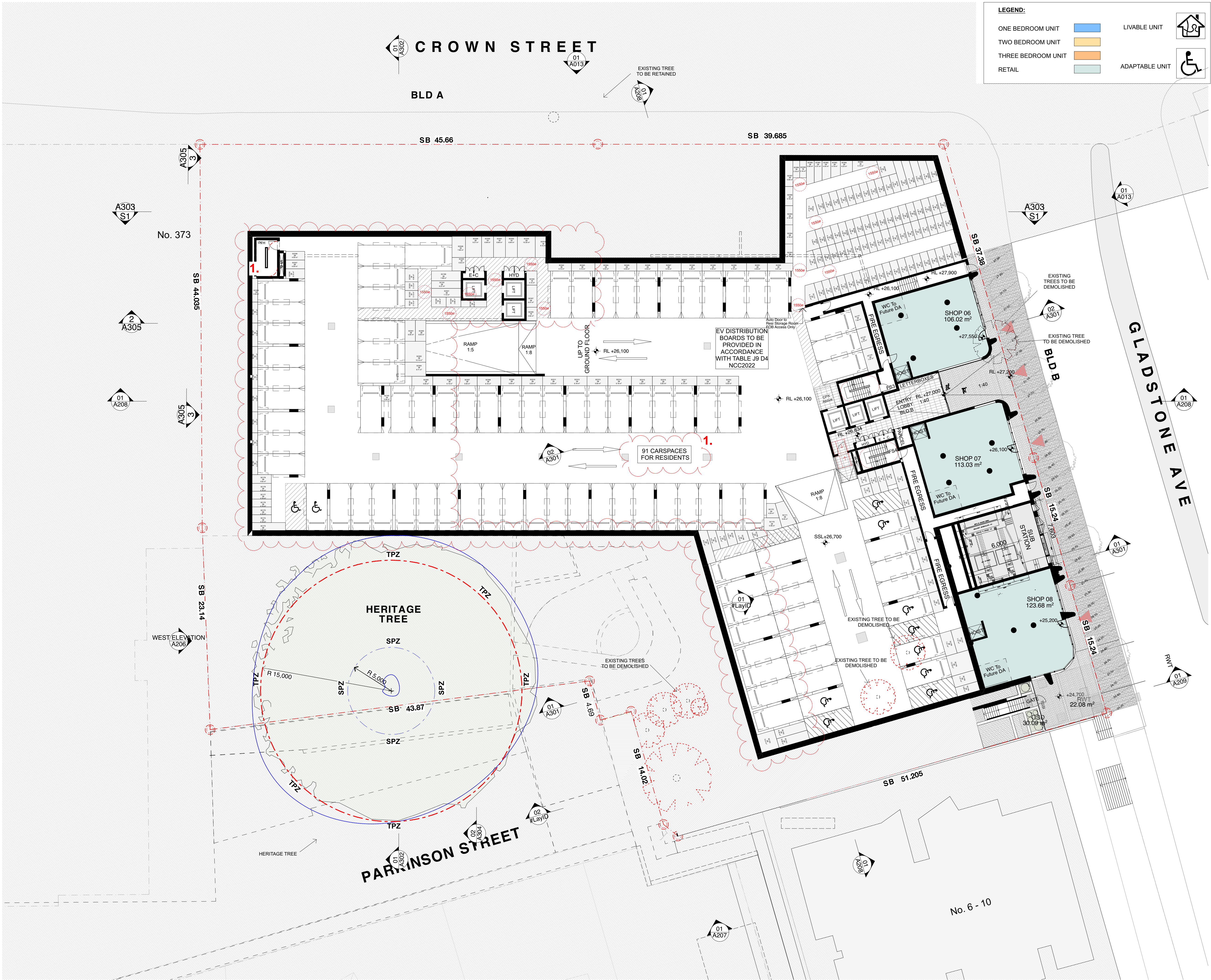
Revision

Drawing No.

22003

03

A007



LEGEND:

ONE BEDROOM UNIT	[Blue Box]	LIVABLE UNIT	[House Icon]
TWO BEDROOM UNIT	[Yellow Box]	ADAPTABLE UNIT	[Wheelchair Icon]
THREE BEDROOM UNIT	[Orange Box]		
RETAIL	[Light Blue Box]		

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Nominated Architects (NSW) - John Baker 3552, John Kavanagh 5999

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ACCESS
JAZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC
DOMENIKI TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreereconsulting.com.au

BCA
ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL
Kamyar Elvazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartstructs.com.au

GEOTECH
Joel Heinger
Suite 101, Level 1, 1 Burrell Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heinger@elaustalia.com.au

HERITAGE
Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2521 E: ankita@heritage21.com.au

PHOTOMONTAGE
Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com

PLANNER
TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningenuity.com.au

QS
Rafael Bozonelos / ARCHI QS
Shop 3 | 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR
GEO SURV / SAEID TAHERI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC
Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

WASTE
Tobias McPherson / ELEPHANTS FOOT
T: 02 97803510
E: tobias.mcpherson@elephantsfoot.com.au

WIND
ERIC YUEN / VIPAC
279 Normanby Road, Port Melbourne VIC 3207 Australia
T: 0447 895 144 E: eric@vipac.com.au

Client

LEVEL 33

LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect

BKA Architecture

SYDNEY Suite 1.04, 77 Dunning Ave, Randwick NSW 2018 E: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au	NEWCASTLE Suite 4, 19 Bolton St, Newcastle NSW 2300 T: +61 2 4926 5563	NORTH COAST Unit 1, 10 Station St, Bangalow NSW 2479 T: +61 2 6687 2712
---	--	---

North

Status

DA

Date

22/1/2025

Project

2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing

LOWER GROUND

Project No.

22003

Revision

07 - WIP

Drawing No.

A101

Scale at A1

1:200

Drawn

AC, AK, JY

Checked

JG



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Nominated Architects (NSW) - John Baker 3552, John Kavanagh 5999

Rev. Date Issue
22/1/2025 - DRAFT DISCUSSION DRAWINGS

ACCESS
JAZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecaprovals.com.au

ACOUSTIC
DOMENIKI TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreeconsulting.com.au

BCA
ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL
Kamyar Elvazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartsructs.com.au

GEOTECH
Joel Heinger
Suite 101, Level 1, 1 Burrell Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heinger@elaustralia.com.au

HERITAGE
Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2321 E: ankita@heritage21.com.au

PHOTOMONTAGE
Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com

PLANNER
TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS
Rafael Bozonelos / ARCHI QS
Shop 3 | 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR
GEOSURV / SAEID TAHIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC
Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

WASTE
Tobias McPherson / ELEPHANTS FOOT
T: 02 97803510
E: tobias.mcpherson@elephantsfoot.com.au

WIND
ERIC YUEN / VIPAC
279 Normanby Road, Port Melbourne VIC 3207 Australia
T: 0447 895 144 E: eric@vipac.com.au

Client
LEVEL 33
LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect
BKA Architecture

SYDNEY
Suite 104,
77 Dunning Ave,
Riverside
NSW 2038
T: +61 2 9319 9200
E: bka@bka.com.au
W: www.bka.com.au

NEWCASTLE
Suite 4,
19 Bolton St,
Newcastle
NSW 2300
T: +61 2 4926 5563

NORTH COAST
Unit 1,
10 Station St,
Bangalow
NSW 2479
T: +61 2 6687 2712

North
Status
DA

Scale at A1
1:200

Drawn
AC, AK, JY

Date
22/1/2025

Checked
JG

Project
2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing
GROUND FLOOR

Project No.
22003

Revision
07 - WIP

Drawing No.
A102

CROWN STREET

BLD A

SB 45.66

SB 39.685

No. 373

A305

A208

A305

SB 23.14

WEST ELEVATION A206

SB 43.87

TPZ

TPZ

TPZ

HERITAGE TREE

SPZ

SB 43.87

TPZ

TPZ

TPZ

LANDSCAPE AREA TO LANDSCAPE ARCHITECT DETAILS

EXISTING WATER RUN OFF

EXISTING TREES TO BE DEMOLISHED

EXISTING VEHICULAR CIRCULATION

PROPOSED VEHICULAR CROSSING

EXISTING TREE TO BE RETAINED

59 CARSPACES FOR RESIDENTS

SSL +31,750

EX RL 35.00

EX RL 34.50

EX RL 33.50

EX RL 31.50

EX RL 31.50

EXISTING TREE TO BE RETAINED

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

VOID

VEHICULAR ENTRY

DEEP SOIL LANDSCAPE

LANDSCAPE TO LANDSCAPE ARCHITECT DETAILS

EXISTING UNPAVED LANE TO HERBERT STREET

EXISTING TREE TO BE RETAINED

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

VOID

VEHICULAR ENTRY

DEEP SOIL LANDSCAPE

LANDSCAPE TO LANDSCAPE ARCHITECT DETAILS

EXISTING UNPAVED LANE TO HERBERT STREET

EXISTING TREE TO BE RETAINED

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

OPEN TO BELOW

No. 6 - 10

LEGEND:

ONE BEDROOM UNIT		LIVABLE UNIT	
TWO BEDROOM UNIT			
THREE BEDROOM UNIT			
RETAIL		ADAPTABLE UNIT	

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ACCESS

JAZZYN STOL / EAST COAST ACCESSIBILITY

PO Box 4276, Sydney South NSW 1235

P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC

DOMENIKI TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE AND VIBRATION SOLUTIONS

SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220

P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST

DAVID COWENLOCK / SEASONED TREE CONSULTING

T: 0415 961 074 E: david@seasonedtreeconsulting.com.au

BCA

ALEKS STOJCEVIC

PO Box 2331, NORTH PARAMATTA 1750

T: 0405 295 978 E: aleks@designgrc.com.au

BASIX / NATHERS

MARTIN PINSON

Suite 241, 65-71 Belmore Rd, Randwick 2031

T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL

Kamyar Elvazzadeh

Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113

T: 0401 843 236 E: kamyar@smartstructs.com.au

GEOTECH

Joel Heinger

Suite 101, Level 1, 1 Burelli Street, Wollongong, NSW 2500

T: 0475 554 383 E: joel.heinger@elaustralia.com.au

HERITAGE

Ankita Powale / HERITAGE 21

Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015

T: 02 9519 2521 E: ankita@heritage21.com.au

PHOTOMONTAGE

Dan Delavega / PREMIER 3D

Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065

T: 0475 554 383 E: dan@premier3d.com

PLANNER

TROY LOVEDAY / PLANNING INGENUITY

Suite 210, 531-533 Kingsway, Miranda NSW 2228

T: 0448 878 712 E: troy@planningingenuity.com.au

QS

Rafael Bozonelos / ARCHI QS

Shop 3 | 350 Oxford Street, Bondi Junction NSW 2022

T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR

GEOSURV / SAEID TAHIRI

P: 1300 554 675 M: 0411 756 547

E: saeid@geosurv.com.au

TRAFFIC

Bernard Lo / GENESIS TRAFFIC

T: 02 7255 8198 (Direct)

E: bernard@genesistraffic.com.au

WASTE

Tobias McPherson / ELEPHANTS FOOT

T: 02 97803510

E: tobias.mcpherson@elephantsfoot.com.au

WIND

ERIC YUEN / VIPAC

279 Normanby Road, Port Melbourne VIC 3207 Australia

T: 0447 895 144 E: eric@vipac.com.au

Client

LEVEL 33

LEVEL 33

30A/44 Eva St, Riverwood NSW 2210

(02) 8199 1144

Architect

BKA Architecture

SYDNEY

Suite 104,

77 Dunning Ave,

Rosebery

NSW 2018

NEWCASTLE

Suite 4,

19 Bolton St,

Roseberry

NSW 2300

NORTH COAST

Unit 1

10 Station St,

Bangalow

NSW 2479

T: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au

T: +61 2 4926 5563

T: +61 2 6687 2712

North

Status

DA

Date

22/1/2025

Project

2-4 Gladstone Ave / 357-363 Crown St Wollongong NSW

Drawing

UPPER GROUND

Project No.

22003

Revision

07 - WIP

Drawing No.

A103

Scale at A1

1:200

Drawn

AC, AK, JY

Checked

JG

Project

2-4 Gladstone Ave / 357-363 Crown St Wollongong NSW

Drawing

UPPER GROUND

Project No.

22003

Revision

07 - WIP

Drawing No.

A103

CROWN STREET

BLD A

01 A302

01 A013

LEGEND:

ONE BEDROOM UNIT		LIVABLE UNIT	
TWO BEDROOM UNIT			
THREE BEDROOM UNIT		ADAPTABLE UNIT	
RETAIL			

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ACCESS

JAZZMAN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC

DOMENIKI TSAGARIS, MOUSSA ZAHOOR - ACOUSTIC NOISE AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST

DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreeconsulting.com.au

BCA

ALEXS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: alexs@designrc.com.au

BASIX / NATHERS

MARTIN PINSON
Suite 241, 65-71 Balmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integrc.com.au

CIVIL

Kamyar Elvazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartsstructs.com.au

GEOTECH

Joel Heinger
Suite 101, Level 1, 1 Burelli Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heinger@elaustralia.com.au

HERITAGE

Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2521 E: ankita@heritage21.com.au

PHOTOMONTAGE

Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com.au

PLANNER

TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS

Rafael Bozonelos / ARCHI QS
Shop 31 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR

GEOSURV / SAEID TAHIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC

Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

WASTE

Tobias McPherson / ELEPHANTS FOOT
T: 02 97803510
E: tobias.mcpherson@elephantsfoot.com.au

WIND

ERIC YUEN / VIPAC
279 Normanby Road, Port Melbourne VIC 3207 Australia
T: 0447 895 144 E: eric@vipac.com.au

Client

LEVEL 33

LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect

BKA Architecture

SYDNEY	NEWCASTLE	NORTH COAST
Suite 104, 77 Dunning Ave, Randwick NSW 2018	Suite 4, 19 Bolton St, Newcastle NSW 2300	Unit 1, 10 Station St, Bangalow NSW 2479
T: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au	T: +61 2 4926 5563	T: +61 2 6657 2712

North

Status

DA

Date

22/1/2025

Project

2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing

LEVEL 1

Project No.

22003

Revision

07 - WIP

Drawing No.

A104

Scale at A1

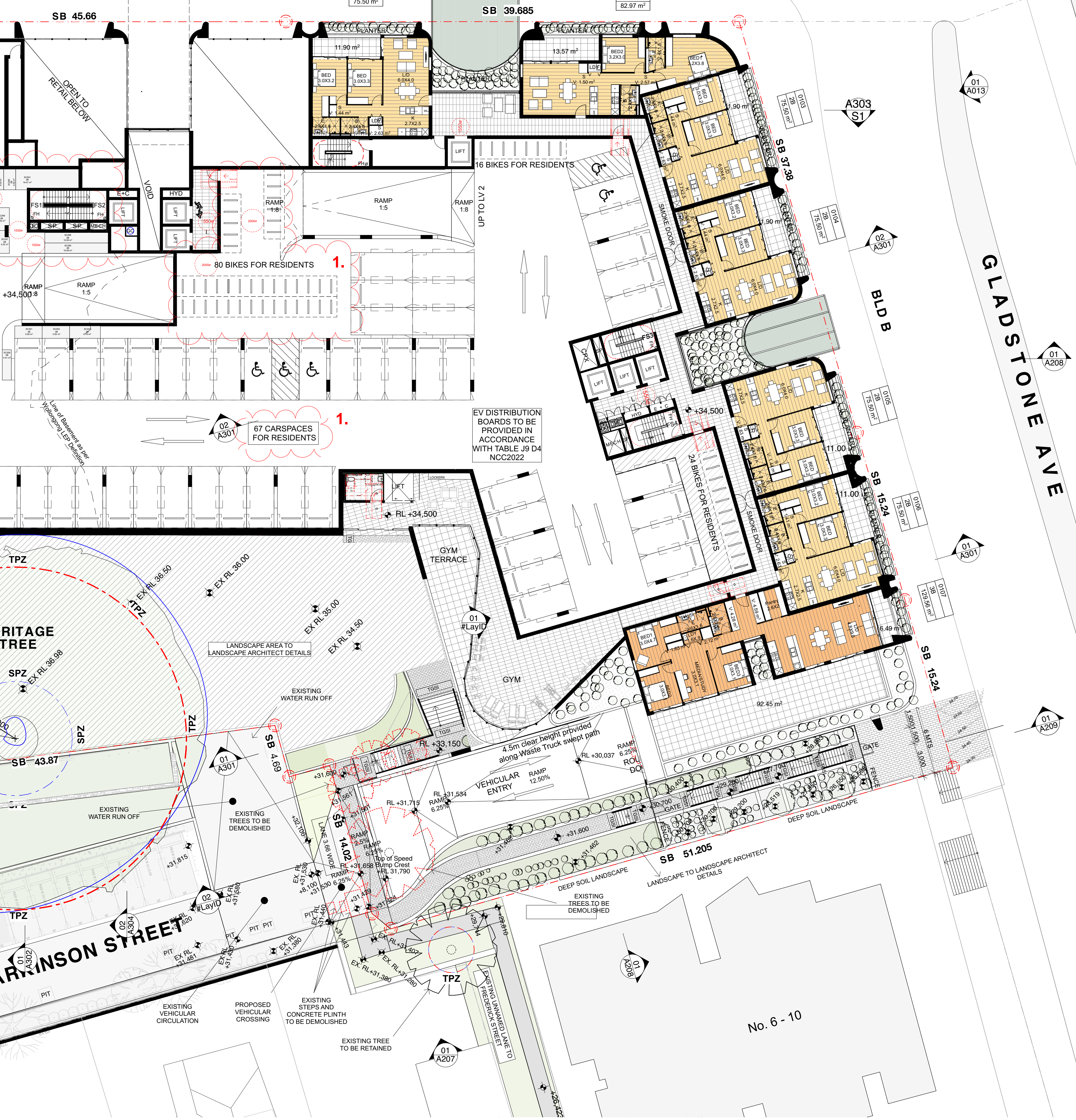
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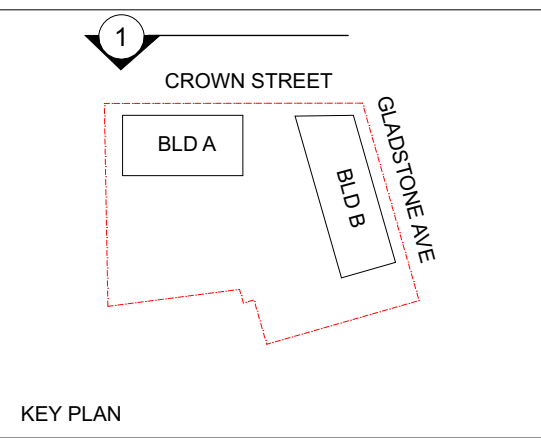
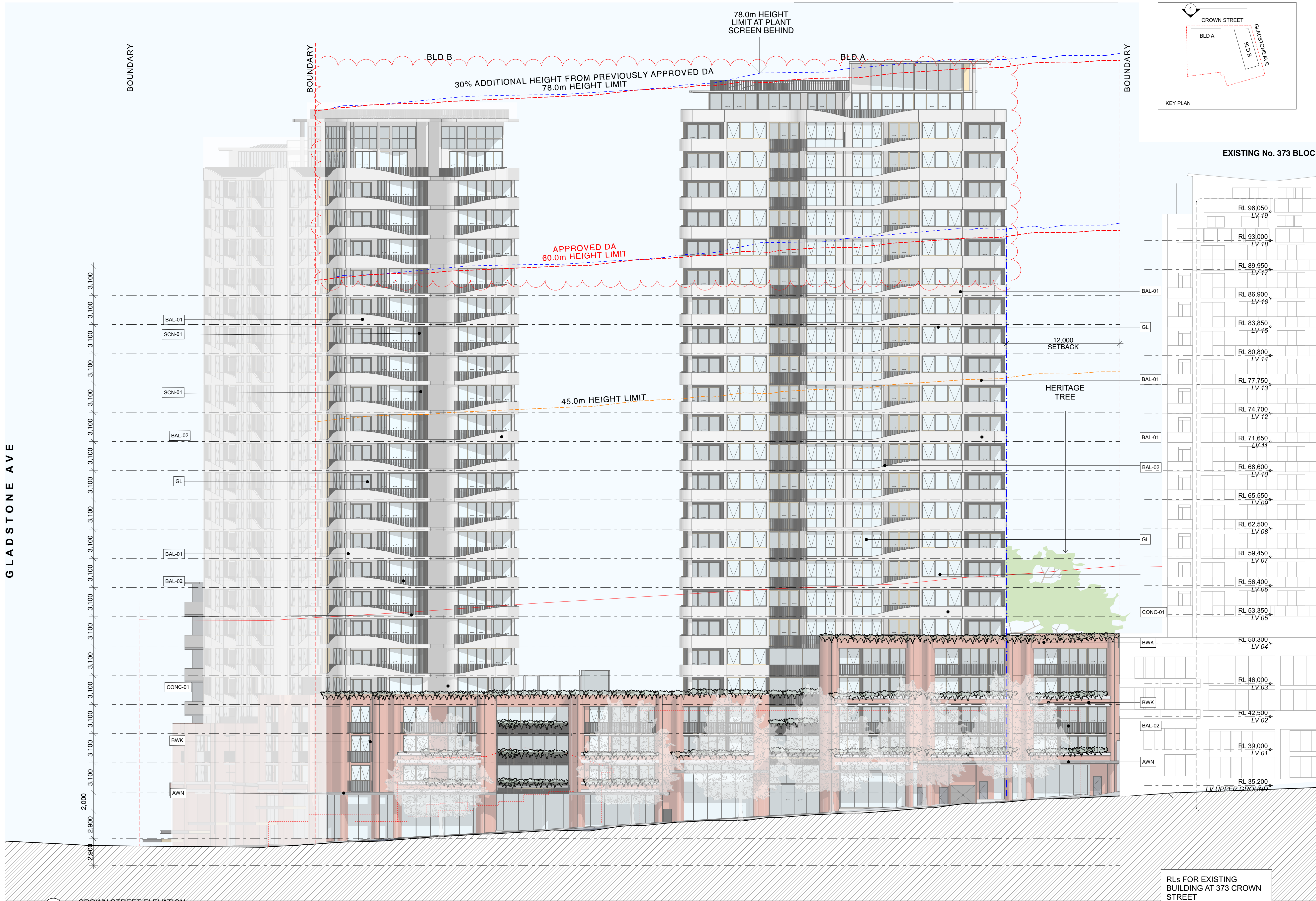
Drawn

AC, AK, JY

Checked

JG





EXISTING No. 373 BLOC

BAL-01	RL 96,050 LV 19
GL	RL 93,000 LV 18
BAL-01	RL 89,950 LV 17
BAL-01	RL 86,900 LV 16
GL	RL 83,850 LV 15
BAL-01	RL 80,800 LV 14
BAL-01	RL 77,750 LV 13
BAL-01	RL 74,700 LV 12
BAL-01	RL 71,650 LV 11
BAL-02	RL 68,600 LV 10
GL	RL 65,550 LV 09
GL	RL 62,500 LV 08
CONC-01	RL 59,450 LV 07
BWK	RL 56,400 LV 06
BWK	RL 53,350 LV 05
BWK	RL 50,300 LV 04
BAL-02	RL 46,000 LV 03
BAL-02	RL 42,500 LV 02
AWN	RL 39,000 LV 01
	RL 35,200 LV UPPER GROUND

RLs FOR EXISTING
BUILDING AT 373 CROWN
STREET

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Rev	Date	Issue
01	21/12/2022	ISSUE FOR DA
02	25/10/2023	RFI AMENDMENTS
03	26/3/2024	RFI AMENDMENTS
04	7/6/2024	RFI AMENDMENTS

ACCESS
JAZZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC
DOMENIK TSAGARIS, MOUSSA ZAIQOR - ACOUSTIC NOISE
AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
PO Box 2331, NORTH PARRAMATTA 1750
T: 0415 961 074 E: david@seasonedtreereconsulting.com.au

BCA
ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL
Kamyar Elvazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartsstructs.com.au

GEOTECH
Joel Heininger
Suite 101, Level 1, 1 Burrell Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heininger@elaustralia.com.au

HERITAGE
Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2521 E: ankita@heritage21.com.au

PHOTOMONTAGE
Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@Premier3D.com

PLANNER
TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS
Rafael Bozonelos / ARCHI QS
Shop 3 | 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR
GEOSURV / SAEID TAHIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC
Bernard Lo / GENESIS TRAFFIC
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WASTE
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---	---	--

North

Status
DA

Date
20/1/2025

Scale at A1
1:200

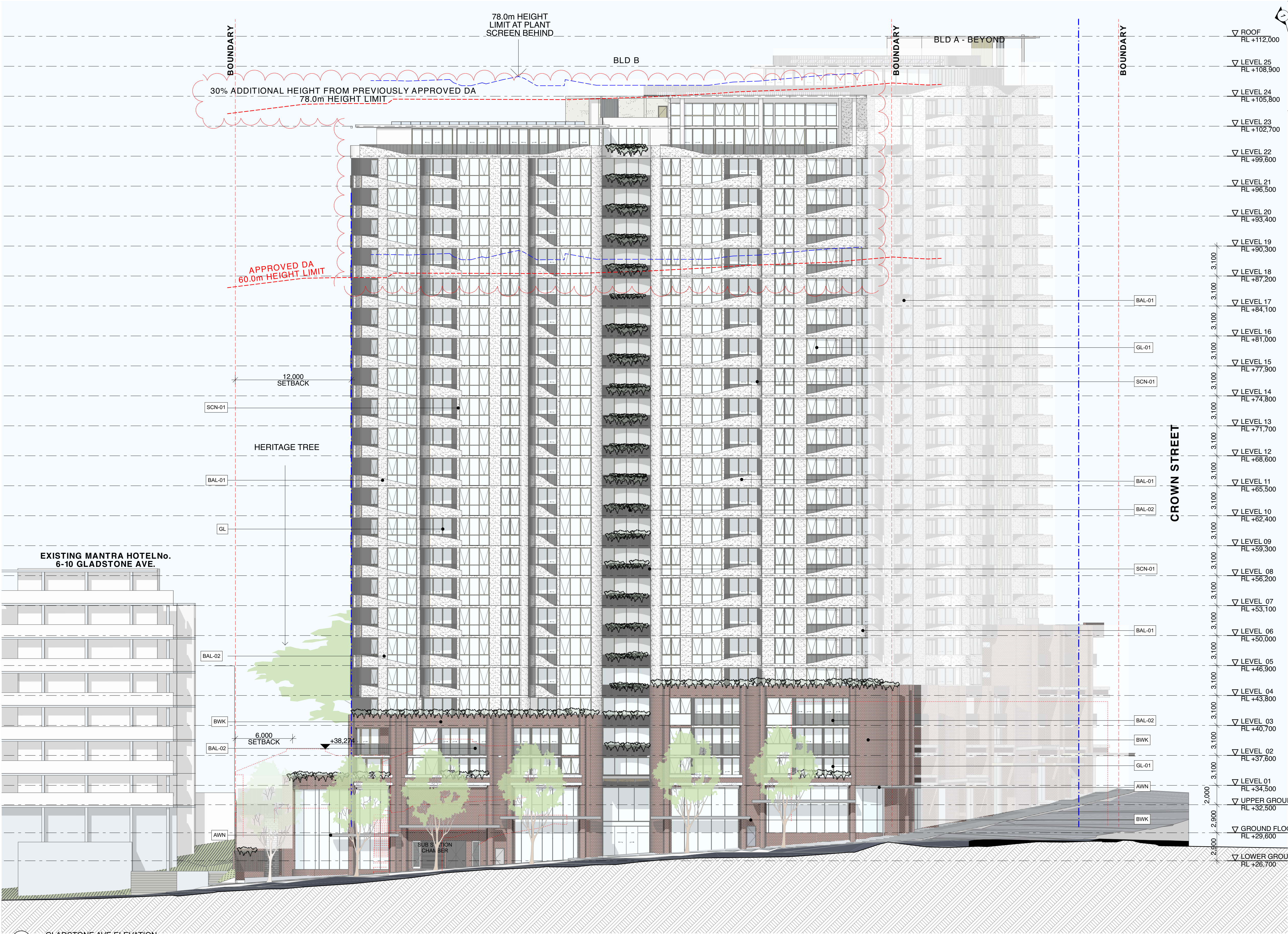
Drawn
AC, AK, JY

Checked
JG

Project
2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing
CROWN STREET ELEVATION

Project No.	Revision	Drawing No.
22003	04	A204



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ACCESS
JAZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC
DOMENIKI TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreeconsulting.com.au

BCA
ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designr.com.au

BASIX / NATHERS
MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL
Kamyar Elvazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
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HERITAGE
Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2321 E: ankita@heritage21.com.au

PHOTOMONTAGE
Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com

PLANNER
TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS
Rafael Bozonelos / ARCHI QS
Shop 3 | 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR
GEOSURV / SAEID TAHIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC
Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

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Tobias McPherson / ELEPHANTS FOOT
T: 02 97803510
E: tobias.mcpherson@elephantsfoot.com.au

WIND
ERIC YUEN / VIPAC
279 Normanby Road, Port Melbourne VIC 3207 Australia
T: 0447 895 144 E: eric@vipac.com.au

Client

LEVEL 33

LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect

BKA Architecture

SYDNEY Suite 104, 77 Dunning Ave, Rosebery NSW 2018 T: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au	NEWCASTLE Suite 4, 19 Bolton St, Bangalore NSW 2300 T: +61 2 4926 5563	NORTH COAST Unit 1 10 Station St, Bangalore NSW 2479 T: +61 2 6687 2712
--	--	---

North

Status

DA

Scale at A1

1:200

Drawn

AC, AK, JY

Date

20/1/2025

Checked

JG

Project

2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing

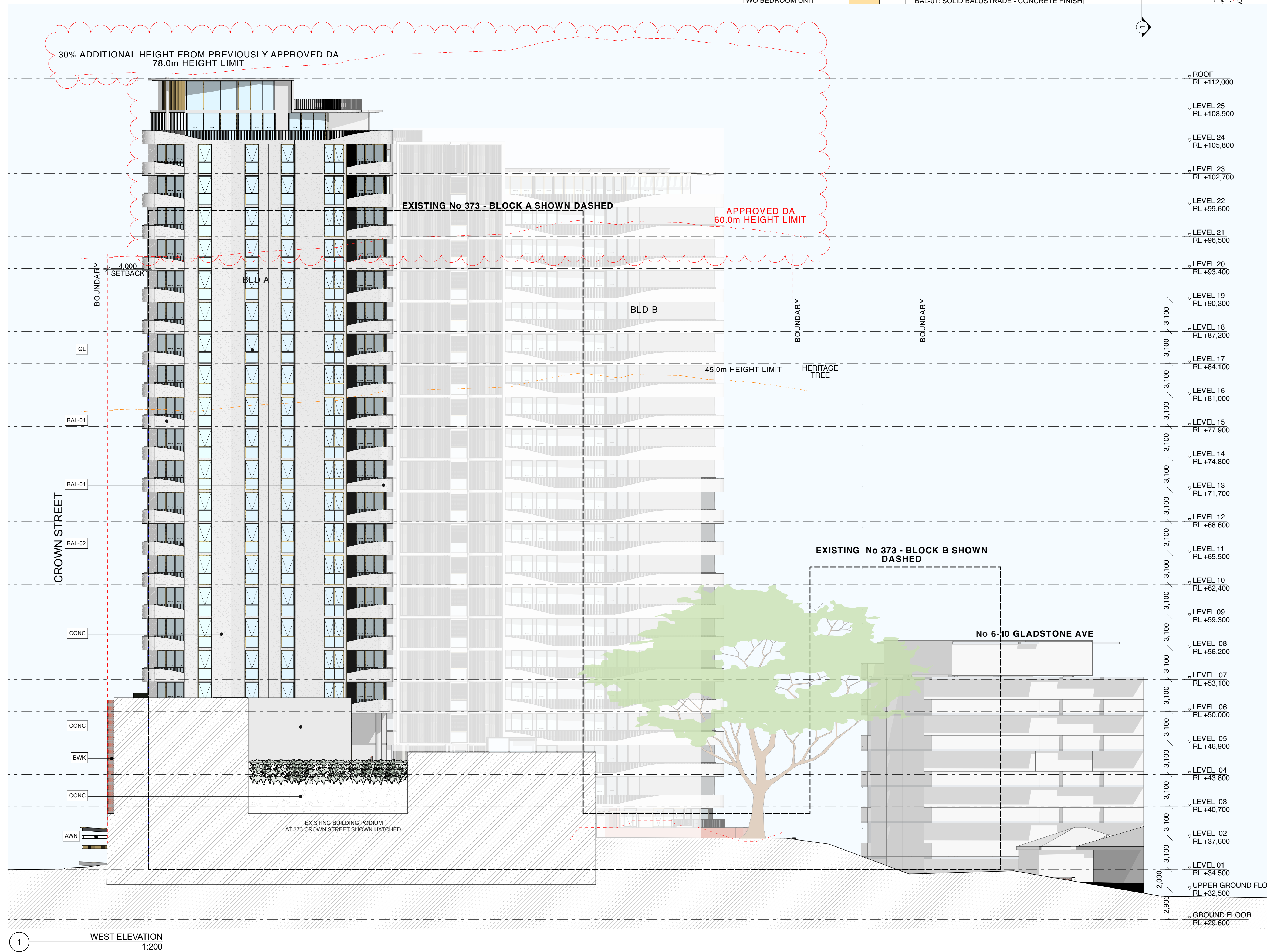
GLADSTONE AVE ELEVATION

Project No.	Revision	Drawing No.
22003	04	A205

ONE BEDROOM UNIT

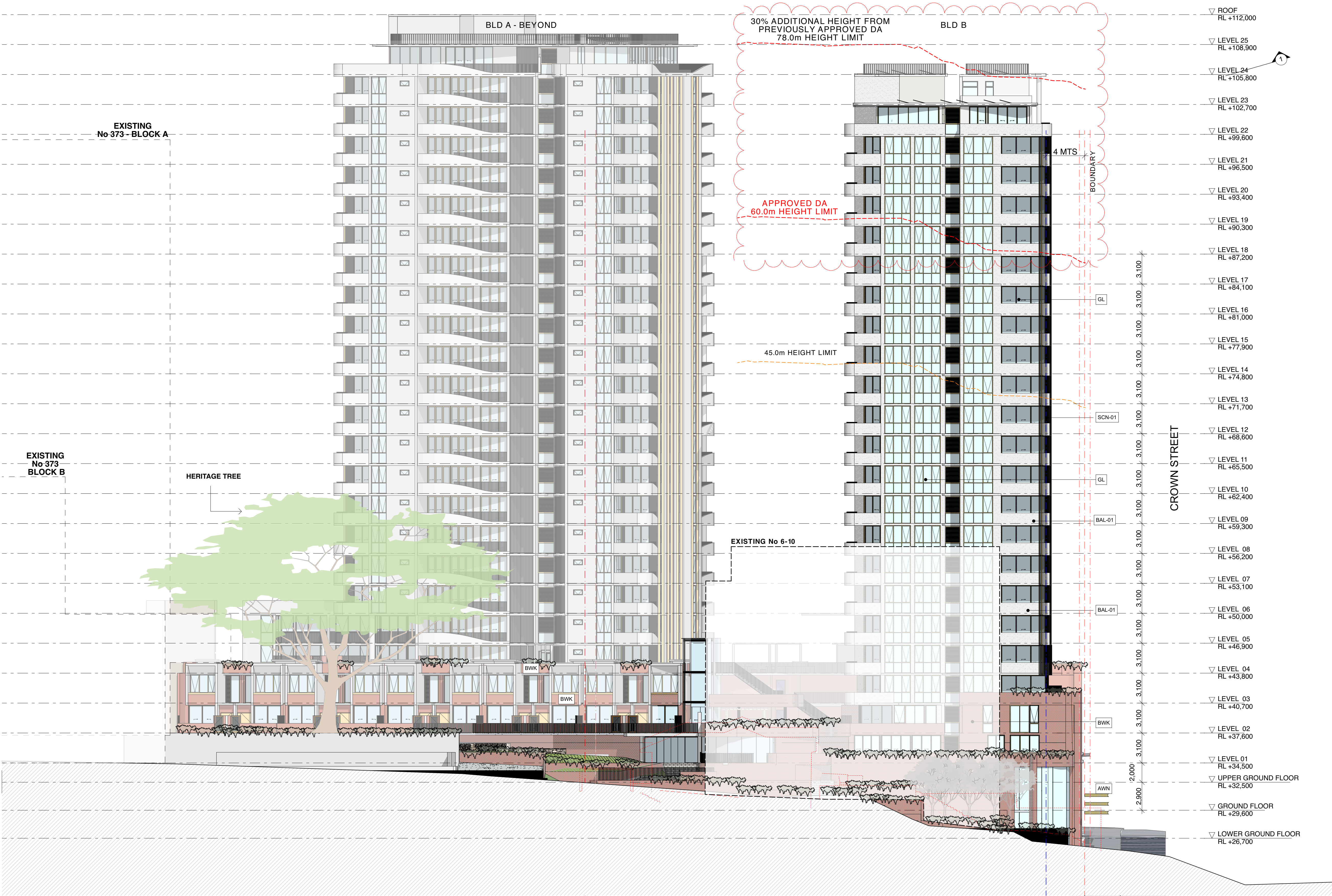
TWO BEDROOM UNIT

AWN: AWNING
BWK: BRICKWORK
BAL-01: SOLID BALUSTRADE - CONCRETE FINISH



1 WEST ELEVATION 1:200

Project No.	Revision	Drawing No.
22003	04	A206



1 OVERALL SOUTH ELEVATION
1:200

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Nominated Architects (NSW) - John Baker 3552, John Kavanagh 5999

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02	25/10/2023	RFI AMENDMENTS
03	26/3/2024	RFI AMENDMENTS
04	7/6/2024	RFI AMENDMENTS

ACCESS
JAZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC
DOMENIKI TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreereconsulting.com.au

BCA
ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL
Kamyar Elvazadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartstructs.com.au

GEOTECH
Joel Heining
Suite 101, Level 1, 1 Burrell Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heining@elaustralia.com.au

HERITAGE
Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2321 E: ankita@heritage21.com.au

PHOTOMONTAGE
Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com

PLANNER
TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS
Rafael Bozonelos / ARCHI QS
Shop 3 | 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR
GEO SURV / SAEID TAHRIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC
Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

WASTE
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WIND
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Client

LEVEL 33

LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect

BKA Architecture

SYDNEY

Suite 104,
77 Dunning Ave,
Rangeferry
NSW 2018
T: +61 2 9319 9200
E: bka@bka.com.au
W: www.bka.com.au

NEWCASTLE

Suite 4
19 Bolton St,
Rangeferry
NSW 2300
T: +61 2 4926 5563

NORTH COAST

Unit 1
10 Station St,
Bangalow
NSW 2479
T: +61 2 6687 2712

North



Status

DA

Date

20/1/2025

Project

2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing

SOUTH ELEVATION

Project No.

22003

Revision

04

Drawing No.

A207

Scale at A1

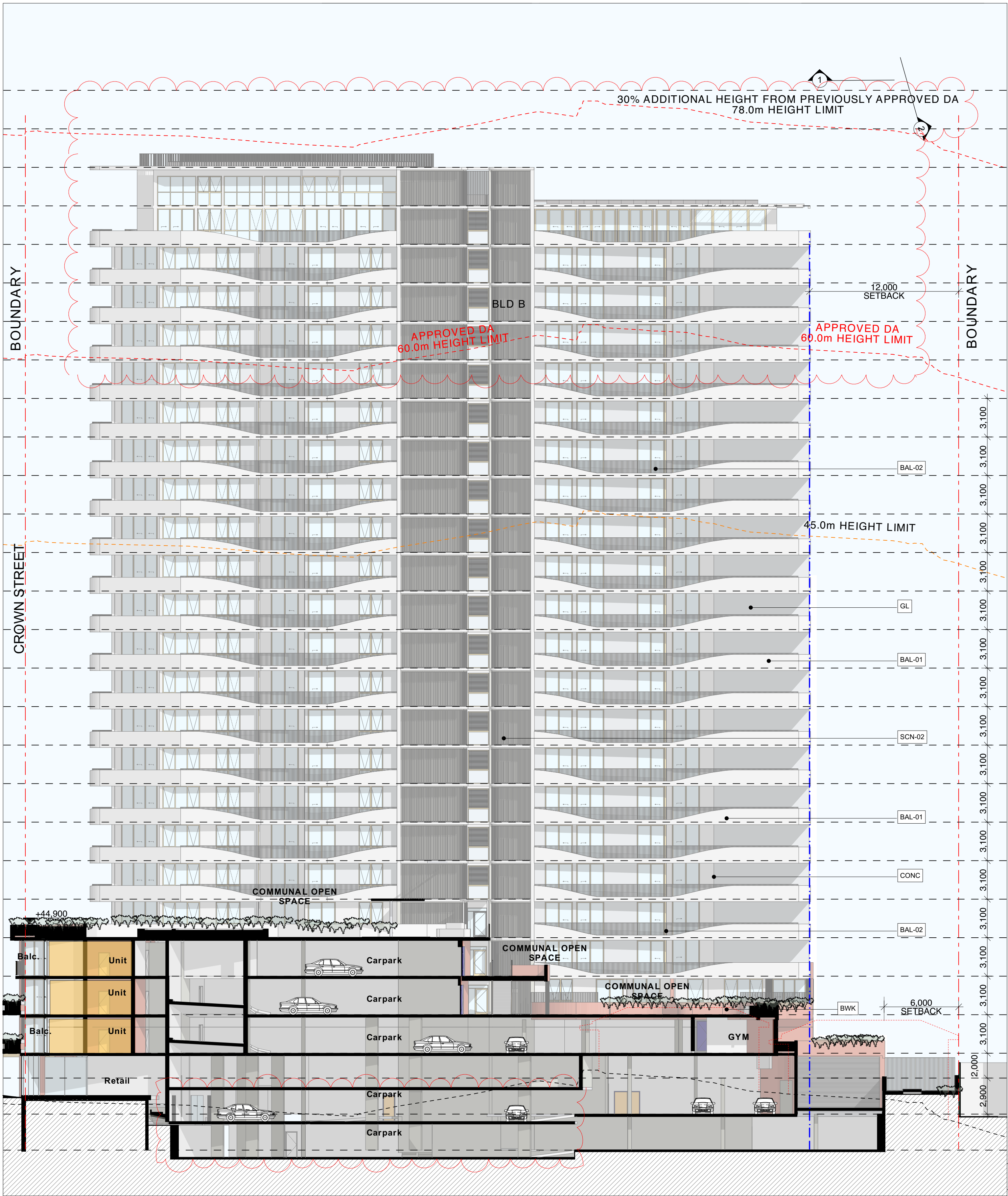
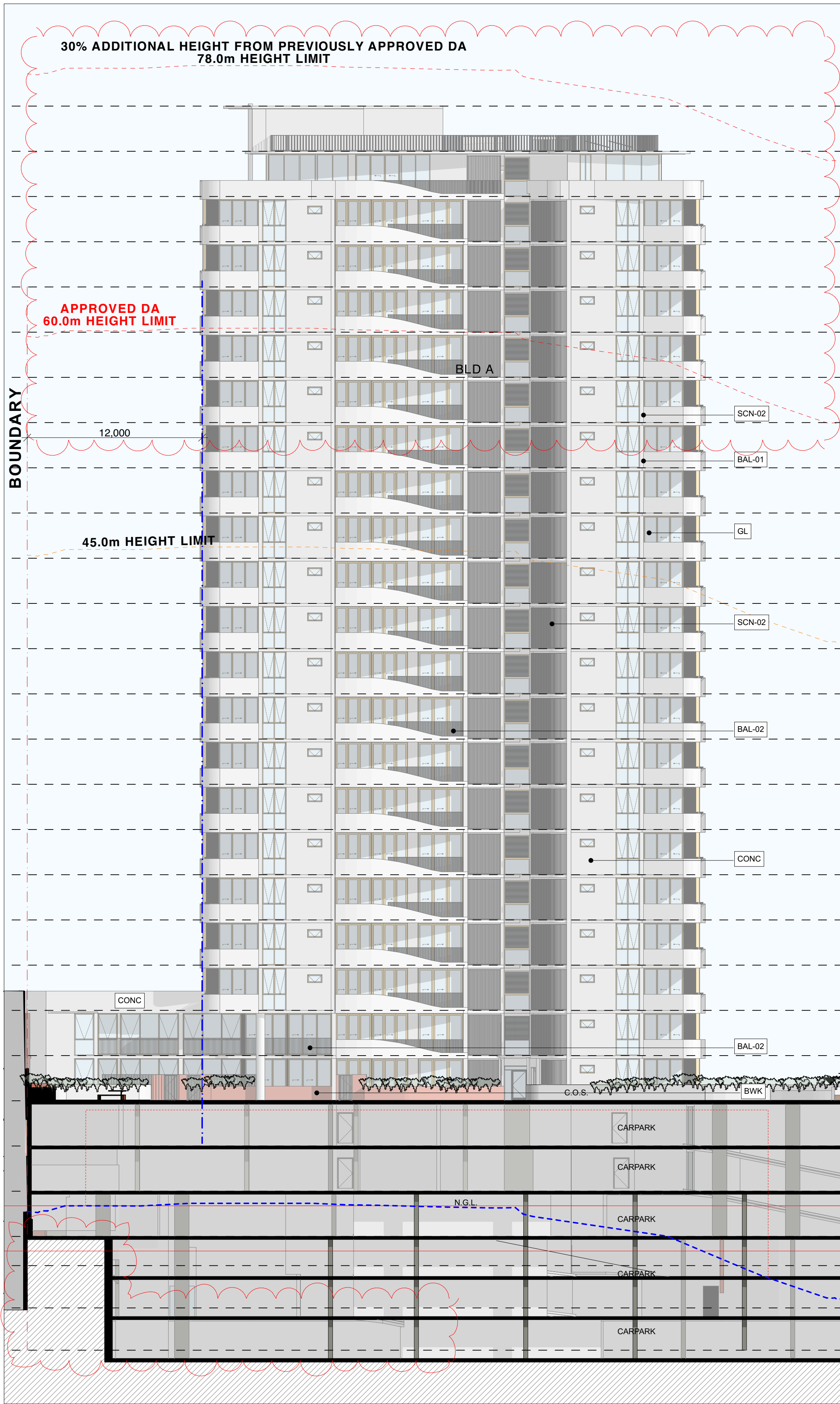
1:200

Drawn

AC, AK, JY

Checked

JG



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JAZZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC
DOMENIK TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE
AND VIBRATION SOLUTIONS
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ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
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BCA
ALEKS STOJCEVIC
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T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
MARTIN PINSON
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T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL
Kamyar Evazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartsstructs.com.au

GEOTECH
Joel Heinger
Suite 101, Level 1, 1 Burelli Street, Wollongong, NSW 2500
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HERITAGE
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Client

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SYDNEY	NEWCASTLE	NORTH COAST
Suite 1.04, 77 Dunning Ave, Roseberry NSW 2018	Suite 4 19 Bolton St, Newcastle NSW 2300	Unit 1 10 Station St, Bangalow NSW 2479
T: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au	T: +61 2 4926 5563	T: +61 2 6687 2712

North



Status

DA

Date

20/1/2025

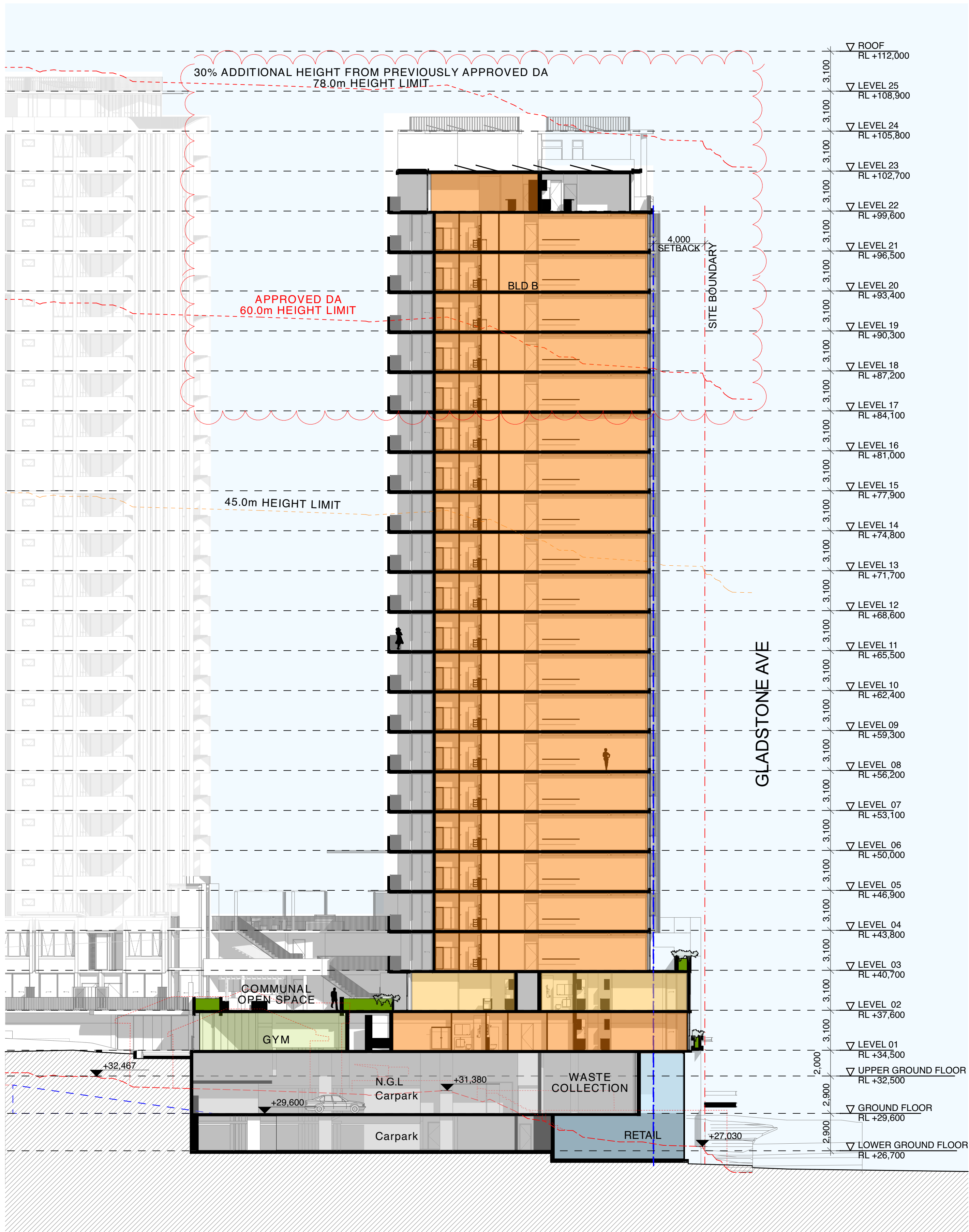
Project

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Wollongong NSW

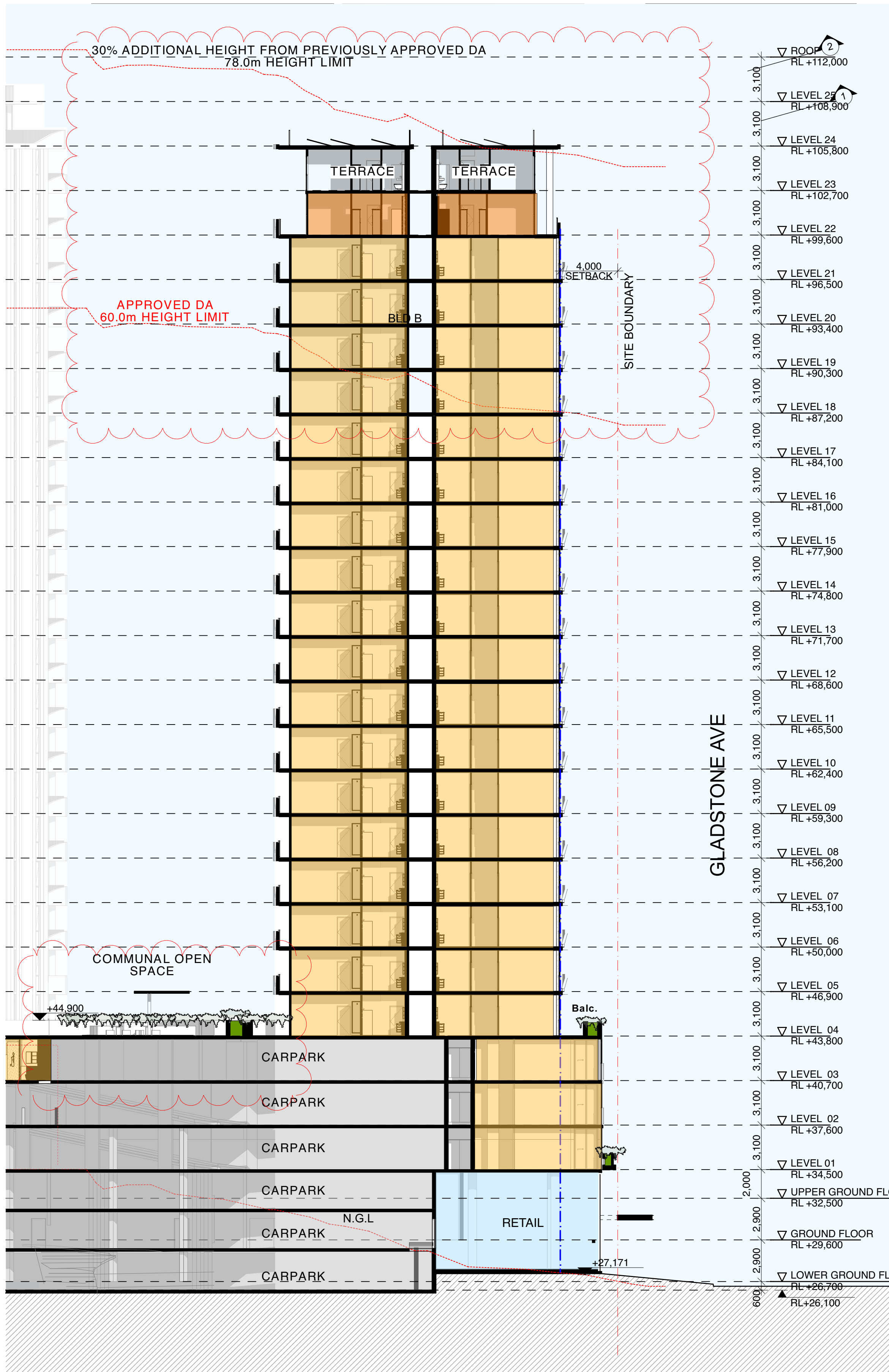
Drawing

**INTERNAL ELEVATION TOWER A
& B**

Project No.	Revision	Drawing No.
22003	04	A208



1 SECTION 01
1:200



2 SECTION 02
1:200

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ACCESS

JAZZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC

DOMENIK TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE
AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST

DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreeconsulting.com.au

BKA

ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS

MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreco.com

CIVIL

Kamyar Evazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartsructs.com.au

GEOTECH

Joel Heining
Suite 101, Level 1, 1 Burelli Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heining@elaustralia.com.au

HERITAGE

Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2521 E: ankita@heritage21.com.au

PHOTOMONTAGE

Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com

PLANNER

TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS

Rafael Bozonelos / ARCHI QS
Shop 31 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR

GEOSURV / SAEID TAHIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC

Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

WASTE

Tobias McPherson / ELEPHANTS FOOT
T: 02 957803510
E: tobias.mcpherson@elephantsfoot.com.au

WIND

ERIC YUEN / VIPAC
279 Normanby Road, Port Melbourne VIC 3207 Australia
T: 0447 895 144 E: eric@vipac.com.au

Client

LEVEL 33
LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect

BKA Architecture

SYDNEY	NEWCASTLE	NORTH COAST
Suite 104, 77 Dunning Ave, NSW 2018	Suite 4 19 Bolton St, Bangalow NSW 2300	Unit 1 10 Station St, Bangalow NSW 2479
T: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au	T: +61 2 4926 5563	T: +61 2 6687 2712

North



Scale at A1

1:200

Status

DA

Drawn

AC, AK, JY

Date

20/1/2025

Checked

JG

Project

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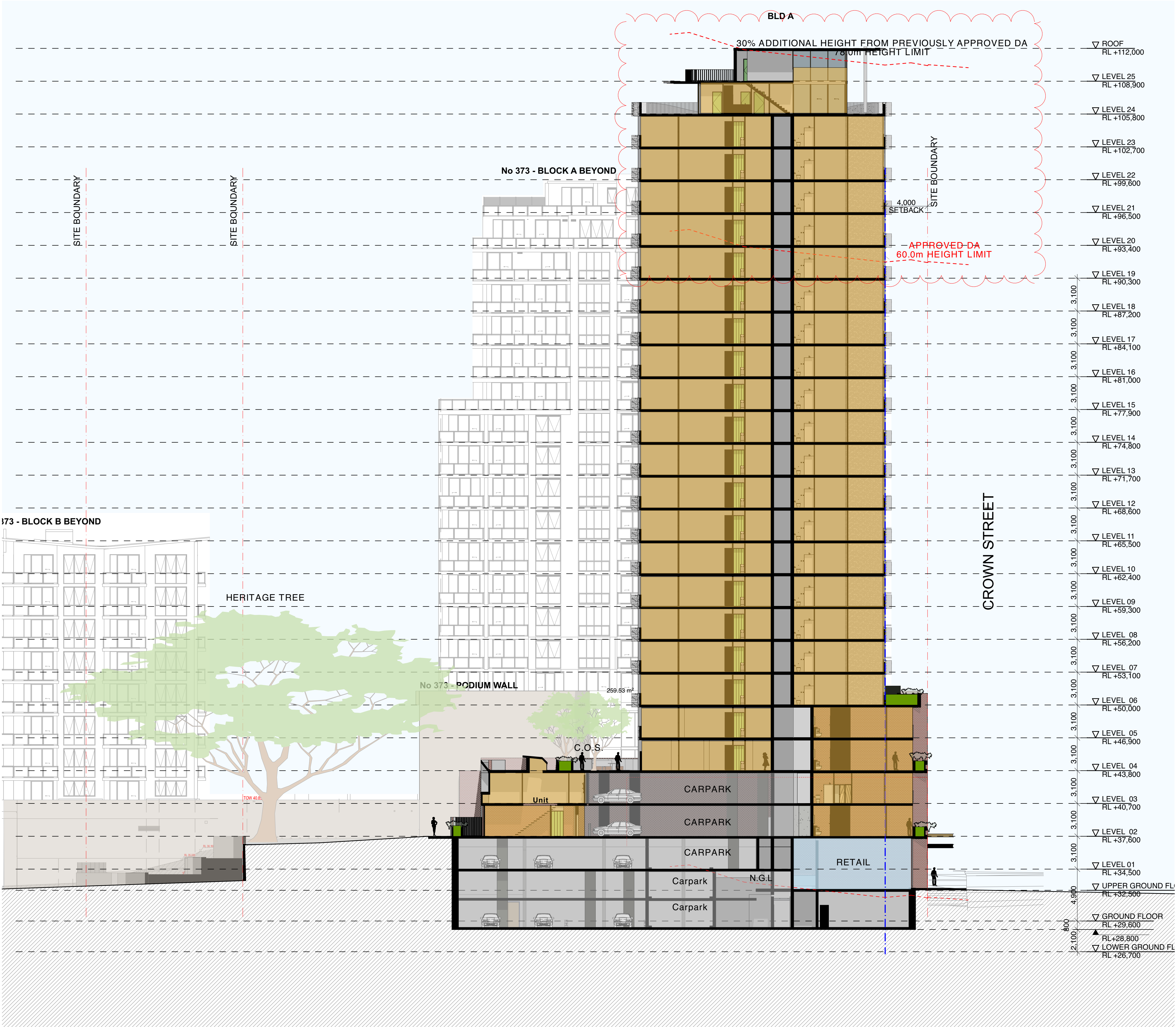
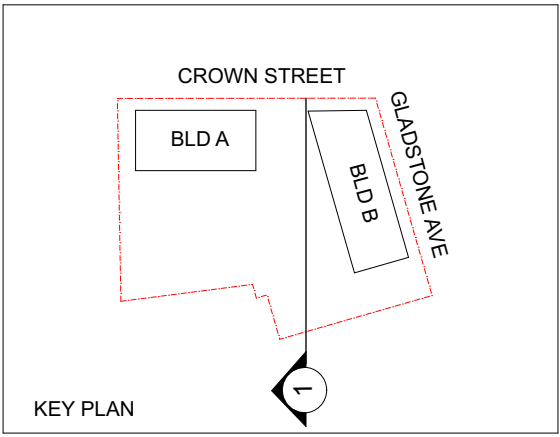
Drawing

SECTION 01 / 02

Project No.	Revision	Drawing No.
22003	03	A301

LEGEND:	
ONE BEDROOM UNIT	
TWO BEDROOM UNIT	
THREE BEDROOM UNIT	
RETAIL	
EXISTING BUILDINGS TO BE DEMOLISHED	

MATERIAL AND FINISHES LEGEND:	
AWN: AWNING	
BWK: BRICKWORK	
BAL-01: SOLID BALUSTRADE - CONCRETE FINISH	
BAL-02: METAL BALUSTRADE	
CONC: CONCRETE FINISH	
GL: GLAZING	
SCN-01: PRIVACY SCREEN	
SCN-02: PLANT SCREEN	



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ACCESS
JAZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecapprovals.com.au

ACOUSTIC
DOMENIKI TSAGARIS, MOUSSA ZAIOOR - ACOUSTIC NOISE AND VIBRATION SOLUTIONS
SUITE 9, NO 438 FOREST RD, HURSTVILLE NSW 2220
P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
DAVID COWENLOCK / SEASONED TREE CONSULTING
T: 0415 961 074 E: david@seasonedtreeconsulting.com.au

BCA
ALEKS STOJCEVIC
PO Box 2331, NORTH PARRAMATTA 1750
T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
MARTIN PINSON
Suite 241, 65-71 Belmore Rd, Randwick 2031
T: 0422 144 603 E: martin.pinson@integreo.com.au

CIVIL
Kamyar Evazzadeh
Suite 2.04, Building 3, 35-41 Waterloo Rd, Macquarie Park NSW 2113
T: 0401 843 236 E: kamyar@smartsstructs.com.au

GEOTECH
Joel Heining
Suite 101, Level 1, 1 Burrell Street, Wollongong, NSW 2500
T: 0475 554 383 E: joel.heining@elaustralia.com.au

HERITAGE
Ankita Powale / HERITAGE 21
Suites 3 & 48, 20 - 28 Maddox St, Alexandria NSW 2015
T: 02 9519 2521 E: ankita@heritage21.com.au

PHOTOMONTAGE
Dan Delavega / PREMIER 3D
Studio 101, 6-8 Clarke Street, Crows Nest NSW 2065
T: 0475 554 383 E: dan@premier3d.com

PLANNER
TROY LOVEDAY / PLANNING INGENUITY
Suite 210, 531-533 Kingsway, Miranda NSW 2228
T: 0448 878 712 E: troy@planningingenuity.com.au

QS
Rafael Bozonelos / ARCHI QS
Shop 3 | 350 Oxford Street, Bondi Junction NSW 2022
T: 02 9586 4401 E: rafael@archi-qs.com.au

SURVEYOR
GEOSURV / SAEID TAHIRI
P: 1300 554 675 M: 0411 756 547
E: saeid@geosurv.com.au

TRAFFIC
Bernard Lo / GENESIS TRAFFIC
T: 02 7255 8198 (Direct)
E: bernard@genesistraffic.com.au

WASTE
Tobias McPherson / ELEPHANTS FOOT
T: 02 97603510
E: tobias.mcpherson@elephantsfoot.com.au

WIND
ERIC YUEN / VIPAC
279 Normanby Road, Port Melbourne VIC 3207 Australia
T: 0447 895 144 E: ericy@vipac.com.au

Client

LEVEL 33

LEVEL 33
30A/44 Eva St, Riverwood NSW 2210
(02) 8199 1144

Architect

BKA Architecture

SYDNEY Suite 1.04, 77 Dunning Ave, Riverside NSW 2018	NEWCASTLE Suite 4 19 Bolton St, Newcastle NSW 2300	NORTH COAST Unit 1 10 Station St, Bangalow NSW 2479
T: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au	T: +61 2 4926 5563	T: +61 2 6687 2712

North

Status

DA

Date

20/1/2025

Project

2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing

SECTION 03

Project No.	Revision	Drawing No.
22003	03	A302

LEGEND:

ONE BEDROOM UNIT

TWO BEDROOM UNIT

THREE BEDROOM UNIT

RETAIL

EXISTING BUILDINGS TO
BE DEMOLISHED

MATERIAL AND FINISHES LEGEND:

AWN: AWNING

BWK: BRICKWORK

BAL-01: SOLID BALUSTRADE - CONCRETE FINISH

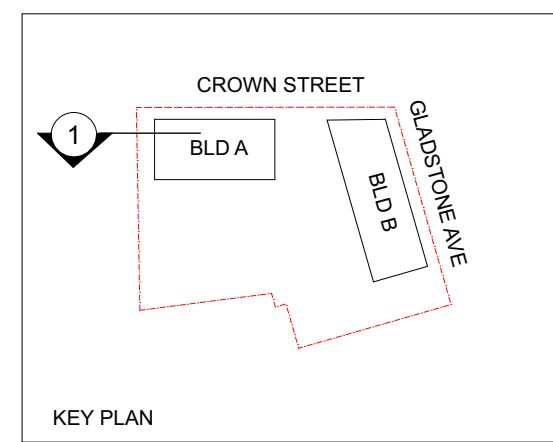
BAL-02: METAL BALUSTRADE

CONC: CONCRETE FINISH

GL: GLAZING

SCN-01: PRIVACY SCREEN

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ACCESS
JAZMYN STOL / EAST COAST ACCESSIBILITY
PO Box 4276, Sydney South NSW 1235
P: 02 9264 9089 T: 0418 985 617 E: jaz@ecaprovals.com.au

ACOUSTIC
DOMENIK TSAGARIS, MOUSSA ZAHOOR - ACOUSTIC NOISE
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P: 02 9793 1393 E: info@acousticsolutions.com.au

ARBORIST
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BCA
ALEKS STOJCEVIC
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T: 0405 295 978 E: aleks@designrc.com.au

BASIX / NATHERS
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CIVIL
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PLANNER
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QS
Rafael Bozonelos / ARCHI QS
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SURVEYOR
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Architect
BKA Architecture

SYDNEY Suite 1.04, 77 Dunning Ave, Newcastle NSW 2308 T: +61 2 9319 9200 E: bka@bka.com.au W: www.bka.com.au	NEWCASTLE Suite 4 19 Bolton St, Newcastle NSW 2300 T: +61 2 4926 5563	NORTH COAST Unit 1 10 Station St, Bangalow NSW 2479 T: +61 2 6687 2712
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North
Scale at A1
1:200

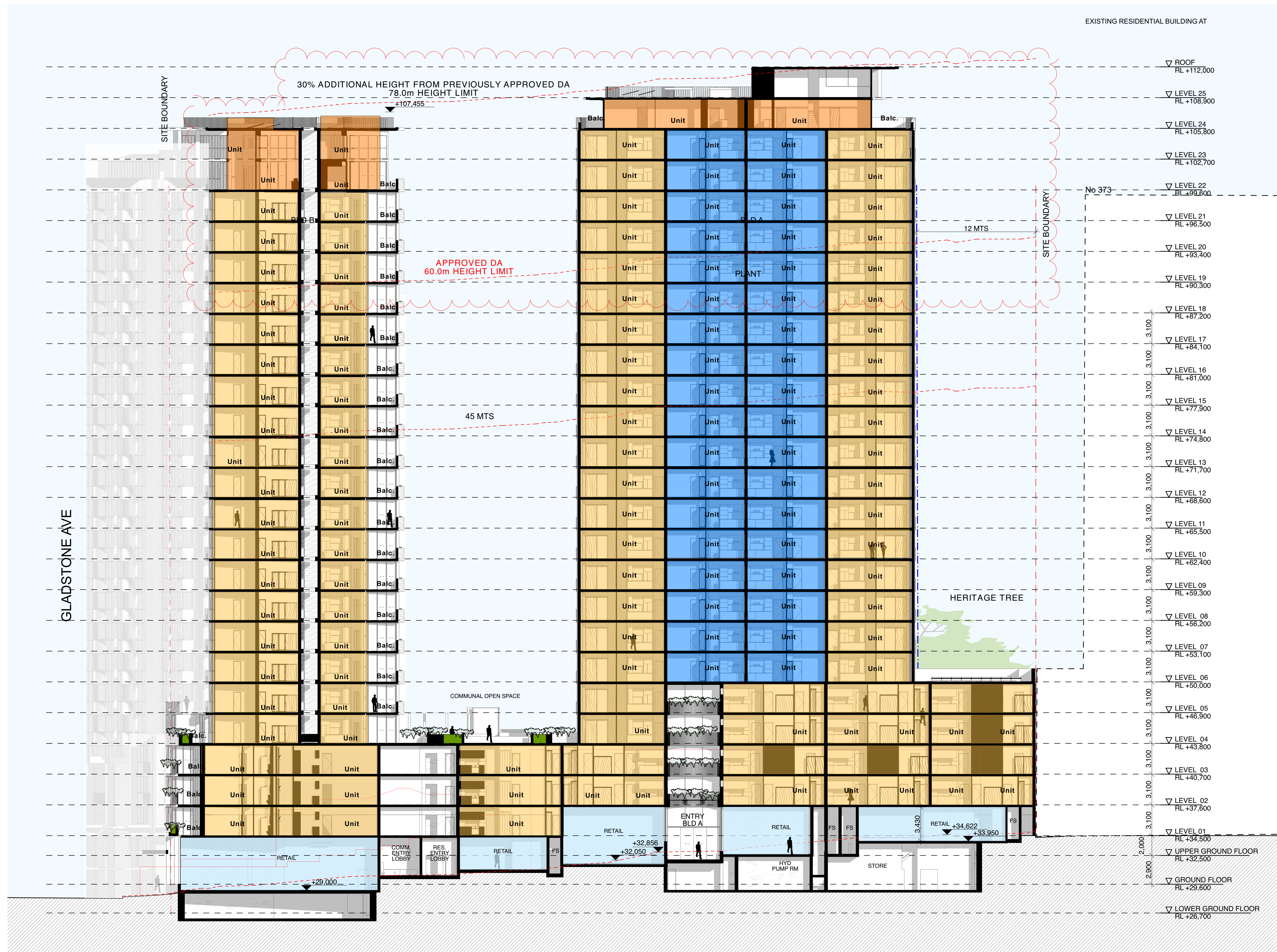
Status
DA
Drawn
AC, AK, JY

Date
20/1/2025
Checked
JG

Project
2-4 Gladstone Ave / 357-363 Crown St
Wollongong NSW

Drawing
SECTION 04

Project No.	Revision	Drawing No.
22003	03	A303



Appendix F

Survey Plan



MGA NORTH

LEGEND

- INDICATIVE BOUNDARY
- INDICATIVE EASEMENT
- ELECTRICAL OVERHEAD
- SIGNPOST
- LIGHT POLE
- TRAFFIC LIGHT
- POWER POLE
- SECURITY CAMERA
- RAMP LEVEL
- NATURAL SURFACE
- INVERT OF KERB
- TOP OF KERB
- KERB ONLY
- KERB AND GUTTER
- HARDSTAND
- EDGE OF CONCRETE
- CONTOUR 0.25m
- FENCELINE
- BUILDING
- AWNING
- FACE OF WALL
- WALL
- LOW CONCRETE WALL
- PRAM CROSSING
- VEHICLE CROSSING
- TRAFFIC CONTROL BOX
- DRAINAGE PIT
- ELECTRICAL PIT
- COMMUNICATIONS PIT
- UNIDENTIFIED PIT
- TREE
- (Trunk G, Height, Canopy Ø)

EASEMENT SCHEDULE

- (A) EASEMENT FOR PIPE LINES BK 752 No.307 APPROX. POSITION
- (B) RIGHT OF CARRIAGEWAY 12' & VAR. (DEALING M8664 - L849290)
- (C) RIGHT OF WAY 12' WIDE DP 201949
- (D) RIGHT OF WAY VARIABLE WIDTH M086644

NOTES:

- NO BOUNDARY SURVEY HAS BEEN UNDERTAKEN. RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY.
- IF CONSTRUCTION OR DESIGN OF ANY NEW STRUCTURE IS INTENDED WITHIN PROXIMITY OF THE BOUNDARIES OR LOCAL GOVERNMENT REQUIREMENTS, A FURTHER SURVEY SHOULD BE REQUESTED TO MARK BOUNDARIES AND/OR DIMENSION WALL TO BOUNDARY DISTANCES.
- CONSTRUCTION WORKS MUST BE RELATED TO THE BENCHMARK AND NOT LEVELS OF STRUCTURES SHOWN ON THE PLAN.
- TREE SPREADS & TRUNK RADIUS SHOWN ARE DIAGRAMMATIC ONLY. SPOT LEVELS SHOULD BE USED IN REFERENCE TO CONTOUR LEVELS. FEATURES AND LEVELS CRITICAL TO DESIGN SHOULD BE LOCATED BY A MORE ACCURATE SURVEY. ALL SET OUT WITH REGARD TO LEVELS SHOULD REFER TO THE BENCHMARK.
- CONTOURS ARE AT 0.25m INTERVALS AND ARE APPROXIMATE ONLY. SPOT LEVELS SHOULD BE USED IN REFERENCE TO CONTOUR LEVELS. FEATURES AND LEVELS CRITICAL TO DESIGN SHOULD BE LOCATED BY A MORE ACCURATE SURVEY. ALL SET OUT WITH REGARD TO LEVELS SHOULD REFER TO THE BENCHMARK.
- NO SERVICES SEARCH HAS BEEN CARRIED OUT FOR THIS SURVEY. SERVICES SHOWN ARE INDICATIVE ONLY. POSITIONS ARE BASED ON SURFACE INDICATORS LOCATED DURING SURVEY. APPROPRIATE DIAL BEFORE YOU DIG SEARCHES SHOULD BE CARRIED OUT PRIOR TO ANY CONSTRUCTION TAKING PLACE. SEE DIAL BEFORE YOU DIG CONTACT INFORMATION ON THIS PLAN.
- THIS SURVEY IS FOR CONTOUR AND DETAIL PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE

A	22.02.22	ISSUED FOR INFORMATION	BTP
REV.	DATE	AMENDMENTS	INT.

PREPARED BY:



www.geosurv.com.au 1300 554 675

PREPARED FOR:

WOLLONGONG
INVESTMENTS No.5 Pty Ltd

PLAN OF:

TOPOGRAPHICAL SURVEY
PLAN SHOWING DETAIL AND LEVELS
No.357-363 CROWN STREET
No.2 & No.4 GLADSTONE STREET
SP16167, 2 DP201949, 100 DP1214547, 6 DP14480, 7 DP661845

ORIGINAL SIZE: A1

SCALE:	1:200	CO-ORD:	MGA [GDA2020]
DATUM:	AHD	ORIG DATUM:	SSM23204
SURVEY BY:	MA	DATE:	17.01.22
DRAWN BY:	BTP	DATE:	24.02.22
CHECKED BY:	MA	DATE:	24.02.22
APPROVED BY:	ST	DATE:	24.02.22

DRAWING #: 220013-DT-02 [A]-ACAD (1)

