CONSULTING EARTH SCIENTISTS

GEOTECHNICAL INVESTIGATION REPORT

INDUSTRIAL SUBDIVISION AND GENERAL INDUSTRY DEVELOPMENT

2 &10 BOWMAN ROAD, MOSS VALE NSW 2577

PREPARED FOR SAAS AUS PTY LTD

C/-JACKSON ENVIRONMENT AND PLANNING PTY LTD

CES DOCUMENT REFERENCE: CES220803-JEP-AB

Written by: A. Crabtree/ V. Arias

Reviewed by: I. Wong/D. Lowe

Authorised by: Duncan Lowe

Client: SAAS Aus Pty Ltd c/-
Jackson Environment and Planning Pty Ltd
25-29 Berry Street,
North Sydney, NSW 2060

Date: 4 August 2023

Telephone: 02 8569 2200 • **Fax**: 02 9552 4399 • Level 1, Suite 3
55 Grandview Street • Pymble NSW 2073 • Australia • www.consultingearth.com.au

Document Control

GEOTECHNICAL INVESTIGATION REPORT

INDUSTRIAL SUBDIVISION AND GENERAL INDUSTRY DEVELOPMENT

2 & 10 BOWMAN ROAD, MOSS VALE NSW 2577

PREPARED FOR SAAS AUS PTY LTD

C/- JACKSON ENVIRONMENT AND PLANNING PTY LTD

CES DOCUMENT REFERENCE: CES220803-JEP-AB

Distribution Register

Digital copy	Recipient	Location
1	Ms Tasneem Rangwala	Jackson Environment and Planning Pty Ltd
1	CES Library	Consulting Earth Scientists Pty Ltd

The Distribution Register identifies the recipients of issued copies of this report.

Revision Register

Revision Number	Revision Date	Description
0	16/12/2022	Draft Geotechnical Investigation Report
1	20/02/2023	Final Geotechnical Investigation Report
2	04/08/2023	Update Geotechnical Investigation Report

The revision register tracks changes to the document.

The latest revision of this document supersedes all previous revisions. It is the responsibility of the recipient to ensure that superseded revisions of this document are removed from circulation.

Documents are only valid if they are signed, original documents issued by CES Pty Ltd. CES Pty Ltd does not accept any liability for actions taken based upon incomplete copies of this document.

GEOTECHNICAL INVESTIGATION REPORT

INDUSTRIAL SUBDIVISION AND GENERAL INDUSTRY DEVELOPMENT

2 & 10 BOWMAN ROAD, MOSS VALE NSW 2577

PREPARED FOR SAAS AUS PTY LTD

C/- JACKSON ENVIRONMENT AND PLANNING PTY LTD

CES DOCUMENT REFERENCE: CES220803-JEP-AB

EXECUTIVE SUMMARY

Consulting Earth Scientists Pty Ltd (CES) was commissioned by Jackson Environment and Planning Pty Ltd on behalf of SAAS Aus Pty Ltd (the Client, SAAS) to carry out a Geotechnical Investigation (GI) at 2 Bowman Road in Moss Vale NSW 2755 (the Site).

SAAS Aus Pty Ltd (SAAS) SAAS is seeking to create a subdivision that will include industrial land from the property at 2 Bowman Road, Moss Vale (Lot 2 / DP1070888), and a small portion of the adjacent property at 10 Bowman Road (Lot 51 / DP130176), and the remaining rural land from the properties. Industrial buildings are proposed to be constructed on three of the created lots with industrial land use zoning. The buildings will be used to house SAAS' scaffolding businesses. The Site location is presented in Figure 1.

The areas proposed for industrial subdivision and general industrial development are shown in Appendix A.

This report outlines the results of the GI and is necessary to fulfill requirements of the Statement of Environmental Effects and Development Application process to Wingecarribee Shire Council.

A Preliminary Site Investigation (PSI) was undertaken concurrently with the GI and is reported separately, *Preliminary Site Investigation Report for 2 Bowman Road, Moss Vale NSW (CES Document Reference: CES220803-JEP-AC).*

To complete the GI, CES carried out the following scope of works:

- Completion of a geotechnical desktop study.
- Completion of Dial Before You Dig (DBYD) search.
- Completion of underground services detection at the proposed borehole locations.
- Drilling of eight (8) boreholes (i.e., BH01 to BH08).
- Field screening for Acid Sulfate Soils (ASS).

- Laboratory testing on collected samples at a NATA-accredited laboratory.
- Preparation of this Geotechnical Investigation (GI) report.

The GI fieldwork was undertaken over a duration of five weekdays between 20 and 24 October 2022 and 15 and 16 November 2022.

The GI and assessment results are summarised below:

- The subsurface materials recovered from the boreholes are generally consistent across the Site. The geotechnical model of the Site can be summarised as Topsoil/Fill (Unit 1) overlying residual soils consisting of Silty Clay/Clayey Silt (Unit 2a), Clay (Unit 2b) and Clayey Sand (Unit 2c) followed by extremely to slightly weathered rock of Weathered Shale (Unit 3). The depths of weathered shale generally vary approximately from 1.7m to 4.5m across the Site.
- The subsurface materials below a depth of 0.5m typically range from firm to hard (for cohesive soil) and dense to hard (for cohesionless soil).
- Groundwater was intersected in BH08, (the most southerly borehole at the lowest elevation) at a depth of 4.5m. No groundwater was intersected in BH01 to BH07.
- This indicates the groundwater flow direction is downgradient from north to south (BH08).
- In consideration of the fieldwork observations, field ASS screening, and laboratory analysis results, the preparation of an Acid Sulfate Soils Management Plan (ASSMP) is recommended the relevant proposed structures situated in the centre and south parts of the Site.

Discussions and recommendations related to site preparation and trafficability, excavation conditions and support, potential reuse of excavated materials, temporary and permanent batter slopes, shallow and deep footings, and pavements are presented in Section 7.

Some of the identified geotechnical risks are as follows:

- The overall site trafficability is expected to be poor condition for Unit 1 and Unit 2 as subgrade. During construction, a thin compacted crushed rock layer (e.g., minimum 200mm thick) is recommended to be placed over the subgrade to provide temporary pavements for heavy loading from piling rigs, cranes, and general construction traffic.
- Unit 1 Fill and Unit 2 Residual Soil are considered to be moderately to highly reactive subgrade, with potential characteristic surface movements estimated between 20 and

60mm. It is recommended that these potential surface movements be taken into consideration in footings construction and floor slab design.

- The groundwater intersected in BH08 is inferred to be perched water table, and therefore may fluctuate depending on seasonal changes and drainage conditions at the Site. The construction activities may become problematic where groundwater is encountered, particularly within the proposed basement envelope. As such, provisions should be made for excavations to be carried out in a manner that allows for efficient water drainage during heavy rainfall events. The excavation of trenches and pumping from locally excavated sumps can manage and control surface water at the Site.
- Heavy duty equipment that could cause vibrations can adversely impact on nearby structures and services (most notably the high-pressure underground gas pipeline running through the centre of the Site), and therefore the use of such equipment must be limited as much possible.
- The eight boreholes were drilled over a large area of the Site, where subsurface conditions may vary even over small distances. As such, it is recommended that a supplementary geotechnical investigation is undertaken in the future to confirm the geotechnical model and target any areas of ground anomalies after the proposed development plans have been finalised.
- During construction phase, the excavation works may reveal different geotechnical conditions than those encountered during the investigation. If the actual geotechnical conditions are found to vary significantly, the discussion and recommendations including the design assumptions should be reviewed and adjusted accordingly. It is recommended that a suitably qualified geotechnical practitioner is present onsite for inspection of materials during excavation works.

GEOTECHNICAL INVESTIGATION REPORT

INDUSTRIAL SUBDIVISION AND GENERAL INDUSTRY DEVELOPMENT

2 & 10 BOWMAN ROAD, MOSS VALE NSW 2577

PREPARED FOR SAAS AUS PTY LTD

C/- JACKSON ENVIRONMENT AND PLANNING PTY LTD

CES DOCUMENT REFERENCE: CES220803-JEP-AB

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

GEOTECHNICAL INVESTIGATION REPORT

INDUSTRIAL SUBDIVISION AND GENERAL INDUSTRY DEVELOPMENT

2 & 10 BOWMAN ROAD, MOSS VALE NSW

PREPARED FOR SAAS AUS PTY LTD

C/- JACKSON ENVIRONMENT AND PLANNING PTY LTD

CES DOCUMENT REFERENCE: CES220803-JEP-AB

1 INTRODUCTION

Consulting Earth Scientists Pty Ltd (CES) was commissioned by Jackson Environment and Planning Pty Ltd on behalf of SAAS Aus Pty Ltd (the Client, SAAS) to undertake a Geotechnical Site Investigation at a site being a part of 2 Bowman Road, Moss Vale NSW 2577 (the Site).

SAAS Aus Pty Ltd (SAAS) SAAS is seeking to create a subdivision that will include industrial land from the property at 2 Bowman Road, Moss Vale (Lot 2 / DP1070888), and a small portion of the adjacent property at 10 Bowman Road (Lot 51 / DP130176), and the remaining rural land from the properties. Industrial buildings are proposed to be constructed on three of the created lots with industrial land use zoning. The buildings will be used to house SAAS' scaffolding businesses.

Lot 2 covers an area of approximately 14.2ha and is divided into three areas separated by a road and gas pipeline easement. The Lot consists of the following land use zones (Figure 3):

- E4 General Industrial; and
- RU2 Rural Landscape.

The property at 2 Bowman Road also includes Lot 1 / DP103123, a C3 Environmental Management zoned portion of land on the opposite side of Whites Creek (Figure 3). No development is proposed on this portion of land, and it will not be included in the subdivision.

The adjacent property at 10 Bowman Road (Lot 51 / DP130176) is a 48-hectare rural property, adjacent to the western boundary of Lot 2 (Figure 3). An area of approximately 12,500m^2 in the north-east portion of the Lot is zoned E4 and is proposed to be incorporated into the industrial subdivision and general industry development. The remainder of the property is zoned RU2.

The GI is required as part of the Statement of Environmental Effects and Development Application process to Wingecarribee Shire Council.

This report presents the geotechnical information gathered from the site investigation, along with recommendations to support the construction phase of the proposed development.

2 OBJECTIVE & SCOPE

The objective of the GI was to identify geotechnical risks associated with the Site and provide engineering recommendations to assist in the design and construction phase of the proposed development.

To complete the GI, CES carried out the following scope of works:

- Geotechnical desktop study of the Site, including the following information:
    - Site plans, including proposed construction works and site layout plans;
    - Site geology and soil maps;
    - Site topography;
    - Acid Sulfate Soil Risk;
    - Hydrogeology;
    - Site Land Zoning;
    - Previous Geotechnical Investigation Reports.
- Completion of Dial Before You Dig (DBYD) search to identify the locations of underground services at the Site and prepare a geotechnical investigation plan for approval by the Client prior to commencement of fieldwork investigation.
- Underground services detection at the proposed borehole locations.
- Drilling of eight (8) boreholes (i.e., BH01 to BH08) over a duration of five weekdays between 20 and 24 October 2022 and 15 and 16 November 2022. The borehole location plan is presented in Figure 2.
- Laboratory testing on collected samples at a NATA-accredited laboratory testing facility for geotechnical analysis.
- Preparation of this Geotechnical Investigation (GI) report.

A Preliminary Site Investigation (PSI) was undertaken concurrently with the GI and is reported separately, *Preliminary Site Investigation Report for 2 Bowman Road, Moss Vale NSW (CES Document Reference: CES220803-JEP-AC).*

3 SITE INFORMATION

3.1 SITE DESCRIPTION

The site is irregular in shape and predominantly comprises grassed open space used for cattle grazing and dairy production. The Site contains one house and two farm sheds with associated livestock pens. A high-pressure, underground gas pipeline easement runs through the centre of the Site.

Wingecarribee Shire Council Recycling and Resource Recovery Centre is located north of the Site. An extensive area of industrial development is located to the east of the Site. Moss Vale Sewerage Treatment Plant is located south of the Site on the southern side of Whites Creek. Grassed farmland extends out from the Site to the west.

Site photographs are provided in Appendix B.

3.2 PROPOSED SUBDIVISION

The subdivision will result in the creation of four new lots and leave Lot 1 / DP103123 in its current arrangement. The proposed subdivision will result in the following lots as shown in Figure 4:

- Created Lot 1 – approximately 2.88 ha of land zoned E4 General Industrial. Access to the lot will be directly from Bowman Road at the eastern end of the lot. The road frontage will be approximately 157 m, and the depth of the lot will vary from approximately 148 m on the southern boundary, to approximately 224 m on the northern boundary;
- Created Lot 2 – approximately 2.64 ha of land zoned E4 General Industrial. This lot will be formed by adjusting the boundaries of Lot 51 and Lot 2 to match the land use zone boundaries. This lot has a frontage to Bowman Road at the eastern end of the lot approximately 127 m wide. The lot will be approximately 352 m deep, tapering to a width of approximately 35 m at the western boundary. This lot is affected by the gas pipeline easement at the south-eastern end;
- Created Lot 3 – approximately 2.62 ha of land zoned E4 General Industrial. This is an irregularly shaped lot with a frontage to Bowman Road of approximately 388 m. This lot also has a frontage of approximately 132 m to an unformed paper road (Hutchinson Road) on the southern boundary. The northern portion of this lot is affected by the gas pipeline easement; and
- Created Lot 4 – approximately 54.64 ha of RU2 Rural Landscape zoned land. This is the RU2 portion of Lot 2 / DP1070888 separated from the remainder of the lot by the paper road along its northern boundary. The southern boundary of this lot is defined by Whites Creek and is within Wingecarribee Shire Council's Flood Planning Area. This part of the lot is to be merged with the remainder of the RU2 Rural Landscape lot of 51 / DP130176.

3.3 PROPOSED DEVELOPMENT

The development proposes the following elements (refer to Appendix A):

- Building 1 – an irregularly shaped industrial building to be located in Created Lot 1 of the proposed subdivision. The north-east corner of the building will accommodate 956 m^2 office and staff amenities area split over the ground floor, first and second floor, outdoor visitor parking along the eastern side of the building, and a basement carpark under the south-east corner of the building. The outdoor hardstand will provide truck parking along the southern lot boundary, an enclosed loading/unloading area along the entire southern side of the building, and a smaller, covered loading/unloading area on the northern side. A fire sprinkler system will be installed within the building. A 200,000L underground tank will be installed to capture rainwater for re-use on site;
- Building 2 – an irregularly shaped building to be located on Created Lot 2 of the subdivision. The building will provide 1,392 m^2 of office space and amenities over a ground and first floor. The building will include a covered outdoor loading area at the north-western end of the building. A fire sprinkler system will be installed within the building. A 200,000L underground tank will be installed to capture rainwater for re-use on site;
- Building 3 – this building will be constructed as a split-level warehouse with the upper and lower levels divided and provided with separate amenities and access. It will be located in the southern portion of Created Lot 3, away from the gas pipeline easement. Building 3A will be further split into two sections (North and South) and will include offices and staff amenities over a ground and first floor within the north-west corner of the building. Parking and access will be provided at the northern end for Building 3A. Building 3B (also split into North and South sections) will include offices and staff amenities within the south-west corner of the building over a ground and first floor. Parking and access will be provided at the southern end for Building 3B. Fire sprinklers will be installed in all sections of the buildings. A 120,000L underground tank will be installed to capture rainwater for re-use on site;
- Extension of Bowman Road and formation of the paper Hutchinson Rd to provide access to all created lots and buildings. Hutchinson Road will terminate in an industrial cul-de-sac near the south-eastern corner of Created Lot 3. An easement will be created within the northern portion of Created Lot 4 to accommodate this cul-de-sac;
- Internal haul roads to accommodate up to 26m B-Doubles (Buildings 1 and 2); heavy vehicles to use Building 3 will be limited to 19m semi-trailers;
- Outdoor hardstand areas surrounding each building;

- Individual stormwater capture and treatment systems to be provided to each building will include a HumeCeptor® Gross Pollutant Trap to remove suspended solids and hydrocarbons, and a HumeFilter® Universal Pollutant Trap to capture suspended solids, nitrogen, phosphorous and gross pollutants in stormwater runoff. The treatment systems will discharge to below ground on-site detention basin/s with discharge control to manage stormwater flow volumes;
- Stormwater from the proposed development will discharge to the northern portion of Created Lot 4 via an outlet headwall with scour protection. An easement will be created within the lot to facilitate construction and maintenance;
- Solar collection arrays on all building roofs;
- Landscaping along site boundaries and within parking areas; and
- 1.8m high open black palisade fencing for security.

3.4 PREVIOUS GEOTECHNICAL INVESTIGATIONS

Publicly available geotechnical reports which contain information from previous investigations were reviewed as part of the desktop study to gain understanding of the geotechnical conditions pertaining to the Site. Such reports along with summarised key findings are provided below:

- Moss Vale Sewerage Augmentation Upgrading of Sewerage Treatment Works Geotechnical Investigation report (Report No. 91157, dated April 1992) prepared by Geotechnical Engineering Group Pty Ltd (previously Geotechnical Engineering Centre). The site area of this report is less than 1km south of the site to which this report pertains. The investigation comprised excavation of eleven (11) test pits to depths ranging from 0.9m to 3.5m and eleven (11) boreholes to depths ranging from 2.60m to 6.50m. The boreholes and test pits generally encountered a topsoil layer (between 0.30m and 0.40m thick) overlying cohesive, residual soil consisting of sandy silty clay/ sandy clayey silts/ clayey sandy silts. The latter unit was assessed as intermediate to high plasticity and stiff to very stiff. A non-cohesive, residual soil was encountered below this unit and above bedrock. This unit was described as medium dense, sandy, clayey gravels found also as thin interbeds in the overlying cohesive residual soil. This layer was not consistent across the investigated site but where present was noted to be saturated and acting as a drainage layer. Extremely to highly weathered siltstone, sandstone or interbedded sandstone and siltstone was intersected below these units and was assessed as weak to very weak.

Groundwater was encountered in more than half of the drilled boreholes and three of the test pits. The general water level ranged between 655mRL and 657mRL.

- Investigation of Clearwater Tank Foundation (Report No. F 86040, dated October 1986) prepared by Geotechnical Engineering Centre Pty Ltd. The site area of this report is less than 1km northwest of the site to which this report pertains. The investigation included the drilling of three boreholes to depths ranging between 12.00m and 15.00m with the objective of assessing the quality and strength of rock below the proposed location of the Clear Water Tank. A previous investigation (October 1985) was completed at the site to shallower depths of 3.00m to 4.00m, however subsequent designs favoured the installation of deep (greater than 4.00m) ground anchors to stabilise the tank against ground uplift. The investigation intersected stiff, sandy, silty clay of intermediate plasticity up to a depth of 4.00m followed by shale bedrock to borehole termination depths. Shale was generally slightly weathered transitioning to fresh below 6.20m and 7.40m depth, areas of highly and moderately weathered shale were encountered in the western borehole until a depth of 3.80m. The subsurface conditions were found to be generally consistent across the three boreholes. Groundwater was intersected at a depth of 2.50m and stabilised at 1.00m depth. The latter was inferred to suggest a possible aquifer between the shale and the silty clay and considered to be charged from the adjacent dam.

3.5 SITE GEOLOGY

Reference to Moss Vale 1:100,000 Geological Map Sheet 8928 (New South Wales Government, 2016) indicates that the Site is underlain by Quaternary residual deposits consisting of weakly consolidated regolithic residuum such as soil or saprolite mostly developed in-situ as a result of advanced weathering and/or pedogenesis. Alluvial floodplain deposits consisting of silt, very fine to medium grained lithic to quartz rich sand and clay are present in the most northern extents of the Site.

Both units are underlain by Triassic age Bringelly Shale of the Wianamatta Group. This unit is described as light to dark grey, sideritic claystone to siltstone, dark grey carbonaceous claystone, sandstone to siltstone, quartz-lithic very fine to medium grained sandstone. Plant fragments are abundant locally. Typically, strongly weathered with extensive soil development.

3.6 ACID SULFATE SOILS

The classification of acid sulfate soils (ASS) is based on the likelihood that these soils will be present areas at specific depths. Soils are classed from 1 (high probability presence) to 5 (low probability presence).

The acid sulfate soil risk mapped for the Site in the Wingecarribee Local Environmental Plan (LEP) 2010 is Class 5, "acid sulfate soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent class 1,2,3 or 4 land."

3.7 HYDROLOGY

The closest watercourse is Whites Creek to the south within 200m of the Site, and a small unnamed creek joining it from the north-west. There is also a farm dam on the southern boundary.

3.8 HYDROGEOLOGY

No information on groundwater flow direction is currently available, however based on topography shallow groundwater is likely to flow to the south, towards the Whites Creek.

4 FIELDWORK INVESTIGATION

4.1 BOREHOLES

Eight boreholes (BH01 to BH08) were drilled at approved locations at the Site under the full-time presence of CES Engineering Geologist. The boreholes were drilled to depths ranging from 5.20m to 9.20m using a track-mounted geotechnical drilling rig.

The boreholes were advanced through soils and weathered rock using solid stem augers fitted with a steel V-shaped bit. Standard Penetration Tests (SPT) were carried out to facilitate assessment of the strength and consistency of the soils and to obtain samples for logging. Boreholes BH02, BH03, BH05, and BH06 were advanced using rotary diamond coring technique and recovered rock core was logged and stored in designated core trays. The borehole locations are shown on the geotechnical investigation plan in Figure 2.

The borehole ID, coordinates, termination depths, estimated surface elevations, and depth to rock of the boreholes are summarised in Table 1.

Table 1: Summary of Borehole Data

Borehole ID	Easting	Northing	Termination Depth (m)	Estimated Surface Elevation (m AHD)	Depth to Rock (m)
BH01	256946	6175309	5.50	681.6	3.00
BH02	257012	6175232	9.20	682.0	3.10
BH03	257112	6175202	8.00	683.0	4.10
BH04	257101	6175345	5.20	682.0	1.70
BH05	257149	6175238	7.40	683.0	4.37
BH06	257204	6175295	9.00	683.6	4.50

Borehole ID	Easting	Northing	Termination Depth (m)	Estimated Surface Elevation (m AHD)	Depth to Rock (m)
BH07	257181	6175096	6.40	680.0	1.70
BH08	257135	6175009	9.00	674.0	3.30

Note: m AHD – metres in Australian Height Datum.

Detailed soil descriptions in accordance with AS1726-2017 Geotechnical site investigations and depths of materials encountered during the fieldwork investigation are presented on the engineering borehole logs and core photographs in Appendix C.

5 RESULTS

5.1 GEOTECHNICAL MODEL

Based on the findings from the investigation, a geotechnical model has been inferred for the Site which is presented in Table 2. Unit depths have been generalised across the Site.

Table 2: Inferred Geotechnical Model

Unit	Geotechnical Unit	Approximate Depth Unit Range (m)	Material Description
Unit 1	Topsoil/ Fill	0.00 - 0.15	FILL; Clayey SILT: dark brown, fine to medium grained, low plasticity silt, with organics and rootlets. Soft, moist.
Unit 2a	Clayey SILT/ Silty CLAY	0.15 - 0.50	Clayey SILT/ Silty CLAY: grey/brown, medium plasticity, fine grained. Soft to firm, moist. Inferred Residual Soil.
Unit 2b	CLAY	0.50 - 3.50	CLAY: medium to high plasticity, grey to brown. Stiff to very stiff. Moist to dry. Becoming Silty Clay with depth (approx. 2.00m). Inferred Residual Soil.
Unit 2c	Clayey SAND	3.50 – 4.00	Clayey SAND: Inferred Extremely Weathered Rock. Fine grained, medium to high plasticity, dense to hard, dry. Inferred Extremely Weathered Rock.
Unit 3	Weathered SHALE	4.00 – 9.20 (Maximum investigation depth)	Weathered SHALE: with interbedded sandstone beds throughout. Highly to slightly weathered and inferred low to medium strength. pale to dark grey, fine grained sand. High plasticity when recovered as clay.

No fill material (with the exclusion of topsoil fill) was observed in the boreholes.

The Site generally encountered a thin topsoil/fill layer (Unit 1) overlying residual soil consisting of Silty Clay/Clayey Silt (Unit 2a), Clay (Unit 2b), Clayey Sand (Unit 2c) underlain by Shale bedrock (Unit 3). The depths of weathered shale generally vary approximately from 1.7m to 4.5m across the Site.

The geotechnical model is generally in line with the findings from our desktop study and local knowledge of the region.

5.2 GROUNDWATER

Groundwater was intersected in BH08, (the most southerly borehole at the lowest elevation) at a depth of 4.50m. No groundwater was intersected in BH01-BH07.

5.3 ACID SULFATE FIELD TESTING

Field screening tests for ASS were carried out on samples from each borehole in accordance with *Acid Sulfate Soils Manual* (ASSMAC 1998). The samples with highest pH change from the field screening were selected for laboratory testing.

Measurement of pH (in 1:5 distilled water) prior oxidation pH_f ranged between 4.6 to 7.4. Based on ASSMAC (1998) guidelines, field pH readings of pH_f <4 indicates that actual acid sulfate soil (AASS) are present with sulfides having been oxidised in the past, resulting in acid soil conditions. The pH results indicated that the soils are not acidic.

Measurement of field pH following oxidation pH_{fox} ranged between 4.1 to 6.3. Based on ASSMAC (1998) guidelines, pH readings of pH_{fox} <3 indicates there is a high level of certainty of a potential acid sulfate soil (PASS). The field pH results indicated that PASS is unlikely to be present at the site.

The ASS field screening test results are presented in Appendix D.

6 LABORATORY TESTING

6.1 LABORATORY ANALYSIS

Soil samples were collected from the boreholes and dispatched to NATA accredited laboratories for the following laboratory analysis:

- Nine (9) Suspension Peroxide Oxidation Combined Acidity and Sulfur (SPOCAS) tests.

- Four (4) Four-day-Soaked California Bearing Ratio (CBR) Tests as per AS 1289.6.4.2 including Maximum Dry Density/Moisture Content Relation (Standard) Tests; and

The laboratory test reports are presented in Appendix E.

6.2 ACID SULFATE SOIL TESTING

Based on the results of ASS field screening (refer to Appendix D), nine soil samples were dispatched to NATA-accredited laboratory for SPOCAS testing.

The results of the laboratory SPOCAS analysis are summarised in Table 3.

Table 3: Summary of Laboratory SPOCAS Results

Sample ID	Depth	pH $_{kcl}$	TAA pH 6.5	TPA pH 6.5	TSA pH 6.5	S_{POS}	Liming rate
	m AHD	pH units	moles H^+/t	moles H^+/t	moles H^+/t	%w/w	kg $CaCO_3$/t
BH01 0.50-0.75m	0.50-0.75	4.4	26	**70**	43	0.009	2.4
BH02 0.15-0.50m	0.15-0.50	5.6	<5	<5	<5	0.01	<0.75
BH02 0.50-1.00m	0.50-1.00	4.3	28	51	23	<0.005	2.2
BH03 2.00-2.20m	2.00-2.20	4.0	**91**	**86**	<5	<0.005	6.9
BH04 0.00-0.25m	0.00-0.25	4.9	17	5	<5	0.04	3.0
BH05 3.00-3.30m	3.00-3.30	4.2	39	43	<5	<0.005	3.0
BH06 1.00-1.20m	1.00-1.20	4.6	23	48	26	0.01	2.4

BH07 0.50-1.00m	0.50-1.00	3.8	**110**	**130**	16	<0.005	8.6
BH08 1.50-2.00m	1.50-2.00	3.9	61	**100**	41	<0.005	4.8
ASSMAC 1998 Action Criteria*		NA	62	62	62	0.03	NA

*>1000 tonnes of soil disturbed. Bold indicates exceedance.

The laboratory SPOCAS test results generally indicate an acceptable level of Titratable Sulfidic Acidity (TSA) across the Site with all samples being below the threshold of 62 moles H+/t.

Samples from BH01 and BH08 show Titratable Actual Acidity (TAA) to be below the action limit while Titratable Peroxide Acidity (TPA) is in exceedance. WA DER (2015) *Identification and investigation of acid sulfate soils and acidic landscapes* indicates this may reflect organic acidity, or acidity from oxidation and/or titration of iron-containing or manganese-containing compounds. WA DER (2015) also suggests numerous aluminium containing compounds may also contribute to this acidity and that this acidity may be present whether or not there is any appreciable potential sulfidic acidity. As Chromium Reducible Sulfur (CRS) testing was not carried out on the samples, the influence of organic material or aluminium in the samples can not be determined.

In the case of BH01, the TAA is well within the acceptable level and is much lower than TPA. This could indicate that the sampled soil may have a large amount of pyrite and carbonate and should not be the only basis for suggestion of required management of ASS. However, for BH08, the TAA is barely below the action limit and the TPA is well over the exceedance, therefore the presence of ASS is not certain but more plausible. As neither of these samples are saturated and are well above the groundwater table, it is assessed that any potential acid-generating compounds are likely to have previously been oxidised and no longer pose a threat.

Two samples from BH03 and BH07 showed exceedances of the action criteria for both TAA and TPA. The sample from BH07 (0.5 – 1.0m depth) has a pH of 3.8, the most acidic of the samples submitted, which indicates that actual acid sulfate soils (AASS) are present. The sample from BH03 (2.0 – 2.2m depth) has a pH of 4.0 which is the threshold limit for AASS. Given the low pH readings of both the samples and the significant exceedance in TAA it is assessed that ASS could be present between 0.5m and 1.0m in the south of the site and 2.0m and 2.2m in the centre of the site.

Given the assessment of the presence of ASS in samples from BH03 and BH07 it seems more likely that the near exceedance and exceedance of TAA and TPA in BH08 may be significant.

From the distribution of the samples which indicate acidity, ASS area likely to be present in the centre and south of the Site.

6.3 CALIFORNIA BEARING RATIO TESTING

The four representative subgrade samples collected from boreholes across the Site were tested at a NATA-accredited geotechnical laboratory for 4-day-soaked California Bearing Ratio (CBR) Test in accordance with *AS 1289.6.4.2* including Maximum Dry Density/Moisture Content Relation (Standard) Tests. Laboratory test reports are provided in Appendix E.

A summary of the CBR laboratory test results is presented in Table 4.

Table 4: Summary of Laboratory CBR Results

4-day soaked CBR including Standard Compaction Test Results				
Sample ID	BH01	BH03	BH06	BH08
Sample Depth Range (m)	0.50 – 1.00	0.50 – 1.00	0.50 – 1.00	0.50 – 1.00
Sample Description	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY
Maximum Dry Density (t/m³)	1.72	1.75	1.77	1.81
Optimum Moisture Content (%)	18.7	18.4	17.7	15.4
CBR value (%)	7	9	7	2
Note: CBR value is at a penetration of 2.5mm.				

7 DISCUSSION AND RECOMMENDATIONS

The high pressure, underground gas pipeline easement through the centre of the Site will need to be sufficiently marked out/flagged and considered in all earthwork activities at the Site.

7.1 SITE PREPARATION & TRAFFICABILITY

Site preparation works for the construction of structures and pavements will require the stripping and removal of vegetation, topsoil, uncontrolled fill, and other deleterious materials.

The general trafficability at the Site is expected to be poor condition for Unit 1 and Unit 2 as subgrade. At the time of construction however, a thin compacted crushed rock layer (e.g., minimum 200mm thick) is recommended to be placed over the Unit 2 subgrade to provide temporary pavements for heavy loading from piling rigs, cranes, and general construction traffic.

Should the placement of fill be required as part of the redevelopment, the nominated area should be filled using suitable geotechnical material using geotechnically suitable imported fill material. Suitable geotechnical material is fill that is capable of being compacted to form a homogeneous mass capable of supporting the proposed structure and/or associated elements which does not contain the following unsuitable materials:

- Organic soils such as topsoil, severely root affected subsoils and peat;
- Imported material not assessed as Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) or materials not subject to a General or Specific Resource Recovery Exception as approved by the NSW Office of Environment and Heritage. Imported fill should be accompanied by documentation adequately demonstrating the material's compliance with the exemption conditions.
- Materials containing substances which can be dissolved or leached out in the presence of moisture, or which undergo volume change or loss of strength when disturbed and exposed to moisture;
- Silts or materials that have the deleterious engineering properties of silt;
- Fill which contains wood, metal, plastic, boulders or other deleterious material;
- Loose, soft, wet or unstable soil or rock;
- Any material deemed unsuitable by the geotechnical practitioner.

Suitable geotechnical fill should be placed in near horizontal layers of uniform thickness placed systematically across the fill area. The fill should be placed in layers no greater than 200mm compacted thickness and compacted to a minimum 98% Standard Maximum Dry Density Ratio

(SMDDR) within ± 2 % of Optimum Moisture Content (OMC). Fill within 500 mm of slabs or pavements, should be compacted to a minimum 100% SMDDR within ± 2 % of OMC.

Subgrade preparation and the placement of fill at the site should be carried out under Level 1 Supervision as defined in AS 3798-2007, *Guidelines on earthworks for commercial and residential developments*.

Erosion and sediment controls should be implemented during any earthwork operations in accordance with the requirements of the Landcom Publication *Managing Urban Stormwater: Soils and Construction*.

7.2 EXCAVATION CONDITIONS AND SUPPORT

Minor bulk excavations (i.e., less than 1m from existing surface level) and above groundwater table can be expected for the proposed development, except for the proposed basement area.

All soil units should be excavatable using conventional earthmoving plant such as hydraulic excavators and bucket or bulldozer blade. If excavations encounter groundwater inflow into excavations can be expected and hence, dewatering such as sump-pumping method is likely to be required.

Earthmoving contractors should examine borehole logs to make their own assessment of suitable excavation plant and production rates.

7.3 REUSE OF EXCAVATED MATERIALS

On review of the laboratory test results, the excavated materials (if applicable) within Unit 2b (Clay) may be re-used as general fill or engineered fill. At the time of construction, it is recommended that a suitably qualified geotechnical engineer is present onsite to confirm the suitability of the materials for reuse.

7.4 PERMANENT AND TEMPORARY BATTER SLOPES

Excavation for trenches or footings will involve cutting temporary batter slope into the subsurface materials identified at the Site. If vertical excavations are required (e.g., for trenching) due to site constraints, temporary shoring boxes must be used.

For excavation batter heights up to 1.5m and above groundwater,

- Cohesive soil units (i.e., predominantly clays) are expected to stand at batters of 1 Vertical to 1 Horizontal (1V:1H) for unsupported temporary batter slopes in the short term and 1V:2H for unsupported permanent batter slopes in the long term.

- Cohesionless soil units (i.e., predominantly sands) are expected to stand at batters of 1V:2H for unsupported temporary batter slopes in the short term, whilst permanent batters are not recommended.

For extremely low to very low strength shale, the recommended batters are 1V:1H for unsupported temporary batter slopes in the short term and 1V:1.5H for unsupported permanent batter slopes in the long term.

For low to medium strength shale, the recommended batters are 0.5V:1H for unsupported temporary batter slopes in the short term and 1V:1H for unsupported permanent batter slopes in the long term.

Surcharge loadings should be placed sufficiently away from the crest batters. The recommended excavated batters should be confirmed by a suitably qualified geotechnical practitioner during excavation works.

7.5 FOOTINGS

The proposed development is three buildings for industrial use and therefore is not applicable to *AS 2870-2011 Residential Slabs and Footings Construction.* As such, a purpose-designed footing system should be designed to support the development using engineering principles in accordance with *AS 2870-2011*.

7.5.1 Shallow Footings

Strip or pad footings for lightly loaded and flexible structures may be constructed on engineered fill and/or Unit 2 Residual Soil that is stiff to hard in consistency. Exposed materials in footing excavations should be assessed by a suitably qualified and experienced geotechnical engineer prior to blinding and construction of the footings.

For preliminary design, the maximum allowable bearing pressures should be limited to 100kPa where footings are founded in the recompacted Unit 1 Fill, and 150kPa where footings are constructed in the stiff or better Unit 2 Residual Soil.

Screened and compacted Unit 1 Fill and Unit 2 Residual Soil are considered to be moderately to highly reactive, with potential characteristic surface movements estimated between 20 and 60mm. It is recommended that these potential surface movements be taken into consideration in footings construction and floor slab design.

Where proposed founding depth is on weak strength material, a reinforced concrete or pre-stressed concrete raft foundation may be constructed to support the proposed development. Engineered fill prepared in accordance with the requirements of *AS3798 – 2007 Guidelines on Earthworks for Commercial and Residential Developments*, should be capable of supporting an allowable bearing pressure of 50kPa for stiffened raft slab, pad, or strip footings provided that the placed and compacted fill is greater than 1m in thickness. Should greater loading intensities than 50kPa be required, geogrid reinforcement should be incorporated into the engineered fill design to mitigate against differential settlements.

All footings should be founded sufficiently outside of the existing gas pipeline at the Site as well as any other existing or future services.

A detailed raft foundation bearing capacity and settlement analysis should be undertaken after the final subgrade levels and structural design loads are confirmed. For the proposed basement development, a stiffened raft slab may be designed to resist any potential uplift hydrostatic forces from groundwater.

Exposed materials in the footing excavations should be assessed by a suitably qualified geotechnical engineer prior to blinding and construction of footings. Where practicable, footings should be founded on similar strata to minimize the risk of differential movements, with articulation provided where appropriate.

7.5.2 Bored or CFA Piles

Open bored piles or continuous flight auger piles may be adopted for the proposed development. The bored or CFA piles should be embedded through Unit 1 Fill and Unit 2 (Residual Soil) and socketed adequately into Unit 3 Weathered Shale. It would be expected that appropriate capacity piling rigs should be able to penetrate the Unit 3 Weathered Shale. Allowable design parameters for bored piles are provided in Table 5.

The use of the recommended allowable bearing pressures would be expected to result in pile settlement of about 1% of pile diameters.

During construction, an experienced geotechnical engineer should observe boring of the piles in order to confirm that the foundation conditions and pile footing elevations are suitable and consistent with adopted design parameters.

Table 5: Bored or CFA Pile Design Parameters

Founding Stratum	Allowable End Bearing (kPa)	Ultimate Shaft Adhesion (kPa)[1]	Effective Modulus E' (MPa)
Unit 2: Residual Soil (Stiff or better)	150	20	20
Unit 3: Extremely Low to Very Low Strength Weathered Shale	700	70	50
Unit 3: Low Strength Weathered Shale	1,000	100	100
Unit 3: Low to Medium Strength Weathered Shale	1,500	150	500

Notes:

[1]Shaft adhesion should only be assumed where piles have a minimum embedment of at least 3 pile diameters into the nominated stratum with a properly cleaned rough socket (at least grooves of depth 1 mm to 4 mm and width greater than 5 mm spacing of 50 mm to 200 mm).

Open bored piles may require temporary liners to provide bore wall stability through the Unit 1 Fill and the Unit 2 Residual Soil or where groundwater is encountered. The potential for the presence of groundwater in bored pile excavations should be taken into consideration when planning construction. Where groundwater is present in bored pile excavations, the excavation should be cleaned, dewatered, and concreted within 24 hours to prevent softening of the footing base.

7.6 PAVEMENTS

The proposed development is understood to include trafficable hardstand pavement areas.

Pavement designs are typically dependent on the subgrade condition. The following subgrade preparation measures are recommended for pavement construction:

- Bulk excavation to final design levels;
- Removal of vegetation or organic soils and any deleterious materials;
- The exposed subgrade surface should be properly proof rolled to a minimum six passes using a suitable vibratory compactor or equivalent and inspected by geotechnical personnel. Any soft/loose areas encountered during the proof-roll process should be replaced by geotechnically suitable material as per Section 7.1.
- Should filling be required to achieve subgrade design levels, the filing procedures should be carried out as per Section 7.1.

Upon review of the 4-day soaked CBR laboratory test results, a preliminary CBR design value of 2% is suggested for Unit 2 Residual Soil as pavement subgrade upon being proof-rolled and inspected by a suitably qualified geotechnical engineer.

7.7 ACID SULFATE SOILS

In consideration of the fieldwork observations, field ASS screening, and laboratory analysis results, Acid Sulfate Soils are likely to be present within the centre and south parts of the Site.

As such, it is recommended that an Acid Sulfate Soils Management Plan is prepared for the relevant proposed structures situated in the centre and south parts of the Site.

7.8 MINE SUBSIDENCE

According to our desktop review, the Site is not subject to any mine subsidence guideline and therefore mine subsidence impacts are negligible.

8 GEOTECHNICAL RISKS

Some of the identified geotechnical risks are as follows:

- The overall site trafficability is expected to be poor condition for Unit 1 and Unit 2 as subgrade. During construction, a thin compacted crushed rock layer (e.g., minimum 200mm thick) is recommended to be placed over the subgrade to provide temporary pavements for heavy loading from piling rigs, cranes, and general construction traffic.
- Unit 1 Fill and Unit 2 Residual Soil are considered to be moderately to highly reactive subgrade, with potential characteristic surface movements estimated between 20 and 60mm. It is recommended that these potential surface movements be taken into consideration in footings construction and floor slab design.
- The groundwater intersected in BH08 is inferred to be perched water table, and therefore may fluctuate depending on seasonal changes and drainage conditions at the Site. The construction activities may become problematic where groundwater is encountered, particularly within the proposed basement envelope. As such, provisions should be made for excavations to be carried out in a manner that allows for efficient water drainage during heavy rainfall events. The excavation of trenches and pumping from locally excavated sumps can manage and control surface water at the Site.
- Heavy duty equipment that could cause vibrations can adversely impact on nearby structures and services (most notably the high-pressure underground gas pipeline running through the centre of the Site), and therefore the use of such equipment must be limited as much possible.
- The eight boreholes were drilled over a large area of the Site, where subsurface conditions may vary even over small distances. As such, it is recommended that a supplementary geotechnical investigation is undertaken in the future to confirm the geotechnical model and target any areas of ground anomalies after the proposed development plans have been finalised.
- During construction phase, the excavation works may reveal different geotechnical conditions than those encountered during the investigation. If the actual geotechnical conditions are found to vary significantly, the discussion and recommendations including

the design assumptions should be reviewed and adjusted accordingly. It is recommended that a suitably qualified geotechnical practitioner is present onsite for inspection of materials during excavation works.

9 LIMITATIONS OF THIS REPORT

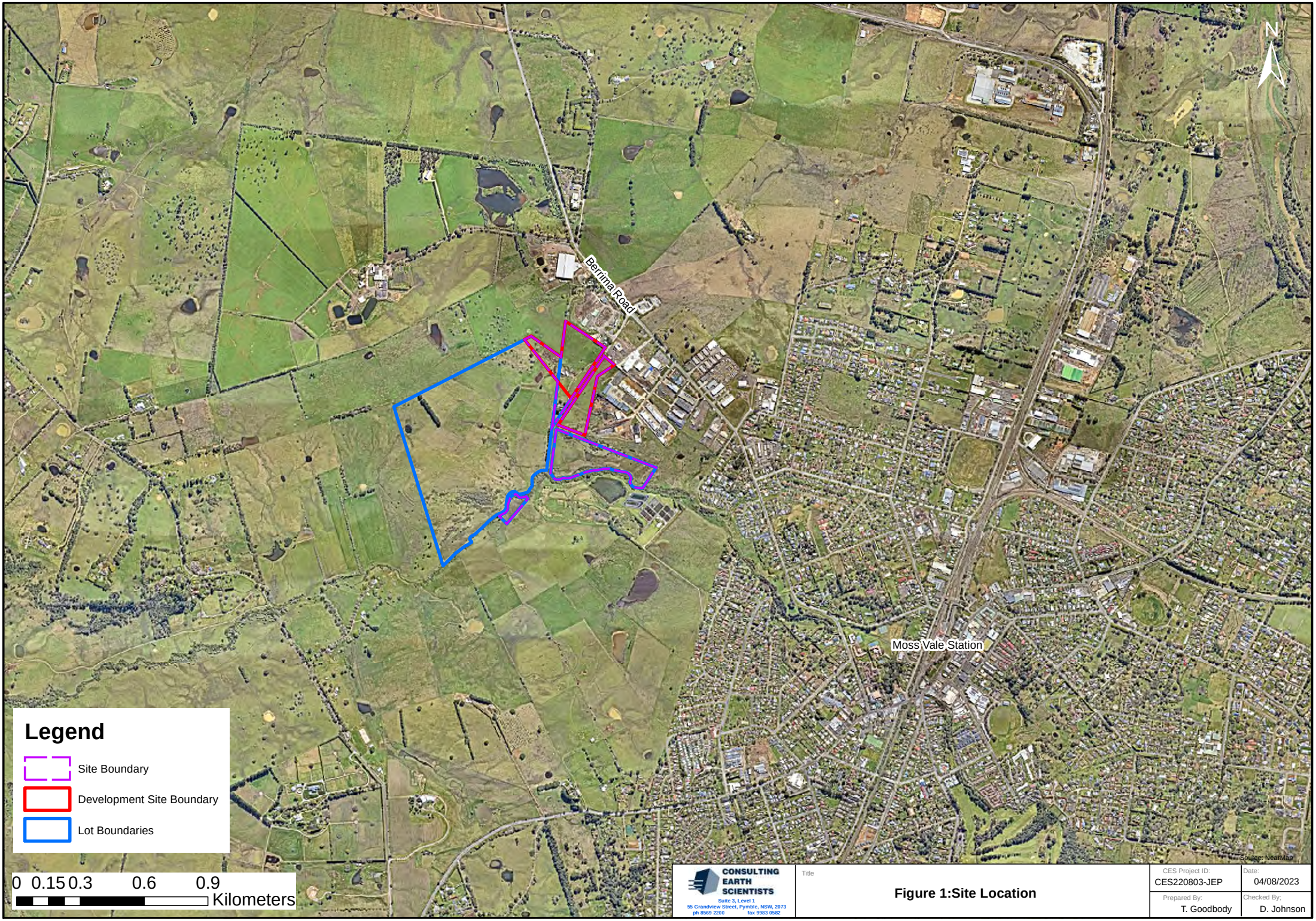
This report has been prepared for use by the client who commissioned the works in accordance with the project brief and based on information provided by the client. The advice contained in this report relates only to the current project and all results, conclusions and recommendations should be reviewed by a competent person with experience in geotechnical and environmental investigations before being used for any other purpose. Consulting Earth Scientists Pty Ltd (CES) accepts no liability for use or interpretation by any person or body other than the client. This report must not be reproduced except in full and must not be amended in any way without prior approval by the client and CES.

This report does not provide a complete assessment of the geotechnical or environmental status of the site and is limited to the scope defined therein. Should information become available regarding conditions at the site including previously unknown sources of contamination, CES reserves the right to review the report in the context of the additional information.

10 REFERENCES

- ASSMAC, 1998. *Acid Sulfate Soil Management Advisory Committee (ASSMAC) Assessment Guidelines.*
- Landcom publication, 2004. *Managing Urban Stormwater: Soils and Construction*. Fourth Edition, NSW Government.
- Look B. G. ,2014. *Handbook of geotechnical investigation and design tables.* CRC Press.
- Poulos H.G. & Davis E.H. 1968. *The Settlement Behaviour of Single Axially loaded Incompressible Piles and Piers. Geotechnique Journal 18(3):351-371*.
- Rose G., 1966. *Wollongong 1:250 000 Geological Sheet SI/56-09, 2nd edition.* Geological Survey of New South Wales, Sydney.
- Standards Australia, 2007. *AS3798 – 2007 Guidelines on Earthworks for Commercial and Residential Developments.*
- Standards Australia, 2009. *AS 2159-2009 Piling - Design and Installation.*
- Standards Australia, 2011. *AS 2870-2011 – Residential Slabs and Footings Construction.*
- Trigg S. J. & Campbell L. M., 2016. *Moss Vale 1:100 000 Geological Sheet 8928.* Geological Survey of New South Wales, Maitland.
- WA DER., 2015. *Identification and investigation of acid sulfate soils and acidic landscapes.*

FIGURES



CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble, NSW, 2073
ph 8569 2200 fax 9983 0582

Title

Figure 1:Site Location

CES Project ID:	Date:
CES220803-JEP	04/08/2023
Prepared By: T. Goodbody	Checked By: D. Johnson

CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble, NSW, 2073
ph 8569 2200 fax 9983 0582

Title

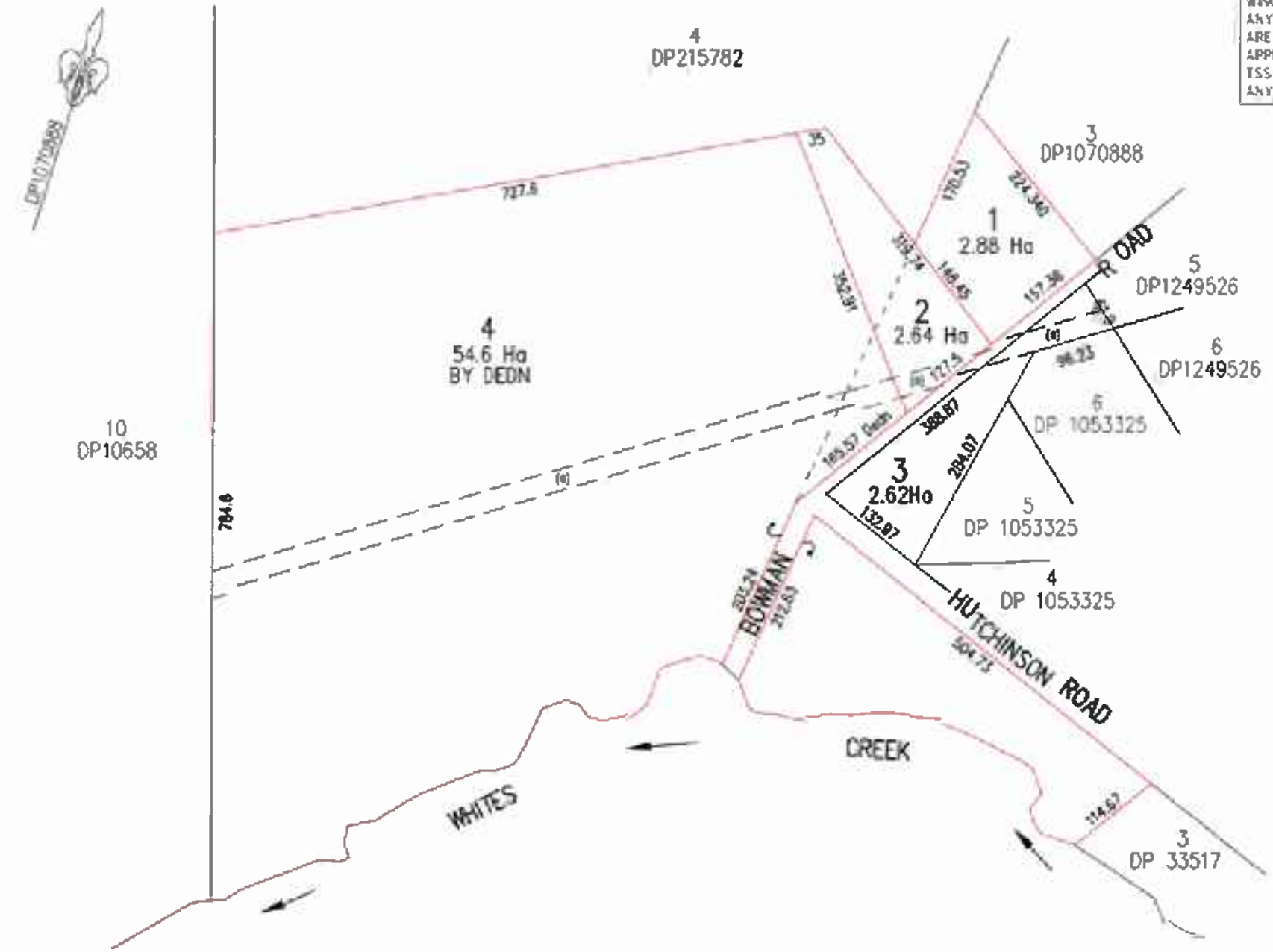
Figure 2:Site Layout

CES Project ID:	Date:
CES220803-JEP	04/08/2023
Prepared By: T. Goodbody	Checked By: D. Johnson

APPENDIX A

PROPOSED SUBDIVISION AND DEVELOPMENT PLANS

THIS DOCUMENT HAD BEEN PRODUCED FOR SUBMISSION TO WINGECARIBEE SHIRE COUNCIL ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE. ALL LOT DIMENSIONS, AREAS AND SHAPES ARE APPROXIMATE ONLY AND ARE SUBJECT TO VARIOUS AUTHROT APPROVAL, FINAL SURVEY & REGISTRATION WITH NSW LRS. TSS TOTAL SURVEYING SOLUTIONS TAKES NO RESPONSIBILITY FOR ANY ERROR OR OMISSION IN THIS DOCUMENT



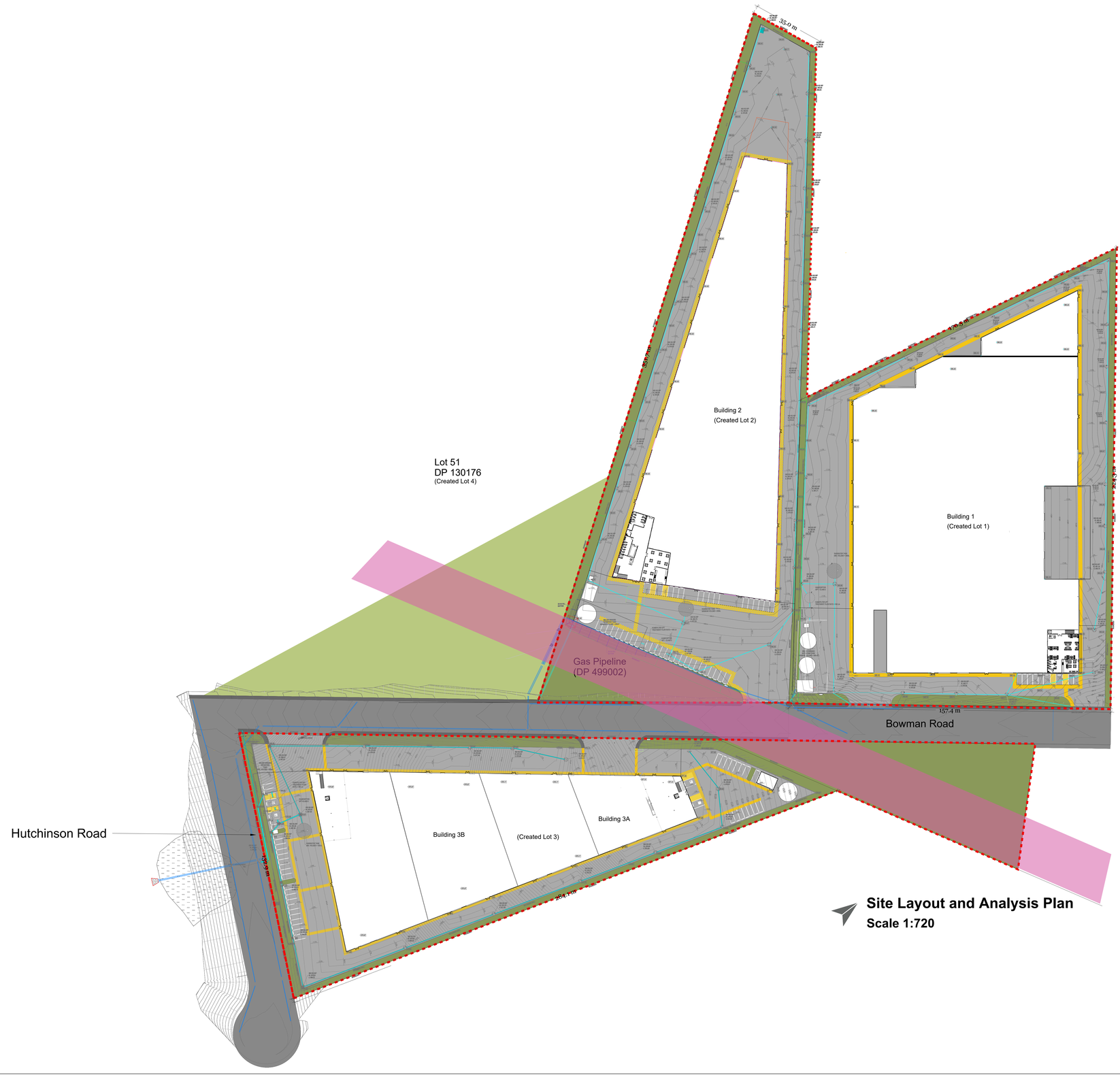
TSS
JAKE COVE | CANBERA | NEWCASTLE | CENTRAL COAST

PLAN OF PROPOSED SUBDIVISION OF LOT 51 IN DP130176 & LOT 2 IN DP1070888

LGA: WINGECARRIBEE
Locality: MOSS VALE
Reduction Ratio: 1: 5000
Lengths are in metres.

REGISTERED

DRAFT
DP PLAN
REV 2 ISSUED: 5/4/2023



Legend

- Roads
- Landscaping
- Internal Pedestrian Footpath
- External Pedestrian Footpath
- Gas Pipeline Easement
- Created Lot boundary

Development Statistics

Created Lot 1	28826.07 m²
Created Lot 2	26,422.12 m²
Created Lot 3	26119.49 m²
Total lot area	81,367.68 m²

Date	Plan Number	Site Layout And Analysis Plan
6-7-2023	1	2 Bowman Road, Moss Vale (Part of lot 51, DP 130176 , Lot 2, DP1070888)

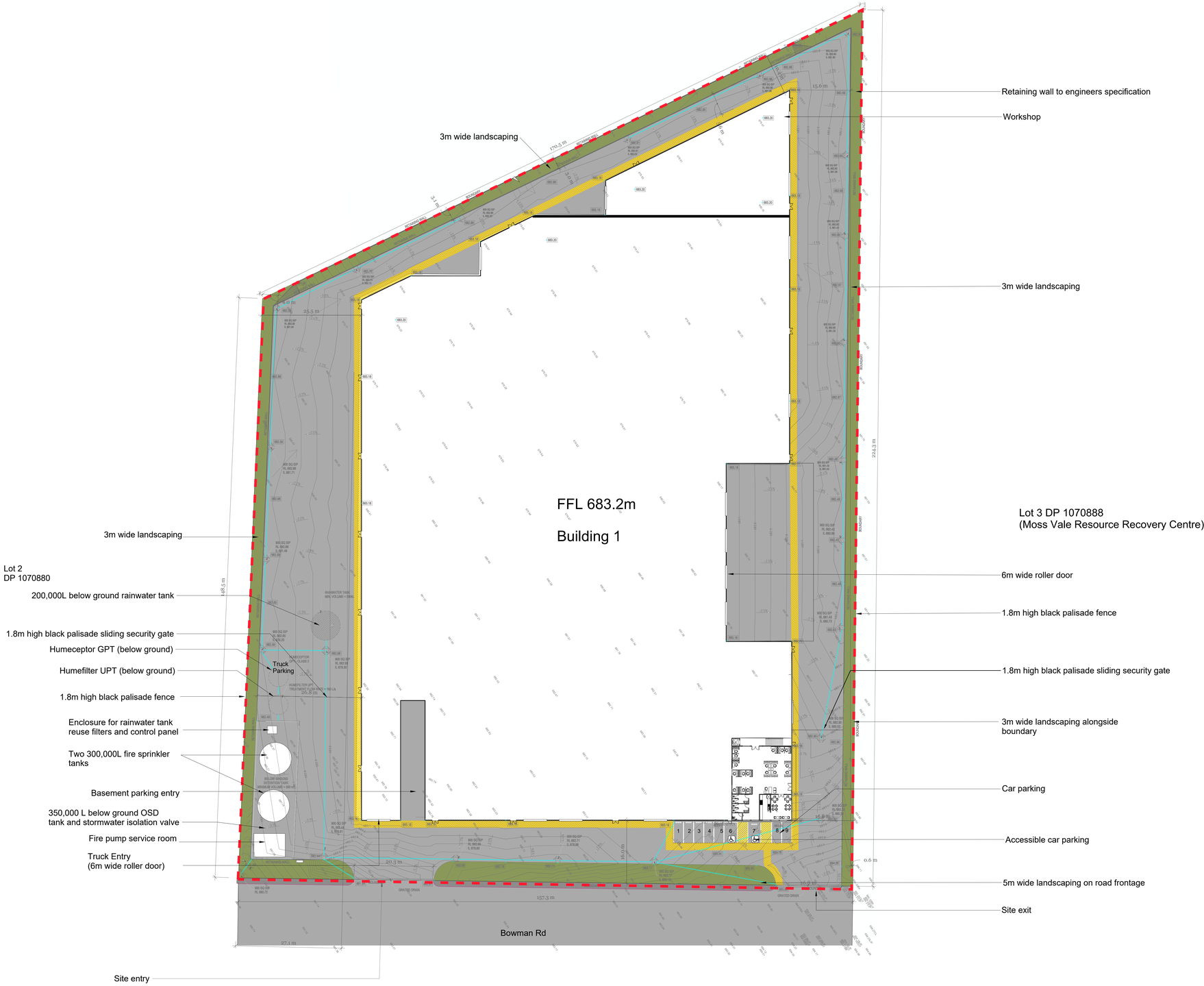
Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivision and General Industry Development
Title	Site Layout and Analysis Plan
Scale	1:720
Source	Jackson Environment and Planning Pty Ltd

01

A



Site Layout
Scale 1:380

Legend

- Roads
- Landscaping
- Internal Pedestrian Footpath
- External Pedestrian Footpath
- Created Lot boundary

Development Statistics

Building 1	16414.3 m²
Basement Floor Area	2215.25 m²
Office Ground Floor Area	293.22 m²
Office First Floor Area	341.6 m²
Office Second Floor Area	321.61 m²
Hardstand Area	13042.77 m²
Total Lot Area	28826.07 m²
Gross Floor Area	17370.73 m²
Building and office volume	212,475.49 m³
Basement volume	6434.24 m³
Site Coverage	57%

Parking Rate - Building 1

1 Space per 300m² GFA

Required = 58

Provided = 59

Date	Plan Number	Site Layout (Building 1)
6-7-2023	1.1	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

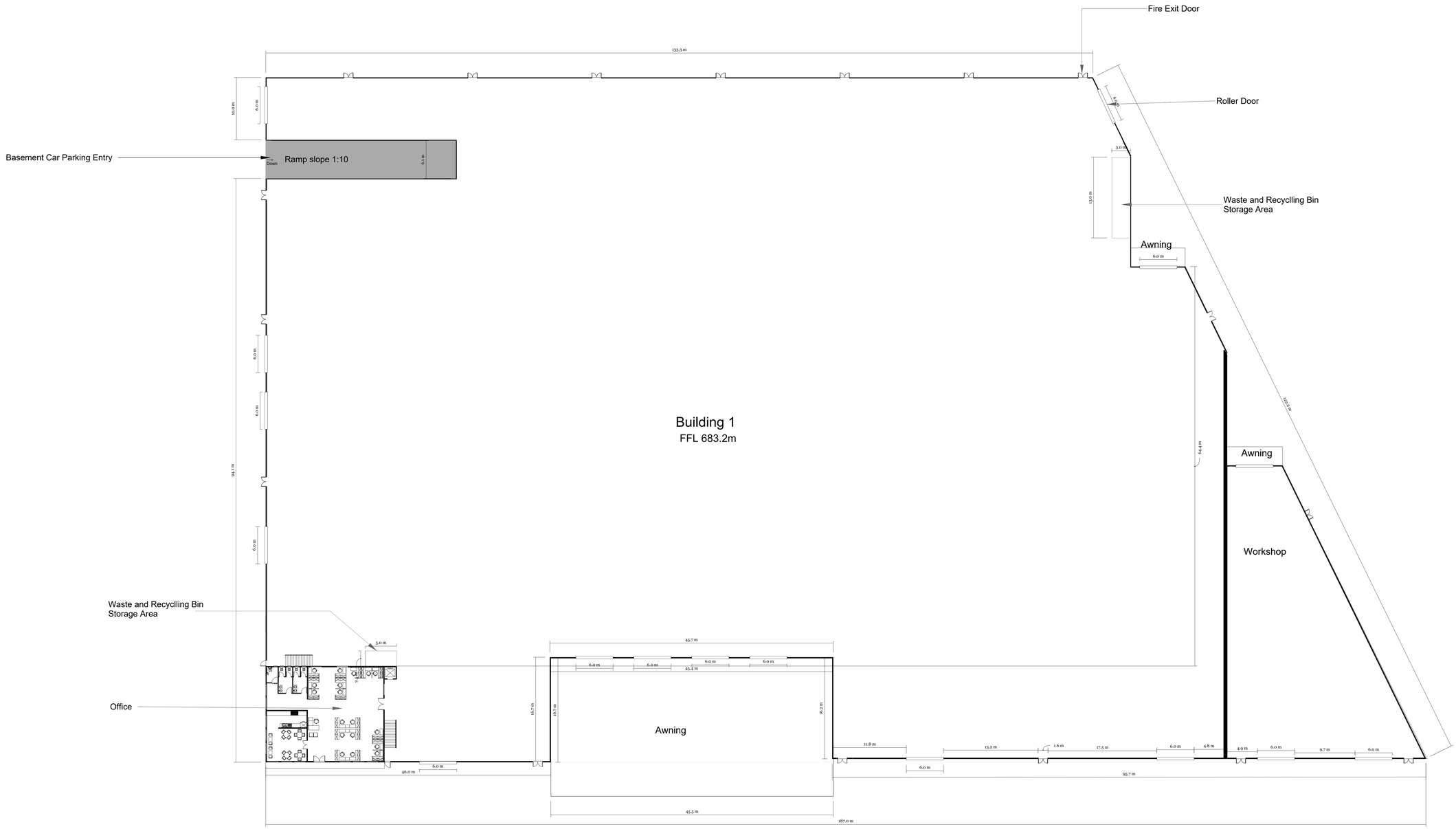
Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivision and General Industry Development
Title	Building 1 Site Layout Plan
Scale	1:380
Source	Jackson Environment and Planning Pty Ltd

01

A



Building Floor Plan
Scale 1:240

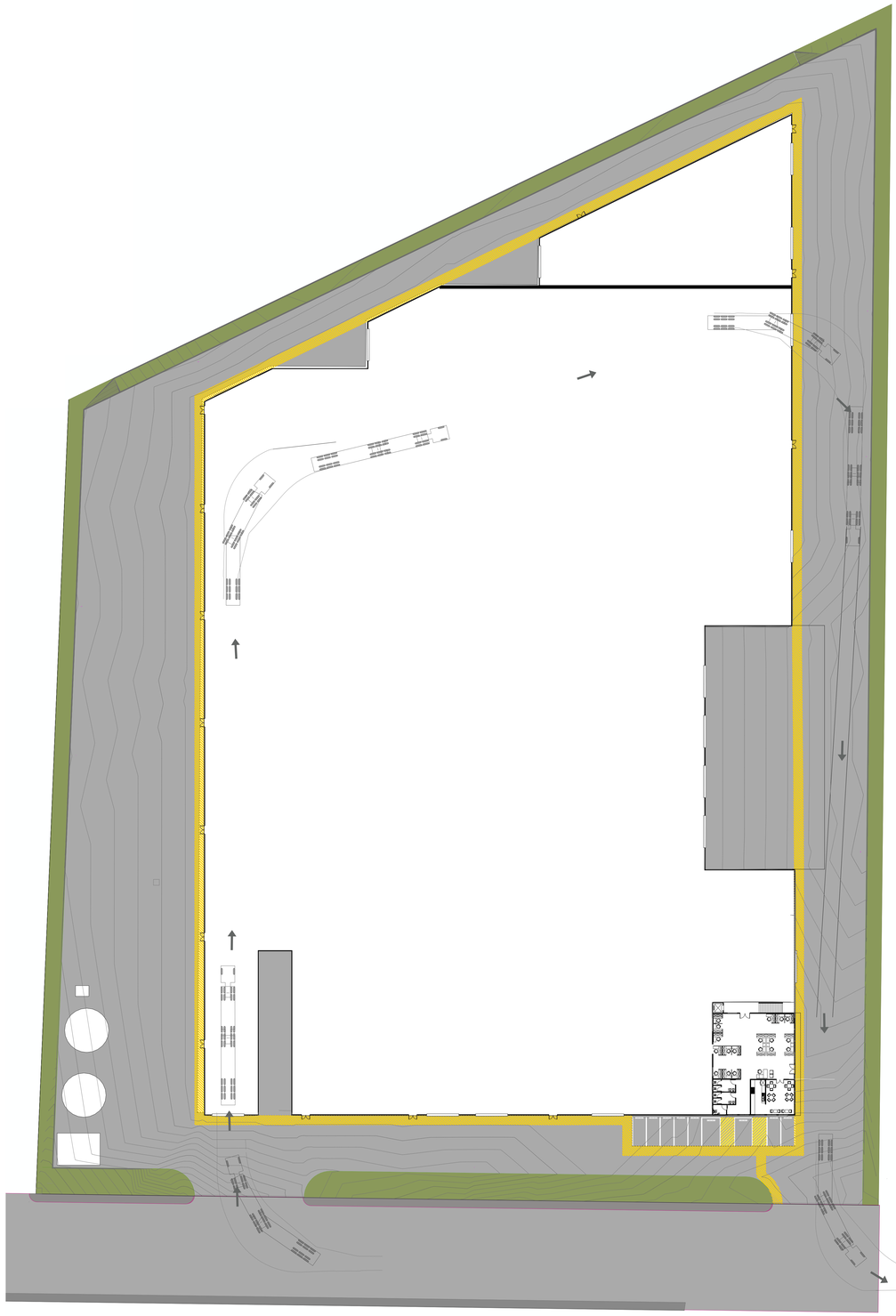
Date	Plan Number	Floor Plan (Building 1)
6-7-2023	1.2	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Floor Plan
Scale	1:240
Source	Jackson Environment and Planning Pty Ltd

01
A



Tractor Width	2.5m
Trailer Width	2.5m
Tractor Track	2.5m
Trailer Track	2.5m
Lock to Lock Time	6.0
Steering Angle	20.6
Articulating Angle	70

Turning Path 26m B-Double Truck

Scale 1:360

Date	Plan Number	Turning Path 26 m B Double Truck
6-7-2023	1.3	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd

Strategy | Infrastructure | Compliance | Procurement

A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Turning Path 26 m B Double Truck
Scale	1:360
Source	Jackson Environment and Planning Pty Ltd

01

A

Basement parking
Scale 1:380

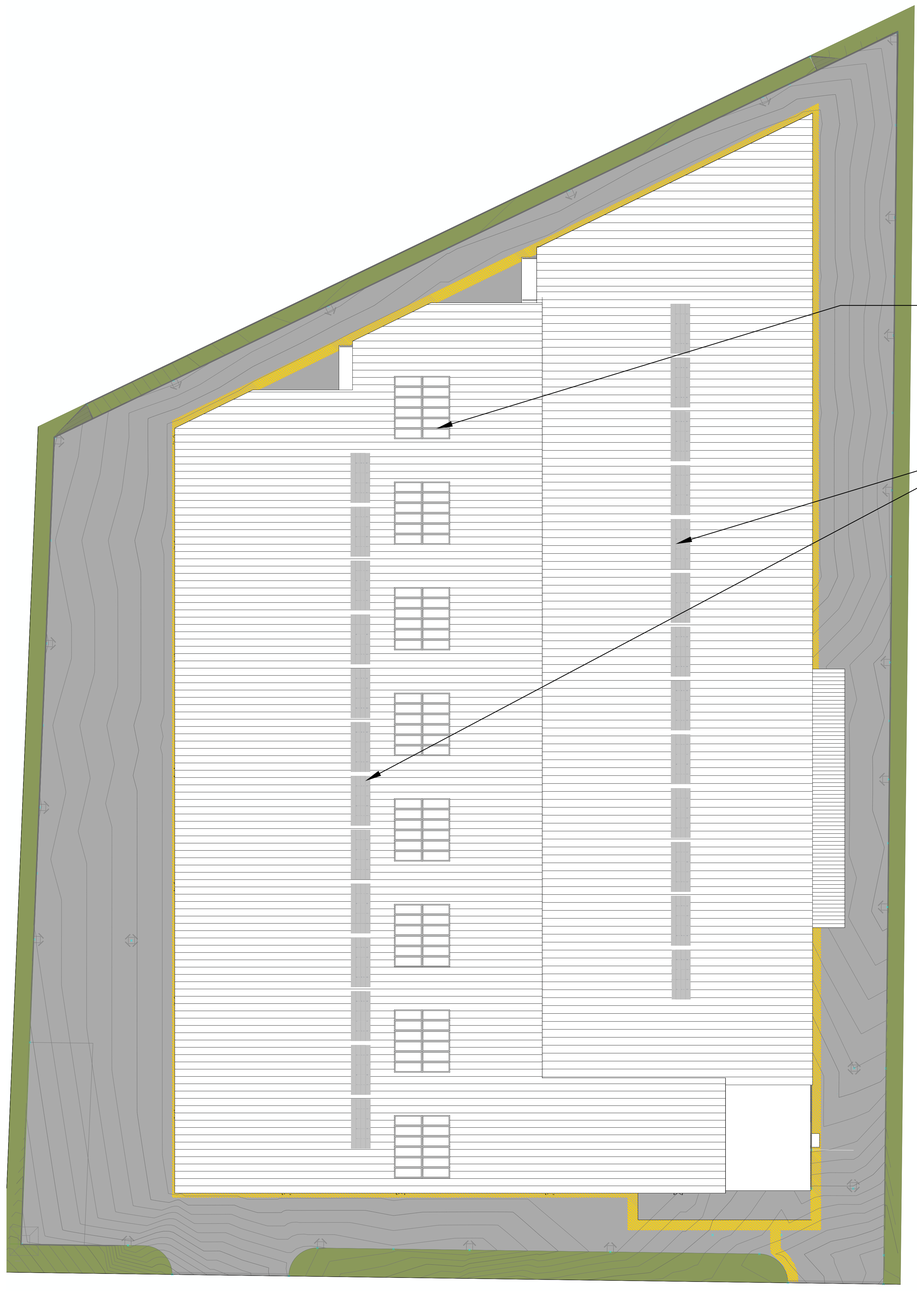
Date	Plan Number	Basement Parkng Plan (Building 1)
6-7-2023	1.4	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON
ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Basement Parking Plan
Scale	1:380
Source	Jackson Environment and Planning Pty Ltd

01
A



Lot 3 DP 1070888
(Moss Vale Resource Recovery Centre)

Building 1 Roof Plan

Scale 1:380

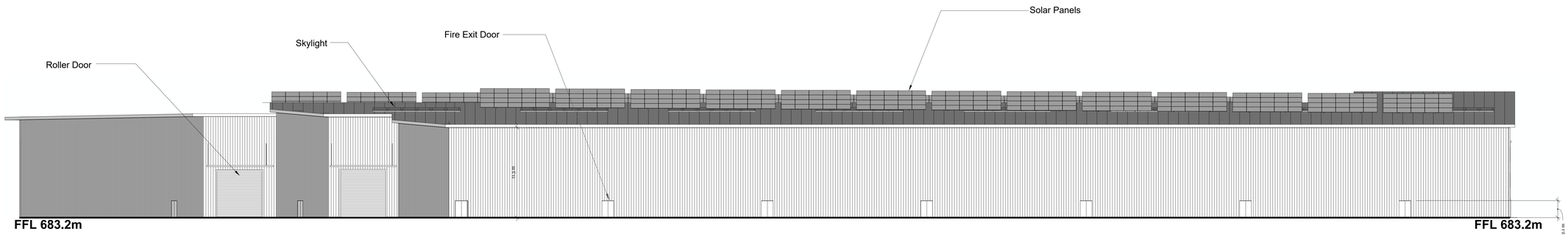
Date	Plan Number	Roof Plan (Building 1)
6-7-2023	1.5	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

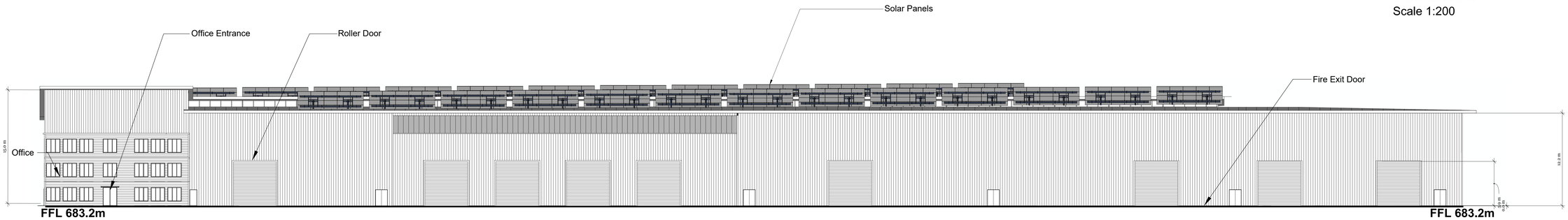
JACKSON
ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Roof Plan
Scale	1:380
Source	Jackson Environment and Planning Pty Ltd

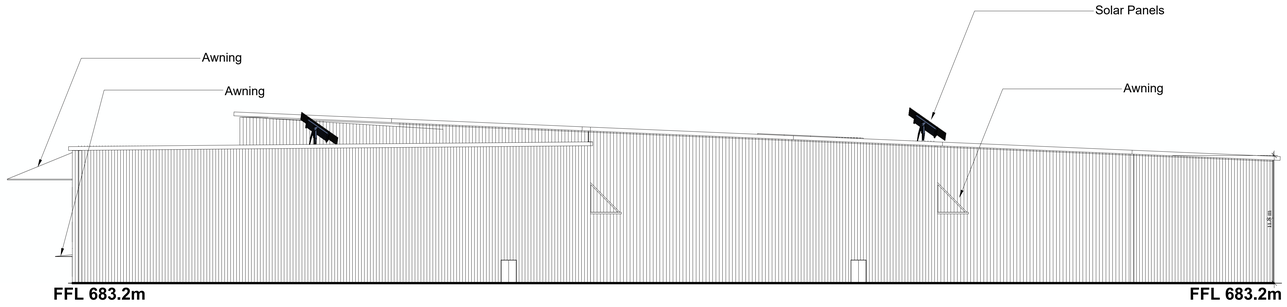
01
A



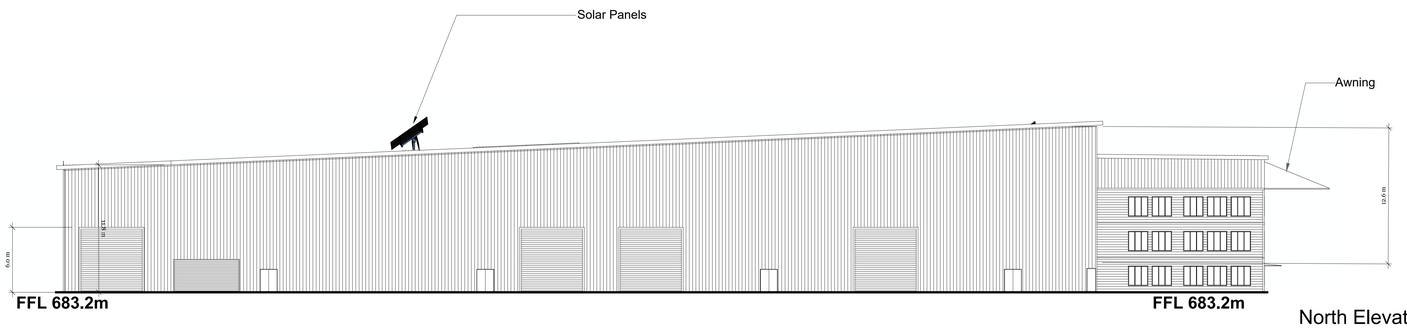
West Elevation
Scale 1:200



East Elevation
Scale 1:200



South Elevation
Scale 1:200



North Elevation
Scale 1:200

Schedule of Materials and Finishes

Wall Material: Colorbond Pale Eucalypt	
Roof Material : Colorbond Evening Haze	
Office Wall Material: Coen Composite Wood Panel (oak) or equivalent	
Office Roof Material : Colorbond Evening Haze	

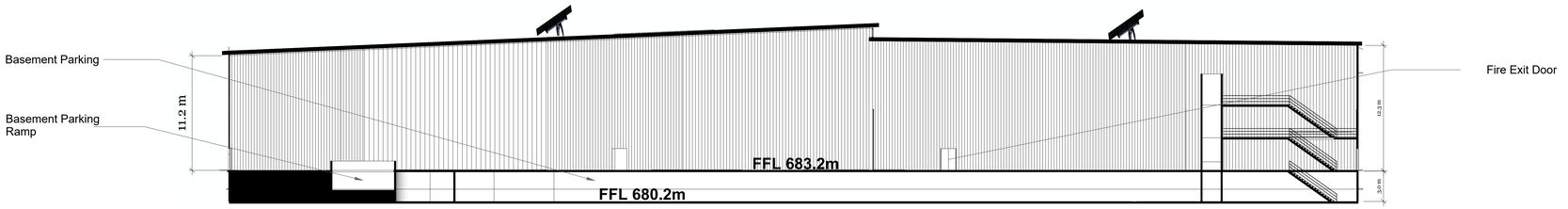
Date	Plan Number	Elevation (Building 1)
6-7-2023	1.6	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

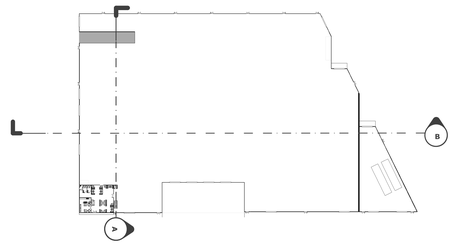
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Elevation
Scale	1:200
Source	Jackson Environment and Planning Pty Ltd

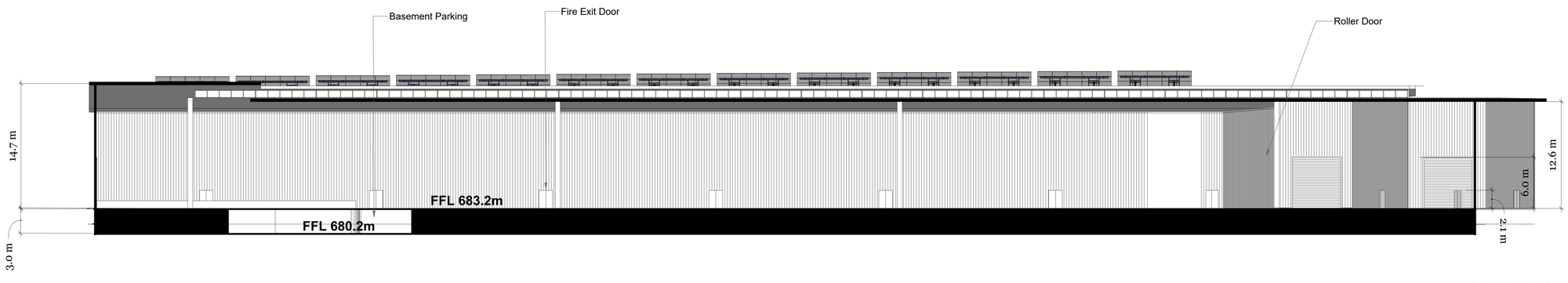
01
A



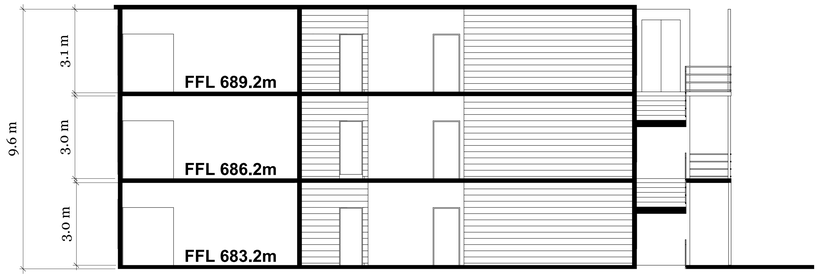
Building 1 Section A
Scale 1:200



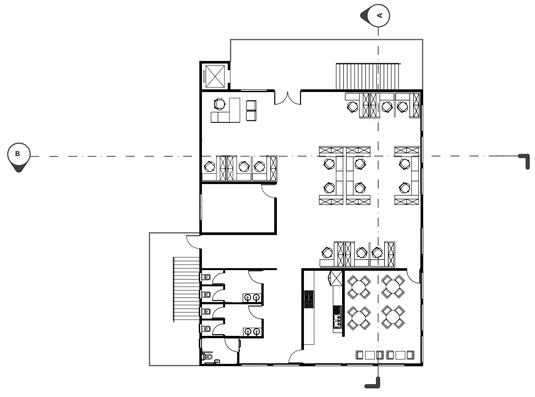
Building 1 Floor Plan
Scale 1:1200



Building 1 Section B
Scale 1:200



Office Section A
Scale 1:50



Office Floor Plan
Scale 1:150

Office Section B
Scale 1:50

Date	Plan Number	Office and Building 1 Section
6-7-2023	1.7	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

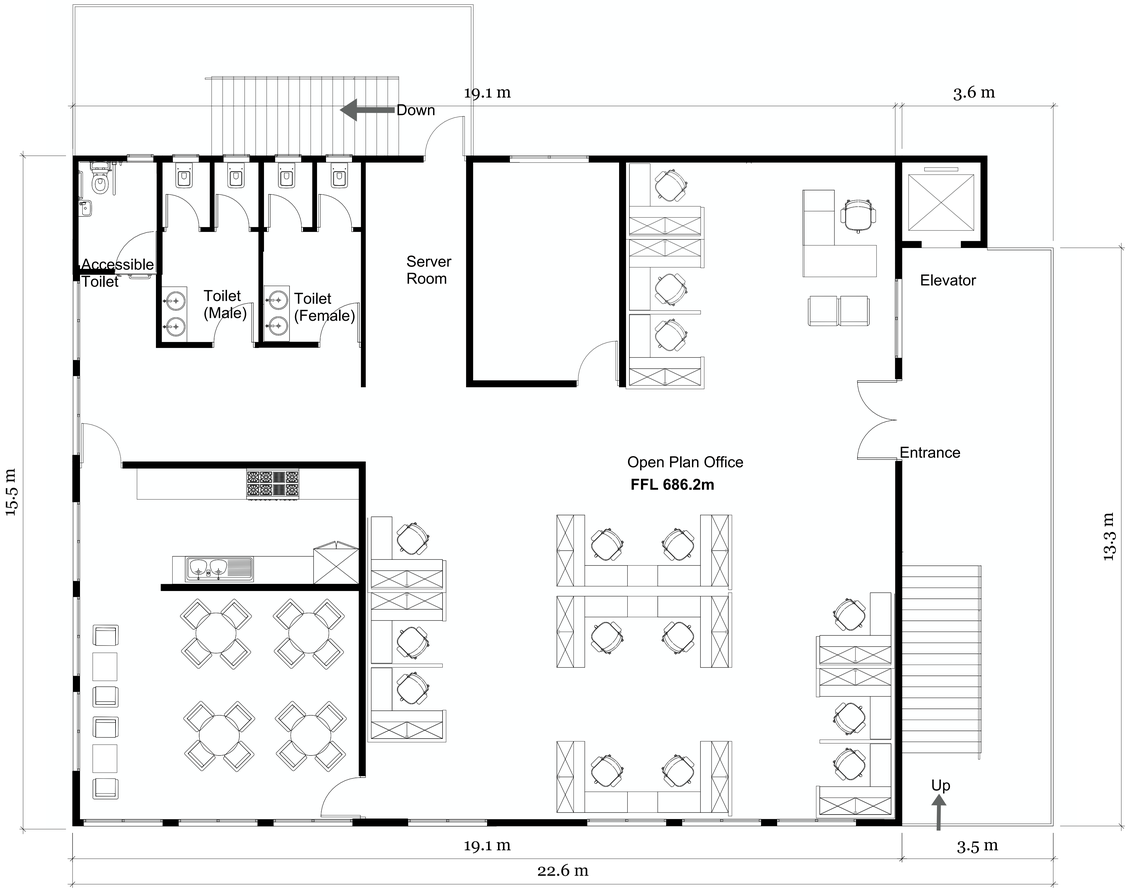
Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

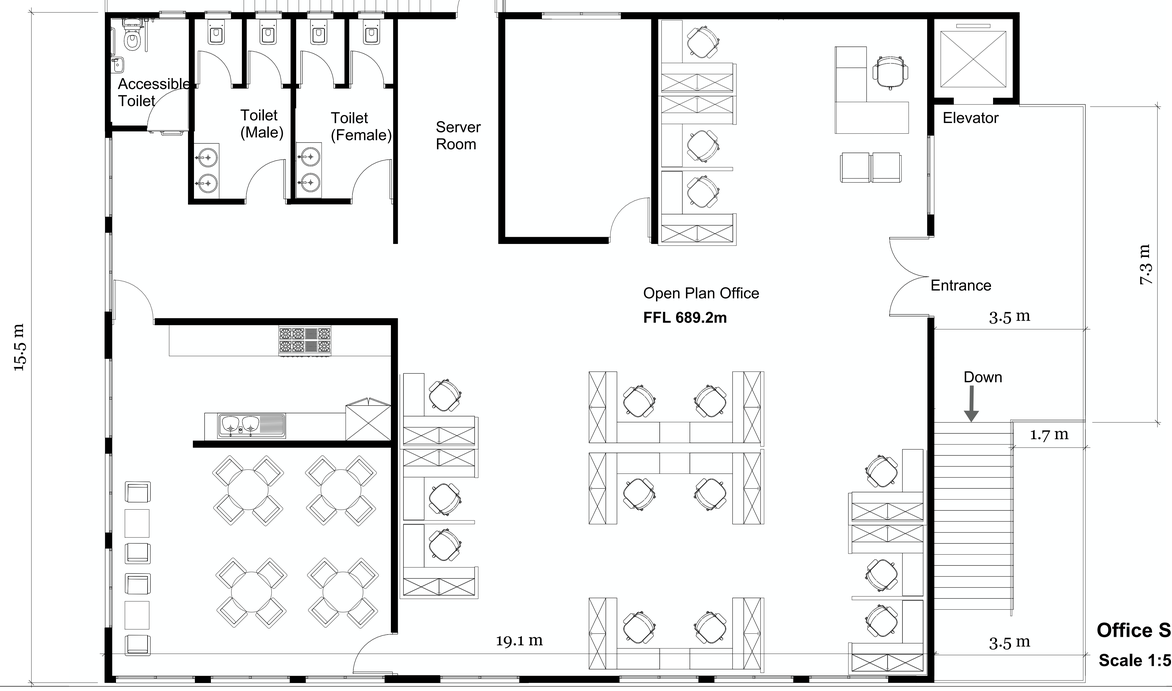
Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Office Section
Scale	1:200 1:50
Source	Jackson Environment and Planning Pty Ltd

01
A

Office Ground Floor Plan
Scale 1:50



Office First Floor Plan
Scale 1:50



Office Second Floor Plan
Scale 1:50

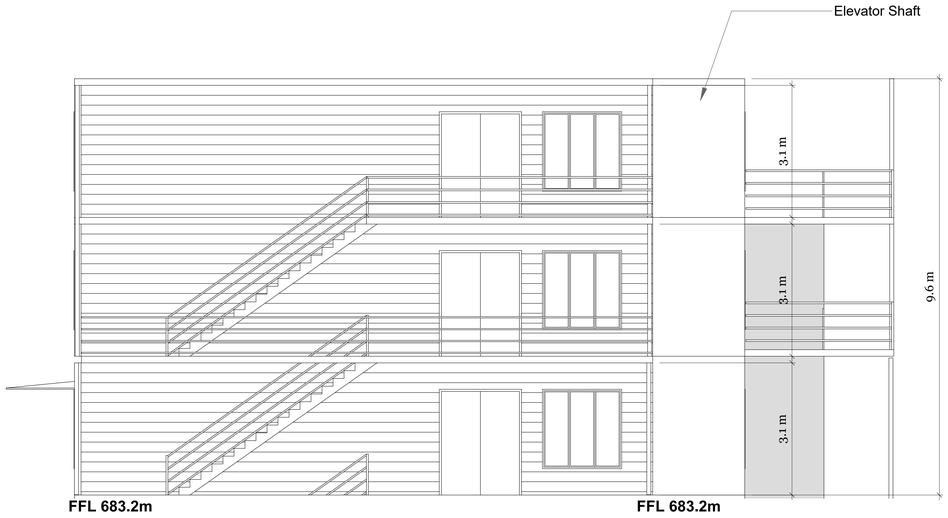
Date	Plan Number	Office Ground Floor Plan (Building 1)
6-7-2023	1.8	2 Bowman Road, Moss Vale (Lot 1, DP103123, Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

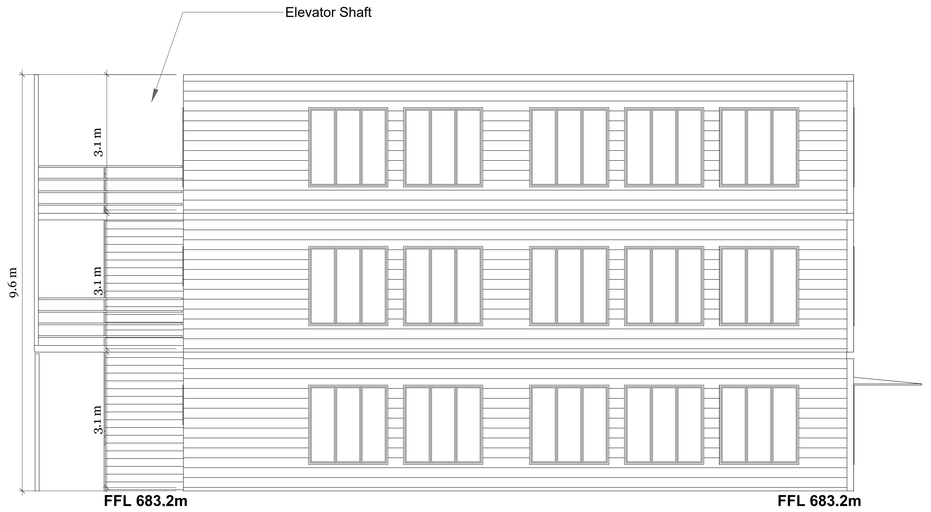
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Office Floor Plan
Scale	1:50
Source	Jackson Environment and Planning Pty Ltd

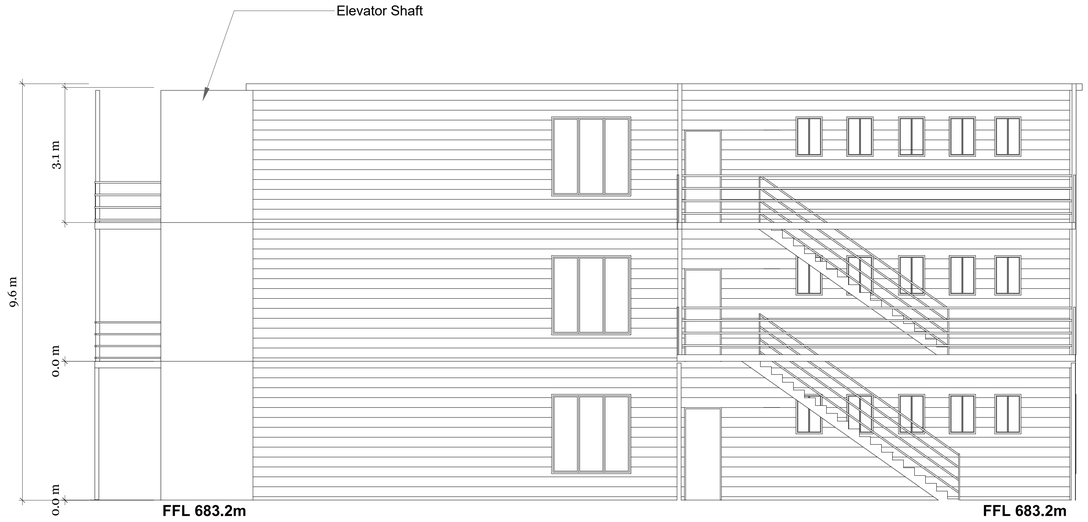
01
A



South Elevation
Scale 1:50



North Elevation
Scale 1:50



West Elevation
Scale 1:50

East Elevation
Scale 1:50

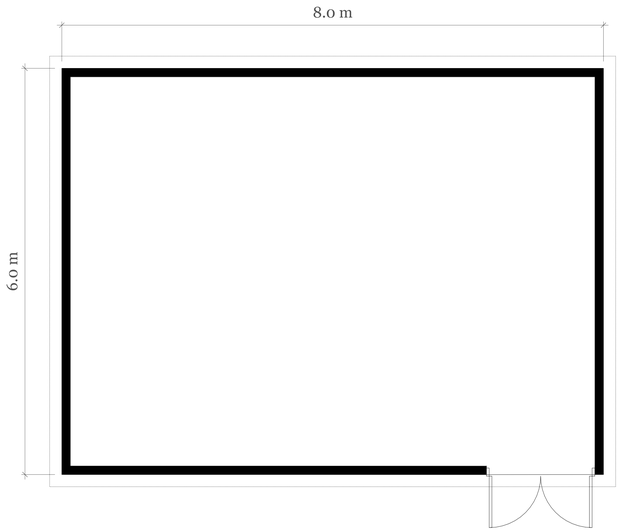
Date	Plan Number	Office Elevation (Building 1)
6-7-2023	1.9	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

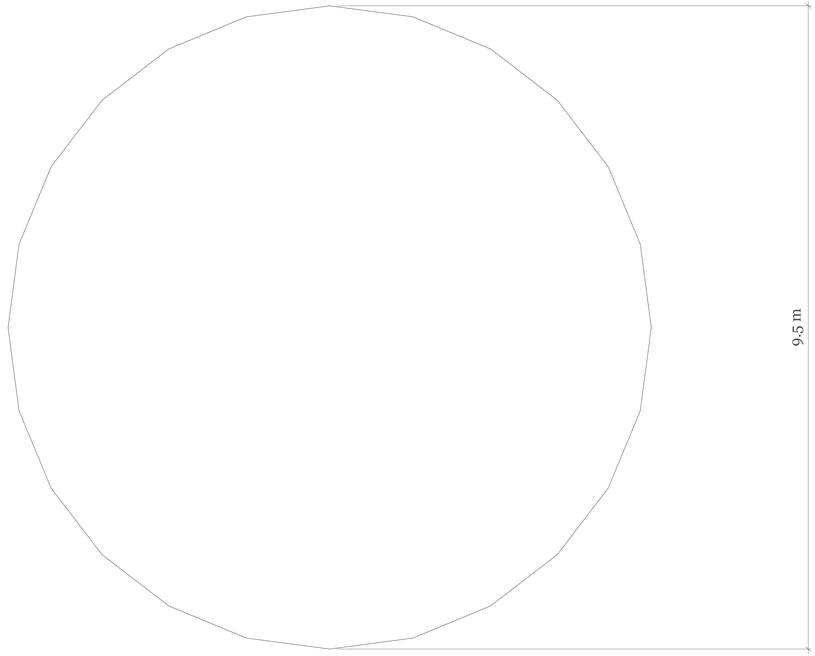
JACKSON
ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Office Elevation (Building 1)
Scale	1:50
Source	Jackson Environment and Planning Pty Ltd

01
A



Fire service pump room plan
Scale 1:32

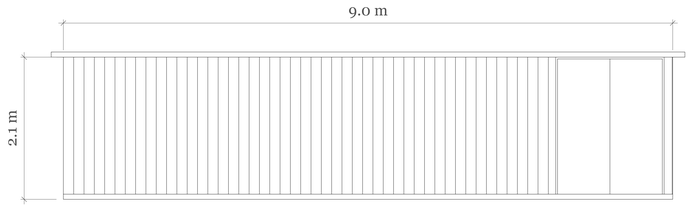


530,000L fire sprinkler tank top view
Scale 1:32

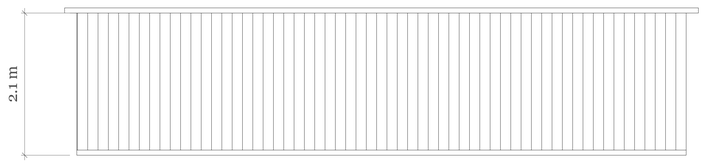
Schedule of Materials and Finishes

Wall Material: Colorbond Pale Eucalypt

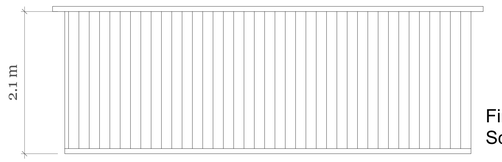
Roof Material : Colorbond Evening Haze



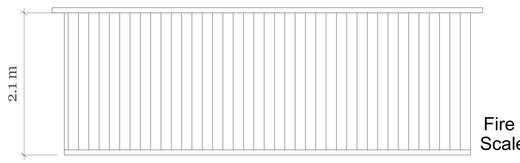
Fire service pump front view
Scale 1:32



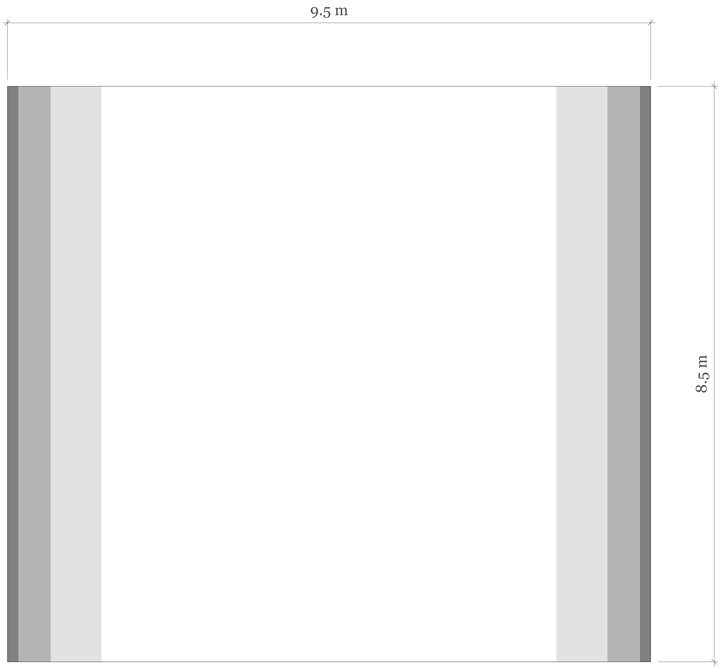
Fire service pump back view
Scale 1:32



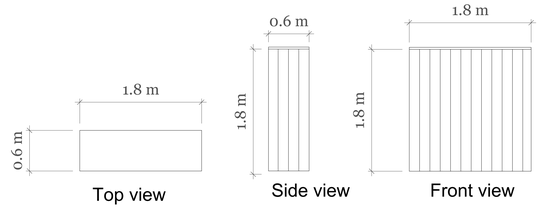
Fire service pump side view
Scale 1:32



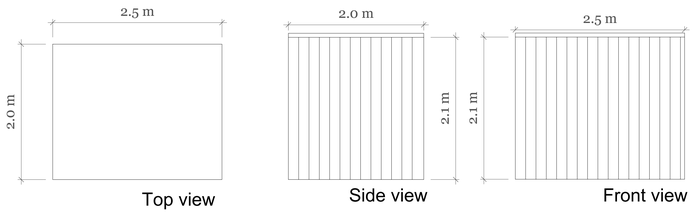
Fire service pump side view
Scale 1:32



530,000L fire sprinkler tank elevation
Scale 1:32



Fire hydrant booster valve assembly enclouser
Scale 1:32



Enclosure for rainwater tank reuse filters and control panel
Scale 1:32

Date	Plan Number	Fire pump room, Fire sprinkler tank
6-7-2023	1.10	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 1 Fire Pump room, fire sprinkler tank
Scale	1:32
Source	Jackson Environment and Planning Pty Ltd

01

A

Site Plan
Scale 1:600

Legend

- Roads
- Landscaping
- Internal Pedestrian Footpath
- External Pedestrian Footpath
- Gas Pipeline Easement
- Created Lot boundary

Development Statistics

Building Floor Area	10,863.68 m²
Office Ground Floor Area	607.07 m²
Office First Floor Area	1,324.6 m²
Gross Floor Area	12,795.35m²
Hardstand Area	10,283.88 m²
Total Lot Area	26,422.12 m²
Building 2 and office volume	185685.86 m³
Site Coverage	41%

Parking Rate - Building 2

1 Space per 300m² GFA

Required = 42

Provided = 42

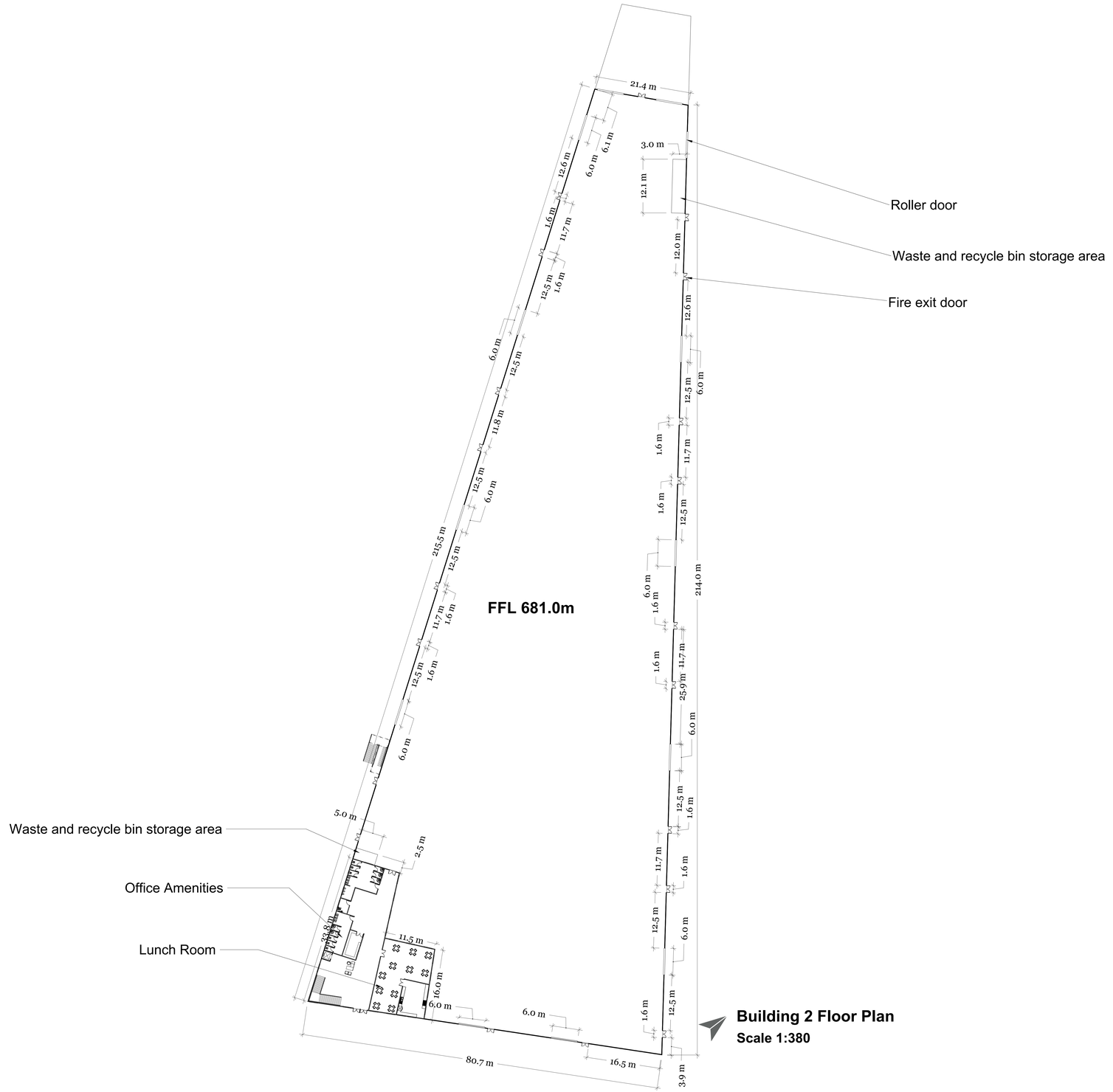
Date	Plan Number	Site Layout (Building 2)
6-7-2023	2.1	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivision and General Industry Development
Title	Building 2 Site Layout Plan
Scale	1:600
Source	Jackson Environment and Planning Pty Ltd

01
A



Building 2 Floor Plan
Scale 1:380

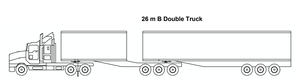
Date	Plan Number	Floor Plan (Building 2)
6-7-2023	2.2	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 2 Floor Plan
Scale	1:380
Source	Jackson Environment and Planning Pty Ltd

01
A



Tractor Width	2.5m
Trailer Width	2.5m
Tractor Track	2.5m
Trailer Track	2.5m
Lock to Lock Time	6.0
Steering Angle	20.6
Articulating Angle	70

Turning Path 26m B-Double Truck

Scale 1:500

Date	Plan Number	Turning Path 26 m Truck (Building 2)
6-7-2023	2.3	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

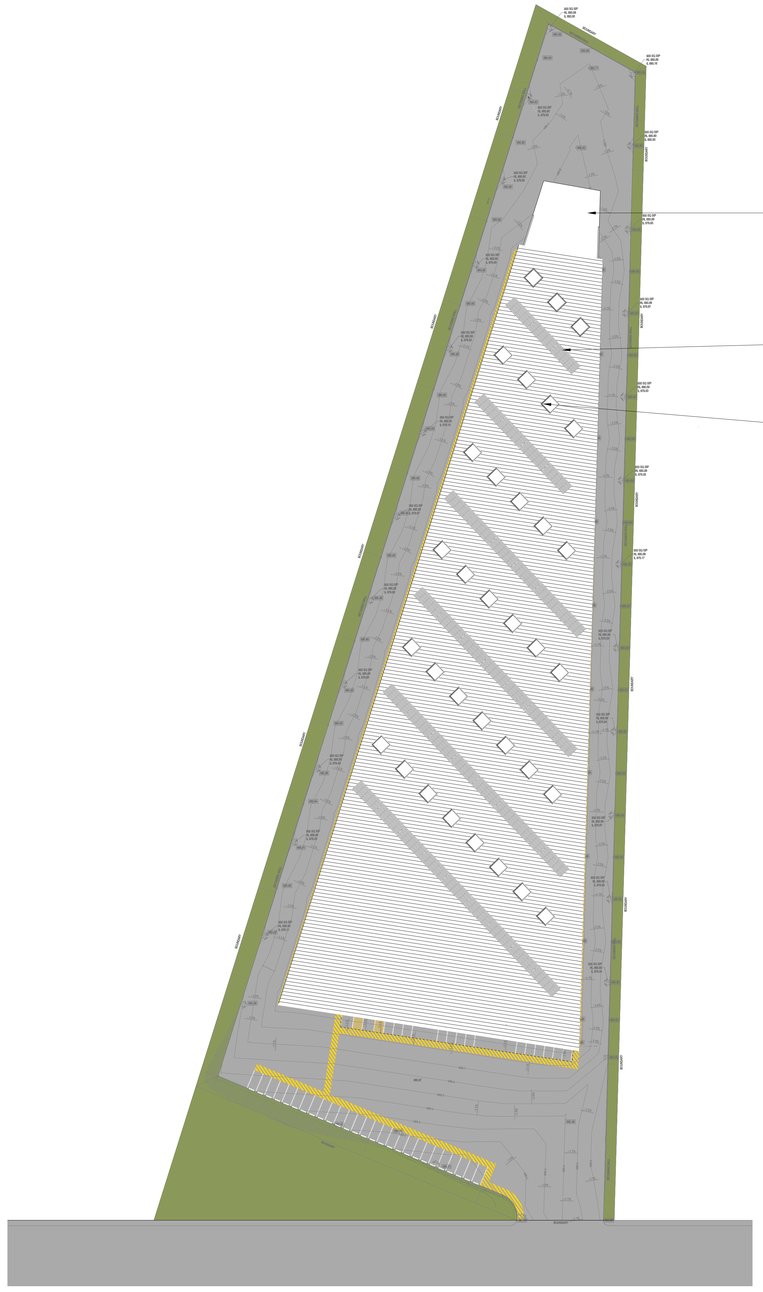
Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Turning Path 26m B-double Truck
Scale	1:500
Source	Jackson Environment and Planning Pty Ltd

01

A



Awning

Solar Panel

Skylights to be constructed from glass reinforced polyester
Each skylight bank not to exceed 14m2
Minimum of 1.5m between each skylight bank

Site Plan
Scale 1:600

Date	Plan Number	Roof Plan (Building 2)
6-7-2023	2.4	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

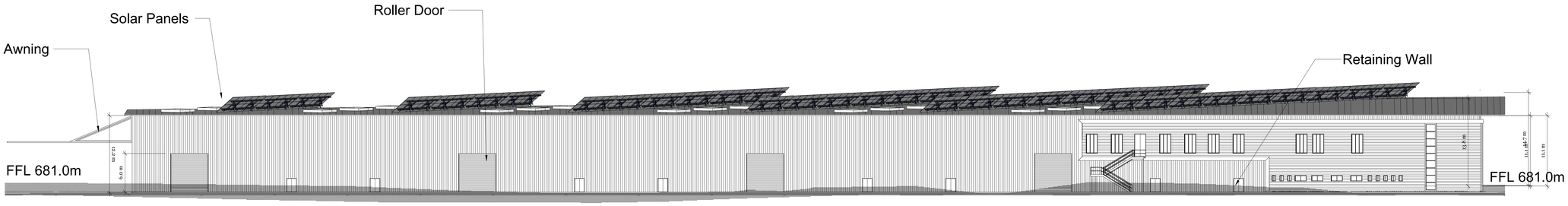
Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON
ENVIRONMENT AND PLANNING

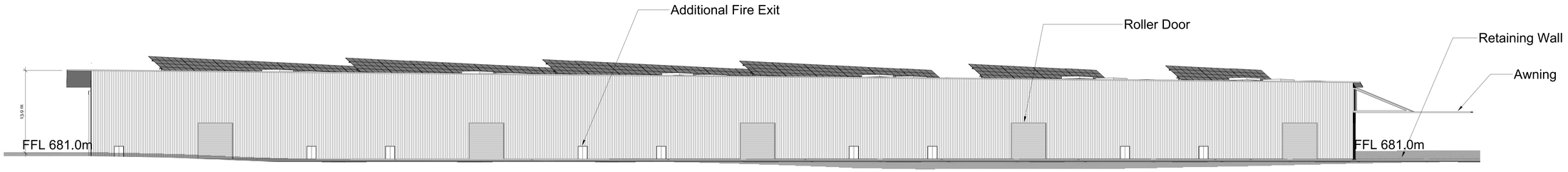
Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Roof Plan (Building 2)
Scale	1:600
Source	Jackson Environment and Planning Pty Ltd

01

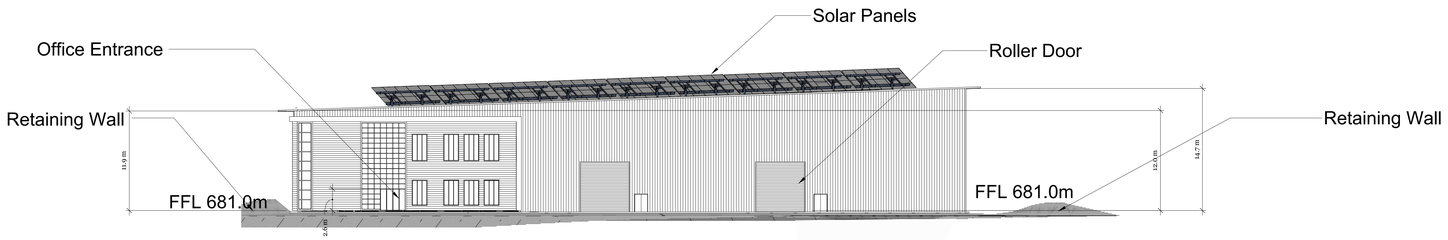
A



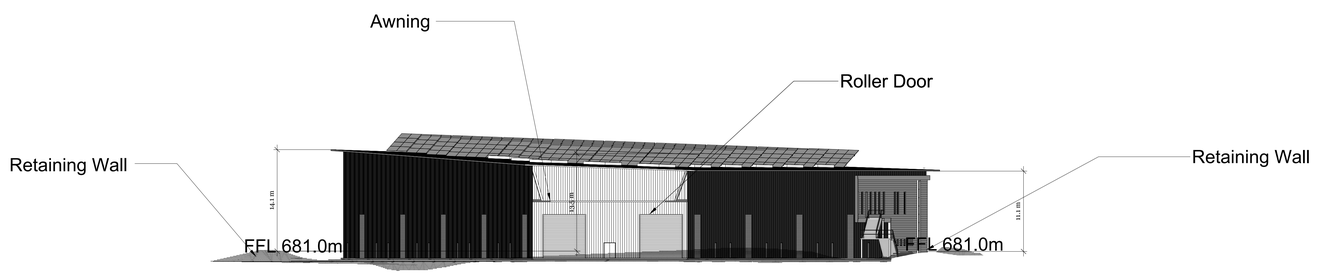
South Elevation
Scale 1:260



North Elevation
Scale 1:260



West Elevation
Scale 1:260



East Elevation
Scale 1:260

Schedule of Materials and Finishes

Wall Material: Colorbond Pale Eucalypt	
Roof Material : Colorbond Evening Haze	
Office Wall Material: Coen Composite Wood Panel (oak) or equivalent	
Office Roof Material : Colorbond Evening Haze	

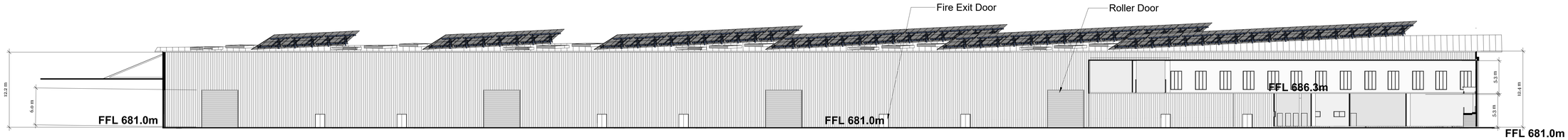
Date	Plan Number	Elevation Plan (Building 2)
6-7-2023	2.5	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

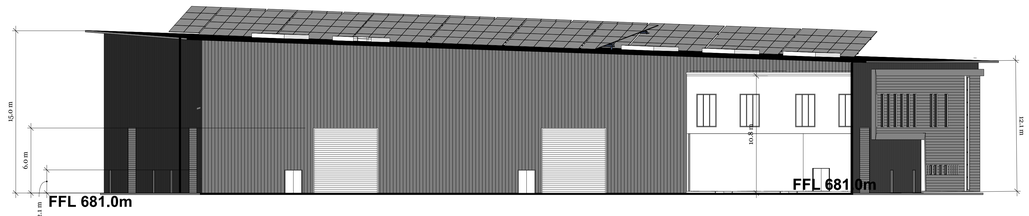
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 2 Elevation
Scale	1:300
Source	Jackson Environment and Planning Pty Ltd

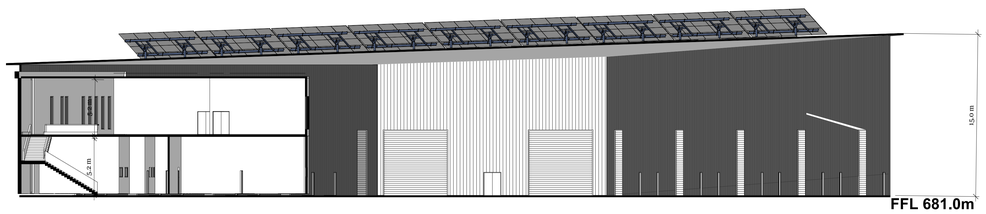
01
A



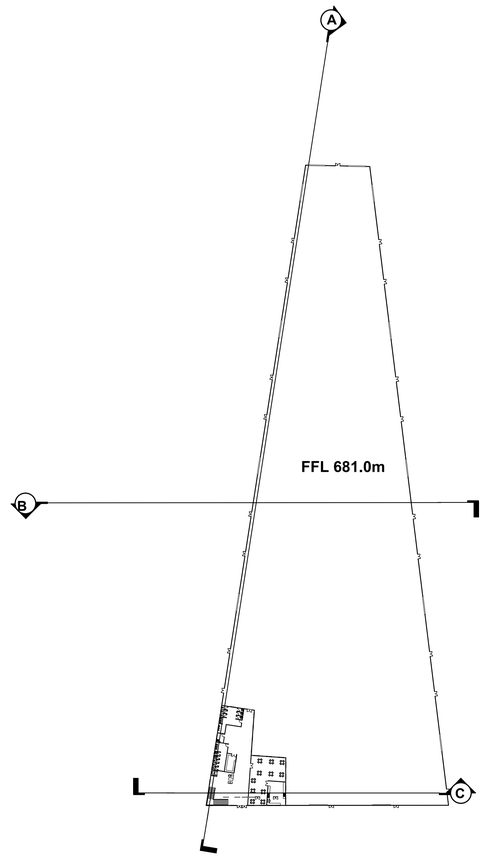
Section A
Scale 1:200



Section B
Scale 1:250



Section C
Scale 1:250



Building 2 Floor Plan
Scale 1:720

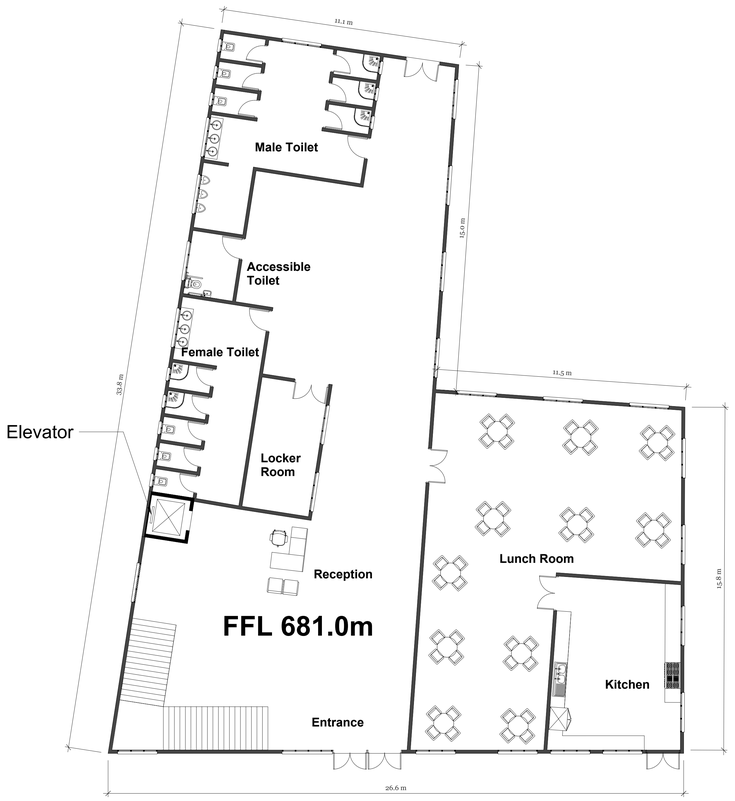
Date	Plan Number	Section (Building 2)
6-7-2023	2.6	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

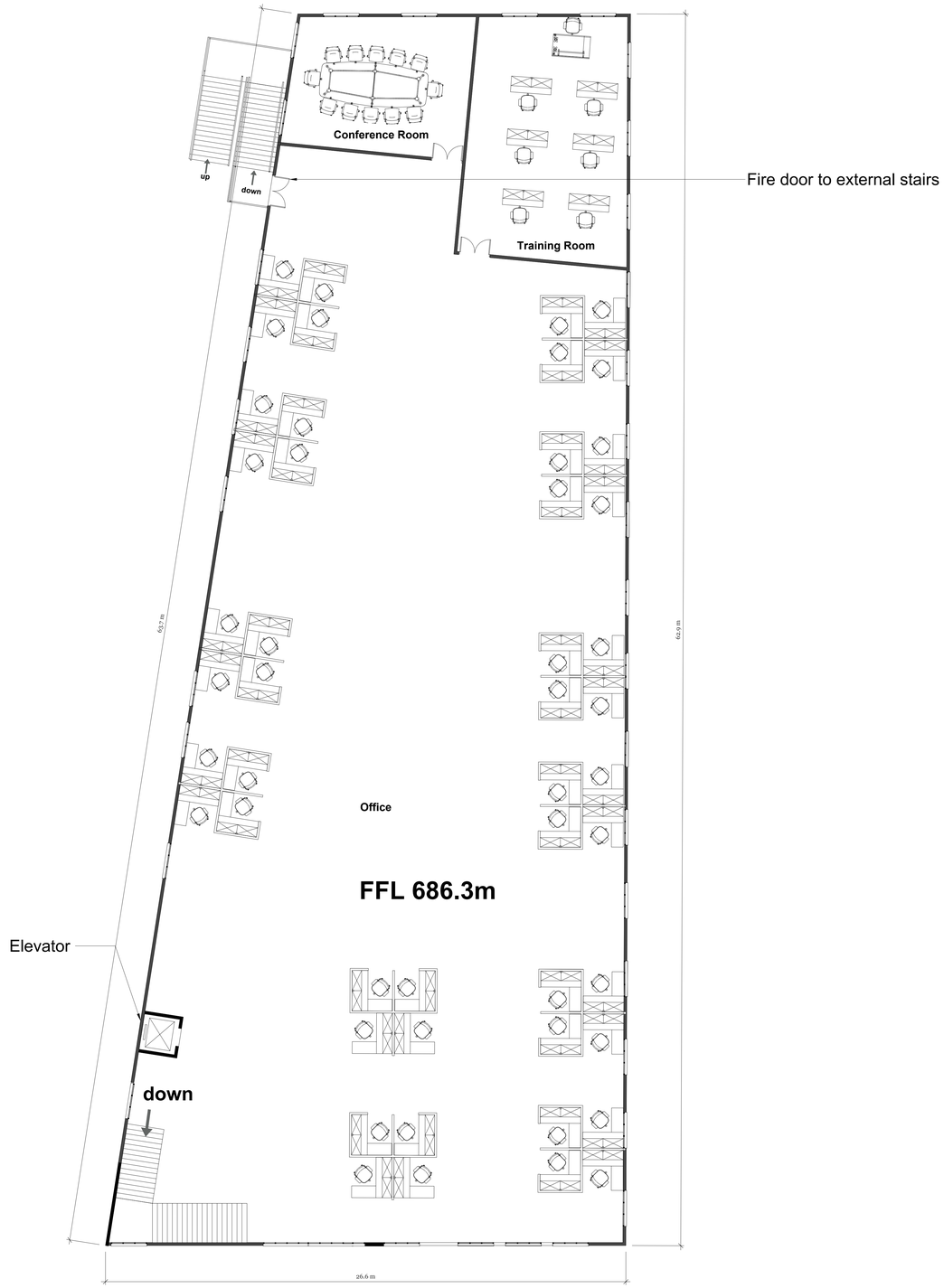
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 2 Section
Scale	1:200
Source	Jackson Environment and Planning Pty Ltd

01
A



Office Ground Floor Plan
Scale 1:150



Office First Floor Plan
Scale 1:100

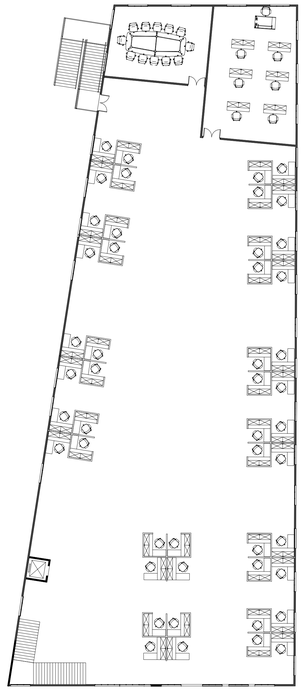
Date	Plan Number	Office Floor Plan (Building 2)
6-7-2023	2.7	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

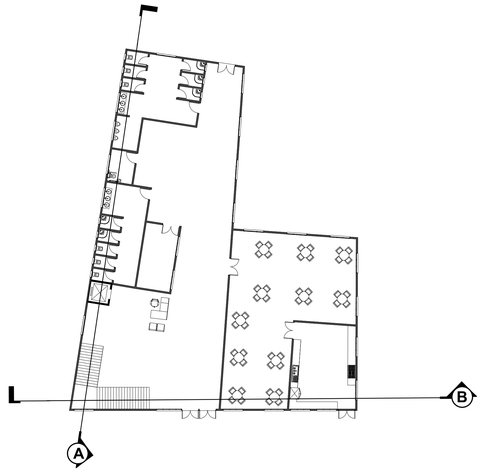
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 2 Office Floor Plan
Scale	1:100
Source	Jackson Environment and Planning Pty Ltd

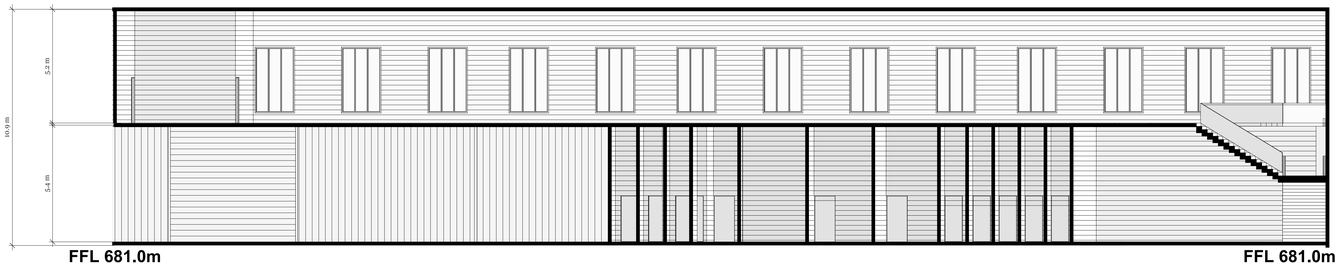
01
A



Office First Floor Plan
Scale 1:100



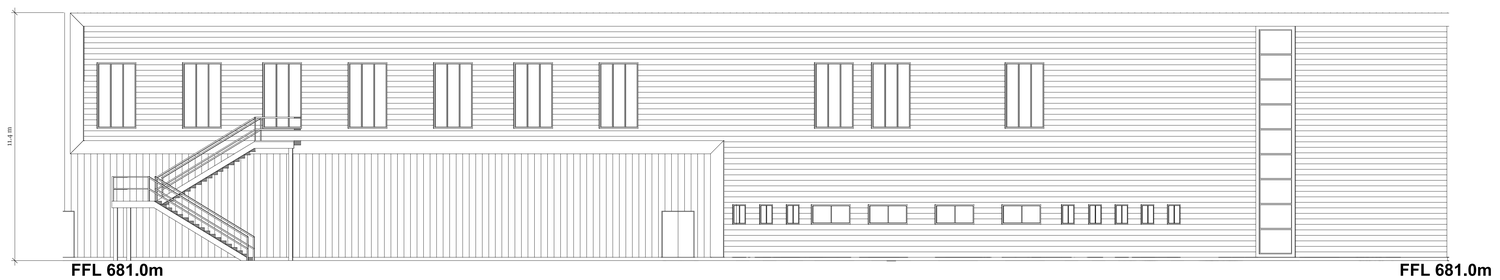
Office Ground Floor Plan
Scale 1:150



Section A
Scale 1:100

East Elevation
Scale 1:100

Section B
Scale 1:100



South Elevation
Scale 1:100

West Elevation
Scale 1:100

North Elevation
Scale 1:100

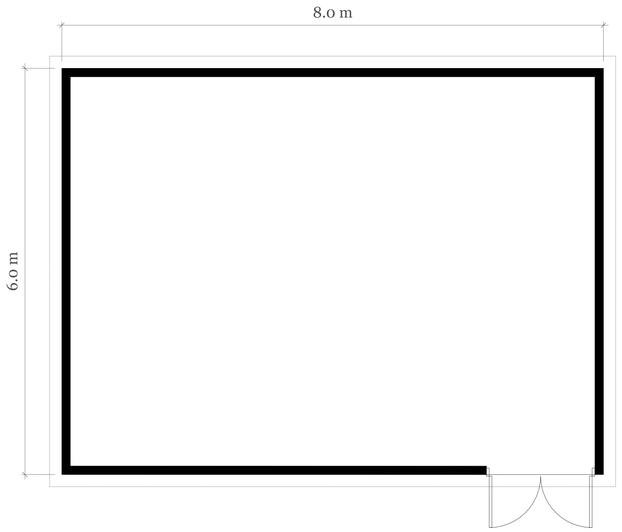
Date	Plan Number	Office Elevation & Section Plan (Building 2)
6-7-2023	2.8	2 Bowman Road, Moss Vale (Part of Lot 51, DP130176, Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

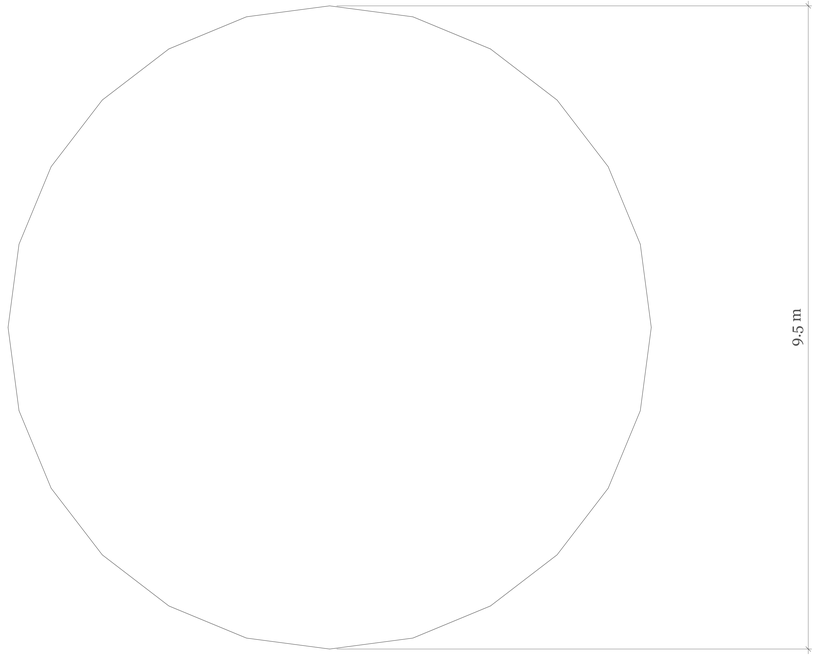
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 2 Office Floor Plan
Scale	1:100
Source	Jackson Environment and Planning Pty Ltd

01
A



Fire service pump room plan
Scale 1:32

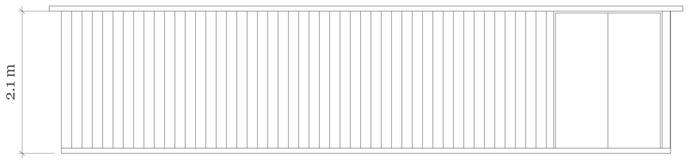


530,000L fire sprinkler tank top view
Scale 1:32

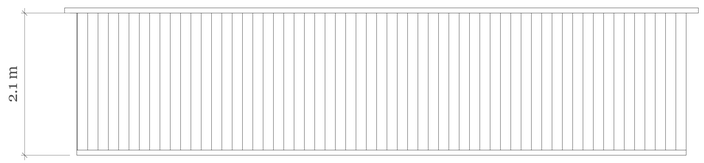
Schedule of Materials and Finishes

Wall Material: Colorbond Pale Eucalypt

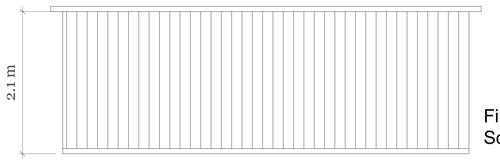
Roof Material : Colorbond Evening Haze



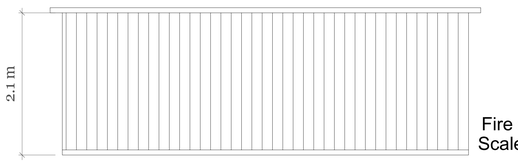
Fire service pump front view
Scale 1:32



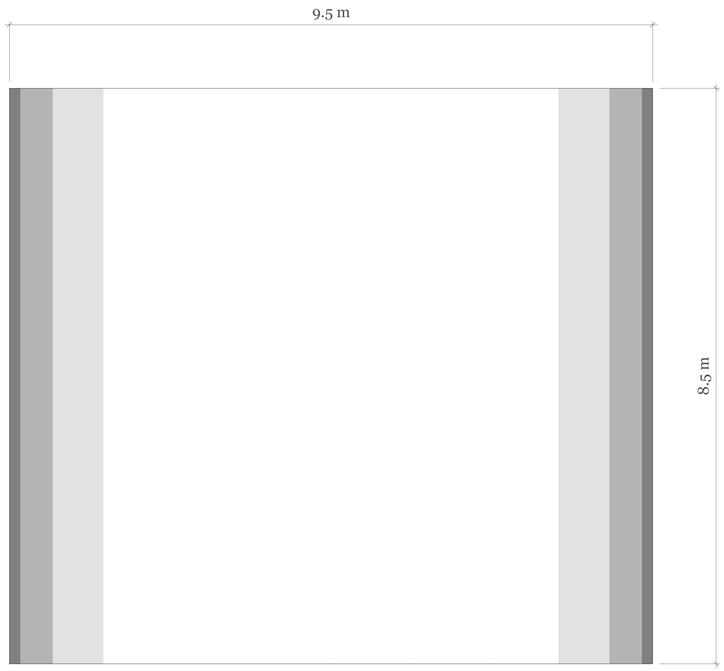
Fire service pump back view
Scale 1:32



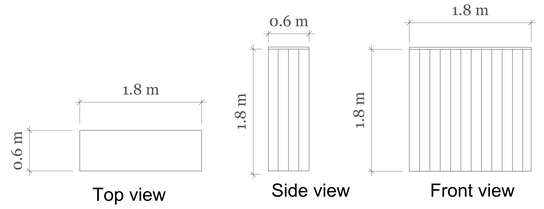
Fire service pump side view
Scale 1:32



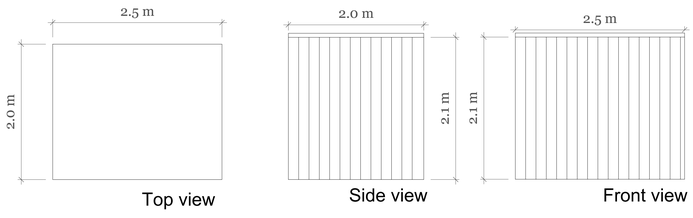
Fire service pump side view
Scale 1:32



530,000L fire sprinkler tank elevation
Scale 1:32



Fire hydrant booster valve assembly enclouser
Scale 1:32



Enclosure for rainwater tank reuse filters and control panel
Scale 1:32

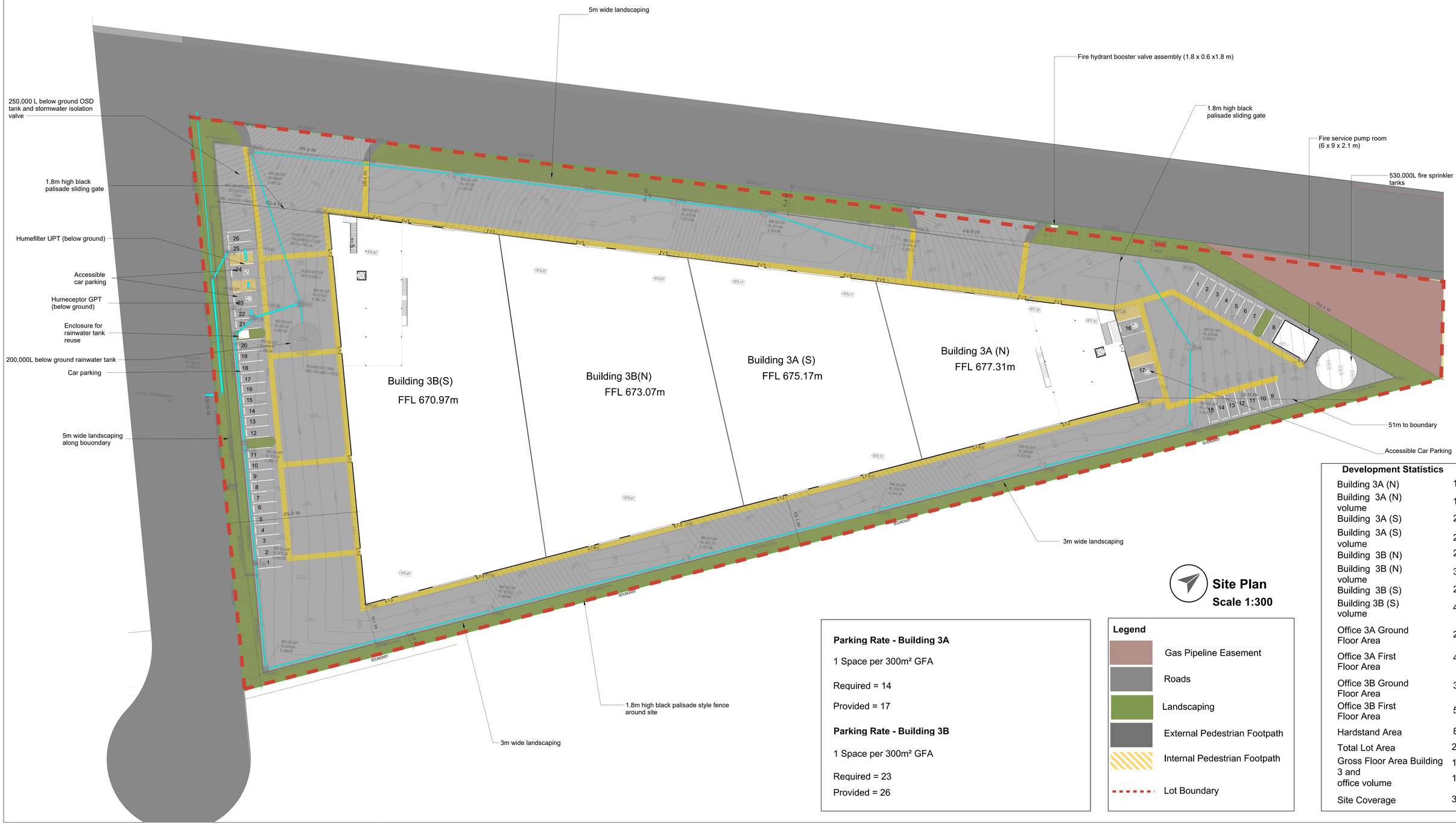
Date	Plan Number	Fire pump room, Fire sprinkler tank
6-7-2023	2.9	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 2 Fire Pump room, fire sprinkler tank
Scale	1:32
Source	Jackson Environment and Planning Pty Ltd

01
A



Site Plan
Scale 1:300

Parking Rate - Building 3A

1 Space per 300m² GFA

Required = 14

Provided = 17

Parking Rate - Building 3B

1 Space per 300m² GFA

Required = 23

Provided = 26

Legend

- Gas Pipeline Easement
- Roads
- Landscaping
- External Pedestrian Footpath
- Internal Pedestrian Footpath
- Lot Boundary

Development Statistics

Building 3A (N)	1394.26 m²
Building 3A (N) volume	18870.57 m³
Building 3A (S)	2092.76 m²
Building 3A (S) volume	21973.25 m³
Building 3B (N)	2949.87 m²
Building 3B (N) volume	33797.26 m³
Building 3B (S)	2971.83 m²
Building 3B (S) volume	41973.39 m³
Office 3A Ground Floor Area	257.89 m²
Office 3A First Floor Area	432.78 m²
Office 3B Ground Floor Area	376.15 m²
Office 3B First Floor Area	517.62 m²
Hardstand Area	8055.64 m²
Total Lot Area	26119.49 m²
Gross Floor Area Building 3 and office volume	10993.04 m² 170,411.87m³
Site Coverage	38.45%

Date	Plan Number	Site Layout (Building 3A, 3B)
6-7-2023	3.1	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivision and General Industry Development
Title	Building 3A, 3B Site Layout Plan
Scale	1:300
Source	Jackson Environment and Planning Pty Ltd

01 A

Site Plan
Scale 1:300

Date	Plan Number	19m Truck Turning Path
6-7-2023	3.2	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3 semi-trailer truck turning path
Scale	1:300
Source	Jackson Environment and Planning Pty Ltd

01
A

Building 3A and 3B floor plan

Scale 1:200

Date	Plan Number	Building 3A 3B Floor Plan
6-7-2023	3.3	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd

Strategy | Infrastructure | Compliance | Procurement

A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3A 3B Floor Plan
Scale	1:200
Source	Jackson Environment and Planning Pty Ltd

01

A

Building 3A and 3B Roof Plan
Scale 1:300

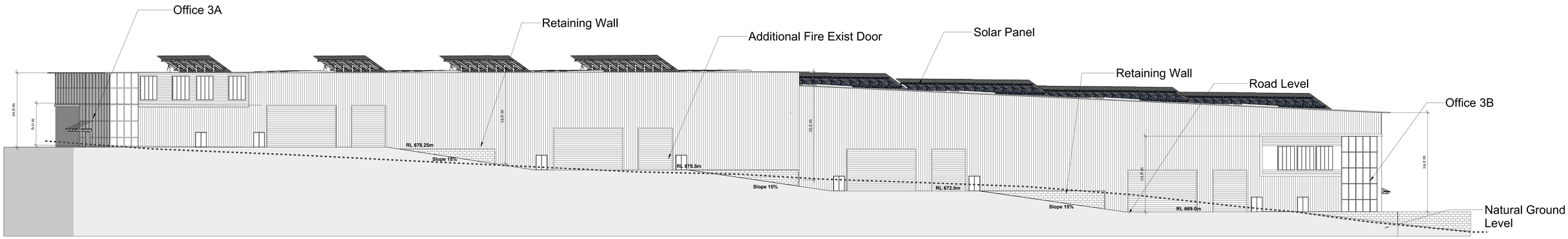
Date	Plan Number	Building 3A and 3B Roof Plan
6-7-2023	3.4	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

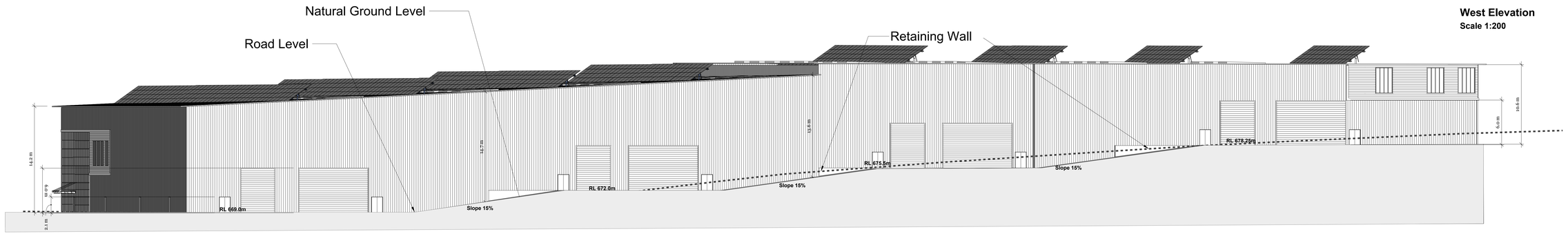
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3A 3B Roof Plan
Scale	1:300
Source	Jackson Environment and Planning Pty Ltd

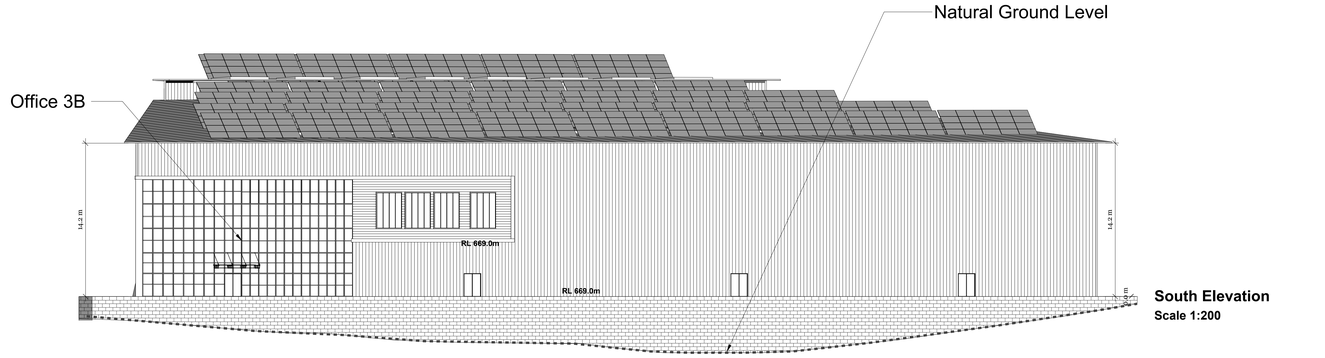
01
A



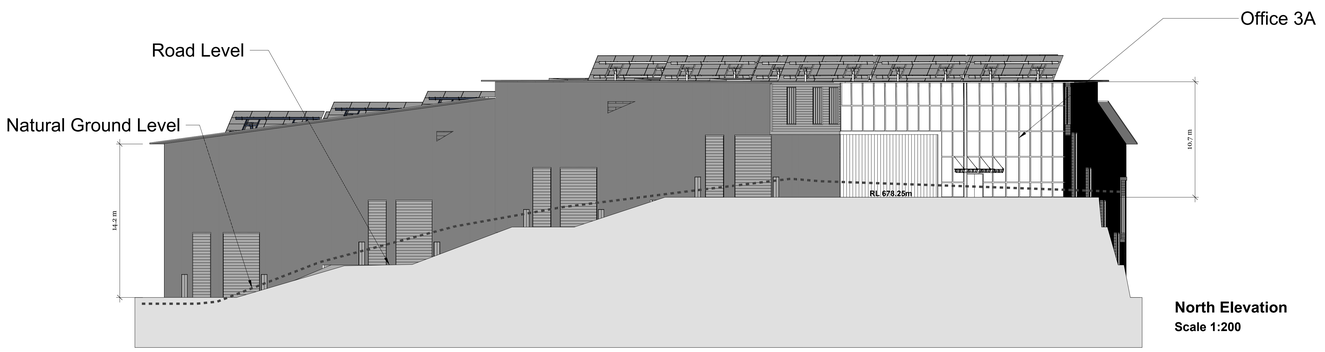
West Elevation
Scale 1:200



East Elevation
Scale 1:200



South Elevation
Scale 1:200



North Elevation
Scale 1:200

Schedule of Materials and Finishes

Wall Material: Colorbond Pale Eucalypt	
Roof Material : Colorbond Evening Haze	
Office Wall Material: Coen Composite Wood Panel (oak) or equivalent	
Office Roof Material : Colorbond Evening Haze	

Date	Plan Number	Building 3A and 3B Elevation
6-7-2023	3.5	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

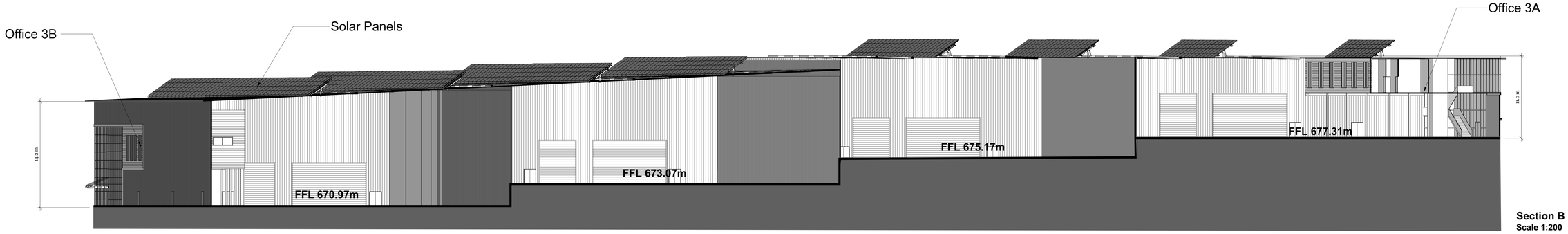
Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3A and 3B Elevation
Scale	1:200
Source	Jackson Environment and Planning Pty Ltd

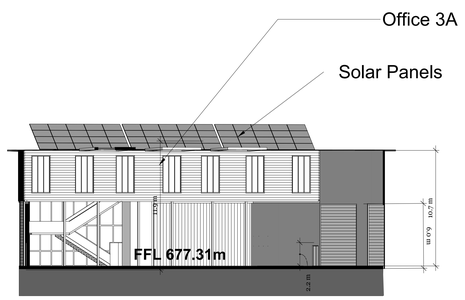
01
A

Section A
Scale 1:100

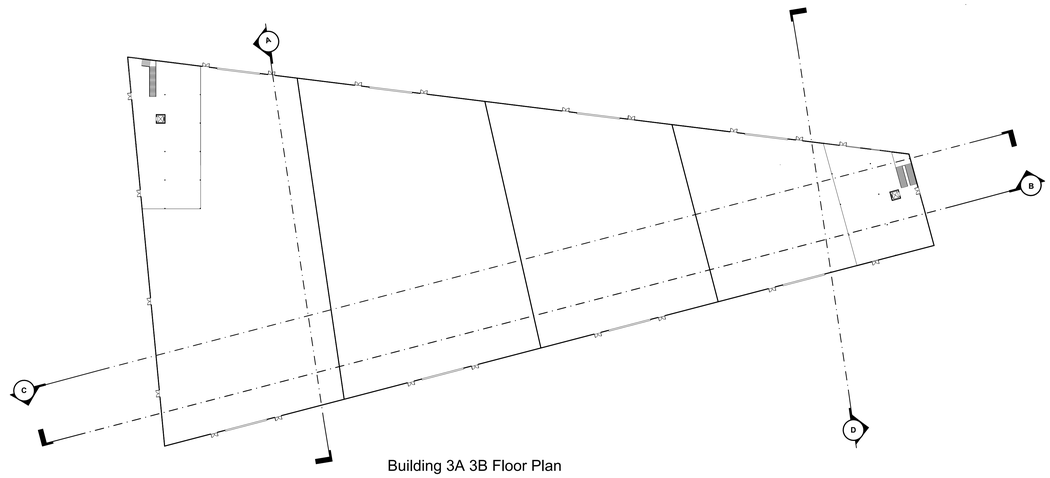


Section B
Scale 1:200

Section C
Scale 1:200



Section D
Scale 1:200



Building 3A 3B Floor Plan
Scale 1:500

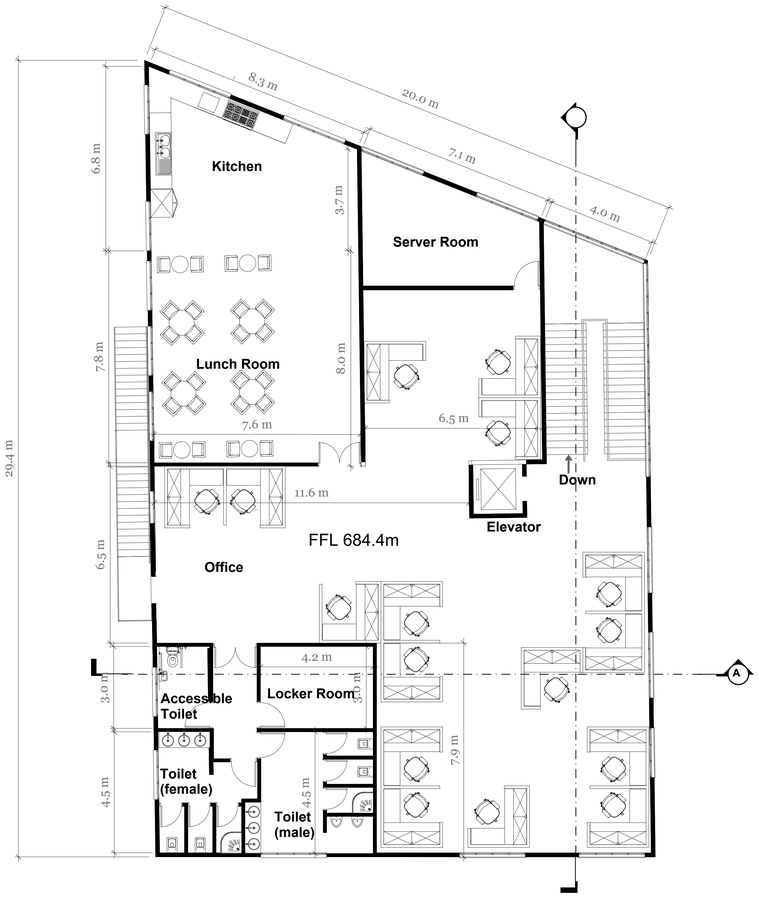
Date	Plan Number	Building 3A and 3B Section
6-7-2023	3.6	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

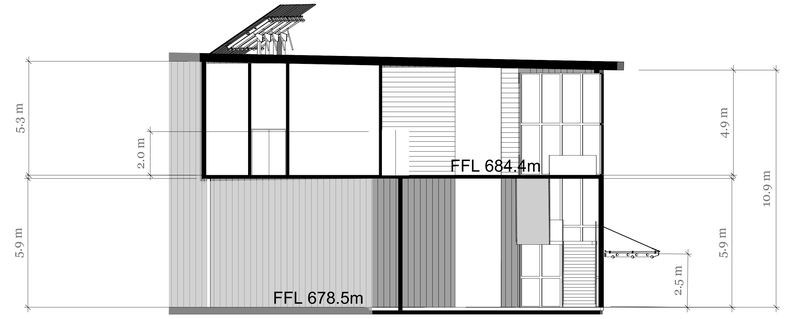
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3A and 3B Section
Scale	1:200 1:100
Source	Jackson Environment and Planning Pty Ltd

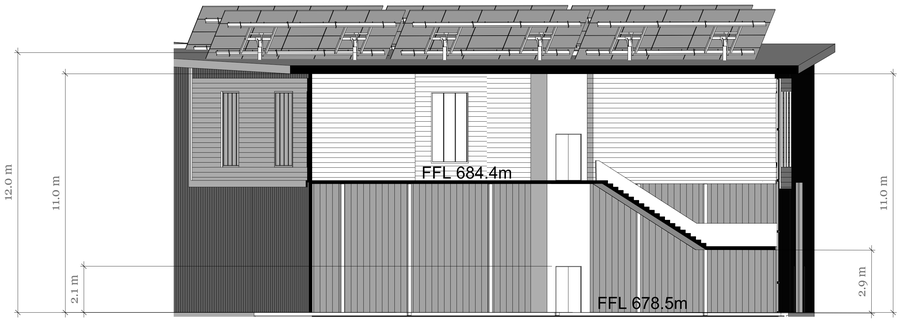
01
A



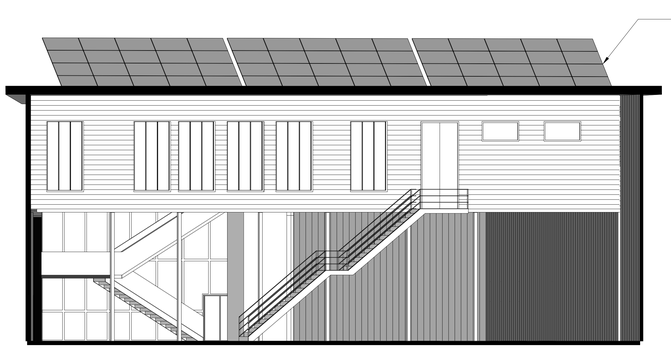
Office 3A Mezzanine Floor Plan
Scale 1:80



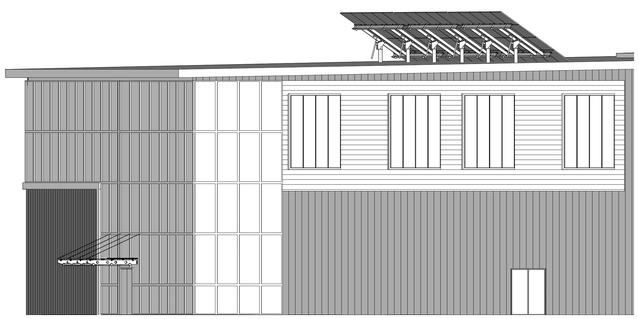
Section A
Scale 1:100



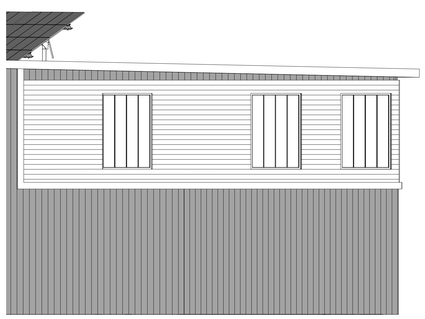
Section B
Scale 1:100



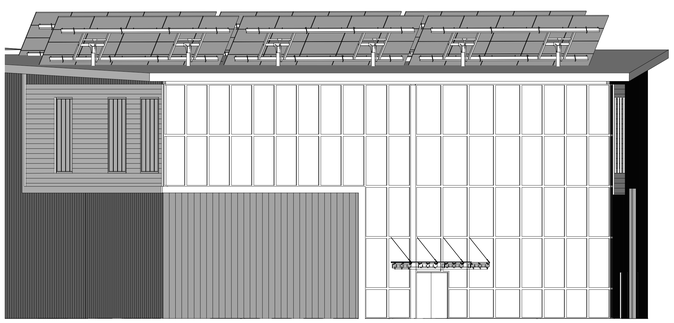
North Elevation
Scale 1:100



East Elevation
Scale 1:100



South Elevation
Scale 1:100



West Elevation
Scale 1:100

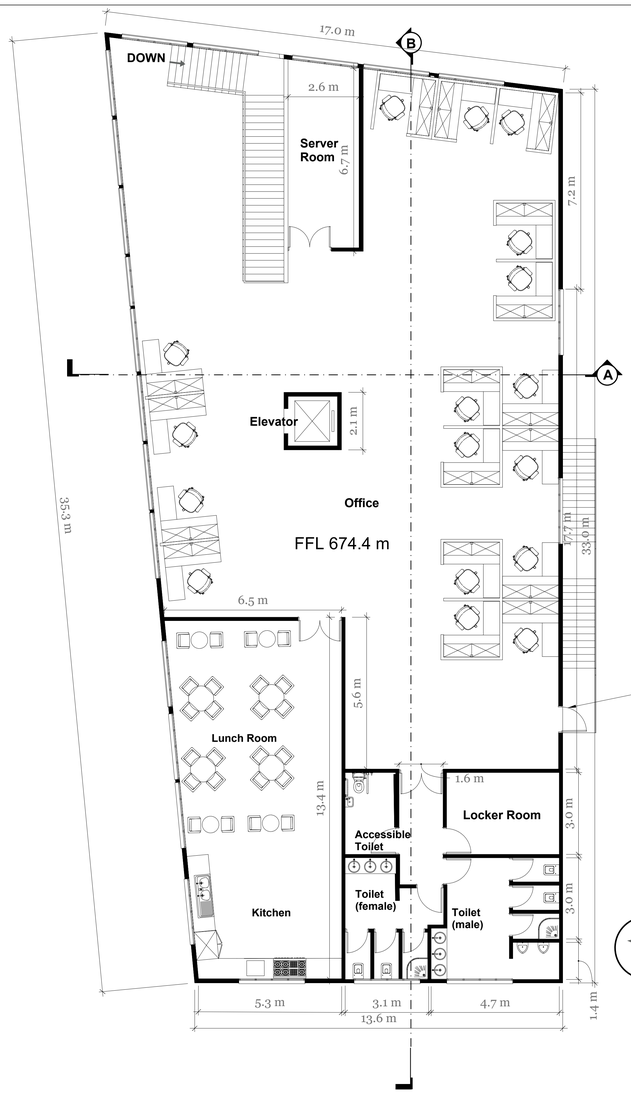
Date	Plan Number	Office 3A Plan, Elevation, Section
6-7-2023	3.7	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

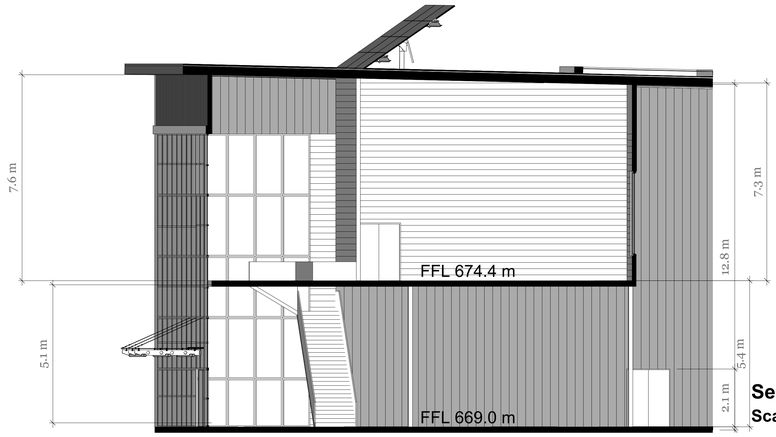
Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3A Office Floor Plan, Elevation and Section
Scale	1:100
Source	Jackson Environment and Planning Pty Ltd

01
A



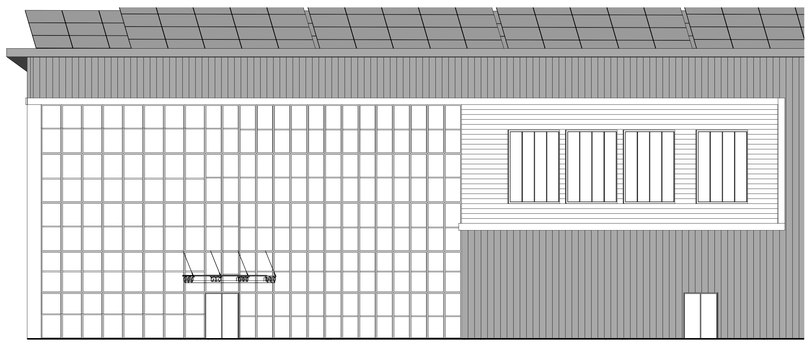
Fire door to internal stair

Office 3B Mezzanine Floor Plan
Scale 1:80

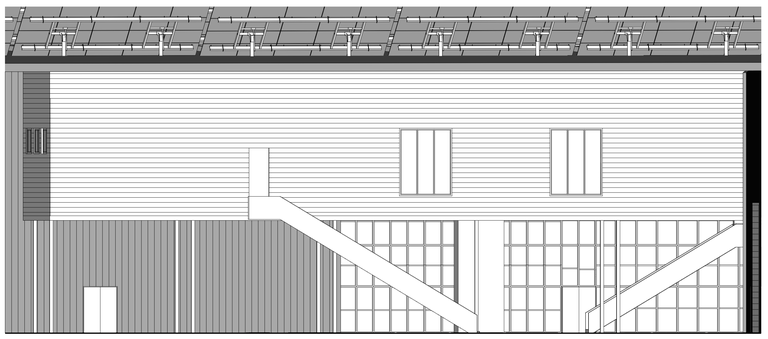


Section A
Scale 1:80

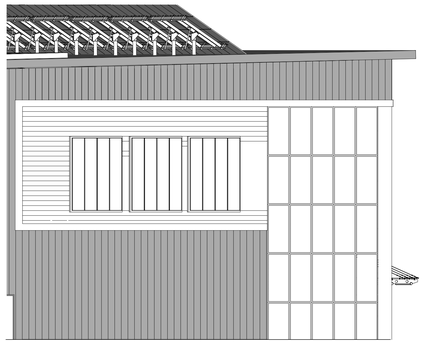
Section B
Scale 1:80



West Elevation
Scale 1:100



East Elevation
Scale 1:100



South Elevation
Scale 1:100

West Elevation
Scale 1:100

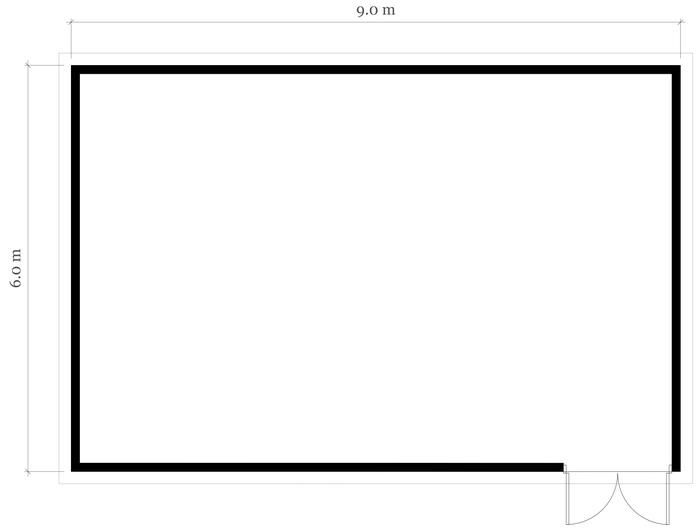
Date	Plan Number	Office 3B Plan, Elevation, Section
6-7-2023	3.8	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

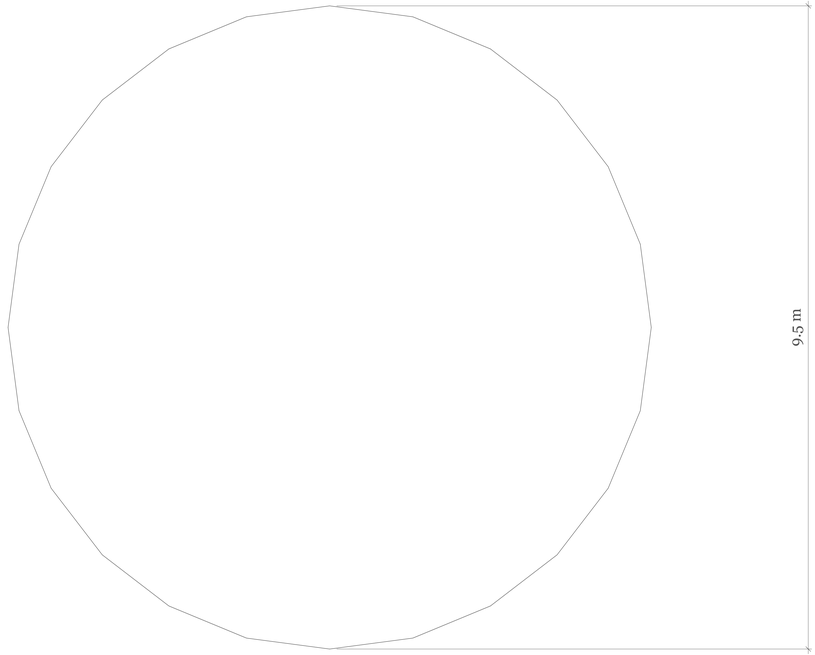
JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3B Office Floor Plan, Elevation and Section
Scale	1:100
Source	Jackson Environment and Planning Pty Ltd

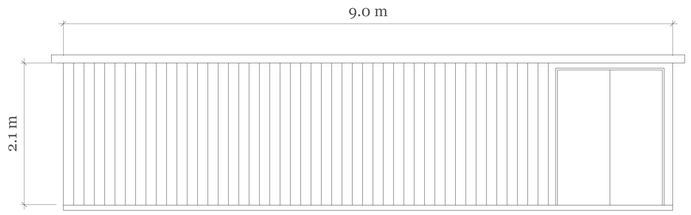
01
A



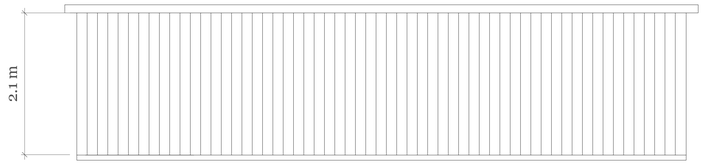
Fire service pump room plan
Scale 1:32



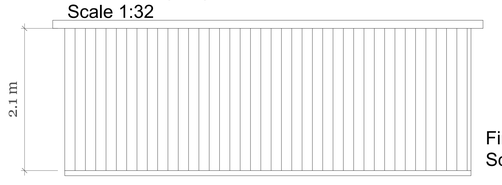
530,000L fire sprinkler tank top view
Scale 1:32



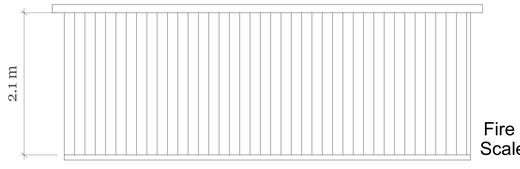
Fire service pump front view
Scale 1:32



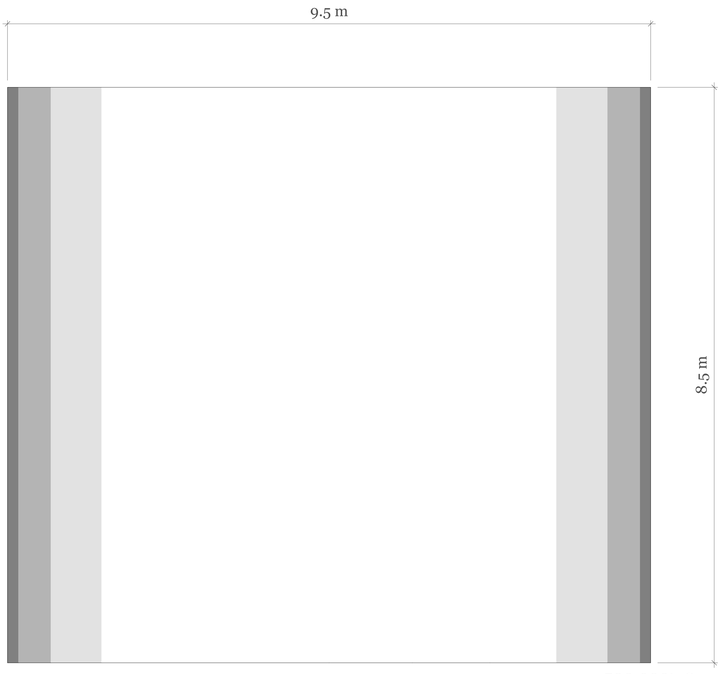
Fire service pump back view
Scale 1:32



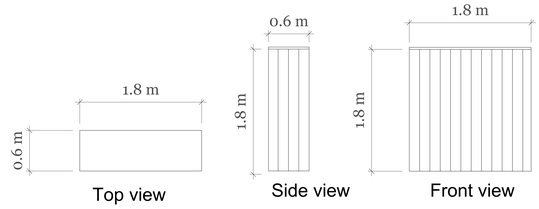
Fire service pump side view
Scale 1:32



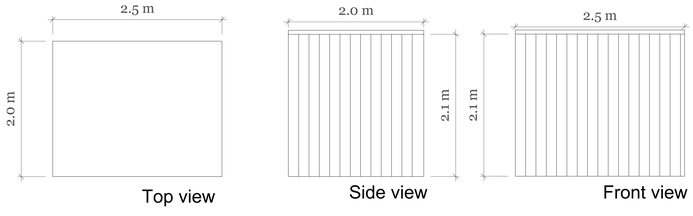
Fire service pump side view
Scale 1:32



530,000L fire sprinkler tank elevation
Scale 1:32



Fire hydrant booster valve assembly enclouser
Scale 1:32



Enclosure for rainwater tank reuse filters and control panel
Scale 1:32

Date	Plan Number	Fire pump room, Fire sprinkler tank
6-7-2023	3.9	2 Bowman Road, Moss Vale (Lot 2, DP1070888)

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JACKSON ENVIRONMENT AND PLANNING

Client	SAAS Aus Pty Ltd
Project	Industrial Subdivsion and General Industry Developpment
Title	Building 3A, 3B Fire Pump room, fire sprinkler tank
Scale	1:32
Source	Jackson Environment and Planning Pty Ltd

01
A

APPENDIX B

SITE PHOTOGRAPHS

Site Photographs

Client Name: Jackson Environment and Planning Pty Ltd

Site Location: 2 Bowman Road, Moss Vale NSW 2577

Project Number: CES220803-JEP

Date:	Plate No:
15/11/2022	1

Description:
Area of site close to the location of BH01. View looking north.

BH01 is the most westerly borehole of the site placed in the proposed footprint of warehouse 2.

Date:	Plate No:
15/11/2022	2

Description:
Area of site close to the location of BH02. Photograph taken approximately halfway in between BH01 and BH02.
View looking east.

BH02 is located within the proposed footprint of warehouse 2.

Site Photographs

Client Name: Jackson Environment and Planning Pty Ltd	**Site Location:** 2 Bowman Road, Moss Vale NSW 2577	**Project Number:** CES220803-JEP

Date:	**Plate No:**
16/11/2022	3

Description:
Drill rig tracking to BH04 across boggy paddock in the north of the site. View looking northwest.

BH04 is in the proposed footprint of warehouse 1.

Date:	**Plate No:**
21/10/2022	4

Description:
Drill rig set up on BH05, looking south.

BH05 is in the proposed footprint of warehouse 1.

Site Photographs

Client Name: Jackson Environment and Planning Pty Ltd	**Site Location:** 2 Bowman Road, Moss Vale NSW 2577	**Project Number:** CES220803-JEP

Date:	**Plate No:**
16/11/2022	5

Description:
Drill rig setting up on BH08 in the south of the site. View looking south.

BH08 is in the proposed footprint of warehouse 3B.

Date:	**Plate No:**
16/11/2022	6

Description:
Drill rig set up on BH07, close to the eastern boundary of the site. View looking northeast.

BH07 is in the proposed footprint of warehouse 3A.

Site Photographs

Client Name: Jackson Environment and Planning Pty Ltd	**Site Location:** 2 Bowman Road, Moss Vale NSW 2577	**Project Number:** CES220803-JEP

Date:	**Plate No:**
16/11/2022	7

Description:
View of recovered material from BH04 at 5.20m depth.

Moderately to slightly weathered shale at the end of hole depth.

Date:	**Plate No:**
16/11/2022	8

Description:
View of recovered material from BH08 at 5.00m depth.

Extremely weathered shale recovered as shaley clay. Groundwater was intersected at 4.50m depth.

Site Photographs

Client Name: Jackson Environment and Planning Pty Ltd

Site Location: 2 Bowman Road, Moss Vale NSW 2577

Project Number: CES220803-JEP

Date:	Plate No:
16/11/2022	9

Description:
View of recovered material from BH03 from 0.10m to 0.50m depth.

Silty clay of medium plasticity inferred to be residual soil.

Date:	Plate No:
24/10/2022	10

Description:
View of ground conditions around BH03.

The ground was saturated following several days of heavy rainfall across the site.

APPENDIX C

ENGINEERING BOREHOLE LOGS AND CORE PHOTOGRAPHS

Project ID:	CES220803-JEP
Client:	Jackson Environment and Planning Pty Ltd
Project:	2 Bowman Street
Location:	Moss Vale, NSW

CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble, NSW 2073
PH: (02) 8569 2200 FAX: (02) 9552 4399
www.consultingearth.com.au

LOG ID: BH01

Sheet: 1 of 1

X-Coord:	256946	GDA 94 MGA 56	**Date Commenced:**	15/11/2022	**Logged by:** A. Crabtree
Y-Coord:	6175309		**Date Completed:**	15/11/2022	**Checked by:** I. Wong
Surface Elevation (RL) :	681.6 mAHD		**Hole Diameter (mm):**	120	

Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa)	Notes and additional observations
0.00					SM	Clayey SILT: low plasticity, dark brown, with organics [Topsoil]	VS	M				BH01 is in the north-west of the site in a large paddock.
					CI	Silty CLAY: medium plasticity, brown/grey [Residual Soil]	S					
0.50	681				CI-CH	CLAY: medium to high plasticity, orange brown, trace subangular, medium sand. [Residual Soil]	St - VSt		#7 0.5 - 0.75	SPT@0.5-0.95 3,3,5 N=8		
								M - D				
1.00												
1.50	680									SPT@1.5-1.95 1,6,9 N=15		
2.00												
2.50	679	Continuous Flight Auger										
3.00						From 3.0m becomes stiffer drilling and colour changes to pale orange/brown.				SPT@3.0-3.45 11,300mm HB N=R		
3.50	678				SP	CLAYEY SAND: Inferred extremely weathered sandstone recovered as Clayey Sand. Fine grained, orange/brown, inferred low strength. [Extremely Weathered Rock]	D - H	D				
4.00					CI	SHALEY CLAY: Inferred extremely weathered shale recovered as clay. Medium to high plasticity, fine grained, dark grey. Dark grey, fine to medium, angular shale fragments. Inferred medium to high strength. [Extremely Weathered Rock]	H					
4.50	677											
5.00						SANDSTONE: Fine to medium grained, pale grey/blue, inferred medium to high strength. [Moderately Weathered Rock]						
					SP		H					
5.50												5.50m End of Hole depth

Drill Company:	Stratacore Drilling Pty Ltd	**Operator Name:**	Daniel
Machine Type:	GEO 300		

Refer to Standard Sheets for details of abbreviations

Project ID:	CES220803-JEP		
Client:	Jackson Environment and Planning Pty Ltd		
Project:	2 Bowman Street		
Location:	Moss Vale, NSW		

CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble, NSW 2073
PH: (02) 8569 2200 FAX: (02) 9552 4399
www.consultingearth.com.au

LOG ID: BH02

Sheet: 1 of 1

X-Coord:	257012	GDA 94 MGA 56	**Date Commenced:**	15/11/2022	**Logged by:** A. Crabtree
Y-Coord:	6175232		**Date Completed:**	15/11/2022	**Checked by:** I. Wong
Surface Elevation (RL) :	682	mAHD	**Hole Diameter (mm):**	120	

Drilling Information				LITHOLOGY					Samples	Tests		
Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa) 100 200 300 400	Notes and additional observations
0.00	682	Continuous Flight Auger			SM	Clayey SILT: low plasticity, dark brown, with organics (rootlets and straw). [Topsoil]	VS	M				BH02 is to the west of the site in a paddock northwest of the farm buildings.
					SM	CLAYEY SILT: low plasticity, fine grained, pale yellow/brown [Residual Soil]	VS	M - W	#8 0.15 - 0.5			
0.50					CH	CLAY: high plasticity, orange brown with red and grey mottling. Trace angular, medium shale fragments. [Residual Soil]	St - VSt	M	#9 0.5 - 1.0	SPT@0.5-0.95 3,4,5 N=9		
1.00	681											
1.50										SPT@1.5-1.95 4,10,14 N=24		
2.00	680											
2.50												
3.00	679					Coring commenced at 3.1m depth. Refer to BH02 corelog.						
3.50												

Drill Company:	Stratacore Drilling Pty Ltd	**Operator Name:**	Daniel
Machine Type:	GEO 300		

Refer to Standard Sheets for details of abbreviations

Project ID:	CES220803-JEP
Client:	Jackson Environment and Planning Pty Ltd
Project:	2 Bowman Street
Location:	Moss Vale, NSW

CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble NSW 2073
PH: (02) 8569 2200 FAX: (02) 9983 0582
www.consultingearth.com.au

Corehole ID: BH02

Sheet: 2 of 2

X-Coord:	6175232	**Date Commenced:**	15/11/2022	**Logged by:**	A. Crabtree
Y-Coord:	257012	**Date Completed:**	15/11/2022	**Checked by:**	I. Wong
Surface Elevation (RL):	682 mAHD	**Hole Diameter (mm):**	120		

Drilling Information | **LITHOLOGY** | **Natural Defects**

Depth (mBGL)	R.L. (m)	Drill Method	% Coreloss	Water	Symbol	Rock Description (ROCK TYPE: grain characteristics, colour structure, minor components)	Weathering	Estimated Strength MPa (EL 0.03, VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Is (50) MPa	RQD %	Spacing (mm) (20, 60, 200, 600, 2000)	Description
3.5												
4.0	678	HMLC	0%			LAMINITE: Shale with sandstone interbeds. Pale orange-brown, extremely weathered and low strength. Clayey in extremely weathered zone with orange brown sandstone showing bedding and iron staining.	EW			100%		4
4.5						From 4.60m Sandstone with shale interbeds. Pale grey to dark grey, fine grained, low to medium strength. Moderately to slightly weathered. Shale is fissile in places, typically 1mm to 2cm dark grey bands. Multiple breaks along bedding partings.	MW - SW					
5.0	677		0%									4.89m JT, 45, ST, RO, CN
5.5												5
6.0	676					From 6.3m to 6.4m increased shale beds.				100%		6
6.5						From 6.5m to 6.73m increased shale beds.						
7.0	675					From 7m slightly weathered. At 7.08m 1-2cm siltstone clasts; cubic, angular, aligned to bedding.						7
7.5												
8.0	674		0%							100%		7.85m JT, 35, ST, SM, CN 7.92m PT, HZ, PLN, RO, CO
8.5												8
9.0	673											9
9.5						End of Hole at 9.20m depth						

Drill Company:	Stratacore Drilling Pty Ltd	**Operator Name:**	Daniel
Machine Type:	GEO 300		

Refer to Standard Sheets for details of abbreviations

Project No. CES220803-JEP	Depth: 3.10 – 7.00m
Borehole ID: BH02	Core Box No. Box 1 of 2

CONSULTING EARTH SCIENTISTS	Client: Jackson Environment and Planning Pty	Rock Core Photograph BH02 3.10 – 7.00 m Bowman Rd, Moss Vale	Logged by: AC
	Location: 2 Bowman Road, Moss Vale NSW		Checked by: IW
	Date: 15/11/2022		Revision: 0

Project No. CES220803-JEP	Depth: 7.00 – 9.20m
Borehole ID: BH02	Core Box No. Box 2 of 2

CONSULTING EARTH SCIENTISTS	Client: Jackson Environment and Planning Pty	Rock Core Photograph BH02 7.00 – 9.20 m Bowman Rd, Moss Vale	Logged by: AC
	Location: 2 Bowman Road, Moss Vale NSW		Checked by: IW
	Date: 15/11/2022		Revision: 0

Project ID:	CES220803-JEP	CONSULTING EARTH SCIENTISTS	**LOG ID: BH03**
Client:	Jackson Environment and Planning Pty Ltd	Suite 3, Level 1 55 Grandview Street, Pymble, NSW 2073 PH: (02) 8569 2200 FAX: (02) 9552 4399 www.consultingearth.com.au	Sheet: 1 of 1
Project:	2 Bowman Street		
Location:	Moss Vale		

X-Coord:	257112	GDA 94 MGA 56	**Date Commenced:**	21/10/22	**Logged by:** E. Soldin
Y-Coord:	6175202		**Date Completed:**	21/10/22	**Checked by:** I. Wong
Surface Elevation (RL) :	683	mAHD	**Hole Diameter (mm):**	100	

Drilling Information				LITHOLOGY					Samples	Tests		
Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa) 100 200 300 400	Notes and additional observations
0.00	683	Continuous Flight Auger			SM	Clayey SILT: low plasticity, dark brown, with organics [Topsoil]	S	>PL				0
					CI	Silty CLAY: medium plasticity, brown/grey [Residual Soil]	F	PL				
0.50					CL-CI	CLAY: medium to high plasticity, grey/brown mottled orange [Residual Soil]	St-Vst	<PL	#4 0.5 - 1.0	SPT@0.5-0.95 2,2,4 N=6		
1.00	682								#6 1.0 - 1.45			1
1.50							VSt-H			SPT@1.5-1.95 6,10,15 N=25		
2.00	681				CL-CI	Silty CLAY: medium to high plasticity, grey mottled brown/orange [Residual Soil]		<PL	#5 2.0 - 2.2			2
2.50												
3.00	680									SPT@3.0-3.45 7,15/150mm HB N=R		3
3.50												
4.00	679					Coring commenced at 4.1m BGL. Refer to BH03 corelog						4
4.50												

Drill Company:	BG Drilling	**Operator Name:**	Jacob	Refer to Standard Sheets for details of abbreviations
Machine Type:	CE180			

Project ID: CES220803-JEP
Client: Jackson Environment and Planning Pty Ltd
Project: 2 Bowman Street
Location: Moss Vale

CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble NSW 2073
PH: (02) 8569 2200 FAX: (02) 9983 0582
www.consultingearth.com.au

Corehole ID: BH03

Sheet: 2 of 2

X-Coord: 6175202
Y-Coord: 257112
Surface Elevation (RL): 683 mAHD

Date Commenced: 24/10/22
Date Completed: 24/10/22
Hole Diameter (mm): 100mm

Logged by: E. Soldin
Checked by: I. Wong

Drilling Information					LITHOLOGY					Natural Defects		
Depth (mBGL)	R.L. (m)	Drill Method	% Coreloss	Water	Symbol	Rock Description ROCK TYPE: grain characteristics, colour structure, minor components	Weathering	Estimated Strength MPa (0.03 EL, 0.1 VL, 0.3 L, 1 M, 3 H, 10 VH, EH)	Is (50) MPa	RQD %	Spacing (mm) (20, 60, 200, 600, 2000)	Description
4.0	679					Coring commenced from 4.1m BGL						4
						SHALE: fine to medium, grey, moderatey bedded, moderatey weathered, medium to high strength	EW					4.25-4.33m SM HZ PLN SO
4.5												4.5m 4.63m MB
												4.8m MB
5.0	678		0				MW			48%		5.0-5.2m MB 5
												5.35m JT HZ PLN SO
5.5												5.54m JT HZ PLN SO
												5.78m JT HZ PLN SO
6.0	677	NMLC										5.98-6.0m MB 6
												6.2m JT HZ PLN SO
6.5												6.45m JT HZ PLN SO
												6.69m JT HZ PLN SO
												6.8m 6.86m JT HZ PLN SO
7.0	676		0							70%		6.95m-7.0m MB 7
												7.1-7.17m JT HZ PLN SO
7.5												7.35-7.39m JT HZ PLN SO
												7.5m 7.63m JT HZ PLN SO
												7.77m 7.87m JT HZ PLN SO
8.0	675					End of BH03 at 8.0m BGL.						8
8.5												

Drill Company: BG Drilling
Machine Type: CE180
Operator Name: Jacob

Refer to Standard Sheets for details of abbreviations

Project No. CES220803-JEP	Depth: 4.10 – 8.00m
Borehole ID: BH03	Core Box No. Box 1 of 1

CONSULTING EARTH SCIENTISTS	Client: Jackson Environment and Planning Pty	Rock Core Photograph BH03 4.10 – 8.00 m Bowman Rd, Moss Vale	Logged by: AC
	Location: 2 Bowman Road, Moss Vale NSW		Checked by: IW
	Date: 24/10/2022		Revision: 0

Project ID:	CES220803-JEP	CONSULTING EARTH SCIENTISTS	**LOG ID: BH04**
Client:	Jackson Environment and Planning Pty Ltd	Suite 3, Level 1 55 Grandview Street, Pymble, NSW 2073 PH: (02) 8569 2200 FAX: (02) 9552 4399 www.consultingearth.com.au	Sheet: 1 of 1
Project:	2 Bowman Street		
Location:	Moss Vale, NSW		

X-Coord:	257101	GDA 94 MGA 56	**Date Commenced:**	16/11/2022	**Logged by:** A. Crabtree
Y-Coord:	6175345		**Date Completed:**	16/11/2022	**Checked by:** I. Wong
Surface Elevation (RL) :	682	mAHD	**Hole Diameter (mm):**	120	

Drilling Information				LITHOLOGY					Samples	Tests		
Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa) 100 200 300 400	Notes and additional observations
0.00	682	Continuous Flight Auger			SM	Clayey SILT: low plasticity, dark brown, with organics [Topsoil]	S	M - W	#10 0.0 - 0.25			BH04 is in the northern most location of the site in a large paddock.
0.50					CI	SILTY CLAY: medium plasticity, brown/yellow-brown, trace roots. [Residual Soil]	S	M		SPT@0.5-0.95 4,5,7 N=12		
1.00	681											
1.50										SPT@1.5-1.95 9,13,100mm HB N=R		
2.00	680				CH	CLAY: Inferred extremely weathered sandy shale recovered as clay. High plasticity, fine grained, pale orange/grey. [Extremely Weathered Rock]	H	D				
2.50												
3.00	679											
3.50						From 3.5m dark grey/brown. Harder drilling. Inferred moderately weathered shale. Fine, grey, angular, coarse, slatey fragments.						
4.00	678											
4.50						From 4.5m pale grey, hard drilling. Inferred slightly weathered to fresh shale.						
5.00	677											
5.50						End of Hole 5.20m depth						

Drill Company:	Stratacore Drilling Pty Ltd	**Operator Name:** Daniel	Refer to Standard Sheets for details of abbreviations
Machine Type:	GEO 300		

Project ID:	CES220803-JEP	CONSULTING EARTH SCIENTISTS	**LOG ID: BH05**
Client:	Jackson Environment and Planning Pty Ltd	Suite 3, Level 1 55 Grandview Street, Pymble, NSW 2073 PH: (02) 8569 2200 FAX: (02) 9552 4399 www.consultingearth.com.au	Sheet: 1 of 1
Project:	2 Bowman Street		
Location:	Moss Vale		

X-Coord:	255602	GDA 94 MGA 56	**Date Commenced:**	21/10/22	**Logged by:** E. Soldin
Y-Coord:	6234687		**Date Completed:**	21/10/22	**Checked by:** I. Wong
Surface Elevation (RL) :	683	mAHD	**Hole Diameter (mm):**	100	

Drilling Information				LITHOLOGY					Samples	Tests		
Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa) 100 200 300 400	Notes and additional observations
0.00	683	Continuous Flight Auger			SM	Clayey SILT: low plasticity, dark brown, with organics [Topsoil]	S	>PL				0
					CI	Silty CLAY: medium plasticity, brown/grey [Residual Soil]	F	PL		SPT@0.5-0.95 2,3,4 N=7		
1.00	682				CL-CI	CLAY: medium to high plasticity, grey/brown mottled orange [Residual Soil]	F-St	<PL		SPT@1.5-1.95 4,6,15 N=21		1
2.00	681				CL-CI	Silty CLAY: medium to high plasticity, brown-orange mottled grey [Residual Soil]	VSt	<PL				2
3.00	680					from 3.1m grey/orange			#3 3.0 - 3.2	SPT@3.0-3.45 7,15,18 N=33		3
4.00	679						H					4
4.50						Coring commenced at 4.37m BGL. Refer to BH05 corelog						
5.00	678											5

Drill Company:	BG Drilling	**Operator Name:** Jacob	Refer to Standard Sheets for details of abbreviations
Machine Type:	CE180		

Project ID:	CES220803-JEP	CONSULTING EARTH SCIENTISTS	**Corehole ID: BH05**
Client:	Jackson Environment and Planning Pty Ltd	Suite 3, Level 1 55 Grandview Street, Pymble NSW 2073 PH: (02) 8569 2200 FAX: (02) 9983 0582 www.consultingearth.com.au	Sheet: 2 of 2
Project:	2 Bowman Street		
Location:	Moss Vale		

X-Coord:	6234687		**Date Commenced:**	21/10/22	**Logged by:** E. Soldin
Y-Coord:	255602		**Date Completed:**	21/10/22	**Checked by:** I. Wong
Surface Elevation (RL):	683	mAHD	**Hole Diameter (mm):**	100mm	

Drilling Information					LITHOLOGY					Natural Defects		
Depth (mBGL)	R.L. (m)	Drill Method	% Coreloss	Water	Symbol	Rock Description ROCK TYPE: grain characteristics, colour structure, minor components	Weathering	Estimated Strength MPa (EL 0.03, VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Is (50) MPa	RQD %	Spacing (mm) (20, 60, 200, 600, 2000)	Description
4.0	679					Coring commenced from 4.37m BGL						4
4.5						SHALE: fine to medium, grey, moderatey bedded, moderatey weathered, medium to high strength	HW					4.5m 4.54m 4.67m JT HZ PLN SO 4.77m JT HZ PLN SO 4.97m JT HZ PLN SO
5.0	678	NMLC	0				MW			92%		5.0m MB 5.04-5.07m BP/SM HZ PLN SO CLAY 5.2m JT HZ PLN SO
5.5												5.55m JT HZ PLN SO 5.6m JT HZ PLN SO
6.0	677											5.8m JT HZ PLN SO 5.9m JT HZ PLN SO 6.0m MB
6.5			0							100%		6.6-6.66m JT HZ PLN SO 6.8m JT HZ PLN SO
7.0	676											7.0m MB
7.5						End of BH05 at 7.4m BGL.						
8.0	675											8

Drill Company:	BG Drilling	**Operator Name:** Jacob	Refer to Standard Sheets for details of abbreviations
Machine Type:	CE180		

Project No. CES220803-JEP	Depth: 4.37 – 7.40m
Borehole ID: BH05	Core Box No. Box 1 of 1

CONSULTING EARTH SCIENTISTS	Client: Jackson Environment and Planning Pty	Rock Core Photograph BH05 4.37 – 7.40 m Bowman Rd, Moss Vale	Logged by: AC
	Location: 2 Bowman Road, Moss Vale NSW		Checked by: IW
	Date: 21/10/2022		Revision: 0

Project ID:	CES220803-JEP	CONSULTING EARTH SCIENTISTS	**LOG ID: BH06**
Client:	Jackson Environment and Planning Pty Ltd	Suite 3, Level 1 55 Grandview Street, Pymble, NSW 2073 PH: (02) 8569 2200 FAX: (02) 9552 4399 www.consultingearth.com.au	Sheet: 1 of 1
Project:	2 Bowman Street		
Location:	Moss Vale		

X-Coord:	257204	GDA 94 MGA 56	**Date Commenced:**	20/10/22	**Logged by:** E. Soldin
Y-Coord:	6175295		**Date Completed:**	20/10/22	**Checked by:** I. Wong
Surface Elevation (RL) :	683.6 mAHD		**Hole Diameter (mm):**	100	

Drilling Information				LITHOLOGY					Samples	Tests		
Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa)	Notes and additional observations
0.00					SM	Clayey SILT: low plasticity, dark brown, with organics [Topsoil]	S	>PL				
					CI	Silty CLAY: medium plasticity, brown/grey [Residual Soil]	F	PL				
0.50	683				CL-CI	CLAY: medium to high plasticity, grey/brown mottled orange [Residual Soil]	F	<PL	#1 0.5 - 1.0	SPT@0.5-0.95 3,2,3 N=5		
1.00									#2 1.0 - 1.2			
1.50	682						VSt			SPT@1.5-1.95 6,10,11 N=21		
2.00		Continuous Flight Auger			CL-CI	Silty CLAY: medium to high plasticity, grey mottled brown/orange [Residual Soil]		<PL				
2.50	681											
3.00										SPT@3.0-3.45 5,12,15 N=27		
3.50	680											
4.00						grey/brown						
4.50	679						VSt-H			SPT@4.5-4.65 15/150mm HB N=R		
5.00												
5.50						Coring commenced at 5.3m BGL. Refer to BH06 corelog						

Drill Company:	BG Drilling	**Operator Name:**	Jacob	Refer to Standard Sheets for details of abbreviations
Machine Type:	CE180			

Project ID:	CES220803-JEP
Client:	Jackson Environment and Planning Pty Ltd
Project:	2 Bowman Street
Location:	Moss Vale

CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble NSW 2073
PH: (02) 8569 2200 FAX: (02) 9983 0582
www.consultingearth.com.au

Corehole ID: BH06

X-Coord:	6175295	**Date Commenced:**	20/10/22	**Logged by:**	E. Soldin
Y-Coord:	257204	**Date Completed:**	20/10/22	**Checked by:**	I. Wong
Surface Elevation (RL):	683.6 mAHD	**Hole Diameter (mm):**	100mm		

Drilling Information | **LITHOLOGY** | **Natural Defects**

Depth (mBGL)	R.L. (m)	Drill Method	% Coreloss	Water	Symbol	Rock Description (ROCK TYPE: grain characteristics, colour structure, minor components)	Weathering	Estimated Strength MPa (EL 0.03, VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Is (50) MPa	RQD %	Spacing (mm) (20, 60, 200, 600, 2000)	Description
5.0												5
						Coring commenced from 5.3m BGL						
						from 5.3-5.4m core loss	HW					
5.5	678		14%			SHALE: fine to medium, grey, moderatey bedded, moderatey weathered, medium to high strength				79%		5.52m JT 20 IR SO
												5.76-5.83m BP/MB
												5.87m MB
6.0							MW					6.0m MB 6
												6.17m JT HZ PLN SO
6.5	677											6.5m JT HZ PLN SO
7.0		NMLC										7.0m MB 7
7.5	676		0							100%		7.5m JT HZ PLN SO
8.0												8.0-8.03m MB 8
8.5	675											8.77m JT HZ PLN SO
9.0						End of BH06 at 9.0m BGL.						9
9.5												

Drill Company:	BG Drilling	**Operator Name:**	Jacob
Machine Type:	CE180		

Refer to Standard Sheets for details of abbreviations

Project No. CES220803-JEP	Depth: 5.30 – 9.00m
Borehole ID: BH06	Core Box No. Box 1 of 1

CONSULTING EARTH SCIENTISTS	Client: Jackson Environment and Planning Pty	Rock Core Photograph BH06 5.30 – 9.00 m Bowman Rd, Moss Vale	Logged by: AC
	Location: 2 Bowman Road, Moss Vale NSW		Checked by: IW
	Date: 20/10/2022		Revision: 0

Project ID:	CES220803-JEP
Client:	Jackson Environment and Planning Pty Ltd
Project:	2 Bowman Street
Location:	Moss Vale, NSW

CONSULTING EARTH SCIENTISTS
Suite 3, Level 1
55 Grandview Street, Pymble, NSW 2073
PH: (02) 8569 2200 FAX: (02) 9552 4399
www.consultingearth.com.au

LOG ID: BH07

Sheet: 1 of 1

X-Coord:	257181	GDA 94 MGA 56	**Date Commenced:**	16/11/2022	**Logged by:** A. Crabtree
Y-Coord:	6175096		**Date Completed:**	16/11/2022	**Checked by:** I. Wong
Surface Elevation (RL) :	680	mAHD	**Hole Diameter (mm):**	120	

Drilling Information				LITHOLOGY					Samples	Tests		
Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa) 100 200 300 400	Notes and additional observations
0.00	680	Continuous Flight Auger			SM	Clayey SILT: low to medium plasticity, fine grained, pale brown, with organics (rootlets and grass). [Topsoil]	S	M				BH07 is in the east of the site in a large paddock.
0.50					CH	CLAY: high plasticity, orange-brown with orange, red and pale grey mottling. Trace silt. [Residual Soil] From 1m pale orange/yellow to orange.	F - H	M - D	#12 0.5 - 1.0	SPT@0.5-0.95 5,5,8 N=13		
1.00	679											
1.50										SPT@1.5-1.95 5,20,110mm HB N=R		
2.00	678				SP	CLAYEY SAND: Inferred extremely weathered sandstone with shale interbeds recovered as clayey sand. low plasticity, fine grained, pale grey to orange-brown. [Extremely Weathered Rock]	H	D				
2.50												
3.00	677											
3.50												
4.00	676											
4.50					CH	SHALEY CLAY: Inferred moderately weathered shale recovered as shale chips. Fine grained, orange-brown, hard. Grey, angular and fine to coarse shale fragments. [Moderatelu Weathered Rock]	H					Hard drilling from 4.5m. Inferred moderately weathered rock.
5.00	675											
5.50												
6.00	674											
6.50						End of Hole 6.4m depth						Auger refusal at 6.40m depth.

Drill Company:	Stratacore Drilling Pty Ltd	**Operator Name:**	Daniel
Machine Type:	GEO 300		

Refer to Standard Sheets for details of abbreviations

Project ID:	CES220803-JEP	CONSULTING EARTH SCIENTISTS	**LOG ID: BH08**
Client:	Jackson Environment and Planning Pty Ltd	Suite 3, Level 1 55 Grandview Street, Pymble, NSW 2073 PH: (02) 8569 2200 FAX: (02) 9552 4399 www.consultingearth.com.au	Sheet: 1 of 1
Project:	2 Bowman Street		
Location:	Moss Vale, NSW		

X-Coord:	257135	GDA 94 MGA 56	**Date Commenced:**	16/11/2022	**Logged by:** A. Crabtree
Y-Coord:	6175009		**Date Completed:**	16/11/2022	**Checked by:** I. Wong
Surface Elevation (RL) :	674	mAHD	**Hole Diameter (mm):**	120	

Depth (mBGL)	R.L. (m) AHD	Method (Support)	Water	Symbol	USCS Symbol	Description (AS1726-2017) SOIL TYPE: plasticity or particle characteristics, colour secondary and minor components	Consistency / Density	Moisture	Sample ID	SPT	Pocket Penetrometer (kPa) 100 200 300 400	Notes and additional observations
0.00	674	Continuous Flight Auger			SM	Clayey SILT: low to medium plasticity, fine grained, pale brown, with organics (rootlets and grass). [Topsoil]	S - F	M				BH08 is in the southern most location of the site in a large paddock.
0.50					CI - CH	CLAY: medium to high plasticity, orange-brown to pale grey, trace silt. Trace fine to medium, fine grained, reddish brown shale fragments. [Residual Soil]	St - H	M - D		SPT@0.5-0.95 3,5,4 N=9		
1.00	673											
1.50									#11 1.5 - 2.0	SPT@1.5-1.95 5,15,17 N=32		
2.00	672											
2.50												
3.00	671					CLAYEY SAND: Inferred extremely weathered shaley sandstone recovered as clayey sand. low plasticity, fine grained, pale grey to orange-brown. [Extremely Weathered Rock]				SPT@3.0-3.45 21,24,130mm HB N=R		
3.50					SP		H	D				
4.00	670				CH	SHALEY CLAY: Inferred extremely weathered shale recovered as clay. High plasticity, fine grained, brown/grey-brown. Homogeneous.	H					
4.50								M				Groundwater intercepted at 4.5m depth. Softer drilling through weathered shale, recovered as clay.
5.00	669											
5.50												
6.00	668											
6.50												
7.00	667											
7.50												
8.00	666											
8.50												
9.00	665					End of Hole 9.0m depth						
9.50												

Drill Company:	Stratacore Drilling Pty Ltd	**Operator Name:**	Daniel	Refer to Standard Sheets for details of abbreviations
Machine Type:	GEO 300			

APPENDIX D

ACID SULFATE SOIL FIELD SCREENING TEST RESULTS

CONSULTING EARTH SCIENTISTS

Appendix C: ASS Field Screening Test Results

Borehole ID	Sample ID	Sample Depth (m)	pHf	pHfox	Reaction	ΔpH	Field Screening	SPOCAS Testing
BH01	BH01_0-0.5	0.00-0.50	6.3	5.2	Medium	1.1	✓	
	BH01_0.5-0.75	0.50-0.75	5.9	4.8	Medium	1.1	✓	✓
	BH01_1.5-2.0	1.50-2.00	5.9	4.9	Medium	1	✓	
	BH01_3.0-3.50	3.00-3.50	4.9	4.5	Medium	0.4	✓	
BH02	BH02_0-0.15	0.00-0.15	7	5.4	Medium	1.6	✓	
	BH02_0.15-0.5	0.15-0.5	7.1	5.5	Low	1.6	✓	✓
	BH02_0.5-1.00	0.50-1.00	7.1	4.9	Medium	2.2	✓	✓
	BH02_1.5-2.00	1.50-2.00	4.6	4.1	Low	0.5	✓	
	BH02_2.5-3.00	2.50-3.00	4.9	4.2	Medium	0.7	✓	
BH03	BH03_0-0.5	0.00-0.50	7.1	6	Medium	1.1	✓	
	BH03_0.5-1.0	0.50-1.00	6.8	6	Medium	0.8	✓	
	BH03_1.0-1.5	1.00-1.50	7.1	6.1	Medium	1	✓	
	BH03_2.0-2.2	2.00-2.20	7.3	6.1	Medium	1.2	✓	✓
	BH03_2.2-2.5	2.20-2.50	6.8	6	Medium	0.8	✓	
	BH03_2.5-3.0	2.50-3.00	6.7	6.1	Medium	0.6	✓	
	BH03_3.0-3.5	3.00-3.50	6.7	6.1	Medium	0.6	✓	
BH04	BH04_0-0.25	0.00-0.25	6.4	4.4	Medium	2	✓	✓
	BH04_1.25-0.5	0.25-0.50	5.7	4.7	Medium	1	✓	
	BH04_0.5-1.00	0.50-1.00	4.8	4.2	Medium	0.6	✓	
	BH04_1.0-1.50	1.00-1.50	4.9	4.3	Medium	0.6	✓	
	BH04_1.5-2.00	1.50-2.00	5	4.4	Low	0.6	✓	
BH05	BH05_0-0.5	0.00-0.50	7.2	6.2	Medium	1	✓	
	BH05_0.5-1.0	0.50-1.00	7.2	6.1	Medium	1.1	✓	
	BH05_1.0-1.5	1.00-1.50	7.1	6.2	Medium	0.9	✓	
	BH05_1.5-2.0	1.50-2.00	6.9	5.7	Medium	1.2	✓	
	BH05_2.0-2.5	2.00-2.50	7	5.2	Medium	1.8	✓	
	BH05_3.0-3.2	3.00-3.20	7.2	5.2	Medium	2	✓	✓
	BH05_3.2-3.5	3.00-3.50	7.3	5.4	Medium	1.9	✓	
	BH05_3.5-4.0	3.50-4.00	7.2	5.3	Medium	1.9	✓	

Borehole ID	Sample ID	Sample Depth (m)	pHf	pHfox	Reaction	ΔpH	Field Screening	SPOCAS Testing
BH06	BH06_0-0.5	0.00-0.50	6.8	5.2	Medium	1.6	✓	
	BH06_1.0-1.2	1.00-1.20	7.2	5.5	Medium	1.7	✓	✓
	BH06_1.2-1.5	1.20-1.50	7.2	6.3	Medium	0.9	✓	
	BH06_1.5-2.0	1.50-2.00	7.2	5.5	Medium	1.7	✓	
	BH06_2.0-2.5	2.00-2.50	7.2	5.6	Medium	1.6	✓	
	BH06_2.5-3.0	2.50-3.00	7.4	6	Medium	1.4	✓	
	BH06_3.0-3.5	3.00-3.50	7.3	6.1	Medium	1.2	✓	
	BH06_3.5-4.0	3.50-4.00	6.9	5.7	Medium	1.2	✓	
	BH06_4.0-4.5	4.00-4.50	6.7	5.4	High	1.3	✓	
BH07	BH07_0-0.2	0.00-0.20	5.9	5	Medium	0.9	✓	
	BH01_0.3-0.50	0.30-0.50	5.8	4.9	Medium	0.9	✓	
	BH01_0.5-1.00	0.5-1.00	5.8	4.7	Medium	1.1	✓	✓
	BH01_1.0-1.50	1.00-1.50	5.6	4.7	Low	0.9	✓	
	BH01_1.5-2.00	1.50-2.00	5.5	4.8	Low	0.7	✓	
BH08	BH08_0-0.25	0.00-0.25	5.5	5.1	Medium/High	0.4	✓	
	BH08_1.25-0.5	0.25-0.50	6	5	Medium/High	1	✓	
	BH08_0.5-1.0	0.50-1.00	6	5	Low/Medium	1	✓	
	BH08_1.0-1.5	1.00-1.50	6	5	Low/Medium	1	✓	
	BH08_1.5-2.0	1.50-2.00	6.1	5	Low/Medium	1.1	✓	✓
	BH08_2.0-2.5	2.00-2.50	5.8	4.9	Medium/High	0.9	✓	
	BH08_2.5-3.0	2.50-3.00	6	6.3	High	0.3	✓	
	BH08_3.0-3.5	3.00-3.50	6.1	5.8	Medium/High	0.3	✓	

APPENDIX E:
LABORATORY TEST REPORTS

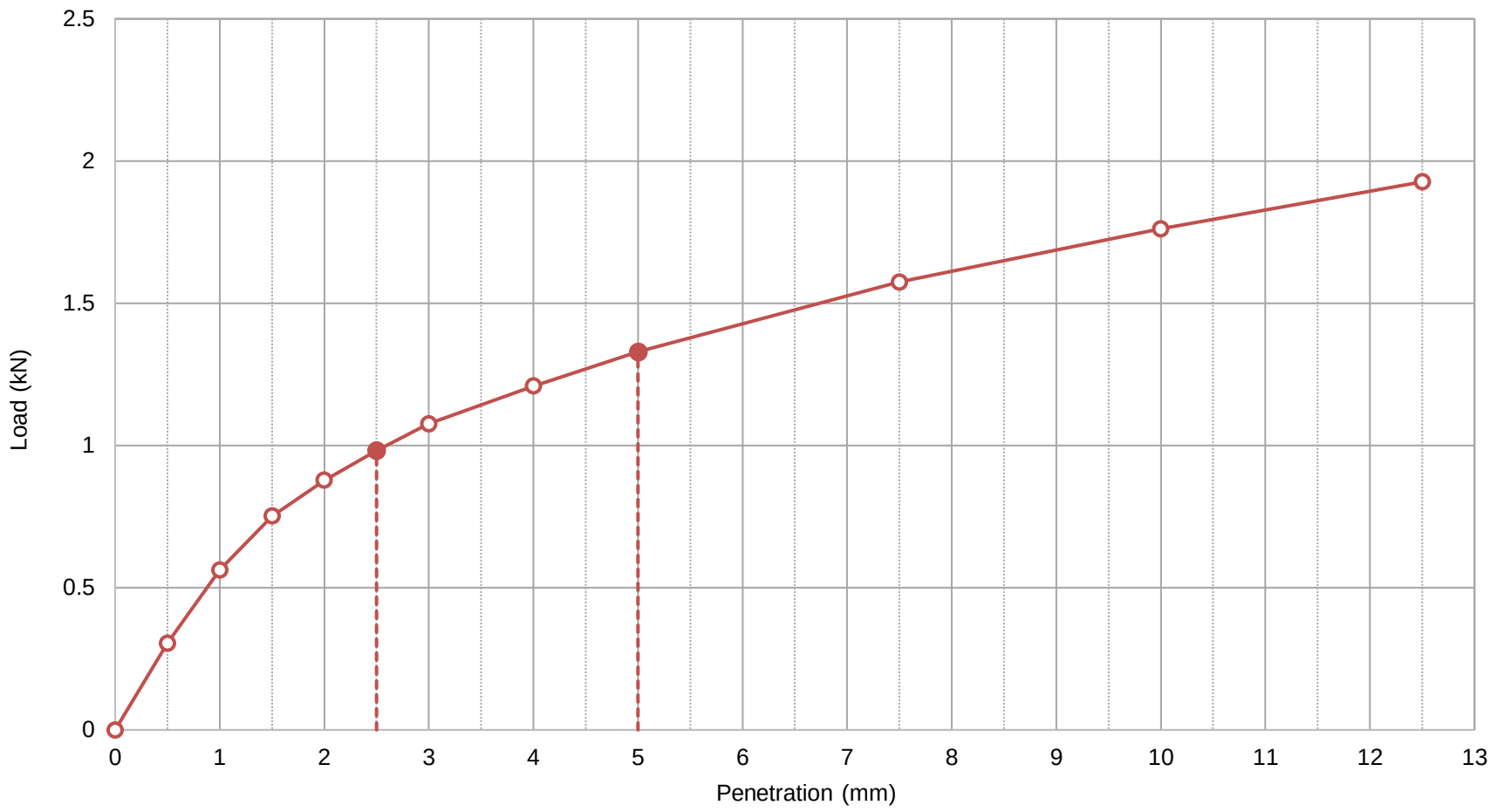
CALIFORNIA BEARING RATIO REPORT

Client	Consulting Earth Scientists	**Source**	BH01
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-JEP	**Report No.**	S82214-CBR
Job No.	S22097-2	**Sample No.**	S82214

Test Procedure	☑ AS 1289.6.1.1	☐ RMS T117	California Bearing Ratio
	☑ AS 1289.5.1.1	☐ RMS T111	Dry Density / Moisture Content Relationship - Standard Compaction
	☐ AS 1289.5.2.1	☐ RMS T112	Dry Density / Moisture Content Relationship - Modified Compaction
	☑ AS 1289.2.1.1	☐ RMS T120	Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** Unknown

Preparation Prepared in accordance with the test method **Date Tested** 5/12/2022



Preparation & Specification		Density & Moisture	Achieved	Target
Retained on 19.0mm Sieve (%)	0	Lab Moisture Ratio - LMR (%)	100.0	100.0
Method of Establishing Plasticity Level	Technician Assessment	Lab Density Ratio - LDR (%)	95.0	95.0
Sample Curing Time (hrs)	72 hrs	Dry Density - At Compaction (t/m³)	1.64	1.64
Compaction Hammer Used	Standard	Dry Density - After Soaking (t/m³)	1.62	
Surcharge Mass Applied (kg)	4.5	Specimen Swell (%)	1.1	
Period of Soaking (Days)	4	Moisture Content - At Compaction (%)	18.7	
Maximum Dry Density - MDD (t/m³)	1.72	Moisture Content - Top 30mm (%)	22.8	
Optimum Moisture Content - OMC (%)	18.7	Moisture Content - Remainder (%)	20.3	

Material CBR Value (%): 7 at a penetration of 2.5 mm

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

6/12/2022

Chris Lloyd Date:

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

Client	Consulting Earth Scientists	**Source**	BH01
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-JEP	**Report No**	S82214-MDD
Job No	S22097-2	**Sample No**	S82214

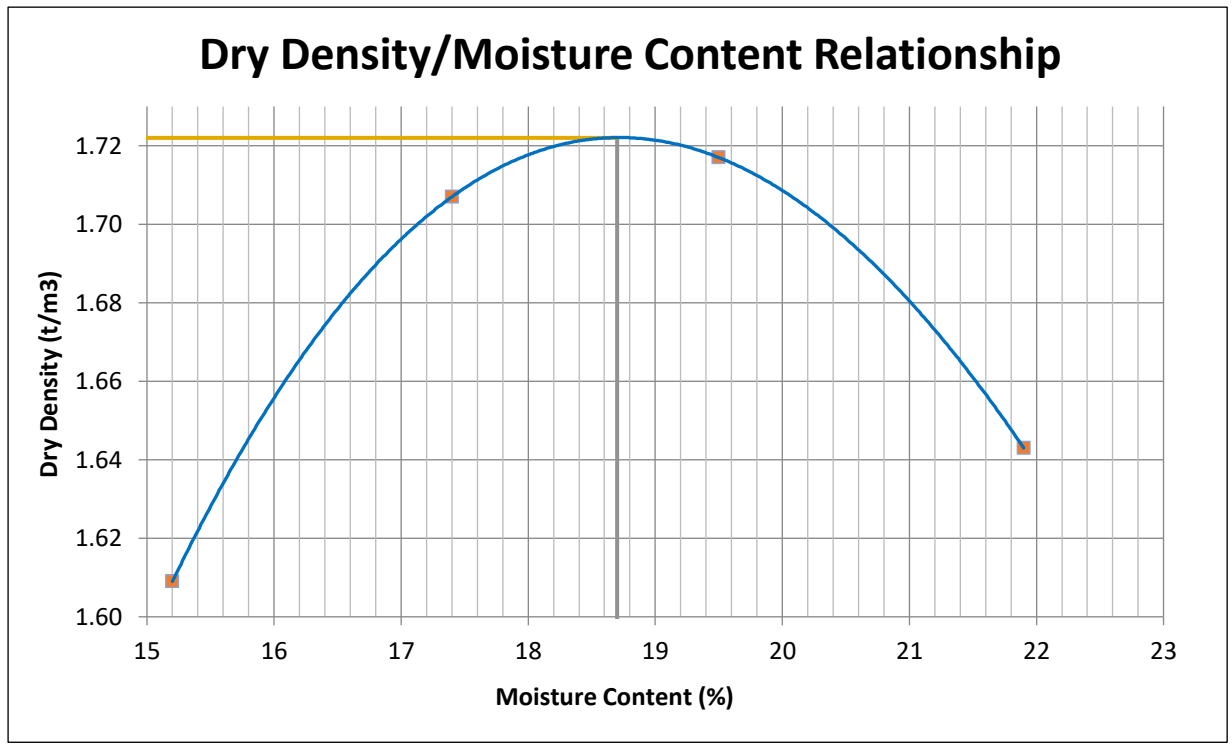
Test Procedure

☑ AS1289.5.1.1 Dry Density / Moisture Content Relationship - Standard Compaction

☑ AS1289.2.1.1 Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** Unknown

Preparation Prepared in accordance with the test method **Date Tested** 24/11/2022



Maximum Dry Density (t/m^3)	1.722
Optimum Moisture Content (%)	18.7
Oversize Retained on 19mm sieve (%)	0.0
Oversize Retained on 37.5mm sieve (%)	0.0
Curing Time	24 hrs
Liquid Limit Determination	Technician Assessment

Notes

NATA

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

6/12/2022

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

CALIFORNIA BEARING RATIO REPORT

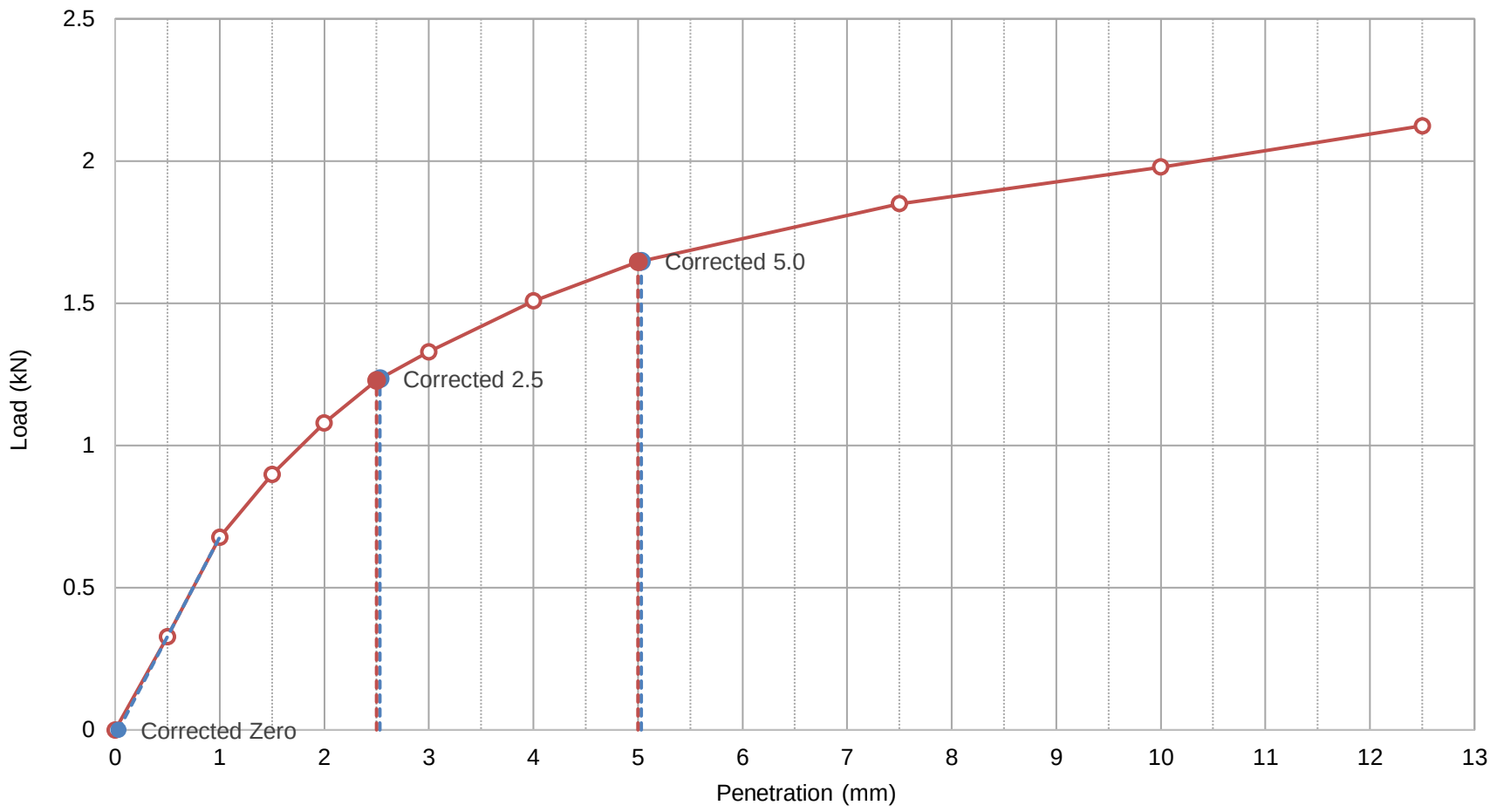
Client	Consulting Earth Scientists	**Source**	#4
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-VEP Bowman Street	**Report No.**	S81457-CBR
Job No.	S22097-	**Sample No.**	S81457

Test Procedure

☑ AS 1289.6.1.1	☐ RMS T117	California Bearing Ratio
☑ AS 1289.5.1.1	☐ RMS T111	Dry Density / Moisture Content Relationship - Standard Compaction
☐ AS 1289.5.2.1	☐ RMS T112	Dry Density / Moisture Content Relationship - Modified Compaction
☑ AS 1289.2.1.1	☐ RMS T120	Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** 24/10/2022

Preparation Prepared in accordance with the test method **Date Tested** 12/11/2022



Preparation & Specification	
Retained on 19.0mm Sieve (%)	0
Method of Establishing Plasticity Level	Technician Assessment
Sample Curing Time (hrs)	96 hrs
Compaction Hammer Used	Standard
Surcharge Mass Applied (kg)	4.5
Period of Soaking (Days)	4
Maximum Dry Density - MDD (t/m³)	1.75
Optimum Moisture Content - OMC (%)	18.4

Density & Moisture	Achieved	Target
Lab Moisture Ratio - LMR (%)	99.0	100.0
Lab Density Ratio - LDR (%)	95.0	95.0
Dry Density - At Compaction (t/m³)	1.67	1.66
Dry Density - After Soaking (t/m³)	1.66	
Specimen Swell (%)	0.1	
Moisture Content - At Compaction (%)	18.3	
Moisture Content - Top 30mm (%)	20.2	
Moisture Content - Remainder (%)	20.1	

Material CBR Value (%): 9 at a penetration of 2.5 mm

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd Date: 14/11/2022

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

Client	Consulting Earth Scientists	**Source**	#4
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-VEP Bowman Street	**Report No**	S81457-MDD
Job No	S22097-	**Sample No**	S81457

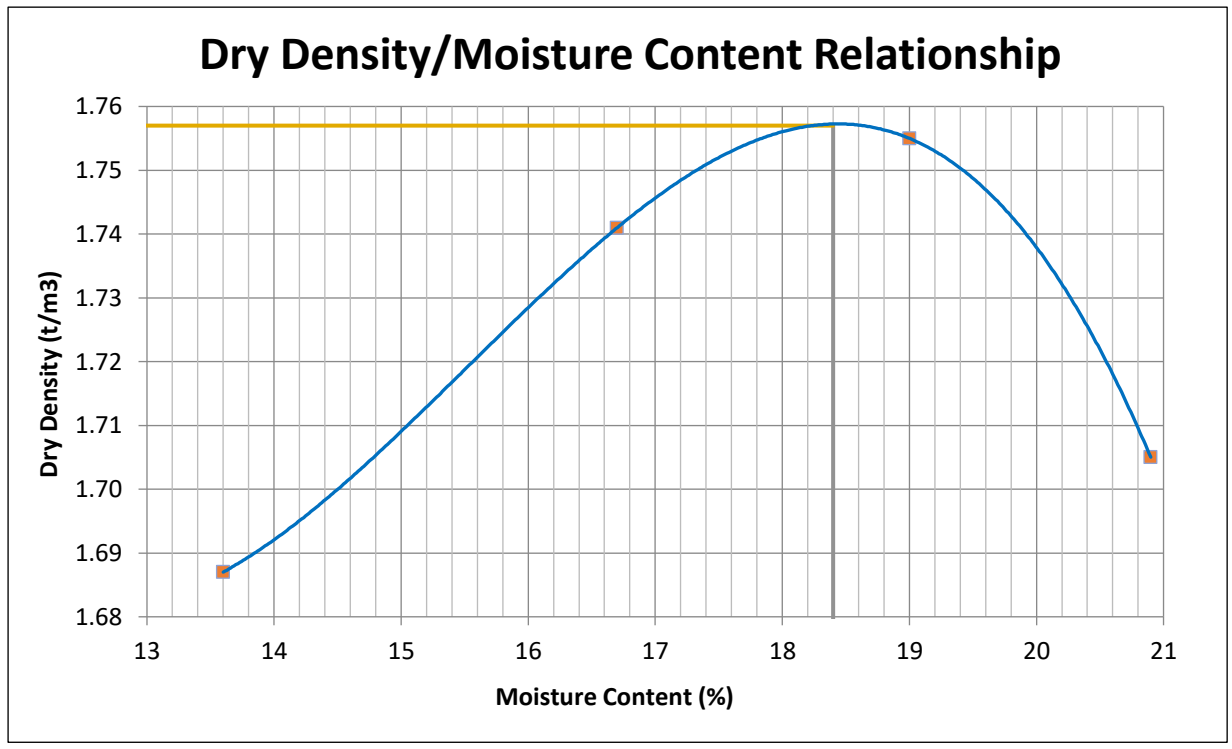
Test Procedure

☑ AS1289.5.1.1 Dry Density / Moisture Content Relationship - Standard Compaction

☑ AS1289.2.1.1 Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** 24/10/2022

Preparation Prepared in accordance with the test method **Date Tested** 3/11/2022



Maximum Dry Density (t/m^3)	1.752
Optimum Moisture Content (%)	18.4
Oversize Retained on 19mm sieve (%)	0.2
Oversize Retained on 37.5mm sieve (%)	0.0
Curing Time	48 hrs
Liquid Limit Determination	Technician Assessment

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

7/11/2022

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

CALIFORNIA BEARING RATIO REPORT

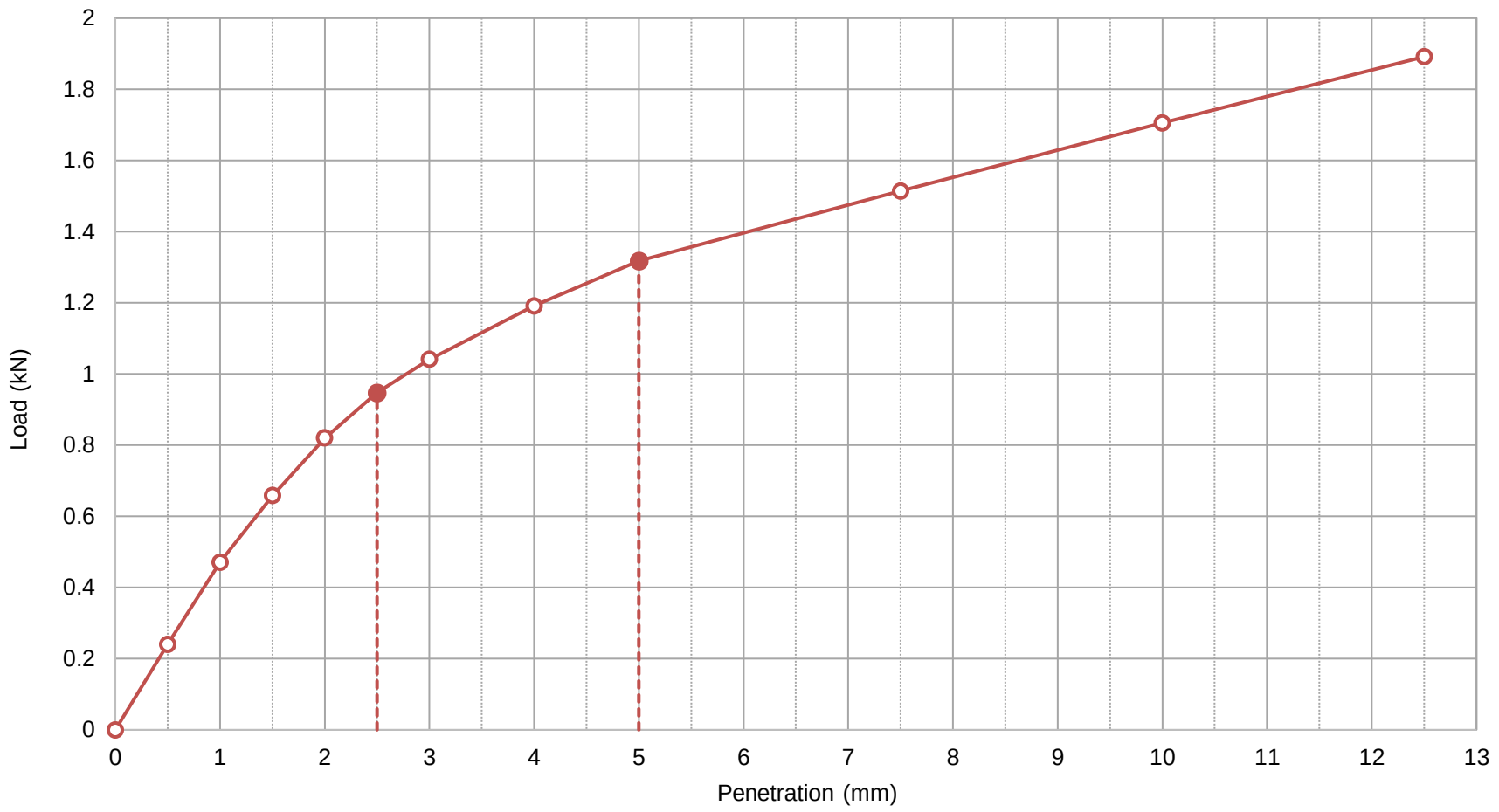
Client	Consulting Earth Scientists	**Source**	#1
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-VEP Bowman Street	**Report No.**	S81451-CBR
Job No.	S22097-	**Sample No.**	S81451

Test Procedure

☑	AS 1289.6.1.1	☐ RMS T117	California Bearing Ratio
☑	AS 1289.5.1.1	☐ RMS T111	Dry Density / Moisture Content Relationship - Standard Compaction
☐	AS 1289.5.2.1	☐ RMS T112	Dry Density / Moisture Content Relationship - Modified Compaction
☑	AS 1289.2.1.1	☐ RMS T120	Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** 21/10/2022

Preparation Prepared in accordance with the test method **Date Tested** 12/11/2022



Preparation & Specification	
Retained on 19.0mm Sieve (%)	0
Method of Establishing Plasticity Level	Technician Assessment
Sample Curing Time (hrs)	96 hrs
Compaction Hammer Used	Standard
Surcharge Mass Applied (kg)	4.5
Period of Soaking (Days)	4
Maximum Dry Density - MDD (t/m³)	1.77
Optimum Moisture Content - OMC (%)	17.7

Density & Moisture	Achieved	Target
Lab Moisture Ratio - LMR (%)	98.5	100.0
Lab Density Ratio - LDR (%)	95.0	95.0
Dry Density - At Compaction (t/m³)	1.68	1.68
Dry Density - After Soaking (t/m³)	1.68	
Specimen Swell (%)	0.4	
Moisture Content - At Compaction (%)	17.5	
Moisture Content - Top 30mm (%)	22.4	
Moisture Content - Remainder (%)	18.8	

Material CBR Value (%): 7 at a penetration of 2.5 mm

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd Date: 14/11/2022

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

Client	Consulting Earth Scientists	**Source**	#1
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-VEP Bowman Street	**Report No**	S81451-MDD
Job No	S22097-	**Sample No**	S81451

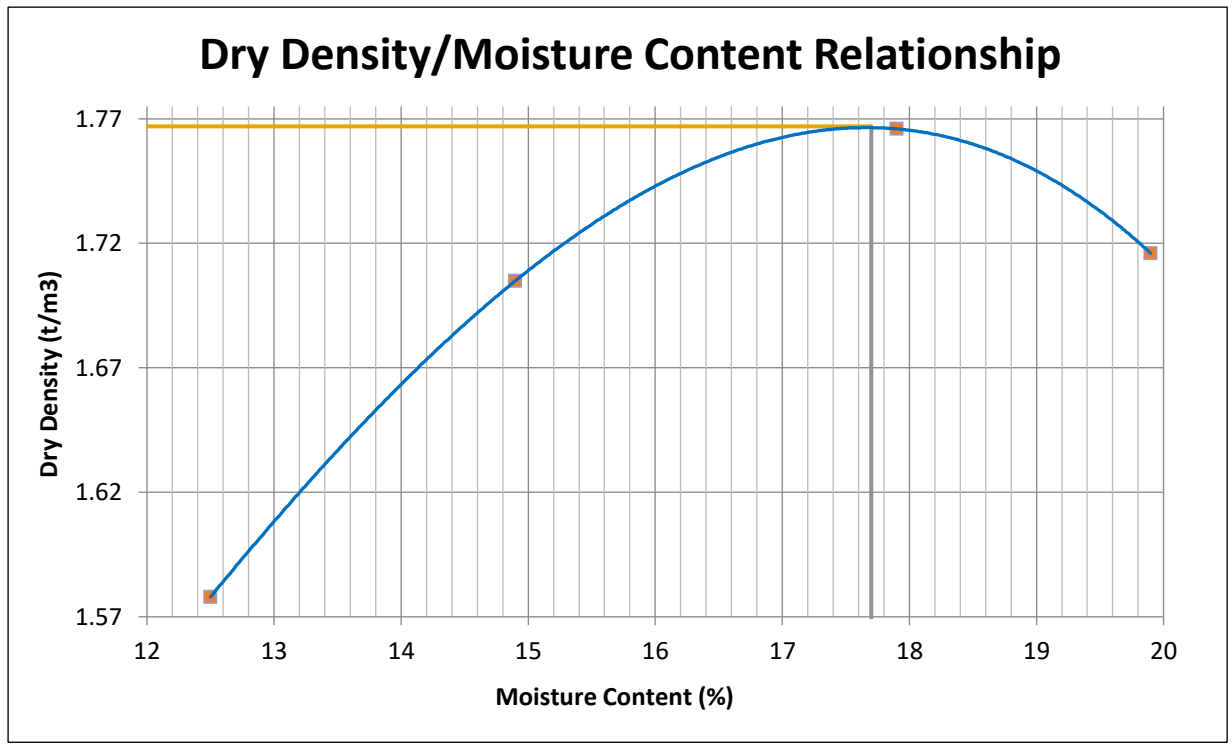
Test Procedure

☑ AS1289.5.1.1 Dry Density / Moisture Content Relationship - Standard Compaction

☑ AS1289.2.1.1 Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** 21/10/2022

Preparation Prepared in accordance with the test method **Date Tested** 3/11/2022



Maximum Dry Density (t/m^3)	1.767
Optimum Moisture Content (%)	17.7
Oversize Retained on 19mm sieve (%)	0.0
Oversize Retained on 37.5mm sieve (%)	0.0
Curing Time	48 hrs
Liquid Limit Determination	Technician Assessment

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

7/11/2022

Date:

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

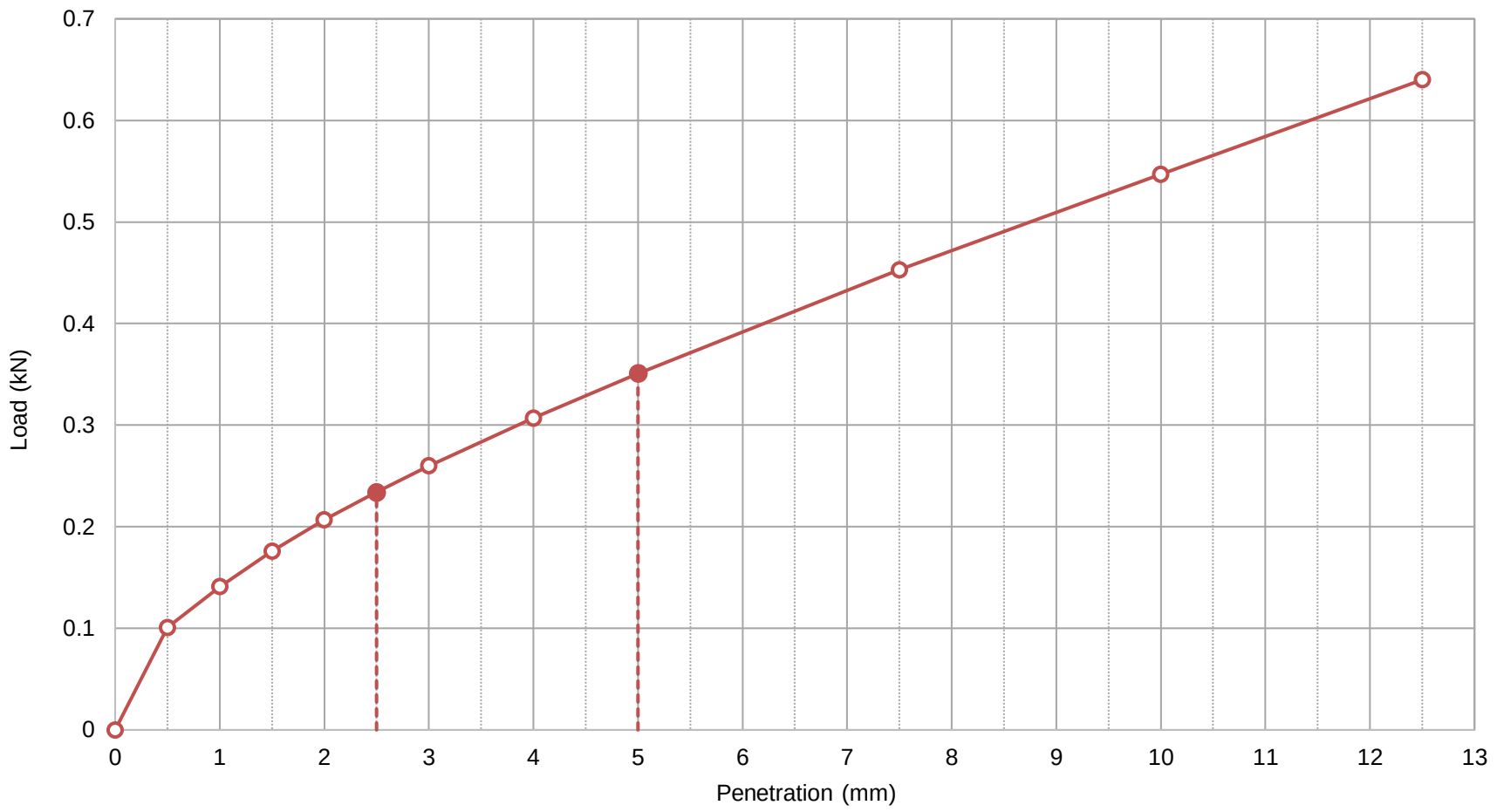
CALIFORNIA BEARING RATIO REPORT

Client	Consulting Earth Scientists	**Source**	BH08
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-JEP	**Report No.**	S82215-CBR
Job No.	S22097-2	**Sample No.**	S82215

Test Procedure	☑ AS 1289.6.1.1	☐ RMS T117	California Bearing Ratio
	☑ AS 1289.5.1.1	☐ RMS T111	Dry Density / Moisture Content Relationship - Standard Compaction
	☐ AS 1289.5.2.1	☐ RMS T112	Dry Density / Moisture Content Relationship - Modified Compaction
	☑ AS 1289.2.1.1	☐ RMS T120	Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** Unknown

Preparation Prepared in accordance with the test method **Date Tested** 5/12/2022



Preparation & Specification		Density & Moisture	Achieved	Target
Retained on 19.0mm Sieve (%)	0	Lab Moisture Ratio - LMR (%)	98.5	100.0
Method of Establishing Plasticity Level	Technician Assessment	Lab Density Ratio - LDR (%)	95.0	95.0
Sample Curing Time (hrs)	72 hrs	Dry Density - At Compaction (t/m³)	1.72	1.72
Compaction Hammer Used	Standard	Dry Density - After Soaking (t/m³)	1.65	
Surcharge Mass Applied (kg)	4.5	Specimen Swell (%)	4.2	
Period of Soaking (Days)	4	Moisture Content - At Compaction (%)	15.2	
Maximum Dry Density - MDD (t/m³)	1.81	Moisture Content - Top 30mm (%)	25.6	
Optimum Moisture Content - OMC (%)	15.4	Moisture Content - Remainder (%)	19.9	

Material CBR Value (%): 2 at a penetration of 2.5 mm

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd Date: 6/12/2022

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

Client	Consulting Earth Scientists	**Source**	BH08
Address	Suite 3, Level 1, 55, Grandview Street, Pymble, NSW, 2073	**Sample Description**	Silty CLAY
Project	CES220803-JEP	**Report No**	S82215-MDD
Job No	S22097-2	**Sample No**	S82215

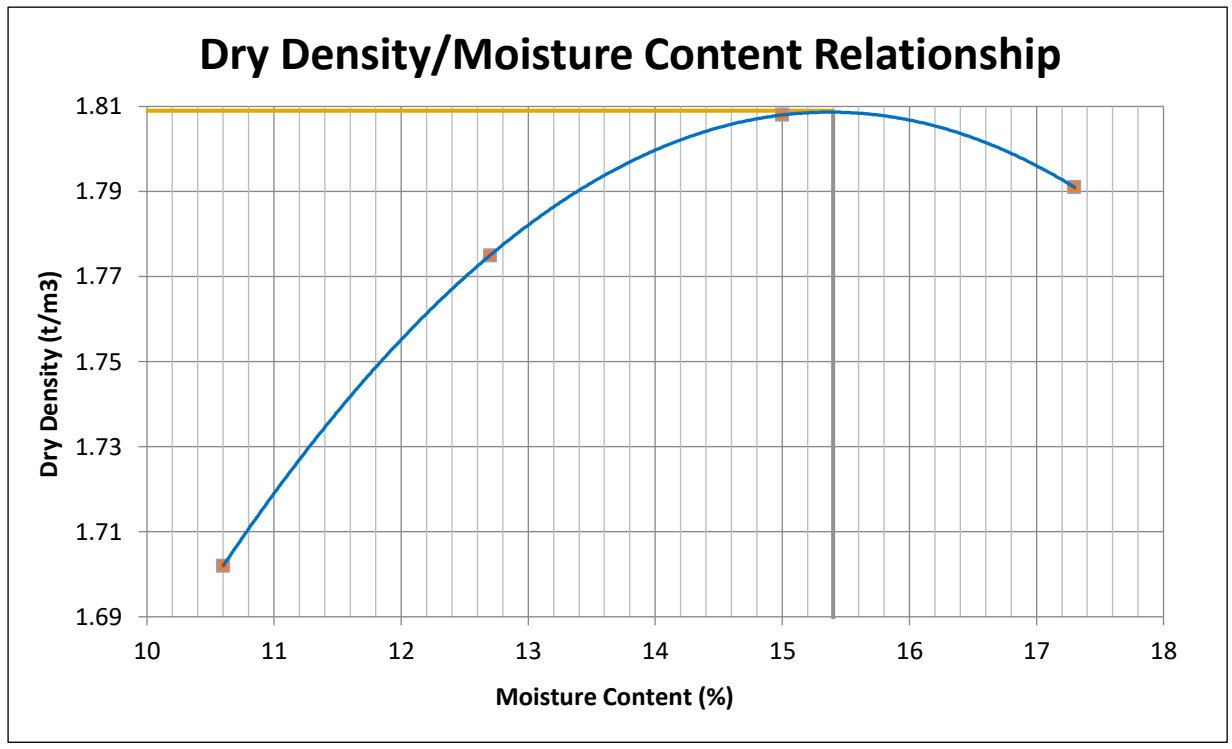
Test Procedure

☑ AS1289.5.1.1 Dry Density / Moisture Content Relationship - Standard Compaction

☑ AS1289.2.1.1 Moisture Content - Oven Drying Method (Standard Method)

Sampling Sampled by Client - results apply to the sample as received **Date Sampled** Unknown

Preparation Prepared in accordance with the test method **Date Tested** 25/11/2022



Maximum Dry Density (t/m^3)	1.809
Optimum Moisture Content (%)	15.4
Oversize Retained on 19mm sieve (%)	0.0
Oversize Retained on 37.5mm sieve (%)	0.0
Curing Time	48 hrs
Liquid Limit Determination	Technician Assessment

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

6/12/2022

Date:

Macquarie Geotechnical
14 Carter St
Lidcombe NSW 2141

CHAIN OF CUSTODY FORM - Client

[Copyright and Confidential]

ENVIROLAB GROUP
National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
02 9910 6200 | sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au

Company:	CONSULTING EARTH SCIENTISTS	Client Project Name/Number/Site etc (ie report title):	CES220803-JEP
Contact Person:	ALEX CRABTREE		
Project Mgr:	IVAN WONG	PO No. (if applicable):	
Sampler:	A CRABTREE	Envirolab Quote No. :	
Address:	55 GRANDVIEW ST, PYMBLE	Date results required: Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day	
Phone:	Mob: 0400305094	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	alex.crabtree@consultingearth.com.au; ivan.wong "	Additional report format: ☐ Esdat ☐ Equis	
Email Invoice to:	kay.lowe "	Lab Comments:	

Sample Information					Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Depth	Date Sampled	Type of Sample		8 SPOCAS															Provide as much information about the sample as you can
1	BH01 0.5-0.75	0.5-.75	15/11	SOIL		X															
2	BH08 1.5-2.00	1.5-2	16/11			X															
3	BH07 0.5-1.00	0.5-1	16/11			X															
4	BH02 0.15-0.50	.15-0.5	15/11			X															
5	BH02 0.50-1.00	0.5-1	15/11			X															
6	BH04 0.0-0.25	0-0.25	16/11	↓		X															

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by (Company):	CES	Received by (Company):	ELS
Print Name:	ALEX CRABTREE	Print Name:	Tanya Doherty
Date & Time:	17/11/22 8:30	Date & Time:	17/11/2022 08:45
Signature:		Signature:	

Lab Use Only

Job number: 310836	Cooling: Ice / Ice pack / None
Temperature: 11 °C	Security seal: Intact / Broken / None
TAT Req - SAME day / 1 / 2 / 3 / 4 / STD	

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 310836

Client Details

Client	Consulting Earth Scientists Pty Ltd
Attention	Alex Crabtree
Address	Suite 3, Level 1, 55 Grandview Street, Pymble, NSW, 2073

Sample Details

Your Reference	**CES220803-JEP**
Number of Samples	6 Soil
Date samples received	17/11/2022
Date completed instructions received	17/11/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

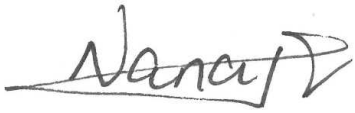
Date results requested by	24/11/2022
Date of Issue	24/11/2022

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

sPOCAS + %S w/w						
Our Reference		310836-1	310836-2	310836-3	310836-4	310836-5
Your Reference	UNITS	BH01	BH08	BH07	BH02	BH02
Depth		0.50-0.75	1.50-2.00	0.50-1.00	0.15-0.50	0.50-1.00
Date Sampled		15/11/2022	16/11/2022	16/11/2022	15/11/2022	15/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
pH $_{kcl}$	pH units	4.4	3.9	3.8	5.6	4.3
TAA pH 6.5	moles H^+ /t	26	61	110	<5	28
s-TAA pH 6.5	%w/w S	0.04	0.1	0.18	<0.01	0.04
pH $_{Ox}$	pH units	3.8	4.0	4.1	4.4	4.1
TPA pH 6.5	moles H^+ /t	70	100	130	<5	51
s-TPA pH 6.5	%w/w S	0.11	0.16	0.20	<0.01	0.08
TSA pH 6.5	moles H^+ /t	43	41	16	<5	23
s-TSA pH 6.5	%w/w S	0.07	0.07	0.03	<0.01	0.04
ANC_E	% $CaCO_3$	[NT]	[NT]	[NT]	[NT]	[NT]
a-ANC_E	moles H^+ /t	[NT]	[NT]	[NT]	[NT]	[NT]
s-ANC_E	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
S_{KCl}	%w/w S	0.005	<0.005	0.01	<0.005	0.02
S_P	%w/w	0.01	<0.005	0.01	0.01	0.02
S_{POS}	%w/w	0.009	<0.005	<0.005	0.01	<0.005
a-S_{POS}	moles H^+ /t	5	<5	<5	6	<5
Ca_{KCl}	%w/w	0.05	<0.005	0.03	0.09	0.06
Ca_P	%w/w	0.05	<0.005	0.03	0.08	0.05
Ca_A	%w/w	<0.005	<0.005	<0.005	<0.005	<0.005
Mg_{KCl}	%w/w	0.042	0.032	0.037	0.013	0.044
Mg_P	%w/w	0.040	0.027	0.036	0.012	0.037
Mg_A	%w/w	<0.005	<0.005	<0.005	<0.005	<0.005
S_{HCl}	%w/w S	<0.005	<0.005	0.006	[NT]	0.012
S_{NAS}	%w/w S	<0.005	<0.005	<0.005	[NT]	<0.005
a-S_{NAS}	moles H^+ /t	<5	<5	<5	[NT]	<5
s-S_{NAS}	%w/w S	<0.01	<0.01	<0.01	[NT]	<0.01
Fineness Factor	-	1.5	1.5	1.5	1.5	1.5
a-Net Acidity	moles H^+ /t	32	64	110	8	29
s-Net Acidity	%w/w S	0.05	0.10	0.18	0.01	0.05
Liming rate	kg $CaCO_3$ /t	2.4	4.8	8.6	<0.75	2.2
s-Net Acidity without -ANCE	%w/w S	0.05	0.10	0.18	0.01	0.05
a-Net Acidity without ANCE	moles H^+ /t	32	64	110	8.5	29
Liming rate without ANCE	kg $CaCO_3$ /t	2.4	4.8	8.6	<0.75	2.2

sPOCAS + %S w/w		
Our Reference		310836-6
Your Reference	UNITS	BH04
Depth		0.00-0.25
Date Sampled		16/11/2022
Type of sample		Soil
Date prepared	-	24/11/2022
Date analysed	-	24/11/2022
pH $_{kcl}$	pH units	4.9
TAA pH 6.5	moles H^+ /t	17
s-TAA pH 6.5	%w/w S	0.03
pH $_{Ox}$	pH units	4.7
TPA pH 6.5	moles H^+ /t	5
s-TPA pH 6.5	%w/w S	<0.01
TSA pH 6.5	moles H^+ /t	<5
s-TSA pH 6.5	%w/w S	<0.01
ANC_E	% $CaCO_3$	[NT]
a-ANC_E	moles H^+ /t	[NT]
s-ANC_E	%w/w S	[NT]
S_{KCl}	%w/w S	<0.005
S_P	%w/w	0.04
S_{POS}	%w/w	0.04
a-S_{POS}	moles H^+ /t	23
Ca_{KCl}	%w/w	0.11
Ca_P	%w/w	0.1
Ca_A	%w/w	<0.005
Mg_{KCl}	%w/w	0.027
Mg_P	%w/w	0.027
Mg_A	%w/w	<0.005
S_{HCl}	%w/w S	[NT]
S_{NAS}	%w/w S	[NT]
a-S_{NAS}	moles H^+ /t	[NT]
s-S_{NAS}	%w/w S	[NT]
Fineness Factor	-	1.5
a-Net Acidity	moles H^+ /t	41
s-Net Acidity	%w/w S	0.06
Liming rate	kg $CaCO_3$ /t	3.0
s-Net Acidity without -ANCE	%w/w S	0.06
a-Net Acidity without ANCE	moles H^+ /t	41
Liming rate without ANCE	kg $CaCO_3$ /t	3.0

Method ID	Methodology Summary
Inorg-064	sPOCAS determined using titrimetric and ICP-AES techniques. Based on National acid sulfate soils identification and laboratory methods manual June 2018. Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Net acidity including ANC has a safety factor of 1.5 applied. Neutralising value (NV) of 100% is assumed for liming rate The recommendation that the SHCL concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCL results reported.

QUALITY CONTROL: sPOCAS + %S w/w						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	[NT]
Date analysed	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	[NT]
pH $_{kcl}$	pH units		Inorg-064	[NT]	1	4.4	4.4	0	102	[NT]
TAA pH 6.5	moles H^+/t	5	Inorg-064	<5	1	26	26	0	97	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	1	0.04	0.04	0	[NT]	[NT]
pH $_{Ox}$	pH units		Inorg-064	[NT]	1	3.8	3.7	3	101	[NT]
TPA pH 6.5	moles H^+/t	5	Inorg-064	<5	1	70	74	6	107	[NT]
s-TPA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	1	0.11	0.12	9	[NT]	[NT]
TSA pH 6.5	moles H^+/t	5	Inorg-064	<5	1	43	48	11	[NT]	[NT]
s-TSA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	1	0.07	0.08	13	[NT]	[NT]
ANC_E	% $CaCO_3$	0.05	Inorg-064	<0.05	1	[NT]	[NT]		[NT]	[NT]
a-ANC_E	moles H^+/t	5	Inorg-064	<5	1	[NT]	[NT]		[NT]	[NT]
s-ANC_E	%w/w S	0.05	Inorg-064	<0.05	1	[NT]	[NT]		[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-064	<0.005	1	0.005	0.005	0	[NT]	[NT]
S_P	%w/w	0.005	Inorg-064	<0.005	1	0.01	0.02	67	[NT]	[NT]
S_{POS}	%w/w	0.005	Inorg-064	<0.005	1	0.009	0.01	11	[NT]	[NT]
a-S_{POS}	moles H^+/t	5	Inorg-064	<5	1	5	6	18	[NT]	[NT]
Ca_{KCl}	%w/w	0.005	Inorg-064	<0.005	1	0.05	0.06	18	[NT]	[NT]
Ca_P	%w/w	0.005	Inorg-064	<0.005	1	0.05	0.05	0	[NT]	[NT]
Ca_A	%w/w	0.005	Inorg-064	<0.005	1	<0.005	<0.005	0	[NT]	[NT]
Mg_{KCl}	%w/w	0.005	Inorg-064	<0.005	1	0.042	0.044	5	[NT]	[NT]
Mg_P	%w/w	0.005	Inorg-064	<0.005	1	0.040	0.039	3	[NT]	[NT]
Mg_A	%w/w	0.005	Inorg-064	<0.005	1	<0.005	<0.005	0	[NT]	[NT]
S_{HCl}	%w/w S	0.005	Inorg-064	<0.005	1	<0.005	<0.005	0	[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-064	<0.005	1	<0.005	<0.005	0	[NT]	[NT]
a-S_{NAS}	moles H^+/t	5	Inorg-064	<5	1	<5	<5	0	[NT]	[NT]
s-S_{NAS}	%w/w S	0.01	Inorg-064	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Fineness Factor	-	1.5	Inorg-064	<1.5	1	1.5	1.5	0	[NT]	[NT]
a-Net Acidity	moles H^+/t	5	Inorg-064	<5	1	32	32	0	[NT]	[NT]
s-Net Acidity	%w/w S	0.01	Inorg-064	<0.01	1	0.05	0.05	0	[NT]	[NT]
Liming rate	kg $CaCO_3$/t	0.75	Inorg-064	<0.75	1	2.4	2.4	0	[NT]	[NT]
s-Net Acidity without -ANCE	%w/w S	0.01	Inorg-064	<0.01	1	0.05	0.05	0	[NT]	[NT]

QUALITY CONTROL: sPOCAS + %S w/w						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
a-Net Acidity without ANCE	moles H^+/t	5	Inorg-064	<5	1	32	32	0	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$/t	0.75	Inorg-064	<0.75	1	2.4	2.4	0	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.