Douglas PARTNERS

GROUNDED EXPERTISE

Report on Geotechnical Investigation

Proposed Amenities Block and In-Ground Pool

17 Reserve Road, Forster NSW

Prepared for Reflections Holiday Parks

Project 230151.00

8 July 2024

Douglas Partners Pty Ltd
ABN 75 053 980 117
douglaspartners.com.au
15 Callistemon Close, Warabrook, NSW 2304
(02) 4960 9600

Document History

Details

Project No.	230151.00
Document Title	Report on geotechnical investigation
Site Address	17 Reserve Road, Forster NSW
Report Prepared For	Reflections Holiday Parks
Filename	230151.00.R.001.Rev0

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Kate Fulham	Michael Gawn	8 July 2024

Distribution of Copies

Status	Issued to
Revision 0	Kate McGee, Reflections Holiday Parks

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		8 July 2024
Reviewer		8 July 2024

Douglas PARTNERS | GROUNDED EXPERTISE

Table of Contents

Report on Geotechnical Investigation
Proposed Amenities Block and In-Ground Pool

17 Reserve Road, Forster NSW

1. Introduction

This report prepared by Douglas Partners Pty Ltd (Douglas) presents the results of a geotechnical investigation undertaken in connection with a proposed amenities block and in-ground pool at 17 Reserve Road, Forster NSW (the site). The investigation was commissioned by an email instructing Douglas to proceed dated 13 June 2024 from Kate McGee of Reflections Holiday Parks and was undertaken with reference to Douglas' proposal 230151.00.P.001.Rev0 dated 13 June 2024.

It is understood that the proposed development of the site includes a new amenities block, with camp kitchen and toilet facilities is proposed between Schnapper Parade and Terraglin Avenue and an inground pool, associated fencing and services between Kingfish Avenue and Trevally Ally. The proposed development areas are shown on Drawing 1, in Appendix A.

The aim of the investigation was to assess the subsurface soil and groundwater conditions at the field test locations in order to provide:

- Comments on excavatability and temporary batter slope angles;
- Dewatering requirements (if encountered within the proposed depth of excavation for the in-ground pool);
- Comments on site preparation and earthworks for the proposed amenities block;
- Site classification in accordance with AS 2870 (2011) for the proposed amenities block;
- Allowable bearing pressure and estimated settlements for shallow (pad / strip) footings for the proposed amenities block;
- Geotechnical comment on the proposed in-ground pool construction (eg allowable bearing capacity at the founding depth of the pool (which is to be confirmed) and foundation preparation);
- Comments on soil aggressivity in accordance with AS 2159 (2009); and
- Comments on the presence of acid sulfate soils.

The investigation included the drilling of four boreholes and laboratory testing of selected samples. The details of the field and laboratory work are presented in this report, together with comments and recommendations on the items listed above.

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

2. Site Description and Review of Mapping

The proposed development areas are located within the Reflections Forster Beach Holiday Park at 17 Reserve Road, Forster, as indicated on Drawing 1, Appendix D.

2.1 Proposed Amenities Block

The proposed amenities block development area comprises powered camping sites 77 to 81, and 88 to 92, and was bounded by Schnapper Parade to the south, Terraglin Avenue to the north, Kingfish Avenue to the west and powered camping sites 82 and 87 to the east. The site is approximately 500 m^2 and undulates gently down to the south-west, with surface levels at the borehole locations of 3.1 AHD and 3.9 AHD.

At the time of the investigation, the site was covered by short grass. Camping services (electricity and water) run north-west to south-east through the middle of the site, a power pole was located in the central, northern portion of the site and a small tree (approximately 5 m to 6 m tall) was located in the central, southern portion of the site.

Figure 1 presents a view of the site at the time of the investigation field work.

Figure 1: Looking west from Bore 4 across the western portion of the proposed amenities block footprint.

Reference to the NSW Seamless Geology map indicates that the site is underlain by Booti Booti sandstone, which typically comprises coal rich, cross bedded sandstone with white siltstone and parallel laminated quartzose sandstone with sorted brachiopod valves.

Reference to the NSW Acid Sulfate Soil Risk mapping indicates that the site lies in an area mapped to have low probability of occurrence of acid sulfate soils greater than 3 m below the ground surface.

2.2 Proposed In-Ground Pool

The proposed in-ground pool development area is relatively flat and level with surface levels at the borehole locations of 2.8 AHD. The site was bounded by powered camping sites to the north and east, Trevally Ally to the east, Kingfish Parade to the west and Oyster Parade to the south.

At the time of the investigation, the site was covered by short grass. Cabins occupied the eastern portion of the site, garden beds with palm trees were located centrally and shade structures were located in the northern portion.

Drawing 1 in Appendix D presents an aerial view of the site from October 2021. It is understood that the amenities structure occupying majority of the proposed in-ground pool footprint in Drawing 1 was demolished in 2022.

Figure 2 presents a view of the site at the time of the investigation field work.

Figure 2: Looking east from Bore 1 across the proposed in-ground pool footprint.

Reference to the NSW Seamless Geology Map prepared by The Geological Survey of NSW indicates the proposed in-ground pool developmental area is underlain by Quaternary aged coastal deposits (backbarrier flat facies), which typically comprises sand, indurated sand, silt, clay, gravel, organic mud and peat.

Reference to the Quaternary Geological Mapping produced by the Geological Survey of NSW for the Comprehensive Coastal Assessment 2004 indicates that the site is underlain by Pleistocene aged coastal barrier, backbarrier flat, which typically comprises marine sand, indurated sand, silt, clay, gravel, organic mud and peat. Soils of this geological unit generally have low pyrite, carbonate and organic content.

Reference to the NSW Acid Sulfate Soil Risk mapping indicates that the site lies in an area mapped to have low probability of occurrence of acid sulfate soils between 1 m and 3 m below the ground surface.

3. Field Work

3.1 Methods

The field work was undertaken on 19 June 2024 and comprised the drilling of four bores using a continuous push tube sampling drilling rig to 3.0 m depth at the approximate locations indicated on Drawing 1, in Appendix D.

Bores 3 and 4 were drilled within the proposed amenities block footprint and Bores 1 and 2 were drilled within the proposed in-ground pool footprint.

The bores were reinstated with drilled spoil at the completion of drilling and sampling, which was compacted in layers using hand tools within about 1 m of the surface. The coordinates and surface levels at the bores were recorded using a differential GPS, which has a horizontal and vertical accuracy of approximately 0.1 m. It is important to note that Douglas is not a registered surveyor, hence the test locations are considered approximate only.

3.2 Results

The subsurface conditions encountered in the bores are detailed on the borehole logs in Appendix B. These should be read in conjunction with the attached notes About this Report and the explanatory notes in Appendix A which comment on the sampling methods, soil descriptions, and symbols and abbreviations used in their preparation.

The subsurface conditions encountered in the bores are summarised in Table 1 below. The layers have been categorised into broad geotechnical units according to their inferred geological history as follows:

- **Unit 1 – Fill:** generally comprising silty sand, sand and sandy gravel, encountered in Bore 2 from the surface to 0.9 m depth;
- **Unit 2 – Topsoil:** generally comprising sand with rootlets, encountered in Bores 1, 3 and 4 from the surface to 0.2 m depth;
- **Unit 3 - Alluvium**
    - **Unit 3.1 – Sand / Silty Sand:** generally medium dense, or medium dense to dense, encountered in all bores below the fill or topsoil to depths between 2.8 m and 3.0 m. Loose between 0.8 m and 1.0 m depth in Bore 1; and
    - **Unit 3.2 – Silty Clay:** soft, encountered in Bore 1 only, from 2.8 m to 3.0 m depth.

Groundwater was observed at depths between 1.3 m and 2.3 m depth (corresponding to 1.3 AHD to 1.8 AHD) while the bores remained open. It should be noted that groundwater depths are affected by factors such as climatic conditions and soil permeability, and will therefore vary with time.

Table 1: Summary of Subsurface Conditions

Bore	Area	Surface Elevation (AHD)	Groundwater Depth (m)	Max. Depth of Excavation (m)	Depth to Base of Unit (m)			
					1 (Fill)	2 (Topsoil)	3.1 (Sand)	3.2 (Clay)
1	In-Ground Pool	2.8	**1.5**	2.5	NE	0.2	2.8	3.0 (LOI)
2		2.8	**1.5**	2.5	0.9	NE	3.0 (LOI)	NE
3	Amenities Block	3.1	1.3	1.0	NE	0.2	3.0 (LOI)	NE
4		3.9	2.3	1.0	NE	0.2	3.0 (LOI)	NE

Notes to Table 1:

NE – not encountered

LOI – limit of investigation

Shaded represents material at proposed excavation depth

Bold represents groundwater within proposed depth of excavation

4. Laboratory Testing

4.1 Geotechnical

Geotechnical laboratory testing comprised four aggressivity tests. The laboratory test results are detailed in the test report sheets in Appendix C and are summarised in Table 4 in Section 6.5.

4.2 Acid Sulfate Soils

Acid sulfate soil laboratory testing comprised the following:

- Field screening tests on all soil samples for pH in deionised water (pH_F) and pH following oxidation with hydrogen peroxide (pH_{FOX}); and
- Six soil samples tested for acid base accounting (ABA) to further assess ASS conditions.

Based on the results of the screening tests, six soil samples were selected for detailed laboratory testing, undertaken by Envirolab Services Pty Ltd, which is a NATA accredited laboratory, and comprising acid base accounting (ABA) (including the chromium reducible sulfur (Scr) method for reduced inorganic sulfur (RIS) measurement) in accordance with (Sullivan, et al., 2018b). The results of detailed laboratory testing are provided in the attached laboratory report sheets and summarised in Table C1 in Appendix C.

5. Proposed Development

5.1 Proposed Amenities Block

It is understood that a new single storey amenities block, with camp kitchen and toilet facilities is proposed between Schnapper Parade and Terraglin Avenue, as indicated on Drawing 1, Appendix D. Myers Ellyett drawings (included in Appendix D) indicate the development includes a single storey structure with a suspended ground floor slab (finished floor level of 4.16 AHD), deck and footpaths.

It is further understood that the preferred footing arrangement comprises shallow footings. It is assumed that trench excavation up to 1 m depth would be required for the installation of service infrastructure and localised footing excavations may be required.

Selected plan and elevation views of the proposed amenities block taken from the development plans are shown below. The plans are also included in Appendix D.

Figure 3 to Figure 5 below show the proposed development.

No information on footing loads was provided at the time of reporting.

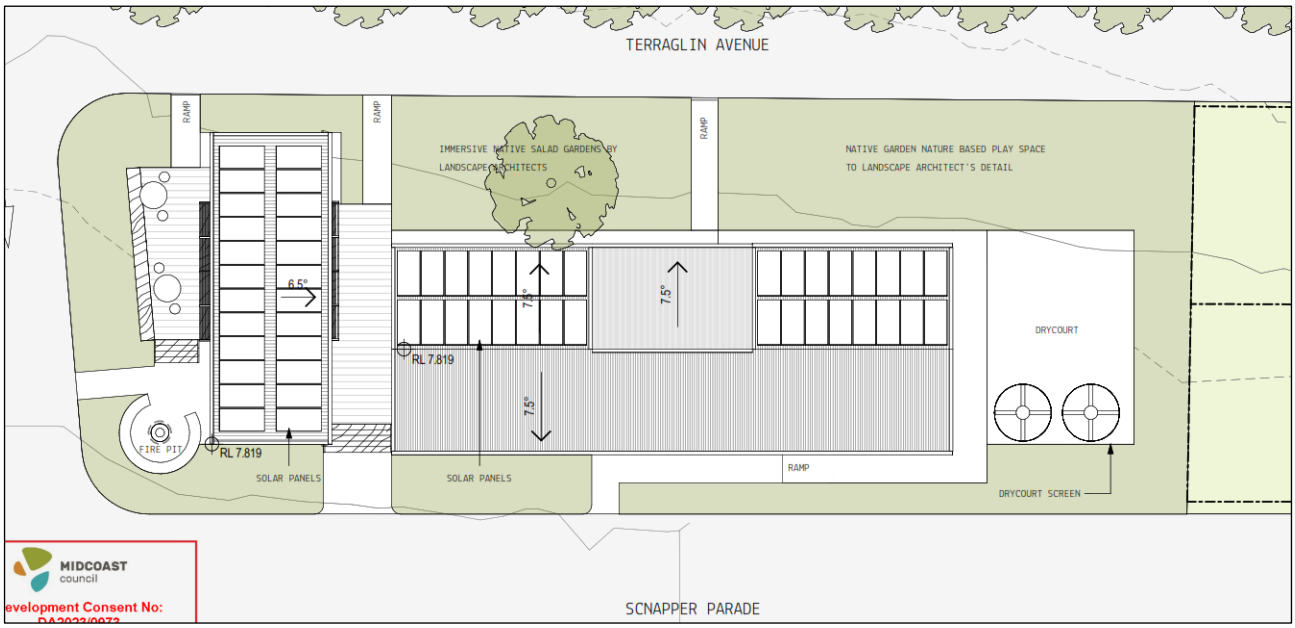


Figure 3: Proposed amenities block from Myers Ellyett drawing "Proposed Camp Kitchen & Amenities Site Plan" Drawing No. DD.08.5 Rev 2 dated 18.09.2023.

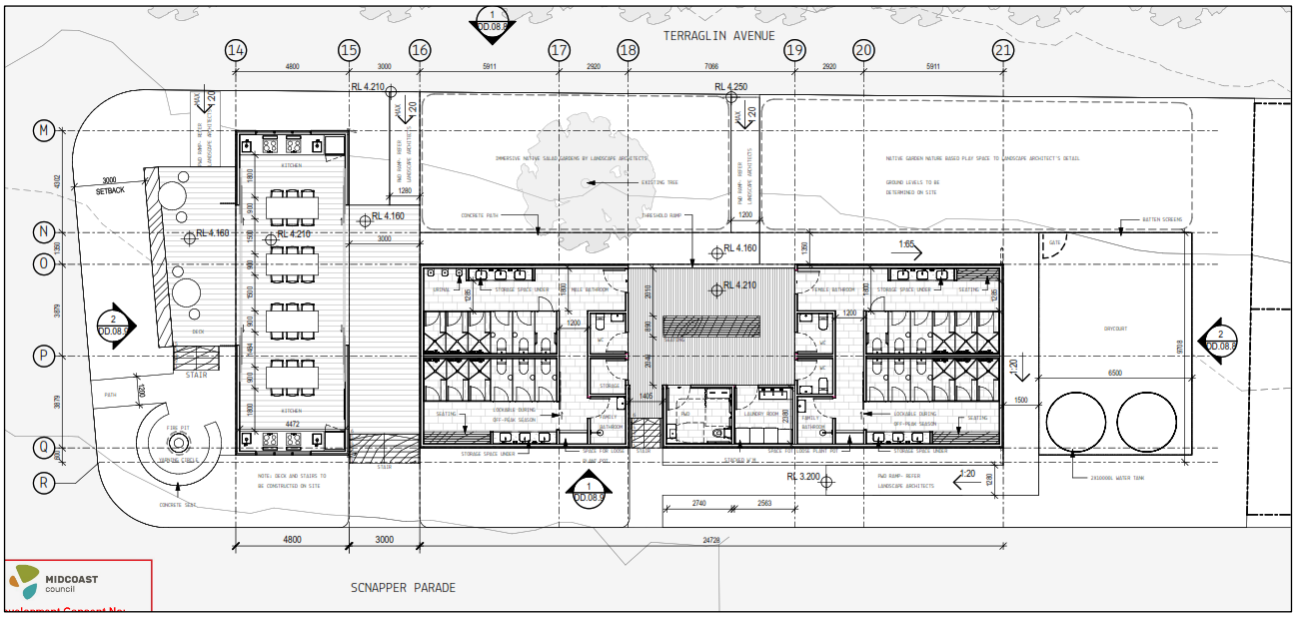


Figure 4: Proposed amenities block from Myers Ellyett drawing "Proposed Camp Kitchen & Amenities - Floor Plan" Drawing No. DD.08.7 Rev 2 dated 18.09.2023.

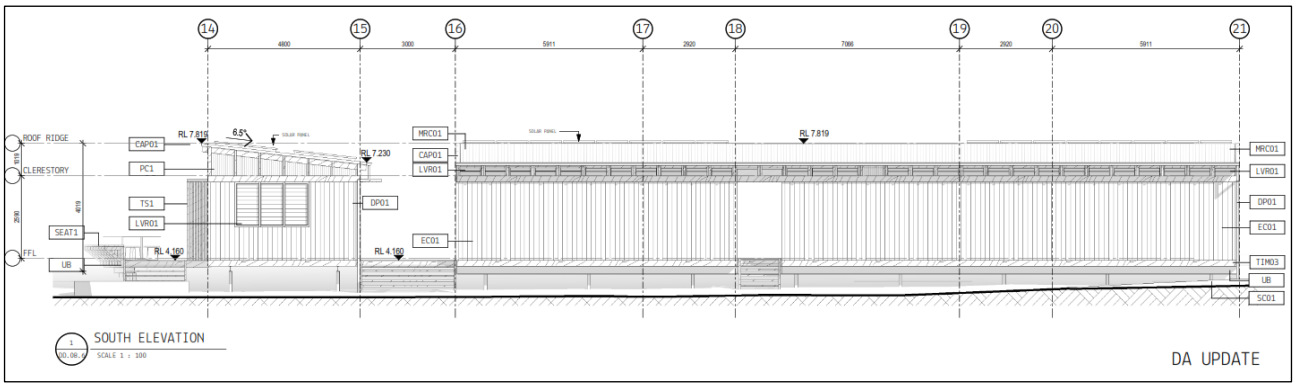


Figure 5: Proposed amenities block (south elevation) from Myers Ellyett drawing "Proposed Camp Kitchen & Amenities - Elevations" Drawing No. DD.08.9 Rev 2 dated 18.09.2023.

5.2 **Proposed In-Ground Pool**

It is understood that an in-ground pool, associated fencing and services are proposed between Kingfish Avenue and Trevally Ally, as indicated on Drawing 1, Appendix D.

A plan of the proposed in-ground pool taken from the email brief is shown below in Figure 6.

Excavation of up to 2.5 m has been assumed, based on a maximum pool depth of 1.9 m.

Figure 6: Proposed in-ground pool from Myers Ellyett drawing "Pool – Floor Plan" Drawing No. DD.05.02 undated (plan taken from email brief).

6. Comments

6.1 Excavations

6.1.1 Excavatability

The following excavation depths have been assumed for the proposed developments at the site:

- Up to 1.0 m for shallow footings associated with the amenities block;
- Up to 1.0 m for installation of service infrastructure (for both the amenities block and the in-ground pool); and
- Up to 2.5 m for the in-ground pool.

Excavations to about 2.5 m depth would probably encounter medium dense sand. Predominantly granular fill was encountered to 0.9 m depth in Bore 2. Some bands of indurated (cemented) sands may be encountered, though it is noted that these were not encountered in the bores.

Excavation of this material to depth above the groundwater level may be readily conducted using conventional earthmoving equipment, such as a hydraulic excavator.

Groundwater was encountered between 1.3 m and 2.3 m depth (corresponding to 1.3 AHD to 1.8 AHD) and is not expected to be encountered in excavations limited to 1.0 m below existing site levels.

Groundwater is expected to be encountered within excavations below about 1.3 m for the in-ground pool. Dewatering will be required for construction of the in-ground pool (refer Section 6.1.4). Excavations below the groundwater will also require excavation support (refer Section 6.1.3).

6.1.2 Temporary Batter Slopes

Temporary unretained excavations up to a maximum 1.0 m deep (anticipated to the proposed amenities) and provided there are no loads, services, structures or traffic located within a zone of influence of 1H:1V from the base of the excavation, , should be battered at no steeper than 2H:1V in the sands. If elevated groundwater is encountered at the time of excavation, such that it seeps from the batter face, additional geotechnical advice should be sought. Excavations greater than 1.0 m deep within the sand at the site should be appropriately supported (refer Section 6.1.3).

The adoption of such temporary batter slopes will also be dependent upon all surcharge, such as from spoil heaps, equipment and traffic, being kept well back (or at least the vertical excavation depth) from the slope crest.

Any cuts steeper than suggested above should be fully shored unless further geotechnical assessment indicates that it is acceptable to do so.

The duration of construction personnel working within trench excavations should be minimised as far as practicable (eg use of laser guided buckets for bedding sand placement/trimming after compaction, remote control/excavator mounted compaction equipment etc). It is also suggested that trench boxes/shields be installed at pipe joints, to provide further protection for construction personnel. No personnel should enter trench excavations of greater than 1 m unless it is positively supported.

6.1.3 Excavation Support

For the in-ground pool excavation and where battering is not feasible for trench or footing excavations (due to space, the presence of groundwater or surface infrastructure such as roads, other services and structures), sheet piling is recommended to support excavations. Sheet piling in combination with dewatering will be required for the in-ground pool excavation due to the depth of excavation and expected presence of groundwater below 1.5 m depth. Sheet piling will help to control groundwater inflow as well as provide protection of adjacent services and other infrastructure, such as roadways.

Design of cantilevered or single prop cantilevered retention systems (ie sheet piles) constructed in-situ prior to excavation (but not multi-propped), should utilise a triangular load distribution which increases with depth (refer below) derived from a combination of the following lateral soil pressure coefficients (multiplied by the bulk unit weight of the soil):

Ko = 'at rest' condition for retained soil, which will apply when wall movement and rotation is to be minimised.

Ka = 'active' condition for retained soil, which will apply when wall movement or rotation is acceptable and hence stresses can dissipate from the 'at-rest' condition.

Kp = 'passive' condition in restraining soil, below the toe of the wall.

Where the earth pressure is given by:

Earth Pressure = K. γ.d (in kPa)

Where K = earth pressure coefficient (as outlined above and in Table 2 below)

= bulk unit weight of retained material (in Table 2)

d = depth below the retained surface (retained side) or below the excavation (passive side) in metres

The use of active pressure coefficients (Ka) requires that there will be sufficient deflection of the retaining system during construction to reach active conditions. If lateral deflections are required to be limited, at-rest coefficients (Ko) should be used.

If retention walls are sealed, hydrostatic pressure build-up behind the walls and buoyant conditions should be considered in design.

The lateral earth co-efficient values suggested for the soils encountered at the site are contained in Table 2.

Table 2: Lateral Earth Coefficients and Pressures

Material		Effective Unit Weight	Moist Bulk Unit Weight	Lateral Earth Pressure Coefficient (K)		
		(kN/m³)	(kN/m³)	Ka	Ko	Kp
Fill (controlled)		10	18	0.31	0.47	3.25
Granular soils (silty sand / sand)	Loose	10	16	0.33	0.50	3.00
	Medium dense	10	18	0.31	0.47	3.25
	Dense	10	20	0.26	0.41	3.85

Notes to table:

Ka - coefficient of active earth pressure

Ko - coefficient of 'at-rest' earth pressure

Kp - coefficient of passive earth pressure

An appropriate factor of safety or material reduction factor should be applied to the above parameters for the design of the wall.

The design values given in Table 2 are based on level ground behind the wall and do not include any surcharge loads that may be imposed near the top / behind the wall eg vehicle loads, neighbouring buildings, construction surcharge. Below the long-term water table, earth pressures may be based on submerged (buoyant) unit weights of the soil plus the hydrostatic pressure on the wall.

The sheet pile walls must be design for an appropriate groundwater levels, and in absence of specific data which can establish the highest possible level while the sheet pile wall is in service, they should be designed for full hydrostatic forces.

Notwithstanding the above comments, the contractor should comply with all statutory requirements for excavation support.

6.1.4 **Dewatering**

Groundwater is expected to be intercepted within in-ground pool excavations. It is important to note that groundwater levels will fluctuate with the prevailing weather. Construction should therefore consider the risk of encountering groundwater within the footing and trenched excavations (for both the in-ground pool and amenities block) and make provision accordingly.

Fetter (1994) indicates the following typical permeability values for sand and silty sand:

- Silty sands, fine sands: 10^{-7} m/s to 10^{-5} m/s.
- Well-sorted sands: 10^{-5} m/s to 10^{-3} m/s.

The suggested permeability for the design of dewatering systems within relatively 'clean' sand below 1.3 m depth is 1×10^{-4} to 5×10^{-4} m/s.

This has been based on published data and Douglas' previous experience with similar materials. It should be noted that soil permeability can vary widely between locations and different layers. The design of the dewatering system should cater for potential variations.

It is considered that spear point dewatering methods would generally be suitable for dewatering. The effectiveness of spear point dewatering techniques may be reduced in areas with significant fines fraction or where indurated sand layers are present. In this regard, it is noted that silty clay was encountered at 2.8 m depth in Bore 1, which may impact on the efficiency of spear points. Sump-pump techniques may be required in combination with spear point dewatering where such conditions are encountered. Where indurated sand layers are present, premature refusal of spearpoints may occur. In this instance wash bore drilling methods would be required to facilitate installation.

It is the contractor's responsibility to ensure that any groundwater extracted from the excavations is lawfully disposed of and treated in accordance with recommendations in the ASSMP (refer Section 6.6).

Large scale dewatering should not be undertaken without prior geotechnical review, as it may impact on adjoining infrastructure or nearby buildings. Consideration should also be given to the effect of dewatering on acid sulfate soils.

6.2 Site Preparation and Earthworks

6.2.1 General

Prior to any earthworks at the site, any deleterious materials and vegetation should be stripped from within building envelopes and either removed from site or stockpiled for possible re-use, if applicable.

The shallow granular fill material and naturally occurring sand excavated from the development areas could be suitable for re-use as structural fill, provided that it is free from deleterious materials such as topsoil, vegetation and particles greater than 150 mm in size, and subject to recommendations from the ASSMP. It is noted that the silty sand fill will require careful moisture conditioning as it can become difficult to compact if it is too wet.

Imported fill should preferably comprise free draining cohesionless sand with less than 5% by weight of particles passing a 0.075 mm sieve. The material should be free from organic matter and large particles.

It is recommended that naturally occurring sands at this site and imported fill be placed in loose lift thickness of not more than 300 mm, with each layer compacted to at least 100% standard maximum dry density ratio or 80% density index.

Density testing of sand layers would probably require placement of a second layer to allow confinement, with the testing undertaken through the upper layer into the underlying layer.

During construction, some loosening of the surface sands in foundation excavations is expected. Therefore, the base of any excavation should be re-compacted using a vibratory plate compactor prior to constructing any footings.

If fill is to be used for the support of structural loads, earthworks testing and inspections should be carried out under controlled 'Level 1' inspection and testing, as defined in Section 8 of AS 3798 (2007).

6.2.2 Trafficability

Owing to the sand subgrade at the site, a granular bridging / capping layer will likely be required to act as a working platform if any tyred vehicles (construction or otherwise) are required to traffic the compacted sand surface once the site is brought to finished levels, prior to construction. Based on previous experience, the granular layer will need to be at least 200 mm to 250 mm thick, however the actual thickness will depend on the material used. Any damage to the working platform caused by vehicular traffic should be promptly repaired by placement and compaction of additional granular material.

6.3 Site Classification (Proposed Amenities Block)

Site classification of foundation soil reactivity in accordance with AS 2870 (2011) is strictly only applicable to the design and construction of residential structures up to two storeys high, however such classification can assist in footing design of similarly constructed commercial structures. The following is therefore provided for information purposes.

Reactive surface movements are considered negligible for the sandy soils at the site but some allowance should be made to account for the variability of the relative density / stiffness of the sand across there site which could result in differential movement beneath floor slabs. It is suggested that a Class S classification is applied to this site to account for the variability provided the site preparation measures as presented in Section 6.2 are undertaken and the estimated settlements beneath footings as presented in Section 6.4 are considered.

6.4 Shallow Footings

The allowable bearing pressure of footings founded in sand are a function of footing geometry, groundwater levels and depth of embedment. The design bearing pressure is normally selected on the basis of the need to limit settlement to tolerable levels.

Table 3 below provides recommended maximum allowable bearing pressures and estimated settlements for a range of footing arrangements and founding depths for both the amenities building and the in-ground pool.

Table 3: Allowable Bearing Pressures and Estimated Settlements

Founding Depth	Max Footing Width (m)		Founding Stratum	Allowable Bearing Pressure (kPa)	Estimated Settlement (mm)
	Pad	Strip			
0.5	1.0	0.6	Medium dense sand	100	5 - 10
1.0	1.0	0.6	Medium dense sand	100	5 - 10
1.5	1.0	0.6	Medium dense sand	80	5 - 10
2.0	1.0	0.6	Medium dense sand	60	5 - 10

Notes to table:

Allowable bearing pressures for footings funded at 1.5 m and deeper have been reduced due to the underlying soft silty clay encountered in Bore 1.

It is important that the founding depth for narrow (0.3 m wide) strip footings should be founded below 0.5 m in order to develop sufficient overburden pressure to achieve the recommended allowable bearing pressures.

Geotechnical inspection and testing is recommended during construction to confirm loose to medium dense sands to depths of at least twice the footing width below the base of the footing excavations.

Buoyant forces should be considered in the long term design of the in-ground pool. If piles or anchors are proposed, deeper investigation would be required to inform design parameters.

6.5 Soil Aggressiveness

The results of laboratory testing of soil samples collected during field work have been compared to the exposure classifications for steel and concrete as outlined in AS 2159 (2009). The following table summarises the exposure classifications for each of the samples tested.

Table 4: Soil Aggressiveness Exposure Classification with reference to AS 2159 (2009)

Sample	Depth (m)	Description	Soil Condition	pH (concrete)	pH (steel)	Resistivity(1) (Ω.cm) (steel)	SO_3 (ppm) (concrete)	Cl (ppm) (steel)
1	3.0	Silty Clay - black	B	4.9	4.9	909	2200	47
2	1.0	Sand - grey	B	6.7	6.7	31250	10	<10
3	1.5	Sand - brown grey	A	6.4	6.4	76923	<10	<10
4	2.0	Sand - brown	B	6.4	6.4	71429	<10	<10

Notes to Table

Non-aggressive

Mildly aggressive

Moderately aggressive

Severely Aggressive

Very Severe

1 Resistivity calculated based on inverse of conductivity in aqueous solution results

Scale of aggressivity based on threshold values given in AS 2159 – 2009: Piling – Design and Installation.

The results of the laboratory testing suggest mildly aggressive conditions towards buried concrete structures and moderately aggressive conditions towards buried steel structures.

6.6 Acid Sulfate Soils

The purpose of the acid sulfate soil assessment was to confirm the presence / absence of acid sulfate soils which may be disturbed during construction of the proposed development. The assessment was carried out with reference to Stone et al (1998), Ahern et al (2004), Dear et al (2014) Sullivan et al (2018a), and Sullivan et al (2018b).

Indicators of acid sulfate soils from field screening comprise one, or preferably more of the following:

- Field pH / pH in distilled H_2O (pH_F) is less than or equal to 4 pH units. The pH_F (non-oxidised) is a measure of existing acidity;
- pH following addition of H_2O_2 (pH_{Fox}) is less than 3 pH units. The pH_{Fox} (oxidised pH) is a measure of potential acidity;
- A decrease of more than 1 pH unit from the pH_F to the pH_{Fox}.

The results of screening tests indicated that none of the samples tested exhibited soil pH <4 in distilled H_2O (ie pH_F), suggesting the absence of actual acid sulfate soils at the locations and depths tested. The results of the acid sulfate soil screening tests indicated the following for the proposed development areas:

- **Proposed amenities block (Bores 3 and 4):** that none of the 24 samples exhibited soil pH < 3 in H_2O_2 (ie pH_{FOX}), and 18 out of the 24 samples screened exhibited a pH drop of one or more following oxidation in peroxide, with a difference ranging from 0.5 to 2.3 pH units; and
- **Proposed in-ground pool (Bores 1 and 2):** that five of the 24 samples exhibited soil pH < 3 in H_2O_2 (ie pH_{FOX}), and 22 out of the 24 samples screened exhibited a pH drop of one or more following oxidation in peroxide with a difference ranging from 1.0 to 4.6 pH units.

It is noted that ASS screening tests are a qualitative method only and give an indication of the intensity of total acidification (pH). The guidelines indicate that peroxide may also oxidise organic matter (in addition to pyrite) to produce acids which are unlikely to form under natural conditions, thus giving falsely high indication of acid sulfate potential.

Based on the results of screening tests, six soil samples (two from the amenities block and four from the in-ground pool) were selected for detailed laboratory testing, comprising acid base accounting (ABA) with reference to NASSG laboratory methods guidelines (Sullivan, et al., 2018b).

The laboratory results of ABA testing with reference to Sullivan et al (2018) indicated that the Net Acidity in three of the six samples were less than the practical quantitation limit of 0.005 w/w S and three samples had a Net Acidity ranging between 0.005 w/w S and 0.64 w/w S.

The NASSG action criteria which define the requirement for management of acid sulfate soils vary depending on the amount of soil disturbed (ie < 1000 tonnes) and the textural classification of the soil. The relevant criteria are shown on Table C1, Appendix C.

Based on the results of the ASS screening tests, the detailed laboratory testing (ABA) conducted and the geological formations present, it is considered that ASS conditions are present within the existing natural soils encountered at the site.

The following comments are made for the proposed development areas:

- Proposed amenities block (Bores 3 and 4):
  - The net acidity in both of the samples was less than, or equal to the practical quantitation limit of 0.005 w/w S; and
  - If follows from the above that an **ASSMP would not be required** prior to any construction works or earthworks being conducted for the amenities block within the limit of sampling (3 m). Where soil disturbance greater than 3 m depth is proposed (ie piles), further investigation will be required to determine if an ASSMP is required.
- Proposed in-ground pool (Bores 1 and 2):
  - The net acidity in two out of the four samples were less than the practical quantitation limit of 0.005 w/w S;
  - The net acidity in two out of the four samples exceeded the NASSG respective action criteria (0.03% w/w S); and

- It follows from the above that an **ASSMP would be required** prior to any construction works or earthworks being conducted for the in-ground pool.

7. References

Ahern, C. R., McElnea, A. E., & Sullivan, L. A. (2004). *Acid Sulfate Soils Laboratory Methods Guidelines. In Queensland Acid Sulfate Soils Manual 2004.* (QASSIT) Indooroopilly, Queensland, Australia: Department of Natural Resources, Mines and Energy.

AS 2159. (2009). *Piling - Design and Installation.* Standards Australia.

AS 2870. (2011). *Residential Slabs and Footings.* Standards Australia.

AS 3798. (2007). *Guidelines on Earthworks for Commercial and Residential Developments.* Standards Australia.

Dear, S., Ahern, C., O'Brien, L., Dobos, S., McElnea, A., Moore, N., & Watling, K. (2014). *Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines.* (QASSIT). Brisbane: Department of Science: Department of Science, Information, Technology, Innovation and the Arts, Queensland Government.

Fetter, C. W. (1994). Applied Hydrogeology. New York: Macmillan College Publishing Company.

Stone, Y., Ahern, C. R., & Blunden, B. (1998). *Acid Sulfate Soil Manual.* Acid Sulfate Soil Management Committee (ASSMAC).

Sullivan, L., Ward, N., Toppler, N., & Lancaster, G. (2018a). *National Acid Sulfate Soils Guidance: National Acid Sulfate Soils Sampling and Identification Methods Manual.* Canberra ACT CC BY 4.0: Department of Agriculture and Water Resources.

Sullivan, L., Ward, N., Toppler, N., & Lancaster, G. (2018b). *National Acid Sulfate Soils Guidance: National Acid Sulfate Soils Identification and Laboratory Methods Manual.* Canberra ACT CC BY 4.0: Department of Agriculture and Water Resources.

8. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 17 Reserve Road, Forster NSW in accordance with Douglas' proposal 230151.00.P.001.Rev0 dated 13 June 2024 and acceptance received from Kate McGee of Reflections Holiday Parks dated 13 June 2024. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of Reflections Holiday Parks for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope of work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

Appendix A

About This Report

Terminology, Symbols and Abbreviations

Soil Descriptions

Sampling, Testing and Excavation Methodology

About this Report

November 2023

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

continued next page

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

intentionally blank

intentionally blank

Terminology, Symbols and Abbreviations

November 2023

Introduction to Terminology, Symbols and Abbreviations

Douglas Partners' reports, investigation logs, and other correspondence may use terminology which has quantitative or qualitative connotations. To remove ambiguity or uncertainty surrounding the use of such terms, the following sets of notes pages may be attached Douglas Partners' reports, depending on the work performed and conditions encountered:

- Soil Descriptions;
- Rock Descriptions; and
- Sampling, insitu testing, and drilling methodologies

In addition to these pages, the following notes generally apply to most documents.

Abbreviation Codes

Site conditions may also be presented in a number of different formats, such as investigation logs, field mapping, or as a written summary. In some of these formats textual or symbolic terminology may be presented using textual abbreviation codes or graphic symbols, and, where commonly used, these are listed alongside the terminology definition. For ease of identification in these note pages, textual codes are presented in these notes in the following style XW. Code usage conforms with the following guidelines:

- Textual codes are case insensitive, although herein they are generally presented in upper case; and
- Textual codes are contextual (i.e. the same or similar combinations of characters may be used in different contexts with different meanings (for example `PL` is used for plastic limit in the context of soil moisture condition, as well as in `PL(A)` for point load test result in the testing results column)).

Data Integrity Codes

Subsurface investigation data recorded by Douglas Partners is generally managed in a highly structured database environment, where records "span" between a top and bottom depth interval. Depth interval "gaps" between records are considered to introduce ambiguity, and, where appropriate, our practice guidelines may require contiguous data sets. Recording meaningful data is not always appropriate (for example assigning a "strength" to a concrete pavement) and the following codes may be used to maintain contiguity in such circumstances.

Term	Description	Abbreviation Code
Core loss	No core recovery	KL
Unknown	Information was not available to allow classification of the property. For example, when auguring in loose, saturated sand auger cuttings may not be returned.	UK
No data	Information required to allow classification of the property was not available. For example if drilling is commenced from the base of a hole predrilled by others	ND
Not Applicable	Derivation of the properties not appropriate or beyond the scope of the investigation. For example providing a description of the strength of a concrete pavement	NA

Graphic Symbols

Douglas Partners' logs contain a "graphic" column which provides a pictorial representation of the basic composition of the material. The symbols used are directly representing the material name stated in the adjacent "Description of Strata" column, and as such no specific graphic symbology legend has been provided in these notes.

intentionally blank

Soil Descriptions

Terminology
Symbols
Abbreviations

March 2024

Introduction

All materials which are not considered to be "in-situ rock" are described in general accordance with the soil description model of AS 1726-2017 Part 6.1.3, and can be broken down into the following description structure:

The "classification" comprises a two character "group symbol" providing a general summary of dominant soil characteristics. The "name" summarises the particle sizes within the soil which most influence its behaviour. The detailed description presents more information about composition, condition, structure, and origin of the soil.

Classification, naming and description of soils require the relative proportion of particles of different sizes within the whole soil mixture to be considered.

Particle size designation and Behaviour Model

Solid particles within a soil are differentiated on the basis of size.

The engineering behaviour properties of a soil can subsequently be modelled to be either "fine grained" (also known as "cohesive" behaviour) or "coarse grained" ("non cohesive" behaviour), depending on the relative proportion of fine or coarse fractions in the soil mixture.

Particle Size Designation	Particle Size (mm)	Behaviour Model	
		Behaviour	Approximate Dry Mass
Boulder	>200	Excluded from particle behaviour model as "oversize"	
Cobble	63 - 200		
Gravel[1]	2.36 - 63	Coarse	>65%
Sand[1]	0.075 - 2.36		
Silt	0.002 - 0.075	Fine	>35%
Clay	<0.002		

[1] – refer grain size subdivision descriptions below

The behaviour model boundaries defined above are not precise, and the material behaviour should be assumed from the name given to the material (which considers the particle fraction which dominates the behaviour, refer "component proportions" below), rather than strict observance of the proportions of particle sizes. For example, if a material is named a "Sandy CLAY", this is indicative that the material exhibits fine grained behaviour, even if the dry mass of coarse grained material may exceed 65%.

Component proportions

The relative proportion of the dry mass of each particle size fraction is assessed to be a "primary", "secondary", or "minor" component of the soil mixture, depending on its influence over the soil behaviour.

Component Proportion Designation	Definition[1]	Relative Proportion	
		In Fine Grained Soil	In Coarse Grained Soil
Primary	The component (particle size designation, refer above) which dominates the engineering behaviour of the soil	The clay/silt component with the greater proportion	The sand/gravel component with the greater proportion
Secondary	Any component which is not the primary, but is significant to the engineering properties of the soil	Any component with greater than 30% proportion	Any granular component with greater than 30%; or Any fine component with greater than 12%
Minor[2]	Present in the soil, but not significant to its engineering properties	All other components	All other components

[1] As defined in AS1726-2017 6.1.4.4

[2] In the detailed material description, minor components are split into two further sub-categories. Refer "identification of minor components" below.

Composite Materials

In certain situations, a lithology description may describe more than one material, for example, collectively describing a layer of interbedded sand and clay. In such a scenario, the two materials would be described independently, with the names preceded or followed by a statement describing the arrangement by which the materials co-exist. For example, "INTERBEDDED Silty CLAY AND SAND".

Soil Descriptions

Classification

The soil classification comprises a two character group symbol. The first character identifies the primary component. The second character identifies either the grading or presence of fines in a coarse grained soil, or the plasticity in a fine grained soil. Refer AS1726-2017 6.1.6 for further clarification.

Soil Name

For most soils, the name is derived with the primary component included as the noun (in upper case), preceded by any secondary components stated in an adjective form. In this way, the soil name also describes the general composition and indicates the dominant behaviour of the material.

Component [1]	Prominence in Soil Name
Primary	Noun (eg "CLAY")
Secondary	Adjective modifier (eg "Sandy")
Minor	No influence

[1] – for determination of component proportions, refer component proportions on previous page

For materials which cannot be disaggregated, or which are not comprised of rock or mineral fragments, the names "ORGANIC MATTER" or "ARTIFICIAL MATERIAL" may be used, in accordance with AS1726-2017 Table 14.

Commercial or colloquial names are not used for the soil name where a component derived name is possible (for example "Gravelly SAND" rather than "CRACKER DUST").

Materials of "fill" or "topsoil" origin are generally assigned a name derived from the primary/secondary component (where appropriate). In log descriptions this is preceded by uppercase "FILL" or "TOPSOIL". Origin uncertainty is indicated in the description by the characters (?), with the degree of uncertainty described (using the terms "probably" or "possibly" in the origin column, or at the end of the description).

Identification of minor components

Minor components are identified in the soil description immediately following the soil name. The minor component fraction is usually preceded with a term indicating the relative proportion of the component.

Minor Component Proportion Term	Relative Proportion	
	In Fine Grained Soil	In Coarse Grained Soil
With	All fractions: 15-30%	Clay/silt: 5-12% sand/gravel: 15-30%
Trace	All fractions: 0-15%	Clay/silt: 0-5% sand/gravel: 0-15%

The terms "with" and "trace" generally apply only to gravel or fine particle fractions. Where cobbles/boulders are encountered in minor proportions (generally less than about 12%) the term "occasional" may be used. This term describes the sporadic distribution of the material within the confines of the investigation excavation only, and there may be considerable variation in proportion over a wider area which is difficult to factually characterise due to the relative size of the particles and the investigation methods.

Soil Composition

Plasticity

Descriptive Term	Laboratory liquid limit range	
	Silt	Clay
Non-plastic materials	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35 and ≤50
High plasticity	>50	>50

Note, Plasticity descriptions generally describe the plasticity behaviour of the whole of the fine grained soil, not individual fine grained fractions.

Grain Size

Type		Particle size (mm)
Gravel	Coarse	19 - 63
	Medium	6.7 - 19
	Fine	2.36 – 6.7
Sand	Coarse	0.6 - 2.36
	Medium	0.21 - 0.6
	Fine	0.075 - 0.21

Grading

Grading Term	Particle size (mm)
Well	A good representation of all particle sizes
Poorly	An excess or deficiency of particular sizes within the specified range
Uniformly	Essentially of one size
Gap	A deficiency of a particular size or size range within the total range

Note, AS1726-2017 provides terminology for additional attributes not listed here.

Soil Condition

Moisture

The moisture condition of soils is assessed relative to the plastic limit for fine grained soils, while for coarse grained soils it is assessed based on the appearance and feel of the material. The moisture condition of a material is considered to be independent of stratigraphy (although commonly these are related), and this data is presented in its own column on logs.

Applicability	Term	Tactile Assessment	Abbreviation code
Fine	Dry of plastic limit	Hard and friable or powdery	w<PL
	Near plastic limit	Can be moulded	w=PL
	Wet of plastic limit	Water residue remains on hands when handling	w>PL
	Near liquid limit	"oozes" when agitated	w=LL
	Wet of liquid limit	"oozes"	w>LL
Coarse	Dry	Non-cohesive and free running	D
	Moist	Feels cool, darkened in colour, particles may stick together	M
	Wet	Feels cool, darkened in colour, particles may stick together, free water forms when handling	W

The abbreviation code NDF, meaning "not-assessable due to drilling fluid use" may also be used.

Note, observations relating to free ground water or drilling fluids are provided independent of soil moisture condition.

Consistency/Density/Compaction/Cementation/Extremely Weathered Material

These concepts give an indication of how the material may respond to applied forces (when considered in conjunction with other attributes of the soil). This behaviour can vary independent of the composition of the material, and on logs these are described in an independent column and are generally mutually exclusive (i.e it is inappropriate to describe both consistency and compaction at the same time). The method by which the behaviour is described depends on the behaviour model and other characteristics of the soil as follows:

- In fine grained soils, the "consistency" describes the ease with which the soil can be remoulded, and is generally correlated against the materials undrained shear strength;
- In granular materials, the relative density describes how tightly packed the particles are, and is generally correlated against the density index;
- In anthropogenically modified materials, the compaction of the material is described qualitatively;
- In cemented soils (both natural and anthropogenic), the cemented "strength" is described qualitatively, relative to the difficulty with which the material is disaggregated; and
- In soils of extremely weathered material origin, the engineering behaviour may be governed by relic rock features, and expected behaviour needs to be assessed based the overall material description.

Quantitative engineering performance of these materials may be determined by laboratory testing or estimated by correlated field tests (for example penetration or shear vane testing). In some cases, performance may be assessed by tactile or other subjective methods, in which case investigation logs will show the estimated value enclosed in round brackets, for example (VS).

Consistency (fine grained soils)

Consistency Term	Tactile Assessment	Undrained Shear Strength (kPa)	Abbreviation Code
Very soft	Extrudes between fingers when squeezed	<12	VS
Soft	Mouldable with light finger pressure	>12 - ≤25	S
Firm	Mouldable with strong finger pressure	>25 - ≤50	F
Stiff	Cannot be moulded by fingers	>50 - ≤100	St
Very stiff	Indented by thumbnail	>100 - ≤200	VSt
Hard	Indented by thumbnail with difficulty	>200	H
Friable	Easily crumbled or broken into small pieces by hand	-	Fr

Relative Density (coarse grained soils)

Relative Density Term	Density Index	Abbreviation Code
Very loose	<15	VL
Loose	>15 - ≤35	L
Medium dense	>35 - ≤65	MD
Dense	>65 - ≤85	D
Very dense	>85	VD

Note, tactile assessment of relative density is difficult, and generally requires penetration testing, hence a tactile assessment guide is not provided.

Compaction (anthropogenically modified soil)

Compaction Term	Abbreviation Code
Well compacted	WC
Poorly compacted	PC
Moderately compacted	MC
Variably compacted	VC

Cementation (natural and anthropogenic)

Cementation Term	Abbreviation Code
Moderately cemented	MOD
Weakly cemented	WEK

Extremely Weathered Material

AS1726-2017 considers weathered material to be soil if the unconfined compressive strength is less than 0.6 MPa (i.e. less than very low strength rock). These materials may be identified as "extremely weathered material" in reports and by the abbreviation code XWM on log sheets. This identification is not correlated to any specific qualitative or quantitative behaviour, and the engineering properties of this material must therefore be assessed according to engineering principles with reference to any relic rock structure, fabric, or texture described in the description.

Soil Origin

Term	Description	Abbreviation Code
Residual	Derived from in-situ weathering of the underlying rock	RS
Extremely weathered material	Formed from in-situ weathering of geological formations. Has strength of less than 'very low' as per as1726 but retains the structure or fabric of the parent rock.	XWM
Alluvial	Deposited by streams and rivers	ALV
Fluvial	Deposited by channel fill and overbank (natural levee, crevasse splay or flood basin)	FLV
Estuarine	Deposited in coastal estuaries	EST
Marine	Deposited in a marine environment	MAR
Lacustrine	Deposited in freshwater lakes	LAC
Aeolian	Carried and deposited by wind	AEO
Colluvial	Soil and rock debris transported down slopes by gravity	COL
Slopewash	Thin layers of soil and rock debris gradually and slowly deposited by gravity and possibly water	SW
Topsoil	Mantle of surface soil, often with high levels of organic material	TOP
Fill	Any material which has been moved by man	FILL
Littoral	Deposited on the lake or seashore	LIT
Unidentifiable	Not able to be identified	UID

Cobbles and Boulders

The presence of particles considered to be "oversize" may be described using one of the following strategies:

- Oversize encountered in a minor proportion (when considered relative to the wider area) are noted in the soil description; or
- Where a significant proportion of oversize is encountered, the cobbles/boulders are described independent of the soil description, in a similar manner to composite soils (described above) but qualified with "MIXTURE OF".

intentionally blank

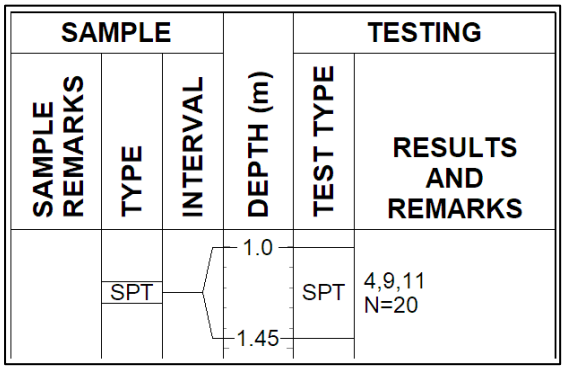
Sampling, Testing and Excavation Methodology

Terminology
Symbols
Abbreviations

March 2024

Sampling and Testing

A record of samples retained, and field testing performed is usually shown on a Douglas Partners' log with samples appearing to the left of a depth scale, and selected field and laboratory testing (including results, where relevant) appearing to the right of the scale, as illustrated below:



Sampling

The type or intended purpose for which a sample was taken is indicated by the following abbreviation codes.

Sample Type	Code
Auger sample	A
Acid Sulfate sample	ASS
Bulk sample	B
Core sample	C
Disturbed sample	D
Environmental sample	ES
Gas sample	G
Piston sample	P
Sample from SPT test	SPT
Undisturbed tube sample	U[1]
Water sample	W
Material Sample	MT
Core sample for unconfined compressive strength testing	UCS

[1] – numeric suffixes indicate tube diameter/width in mm

The above codes only indicate that a sample was retained, and not that testing was scheduled or performed.

Field and Laboratory Testing

A record that field and laboratory testing was performed is indicated by the following abbreviation codes.

Test Type	Code
Pocket penetrometer (kPa)	PP
Photo ionisation detector (ppm)	PID
Standard Penetration Test x/y =x blows for y mm penetration HB = hammer bouncing HW = fell under weight of hammer	SPT
Shear vane (kPa)	V
Unconfined compressive strength, (MPa)	UCS

Field and laboratory testing (continued)

Test Type	Code
Point load test, (MPa), axial (A), diametric (D), irregular (I)	PLT(_)
Dynamic cone penetrometer, followed by blow count penetration increment in mm (cone tip, generally in accordance with AS1289.6.3.2)	DCP/150
Perth sand penetrometer, followed by blow count penetration increment in mm (flat tip, generally in accordance with AS1289.6.3.3)	PSP/150

Groundwater Observations

▷	seepage/inflow
▽	standing or observed water level
NFGWO	no free groundwater observed
OBS	observations obscured by drilling fluids

Drilling or Excavation Methods/Tools

The drilling/excavation methods used to perform the investigation may be shown either in a dedicated column down the left-hand edge of the log, or stated in the log footer. In some circumstances abbreviation codes may be used.

Method	Abbreviation Code
Direct Push	DP
Solid flight auger. Suffixes: /T = tungsten carbide tip, /V = v-shaped tip	AD[1]
Air Track	AT
Diatube	DT[1]
Hand auger	HA[1]
Hand tools (unspecified)	HAND
Existing exposure	X
Hollow flight auger	HSA[1]
HQ coring	HQ3
HMLC series coring	HMLC
NMLC series coring	NMLC
NQ coring	NQ3
PQ coring	PQ3
Predrilled	PD
Push tube	PT[1]
Ripping tyne/ripper	R
Rock roller	RR[1]
Rock breaker/hydraulic hammer	EH
Sonic drilling	SON[1]
Mud/blade bucket	MB[1]
Toothed bucket	TB[1]
Vibrocore	VC[1]
Vacuum excavation	VE
Wash bore (unspecified bit type)	WB[1]

[1] – numeric suffixes indicate tool diameter/width in mm

Douglas PARTNERS

Appendix B

Borehole Logs (Bores 1 to 4)

BOREHOLE LOG

CLIENT: Reflections Holiday Parks
PROJECT: Proposed Amenities Block and In-Ground Pool
LOCATION: 17 Reserve Road, Forster, NSW

SURFACE LEVEL: 2.8 AHD
COORDINATE: E:453773.0, N:6439693.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 230151.00
DATE: 19/06/24
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS
		0.20	TOPSOIL / SAND (SP-SM), with silt: pale yellow; medium; trace rootlets.		TOP	NA	M						
			SAND (SP), trace silt: pale grey; medium; trace rootlets.		ALV	MD	M		ASS		0.25		
									ASS		0.50		
									ASS		0.75		
		0.80	Silty SAND (SM): black; medium.		ALV	L	M						
		1.00	SAND (SP-SM), with silt: grey; medium.						ASS		1.00		
									ASS		1.25		
▼ 19/06/24									ASS		1.50	PSP/150	22
Free groundwater observed at 1.5m					ALV	D to VD	W		ASS		1.75		25/130
									ASS		2.00		
									ASS		2.25		
									ASS		2.50		
									ASS		2.75		
		2.80	Silty CLAY (CL), with sand: black; low plasticity; fine sand.		ALV	S	w>PL		ASS		3.00	PP	20kPa
		3	Borehole discontinued at 3.00m depth. Limit of investigation.										

NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Push Tube Rig
METHOD: Push tube to 3.0m
REMARKS: Coordinates and elevations measured by dGPS with typical accuracy of +/- 0.1 m, depending on satellite coverage and site condition

OPERATOR: Douglas Partners
LOGGED: Murphy
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

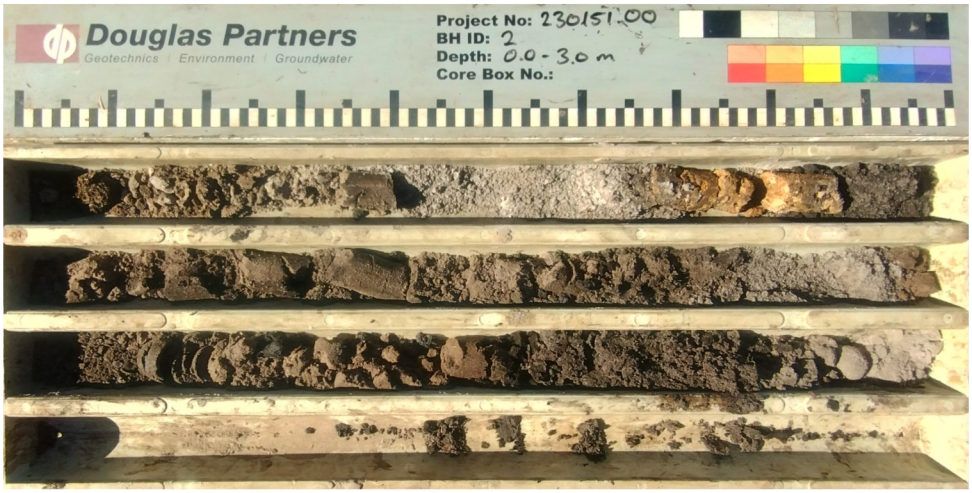
BOREHOLE LOG

CLIENT: Reflections Holiday Parks
PROJECT: Proposed Amenities Block and In-Ground Pool
LOCATION: 17 Reserve Road, Forster, NSW

SURFACE LEVEL: 2.8 AHD
COORDINATE: E:453775.0, N:6439706.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: 2
PROJECT No: 230151.00
DATE: 19/06/24
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
		0.30	FILL / Silty SAND (SM), with gravel: brown grey; medium; fine to coarse, sub-angular to sub-rounded gravel.		FILL	NA	M		ASS		0.25		
			FILL / SAND (SP-SM), with silt: pale grey; medium.		FILL	NA	M		ASS		0.50		
		0.70	FILL / Sandy GRAVEL (GP-GC), with clay: orange; fine to medium, sub-angular to sub-rounded; fine to coarse sand.		FILL	NA	w<PL		ASS		0.75		
		0.90	SAND (SP-SM), with silt: grey; medium.				M		ASS		1.00		
▼ 19/06/24 Free groundwater observed at 1.47m									ASS		1.25		
									ASS		1.50		
									ASS		1.75	PSP/150	
					ALV	MD			ASS		2.00		
							W		ASS		2.25		
									ASS		2.50		
									ASS		2.75		
		3.00	Borehole discontinued at 3.00m depth. Limit of investigation.						ASS		3.00		



NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Push Tube Rig
METHOD: Push tube to 3.0m
REMARKS: Coordinates and elevations measured by dGPS with typical accuracy of +/- 0.1 m, depending on satellite coverage and site condition

OPERATOR: Douglas Partners
LOGGED: Murphy
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Reflections Holiday Parks
PROJECT: Proposed Amenities Block and In-Ground Pool
LOCATION: 17 Reserve Road, Forster, NSW

SURFACE LEVEL: 3.1 AHD
COORDINATE: E:453812.0, N:6439754.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: 3
PROJECT No: 230151.00
DATE: 19/06/24
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^]/ DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS
	3	0.20	TOPSOIL / SAND (SP-SM), with silt: brown; medium; trace rootlets.		TOP	NA	M		ASS		0.25	PSP/150	5 10 15
			SAND (SP), trace silt: dark grey; medium.		ALV	MD	M		ASS		0.50		
		0.90							ASS		0.75		
	2 1	1	SAND (SP), with silt: brown grey; medium.				M		ASS		1.00		
▼ Free groundwater observed at 1.33m 19/06/24						D			ASS		1.25		
									ASS		1.50		
					ALV				ASS		1.75		
		2					W		ASS		2.00		
						MD			ASS		2.25		
									ASS		2.50		
									ASS		2.75		
	3 0	3	Borehole discontinued at 3.00m depth. Limit of investigation.						ASS		3.00		
	-1	4											

NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Push Tube Rig
METHOD: Push tube to 3.0m
REMARKS: Coordinates and elevations measured by dGPS with typical accuracy of +/- 0.1 m, depending on satellite coverage and site condition

OPERATOR: Douglas Partners

LOGGED: Murphy
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Reflections Holiday Parks
PROJECT: Proposed Amenities Block and In-Ground Pool
LOCATION: 17 Reserve Road, Forster, NSW

SURFACE LEVEL: 3.9 AHD
COORDINATE: E:453830.0, N:6439759.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: 4
PROJECT No: 230151.00
DATE: 19/06/24
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS
		0.20	TOPSOIL / SAND (SP), with silt: brown grey; medium; trace rootlets and grass in upper 0.05m.		TOP	NA	M		ASS		0.25	PSP/150	5 10 15
	3		SAND (SP), trace silt: grey; medium.						ASS		0.50		
		1							ASS		0.75		
					ALV	MD	M		ASS		1.00		
									ASS		1.25		
	2	1.90				D			ASS		1.50		
									ASS		1.75		
▼ 19/06/24		2	SAND (SP-SM), with silt: brown; medium.						ASS		2.00		
Free groundwater observed at 2.3m					ALV	MD to D	W		ASS		2.25		
									ASS		2.50		
	1								ASS		2.75		
		3	Borehole discontinued at 3.00m depth. Limit of investigation.						ASS		3.00		
	0												
		4											
	-1												

NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Push Tube Rig
METHOD: Push tube to 3.0m
REMARKS: Coordinates and elevations measured by dGPS with typical accuracy of +/- 0.1 m, depending on satellite coverage and site condition

OPERATOR: Douglas Partners
LOGGED: Murphy
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

Appendix C

Table C1: Summary of Results – Acid Sulfate Soils Laboratory Test Results

Table C1: Summary of Results - Acid Sulfate Soils

Project No: 230151.00

Project Name: Proposed Amenities and In-Ground Pool

Location: 17 Reserve Road, Forster

Sample Information						Screening Test Results				Laboratory Analysis Results (Acid Base Accounting)									
Location ID	Depth from (m)	Depth to (m)	Reduced level (AHD)	Sample Description	Adopted Texture	pH_F (pH units)	pH_{FOX} (pH units)	Reaction Strength	pH change (pH units)	pH_{KCl} (pH units)	S_{KCl} (%S)	S_{HCl} (%S)	S_{Cr} (%S)	TAA (%S)	S_{NAS} (%S)	ANC_{BT} (%S)	ANC Corroborated (Y/N)	Net Acidity (%S)
				Assessment Criteria (pH units)		**<4**	**<3**	-	**1.0**	Action Criteria (%S)		Coarse texture: sands to loamy sands and peats						0.03
												Medium texture: clayey sand to light clays						$0.06^a/0.03^b$
												Fine texture: light medium to heavy clays						$0.1^a/0.03^b$
Location ID	Depth from (m)	Depth to (m)	Reduced level (AHD)	Sample Description	Adopted Texture	pH_F (pH units)	pH_{FOX} (pH units)	Reaction Strength	pH change (pH units)	pH_{KCl} (pH units)	S_{KCl} (%S)	S_{HCl} (%S)	S_{Cr} (%S)	TAA (%S)	S_{NAS} (%S)	ANC_{BT} (%S)	ANC Corroborated (Y/N)	Net Acidity (%S)
1	0.25		2.55	Sand - pale grey	C	4.6	6.7	L	**-**	-	-	-	-	-	-	-	-	-
1	0.50		2.30	Sand - pale grey	C	6.9	5.9	L	**1.0**	-	-	-	-	-	-	-	-	-
1	0.75		2.05	Sand - pale grey	C	6.8	4.9	L	**1.9**	-	-	-	-	-	-	-	-	-
1	1.00		1.80	Sand - Grey	C	6.6	3.4	L	**3.2**	6.4	NT	NT	<0.005	<0.01	NT	NT	N	<0.005
1	1.25		1.55	Sand - grey	C	7.0	4.1	L	**2.9**	-	-	-	-	-	-	-	-	-
1	**1.50**		1.30	Sand - grey	C	6.2	4.2	L	**2.0**	-	-	-	-	-	-	-	-	-
1	**1.75**		1.05	Sand - grey	C	6.8	4.1	L	**2.7**	-	-	-	-	-	-	-	-	-
1	**2.00**		0.80	Sand - grey	C	6.7	**2.8**	L	**3.9**	5.7	NT	NT	<0.005	<0.01	NT	NT	N	<0.005
1	**2.25**		0.55	Sand - grey	C	6.7	3.5	L	**3.2**	-	-	-	-	-	-	-	-	-
1	**2.50**		0.30	Sand - grey	C	6.7	4.4	L	**2.3**	-	-	-	-	-	-	-	-	-
1	**2.75**		0.05	Sand - grey	C	7.0	4.6	L	**2.4**	-	-	-	-	-	-	-	-	-
1	**3.00**		-0.20	Silty Clay - Black	F	6.8	**2.2**	L	**4.6**	4.9	NT	NT	0.55	0.1	NT	NT	N	0.64
2	0.25		2.55	Fill / Silty Sand - brown grey	C	9.0	7.1	L	**1.9**	-	-	-	-	-	-	-	-	-
2	0.50		2.30	Fill / Sand - pale grey	C	8.1	5.1	L	**3.0**	-	-	-	-	-	-	-	-	-
2	0.75		2.05	Fill / Sandy Gravelly Clay - orange	F	7.7	8.7	V	**-**	-	-	-	-	-	-	-	-	-
2	1.00		1.80	Sand - grey	C	7.0	4.1	L	**2.9**	-	-	-	-	-	-	-	-	-
2	1.25		1.55	Sand - grey	C	7.0	4.3	L	**2.7**	-	-	-	-	-	-	-	-	-
2	**1.50**		1.30	Sand - grey	C	7.3	5.6	L	**1.7**	-	-	-	-	-	-	-	-	-
2	**1.75**		1.05	Sand - grey	C	7.0	5.0	L	**2.0**	-	-	-	-	-	-	-	-	-
2	**2.00**		0.80	Sand - grey	C	8.5	7.0	L	**1.5**	-	-	-	-	-	-	-	-	-
2	**2.25**		0.55	Sand - grey	C	8.0	4.9	L	**3.1**	-	-	-	-	-	-	-	-	-
2	**2.50**		0.30	Sand - grey	C	7.1	**2.6**	L	**4.5**	5.7	NT	NT	0.04	<0.01	NT	NT	N	0.043
2	**2.75**		0.05	Sand - grey	C	6.9	**2.4**	L	**4.5**	-	-	-	-	-	-	-	-	-
2	**3.00**		-0.20	Sand - grey	C	6.7	**2.3**	L	**4.4**	-	-	-	-	-	-	-	-	-
3	0.25		2.85	Sand - dark grey	C	6.3	4.0	L	**2.3**	-	-	-	-	-	-	-	-	-
3	0.50		2.60	Sand - dark grey	C	6.2	4.6	L	**1.6**	-	-	-	-	-	-	-	-	-
3	0.75		2.35	Sand - dark grey	C	6.2	4.6	L	**1.6**	-	-	-	-	-	-	-	-	-
3	1.00		2.10	Sand - brown grey	C	6.5	5.4	L	**1.1**	-	-	-	-	-	-	-	-	-
3	1.25		1.85	Sand - brown grey	C	6.4	5.9	L	0.5	-	-	-	-	-	-	-	-	-
3	**1.50**		1.60	Sand - brown grey	C	6.5	5.2	L	**1.3**	-	-	-	-	-	-	-	-	-
3	**1.75**		1.35	Sand - brown grey	C	5.7	3.9	L	**1.8**	5.4	NT	NT	<0.005	<0.01	NT	NT	N	<0.005
3	**2.00**		1.10	Sand - brown grey	C	6.4	4.7	L	**1.7**	-	-	-	-	-	-	-	-	-
3	**2.25**		0.85	Sand - brown grey	C	6.4	5.2	L	**1.2**	-	-	-	-	-	-	-	-	-
3	**2.50**		0.60	Sand - brown grey	C	6.3	5.7	L	0.6	-	-	-	-	-	-	-	-	-
3	**2.75**		0.35	Sand - brown grey	C	6.5	5.5	L	**1.0**	-	-	-	-	-	-	-	-	-
3	**3.00**		0.10	Sand - brown grey	C	6.2	4.7	L	**1.5**	-	-	-	-	-	-	-	-	-
4	0.25		3.65	Sand - grey	C	6.4	5.4	L	**1.0**	-	-	-	-	-	-	-	-	-
4	0.50		3.40	Sand - grey	C	6.6	5.1	L	**1.5**	-	-	-	-	-	-	-	-	-
4	0.75		3.15	Sand - grey	C	6.4	5.1	L	**1.3**	-	-	-	-	-	-	-	-	-
4	1.00		2.90	Sand - grey	C	5.7	4.5	L	**1.2**	-	-	-	-	-	-	-	-	-
4	1.25		2.65	Sand - grey	C	6.3	4.5	L	**1.8**	5.6	NT	NT	0.005	<0.01	NT	NT	N	0.005
4	1.50		2.40	Sand - grey	C	6.5	6.0	L	0.5	-	-	-	-	-	-	-	-	-
4	1.75		2.15	Sand - grey	C	6.6	5.6	L	**1.0**	-	-	-	-	-	-	-	-	-
4	2.00		1.90	Sand - brown	C	6.6	5.6	L	**1.0**	-	-	-	-	-	-	-	-	-
4	2.25		1.65	Sand - brown	C	6.6	5.4	L	**1.2**	-	-	-	-	-	-	-	-	-
4	**2.50**		1.40	Sand - brown	C	6.6	5.9	L	0.7	-	-	-	-	-	-	-	-	-
4	**2.75**		1.15	Sand - brown	C	6.4	5.9	L	0.5	-	-	-	-	-	-	-	-	-
4	**3.00**		0.90	Sand - brown	C	6.5	5.9	L	0.6	-	-	-	-	-	-	-	-	-

Notes:

Adopted texutre - C = coarse, M = medium, F = fine

pH_F - Soil pH in water

pH_{FOX} - Soil pH in peroxide

Reaction strength: L - Low , M - Medium, H - High, X - Extreme, V - Volcanic, F - Frothing (indicative of organic material)

pH change = pH_F - pH_{FOX}

pH_{KCL} - KCl extractable pH

S_{KCl} - KCl extractable sulfur

S_{HCl} - HCl extractable sulfur

S_{Cr} - potential sulfidic acidity

TAA - titratable actual acidity (reported if pH_{KCL}<6.5)

S_{NAS} – retained acidity (reported if pHKCl < 4.5)

ANC_{BT} – acid neutralising capacity (reported if pH_{KCl} ≥ 6.5)

NT - Not tested

Blue depths indicate where samples have been collected at or below the groundwater table

Bold results are indicators of ASS conditions, noting:

- Assessment criteria are considered a reasonable initial screening for AASS or PASS
- pH_F<4 is indicative of the presence of Actual ASS (AASS), although it is not conclusive of ASS on its own as naturally occurring non ASS soils can have pH_F<5
- pH_{FOX}<3 or pH Change ≥1 may indicate potential ASS (PASS), although exception apply. Laboratory testing required to confirm presence of Reduced Inorganic Sulfur (RIS)
- Refer to Table 5.1, A2, A3 of Sullivan,L. et al (2018) for further details

Shaded results trigger action (i.e. equal to or exceed the action criteria). Criteria is specific for soil texture and anticpated tonnage of soil disturbed.

Net Acidity can only include the measured ANC where the ANC has been corroborated by other data (for example slab incubation data) that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.

a - Action criterion for disturbance of 1-1000 tonnes of material

b - Action criterion for disturbance of more than 1000 tonnes of material

The action criteria apply only to ASS materials and not to other acidic soils such as acidic peatlands and coastal heaths.

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 354640

Client Details

Client	Douglas Partners Newcastle
Attention	Kate Fulham
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**230151.00 - Forster**
Number of Samples	48 Soil
Date samples received	21/06/2024
Date completed instructions received	21/06/2024

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	28/06/2024
Date of Issue	28/06/2024

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
Jenny He, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Chromium Suite						
Our Reference		354640-1	354640-2	354640-3	354640-5	354640-7
Your Reference	UNITS	1	1	1	2	3
Depth		1	2	3	2.5	1.75
Date Sampled		19/06/2024	19/06/2024	19/06/2024	19/06/2024	19/06/2024
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/06/2024	21/06/2024	21/06/2024	21/06/2024	21/06/2024
Date analysed	-	24/06/2024	24/06/2024	24/06/2024	24/06/2024	24/06/2024
pH $_{kcl}$	pH units	6.4	5.7	4.9	5.7	5.4
s-TAA pH 6.5	%w/w S	<0.01	<0.01	0.1	<0.01	<0.01
TAA pH 6.5	moles H^+ /t	<5	<5	61	<5	<5
Chromium Reducible Sulfur	%w/w	<0.005	<0.005	0.55	0.04	<0.005
a-Chromium Reducible Sulfur	moles H^+ /t	<3	<3	340	27	<3
S_{HCl}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
S_{KCl}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
S_{NAS}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	[NT]	[NT]	[NT]	[NT]	[NT]
s-ANC_{BT}	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
s-Net Acidity	%w/w S	<0.005	<0.005	0.64	0.043	<0.005
a-Net Acidity	moles H^+ /t	<5	<5	400	27	<5
Liming rate	kg $CaCO_3$ /t	<0.75	<0.75	30	2	<0.75
a-Net Acidity without ANCE	moles H^+ /t	<5	<5	400	27	<5
Liming rate without ANCE	kg $CaCO_3$ /t	<0.75	<0.75	30	2.0	<0.75
s-Net Acidity without ANCE	%w/w S	<0.005	<0.005	0.64	0.043	<0.005

Chromium Suite		
Our Reference		354640-8
Your Reference	UNITS	4
Depth		1.25
Date Sampled		19/06/2024
Type of sample		Soil
Date prepared	-	21/06/2024
Date analysed	-	24/06/2024
pH $_{kcl}$	pH units	5.6
s-TAA pH 6.5	%w/w S	<0.01
TAA pH 6.5	moles H^+ /t	<5
Chromium Reducible Sulfur	%w/w	0.005
a-Chromium Reducible Sulfur	moles H^+ /t	3
S_{HCl}	%w/w S	[NT]
S_{KCl}	%w/w S	[NT]
S_{NAS}	%w/w S	[NT]
ANC_{BT}	% $CaCO_3$	[NT]
s-ANC_{BT}	%w/w S	[NT]
s-Net Acidity	%w/w S	0.0050
a-Net Acidity	moles H^+ /t	<5
Liming rate	kg $CaCO_3$ /t	<0.75
a-Net Acidity without ANCE	moles H^+ /t	<5
Liming rate without ANCE	kg $CaCO_3$ /t	<0.75
s-Net Acidity without ANCE	%w/w S	0.0050

Misc Inorg - Soil					
Our Reference		354640-3	354640-4	354640-6	354640-9
Your Reference	UNITS	1	2	3	4
Depth		3	1	1.5	2
Date Sampled		19/06/2024	19/06/2024	19/06/2024	19/06/2024
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	21/06/2024	21/06/2024	21/06/2024	21/06/2024
Date analysed	-	26/06/2024	26/06/2024	26/06/2024	26/06/2024
pH 1:5 soil:water	pH Units	4.9	6.7	6.4	6.4
Electrical Conductivity 1:5 soil:water	µS/cm	1,100	32	13	14
Chloride, Cl 1:5 soil:water	mg/kg	47	<10	<10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	2,200	10	<10	<10

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell.
Inorg-068	Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity. 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 result. However, it has been applied in the SNAS calculation: SNAS % = (SHCL-SKCL)x2
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.

QUALITY CONTROL: Chromium Suite						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/06/2024	1	21/06/2024	21/06/2024		21/06/2024	[NT]
Date analysed	-			24/06/2024	1	24/06/2024	24/06/2024		24/06/2024	[NT]
pH $_{kcl}$	pH units		Inorg-068	[NT]	1	6.4	6.4	0	95	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
TAA pH 6.5	moles H^+ /t	5	Inorg-068	<5	1	<5	<5	0	94	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	1	<0.005	<0.005	0	97	[NT]
a-Chromium Reducible Sulfur	moles H^+ /t	3	Inorg-068	<3	1	<3	<3	0	[NT]	[NT]
S_{HCl}	%w/w S	0.005	Inorg-068	<0.005	1	[NT]	[NT]		[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-068	<0.005	1	[NT]	[NT]		[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-068	<0.005	1	[NT]	[NT]		[NT]	[NT]
ANC_{BT}	% $CaCO_3$	0.05	Inorg-068	<0.05	1	[NT]	[NT]		100	[NT]
s-ANC_{BT}	%w/w S	0.05	Inorg-068	<0.05	1	[NT]	[NT]		[NT]	[NT]
s-Net Acidity	%w/w S	0.005	Inorg-068	<0.005	1	<0.005	<0.005	0	[NT]	[NT]
a-Net Acidity	moles H^+ /t	5	Inorg-068	<5	1	<5	<5	0	[NT]	[NT]
Liming rate	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	1	<0.75	<0.75	0	[NT]	[NT]
a-Net Acidity without ANCE	moles H^+ /t	5	Inorg-068	<5	1	<5	<5	0	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	1	<0.75	<0.75	0	[NT]	[NT]
s-Net Acidity without ANCE	%w/w S	0.005	Inorg-068	<0.005	1	<0.005	<0.005	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/06/2024	[NT]	[NT]	[NT]	[NT]	21/06/2024	[NT]
Date analysed	-			26/06/2024	[NT]	[NT]	[NT]	[NT]	26/06/2024	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	98	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	103	[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.

COC: 20/06/24 1719.

Douglas PARTNERS

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	230151.00	**Suburb:**	Forster	**To:**	Envirolab Services
Project Manager:	Kate Fulham	**Order Number:**	NC232861	**Sampler:**	JJM	12 Ashley St, Chatswood NSW 2067
Email:	Kate.Fulham@douglaspartners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com
Prior Storage	☐ Fridge ☑ Freezer ☐ Esky ☐ Shelf	**Do samples contain 'potential' HBM?**	☐ No ☐ Yes (If YES, handle, transport, store in accordance with FPM HAZID)		

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water M - Material	Container Type: G - glass P - plastic	Analytes: Chromium suite	pH, EC, SO_4, Cl									Notes/ Preservation/ Additional Requirements
1	1	1		19/06/24	S	P	x										
2	1	2		19/06/24	S	P	x										
3	1	3		19/06/24	S	P	x	x									
4	2	1		19/06/24	S	P		x									
5	2	2.5		19/06/24	S	P	x										
6	3	1.5		19/06/24	S	P		x									
7	3	1.75		19/06/24	S	P	x										
8	4	1.25		19/06/24	S	P	x										
9	4	2		19/06/24	S	P		x									

Envirolab Services
ENVIROLAB GROUP
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 354640
Date Received: 21/6/24
Time Received: 1130
Received By: WW
Temp: Cool/Ambient
Cooling: Ice/Icepack 6°C
Security: Intact/Broken/None

Metals to analyse:			
Number of samples in container:	48	**Transported to laboratory by:**	TNT
Send results to:	Douglas Partners Pty Ltd		
Address:	15 Callistemon Close, Warabrook NSW 2	**Phone:**	(02) 4960 9600
Relinquished by:	Lachlan Helbig	**Date:**	20/06/2024
		Signed:	

LAB RECEIPT

Lab Ref. No:	354640
Received by:	Katy Wayne
Date & Time	21/6/24 1130
Signed:	

#354640 - extra samples

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:		Client Project Name/Number/Site etc (ie report title):	
Contact Person:			
Project Mgr:		PO No. (if applicable):	
Sampler:		Envirolab Quote No. :	
Address:		Date results required: Or choose: ☐ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day	
Phone:	Mob:	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Email Results to:		Additional report format: ☐ Esdat ☐ Equis	
Email Invoice to:		Lab Comments:	

Sample information					Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Depth	~~Date Sampled~~	~~Type of Sample~~ Sample ID	Depth					Sample ID	Depth					Sample ID	Depth				Provide as much information about the sample as you can
10	1	0.25	21	2	0.75			32		3	1.0			43		4	1.5				
11	↓	0.5	22	↓	1.25			33		↓	1.25			44		↓	1.75				
12	↓	0.75	23	↓	1.5			34		↓	20			45		↓	2.25				
13	↓	1.25	24	↓	1.75			35		↓	2.25			46		↓	2.5				
14	↓	1.5	25	↓	2.0			36		↓	2.5			47		↓	2.75				
15	↓	1.75	26	↓	2.25			37		↓	2.75			48		↓	3.0				
16	↓	2.25	27	↓	2.75			38		↓	3.0										
17	↓	2.5	28	↓	3.0			39		4	0.25										
18	↓	2.75	29	3	0.25			40		↓	0.5										
19	2	0.25	30	↓	0.5			41		↓	0.75										
20	↓	0.5	31	↓	0.75			42		↓	1.0										

☐ *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):	Received by (Company):	*Lab Use Only*	
Print Name:	Print Name:	Job number: 354640	Cooling: Ice / Ice pack / None
Date & Time:	Date & Time:	Temperature:	Security seal: Intact / Broken / None
Signature:	Signature:	TAT Req - SAME day / 1 / 2 / 3 / 4 / STD	

#354640
21/6 kw

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
15 Callistemon Close
Warabrook NSW 2304

PURCHASE ORDER

Date	19/6/24
PO No.	NC232861

Vendor/ Subcontractor:
Envirolab Services Pty Ltd
Contact Name:

Deliver To:
Douglas Partners Pty Ltd
Requisitioner: Kate Fulham

This order covers the supply of goods, materials or services shown here, subject to the terms and conditions of the purchase order. **PO number** or **Project number** and **Requisitioner** should always be quoted in your invoice.

This PO should be attached to your invoice and emailed to apinvoices@douglaspartners.com.au in PDF format.

Item	Description	Quantity	Unit Price	Total	Project No. & G/L Code
	Testing as per attached chain of custody				230151.00

SUBTOTAL	
GST/TAX	
SHIPPING/ OTHER	
TOTAL	

Comments or Special Instructions

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Kate Fulham

Sample Login Details

Your reference	230151.00 - Forster
Envirolab Reference	354640
Date Sample Received	21/06/2024
Date Instructions Received	21/06/2024
Date Results Expected to be Reported	28/06/2024

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	48 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Extra samples received :#10-#48
No testing confirmed

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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

Sample ID	Chromium Suite	Misc Inorg - Soil	On Hold
1-1	✓		
1-2	✓		
1-3	✓	✓	
2-1		✓	
2-2.5	✓		
3-1.5		✓	
3-1.75	✓		
4-1.25	✓		
4-2		✓	
1-0.25			✓
1-0.5			✓
1-0.75			✓
1-1.25			✓
1-1.5			✓
1-1.75			✓
1-2.25			✓
1-2.5			✓
1-2.75			✓
2-0.25			✓
2-0.5			✓
2-0.75			✓
2-1.25			✓
2-1.5			✓
2-1.75			✓
2-2.0			✓
2-2.25			✓
2-2.75			✓
2-3.0			✓
3-0.25			✓
3-0.5			✓
3-0.75			✓
3-1.0			✓

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

Sample ID	Chromium Suite	Misc Inorg - Soil	On Hold
3-1.25			✓
3-2.0			✓
3-2.25			✓
3-2.5			✓
3-2.75			✓
3-3.0			✓
4-0.25			✓
4-0.5			✓
4-0.75			✓
4-1.0			✓
4-1.5			✓
4-1.75			✓
4-2.25			✓
4-2.5			✓
4-2.75			✓
4-3.0			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Appendix D

Architectural Drawings (Myers Ellyett)

Drawing 1 – Site and Test Location Plan

SCHEDULE OF MATERIALS AND FINISHES

ABBREVIATION	DESCRIPTION
AWN01	AWNING STRUCTURE - PAINTED TIMBER AWNING STRUCTURE, SIZE AND SETOUT TO FUTURE DETAIL
CAP01	COLORBOND CAP FLASHING - POWDERCOAT METAL TO MATCH ROOF SHEETING
DP01	STANDARD DOWNPIPE, PAINT FINISH COLOUR TO MATCH EXTERNAL COLORBOND CLADDING. REFER HYDRAULIC ENGINEER FOR SIZE.
EC01	EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL - PAINT DARK
GUT01	COLORBOND HALF ROUND GUTTER - REFER HYDRAULIC ENGINEER'S FOR SPECIFICATION. PAINTED TO MATCH ROOF SHEETING.
LVR01	LOUVRE WINDOW TYPE 01 - REFER ARCHITECT'S DRAWINGS FOR SIZE AND LOCATIONS.
MRC01	METAL ROOF CLADDING - KLIP LOK METAL ROOFING (COLORBOND) ON TIMBER FRAME CONSTRUCTION
PC1	POLYCARBONATE WALL CLADDING - TRANSLUCENT
RP01	ROOF PANEL TYPE 01 - TRANSLUCENT ALSYNITE ROOF SHEEING
SC01	SUBFLOOR STRUCTURE COLUMNS - REFER STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING
SE1	89 x 19 HWD SPOTTED GUM SHOT EDGE DECKING - PAINTED DARK
SEAT1	HARDWOOD FRAMED TIMBER SEAT - COLOUR TO MATCH EXTERNAL CLADDING AND DECKING
TB	HARDWOOD TIMBER BEAM - REFER TO STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING
TGSI	TACTILE GROUND SURFACE INDICATORS - IN ACCORDANCE WITH AS 1428.4.1
TIL	TILE TYPE 01
TIM01	TIMBER FLOORING TYPE 01 - 90X20 SPOTTED GUM HWD MATT FINISH ON PLYWOOD SUBSTRATE
TIM03	EXPOSED TIMBER FRAMING - REFER TO STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING.
TS1	TIMBER SCREEN 1
UB	STRUCTURAL STEEL SUBFRAME - REFER STRUCTURAL ENGINEER FOR SIZING
WT01	10000L WATER TANK - REFER HYDRAULIC ENGINEER'S SPECIFICATION

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
SCHEDULE OF FINISHES

SCALE: @ A3

DATE:
12/02/19

DWG No:
DD.00.001

PROJECT No:
170101_014

DRAWN BY:
Author

REV

MYERS ELLYETT

21 AGARS ST PADDINGTON QLD 4064
07 3876 6040

www.myersellyett.com.au

ACN 005 783 997

TIMBER RAFTER

LVR01 - HIGH LEVEL LOUVRE WINDOWS BEHIND TIMBER SCREEN

PC01 - POLYCARBONATE WALL CLADDING

EC01 - EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL

SEAT01 - HARDWOOD FRAMED TIMBER SEAT

TIM03 - EXPOSED TIMBER FRAMING

UB - STRUCTURAL STEEL SUBFRAME

YARNING CIRCLE

SCNAPPER PARADE

LVR01 - HIGH LEVEL LOUVRE WINDOWS BEHIND TIMBER SCREEN

AWN01 - AWNING STRUCTURE

EC01 - EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL

SEAT01 - HARDWOOD FRAMED TIMBER SEAT

CONCRETE RAMP

TERRAGLIN AVENUE

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
RENDER

SCALE: @ A3

DATE:
12/02/19

DWG No:
DD.00.011

PROJECT No:
170101_014

DRAWN BY:
Author

REV

MYERS ELLYETT

21 AGARS ST PADDINGTON QLD 4064
07 3876 6040

www.myersellyett.com.au

ACN 005 783 997

TIMBER RAFTER

LVR01 - HIGH LEVEL LOUVRE WINDOWS

PC01 - POLYCARBONATE WALL CLADDING

EC01 - EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL

SEAT - HARDWOOD FRAMED TIMBER SEAT

IMMERSIVE NATIVE SALAD GARDENS

CONCRETE RAMP

AWN01 - AWNING STRUCTURE

GUT01 - COLORBOND HALF ROUND GUTTER

IMMERSIVE NATIVE SALAD GARDENS

CONCRETE PATH

EC01 - EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
RENDER

SCALE: @ A3

DATE:
12/02/19

DWG No:
DD.00.021

PROJECT No:
170101_014

DRAWN BY:
Author

REV

MYERS ELLYETT

21 AGARS ST PADDINGTON QLD 4064
07 3876 6040

www.myersellyett.com.au

ACN 005 783 997

GUT01 - COLORBOND HALF ROUND GUTTER

LVR01 - HIGH LEVEL LOUVRE WINDOWS

EC01 - EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL

TIM03 - EXPOSED TIMBER FRAMING

PC01 - POLYCARBONATE WALL CLADDING

GUT01 - COLORBOND HALF ROUND GUTTER

LVR01 - HIGH LEVEL LOUVRE WINDOWS

EC01 - EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL

TIM03 - EXPOSED TIMBER FRAMING

TIMBER STAIR

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
RENDER

SCALE: @ A3

DATE:
12/02/19

DWG No:
DD.00.031

PROJECT No:
170101_014

DRAWN BY:
Author

REV

MYERS ELLYETT

21 AGARS ST PADDINGTON QLD 4064
07 3876 6040

www.myersellyett.com.au

ACN 005 783 997

CAMP KITCHEN

MALE BATHROOM

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
RENDER

SCALE: @ A3

DATE:
12/02/19

DWG No:
DD.00.041

PROJECT No:
170101_014

DRAWN BY:
Author

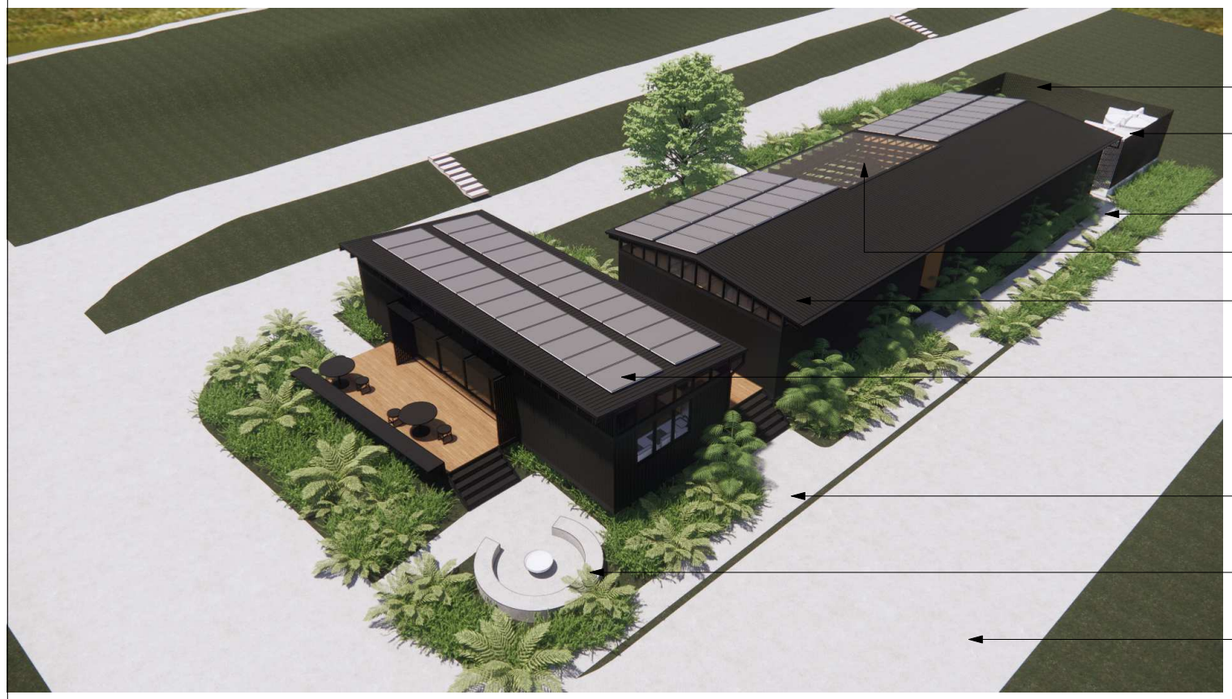
REV

MYERS ELLYETT

21 AGARS ST PADDINGTON QLD 4064
07 3876 6040

www.myersellyett.com.au

ACN 005 783 997



DRYCOURT
WATER TANK
RAMP
RP01 - ROOF PANEL TYPE_TRANSLUCENT ALSYNITE ROOF SHEETING
MRC01 METAL ROOF CLADDING
SOLAR PANEL
CONCRETE PATHWAY
YARNING CIRCLE
SCNAPPER PARADE

MRC01 METAL ROOF CLADDING
IMMERSIVE NATIVE SALAD GARDENS
YARNING CIRCLE
DECKING
TIMBER SEAT
KINGFISH AVENUE
RAMP
TERRAGLIN AVENUE

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
RENDER

SCALE: @ A3

DATE:
12/02/19

DWG No:
DD.00.051

PROJECT No:
170101_014

DRAWN BY:
Author

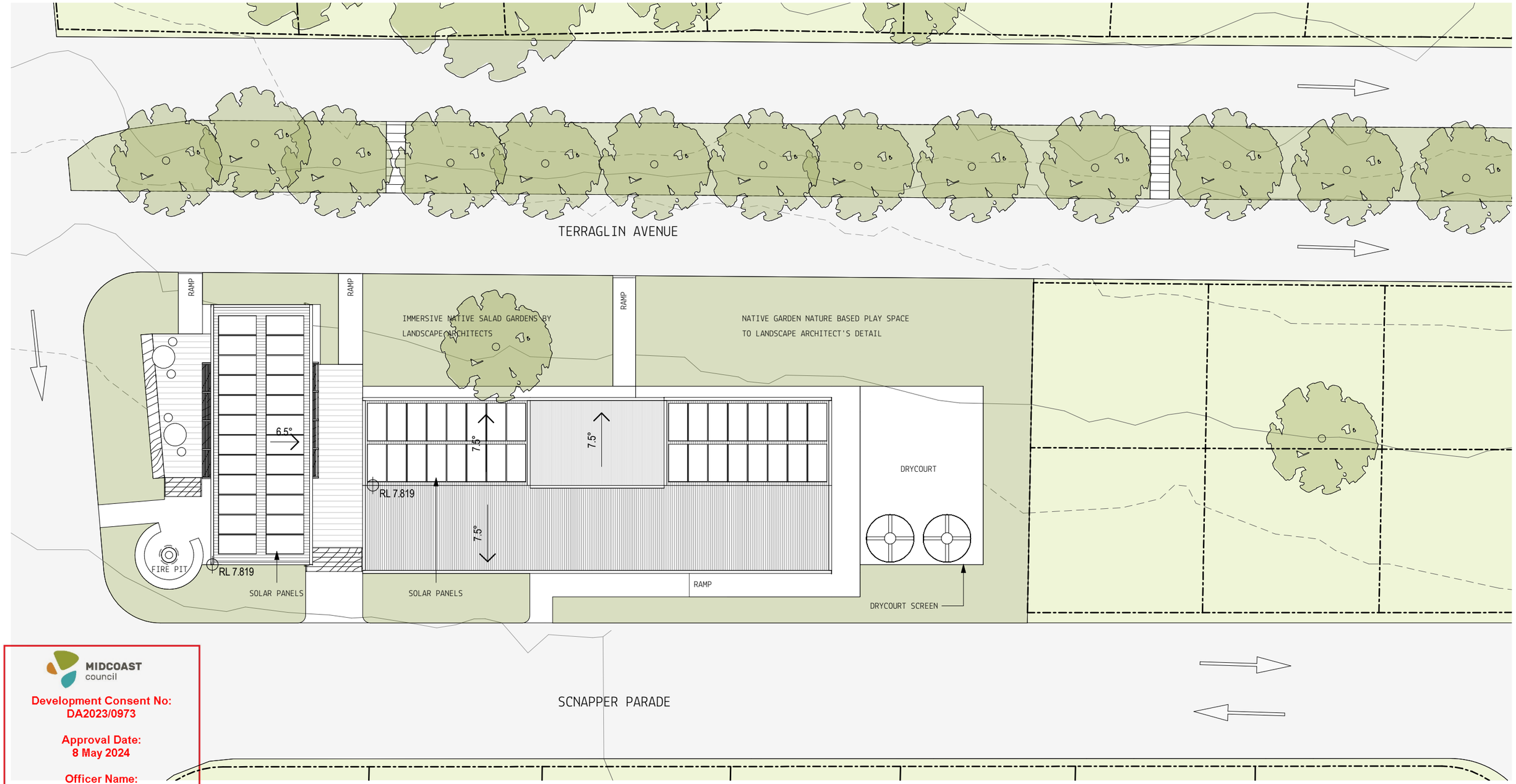
REV

MYERS ELLYETT

21 AGARS ST PADDINGTON QLD 4064
07 3876 6040

www.myersellyett.com.au

ACN 005 783 997



MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	26.02.2020	DA ISSUE	RW
2	18.09.2023	DA UPDATE	

N

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
PROPOSED CAMP KITCHEN & AMENITIES SITE PLAN

SCALE: @ A3
1 : 200

PROJECT No:
170101_014

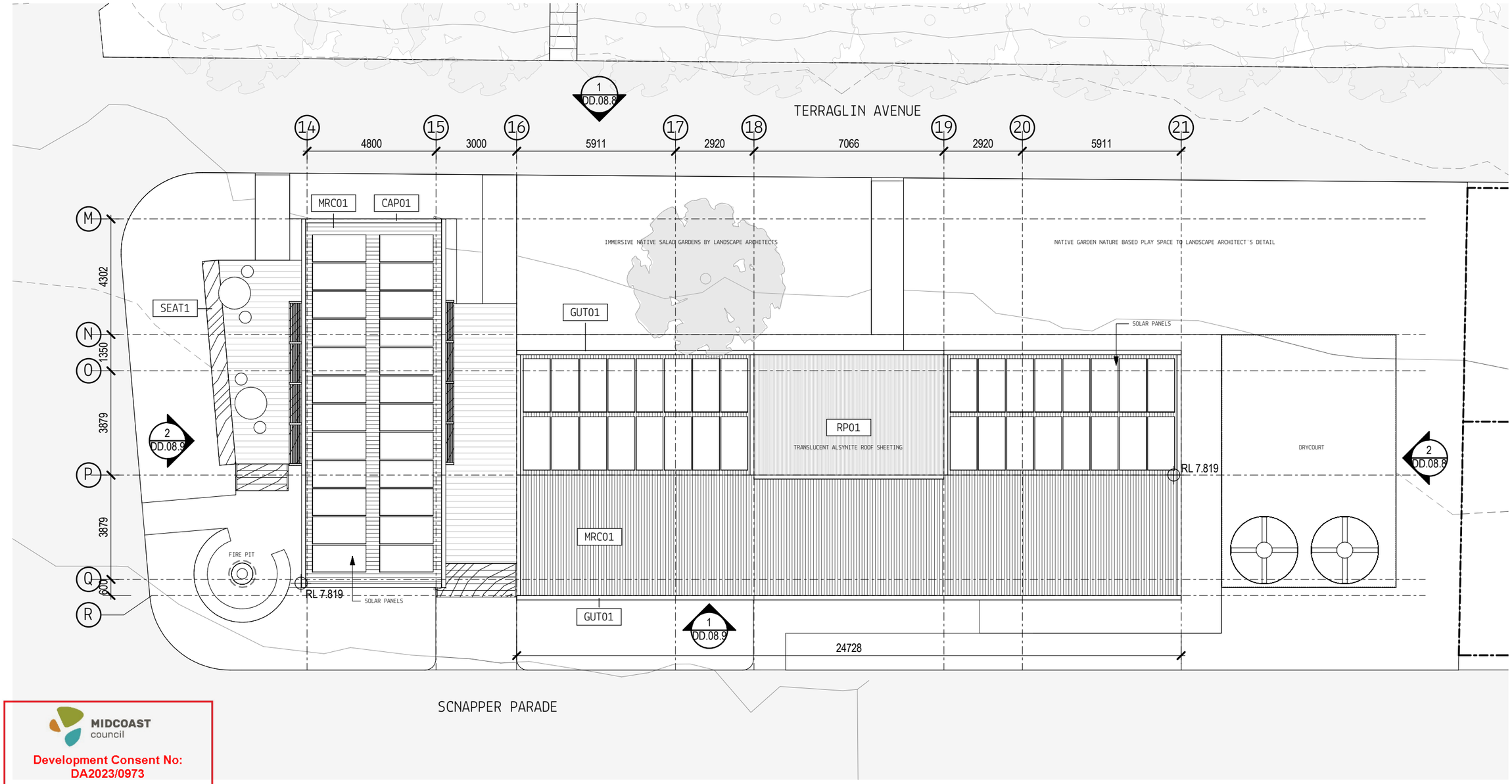
DATE:
09/16/20

DRAWN BY:
Author

DWG No:
DD.08.5

REV
2

MYERS ELLYETT
21 AGARS ST PADDINGTON QLD 4064
07 3876 6040
www.myersellyett.com.au
ACN 005 783 997



MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	26.02.2020	DA ISSUE	RW
2	18.09.2023	DA UPDATE	

N

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
PROPOSED CAMP KITCHEN & AMENITIES -ROOF PLAN

SCALE: @ A3
1 : 150

PROJECT No:
170101_014

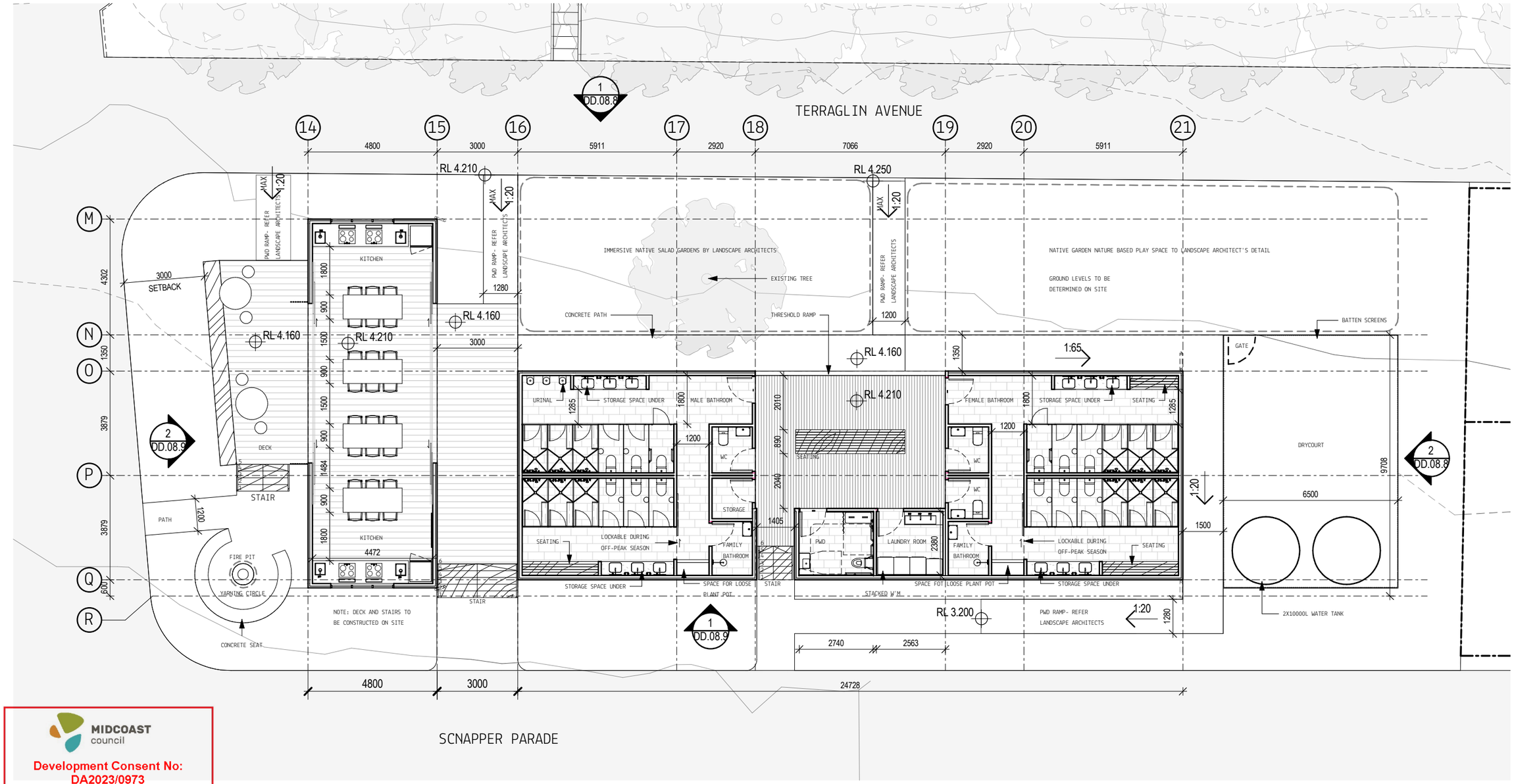
DATE:
12/04/19

DRAWN BY:
Author

DWG No:
DD.08.6

REV
2

MYERS ELLYETT
21 AGARS ST PADDINGTON QLD 4064
07 3876 6040
www.myersellyett.com.au
ACN 005 783 997



MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	26.02.2020	DA ISSUE	RW
2	18.09.2023	DA UPDATE	

N

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
PROPOSED CAMP KITCHEN & AMENITIES -FLOOR PLAN

SCALE: @ A3
1 : 150

DATE:
12/04/19

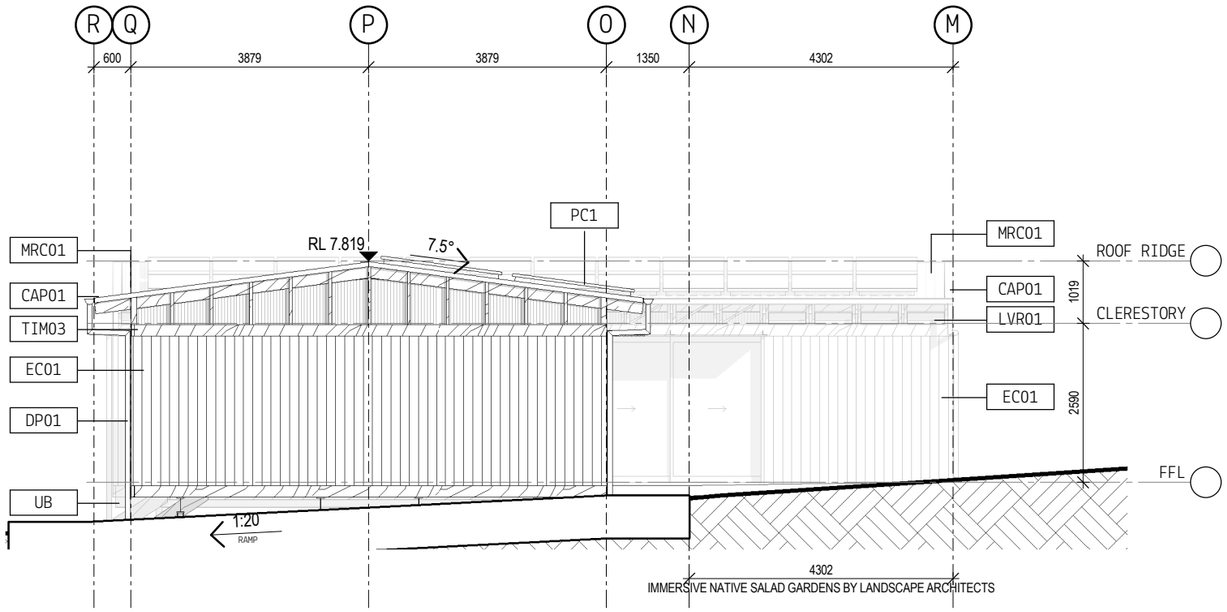
DWG No:
DD.08.7

REV
2

PROJECT No:
170101_014

DRAWN BY:
Author

MYERS ELLYETT
21 AGARS ST PADDINGTON QLD 4064
07 3876 6040
www.myersellyett.com.au
ACN 005 783 997



2
DD.08.6

WEST ELEVATION

SCALE 1 : 100

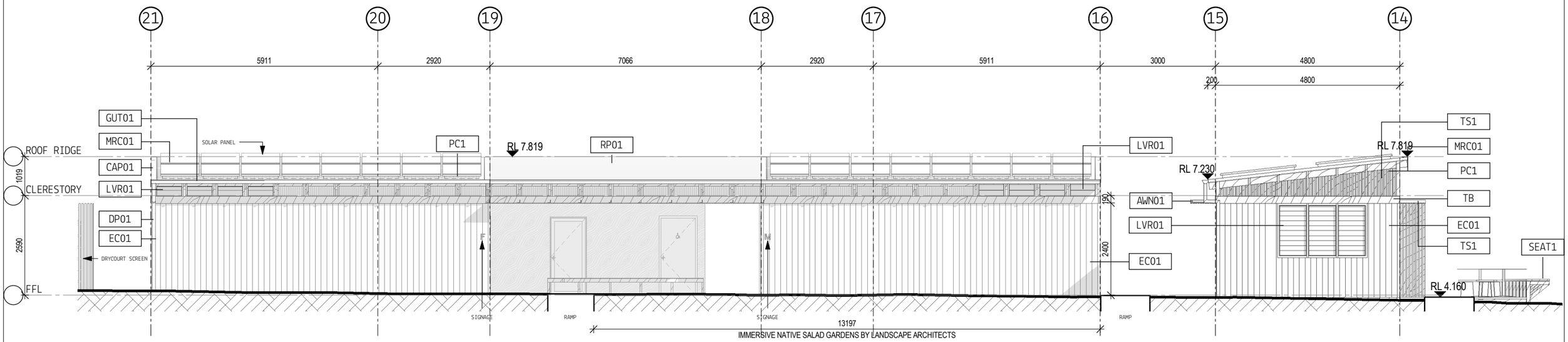
MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

Keynote Legend	
ABBREVIATION	DESCRIPTION
AWN01	AWNING STRUCTURE - REFER MATERIALS AND FINISHES SCHEDULE AND ARCHITECTURAL DETAILS
CAP01	COLORBOND CAP FLASHING - REFER TO MATERIALS AND FINISHES SCHEDULE
DP01	100 DIA COLORBOND DOWNPIPE
EC01	EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL - REFER TO MATERIALS AND FINISHES SCHEDULE
GUT01	COLORBOND HALF ROUND GUTTER - REFER TO MATERIALS AND FINISHES SCHEDULE
LVR01	LOUVRE TYPE 01
MRC01	METAL ROOF CLADDING - CUSTOM ORB (COLORBOND) ON TIMBER FRAME CONSTRUCTION
PC1	POLYCARBONATE WALL CLADDING - REFER MATERIALS AND FINISHES SCHEDULE
RP01	ROOF PANEL TYPE 01
SEAT1	HARDWOOD FRAMED TIMBER SEAT
TB	HARDWOOD TIMBER BEAM - REFER TO STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING
TIM03	EXPOSED TIMBER FRAMING - REFER TO STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING. REFER TO MATERIALS AND FINISHES SCHEDULE
TS1	TIMBER SCREEN 1
UB	STRUCTURAL STEEL SUBFRAME - REFER STRUCTURAL ENGINEER FOR SIZING



1
DD.08.6

NORTH ELEVATION

SCALE 1 : 100

DA UPDATE

REVISIONS

No	Date	Description	By
1	26.02.2020	DA ISSUE	RW
2	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
PROPOSED CAMP KITCHEN & AMENITIES
-ELEVATIONS

SCALE: @ A3
1 : 100

PROJECT No:
170101_014

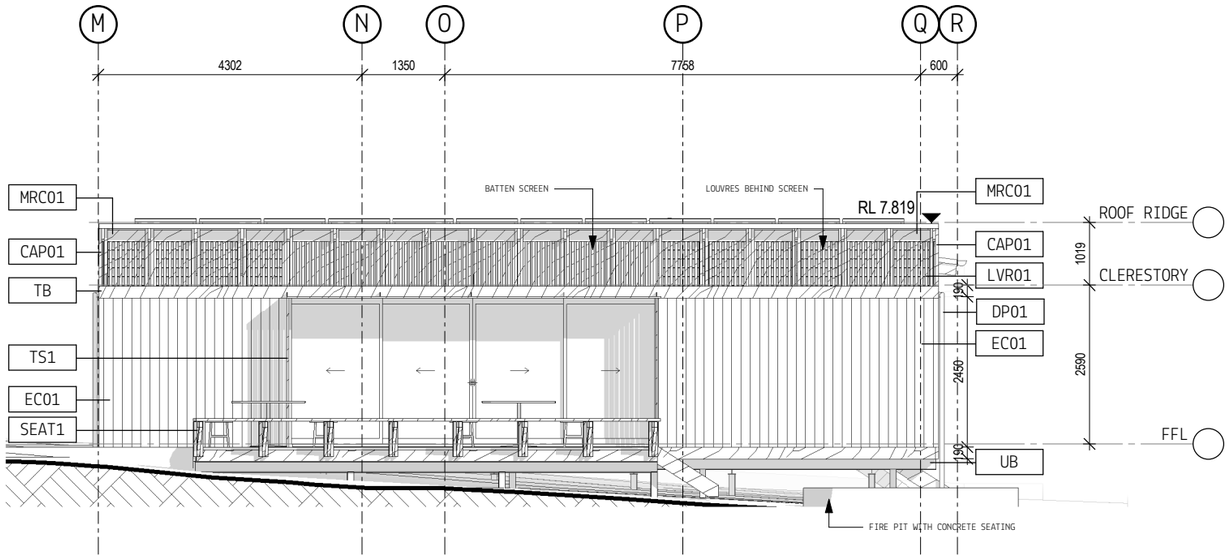
DATE:
12/04/19

DRAWN BY:
Author

DWG No:
DD.08.8

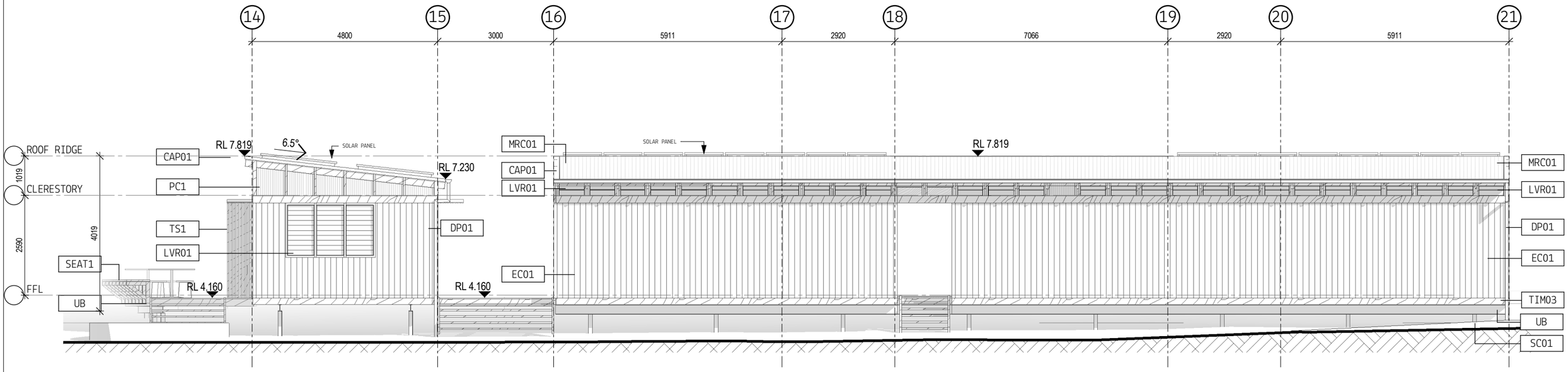
REV
2

MYERS ELLYETT
21 AGARS ST PADDINGTON QLD 4064
07 3876 6040
www.myersellyett.com.au
ACN 005 783 997



2 DD.08.6 EAST ELEVATION

SCALE 1 : 100



1 DD.08.6 SOUTH ELEVATION

SCALE 1 : 100

MIDCOAST council

Development Consent No: DA2023/0973

Approval Date: 8 May 2024

Officer Name: Arnna Fotheringham

Keynote Legend

ABBREVIATION	DESCRIPTION
CAP01	COLORBOND CAP FLASHING - REFER TO MATERIALS AND FINISHES SCHEDULE
DP01	100 DIA COLORBOND DOWNPIPE
EC01	EXTERNAL COLORBOND CLADDING WITH VERTICAL TEXTURE TO DETAIL - REFER TO MATERIALS AND FINISHES SCHEDULE
LVR01	LOUVRE TYPE 01
MRC01	METAL ROOF CLADDING - CUSTOM ORB (COLORBOND) ON TIMBER FRAME CONSTRUCTION
PC1	POLYCARBONATE WALL CLADDING - REFER MATERIALS AND FINISHES SCHEDULE
SC01	SUBFLOOR COLUMNS - REFER STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING - REFER TO MATERIALS AND FINISHES SCHEDULE FOR SPECIFICATION
SEAT1	HARDWOOD FRAMED TIMBER SEAT
TB	HARDWOOD TIMBER BEAM - REFER TO STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING
TIM03	EXPOSED TIMBER FRAMING - REFER TO STRUCTURAL ENGINEER'S SPECIFICATION FOR SIZING. REFER TO MATERIALS AND FINISHES SCHEDULE
TS1	TIMBER SCREEN 1
UB	STRUCTURAL STEEL SUBFRAME - REFER STRUCTURAL ENGINEER FOR SIZING

DA UPDATE

REVISIONS

No	Date	Description	By
1	26.02.2020	DA ISSUE	RW
2	18.09.2023	DA UPDATE	

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
PROPOSED CAMP KITCHEN & AMENITIES
-ELEVATIONS

SCALE: @ A3
1 : 100

PROJECT No:
170101_014

DATE:
02/11/20

DRAWN BY:
Author

DWG No:
DD.08.9

REV
2

MYERS ELLYETT
21 AGARS ST PADDINGTON QLD 4064
07 3876 6040
www.myersellyett.com.au
ACN 005 783 997

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

Officer Name:
Arnna Fotheringham

DA UPDATE

REVISIONS

No	Date	Description	By
1	01.02.2021	STAGING	
2	18.09.2023	DA UPDATE	

N

PROJECT TITLE
FORSTER HOLIDAY PARK

PROJECT ADDRESS
1 RESERVE ROAD FORSTER NSW 2428

DRAWING TITLE
PROPOSED MASTERPLAN - NEW CAMP KITCHEN & AMENITIES

SCALE: @ A3
1 : 1000

PROJECT No:
170101_014

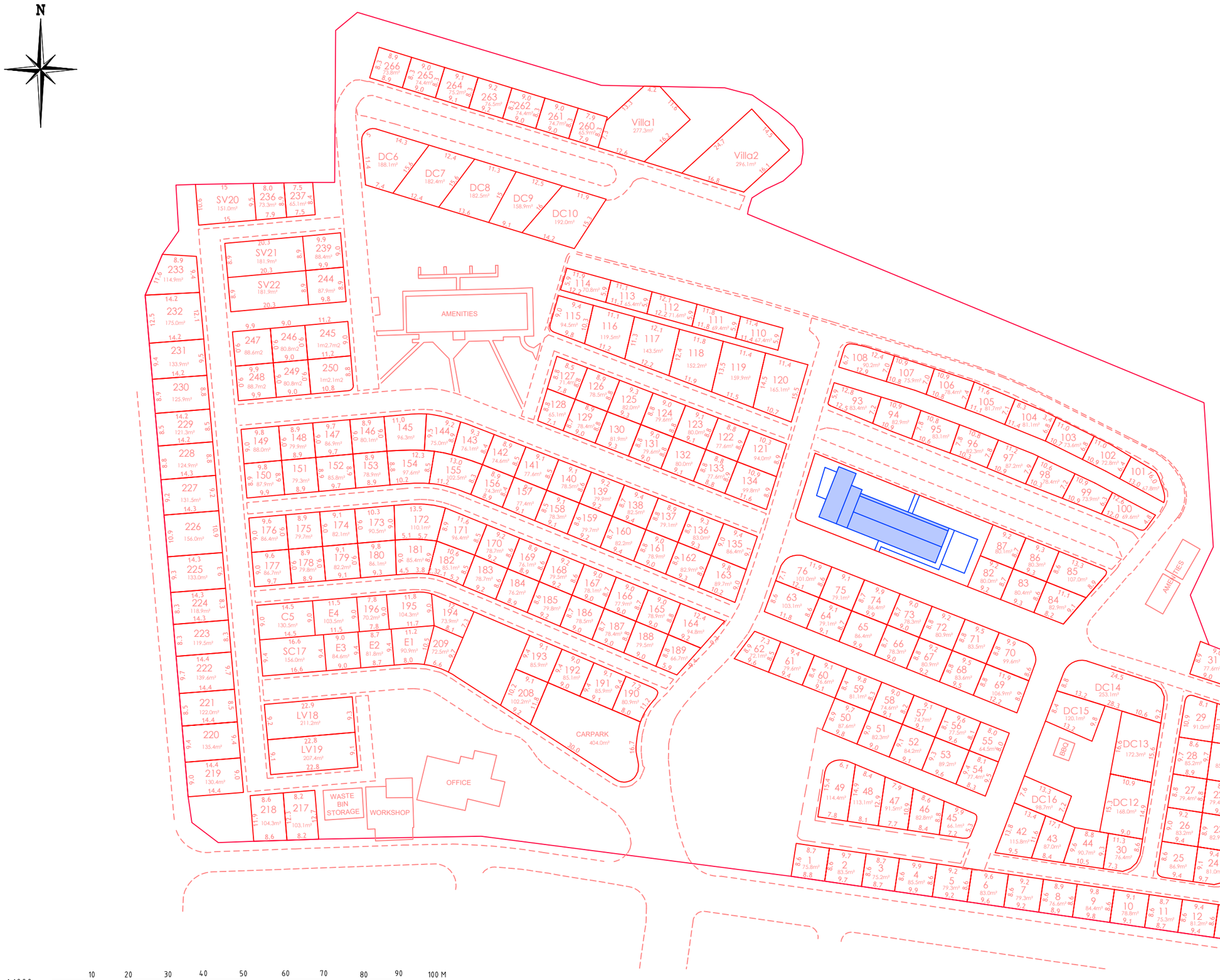
DATE:
01/29/21

DRAWN BY:
Author

DWG No:
DD.05.102

REV

MYERS ELLYETT
21 AGARS ST PADDINGTON QLD 4064
07 3876 6040
www.myersellyett.com.au
ACN 005 783 997



1:1000 PRINTED A3

10 20 30 40 50 60 70 80 90 100 M

MIDCOAST council

Development Consent No:
DA2023/0973

Approval Date:
8 May 2024

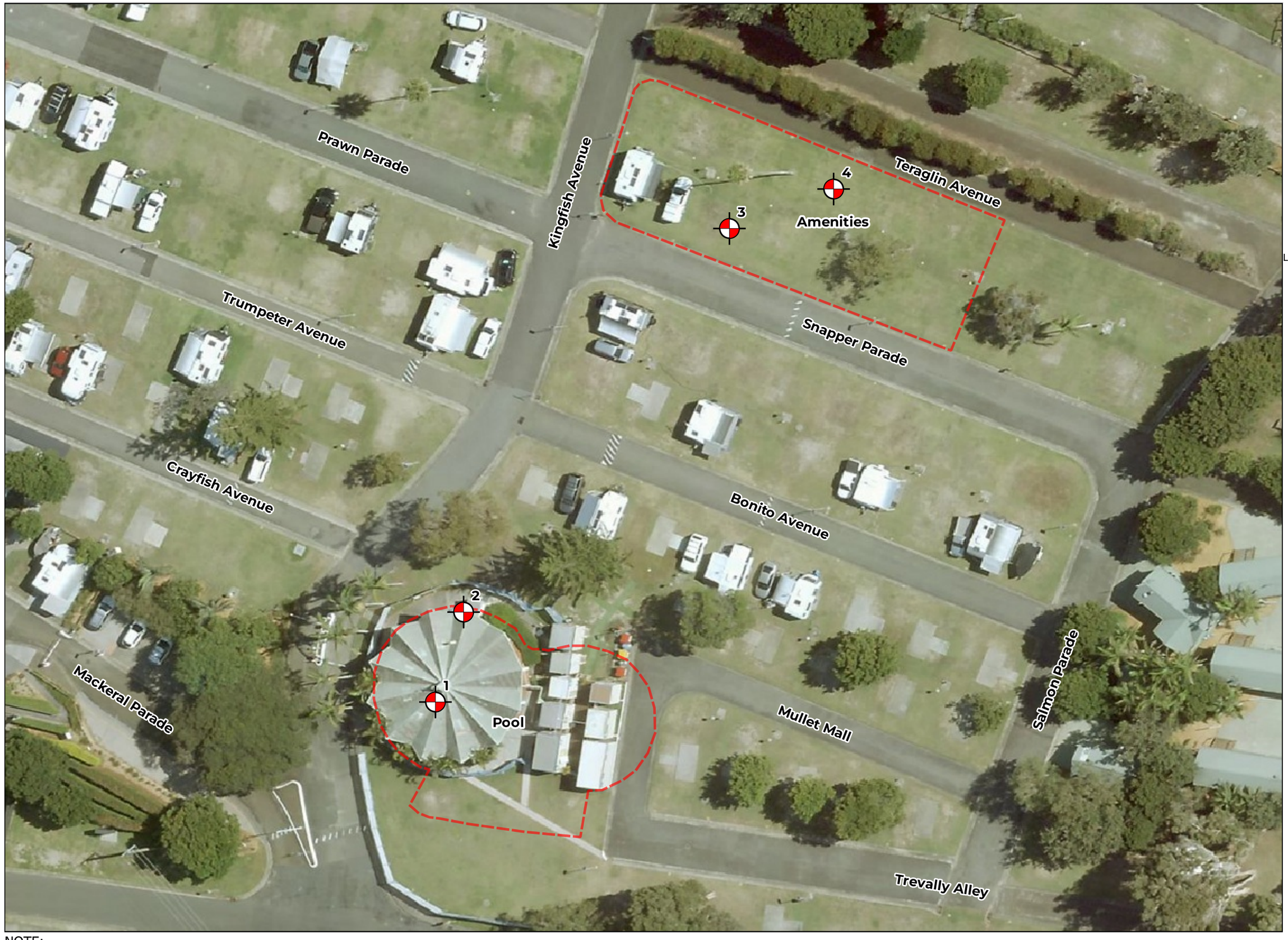
Officer Name:
Arnna Fotheringham

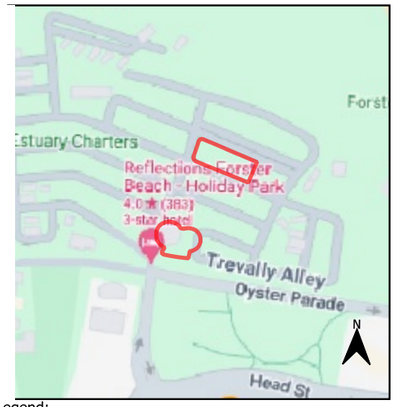
LANDSAS

Title: Reflections Holiday Park Foster Beach
Property Address: 1 Reserve Rd Forster. 2428
Details: Community Plan
Sheet 01

Date of Issue: 28/09/23

Disclaimer:
While Lands Advisory Services has attempted to ensure the information in this drawing is accurate, no responsibility for any errors or omissions or loss or damages incurred in the use of this diagram is taken by Lands Advisory Services.





Legend:

Site Location

Legend:

- Borehole Location and Number
- Approximate Development Footprints

NOTE:
1. Drawing adapted from aerial imagery from "Metromap" dated 27.10.2021
2. Test locations are approximate only and were located using differential GPS typically accurate to ± 0.1 m depending on satellite coverage

0 5 10 15 20 25 30 35 40 45 50 m

Douglas PARTNERS

CLIENT:	Reflections Foster Holiday Park	
OFFICE:	Newcastle	DRAWN BY: JJM
SCALE:	1:500 @A3	DATE: 27.June.2024

TITLE: Site and Test Location Plan
Proposed Amenities Block and Pool
1 Reserve Rd, Forster NSW 2428

N

Project:	230151.00
DRAWING No:	1
REVISION:	0

DP.QGIS.A3LandscapeDrawingLayout.Rev2 - P:\230151.00 - FORSTER, Reflections, Amenities Block\7.0 Drawings\7.2 Out\230151.00 - Mapping.qgz