NALU



Miami

122 MARINE PARADE

UPS
URBAN PLANNING SERVICES

DEVELOPMENT APPLICATION (MCU IMPACT) | APRIL 2025
SECTION 3: SPECIALIST REPORTS

ATTACHMENT 7

Traffic Impact Assessment
prepared by Bitzios Consulting



122 Marine Parade, Miami

Traffic Impact Assessment

BITZIOS consulting
traffic engineering transport planning

Monaco Property Group Pty Ltd

24th April 2025

Gold Coast
Suite 26, 58 Riverwalk Avenue
Robina QLD 4226
P: (07) 5562 5377

Brisbane
Level 2, 428 Upper Edward Street
Spring Hill QLD 4000
P: (07) 3831 4442

Sydney
Studio 203, 3 Gladstone Street
Newtown NSW 2042
P: (02) 9557 6202

W: www.bitziosconsulting.com.au

E: admin@bitziosconsulting.com.au

Copyright in the information and data in this document is the property of Bitzios Consulting. This document and its information and data is for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or in part for any purpose other than for which it was supplied by Bitzios Consulting. Bitzios Consulting makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or its information and data.

Document Issue History

Report File Name	Version	Document Control		Date	Issued to
P6870.001R 122 Marine Parade, Miami TIA	001	Prepared: Reviewed: Issued	T. Rasmussen / S.Tafa M. Bitzios M. Bitzios	11/04//2025	nensor@eastview.com.au
P6870.002R 122 Marine Parade, Miami TIA	002	Prepared: Reviewed: Issued	S.Tafa / A. Soltan M. Bitzios M. Bitzios	23/04/2025	nensor@eastview.com.au
P6870.002R 122 Marine Parade, Miami TIA	003	Prepared: Reviewed: Issued	S.Tafa / A. Soltan M. Bitzios M. Bitzios	24/04/2025	nensor@eastview.com.au

CONTENTS

		Page
1.	**INTRODUCTION**	**4**
1.1	Background	4
1.2	Proposed Development Details	4
1.3	Scope	5
2.	**EXISTING CONDITIONS**	**6**
2.1	Existing Development	6
2.2	Surrounding Road Network	6
2.3	Public Transport	7
2.3.1	Bus Services	7
2.3.2	Gold Coast Light Rail (GCLR)	7
2.4	Active Transport	8
3.	**PARKING ASSESSMENT**	**10**
3.1	Car Parking Provision	10
3.2	Bicycle Parking Provision	10
3.3	Parking Geometric Layout Assessment	11
4.	**TRAFFIC ASSESSMENT**	**12**
4.1	Overview	12
4.2	Background Traffic	12
4.3	Development Generated Traffic	12
4.4	Development Trip Distribution	13
4.5	Design Traffic	13
4.6	Intersection Analysis	13
4.6.1	Intersection 1: Albatross Avenue / Chairlift Avenue	13
4.6.2	Intersection 2: Chairlift Avenue / Fraser Avenue	15
4.7	Impact Assessment	16
4.8	Environmental Capacity	16
5.	**ACCESS ASSESSMENT**	**18**
5.1	Access Location Review	18
5.2	Sight Distance	18
5.3	Pedestrian Connectivity	19
6.	**SERVICING ASSESSMENT**	**20**
6.1	Servicing	20
6.2	On-Site Refuse Collection	20
6.3	Nagel Avenue Refuse Collection	20
7.	**SUMMARY AND CONCLUSIONS**	**21**

Tables

Table 2.1: Surrounding Road Network
Table 2.2: Key Intersections
Table 2.3: Bus Services Surrounding the Subject Site
Table 3.1: Car Parking Requirements and Provisions
Table 3.2: Bicycle Parking Requirements (Transport Code) and Provisions
Table 3.3: Bicycle Parking Requirements (Austroads) and Provisions
Table 3.4: Car Parking Geometric Layout Assessment
Table 4.1: Traffic Assessment Scenarios
Table 4.2: Development Traffic Generation
Table 4.3: Development Traffic Splits
Table 4.4: 2026 SIDRA Results Summary for Albatross Avenue / Chairlift Avenue
Table 4.5: 2036 SIDRA Results Summary for Albatross Avenue / Chairlift Avenue
Table 4.6: 2026 SIDRA Results Summary for Chairlift Avenue / Fraser Avenue Intersection
Table 4.7: 2036 SIDRA Results Summary for Chairlift Avenue / Fraser Avenue Intersection
Table 4.8: Daily Traffic Generation (Fraser Avenue)
Table 5.1: Vehicular Access Details

Figures

Figure 1.1: Subject Site Location
Figure 2.1: Existing Subject Site
Figure 2.2: Public Transport Connectivity
Figure 2.3: Pedestrian and Cycle Path Connectivity
Figure 4.1: Intersection 1: Albatross Avenue / Chairlift Avenue Layout
Figure 4.2: Intersection 2: Chairlift Avenue / Fraser Avenue
Figure 5.1: Sight Distance

Appendices

Appendix A: Development Plans
Appendix B: Swept Path Assessment
Appendix C: Traffic Volume Plots
Appendix D: SIDRA Movement Summaries

1. INTRODUCTION

1.1 Background

Bitzios Consulting (Bitzios) has been engaged by Monaco Property Group Pty Ltd (Client) to prepare a Traffic Impact Assessment (TIA) for a proposed multiple dwelling development located at 122 Marine Parade, Miami (formally described as Lot 122 SP284713. The location of the subject site is shown in Figure 1.1.



Source: Adapted from Google Maps

Figure 1.1: Subject Site Location

1.2 Proposed Development Details

The proposal is for a multiple dwelling development with the following key development details:

- Total of 46 units over four storeys (including ground) and a partial fifth storey, with private roof terraces above
- One (1) basement parking level
- A port-cochere entrance on ground floor on Fraser Avenue
- Service vehicle entry from Nagel Avenue

The proposed development plans (transport and traffic related) are included in **Appendix A**.

1.3 Scope

The scope for this assessment includes:

- Review of the existing conditions of the site and its surrounds relevant to traffic and transport
- Estimation of the proposed development's traffic generation and distribution to the external road network
- Assessment of the alternate transport provisions (public and active) and connectivity to the surrounding network
- Assessment of the car and bicycle parking provisions against City of Gold Coast Council's (Council) *Transport Code* (Ver. 11) and the relevant sections of Australian Standards AS2890
- Assessment of the on-site car parking geometric layout against Council's *Transport Code* (Ver. 11 and the relevant sections of Australian Standards AS2890
- Assessment of the proposed access location and form against the Institute of Public Works Engineering Australia (IPWEA) standard drawings, Australian Standards AS2890 and Council's *Driveways and Vehicular Crossings Code* (Ver. 11)
- A review of the development facilities for servicing and refuse collection against Council's *Transport Code* (Ver. 11) and the relevant sections of Australian Standards AS2890
- Swept path checks using AutoTURN software for general traffic and service vehicle manoeuvring.

2. EXISTING CONDITIONS

2.1 Existing Development

The lot covers 7,284m^2 and is currently improved by a multiple dwelling development spanning two storeys. It is noted that the subject site is located within the medium-density residential zone of Council's City Plan (Ver. 11).

The current access driveway is on Marine Parade, with a separate access on Fraser Avenue and Nagel Avenue. Figure 2.1 shows the existing site conditions.



Source: Nearmap (Edited by Btizios)

Figure 2.1: Existing Subject Site

2.2 Surrounding Road Network

Details of the road network surrounding the subject site are shown in Table 2.1.

Table 2.1: Surrounding Road Network

Road Name	Jurisdiction	No. of Lanes	Hierarchy	Divided	Speed Limit
Fraser Avenue	Council	Two	Local Access	No	50km/h
Marine Parade	Council	Two	Collector	Yes	50km/h
Nagel Avenue	Council	Two	Local Access	No	50km/h
Chairlift Avenue	Council	Two	Local Access	Yes	50km/h
Santa Monica Road	Council	Two	Collector	No	50km/h
Gold Coast Highway	State	Four	Sub-arterial	Yes	60km/h

*Note: * - Department of Transport and Main Roads*

The key intersections in proximity to the subject site are detailed in Table 2.2.

Table 2.2: Key Intersections

Road 1 Name	Road 2 Name	Jurisdiction	Type
Chairlift Avenue	Fraser Avenue	Council	Priority-Controlled
Santa Monica	Nagel Avenue	Council	Priority-Controlled
Marine Parade	Chairlift Avenue	Council	Priority-Controlled
Gold Coast Highway	Chairlift Avenue	DTMR*	Signalised
Gold Coast Highway	Santa Monica Road	DTMR*	Priority-Controlled (LILO)

*Note: *Department of Transport and Main Roads*

2.3 Public Transport

2.3.1 Bus Services

The nearest north-bound bus stops are located approximately 600m (8-minute walk) to the subject site, on the Gold Coast Highway. Southbound bus stops are located directly opposite, which are 650m (9-minutes) from the subject site.

Table 2.3 summarises the relevant bus service and the frequencies during peak periods.

Table 2.3: Bus Services Surrounding the Subject Site

Bus Service	Bus Routes	Peak Frequency	Notes
700	Southport to Tweed Heads	10 minutes	Bus stops along Gold Coast Highway impacted by Light Rail works
777	Gold Coast Airport to Broadbeach Station	15 minutes	

2.3.2 Gold Coast Light Rail (GCLR)

The nearest existing light rail station is located in Broadbeach. There are currently ongoing works to provide the GCLR Stage 3, which will form two new light rail stations. Nobby Beach station will be placed just north of Gold Coast Highway / Chairlift Avenue signalised intersection and a Miami North Station at Gold Coast Highway / Santa Monica Road. The subject site is located approximately 600m from the proposed Nobby Beach station and 650m from the Miami North station. Both stations are approximately 9 – 10 minutes' walk from Fraser Avenue and Nagel Avenue.

Figure 2.2 shows the surrounding public transport in proximity to the subject site.



Source: Adapted from Nearmap

Figure 2.2: Public Transport Connectivity

2.4 Active Transport

Pedestrian footpaths are provided on both sides of the road, directly fronting the subject site as well as a wider path along the beach front, connecting Thorn Park down to Miami Rainbow Stairs. Marine parade also serves as a popular off-road bike route for cyclists from Burleigh to Mermaid Beach. There are strong pedestrian connections from the subject site to the Nobby Beach Neighbourhood Centre, and to the nearest retail centre at Miami One.

The pedestrian and cycle pathway network(s) surrounding the subject site are shown in Figure 2.3.



Source: Adapted from Gold Coast City Council Active Travel Map

Figure 2.3: Pedestrian and Cycle Path Connectivity

3. PARKING ASSESSMENT

3.1 Car Parking Provision

The carparking requirements for the proposed development were sourced from Council's *Transport Code* (Ver. 11). The relevant car parking rates, requirements and proposed provisions are outlined in Table 3.1.

Table 3.1: Car Parking Requirements and Provisions

Land Use	Type	Quantity	Parking Rate	Required	Provision
Multiple Dwelling	2-bedroom	1 unit	1.25 spaces per unit	2	139
	3-bedroom	40 units	1.5 spaces per unit	60	
	4+-bedroom	5 units	2 spaces per unit	10	
	Visitors	46 units	3 spaces for first 10 units, plus 1 per 10 units thereafter	7	8
			Total	**79**	**147**

The proposed development residential and visitor parking supply is provided in accordance with AO1 of Council's *Transport Code* (Ver. 11).

3.2 Bicycle Parking Provision

Council's *Transport Code* (Ver. 11) has been used to source bicycle parking requirements and provisions for the proposed development. The rates, requirements and proposed provisions are outlined in Table 3.2.

Table 3.2: Bicycle Parking Requirements (Transport Code) and Provisions

Land Use	Quantity	Type	Parking Rate	Required	Provision
Multiple Dwelling	46 units	Residential (Class B)	1 per dwelling	46	16
		Visitor (Class C)	1 per 12 dwellings	4	4
			Total	**50**	**20**

Whilst the proposed development does not meet AO7.1 of the *Transport Code* (Ver. 11), the parking supply does meet the recommended bicycle parking supply rates in the Austroads' publication *Cycling of Aspects of Austroads Guides*, being one space per three (3) flats for residents and one space per 12 flats for visitors. The bicycle parking requirements when applying the Austroads' rates are provided in Table 3.3.

Table 3.3: Bicycle Parking Requirements (Austroads) and Provisions

Land Use	Quantity	Type	Parking Rate	Required	Provision
Multiple Dwelling	46 units	Residential (Class B)	1 per 3 dwellings	16	16
		Visitor (Class C)	1 per 12 dwellings	4	4
			Total	**20**	**20**

Austroads is the apex organisation of road transport and traffic agencies in Australia and New Zealand. Austroads guidelines and codes of practice promote best practice and are typically based on extensive research and input from industry experts. It is therefore considered that the proposed bicycle parking supply for residents and visitors will encourage use and meet the needs and volumes of cyclists in accordance with PO7 of Council's *Transport Code* (Ver. 11).

Visitor bicycle parking spaces are located on the ground floor and accessed via Fraser Avenue.

3.3 Parking Geometric Layout Assessment

The on-site parking geometric layout has been assessed against Council's *Transport Code* (Ver. 11) and the relevant sections of *AS2890.1:2004 Off-Street Car Parking,* with key features outlined in Table 3.4.

Table 3.4: Car Parking Geometric Layout Assessment

Design Element	Required	Provided	Compliant
Residential Parking Space (User Class 1A)	2.4m x 5.4m	2.4m x 5.4m	Yes
Visitor Parking Space (User Class 2)	2.5m x 5.4m	2.5m x 5.4m	Yes
Bicycle Horizontal Parking	0.5m by 1.8m, 1.5m aisle	0.5m by 1.8m, 1.5m aisle	Yes
Parking Aisle Width (Two-way; where not adjacent to a single-car garage)	5.8m (min.) + 0.3m clearance where bounded by solid wall	5.8m+ 0.3m clearance where bounded by solid wall	Yes
Clearance to Vertical Obstructions	0.3m	0.3m	Yes
Car Parking Envelope	As per AS2890.1 Figure 5.2	As per AS2890.1 Figure 5.2	Yes
Blind Aisle Extension	1.0m	1.0m	Yes
Grades (Entry)	1:20 (max.) first 6.0m inside property boundary	Not annotated	**Shall Comply**
Grades (Parking Module)	1:20 (max.) parallel to the angle of parking and 1:16 (max.) in any other direction	Not annotated	**Shall Comply**

As demonstrated in Table 3.4 the on-site parking geometric layout does not provide a turnaround bay. However, a digital sign will be provided at the entrance to the site demonstrating whether there are visitor spaces available within the basement level. There is sufficient room on the ground floor for a visitor to turnaround on-site should all spaces in the basement be occupied, or a visitor is denied access.

As such, the parking layout of the subject site is considered to be generally in accordance with AS2890.1 (2004).

4. TRAFFIC ASSESSMENT

4.1 Overview

The purposed of this traffic assessment is to determine the impacts of the proposed development on the external road network. To achieve this, the development's impacts at the anticipate year of opening (full development) and at the 10-year design horizon will be determined. For the purpose of this assessment, the proposed development's anticipated year of opening is 2026 and as such, the 10-year horizon is 2036.

The traffic demands have been prepared for the scenarios outlined in Table 4.1.

Table 4.1: Traffic Assessment Scenarios

Year	Periods	Traffic Scenario	Details
2026	AM / PM	Background	Determined by applying growth rates to the traffic survey data
		Design	Determined by combining background traffic and the development traffic
2036	AM / PM	Background	Determined by applying growth rates to the traffic survey data
		Design	Determined by combining background traffic and the development traffic

The proposed development's area of influence was determined through analysis of the likely distribution of trips onto the external road network. Detailed analysis (SIDRA modelling) was undertaken on the following intersections to determine the impact of the proposed development:

- Albatross Avenue / Chairlift Avenue
- Chairlift Avenue / Fraser Avenue.

4.2 Background Traffic

The traffic survey data was recorded on 12th February 2025 by our affiliate company Traffic & Data Control. The peak hours recorded by the traffic survey were 7:30AM-8:30AM and 4:30pm-5:30pm. A copy of the traffic survey data is attached at **Appendix B**. During the survey period, Mermaid Avenue

A compounding growth rate of 1.15% per annum was adopted and applied to the survey data to forecast background traffic volumes at anticipated year of opening (assumed to be 2026) and a ten-year design horizon (2036). This growth was found using Council's growth data for the Coastal Core area, which is considered more applicable than the Carrara-Burleigh.

The growth rate was applied to the AM and PM peak traffic survey data to forecast background traffic at year 2026 and 2036. The forecast background traffic is summarised in network diagrams attached at **Appendix C**.

4.3 Development Generated Traffic

The existing and proposed development traffic was estimated using the *Transport for New South Wales' (TfNSW) Guide to Traffic Impact Assessment (GTIA) 2024* for a high-density residential flat building. The estimated net traffic generation is shown in Table 4.2. Given the provision of residential car parking compared to the minimum parking rates stipulated in AO1 of Council's Transport Code, the proposed development's peak hour trip generation has been based on the number of car spaces.

Table 4.2: Development Traffic Generation

Land Use	Quantity	AM Peak Rate	PM Peak Rate	AM Trips (veh/h)	PM Trips (veh/h)
Existing Development					
Multiple Dwelling	46 dwellings	0.4 trips per dwelling	0.4 trips per dwelling	18	18
Proposed Development					
Multiple Dwelling	139 residential car spaces	0.35 trips per dwelling	0.26 trips per dwelling	49	37
			Net Trip Increase	**(+) 31**	**(+) 19**

The proposed development is estimated to generate an additional 31 trips during the AM peak hour and an additional 19 trips during the PM peak hour.

4.4 Development Trip Distribution

A typical residential 'IN:OUT' split was adopted for this assessment to estimate the distribution of the development generated traffic onto the surrounding road network. The 'IN:OUT' split of development traffic is summarised in Table 4.3.

Table 4.3: Development Traffic Splits

Land Use	Am Trip Split		PM Trip Split		AM Trips (vph)		PM Trips (vph)	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Multiple Dwelling	30%	70%	70%	30%	9	22	13	6

4.5 Design Traffic

The forecast background traffic was combined with the development traffic to determine the design traffic volumes at the year 2026 and 2036. The design traffic volumes are attached at **Appendix C**.

4.6 Intersection Analysis

SIDRA Intersection (version 9.1) was used to assess the development traffic impacts on the following key intersections:

- Albatross Avenue / Chairlift Avenue
- Chairlift Avenue / Fraser Avenue.

The following subsections detail the analysis for each intersection while detailed SIDRA results are included in **Appendix D.**

4.6.1 Intersection 1: Albatross Avenue / Chairlift Avenue

Figure 4.1 shows the geometric layout of Albatross Avenue / Chairlift Avenue intersection used in the assessment.

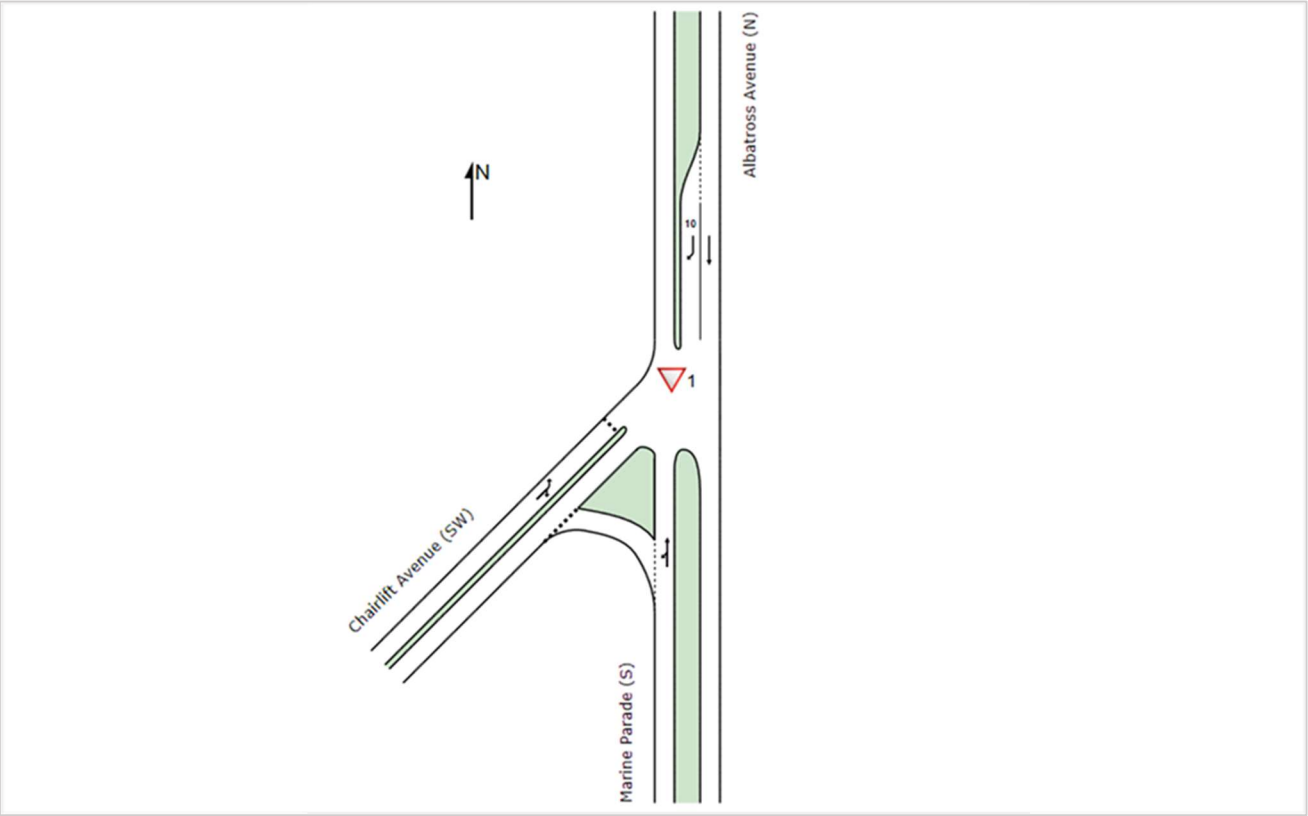


Figure 4.1: Intersection 1: Albatross Avenue / Chairlift Avenue Layout

A summary of the SIDRA Results for Albatross Avenue / Chairlift Avenue Intersection for 2026 Background and Design are summarised in Table 4.4.

Table 4.4: 2026 SIDRA Results Summary for Albatross Avenue / Chairlift Avenue

Approach	AM Peak				PM Peak			
	DOS (v/c)	Delay (sec)	LOS	Queue (m)	DOS (v/c)	Delay (sec)	LOS	Queue (m)
2026 Background								
Marine Parade (S)	0.20	0.1	NA	0.7	0.17	0.3	NA	1.2
Albatross Avenue (N)	0.08	0.2	NA	0.1	0.11	0.1	NA	0.2
Chairlift Avenue (SW)	0.07	7.7	A	1.7	0.04	7.3	A	0.2
2026 Design								
Marine Parade (S)	0.20	0.2	NA	0.8	0.17	0.4	NA	1.4
Albatross Avenue (N)	0.08	0.2	NA	0.2	0.11	0.2	NA	0.2
Chairlift Avenue (SW)	0.09	7.8	A	2.3	0.05	7.4	A	1.3

A summary of SIDRA results for Albatross Avenue / Chairlift Avenue Intersection for 2036 Background and Design are summarised in Table 4.4.

Table 4.5: 2036 SIDRA Results Summary for Albatross Avenue / Chairlift Avenue

Approach	AM Peak				PM Peak			
	DOS (v/c)	Delay (sec)	LOS	Queue (m)	DOS (v/c)	Delay (sec)	LOS	Queue (m)
2036 Background								
Marine Parade (S)	0.23	0.1	NA	0.8	0.19	0.3	NA	1.4
Albatross Avenue (N)	0.08	0.2	NA	0.2	0.16	0.1	NA	0.2
Chairlift Avenue (SW)	0.08	8.3	A	2.1	0.05	7.8	A	1.3
2036 Design								
Marine Parade (S)	0.23	0.2	NA	0.9	0.19	0.4	NA	1.6
Albatross Avenue (N)	0.08	0.2	NA	0.2	0.13	0.2	NA	0.2
Chairlift Avenue (SW)	0.10	8.4	A	2.7	0.06	7.9	A	1.5

Results show that Albatross Avenue / Chairlift Avenue intersection can cater for the additional development generated traffic.

4.6.2 Intersection 2: Chairlift Avenue / Fraser Avenue

Figure 4.2 shows the geometric layout of Chairlift Avenue / Fraser Avenue intersection used in the assessment.

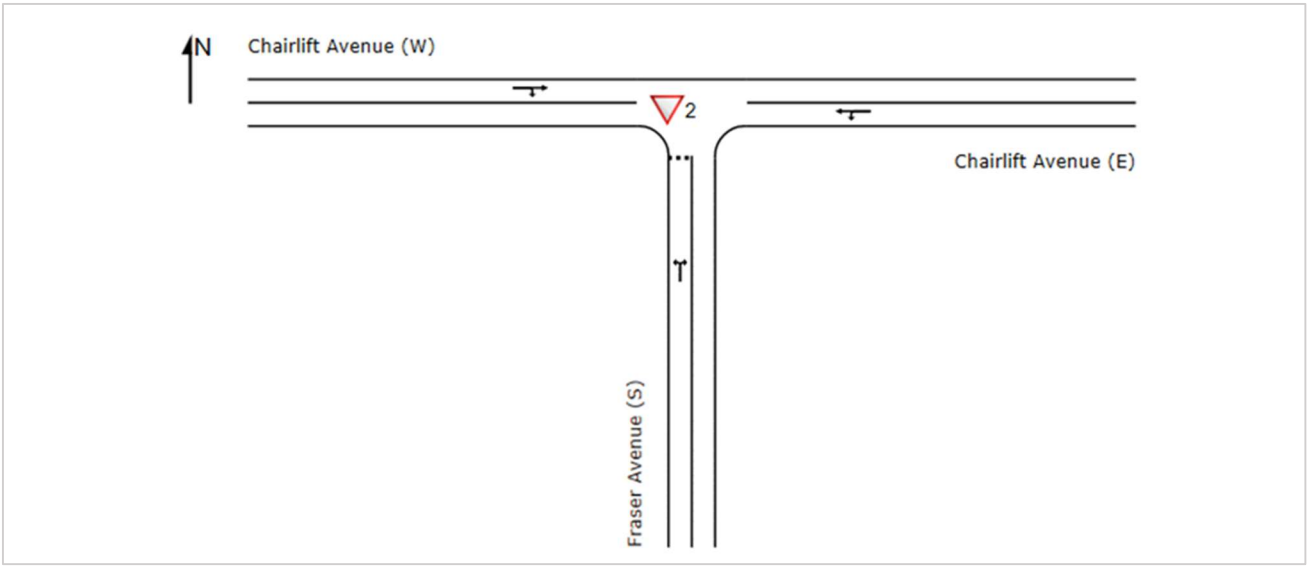


Figure 4.2: Intersection 2: Chairlift Avenue / Fraser Avenue

A summary of the SIDRA Results for Chairlift Avenue / Fraser Avenue Intersection for 2026 Background and Design are summarised in Table 4.6.

Table 4.6: 2026 SIDRA Results Summary for Chairlift Avenue / Fraser Avenue Intersection

Approach	AM Peak				PM Peak			
	DOS (v/c)	Delay (sec)	LOS	Queue (m)	DOS (v/c)	Delay (sec)	LOS	Queue (m)
2026 Background								
Fraser Avenue (S)	0.02	5.6	A	0.5	0.01	5.7	A	0.3
Chairlift Avenue (E)	0.02	0.6	NA	0.0	0.02	0.9	NA	0.0
Chairlift Avenue (W)	0.02	0.9	NA	0.3	0.02	2.8	NA	0.7
2026 Design								
Fraser Avenue (S)	0.04	5.7	A	1.0	0.02	5.7	A	0.4
Chairlift Avenue (E)	0.02	0.8	NA	0.0	0.03	1.2	NA	0.0
Chairlift Avenue (W)	0.03	1.5	NA	0.5	0.03	3.4	NA	1.0

A summary of SIDRA results for Chairlift Avenue / Fraser Avenue Intersection for 2036 Background and Design are summarised in Table 4.7.

Table 4.7: 2036 SIDRA Results Summary for Chairlift Avenue / Fraser Avenue Intersection

Approach	AM Peak				PM Peak			
	DOS (v/c)	Delay (sec)	LOS	Queue (m)	DOS (v/c)	Delay (sec)	LOS	Queue (m)
2036 Background								
Fraser Avenue (S)	0.03	5.7	A	0.6	0.01	5.7	A	0.3
Chairlift Avenue (E)	0.02	0.5	NA	0.0	0.02	0.9	NA	0.0
Chairlift Avenue (W)	0.03	0.9	NA	0.3	0.03	2.8	NA	0.8
2036 Design								
Fraser Avenue (S)	0.04	5.7	A	1.0	0.02	5.7	A	0.4
Chairlift Avenue (E)	0.02	0.8	NA	0.0	0.03	1.1	NA	0.0
Chairlift Avenue (W)	0.03	1.3	NA	0.5	0.03	3.4	NA	1.0

As shown above, there will be minimal change in traffic after completion of the proposed development. Delays are expected to remain consistent with the introduction of development traffic.

4.7 Impact Assessment

Assuming uniform flow, the additional traffic generation as a result of the development is equivalent to one vehicle entering or exiting the site every three minutes in the AM and one vehicle entering or exiting the site every five minutes during PM peak hours.

The development is considered to have a negligible impact on the surrounding road network from a traffic engineering perspective and is not expected to result in any significant traffic issues that would require mitigation measures or further analysis.

4.8 Environmental Capacity

The development proposes to generate all light vehicle trips onto Fraser Avenue. Fraser Avenue is designed as a Residential Access Street, which, pursuant to Council's Standard Drawings, has an environmental capacity of 750 vehicles per day. Given the provision of residential car parking compared to the minimum parking rates stipulated in AO1 of Council's Transport Code, the proposed development's daily trip generation has been based on the number of car spaces.

The daily traffic generation for the proposed development and neighbouring properties is shown in Table 4.8.

Table 4.8: Daily Traffic Generation (Fraser Avenue)

Land Use	Quantity	Daily Trip Rate	Daily Trips
Neighbouring Properties	65 dwellings	4.58 trips per dwelling	298
Proposed Development	138 residential car spaces	3.22 trips per car space	445
		Fraser Avenue Total	**743**

With the addition of development-generated traffic, Fraser Avenue is anticipated to experience in the order of 743 daily trips.

5. ACCESS ASSESSMENT

5.1 Access Location Review

The proposed development provides two access crossovers on site; specifically one main access on Fraser Avenue, and a Service and Refuse access only on Nagel Avenue.

Details of the proposed accesses are summarised in Table 5.1.

Table 5.1: Vehicular Access Details

Design Element	Details
Vehicular Access 1: Fraser Avenue	
Access Facility Category	Type 1 given location at end of roadway (no need for widened splays / width associated with higher turnover crossovers)
Crossover Form	IPWEA Standard Drawing RS-051 – Type A (6.0m wide at property boundary) as per Council's Driveway Code.
Pedestrian Sight Line Triangle	Pedestrian sight line triangles are on left side (exit) of the driveway at 2.0m along the property boundary 2.5m into the site as per Figure 3.3 in AS2890.1. The area within the triangle is clear of all obstructions to visibility.
Vehicular Access 2: Nagel Avenue	
Access Facility Category	Type 1 as per AS2890.1 (i.e. User Class 3A, less than 25 car parking spaces and local road frontage)
Crossover Form	IPWEA Standard Drawing RS-051 – Type A (6.0m wide at property boundary) as per Council's Driveway Code.
Pedestrian Sight Line Triangle	Pedestrian sight line triangles are both sides of the driveway at 2.0m along the property boundary 2.5m into the site as per Figure 3.3 in AS2890.1. The area within the triangle is clear of all obstructions to visibility.

The proposed vehicular accesses are generally in accordance with the relevant requirements AS2890.1 and IPWEAQ Standard Drawing RS-051.

5.2 Sight Distance

A sight distance assessment was undertaken for the proposed vehicular accesses. The sight distance was observed to be 132m north towards Chairlift Avenue. As the access driveway is located at the head of the Fraser Avenue cul-de-sac, vehicles exiting the driveway have a clear view down the street to Chairlift Avenue considering the street profile flat and straight.

Figure 5.1 shows the sight distance provision for the subject site.



Source: Adapted from Nearmap

Figure 5.1: Sight Distance

The desirable required sight distance is 69m for a 50km/h road (as per Figure 3.2 of AS2890.1). Fraser Avenue is categorised as a local access road according to Council's Transport Code Road Hierarchy. As the subject site fronts Fraser Avenue as a cul-de-sac, and the road is generally flat with a low order of vehicle traffic, sight distance for vehicles exiting the subject site is considered more than enough, as vehicles can see straight ahead when exiting.

5.3 Pedestrian Connectivity

The site shall be accessed via a footpath onto Marine Parade and Fraser Avenue. There is insufficient space in either verge on Nagel Avenue to provide a footpath.

6. SERVICING ASSESSMENT

6.1 Servicing

Council's *Transport Code* (Ver. 11) prescribes on-site standing area for an 8.8m Medium Rigid Vehicle (MRV; typical removalist truck size) for Multiple Dwelling land uses containing an internal circulation roadway. Servicing will take place on-site within the designated servicing standing area with access from Nagel Avenue. Additional key elements pertaining to the onsite servicing are as follows:

- A 3.5m by 8.8m MRV service 'bay' has been allocated adjacent the Bin Store
- MRV service vehicle can enter in forward gear and park on the dedicated parking bay
- Adequate space is provided for truck turnaround movements to allow heavy vehicles to exit in a forward gear

Design Swept Paths were undertaken for the proposed development using AutoTURN software. Swept path diagrams are provided in **Appendix B** and demonstrate:

- An MRV entering and sitting on site
- MRV reverse manoeuvre and forward gear exit.

6.2 On-Site Refuse Collection

Refuse collection is proposed to occur on-site via a rear-loading Refuse Collection Vehicle (RCV). A dedicated refuse collection area is provided, independent from MRV servicing and light vehicle movements. A swept path demonstrating RCV servicing is provided in **Appendix B**.

6.3 Nagel Avenue Refuse Collection

The applicant has observed that Council's standard side-loading RCV enters the site to perform a turnaround manoeuvre when servicing properties along Nagel Avenue to the south of the site. The applicant, therefore, has accommodated provision within the servicing area of the development to facilitate this movement for Council's RCV with the development in place.

7. SUMMARY AND CONCLUSIONS

The key findings of the traffic impact assessment for the proposed development to be located at 122 Marine Parade, Miami are as follows:

- The proposed development involves re-design of an existing residential apartment development into a 46-unit Multiple Dwelling block
- The subject site is well serviced by public and active transport and is located less than 500m to a sub-arterial road
- The proposed development is estimated to generate a net increase of 30 trips during the AM peak hour and 18 trips during the PM peak hour
- The development provides 139 residential car parking spaces within the units and eight visitor car parking spaces and complies with AO1 of Council's *Transport Code (Ver. 11)*
- The development provides 16 residential bicycle spaces and four visitor bicycle spaces pursuant to PO7 of Council's Transport Code
- The car parking and internal road layout has been designed in accordance with the relevant requirements of Council's *Transport Code* (Ver. 11) and *AS2890.1* (or otherwise is considered to comply with the intent of the requirement)
- The proposed vehicular accesses are generally consistent with AS2890.1 and the IPWEA Standard Drawing RS-051 for a Type A driveway crossover (subject to changes to be reflected in updated drawings)
- An MRV and RCV servicing area has been included on-site. All service vehicles enter and exit the site in a forward gear
- A turnaround area has been provided for Council's side-loading RCV.

Based on the above assessment it is concluded that there are no significant traffic or transport impacts associated with the proposed development to preclude its approval and relevant conditioning on transport planning grounds.

Appendix A: Development Plans (Traffic Related)





0 5 10 15 20 25

DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI

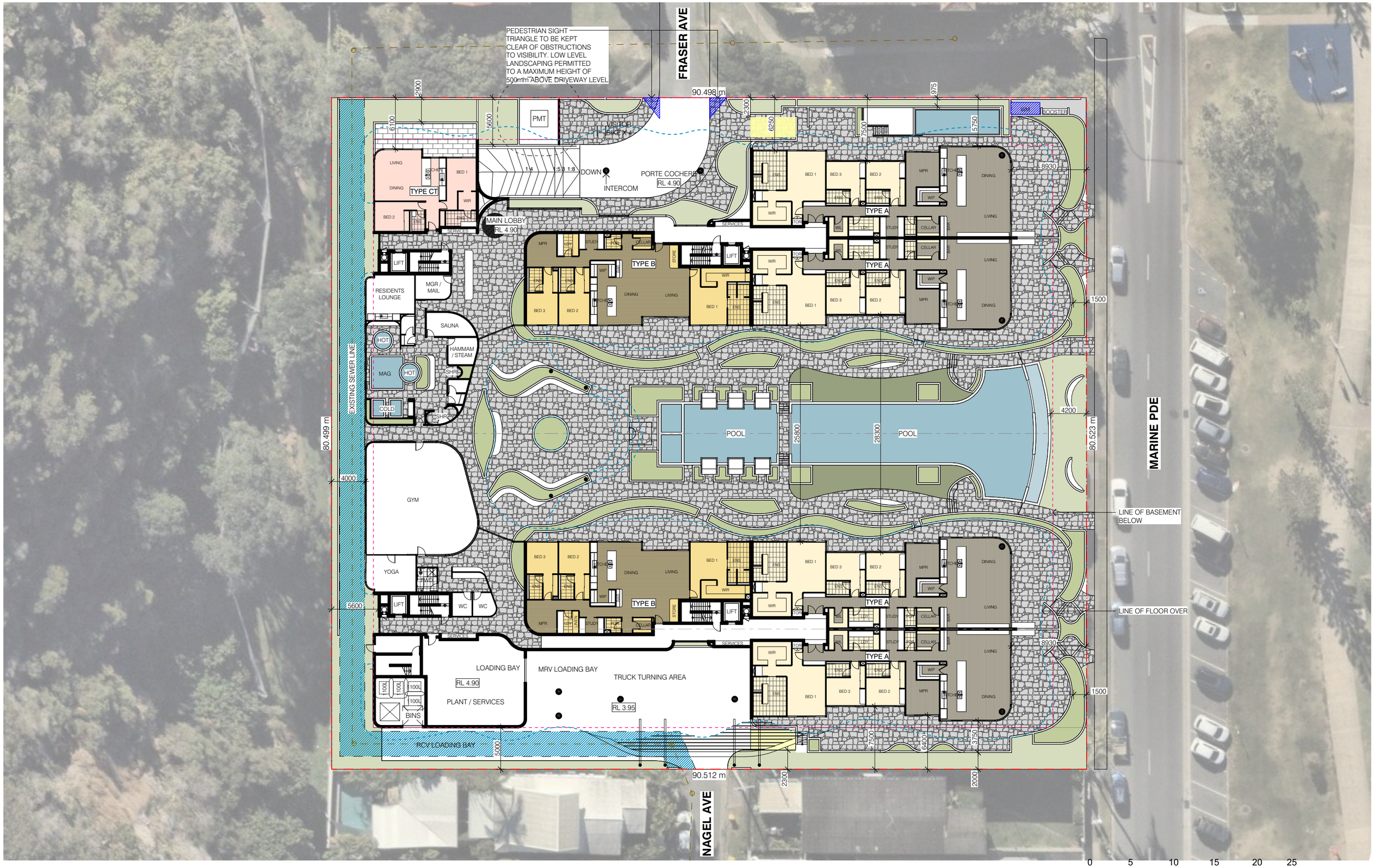
PROJECT NO. 568100
23 APRIL 2025, ISSUE

DRAWING NO. DA2.101
BASEMENT FLOOR PLAN

PREPARED FOR
MONACO PROPERTY GROUP

SCALE:
1:400 @ A3

Koichi Takada Architects



DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI

PROJECT NO. 568100
23 APRIL 2025, ISSUE

DRAWING NO. DA2.102
GROUND FLOOR / LEVEL 1

PREPARED FOR
MONACO PROPERTY GROUP

SCALE:
1:400 @ A3

Koichi Takada Architects

Appendix B: Swept Path Assessment

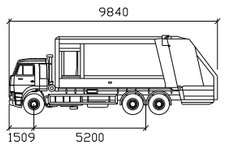


N

Notes:

- RPEQ Signature pertains to Vehicle Swept Paths only
- Grey *landscaping* to remain at most 300mm height where orange *vehicle clearance* overhangs

Vehicle Clearance (300mm)

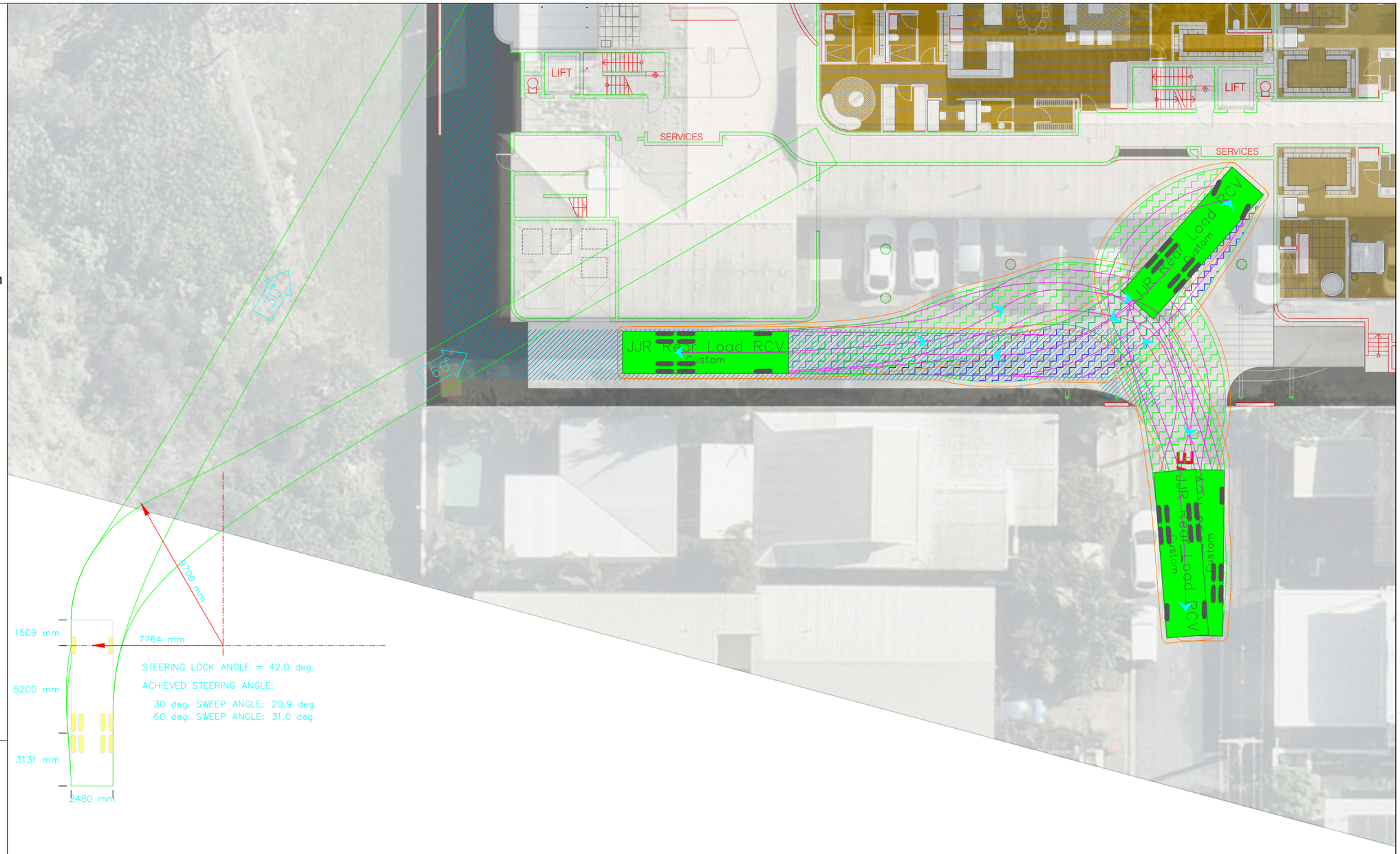


JJR Rear Load RCV

mm

Width	: 2480
Track	: 2480
Lock to Lock Time	6.0
Steering Angle	: 42.0

DESIGN VEHICLE



Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226
P: (07) 5562-5377
W: www.bitziosconsulting.com.au
Brisbane
Level 2, 428 Upper Edward Street, Spring Hill 4000
P: (07) 3831-4442
E: admin@bitziosconsulting.com.au
Sydney
Studio 203, 3 Gladstone Street, Newtown NSW 2042
P: (02) 9557 6202

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Revision 1 - Swept Paths	A.S	22.04.2025
002	Revision 2 - Swept Paths	A.S	23.04.2025

Scale @ A3 — 0 2 4 6 8 10 12 — 1:250

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date
A.EKE		19186	23.04.2025

Project: 122 Marine Parade Miami TIA

Title: RCV Swept Path

Design	Drawn	Checked
A.S	A.S	A.E

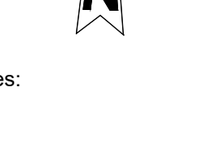
CONCEPT ONLY

Date: 23.04.2025

Project Number	Sheet Number	Issue
P6870	1	002

Notes:

Vehicle Clearance (300mm)



MRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

DESIGN VEHICLE



Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226
P: (07) 5562-5377
W: www.bitziosconsulting.com.au
Brisbane
Level 2, 428 Upper Edward Street, Spring Hill 4000
P: (07) 3831-4442
E: admin@bitziosconsulting.com.au
Sydney
Studio 203, 3 Gladstone Street, Newtown NSW 2042
P: (02) 9557 6202

REVISIONS

Issue	Revisions/Descriptions	Drawn	Date
001	Revision 1 - Swept Paths	A.S	23.04.2025
002	Revision 1 - Swept Paths	A.S	23.04.2025

Scale @ A3 0 1 2 3 4 5 6 7 1:150

Project: 122 Marine Parade Miami TIA

Title: MRV Servicing Swept Path

Design	Drawn	Checked
A.S	A.S	M.B

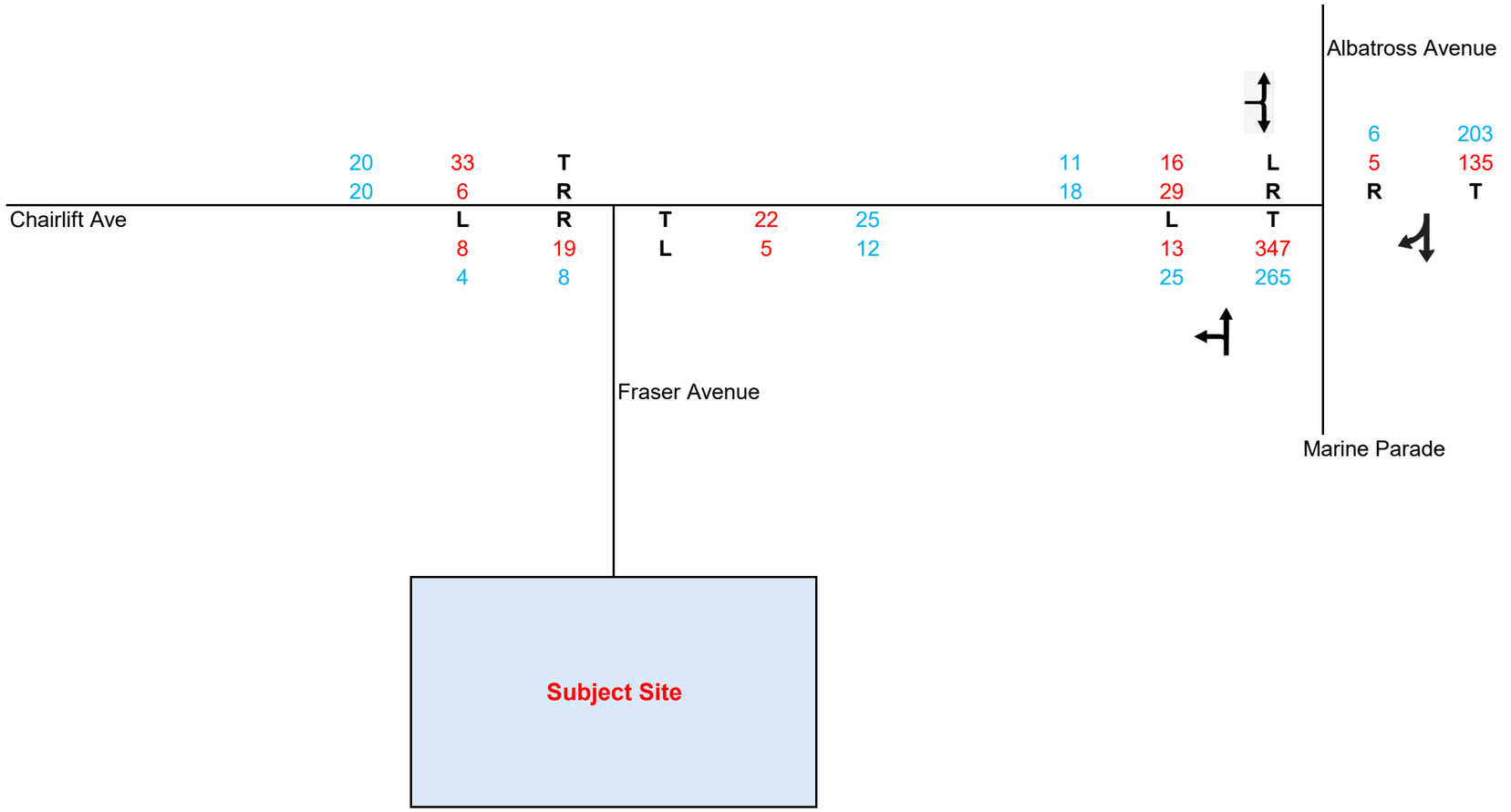
CONCEPT ONLY

Date: 23.04.2025

Project Number	Sheet Number	Issue
P6870	2	002

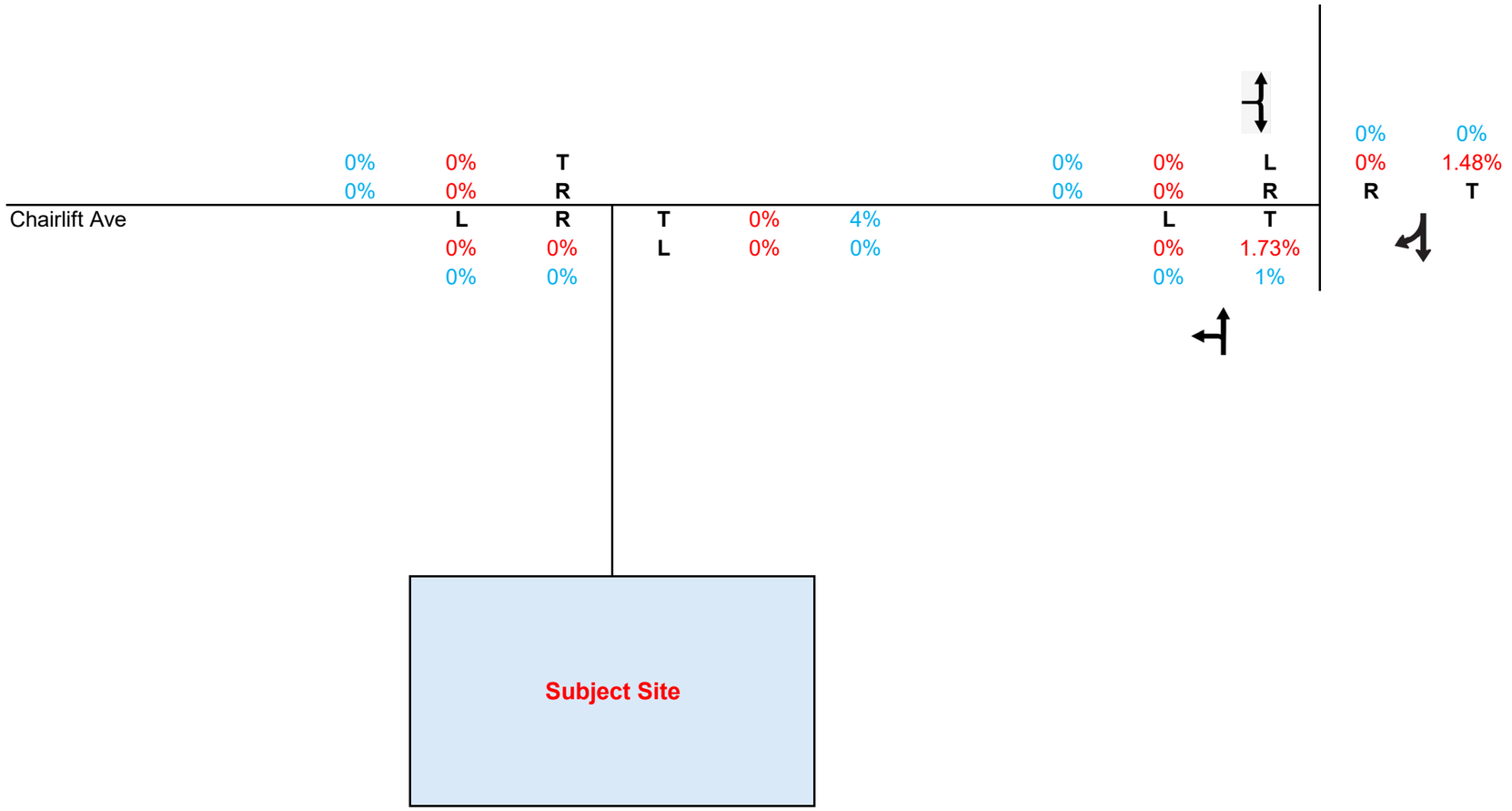
Appendix C: Traffic Volume Plots





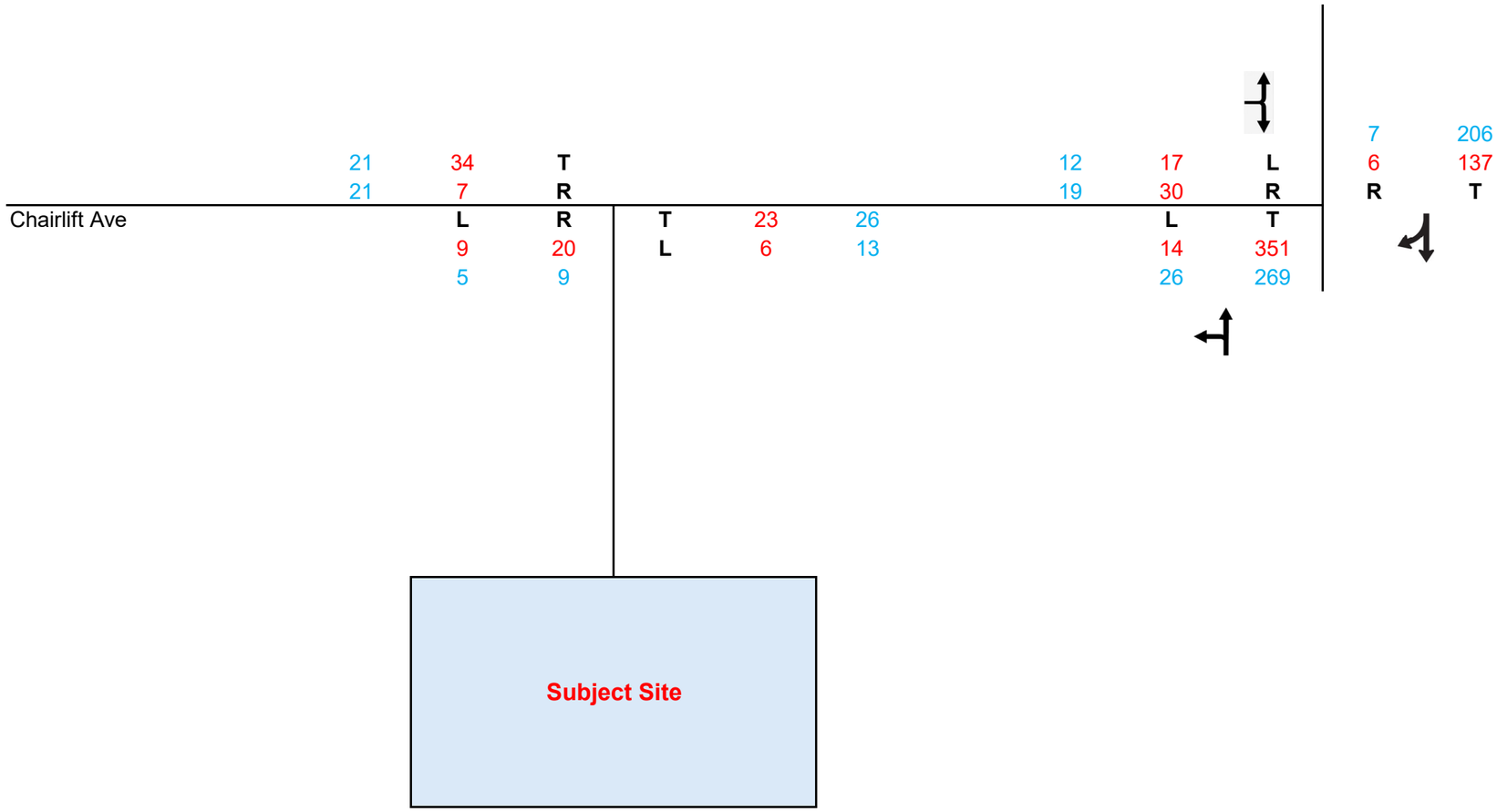
BITZIOS consulting	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year	2025
						Built Year	2026
						Design Year	2036
		Survey		Peak Hours		**Growth Rate**	**1.15%**
				AM	7:30AM – 8:30AM		
				PM	4:30PM – 5:30PM		

Population	**2026**	**2036**
Carrara Burleigh	304867	341827



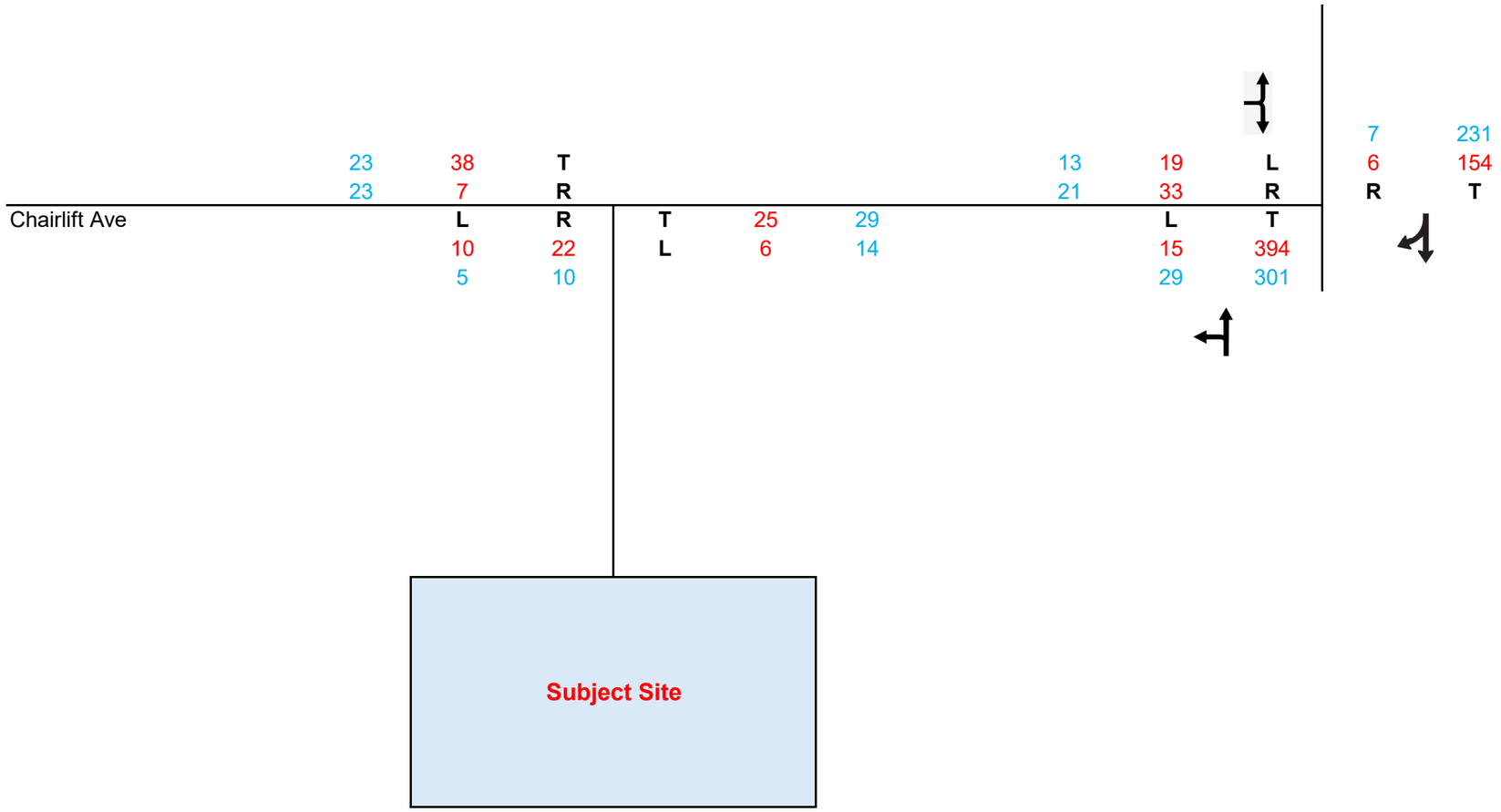
BITZIOS consulting traffic engineering • transport planning	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year	2025
						Built Year	2026
						Design Year	2036
		Survey		Peak Hours		**Growth Rate**	**1.15%**
				AM	7:30AM	8:30AM	
				PM	4:30PM	5:30PM	

Population	**2026**	**2036**
Carrara Burleigh	304867	341827



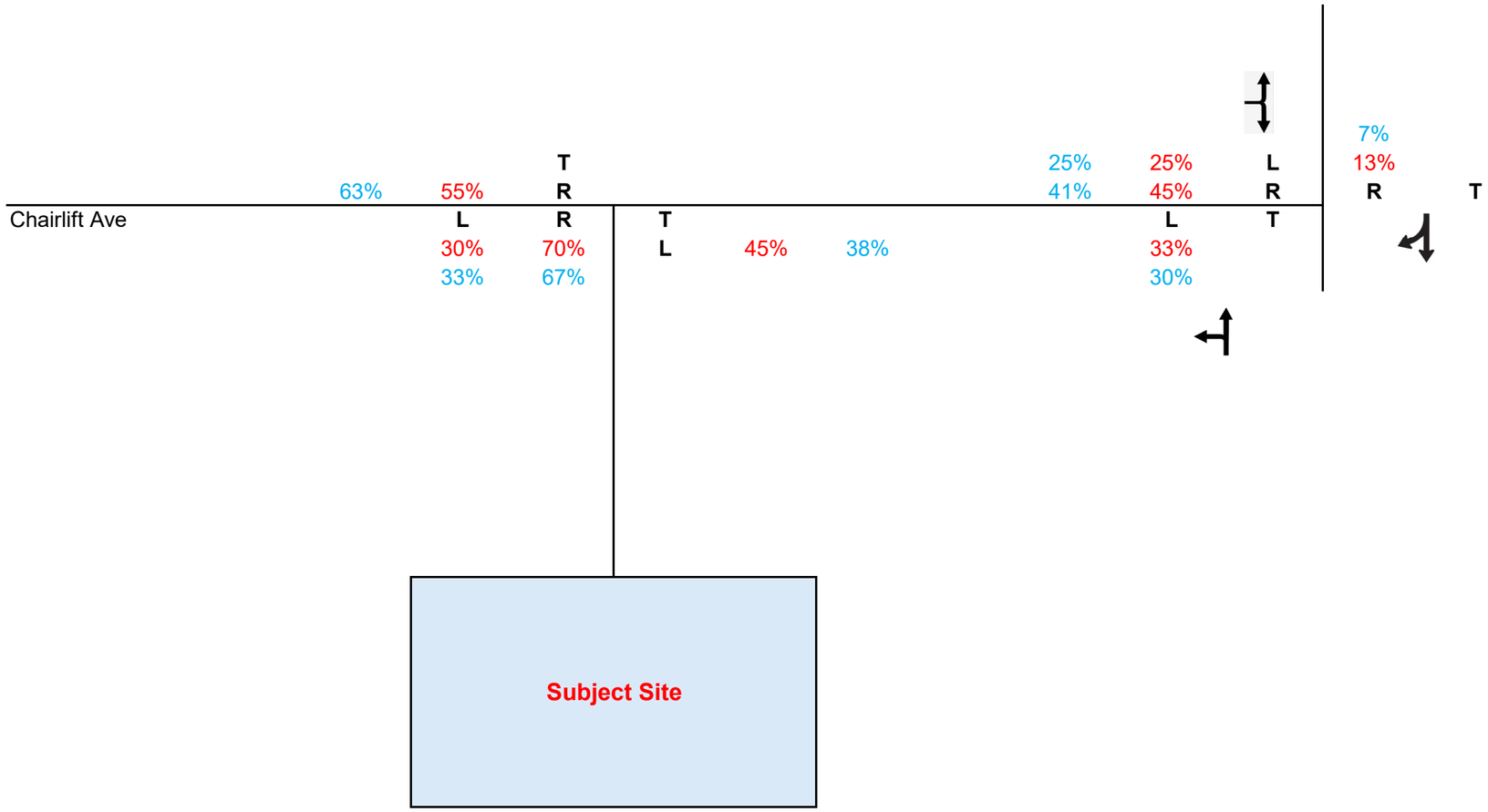
BITZIOS consulting traffic engineering • transport planning	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year 2025
						Built Year 2026
						Design Year 2036
		Survey		Peak Hours		**Growth Rate** **1.15%**
				AM	7:30AM – 8:30AM	
				PM	4:30PM – 5:30PM	

Population	**2026**	**2036**
Carrara Burleigh	304867	341827



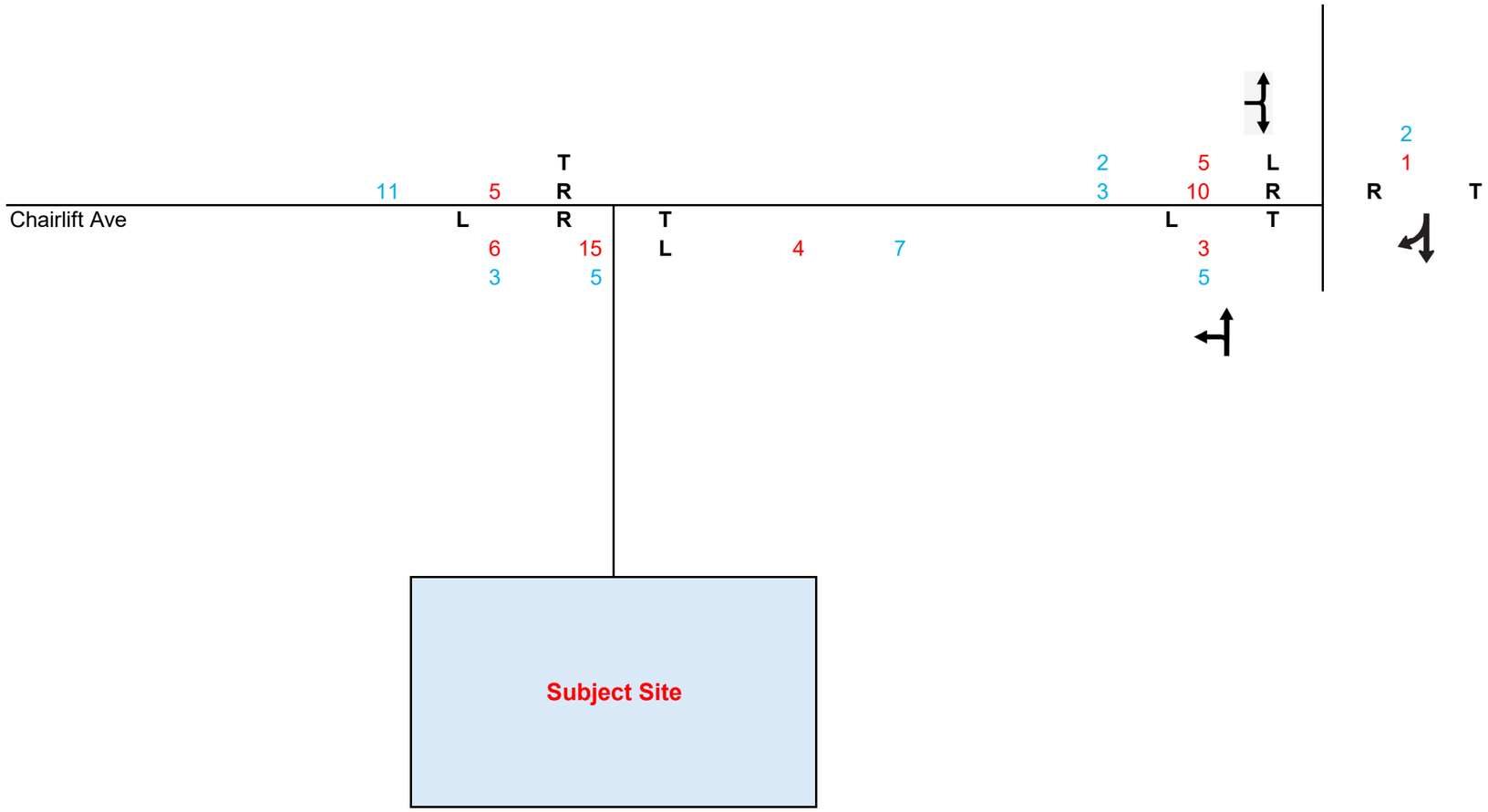
BITZIOS consulting traffic engineering + transport planning	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year 2025
						Built Year 2026
						Design Year 2036
		Survey		Peak Hours		**Growth Rate** **1.15%**
				AM	7:30AM 8:30AM	
				PM	4:30PM 5:30PM	

Population	**2026**	**2036**
Carrara Burleigh	304867	341827



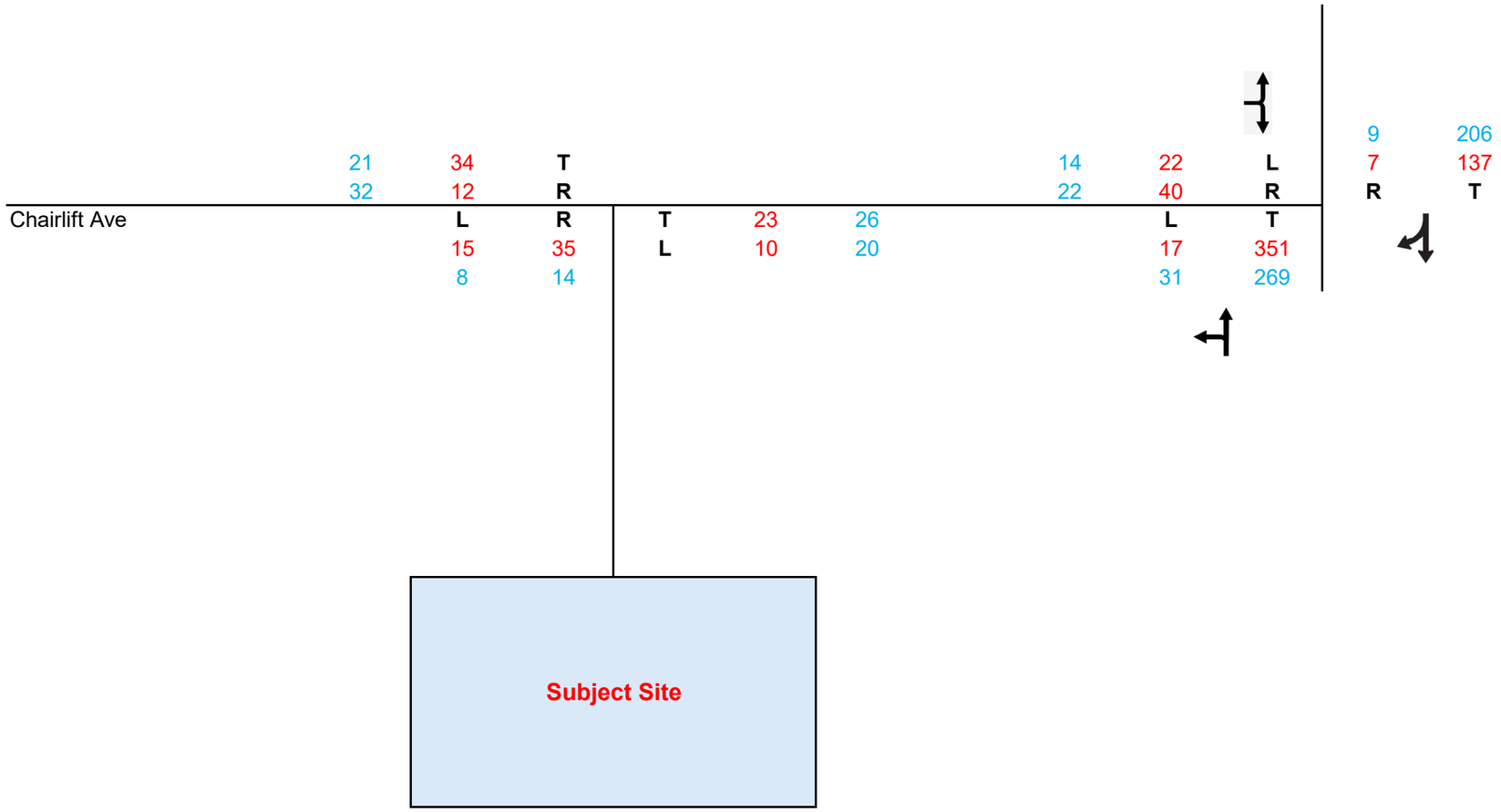
BITZIOS consulting traffic engineering • transport planning	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year	2025
						Built Year	2026
						Design Year	2036
		Survey		Peak Hours		**Growth Rate**	**1.15%**
				AM	7:30AM – 8:30AM		
				PM	4:30PM – 5:30PM		

Population	**2026**	**2036**
Carrara Burleigh	304867	341827



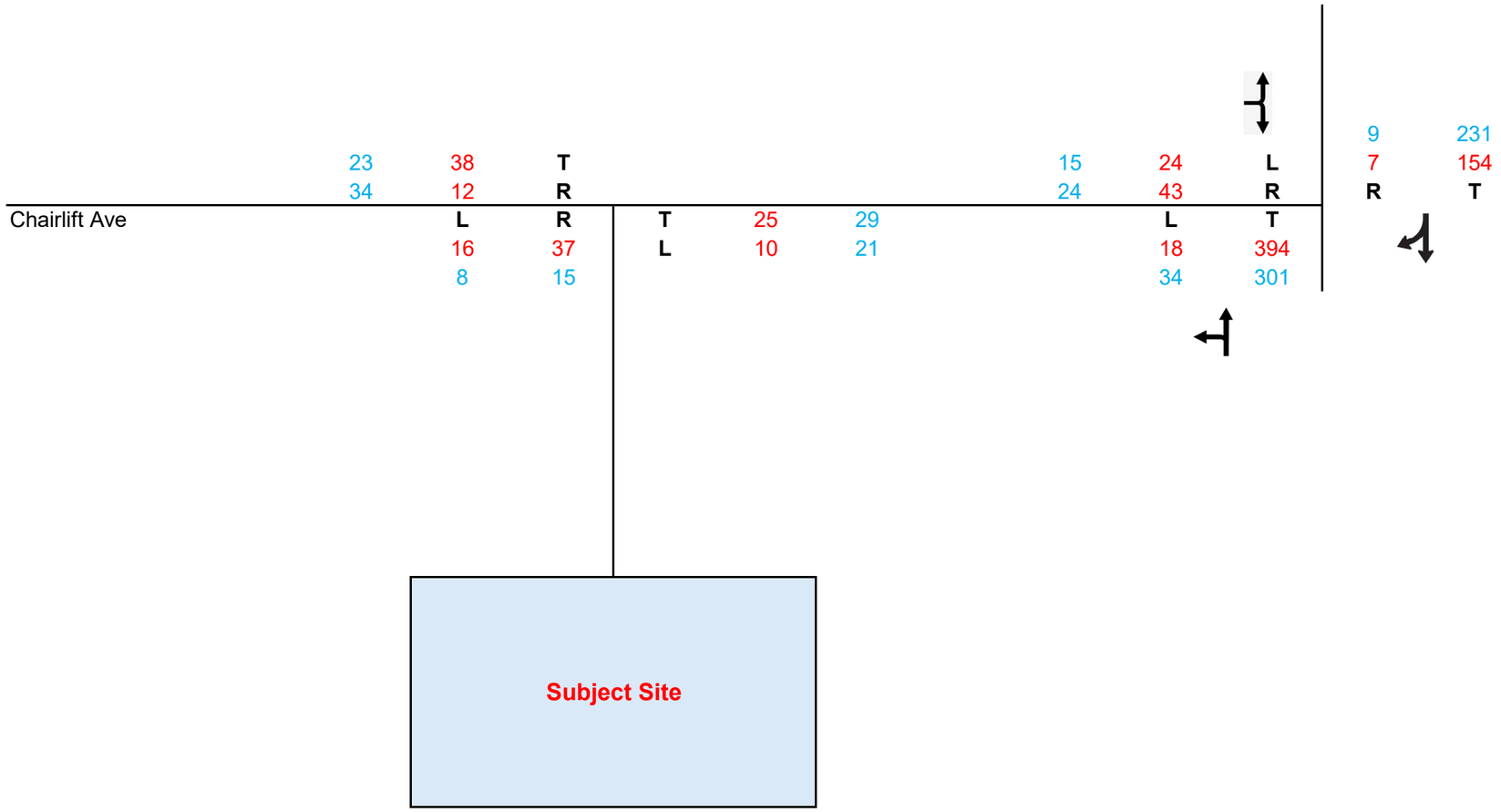
BITZIOS consulting traffic engineering + transport planning	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year	2025
						Built Year	2026
						Design Year	2036
		Survey		Peak Hours		**Growth Rate**	**1.15%**
				AM	7:30AM – 8:30AM		
				PM	4:30PM – 5:30PM		

Population	**2026**	**2036**
Carrara Burleigh	304867	341827



BITZIOS consulting – traffic engineering + transport planning	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year 2025
						Built Year 2026
						Design Year 2036
		Survey		Peak Hours		**Growth Rate** **1.15%**
				AM	7:30AM – 8:30AM	
				PM	4:30PM – 5:30PM	

Population	**2026**	**2036**
Carrara Burleigh	304867	341827



BITZIOS consulting	N	122 Marine Parade, Miami	Sheet 1	Project Number	P6870	Survey Year 2025
						Built Year 2026
						Design Year 2036
		Survey		Peak Hours		**Growth Rate** **1.15%**
				AM	7:30AM – 8:30AM	
				PM	4:30PM – 5:30PM	

Population	**2026**	**2036**
Carrara Burleigh	304867	341827

Appendix D: SIDRA Movement Summaries

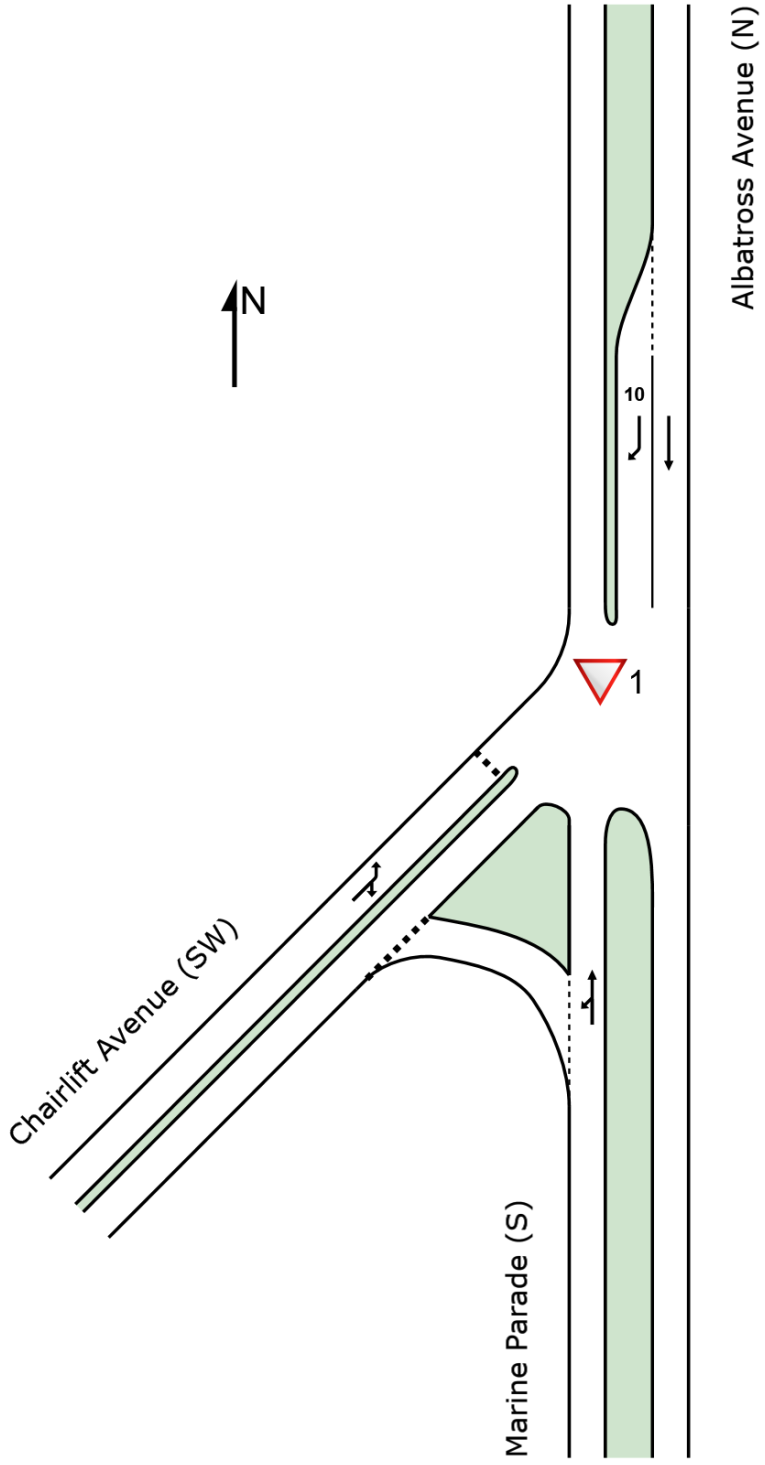


SITE LAYOUT

Site: 1 [2026 AM BG (Site Folder: Background)]

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [2026 AM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade (S)															
1b	L3	All MCs	15	0.0	15	0.0	0.202	3.9	LOS A	0.1	0.7	0.00	0.02	0.00	42.1
2	T1	All MCs	369	1.7	369	1.7	0.202	0.0	LOS A	0.1	0.7	0.00	0.02	0.00	39.9
Approach			384	1.7	384	1.7	0.202	0.1	NA	0.1	0.7	0.00	0.02	0.00	40.0
North: Albatross Avenue (N)															
8	T1	All MCs	144	1.5	144	1.5	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	6	0.0	6	0.0	0.005	3.4	LOS A	0.0	0.1	0.42	0.42	0.42	40.0
Approach			151	1.4	151	1.4	0.075	0.2	NA	0.0	0.1	0.02	0.02	0.02	40.0
SouthWest: Chairlift Avenue (SW)															
30a	L1	All MCs	18	0.0	18	0.0	0.066	5.3	LOS A	0.2	1.7	0.50	0.69	0.50	38.2
32b	R3	All MCs	32	0.0	32	0.0	0.066	9.1	LOS A	0.2	1.7	0.50	0.69	0.50	38.1
Approach			49	0.0	49	0.0	0.066	7.7	LOS A	0.2	1.7	0.50	0.69	0.50	38.2
All Vehicles			584	1.5	584	1.5	0.202	0.8	NA	0.2	1.7	0.05	0.08	0.05	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 1 [2026 PM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade															
1b	L3	All MCs	27	0.0	27	0.0	0.165	3.9	LOS A	0.2	1.2	0.01	0.04	0.01	41.9
2	T1	All MCs	283	1.0	283	1.0	0.165	0.0	LOS A	0.2	1.2	0.01	0.04	0.01	39.8
Approach			311	0.9	311	0.9	0.165	0.3	NA	0.2	1.2	0.01	0.04	0.01	40.0
North: Albatross Avenue															
8	T1	All MCs	217	0.0	217	0.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	7	0.0	7	0.0	0.005	3.1	LOS A	0.0	0.2	0.36	0.39	0.36	40.1
Approach			224	0.0	224	0.0	0.111	0.1	NA	0.0	0.2	0.01	0.01	0.01	40.0
SouthWest: Chairlift Avenue															
30a	L1	All MCs	13	0.0	13	0.0	0.041	4.9	LOS A	0.2	1.1	0.47	0.64	0.47	38.4
32b	R3	All MCs	20	0.0	20	0.0	0.041	8.9	LOS A	0.2	1.1	0.47	0.64	0.47	38.3
Approach			33	0.0	33	0.0	0.041	7.3	LOS A	0.2	1.1	0.47	0.64	0.47	38.4
All Vehicles			567	0.5	567	0.5	0.165	0.7	NA	0.2	1.2	0.04	0.07	0.04	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 1 [2036 AM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade															
1b	L3	All MCs	16	0.0	16	0.0	0.226	3.9	LOS A	0.1	0.8	0.00	0.02	0.00	42.1
2	T1	All MCs	415	1.7	415	1.7	0.226	0.0	LOS A	0.1	0.8	0.00	0.02	0.00	39.9
Approach			431	1.7	431	1.7	0.226	0.1	NA	0.1	0.8	0.00	0.02	0.00	40.0
North: Albatross Avenue															
8	T1	All MCs	162	1.5	162	1.5	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	6	0.0	6	0.0	0.005	3.6	LOS A	0.0	0.2	0.45	0.44	0.45	39.9
Approach			168	1.4	168	1.4	0.084	0.2	NA	0.0	0.2	0.02	0.02	0.02	40.0
SouthWest: Chairlift Avenue															
30a	L1	All MCs	20	0.0	20	0.0	0.080	5.5	LOS A	0.3	2.1	0.54	0.72	0.54	37.9
32b	R3	All MCs	35	0.0	35	0.0	0.080	9.9	LOS A	0.3	2.1	0.54	0.72	0.54	37.8
Approach			55	0.0	55	0.0	0.080	8.3	LOS A	0.3	2.1	0.54	0.72	0.54	37.9
All Vehicles			654	1.5	654	1.5	0.226	0.8	NA	0.3	2.1	0.05	0.08	0.05	39.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 1 [2036 PM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade															
1b	L3	All MCs	31	0.0	31	0.0	0.185	3.9	LOS A	0.2	1.4	0.01	0.04	0.01	41.9
2	T1	All MCs	317	1.0	317	1.0	0.185	0.0	LOS A	0.2	1.4	0.01	0.04	0.01	39.8
Approach			347	0.9	347	0.9	0.185	0.3	NA	0.2	1.4	0.01	0.04	0.01	40.0
North: Albatross Avenue															
8	T1	All MCs	243	0.0	243	0.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	7	0.0	7	0.0	0.006	3.2	LOS A	0.0	0.2	0.38	0.40	0.38	40.0
Approach			251	0.0	251	0.0	0.125	0.1	NA	0.0	0.2	0.01	0.01	0.01	40.0
SouthWest: Chairlift Avenue															
30a	L1	All MCs	14	0.0	14	0.0	0.049	5.0	LOS A	0.2	1.3	0.50	0.67	0.50	38.2
32b	R3	All MCs	22	0.0	22	0.0	0.049	9.5	LOS A	0.2	1.3	0.50	0.67	0.50	38.1
Approach			36	0.0	36	0.0	0.049	7.8	LOS A	0.2	1.3	0.50	0.67	0.50	38.1
All Vehicles			634	0.5	634	0.5	0.185	0.7	NA	0.2	1.4	0.04	0.07	0.04	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 1 [2026 AM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade															
1b	L3	All MCs	18	0.0	18	0.0	0.204	3.9	LOS A	0.1	0.8	0.01	0.02	0.01	42.1
2	T1	All MCs	369	1.7	369	1.7	0.204	0.0	LOS A	0.1	0.8	0.01	0.02	0.01	39.9
Approach			387	1.7	387	1.7	0.204	0.2	NA	0.1	0.8	0.01	0.02	0.01	40.0
North: Albatross Avenue															
8	T1	All MCs	144	1.5	144	1.5	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	7	0.0	7	0.0	0.006	3.4	LOS A	0.0	0.2	0.42	0.42	0.42	40.0
Approach			152	1.4	152	1.4	0.075	0.2	NA	0.0	0.2	0.02	0.02	0.02	40.0
SouthWest: Chairlift Avenue															
30a	L1	All MCs	23	0.0	23	0.0	0.088	5.3	LOS A	0.3	2.3	0.51	0.70	0.51	38.2
32b	R3	All MCs	42	0.0	42	0.0	0.088	9.2	LOS A	0.3	2.3	0.51	0.70	0.51	38.1
Approach			65	0.0	65	0.0	0.088	7.8	LOS A	0.3	2.3	0.51	0.70	0.51	38.1
All Vehicles			604	1.4	604	1.4	0.204	1.0	NA	0.3	2.3	0.06	0.10	0.06	39.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 1 [2026 PM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade															
1b	L3	All MCs	33	0.0	33	0.0	0.169	3.9	LOS A	0.2	1.4	0.01	0.05	0.01	41.9
2	T1	All MCs	283	1.0	283	1.0	0.169	0.0	LOS A	0.2	1.4	0.01	0.05	0.01	39.8
Approach			316	0.9	316	0.9	0.169	0.4	NA	0.2	1.4	0.01	0.05	0.01	40.0
North: Albatross Avenue															
8	T1	All MCs	217	0.0	217	0.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	9	0.0	9	0.0	0.007	3.1	LOS A	0.0	0.2	0.36	0.39	0.36	40.1
Approach			226	0.0	226	0.0	0.111	0.2	NA	0.0	0.2	0.02	0.02	0.02	40.0
SouthWest: Chairlift Avenue															
30a	L1	All MCs	15	0.0	15	0.0	0.048	4.9	LOS A	0.2	1.3	0.47	0.65	0.47	38.4
32b	R3	All MCs	23	0.0	23	0.0	0.048	8.9	LOS A	0.2	1.3	0.47	0.65	0.47	38.3
Approach			38	0.0	38	0.0	0.048	7.4	LOS A	0.2	1.3	0.47	0.65	0.47	38.3
All Vehicles			580	0.5	580	0.5	0.169	0.8	NA	0.2	1.4	0.04	0.08	0.04	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 1 [2036 AM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade															
1b	L3	All MCs	19	0.0	19	0.0	0.228	3.9	LOS A	0.1	0.9	0.00	0.02	0.00	42.1
2	T1	All MCs	415	1.7	415	1.7	0.228	0.0	LOS A	0.1	0.9	0.00	0.02	0.00	39.9
Approach			434	1.7	434	1.7	0.228	0.2	NA	0.1	0.9	0.00	0.02	0.00	40.0
North: Albatross Avenue															
8	T1	All MCs	162	1.5	162	1.5	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	7	0.0	7	0.0	0.006	3.6	LOS A	0.0	0.2	0.45	0.44	0.45	39.9
Approach			169	1.4	169	1.4	0.084	0.2	NA	0.0	0.2	0.02	0.02	0.02	40.0
SouthWest: Chairlift Avenue															
30a	L1	All MCs	25	0.0	25	0.0	0.103	5.6	LOS A	0.4	2.7	0.54	0.74	0.54	37.9
32b	R3	All MCs	45	0.0	45	0.0	0.103	10.0	LOS A	0.4	2.7	0.54	0.74	0.54	37.8
Approach			71	0.0	71	0.0	0.103	8.4	LOS A	0.4	2.7	0.54	0.74	0.54	37.8
All Vehicles			674	1.4	674	1.4	0.228	1.0	NA	0.4	2.7	0.06	0.10	0.06	39.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 1 [2036 PM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Albatross Avenue / Chairlift Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Marine Parade															
1b	L3	All MCs	36	0.0	36	0.0	0.189	3.9	LOS A	0.2	1.6	0.01	0.05	0.01	41.9
2	T1	All MCs	317	1.0	317	1.0	0.189	0.0	LOS A	0.2	1.6	0.01	0.05	0.01	39.8
Approach			353	0.9	353	0.9	0.189	0.4	NA	0.2	1.6	0.01	0.05	0.01	40.0
North: Albatross Avenue															
8	T1	All MCs	243	0.0	243	0.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9a	R1	All MCs	9	0.0	9	0.0	0.007	3.2	LOS A	0.0	0.2	0.38	0.41	0.38	40.0
Approach			253	0.0	253	0.0	0.125	0.2	NA	0.0	0.2	0.01	0.02	0.01	40.0
SouthWest: Chairlift Avenue															
30a	L1	All MCs	16	0.0	16	0.0	0.056	5.0	LOS A	0.2	1.5	0.51	0.67	0.51	38.2
32b	R3	All MCs	25	0.0	25	0.0	0.056	9.6	LOS A	0.2	1.5	0.51	0.67	0.51	38.1
Approach			41	0.0	41	0.0	0.056	7.9	LOS A	0.2	1.5	0.51	0.67	0.51	38.1
All Vehicles			646	0.5	646	0.5	0.189	0.8	NA	0.2	1.6	0.04	0.08	0.04	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

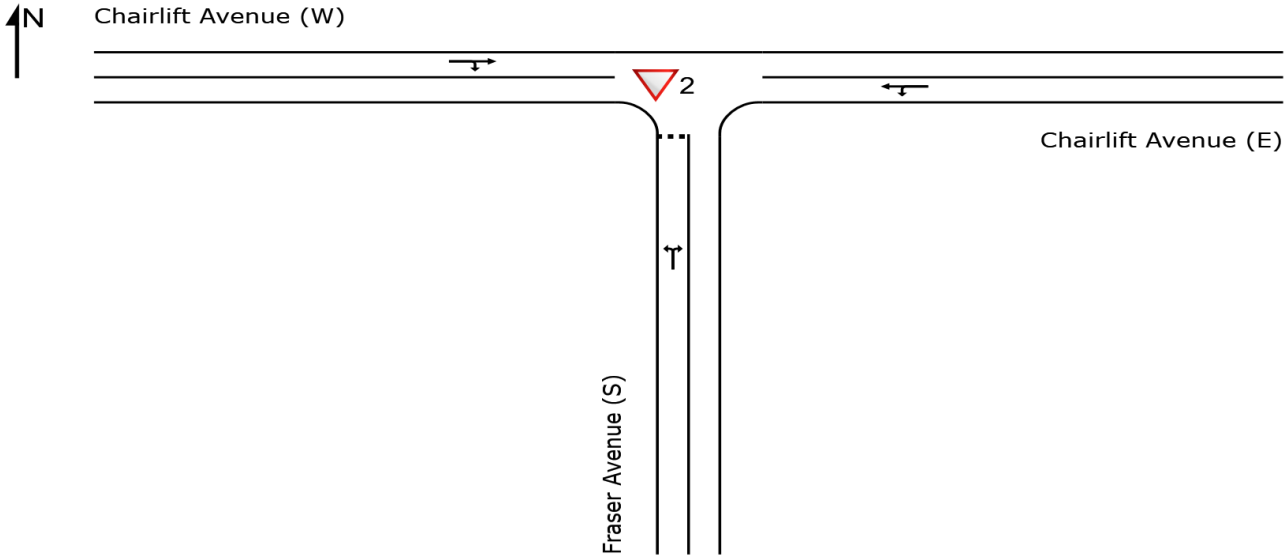
SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

SITE LAYOUT

Site: 2 [2026 AM BG (Site Folder: Background)]

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2026 AM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue (S)															
1	L2	All MCs	9	0.0	9	0.0	0.023	5.6	LOS A	0.1	0.5	0.11	0.56	0.11	48.3
3	R2	All MCs	21	0.0	21	0.0	0.023	5.7	LOS A	0.1	0.5	0.11	0.56	0.11	31.7
Approach			31	0.0	31	0.0	0.023	5.6	LOS A	0.1	0.5	0.11	0.56	0.11	40.8
East: Chairlift Avenue (E)															
4	L2	All MCs	6	0.0	6	0.0	0.016	2.7	LOS A	0.0	0.0	0.00	0.11	0.00	43.5
5	T1	All MCs	24	4.0	24	4.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	58.9
Approach			31	3.2	31	3.2	0.016	0.6	NA	0.0	0.0	0.00	0.11	0.00	57.5
West: Chairlift Avenue (W)															
11	T1	All MCs	36	0.0	36	0.0	0.023	0.0	LOS A	0.0	0.3	0.04	0.11	0.04	57.9
12	R2	All MCs	7	0.0	7	0.0	0.023	5.5	LOS A	0.0	0.3	0.04	0.11	0.04	53.7
Approach			43	0.0	43	0.0	0.023	0.9	NA	0.0	0.3	0.04	0.11	0.04	57.0
All Vehicles			104	0.9	104	0.9	0.023	2.2	NA	0.1	0.5	0.05	0.24	0.05	53.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2026 PM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue															
1	L2	All MCs	5	0.0	5	0.0	0.011	5.6	LOS A	0.0	0.3	0.11	0.56	0.11	48.3
3	R2	All MCs	9	0.0	9	0.0	0.011	5.7	LOS A	0.0	0.3	0.11	0.56	0.11	31.7
Approach			15	0.0	15	0.0	0.011	5.7	LOS A	0.0	0.3	0.11	0.56	0.11	41.7
East: Chairlift Avenue															
4	L2	All MCs	14	0.0	14	0.0	0.022	2.7	LOS A	0.0	0.0	0.00	0.18	0.00	42.3
5	T1	All MCs	27	4.0	27	4.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	58.2
Approach			41	2.7	41	2.7	0.022	0.9	NA	0.0	0.0	0.00	0.18	0.00	55.6
West: Chairlift Avenue															
11	T1	All MCs	22	0.0	22	0.0	0.024	0.1	LOS A	0.1	0.7	0.10	0.30	0.10	54.3
12	R2	All MCs	22	0.0	22	0.0	0.024	5.6	LOS A	0.1	0.7	0.10	0.30	0.10	51.1
Approach			44	0.0	44	0.0	0.024	2.8	NA	0.1	0.7	0.10	0.30	0.10	52.5
All Vehicles			100	1.1	100	1.1	0.024	2.4	NA	0.1	0.7	0.06	0.29	0.06	52.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2036 AM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue															
1	L2	All MCs	11	0.0	11	0.0	0.026	5.6	LOS A	0.1	0.6	0.12	0.56	0.12	48.3
3	R2	All MCs	23	0.0	23	0.0	0.026	5.7	LOS A	0.1	0.6	0.12	0.56	0.12	31.7
Approach			34	0.0	34	0.0	0.026	5.7	LOS A	0.1	0.6	0.12	0.56	0.12	40.8
East: Chairlift Avenue															
4	L2	All MCs	6	0.0	6	0.0	0.017	2.7	LOS A	0.0	0.0	0.00	0.11	0.00	43.6
5	T1	All MCs	26	4.0	26	4.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	58.9
Approach			33	3.2	33	3.2	0.017	0.5	NA	0.0	0.0	0.00	0.11	0.00	57.6
West: Chairlift Avenue															
11	T1	All MCs	40	0.0	40	0.0	0.025	0.0	LOS A	0.0	0.3	0.04	0.10	0.04	58.0
12	R2	All MCs	7	0.0	7	0.0	0.025	5.5	LOS A	0.0	0.3	0.04	0.10	0.04	53.9
Approach			47	0.0	47	0.0	0.025	0.9	NA	0.0	0.3	0.04	0.10	0.04	57.2
All Vehicles			114	0.9	114	0.9	0.026	2.2	NA	0.1	0.6	0.05	0.24	0.05	53.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2036 PM BG (Site Folder: Background)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue															
1	L2	All MCs	5	0.0	5	0.0	0.012	5.6	LOS A	0.0	0.3	0.12	0.56	0.12	48.2
3	R2	All MCs	11	0.0	11	0.0	0.012	5.7	LOS A	0.0	0.3	0.12	0.56	0.12	31.6
Approach			16	0.0	16	0.0	0.012	5.7	LOS A	0.0	0.3	0.12	0.56	0.12	41.2
East: Chairlift Avenue															
4	L2	All MCs	15	0.0	15	0.0	0.024	2.7	LOS A	0.0	0.0	0.00	0.18	0.00	42.4
5	T1	All MCs	31	4.0	31	4.0	0.024	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	58.2
Approach			45	2.7	45	2.7	0.024	0.9	NA	0.0	0.0	0.00	0.18	0.00	55.7
West: Chairlift Avenue															
11	T1	All MCs	24	0.0	24	0.0	0.027	0.1	LOS A	0.1	0.8	0.11	0.30	0.11	54.2
12	R2	All MCs	24	0.0	24	0.0	0.027	5.6	LOS A	0.1	0.8	0.11	0.30	0.11	51.0
Approach			48	0.0	48	0.0	0.027	2.8	NA	0.1	0.8	0.11	0.30	0.11	52.5
All Vehicles			109	1.1	109	1.1	0.027	2.4	NA	0.1	0.8	0.07	0.29	0.07	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2026AM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue															
1	L2	All MCs	16	0.0	16	0.0	0.040	5.6	LOS A	0.1	1.0	0.12	0.56	0.12	48.3
3	R2	All MCs	37	0.0	37	0.0	0.040	5.7	LOS A	0.1	1.0	0.12	0.56	0.12	31.6
Approach			53	0.0	53	0.0	0.040	5.7	LOS A	0.1	1.0	0.12	0.56	0.12	40.6
East: Chairlift Avenue															
4	L2	All MCs	11	0.0	11	0.0	0.018	2.7	LOS A	0.0	0.0	0.00	0.17	0.00	42.6
5	T1	All MCs	24	4.0	24	4.0	0.018	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	58.4
Approach			35	2.8	35	2.8	0.018	0.8	NA	0.0	0.0	0.00	0.17	0.00	56.1
West: Chairlift Avenue															
11	T1	All MCs	36	0.0	36	0.0	0.026	0.0	LOS A	0.1	0.5	0.06	0.16	0.06	56.8
12	R2	All MCs	13	0.0	13	0.0	0.026	5.5	LOS A	0.1	0.5	0.06	0.16	0.06	53.0
Approach			48	0.0	48	0.0	0.026	1.5	NA	0.1	0.5	0.06	0.16	0.06	55.6
All Vehicles			136	0.7	136	0.7	0.040	2.9	NA	0.1	1.0	0.07	0.32	0.07	50.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2026PM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue															
1	L2	All MCs	8	0.0	8	0.0	0.018	5.6	LOS A	0.1	0.4	0.12	0.56	0.12	48.3
3	R2	All MCs	15	0.0	15	0.0	0.018	5.7	LOS A	0.1	0.4	0.12	0.56	0.12	31.6
Approach			23	0.0	23	0.0	0.018	5.7	LOS A	0.1	0.4	0.12	0.56	0.12	41.7
East: Chairlift Avenue															
4	L2	All MCs	21	0.0	21	0.0	0.026	2.7	LOS A	0.0	0.0	0.00	0.24	0.00	41.4
5	T1	All MCs	27	4.0	27	4.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	57.7
Approach			48	2.3	48	2.3	0.026	1.2	NA	0.0	0.0	0.00	0.24	0.00	53.9
West: Chairlift Avenue															
11	T1	All MCs	22	0.0	22	0.0	0.031	0.1	LOS A	0.1	1.0	0.12	0.35	0.12	53.2
12	R2	All MCs	34	0.0	34	0.0	0.031	5.6	LOS A	0.1	1.0	0.12	0.35	0.12	50.3
Approach			56	0.0	56	0.0	0.031	3.4	NA	0.1	1.0	0.12	0.35	0.12	51.3
All Vehicles			127	0.9	127	0.9	0.031	3.0	NA	0.1	1.0	0.08	0.35	0.08	50.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2036AM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue															
1	L2	All MCs	17	0.0	17	0.0	0.043	5.6	LOS A	0.1	1.0	0.12	0.56	0.12	48.3
3	R2	All MCs	39	0.0	39	0.0	0.043	5.7	LOS A	0.1	1.0	0.12	0.56	0.12	31.6
Approach			56	0.0	56	0.0	0.043	5.7	LOS A	0.1	1.0	0.12	0.56	0.12	40.6
East: Chairlift Avenue															
4	L2	All MCs	11	0.0	11	0.0	0.020	2.7	LOS A	0.0	0.0	0.00	0.16	0.00	42.7
5	T1	All MCs	26	4.0	26	4.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.4
Approach			37	2.9	37	2.9	0.020	0.8	NA	0.0	0.0	0.00	0.16	0.00	56.3
West: Chairlift Avenue															
11	T1	All MCs	40	0.0	40	0.0	0.028	0.0	LOS A	0.1	0.5	0.06	0.15	0.06	57.0
12	R2	All MCs	13	0.0	13	0.0	0.028	5.5	LOS A	0.1	0.5	0.06	0.15	0.06	53.1
Approach			53	0.0	53	0.0	0.028	1.3	NA	0.1	0.5	0.06	0.15	0.06	55.9
All Vehicles			145	0.7	145	0.7	0.043	2.9	NA	0.1	1.0	0.07	0.31	0.07	50.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 2 [2036PM DES (Site Folder: DESIGN)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

P6870
122 Marine Parade, Miami
Chairlift Avenue / Fraser Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Fraser Avenue															
1	L2	All MCs	8	0.0	8	0.0	0.019	5.6	LOS A	0.1	0.4	0.13	0.56	0.13	48.2
3	R2	All MCs	16	0.0	16	0.0	0.019	5.8	LOS A	0.1	0.4	0.13	0.56	0.13	31.6
Approach			24	0.0	24	0.0	0.019	5.7	LOS A	0.1	0.4	0.13	0.56	0.13	41.4
East: Chairlift Avenue															
4	L2	All MCs	22	0.0	22	0.0	0.028	2.7	LOS A	0.0	0.0	0.00	0.23	0.00	41.5
5	T1	All MCs	31	4.0	31	4.0	0.028	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	57.8
Approach			53	2.3	53	2.3	0.028	1.1	NA	0.0	0.0	0.00	0.23	0.00	54.1
West: Chairlift Avenue															
11	T1	All MCs	24	0.0	24	0.0	0.034	0.1	LOS A	0.1	1.0	0.13	0.35	0.13	53.3
12	R2	All MCs	36	0.0	36	0.0	0.034	5.6	LOS A	0.1	1.0	0.13	0.35	0.13	50.3
Approach			60	0.0	60	0.0	0.034	3.4	NA	0.1	1.0	0.13	0.35	0.13	51.4
All Vehicles			137	0.9	137	0.9	0.034	2.9	NA	0.1	1.0	0.08	0.34	0.08	50.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Gold Coast
Suite 26, 58 Riverwalk Avenue
Robina QLD 4226
P: (07) 5562 5377

Brisbane
Level 2, 428 Upper Edward Street
Spring Hill QLD 4000
P: (07) 3831 4442

Sydney
Studio 203, 3 Gladstone Street
Newtown NSW 2042
P: (02) 9557 6202

BITZIOS consulting
traffic engineering ■ transport planning

W: www.bitziosconsulting.com.au
E: admin@bitziosconsulting.com.au



ATTACHMENT 8

Site Based Stormwater Management Plan
prepared by Arcadis



ARCADIS

SITE BASED STORMWATER MANAGEMENT PLAN

122 MARINE PARADE, MIAMI

MONACO PROPERTY GROUP PTY LTD

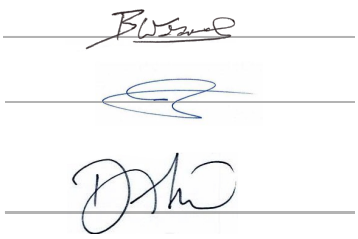


IMPROVING QUALITY OF **LIFE**

122 MARINE PARADE, MIAMI

SITE BASED STORMWATER MANAGEMENT PLAN

Author	Ben Wieser
Checker	James Stockwell
Approver	Darlan Castro RPEQ19918



Project No	30264961-3
Report No	GA0002
Revision	01
Date	24/04/2025

This report has been prepared for Monaco Property Group Pty Ltd in accordance with the terms and conditions of appointment. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Revision	Date	Description
01	24/04/2025	Issue for Approval

Should you require any further information, please contact our Gold Coast office and ask to speak to the report author denoted above.

Reception – Gold Coast: +61 (0) 7 5503 4800

Copyright © 2015 Arcadis. All rights reserved. arcadis.com

CONTENTS

1 EXECUTIVE SUMMARY 3
2 SITE CHARACTERISTICS 4
2.1 Location Details 4
2.2 Land Usage 4
2.3 Topography and Features 4
3 PROPOSED DEVELOPMENT 5
4 STORMWATER MANAGEMENT OBJECTIVES 6
5 LAWFUL POINT OF DISCHARGE AND DRAINAGE 7
5.1 Existing Stormwater Drainage 7
5.2 Proposed Drainage Characteristics and LPOD Test 9
5.3 External Catchment Conveyance 10
6 STORMWATER QUANTITY 11
6.1 Objective 11
6.2 Methodology and Assessment 11
6.3 Objective Discussion 13
7 STORMWATER QUALITY (OPERATION) 14
7.1 Objectives 14
7.2 Proposed Stormwater Treatment Devices 14
7.3 Modelling 14
8 STORMWATER QUALITY (CONSTRUCTION) 17
8.1 Water Quality Objectives 17
8.2 Erosion and Sediment Control Plan Purpose 18
8.3 Specific Activities 18
8.4 Project Personnel Responsibilities 19
8.5 Monitoring and Responsibility 20
8.6 Construction Phase Sediment Control Devices 21
9 ASSET MAINTENANCE AND HANDOVER 22
10 CONCLUSION 23

APPENDICES

APPENDIX A

Survey

APPENDIX B

Engineering Drawings

APPENDIX C

Existing Catchment Areas

APPENDIX D

Developed Catchment Areas

APPENDIX E

SQIDEP Approvals

APPENDIX F

Healthy Waters Code

GLOSSARY OF TERMS

Australia Rainfall and Runoff (ARR) 2019 recommends adaptation of new terminology relating to storm events summarised in Table A below. As recommended, this report documents data with respect to AEP (%).

The following definitions should be noted:

- EY = Number of exceedances per year.
- AEP = Annual Exceedance Probability.
- AEP (1 in x) = 1/AEP.
- ARI = Average Recurrence Interval (years).

The below table should be refereed to for a comparison of storm events.

Table A – Storm Events Terminology

EY	AEP (%)	AEP (1 in ….)	ARI
1	63.21	1.58	1
0.69	50	2	1.44
0.5	39.35	2.54	2
0.22	20	5	4.48
0.2	18.13	5.52	5
0.11	10	10	9.49
0.05	5	20	20
0.02	2	50	50
0.01	1	100	100

ASSOCIATED MODELLING FILES

For internal reference, the following modelling file packages are associated with this report.

- 30264961-3-EDA0001-01 - DRAINS
- 30264961-3-EDB0001-01 - MUSIC

1 EXECUTIVE SUMMARY

Monaco Property Group Pty Ltd has commissioned Arcadis to prepare a Site Based Stormwater Management Plan (SBSMP) for a development application for the site located over the following allotment(s):

- Lot 122 on SP284713 (122 Marine Parade, Miami).

The proposed development intended for the site involves the construction of a residential apartment building.

This report demonstrates the proposed development will be constructed and operated in accordance with the Water Sensitive Urban Design (WSUD) Requirements of Council, the South-East Queensland State Planning Policy (SPP), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM), Australian Rainfall and Runoff (2019) and the Environmental Protection (Water) Policy (2009). The primary objectives of this Site Based Stormwater Management Plan (SBSMP) are achieved as follows:

Lawful Point of Discharge (LPoD)

The site proposes to maintain the existing LPoD being Marine Parade. The site proposes to discharge stormwater to Marine Parade after receiving appropriate treatment on site.

The conveyance of potential external flows to Marine Parade is to be maintained or improved.

Stormwater Quantity

This report includes a hydrological assessment using DRAINS software for the quantity of stormwater discharging from the site in the pre-development (existing) and post-development (developed) scenarios. This assessment estimates that the stormwater discharging from the proposed development is generally consistent with the flows discharging from the existing site. Accordingly, no on-site stormwater detention is applied.

Stormwater Quality

A stormwater quality assessment is provided which demonstrates that a specially tailored treatment system will be required in order to meet the pollutant removal targets of City of Gold Coast (CoGC) during the operational phase of the proposed development. An Ocean Protect treatment system is proposed.

All the stormwater quality controls detailed in this document are contained within the development site and will remain a private asset of the property owner. Regular maintenance of the treatment devices must be undertaken to ensure the continuing performance of the stormwater quality treatment train.

Waterway Stability

The development is proposing to discharge into a hard lined kerb, pit and piped stream and therefore waterway stability is not applicable.

Erosion and Sediment Control

Construction phase sediment control devices are to be implemented during construction works in accordance with requirements associated with Type 3 sediment discharge zones, comprising of a vehicle shakedown, sediment fences and gully inlet protection.

2 SITE CHARACTERISTICS

2.1 Location Details

The subject site is located within Miami, South-East Queensland, Australia over the following allotment(s):

- Lot 122 on SP284713 (122 Marine Parade, Miami).

The site is bordered by Fraser Avenue, as well as residential, open space properties to the north, Marine Parade to the east, Lions Head Park (open space) to the west, and Nagal Avenue, as well as residential properties to the south.

The total area of the site is approximately 7,284m^2.

The City of Gold Coast is the local government authority.

2.2 Land Usage

In its current state, the project site contains a residential apartment building with associated driveways, entries, parking and planting areas. Figure 2-1 below provides a current locality plan of the site.



Figure 2-1 Site Locality Plan (Aerial Imagery Courtesy of Nearmap)

2.3 Topography and Features

The site topography grades towards Marine Parade, east of the site. The site has a high point of approximately RL 4.65m AHD and a low point of RL 3.86m AHD. Refer to the site survey within Appendix A of this report for further information.

3 PROPOSED DEVELOPMENT

The proposed development involves the construction of a residential apartment building, including:

- Residential apartments.
- Residential amenities.
- 1 level of basement parking.

A plan extract of the proposed development has been provided in Figure 3-1.

A full set of Architectural plans are provided within the development application package and should be referred to for further information.

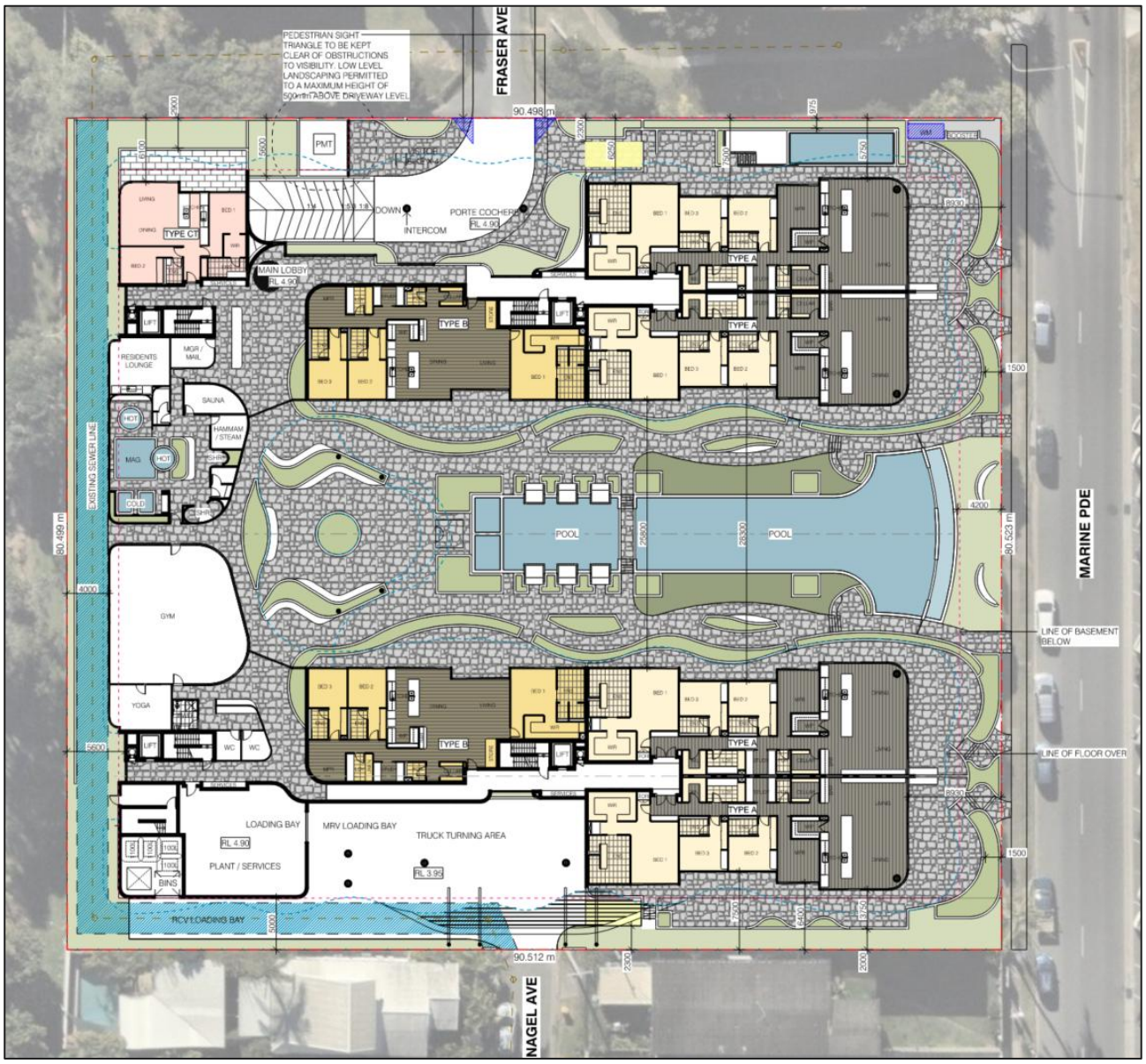


Figure 3-1 Proposed Development Ground Floor

4 STORMWATER MANAGEMENT OBJECTIVES

In accordance with QUDM and the City Plan Healthy Waters code, the following stormwater management components have been investigated.

- Lawful point of discharge (LPOD) | Section 5 of this report.
- Stormwater Quantity, including waterway stability where applicable | Section 5 & 6 of this report.
- Stormwater Quality Operational Phase | Refer to Section 7 of this report.
- Stormwater Quality Construction Phase | Refer to Section 8 of this report.

The Healthy Waters Code has been completed as part of this development application package as a stand-alone document and is also included in Appendix F of this report.

5 LAWFUL POINT OF DISCHARGE AND DRAINAGE

5.1 Existing Stormwater Drainage

Stormwater runoff generated by the site is discharged to Marine Parade via connections to underground drainage and overland flow. Local runoff in Marine Parade, including runoff from the subject site, ultimately arrives in a sag ~20m south of the subject site before discharging via pipe to Miami Beach. The pipe sizes within this network range from DN300 to DN1300.

The following existing stormwater drainage and catchments have been identified adjacent to the development site from both CoGC ArcGIS mapping (online) and 1m DTM, field survey (Appendix A) and site inspection.

1. Fraser Avenue grades south towards the subject site, however, municipal drainage at the cul-de-sac adjacent the site is shown to drain north (backgrading) per Council's online mapping. There is potential for runoff (in excess of Council's drainage system capacity) to spill into the subject site for a short distance before being directed into an existing inlet pit within Lot 3 on WD810476 and out to Marine Parade.
2. Nagal Avenue grades north towards the subject site, however, municipal drainage at the site interface is shown to drain south (backgrading) per Council's online mapping. There is potential for runoff (in excess of Council's drainage system capacity) to spill into the subject site before spilling eastbound to Marine Parade. Based on site inspection, it was determined that water would also pass through the southern adjoining private property Lot 5 on RP46948 due to the existing site topography.
3. A small portion of Lions Head Park to the west grades to the southwest corner of the site before it drains into the site's private infrastructure and out to Marine Parade.

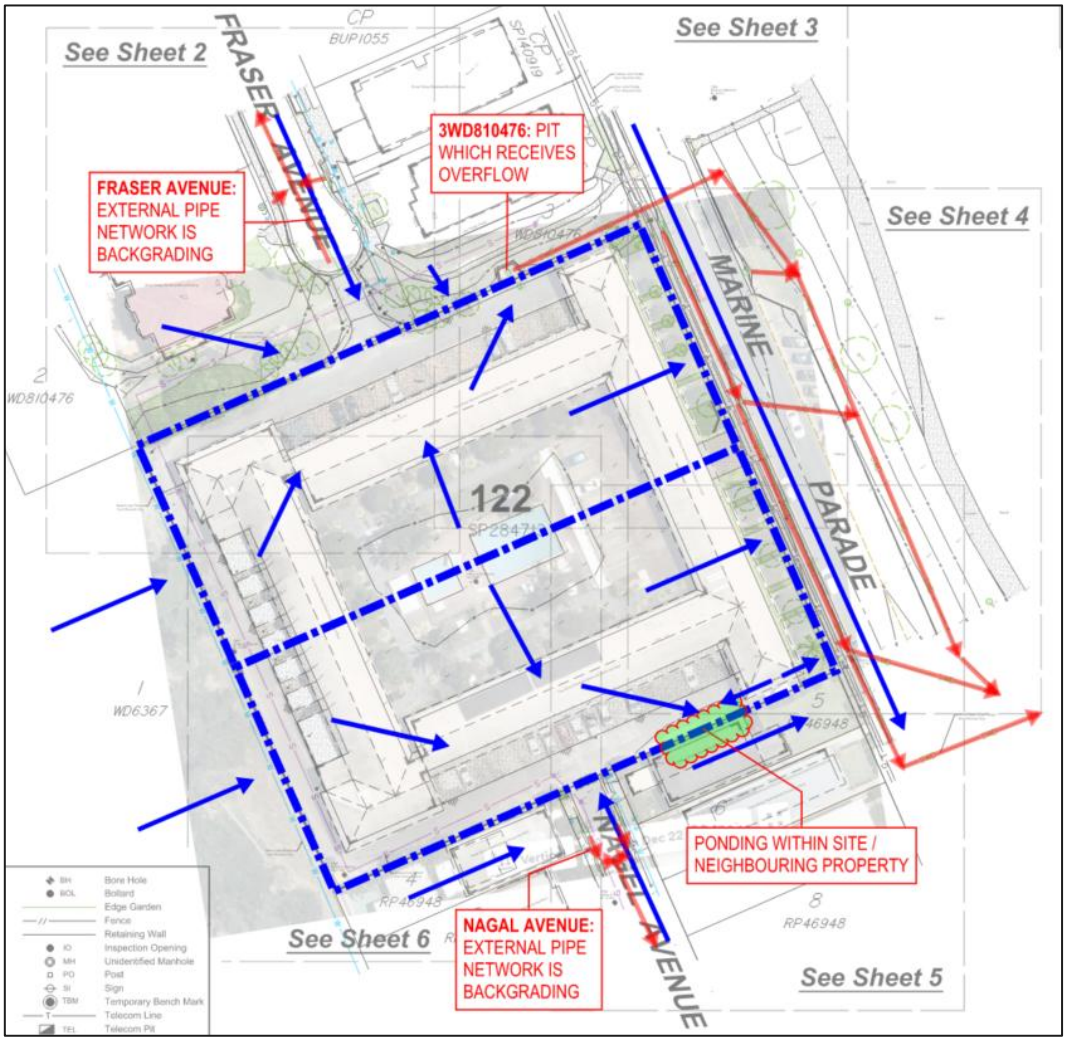


Figure 5-1 General Site Flows

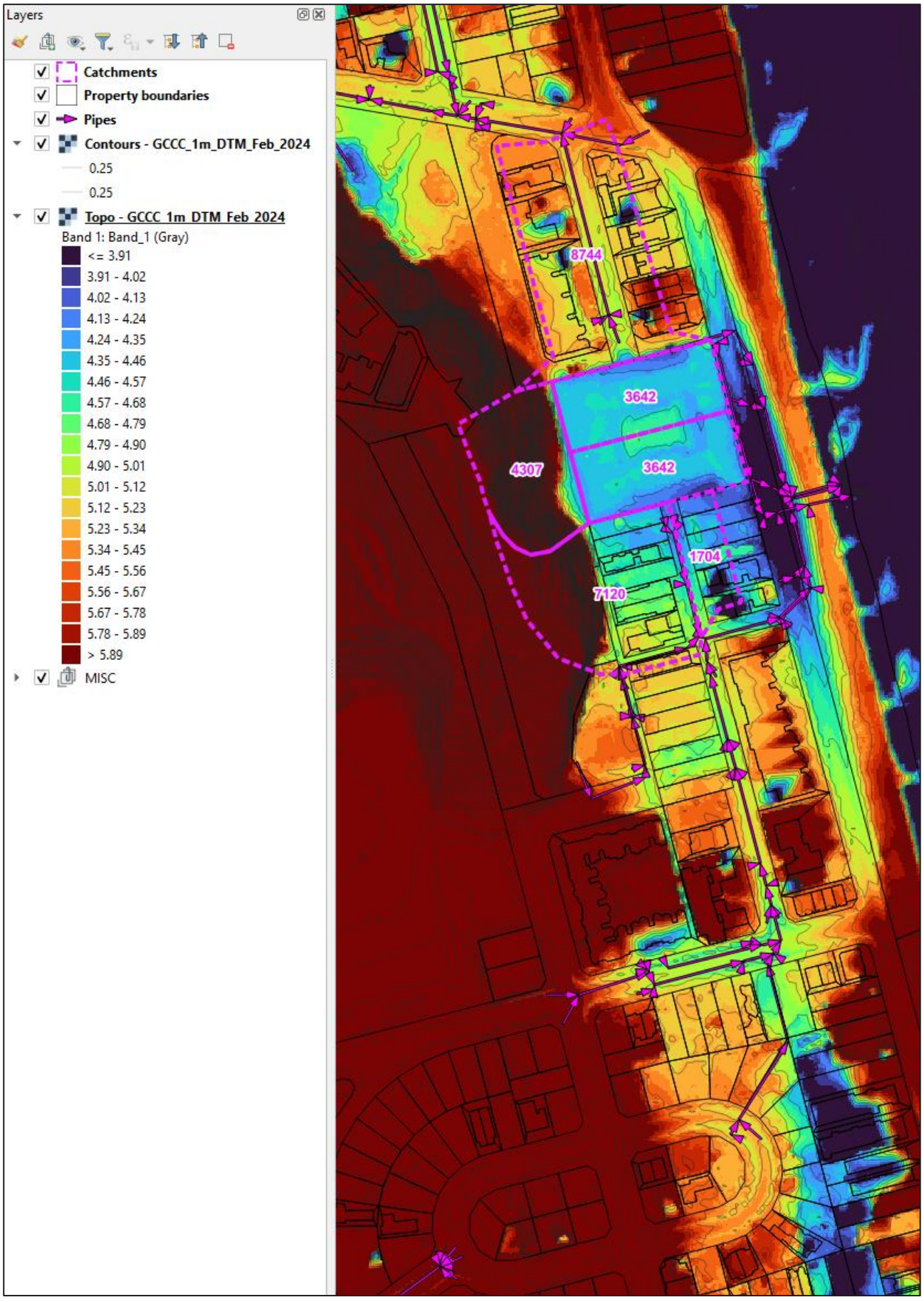


Figure 5-2 External Stormwater Catchments (Overland) and Local Pipe Network

5.2 Proposed Drainage Characteristics and LPOD Test

In the developed case, the site demonstrates compliance with the QUDM as follows:

The location of the discharge is under the lawful control of the local government or other statutory authority from whom permission to discharge has been received. This will include park, drainage or road reserve, stormwater drainage easement.

The proposed development will manage stormwater via the use of private infrastructure to achieve Council's objectives. The site will maintain its discharge location being Marine Parade via connection to underground drainage and overland flow.

Provision for conveyance of runoff from the abovementioned sources, including potential spill areas, to Marine Parade has been made. The adopted strategy is to maintain or improve conveyance of runoff to municipal infrastructure, creating an improvement to existing conditions for the site, Council land and adjacent properties.

Drainage within the subject site will remain private.

At a minimum, 4EY flows from the site catchment areas are to be directed to the stormwater quality treatment system as documented in Section 7 of this report. It should be noted that the design and documentation of private drainage will be addressed by a building hydraulic engineer during the detailed design for Building Approval phase to achieve the objectives of this report.

It is noted that no pumped discharge directed to the kerb is proposed.

Figure 5-3 below illustrates the proposed drainage philosophy for the site, which is adopted for the purposes of detailed calculations in subsequent reporting sections. Further details can be found on Engineering Drawings in Appendix B.

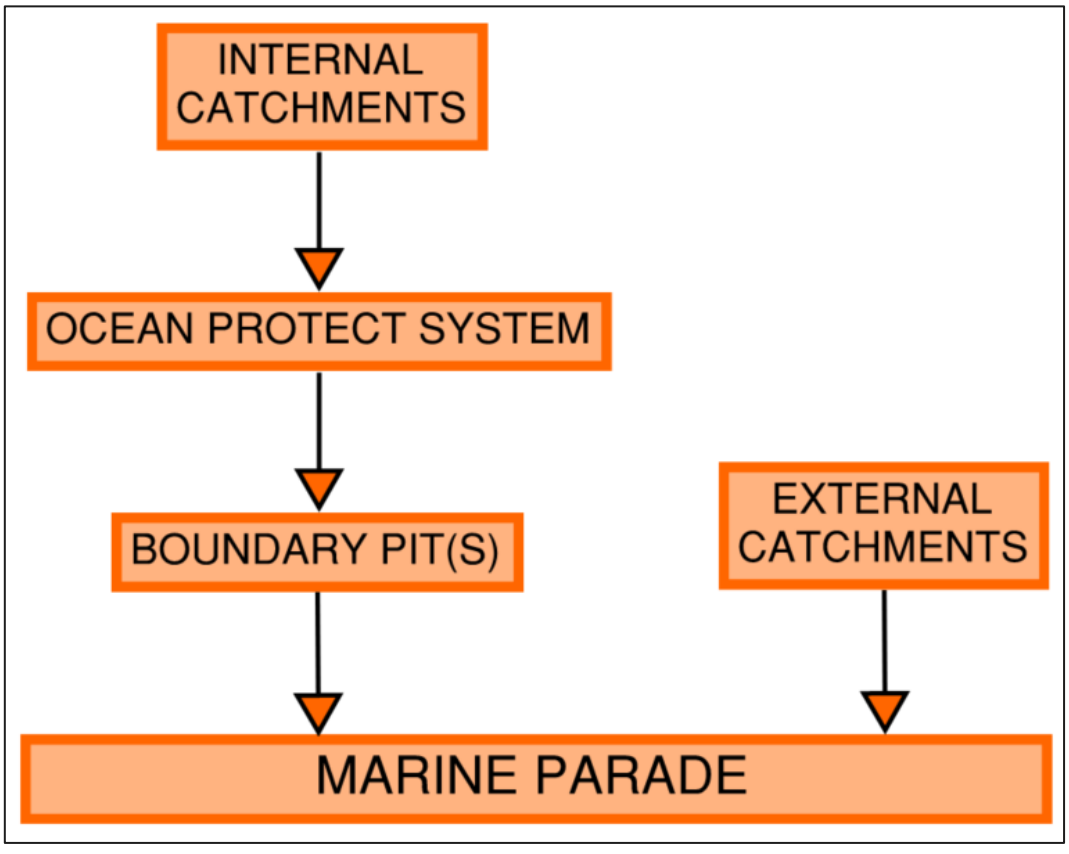


Figure 5-3 Drainage Schematic

That in discharging in that location, the discharge will not cause an actionable nuisance. In general terms this implies no worsening as a result of discharge.

Sections 6, 7 and 8 of this report provide detailed calculations and discussions illustrating no actionable nuisance anticipated.

5.3 External Catchment Conveyance

With reference to the existing drainage identified in Section 5.1, the following is proposed:

1. **Fraser Avenue (flows in excess of Council drainage)** – minor reshaping of Council's open space (Lot 3 on WD810476) is proposed to enable a free-flowing relief flow path to Marine Parade. The development site's Fraser Avenue frontage is proposed to be lifted to meet the new level in the open space area to ensure any overflow from Council's drainage is directed to the relief flow path and drainage infrastructure within Council's land. The existing steep batters and retaining walls within the open space are proposed to be removed, benefitting the area.
2. **Nagal Avenue (flows in excess of Council drainage)** – an at-grade landscaping area is proposed to enable a free-flowing overland flow path, for any potential runoff to Marine Parade. This is achieved by a 2m wide area free from structures, as well as cantilevered flooring for the outdoor areas up to the edge of the basement walls, totalling minimum 3m width.
   - Preliminary calculations estimate a peak flow of 1.16 m^3/s in the 1% AEP and 0.771 m^3/s in the 10% AEP events from the site catchment and 3x southern external catchments identified in Figure 5-2.

     On the basis the minor design 10% AEP at minimum is captured via pit and pipe, this results in a difference of 0.389 m^3/s potentially entering the site.

     Manning's calculations for a 3m wide relief flow path with a 0.15% grade (based on existing levels at the Nagal Avenue interface and southwest side boundary), and assuming a manning's roughness coefficient of 0.05 for landscaped surfaces, indicate this flow can be conveyed at a depth of 0.375m and velocity of 0.35 m/s (resulting in a depth velocity product of 0.13 m^2/s).

     This arrangement does not consider over performance of the external drainage network, or capacity of the internal network, however demonstrates an improvement of the current situation and potential impacts if runoff enters the site in rare weather events.
3. **Lions Head Park (overland flow)** – Private drainage is proposed to capture nuisance overland flow from Lions Head Park to the west. These flows are to bypass the internal quality treatment system and discharge to Marine Parade. The same at-grade landscaping buffer as mentioned above provides provision for overland flow to Marine Parade.

The Engineering Drawings provided within Appendix B of this report should be referred to for further details for the proposed external catchment conveyance.

6 STORMWATER QUANTITY

6.1 Objective

Stormwater discharge from the development must be detained to pre-development flow rates for the median storm event up to and including the 1% AEP ("no-worsening"). The hydrological assessment undertaken measures the site flow rates up to and including the 1% AEP event for both the pre- and post-development scenarios.

6.2 Methodology and Assessment

The hydrological assessment presented in this report has been undertaken in accordance with the methodology documented in the Australia Rainfall & Runoff 2019. This methodology incorporates an ensemble approach (i.e., 10 temporal distribution per storm duration) and uses the design rainfall inputs sourced from the AR&R (2016) data hub.

For the site catchment identified as having an increase in peak flow rates when developed, a hydrologic model was created using DRAINS. The median storm event was determined via an investigation of multiple storm distributions for durations ranging from 10mins to 3hours.

It should be understood that the median results of each ensemble have been extracted to determine peak flows for the assessed catchments, as is standard practice.

6.2.1 Catchment Locality

In accordance with CoGC's City Plan SC6.12.4.4.3 & ARR2019, Rainfall Intensities Frequency Duration data were obtained from The Bureau of Meteorology (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016). The Latitude and Longitude used for the site is summarised in Table 6-1 below.

Table 6-1 Site Latitude and Longitude

Parameter	Value
Latitude	-28.0622
Longitude	153.4419

6.2.2 Catchment Summary

The site was assessed under three cases:

- **Existing Scenario** – The site in its existing state.
- **Developed Scenario** – The site in its developed state per the proposal.

It should be noted that:

- Catchments are represented using the ILSAX hydrological model to represent urbanised catchment conditions per ARR 2019 recommendations.
- Catchment areas only consider deep planting to be pervious. All other planter beds are considered impervious, but with the same depression storage (i.e. no infiltration losses for non-deep planting areas).

The following catchment details in Table 6-2 were determined from the site survey within Appendix A and the architectural plans, which can be found within the full development application package.

Catchment markups have been provided in Appendix C and D for existing and developed scenarios respectively.

Table 6-2 Modelling Catchment Details

Scenario	Catchment Name	Area (ha)	Impervious Fraction (%)	Time of Concentration (min)
Existing	EX_N	0.3642	83	5,7
	EX_S	0.3642	84	5,7
Developed	DEV_N (Impervious & Deep Planting)*	0.3162	90	5,7
	DEV_N_PLANTER (Planter Beds)*	0.0480	100*	5,7
	DEV_S (Impervious & Deep Planting)*	0.3296	89	5,7
	DEV_S_PLANTER (Planter Beds)*	0.0346	100*	5,7

**Detailed assessment for the mitigated scenario (eg. NORTH = DEV_N + DEV_N_PLANTER). Planter beds have been modelled as a separate node with 5mm initial loss as an impervious area (to remove infiltration losses).*

6.2.3 DRAINS Model Setup

An image of the DRAINS model setup has been provided below for ease of reference.

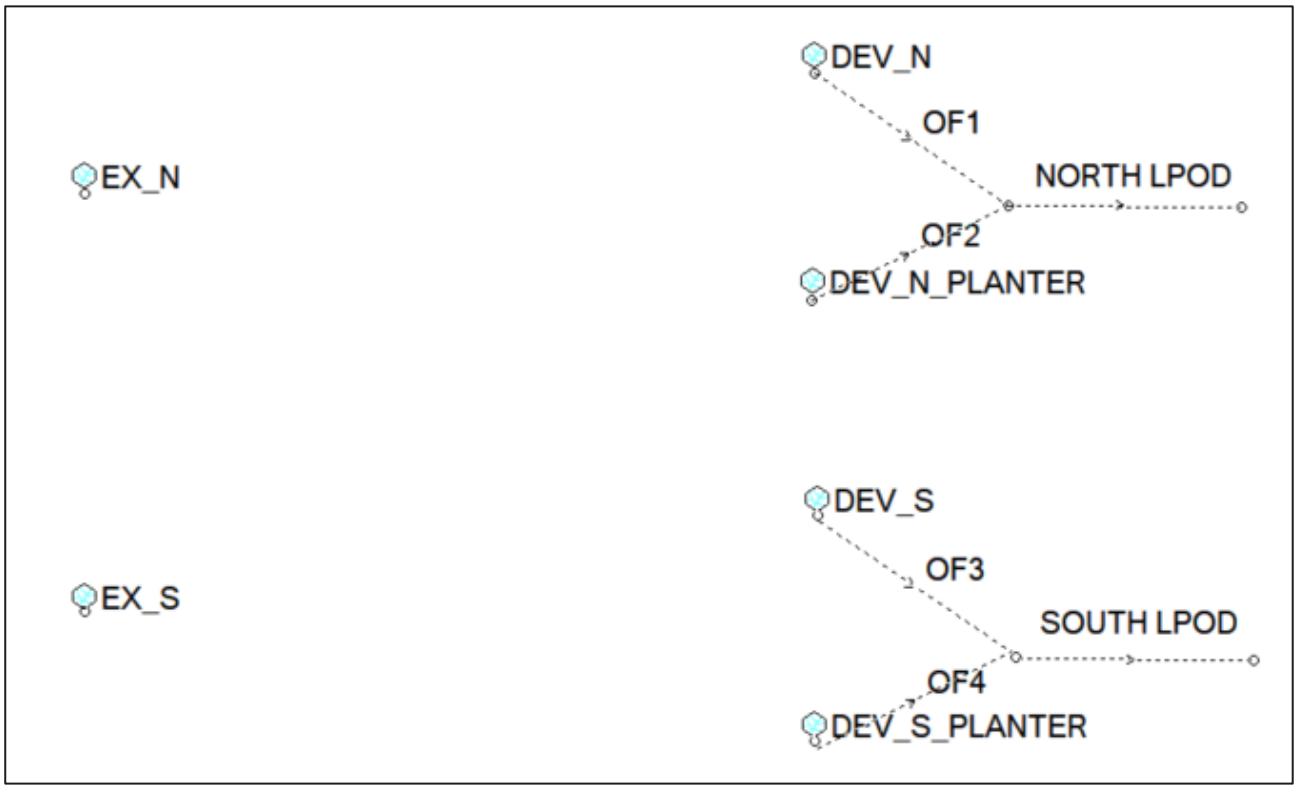


Figure 6-1 DRAINS Model Setup (Existing and Developed Scenarios, Left to Right)

6.2.4 Model Results

The following results have been captured from the DRAINS model. Table 6-3 below summarises the peak flow rates for each identified critical storm across the assessed AEP range at the assessment point for the catchment.

Table 6-3 Summary of DRAINS Hydrologic Results

LPOD	Scenario	AEP (%)	50	20	10	5	2	1
North	Existing	Median Flow (m^3/s)	0.107	0.149	0.184	0.211	0.245	0.271
	Developed	Median Flow (m^3/s)	0.110	0.151	0.187	0.214	0.248	0.274
South	Existing	Median Flow (m^3/s)	0.108	0.150	0.184	0.212	0.245	0.271
	Developed	Median Flow (m^3/s)	0.109	0.152	0.187	0.214	0.247	0.274

6.3 Objective Discussion

The above hydrologic investigation has demonstrated that there is no significant increase in median discharge flow rates being directed off-site to existing infrastructure for 50% AEP events to 1% AEP events in accordance with QUDM and ARR2019.

7 STORMWATER QUALITY (OPERATION)

7.1 Objectives

The following operational water quality objectives are set out by Council:

- Gross Pollutants (>5mm) – 90% reduction in mean annual load.
- Total Suspended Solids (TSS) – 80% reduction in mean annual load.
- Total Phosphorous (TP) – 60% reduction in mean annual load.
- Total Nitrogen (TN) – 45% reduction in mean annual load.

7.2 Proposed Stormwater Treatment Devices

WSUD aims to minimise the impact of a development on the natural water cycle by reducing the export of pollutants, sediments and nutrients from the site into the natural watercourse. To treat the stormwater runoff from the site, various treatment devices can be used throughout the development area and these concepts can be integrated into the overall design of the road layouts, road cross sections, stormwater layouts and water supply reticulation systems. Stormwater from each development stage will follow a specially designed stormwater quality treatment train prior to discharge from the site, which will ensure compliance with the water quality objectives.

A treatment train has been proposed for the site which comprises of several individually designed treatment devices that collectively contribute to the achievement of whole site water quality objectives. It should be noted that pools and transformers have been excluded from the quality treatment areas.

7.3 Modelling

Modelling of the site was undertaken using the 'Model for Urban Stormwater Improvement Conceptualisation (MUSIC)' as promoted by CoGC and the South East Queensland Healthy Waterways Partnership. The development was modelled using the split catchment approach. An appropriate type of land use was applied to all surface types within the developed catchments; where individual treatment devices were assigned the relevant modelling treatment parameters. Consequently, a treatment train was established for each site, ensuring that water discharging from site adheres to the specified Water Quality Objectives.

Meteorological data for input into MUSIC was obtained from Elanora Rainfall Station 40609 from the Bureau of Meteorology. Six-minute time step rainfall data was obtained for the climate period from 1/1/1989 to 31/12/1998. The catchment parameters of the MUSIC modelling are specified within the Water by Design MUSIC Modelling Guidelines Version 3 (2018) and have been modelled as such.

7.3.1 Pollutant Source Node Details

The pollutant source node parameters input into the MUSIC model were determined using the Water by Design MUSIC Modelling Guidelines Version 3 (2018), specifically Tables 3.7 and 3.8 for urban residential surface types. It is noted that all base flow parameters for roof surfaces are adopted as 0.00 or N/A.

Approximate landscape imperviousness was considered for ground areas to ensure an accurate generation of pollutants.

A summary of the source these nodes have been provided in Table 7-1 below. The developed catchment markup provided in Appendix D informed the modelled catchment areas.

Table 7-1 Summary of Source Node Details

LPOD	MUSIC Source Node	Area (ha)*	Imperviousness (%)
North	Roof	0.043	100
	Road	0.005	100
	Ground	0.316	75
South	Roof	0.049	100
	Road	0.018	100
	Ground	0.297	76

7.3.2 Treatment Device Details – Ocean Protect

An Ocean Protect treatment system has been designed specifically to ensure that the site meets the stormwater quality requirements. This treatment system includes a NPSorb StormFilter cartridge system. These are Stormwater Quality Improvement Device Evaluation Protocol (SQIDEP) approved products by Stormwater Australia. Copies of the SQIDEP certification for all proposed devices has been provided in Appendix D of this report.

Once the site is fully developed, the stormwater run-off from sub-catchments will be collected via a private drainage system and directed to the relevant areas per Figure 5-3.

Details of the location and conceptual design of the proposed treatment devices are presented in the Engineering Drawings in Appendix B of this report, which should be referred to for further design information. It is critical to understand that the design provided as part of this report is conceptual in nature, and that further coordination will be required with other consultants and the proprietor during detailed design, prior to construction.

Table 7-2 Ocean Protect Design Parameters

LPOD	Tall (690mm) NPSorb StormFilter Cartridges
North	x12
South	x12

7.3.3 Model Layout and Results

A diagrammatical view and pollutant reduction results can be found in Figure 7-1 below.

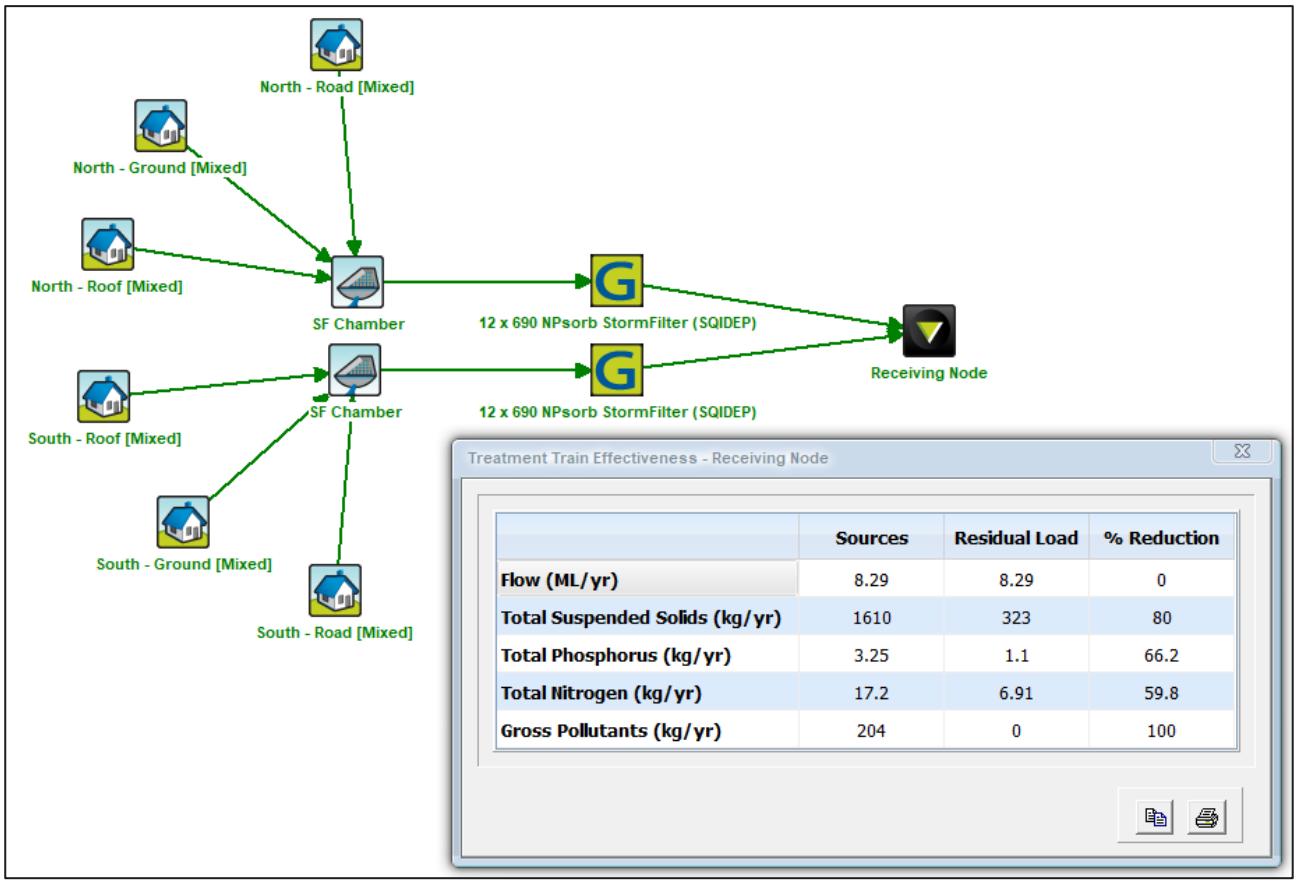


Figure 7-1 MUSIC Model Layout and Results

7.3.4 Hydraulic Performance

A general check for Hydraulic Grade Line (HGL, head) in the downstream pipe systems has been made to verify the performance of the proposed underground treatment systems.

1. **North Ocean Protect System** – The contributing flows to the connection location (450mm pipe) in a 4EY (Q3 month) event is only nuisance runoff the adjacent Council Park areas, totalling less than 0.1ha at ~10% imperviousness (approx. 2 L/s in a 4EY event). No significant tailwater conditions are foreseen for this connection location.
2. **South Ocean Protect System**
    a. **Pipe within the site** – The contributing flows to the connection location (600mm pipe) in a 4EY (Q3 month) event consist of runoff from the Lions Head Park to the west. This area totals approximately 0.431ha at ~60% impervious (approx. 46 L/s in a 4EY event). Based on a Mannings calculation for a 600mm pipe at 1% grade, the pipe would have approximately 111mm depth of water (RL 2.56 at the connection location). The Ocean Protect system invert is at RL 2.50 therefore will operate in the target treatment event per manufacturers requirements.
    b. **Gully pit connection** – The contributing flows to the connection location (750mm pipe) in a 4EY (Q3 month) event consist of runoff from the southern portion of the site, Lions Head Park to the west, some properties to the north and a portion of Marine Parade. This area totals approximately 1.3ha at ~80% impervious (approx. 143 L/s in a 4EY event). Based on a Mannings calculation for a 750mm pipe at 1% grade, the pipe would have approximately 182mm depth of water (RL 2.03 at the connection location). The Ocean Protect system invert is at RL 2.50 therefore will operate in the target treatment event per manufacturers requirements.

8 STORMWATER QUALITY (CONSTRUCTION)

8.1 Water Quality Objectives

Table 8-1 Construction Phase Quality Objectives (SPP and CoGC LDG)

Pollutant	Criteria
Drainage Control	Design life and design storm of temporary drainage works: • Disturbed area open for <12 months—1 in 2 ARI. • Disturbed area open for 12-24 months—1 in 5 ARI. • Disturbed area open for > 24 months—1 in 10 ARI.
Erosion Control	• Minimise exposure of disturbed soils at any time. • Avoid or minimise large construction activities in the wet season. • Divert water run-off from undisturbed areas around disturbed areas. • Use erosion risk ratings to determine appropriate erosion control measures.
Sediment Control	Use soil loss rates to determine appropriate sediment control measures Design storm for sediment control basins should be based on retaining the maximum sediment quantity for the maximum volume of water run-off Site discharge during sediment basin dewatering should not exceed 50 mg/L TSS and pH between 6.5–8.5
Stormwater Drainage / Flow Management	Hydraulics and hydrology—Take all reasonable and practicable measures to minimise significant changes to the natural waterway hydraulics and hydrology from: • peak flow for the one-year and 100-year ARI event (respectively for aquatic ecosystems and flood protection). • run-off frequency and volumes entering receiving waters. • Uncontrolled release of contaminated stormwater.
Water Quality Outcomes	Stormwater flows from undisturbed and disturbed areas—manage to help protect environmental values Coarse sediment—coarse sediment is retained on site Fine sediment—Site discharge during sediment basin dewatering has a TSS concentration less than 50 mg/L Turbidity—Site discharge during sediment basin dewatering has a turbidity (NTU) less than 10% above receiving waters turbidity— measured immediately upstream of the site Nutrients (N & P)—Nitrogen and phosphorus are managed through sediment control. pH—Site discharge during sediment basin dewatering has a pH range 6.5–8.5 Litter and other waste—Prevent litter/waste entering the site, the stormwater system or watercourses that discharge from the site. Also minimise or sufficiently contain on-site litter and waste production and regularly clear waste bins Hydrocarbons and other contaminants—Hydrocarbons and other contaminants are prevented from entering the stormwater system or internal watercourses that discharge from the site. Wash down water—Wash down water is prevented from entering the stormwater system or internal watercourses that discharge from the site Cations and anions—Cations and anions including aluminium, iron and Sulfate are managed as required under an approved acid Sulfate soil management plan

Table 8-1 provides the construction phase stormwater quality objectives outline by the State Planning Policy. Additional relevant acts, policies and information that may be useful for construction phase planning include:

- Environmental Protection Act (1994).
- Environmental Protection (Water) Policy (2009).
- Queensland Development Code, Sediment and Erosion Control (2010).
- Best Practice Erosion and Sediment Control for Building and Construction Sites Guidelines (2008).

8.2 Erosion and Sediment Control Plan Purpose

During the construction phase it shall be the Principal Contractor's responsibility to ensure the objectives of Table 8-1 are achieved.

The following section of this report provides a suggested framework for an Erosion and Sediment Control Plan. This includes recommended actions and responses for specific activities; monitoring and reporting; and construction of specifically designed site-specific sediment basins.

8.3 Specific Activities

8.3.1 Erosion and Sediment Control of Disturbed Land

During the construction phase it shall be the Principal Contractor's responsibility to ensure the following:

- Diversion of any clean water runoff that may interfere with land disturbance by the use of earth bunds, or other control devices deemed appropriate by a suitable supervisor.
- Reduction of sediment migration from disturbed land parcels by implementing silt fences, sediment basins or other control devices as deemed appropriate by a suitable supervisor.
- Where cut to fill operations produce a spoil it is recommended that the excess material be placed upstream of the excavation location to ensure any sediment runoff is directed back into the trench. Earth bunds or sediment fences may be required to control direction of sediment flow should the spoil be placed on the downstream side of the excavation site.
- Control measures such as a gully pit sediment barrier shall be installed around inlet pits where required reducing the potential for sediment discharge into the surrounding stormwater system.
- Any sediment deposited from construction vehicles will be swept up and removed.
- Erosion and sediment control devices may only be removed once disturbed lands which they are protecting are rehabilitated and capable of resisting further erosion.

8.3.2 Spoil and Stockpile Management

It shall be the Principal Contractor's responsibility to oversee the following controls during the construction phase unless otherwise specified:

- The placement of spoil and stockpile material shall be kept at a maximum distance from stormwater inlets, gutters and stormwater pipes to reduce unnecessary sediment migration into nearby infrastructure.
- Spoil and stockpile material shall be placed in a way that reduces the likelihood of sedimentation, erosion and slippage. Advice from an appropriate project manager/representative shall be sought in this instance.
- Spoil or stockpile material that is deemed a contaminant shall be placed on a designated zone of either fill material, plastic or concrete with the installation of appropriate containment devices. Advice from an appropriate project manager/representative shall be sought in this instance as the resulting control will be highly dependent on the severity of contamination.
- It shall be the Project Manager's responsibility to foresee and develop appropriate control measures to prevent the impacts of spoil and stockpile material prior to construction activities. Monitoring and reporting shall also be required during the implementation of any given device associated with spoil and stockpile management.

8.3.3 Erosion Control

It shall be the Principal Contractor's responsibility to oversee the following controls during the construction phase:

- Traffic of any type shall be kept away from areas of rehabilitation to promote stabilisation of the zone.
- Where wind and water are acknowledged as potential erosion sources temporary protection shall be installed. Such measures only apply to zones of spoil, stockpile and land disturbance which are unlikely to receive works within a period of 6-8 weeks. Further advice from an appropriate project manager/representative shall be sought in this instance as the resulting control will be highly dependent on the disturbance type and erosion source.
- Once viable, final landscaping shall be undertaken on applicable zones to increase stability.

8.3.4 Personnel Training

It shall be the Principal Contractor's responsibility to oversee the following training protocols during the construction phase:

- Environmental management and incident reporting is to be included on all site induction courses.
- All personnel are to receive adequate training in workplace health and safety issues, environmental management, best practice erosion and sediment control practices, incident reporting procedures and where applicable site inspection and maintenance procedures.

8.3.5 Miscellaneous

It is the Principal Contractor's responsibility to ensure erosion and sediment controls are operated and maintained in an effective operational condition. These structures are not allowed to accumulate sediment volume in excess of 70% sediment storage design capacity as per Section 6 of the Urban Stormwater Quality Planning Guidelines 2010.

- Sediment removed from control measures must be disposed of in a manner approved by the local Council that does not cause pollution and forms part of the Contractor's obligation.
- Any chemicals, fuel or oil stored on site shall be stored under cover in a bounded area or placed sufficiently above ground level to prevent contamination of surface water.
- A waste concrete receptor (disposal area) must be established if significant concreting is to occur on site. The site must be surrounded by perimeter bunds and be clearly signed.
- A general waste collection area shall be established which is to include appropriate pollutant runoff controls, dependent on the nature of the waste.

8.4 Project Personnel Responsibilities

A description of the key personnel involved with implementing the Erosion and Sediment Control Plan are listed in Table 8-2. It is recommended that all parties involved attend a pre-construction conference to discuss and clarify all issues associated with sediment and erosion control as well as this plan.

Table 8-2 Project Personnel Responsibilities

Project Role	Responsibilities
Superintendent	• Authorisation of this plan; and • Review and monitoring of this plan.
Contractor / Site Manager	• Implementation of this plan; • Monitoring of this plan; • Supervising any activities or requirements required by this plan; • Ensuring all personnel are aware of the contractual agreements associated with this plan.
All Personnel	• Ensuring they are aware of the contractual agreements associated with this plan; and • Informing appropriate personnel of any issues that may arise with respect to the desired sediment and erosion control measures.

8.5 Monitoring and Responsibility

8.5.1 All Personnel

It is the obligation of all personnel to report any failures in the erosion and sediment control works utilised during the project life cycle. Any identified errors within the sediment and erosion control system shall be reported in writing to a relevant project manager. A formal inquiry shall be undertaken in accordance with the reported issue as well as the relevant party procedures (i.e., Principal Contractor).

8.5.2 Contractor/Contractor's Foreman

It shall be the responsibility of the Contractor and Contractor's Foreman to monitor and report on the erosion and sediment control measures utilised in the construction phase. Inspections are to be undertaken:

- On a daily basis during earthworks, land disturbance, spoil or stockpile activities and rain events.
- Weekly during site inactivity.
- Within 24 hours prior to expected rainfall and 18 hours prior to intense rainfall events.

The following shall be inspected or reported on:

- Erosion and sediment control devices are in the correct location and are working as defined by this plan.
- Drainage systems both internal and external to the site are operating effectively or to pre-construction efficiencies.
- Spilled material is removed if it can potentially mobilise via stormwater runoff or wind.
- Stabilisation of disturbed land parcels has been undertaken in an effective manner.
- Excess sediment has been removed from erosion and sediment measures appropriately if the device is operation ineffectively or requires decommissioning.
- It is understood that repairs, maintenance or reinstallation may be required if any control measures are operating inadequately, or if infrastructure is damaged due to inefficient operation of the outlined measures.

8.5.3 Environmental Representative

It shall be the responsibility of the environment representative to periodically inspect and report on the effectiveness of the erosion and sediment controls during the construction phase of the project. Technical advice shall be given to personnel outlying any uncertainty with regards to the applicability, installation, operation, maintenance, removal or rehabilitation of any sediment and erosion control.

8.6 Construction Phase Sediment Control Devices

As the site has been assessed as a single catchment, it is appropriate to approach the assessment of construction phase sediment devices in a similar manner.

In accordance with the Best Practice Erosion and Sediment Control Manual (IECA 2009) the construction phase catchment has been classified to determine the level of sediment and erosion control techniques required. The site is identified as per Table 4.4.6 (IECA 2009) to be closest to the Southport locality and therefore attracts an average monthly rainfall depth of 56m to 205mm.

As the extent of soil disturbance is minimal, Type 3 techniques will be used in accordance with Table 4.5.3. This will require control techniques such as a vehicle shakedown at the site entry, and sediment fences. Specific detailed design plans will be formulated at respective future phases of the development such as operational works.

9 ASSET MAINTENANCE AND HANDOVER

All the stormwater quality controls detailed in this document are contained within the development site and will remain an asset of the development's property owner, Body Corporate or similar internal authority.

The below denotes the anticipated access location for the proposed treatment devices.

- **Ocean Protect cartridge systems:** Access from ground floor driveways.

Additional information including integration drawings and maintenance requirements can be found in Appendix B and on Ocean Protect's website respectively (https://oceanprotect.com.au/stormfilter/).

10 CONCLUSION

This SBSMP has been prepared to provide a design proposal and guide to the stormwater management techniques for the site.

The primary objectives of this report are achieved as follows:

Lawful Point of Discharge (LPoD)

- The site proposes to maintain the LPoD (Marine Parade) after receiving appropriate treatment on site.
- The conveyance of external flows to Marine Parade is to be maintained.

Stormwater Quantity

- The hydrological assessment undertaken has determined that the developed site peak flow rates are generally aligned with the peak existing flow rates.

Stormwater Quality

- An Ocean Protect system is proposed to meet operational phase stormwater quality objectives.

Erosion and Sediment Control

- Type 3 sediment discharge techniques will be used comprising of a vehicle shakedown, sediment fences and gully inlet protection.

APPENDIX A
Survey



Legend

CAG	Comms Above Ground	BH	Bore Hole
COMK	Comms Marker	BOL	Bollard
COMP	Comms Pit		Edge Garden
CUG	Comms Under Ground	//	Fence
SWD	Drainage Swug		Retaining Wall
	Drainage Centre Line	IO	Inspection Opening
SWMH	Stormwater MH	MH	Unidentified Manhole
SWGT	Stormwater Gully Trap	PO	Post
SWFI	Field Inlet Pit	SI	Sign
SWKA	Stormwater Kerb Adaptor	TBM	Temporary Bench Mark
UE	Power Line Under Ground	T	Telecom Line
	Power Line Above Ground	TEL	Telecom Pit
ELMK	Electrical Marker	TELBOX	Telecom Telbox
ELP	Electrical Pillar	TEM	Telecom Marker
ELPI	Electrical Pit	TP	Telecom Pole
GW	Guy Wire Anchor		Bottom of Bank
LAMP	Lamp Post		Top of Bank
LP	Light Pole		Change of Grade
PP #	Power Pole		Water Line
PPL	Power Pole with Light	TR 0306	Edge of Vegetation; Tree - 0.3m Dia Trunk & 6m Canopy Spread
PPLT	PP with Light & Transformer	W	Water Main
PPT	Power Pole with Transformer	HR	Fire Hose Reel
G	Gas Main	HY	Water Hydrant
GM	Gas Meter	SPR	Water Sprinkler
GV	Gas Valve	SV	Water Valve
	Road Crown	TAP	Water Tap
	Edge of Bitumen	WBE	Hydrant Booster
	Edge Track	WM	Water Meter
GP	Guide Post	WMK	Water Marker
	Guard Rail		Bitumen
	Road Kerb Invert		Concrete
S	Sewer Main		Dirt
SMH	Sewer Manhole		Garden
SMK	Sewer Marker		Gravel / Rock
SVE	Sewer Vent		Pavers
	Awning / Top of Gutter		Tiles
TOG RL	Top of Gutter		

Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale 1:750 @ A3

0 7.5 15 22.5m

1 : 750@A3 (Before Reduction)

Approved: DGB

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client

122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

Detail Survey Sheet 1 of 6

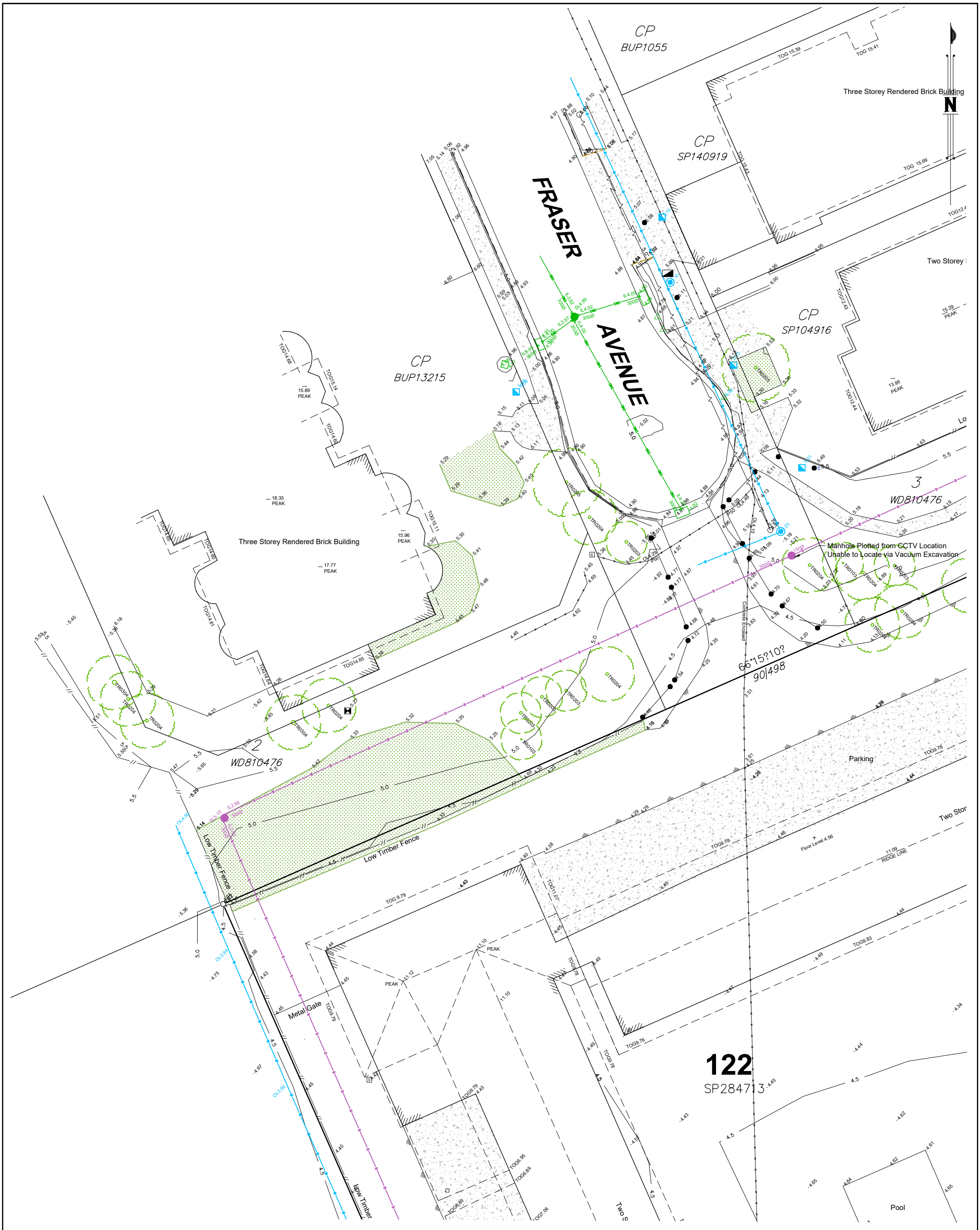
Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au

JENSEN BOWERS

Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Approved: DGB

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

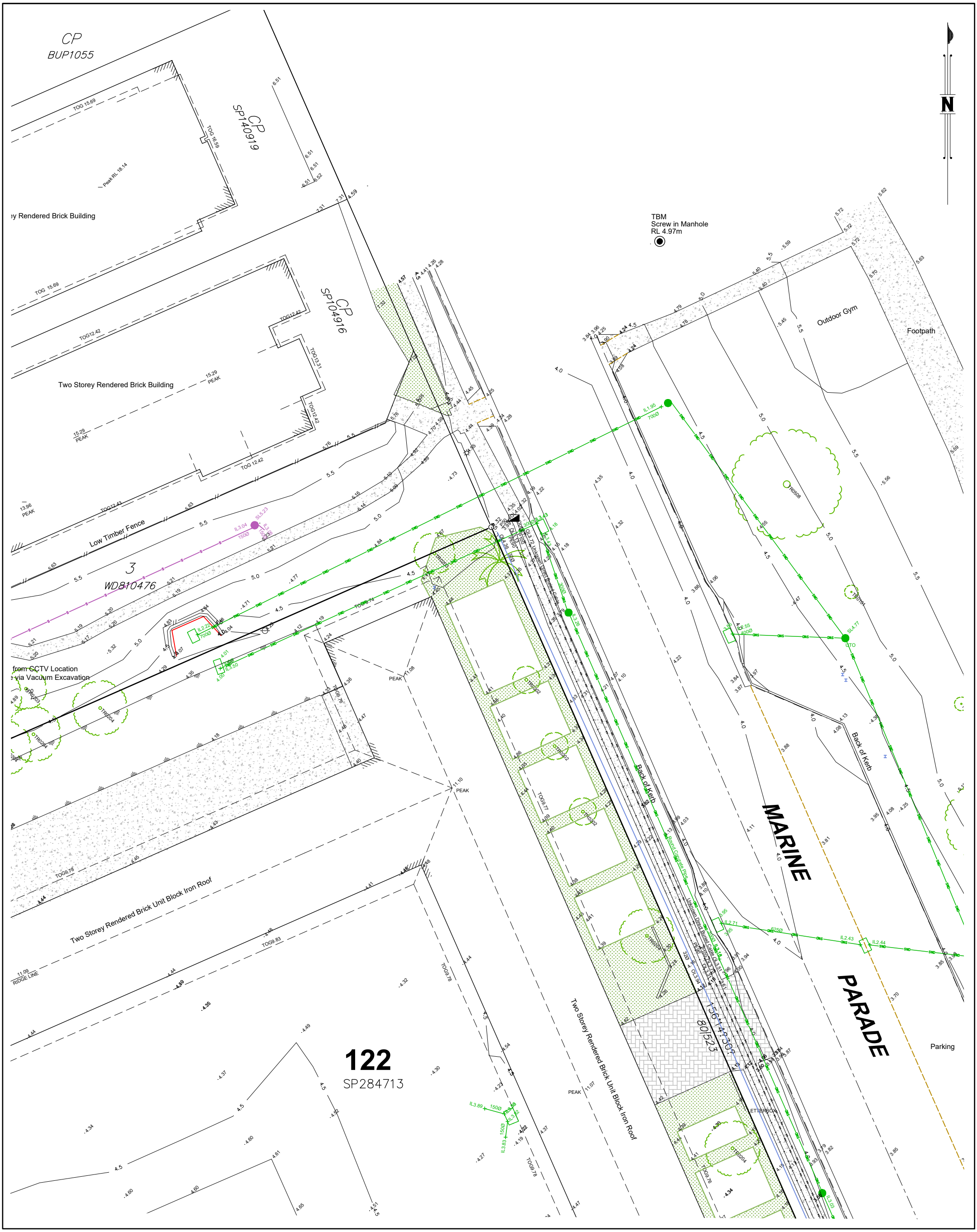
122 Marine Parade Miami

Detail Survey Sheet 2 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au
JENSEN BOWERS
Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 F (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

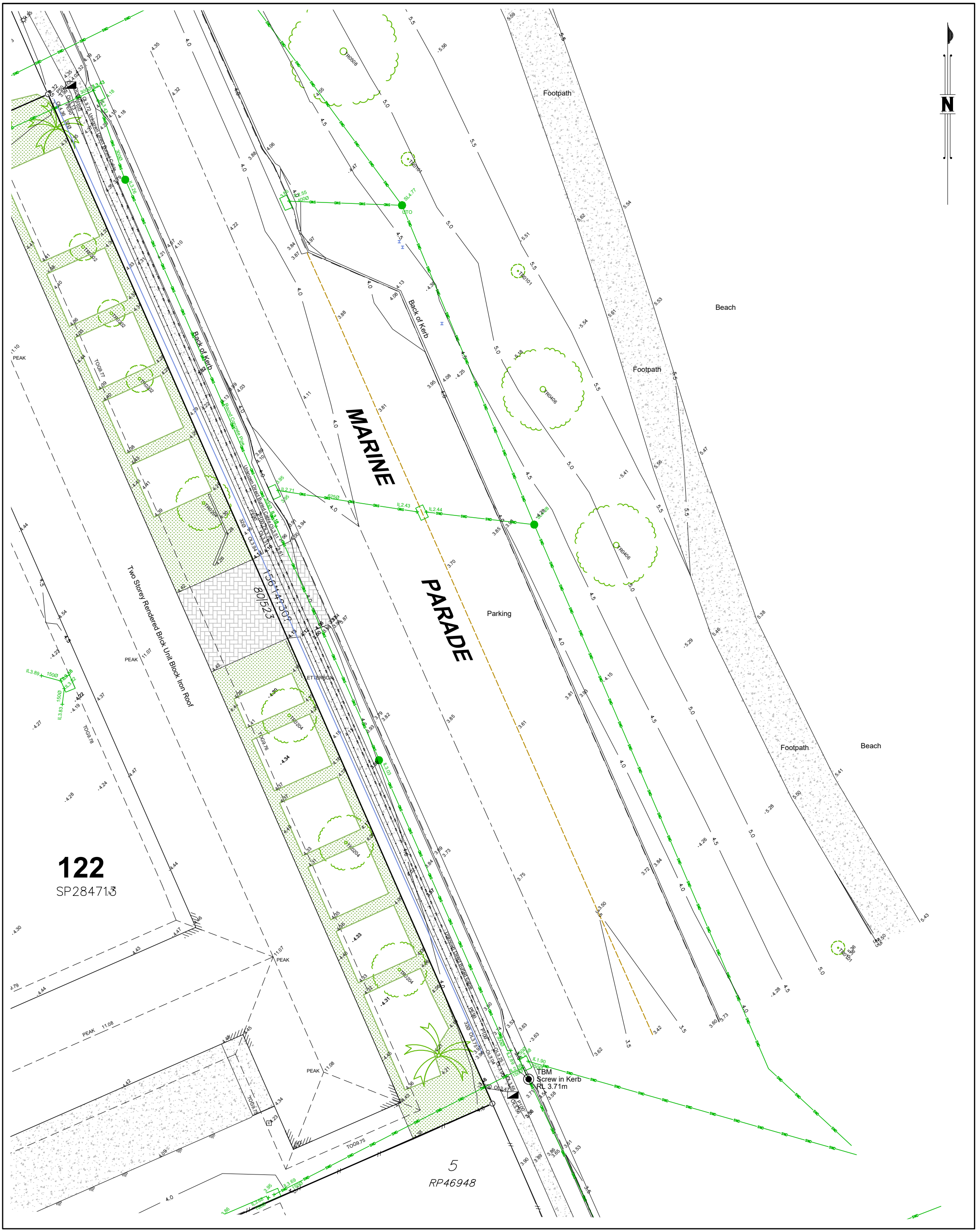
Detail Survey Sheet 3 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

JENSEN BOWERS
SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au

Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale

0 2.5 5 7.5m

1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client

122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

Detail Survey Sheet 4 of 6

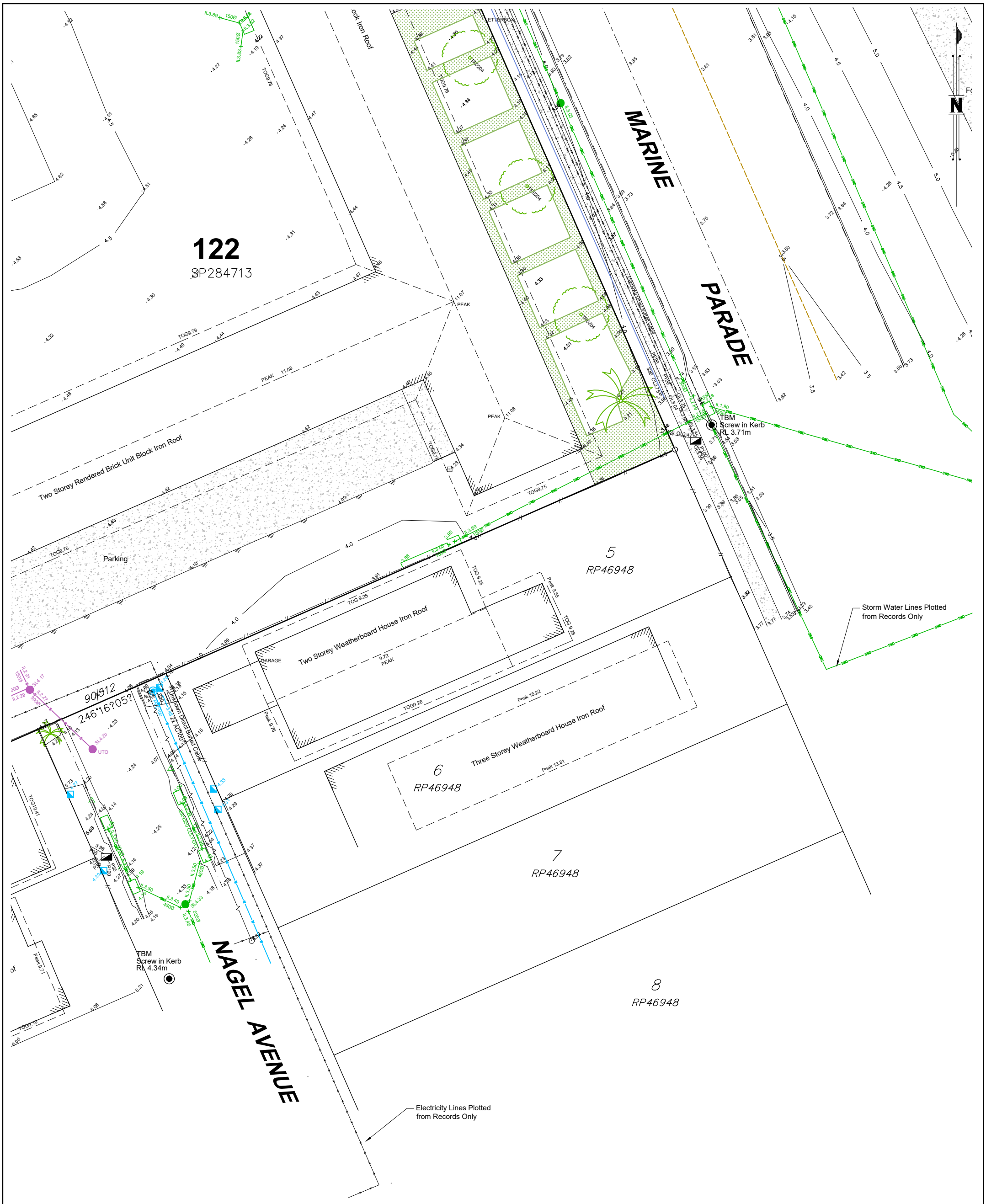
Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au

JENSEN BOWERS

Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

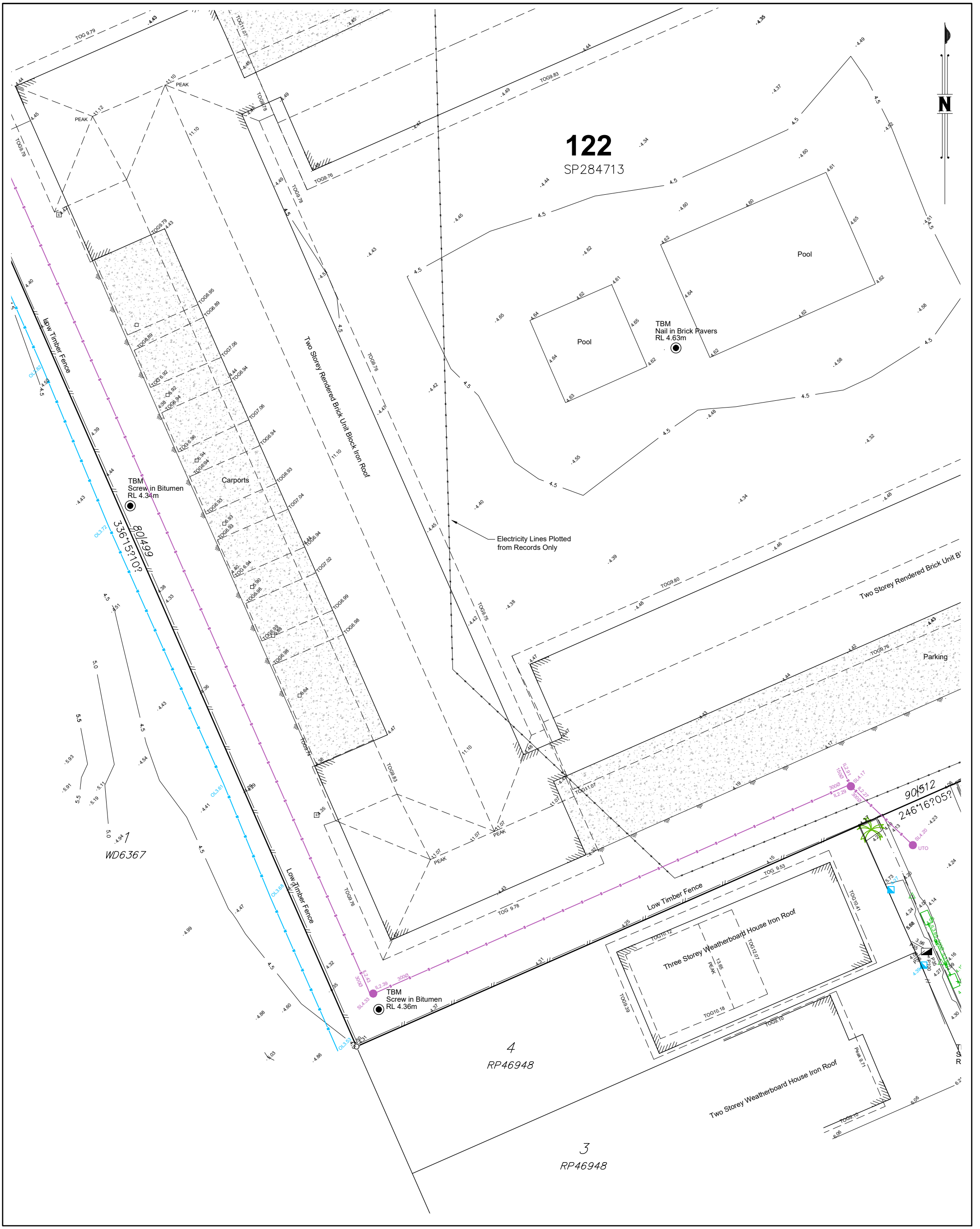
122 Marine Parade Miami

Detail Survey
Sheet 5 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au
JENSEN BOWERS
Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

Detail Survey
Sheet 6 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au
JENSEN BOWERS
Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607
©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd

APPENDIX B
Engineering Drawings

REFER INSET 01 (DRG 0003)

RESHAPING WORK WITHIN PARKS PROPERTY (LOT 3 ON WD810476) TO CONVEY OVERFLOW FROM COUNCIL DRAINAGE NETWORK AND REMOVE FALL RISK STRUCTURES AND STEEP BATTER SLOPES. REFER INSET (DRG 0003) FOR FURTHER DETAILS.

PROVIDE GRATE OVER OCEAN PROTECT SYSTEM AND GRADE SURFACE TO STREET TO ENABLE SURCHARGE (>10% AEP).

NORTH UNDERGROUND OCEAN PROTECT TANK, CONNECTED TO NEW DRAINAGE WITHIN LOT 2 AND 3 ON WD810476 (COUNCIL OPEN SPACE).

EXTERNAL CATCHMENT FROM LIONS HEAD PARK, REFER REPORT FOR FURTHER DETAILS.

EXT 1

PRIVATE INTERNAL DRAINAGE BY BUILDING HYDRAULICS.

AREA TO REMAIN AT GRADE WITH REAR BOUNDARY TO CAPTURE EXTERNAL FLOWS FROM COUNCIL RESERVE. LENGTH OF PIPE SHOWN IS PROVISIONAL.

SOUTH UNDERGROUND OCEAN PROTECT TANK, CONNECTED TO DRAINAGE WITHIN MARINE PARADE.

BOUNDARY PIT TO ENABLE SURCHARGE. SURFACE TO GRADE TO STREET FOR SURCHARGE (>10% AEP).

PRIVATE DRAINAGE SYSTEM TO CAPTURE EXTERNAL FLOWS FROM COUNCIL RESERVE. DN300 PIPE AT 1% GRADE TO CAPTURE 10% AEP, SUBJECT TO DETAILED DESIGN.

3m WIDE FLOW PATH RELIEF FOR FLOWS IN EXCESS OF COUNCIL DRAINAGE (NAGAL AVENUE). REMOVE HIGH POINT ADJACENT BOUNDARY TO LIMIT PONDING IN SITE AND NEIGHBOUR'S PROPERTY. REFER SECTION.

PRIVATE DN600 PIPE AT 1% GRADE TO CAPTURE 10% AEP, SUBJECT TO DETAILED DESIGN.

NOTES

1. PROPOSED SERVICES SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED FIELD SURVEY, DESIGN AND APPROVAL BY AUTHORITIES.
2. REFER TO PROJECT SURVEY AND OTHER ASSET INFORMATION FOR LOCATION EXISTING SERVICES AND ASSUMPTIONS.
3. INTERNAL DRAINAGE IS INDICATIVE AND SUBJECT TO BUILDING HYDRAULIC ENGINEER DESIGN.
4. REFER TO STORMWATER MANAGEMENT PLAN FOR MANAGEMENT DEVICE DETAILS AND SPECIFICATIONS.

LEGEND

- SITE BOUNDARY
- 4.25 EXISTING SURFACE LEVEL
- SWD EXISTING STORMWATER DRAINAGE
- S EXISTING SEWERAGE RETICULATION
- RM EXISTING SEWER RISING MAIN
- W EXISTING WATER RETICULATION
- c EXISTING COMMS RETICULATION
- e EXISTING ELECTRICAL
- oh EXISTING OVERHEAD ELECTRICAL
- fo EXISTING FIBRE OPTIC
- g EXISTING GAS
- SWD PROPOSED STORMWATER DRAINAGE
- S PROPOSED SEWERAGE RETICULATION
- W PROPOSED WATER RETICULATION
- FUTS FUTURE PRIVATE SEWER
- FUTSWD FUTURE PRIVATE STORMWATER
- FUTW FUTURE PRIVATE WATER
- SERVICE TO BE DECOMMISSIONED
- PROPOSED VXO / FOOTPATH
- 1/1 STORMWATER CATCHMENT AND LABEL
- DIRECTION OF FLOW
- INDICATIVE MAINTENANCE ACCESS
- PROPOSED STORMWATER SWALE
- TREATMENT DEVICE
- BYPASS AREA
- EDGE OF BASEMENT WALL

Issue	Description	DR	CH	VE	Date
01	ORIGINAL ISSUE	BW	JS	DC	24.04.25

Scales: 0 5 10 15 20 25m — 1 : 250

Architect: BDA ARCHITECTURE

Surveyor: JENSEN BOWERS

Client: MONACO PROPERTY GROUP PTY LTD

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

© Copyright reserved

Original Issue Signatures			
Drawn	B. WIESER	Original Size	A1
Designed	B. WIESER	Height Datum	AHD
Project Manager	J. STOCKWELL	Grid	LOCAL
Verified	D. CASTRO		

Project: 122 MARINE PARADE MIAMI

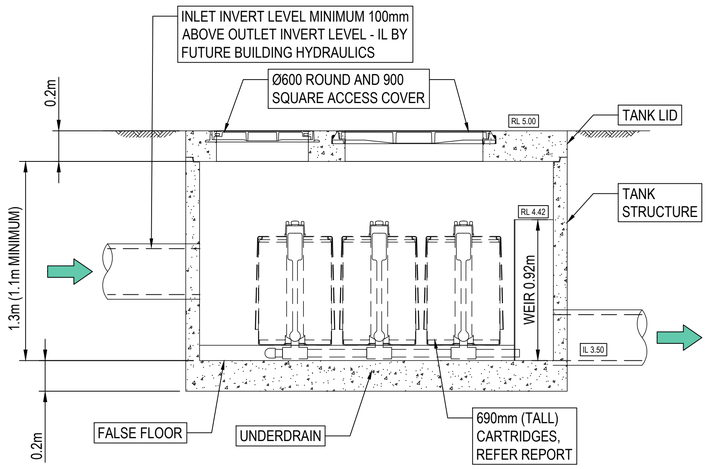
Title: STORMWATER MANAGEMENT LAYOUT PLAN

ARCADIS
Arcadis Australia Pacific Pty Limited
P O Box, 1653
Southport QLD 4215
ABN 76 104 485 289
Tel No: +61 7 5532 3933
Fax No: +61 7 5591 4778
www.arcadis.com

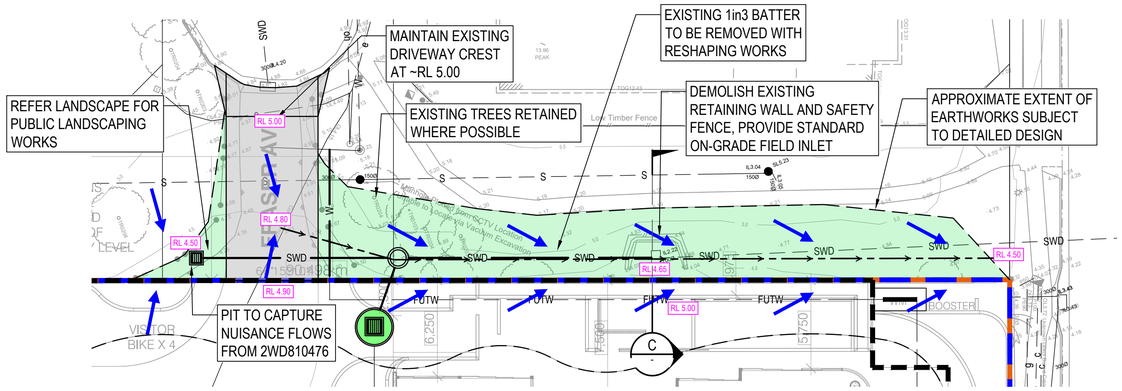
Project No.	Folder Prefix	Zone | Stage | Phase	Discipline	Type	Drawing No.	Issue
30264961-3	DA	- AA01DA -	CV	- DRG -	0002	- 01

100mm on Original

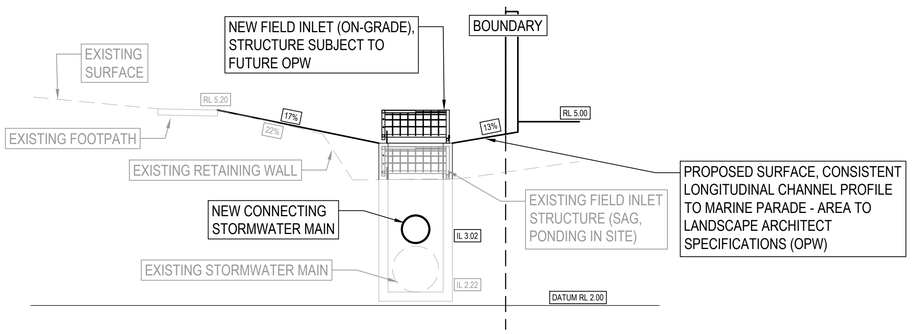
Date Plotted: 24 Apr 2025 - 09:38AM File Name: C:\Users\bw84462\ARCADIS\30264961 - UDR GC FY25 Projects 8 - Project\3 - 122 Marine Parade, Miami\D-DigEng\DA-DA Drawings\30264961-3 - Drawing Set.dwg V1



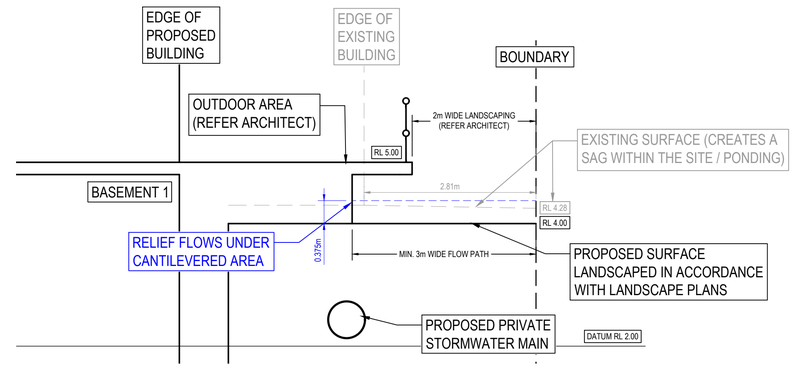
OCEAN PROTECT - NORTH A
1 : 20 0002



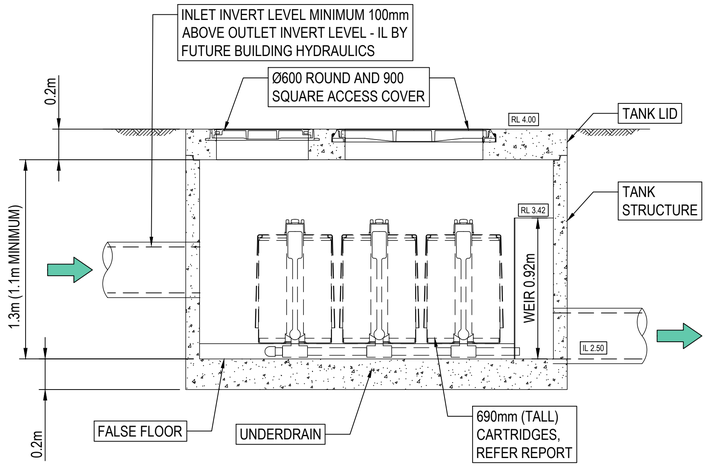
OPEN SPACE WORKS - INSET 01
1 : 200 0002



RESHAPING WORK - OPEN SPACE C
1 : 50 0002



NAGAL AVENUE FLOW RELIEF D
1 : 50 0002



OCEAN PROTECT - SOUTH B
1 : 20 0002

NOTES

1. PROPOSED SERVICES SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED FIELD SURVEY, DESIGN AND APPROVAL BY AUTHORITIES.
2. REFER TO PROJECT SURVEY AND OTHER ASSET INFORMATION FOR LOCATION EXISTING SERVICES AND ASSUMPTIONS.
3. INTERNAL DRAINAGE IS INDICATIVE AND SUBJECT TO BUILDING HYDRAULIC ENGINEER DESIGN.
4. REFER TO STORMWATER MANAGEMENT PLAN FOR MANAGEMENT DEVICE DETAILS AND SPECIFICATIONS.

LEGEND

- SITE BOUNDARY
- 4.25 — EXISTING SURFACE LEVEL
- SWD — EXISTING STORMWATER DRAINAGE
- S — EXISTING SEWERAGE RETICULATION
- RM — EXISTING SEWER RISING MAIN
- W — EXISTING WATER RETICULATION
- c — EXISTING COMMS RETICULATION
- e — EXISTING ELECTRICAL
- oh — EXISTING OVERHEAD ELECTRICAL
- fo — EXISTING FIBRE OPTIC
- g — EXISTING GAS
- SWD — PROPOSED STORMWATER DRAINAGE
- S — PROPOSED SEWERAGE RETICULATION
- W — PROPOSED WATER RETICULATION
- FUTS — FUTURE PRIVATE SEWER
- FUTSWD — FUTURE PRIVATE STORMWATER
- FUTW — FUTURE PRIVATE WATER
- SERVICE TO BE DECOMMISSIONED
- PROPOSED VXO / FOOTPATH
- 1/1 — STORMWATER CATCHMENT AND LABEL
- DIRECTION OF FLOW
- INDICATIVE MAINTENANCE ACCESS
- PROPOSED STORMWATER SWALE
- TREATMENT DEVICE
- BYPASS AREA
- EDGE OF BASEMENT WALL

Issue	Description	DR	CH	VE	Date
01	ORIGINAL ISSUE	BW	JS	DC	24.04.25

100mm on Original

Scales
0 0.5 1 1.5 2m — 1 : 20
0 0.5 1 2 3 4 5m — 1 : 50
0 5 10 15 20m — 1 : 200

Architect: BDA ARCHITECTURE
Surveyor: JENSEN BOWERS
Client: MONACO PROPERTY GROUP PTY LTD

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
© Copyright reserved
Original Issue Signatures

Drawn	B. WIESER	Original Size	A1
Designed	B. WIESER	Height Datum	AHD
Project Manager	J. STOCKWELL	Grid	LOCAL
Verified	D. CASTRO		

Project: 122 MARINE PARADE MIAMI
Title: STORMWATER MANAGEMENT DETAILS

ARCADIS
Arcadis Australia Pacific Pty Limited
P O Box, 1653
Southport QLD 4215
ABN 76 104 485 289
Tel No: +61 7 5532 3933
Fax No: +61 7 5591 4778
www.arcadis.com

Project No.	Folder Prefix	Zone | Stage | Phase	Discipline	Type	Drawing No.	Issue
30264961-3	DA	- AA01DA -	CV	- DRG -	0003	- 01

Date Plotted: 24 Apr 2025 - 09:38AM File Name: C:\Users\bw84462\ARCADIS\30264961 - UDR GC FY25 Projects 8 - Project\3 - 122 Marine Parade, Miami\D-DigEng\DA-DA Drawings\30264961-3 - Drawing Set.dwg V1

APPENDIX C
Existing Catchment Areas



Legend

CAG	Comms Above Ground	BH	Bore Hole
COMK	Comms Marker	BOL	Bollard
COMP	Comms Pit		Edge Garden
CUG	Comms Under Ground	//	Fence
SWD	Drainage Swug		Retaining Wall
	Drainage Centre Line	IO	Inspection Opening
SWMH	Stormwater MH	MH	Unidentified Manhole
SWGT	Stormwater Gully Trap	PO	Post
SWFI	Field Inlet Pit	SI	Sign
SWKA	Stormwater Kerb Adaptor	TBM	Temporary Bench Mark
UE	Power Line Under Ground	T	Telecom Line
	Power Line Above Ground	TEL	Telecom Pit
ELMK	Electrical Marker	TELBOX	Telecom Telbox
ELP	Electrical Pillar	TEM	Telecom Marker
ELPI	Electrical Pit	TP	Telecom Pole
GW	Guy Wire Anchor		Bottom of Bank
LAMP	Lamp Post		Top of Bank
LP	Light Pole		Change of Grade
PP #	Power Pole		Water Line
PPL	Power Pole with Light		Edge of Vegetation
PPLT	PP with Light & Transformer	TR 0306	Tree - 0.3m Dia Trunk & 6m Canopy Spread
PPT	Power Pole with Transformer	W	Water Main
G	Gas Main	HR	Fire Hose Reel
GM	Gas Meter	HY	Water Hydrant
GV	Gas Valve	SPR	Water Sprinkler
	Road Crown	SV	Water Valve
	Edge of Bitumen	TAP	Water Tap
	Edge Track	WBE	Hydrant Booster
GP	Guide Post	WM	Water Meter
	Guard Rail	WMK	Water Marker
	Road Kerb Invert		Bitumen
S	Sewer Main		Concrete
SMH	Sewer Manhole		Dirt
SMK	Sewer Marker		Garden
SVE	Sewer Vent		Gravel / Rock
	Awning / Top of Gutter		Pavers
TOG RL	Top of Gutter		Tiles

Drawn:	SS	Date:	05/12/2023
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2023

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale 1:750 @ A3
0 7.5 15 22.5m
1 : 750@A3 (Before Reduction)

Approved: DGB

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Issue	Description	Date	Appd.
A	Original Issue	05/02/23	DGB

Client
Monaco Property Group

122 Marine Parade Miami

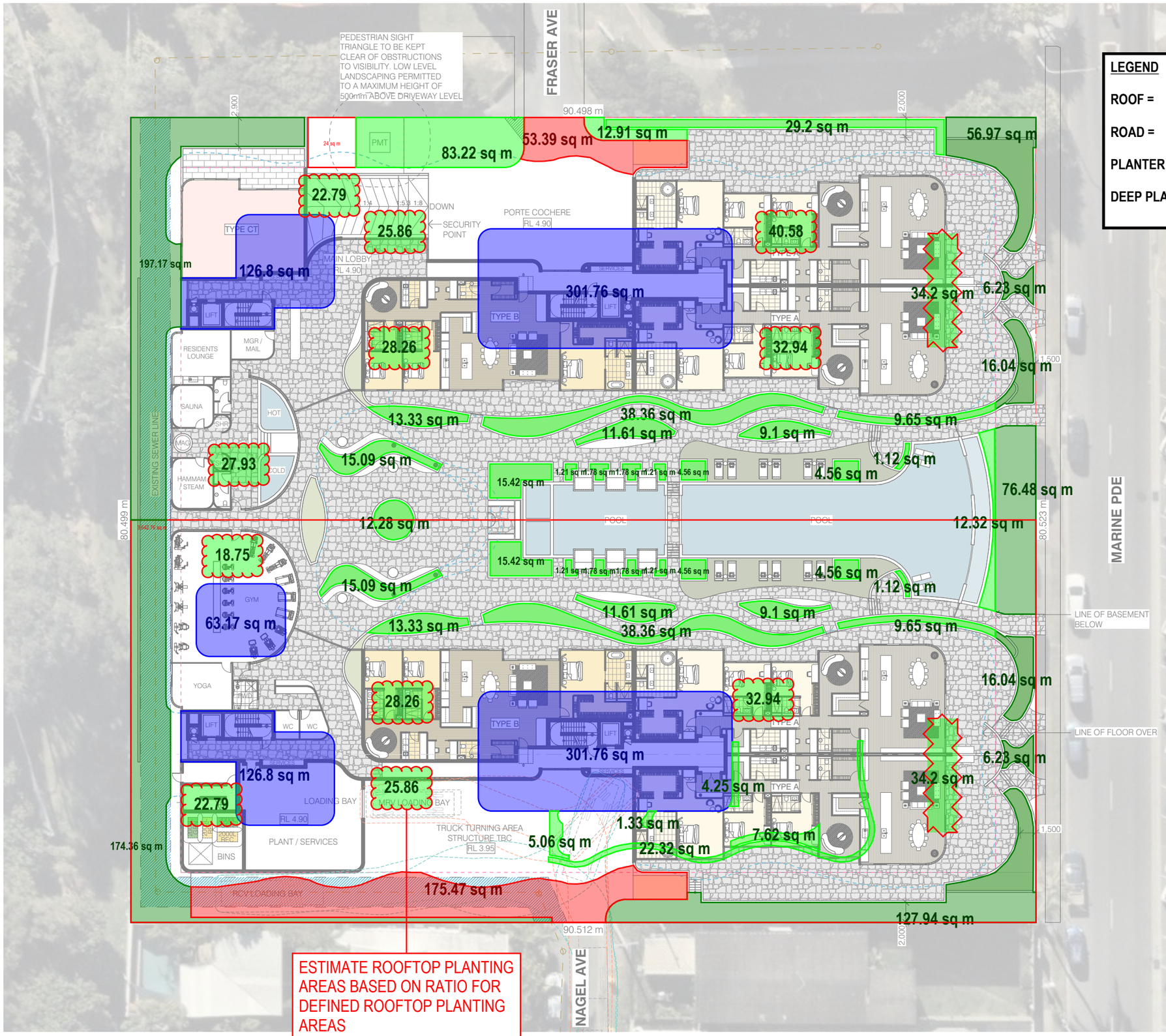
Detail Survey Sheet 1 of 6

Drawing No.	Issue	Original Size
S-11287-001	A	A3

JENSEN BOWERS
SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au
Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 F (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd

APPENDIX D
Developed Catchment Areas



ESTIMATE ROOFTOP PLANTING AREAS BASED ON RATIO FOR DEFINED ROOFTOP PLANTING AREAS

LEGEND

ROOF =	24.75 sq m
ROAD =	24.75 sq m
PLANTER BEDS =	24.75 sq m
DEEP PLANTING =	24.75 sq m

MMARY
7,284 m²

1 bed:6.85m² (1:49 code)

Site Cover:	TBC m² (??%)
Total Residential NSA:	TBC m²
Total GBA (Enclosed):	TBC m²
Total GBA (Unenclosed):	TBC m²

CAR PARKING	REQUIRED	PROVIDED
1 x 2 BED UNIT (1.25 CARS PER UNIT)	1.25 Car Parks	2 Car Parks
40 x 3 BED UNIT (1.5 CARS PER UNIT)	60 Car Parks	128 Car Parks
5 x 5 BED UNIT (2 CARS PER UNIT)	10 Car Parks	30 Car Parks
VISITORS (3+1 PER 10 THEREAFTER)	7 Car Parks	8 Car Parks
TOTAL	**79 Car Parks**	**168 Car Parks**
BICYCLES - RESIDENTIAL (1 PER 3 RES. & 1 PER 12 VIS.)	16 Residents 4 Visitors	?? Residents ?? Visitors

RESIDENTIAL

TYPE A	12 Units (26.1%)	3 Bed + Mpr 3.5 Bath, 3 Cars	300 m² Enclosed 90 m² Balcony 390 m² Total
TYPE B	6 Units (13%)	3 Bed + Mpr 3.5 Bath, 3 Cars	261 m² Enclosed 47 m² Balcony 308 m² Total
TYPE B + ROOF	2 Units (4.3%)	3 Bed + Mpr 3.5 Bath, 4 Cars Private Rooftop	288 m² Enclosed 240 m² Balc / Roof 528 m² Total
TYPE C	4 Units (8.7%)	3 Bed + Mpr 3.5 Bath, 3 Cars	245 m² Enclosed 48 m² Balcony 293 m² Total
TYPE C + ROOF	2 Units (4.3%)	3 Bed + Mpr 3.5 Bath, 4 Cars Private Rooftop	272 m² Enclosed 212 m² Balc / Roof 484 m² Total
TYPE D	6 Units (13%)	3 Bed 3.5 Bath, 3 Cars	186 m² Enclosed 45 m² Balcony 231 m² Total
TYPE E	6 Units (13%)	3 Bed + Mpr 3.5 Bath, 3 Cars	273 m² Enclosed 50 m² Balcony 323 m² Total
TYPE F	2 Units (4.3%)	5 Bed + Mpr 5.5 Bath, 6 Cars Private Rooftop	658 m² Enclosed 422 m² Balc / Roof 1,080 m² Total
TYPE G	2 Units (4.3%)	5 Bed + Mpr 5.5 Bath, 6 Cars Private Rooftop	774 m² Enclosed 754 m² Balc / Roof 1,528 m² Total
TYPE H	2 Units (4.3%)	3 Bed + Mpr 3.5 Bath, 4 Cars Private Rooftop	304 m² Enclosed 210 m² Balc / Roof 514 m² Total
TYPE I	1 Unit (2.1%)	5 Bed + Mpr 5.5 Bath, 6 Cars Private Rooftop	712 m² Enclosed 417 m² Balc / Roof 1129 m² Total
TYPE CT	1 Unit (2.1%)	2 Bed, 2 Bath 2 Cars	113 m² Enclosed 46 m² Balcony 159 m² Total
TOTAL	**46 DWELLINGS**	**147 BEDS**	

* NSA Enclosed areas measured to the centre line of party walls, external walls & glazing. Balconies measured to the centre line of party walls, glazing, and balustrades. Areas are approximate and will be subject to change

* GBA measured to the centre line of party walls and the outside face of external walls & glazing. Balconies measured to the centre line of party walls, and the outside face of glazing, and balconies.
Areas are approximate and will be subject to change

GROUND FLOOR PLAN - 1:400 (A3)

PRELIMINARY ISSUE

APPLICANT	DISCLAIMER	COPYRIGHT	PROJECT NAME	DRAWING	PROJECT NO.: 568100	DRAWING NO.	ISSUE
122 MARINE PARADE P/L ATF 122 MARINE PARADE UNIT TRUST	These drawings are conceptual design drawings only. The information contained herewith is subject to design development and further input from independant planning, structural, services and other technical consultants.	Copyright in this drawing is the property of BDA Architecture and may not be retained, copied in whole or in part or used other than for the specific uses, licence and site for which it has been prepared and issued.	122 MARINE PARADE	GROUND FLOOR PLAN	SCALE: 1:400 (A3) DATE: 15/04/2025	SK2.102	D

59 Peerless Avenue, Mermaid Beach QLD 4218
Phone: 07 5555 2600
Email: bda@bdaarch.com.au
bda architecture

APPENDIX E
SQIDEP Approvals

STORMWATER AUSTRALIA

Stormwater Quality Improvement Device Evaluation Protocol (SQIDEP)

VERIFICATION CERTIFICATE

Applicant Information

Applicant Name	**Ocean Protect Pty Ltd**
Applicant Address	60 Lyn Parade, Prestons, NSW 2170
Website	www.oceanprotect.com.au
Contact Email	bradd@oceanprotect.com.au

Verified Technology

Product Title	**StormFilter NPSorb**
SQIDEP Pathway	**Body of Evidence Pathway**
Reviewed Documents	The following documents form the basis of this independent evaluation: • Dalrymple B, Wicks M. (2024). *Performance report for SQIDEP review – StormFilter NPSorb*. Prepared on behalf of Ocean Protect. • Supporting information for the StormFilter NPSorb technology monitoring at the study site at Western Sydney, including plan and section drawings, site photos, sample receipt notifications, chain of custody documentation, certificate of analyses, individual storm reports, and monitoring equipment calibration and maintenance logs. • Statutory declarations from Ocean Protect personnel. • Photos of other StormFilter technology installations. • Dalrymple B, Wicks M. (2021). *A review of the application of StormFilter® in Australia*. Prepared on behalf of Ocean Protect. • Ocean Protect (2019). *StormFilter® Operations & Maintenance Manual*. • Ocean Protect (2020). *StormFilter® Technical Design Guide*.

Technology Information

Applicant's Verified Performance Claims (ER)	**Total Suspended Solids (TSS) 87 %** **Total Phosphorus (TP) 72 %** **Total Nitrogen (TN) 65 %** **Gross Pollutants 100 %**
Test Stormwater Runoff	The presented runoff pollutant test results complied with the SQIDEP typical stormwater pollutant concentrations for urban environments. The device has therefore been tested within the pollutant loading ranges specified by SQIDEP v1.3 for typical urban environments (e.g. urban roads, residential, industrial, commercial).
Test Catchment	Commercial

Maintenance Performed during monitoring	• Zero servicing or maintenance of the StormFilter NPSorb system at the study site was undertaken following the installation of the StormFilter NPSorb cartridges in April 2021 until after the last sampling event (in March 2023). Only visual inspections of the system were undertaken. • The StormFilter NPSorb system at the study site has been maintained in accordance with typical/ standard maintenance procedures for these assets, as described in the Manufacturer's guidelines.

Verified method to model in MUSIC

Modelling a StormFilter NPSorb technology in MUSIC is as follows:

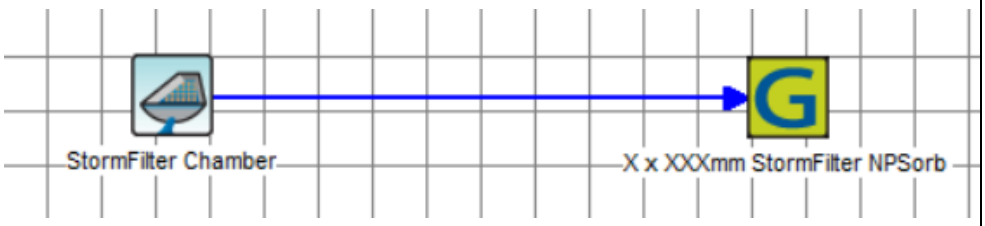


Table 1 – Summary of StormFilter NPSorb cartridge dimensions

Parameter	Cartridge name/ siphon height		
	690	460	310
Physical height (mm)	840	600	600
Typical weir height from outlet (mm)	920	690	540
Treatment flow rate (L/s)*	1.60	1.10	0.70

*: Treatment flow rate based on StormFilter NPsorb technology applied at study site.

Use the detention basin node to hydraulically represent the detention tank (or 'vault'/ storage) 'housing' the StormFilter cartridge system(s), with the properties given in Table 2.

Table 2 – Recommended values for MUSIC Detention Node (StormFilter Chamber) component for StormFilter NPSorb technology modelling

Parameter	Value for given cartridge name/ siphon height			
	690	460	310	Comments
Inlet properties				
Low flow by-pass (m^3/s)	0			No bypass of flows below treatment flow rate occurs.
High flow by-pass (m^3/s)	100			Default (very high value), noting bypass occurs in the Generic (NP Sorb) node and any overflow occurs via the overflow weir in the detention (Stormfilter chamber) node.
Storage properties				
Surface area (m^2)	Varies. Adjust to be equal to value of surface area of chamber housing StormFilter cartridges minus area of cartridges.			
Extended detention depth (m)	0.77	0.54	0.39	Standard 80mm head above top of cartridge media.
Permanent pool volume (m^3)	0			No permanent ponding of water occurs in appropriately functioning StormFilter technologies.
Initial volume (m^3)	0			
Evaporative Loss as % of PET	0			StormFilter cartridges are almost exclusively underground. Any evaporative loss is likely to be minimal.
Outlet properties				
Equivalent pipe diameter (mm)	Varies.			Depends on cartridge height, number, and chamber dimensions. Best to liaise with Ocean Protect.
Overflow weir width (m)	Varies. Adjust to be equal to width of weir structure within system.			
Notional detention time (hrs)	Varies.			
Advanced properties				
k (m/year)	Set to 1 or zero.			Ensures no additional treatment is modelled where none exists.

Use the generic node with the properties given below in Tables 3 and 4.

Table 3 – Recommended treatment flow rate & pollutant removal for StormFilter NPSorb technology (Generic Node)

High flow bypass/ treatment flow rate (TFR)	Pollutant removal up to TFR
Treatment flow rate multiplied by type and number of cartridges*	87% for TSS 72% for TP 65% for TN 100% for gross pollutants

*: Treatment flow rates for available configurations given in Table 1.

Table 4 – Recommended generic node transfer function properties for StormFilter NPSorb technology

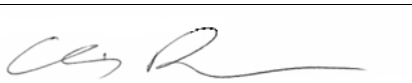
Pollutant	Influent	Effluent	Reduction
Total suspended solids (TSS)	1000	130	87%
Total Phosphorus (TP)	10	2.8	72%
Total Nitrogen	100	35	65%
Gross Pollutants	1000	0	100%

Conditions/Notes

The limitations of the acceptance of these claims include:

- The results lie within acceptable inflow limits for this type of catchment and based on the analysis are found to be representative. The device has been tested within the pollutant loading ranges specified by SQIDEP v1.3. As with the majority of treatment devices, where the influent water is more polluted there would likely be a greater percentage of pollutants removed and a higher residual load in effluent water – and, where the influent water is cleaner (i.e. below limits of detection), there would likely be a lower percentage of pollutants removed and a lower residual pollutant load in effluent water.
- Design and installation should be performed in accordance with the Manufacturer's guidelines. Results are reliant on the design of the device being consistent with the Manufacturer's guidelines.
- Regular inspection and maintenance should be performed in accordance with the Manufacturer's Operation and Maintenance Manuals. Results are reliant on the maintenance of the device being consistent with the Manufacturer's guidelines.

Independent Reviewers

Evaluator Signature	
Damian McCann Director AWC	
Chris Beardshaw Principal Engineer Afflux Consulting	

Issue of Verification Certificate

Acceptance by SQIDEP Governance Panel	16 September 2024
Acceptance by Stormwater Australia Board of Directors	16 September 2024
Verification Issued	9 September 2024
Stormwater Australia Verification Certificate Number Reference	SA-2024/10-VC

Verified under SQIDEP Version 1.3

Body of Evidence Pathway

APPENDIX F
Healthy Waters Code

City Plan code template

This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.

Please note:

Note: In accordance with Section 2.1 of City Plan, an assessment against State interest - Water quality (policies 4 and 5) of the State Planning Policy 2017 is required as the Healthy water development code does not fully integrate this State interest. A response table for policies 4 and 5 have been included below.

For assessment against the overall outcomes, refer to the appropriate code.

Note: The whole of the planning scheme is identified as the assessment benchmark for impact assessable development. This specifically includes assessment of impact assessable development against this strategic framework. The strategic framework may contain intentions and requirements that are additional to and not necessarily repeated in zone, overlay or other codes. In particular, the performance outcomes in zone codes address only a limited number of aspects, predominantly related to built form. Development that is impact assessable must also be assessed against the overall outcomes of the code as well as the strategic framework.

9.4.5 Healthy waters code

9.4.5.1 Application

This code applies to assessing material change of use, reconfiguring a lot or operational work for development where indicated within:

(1) **Part 5 Tables of assessment**; and

(2) **Table 9.4.5.1-1: Development triggers for applying the Healthy waters code.**

Table 9.4.5.1-1: Development triggers for applying the Healthy waters code

Topic	Assessment triggers	Applicable assessment benchmarks
Erosion and sediment control	All development.	For accepted development subject to requirements: **RO1, RO2**
		For assessable development: **PO1, PO2**
Stormwater quality and	For residential land uses involving one or more of the following:	For accepted development subject to requirements:

Topic	Assessment triggers	Applicable assessment benchmarks
waterway stability	(a) 3 or more dwellings; or (b) a land area greater than 1,200m^2; or (c) a newly constructed road (previously unformed road) exceeding 30m in total length; or (d) 200m^2 or more of uncovered new or refurbished car park area including parking bays and circulation driveways; or (e) the creation of high polluting outdoor activities (including Bulk landscape supplies, Garden centres, Tourist parks, Transport depots, Warehouses and Wholesale nurseries).	**RO3, RO5** For assessable development: **PO3, PO4, PO8 – PO13**
	For non-residential land uses involving one or more of the following: (a) a land area greater than 1,200m^2; or (b) a newly constructed road (previously unformed road) exceeding 30m in total length; or (c) 200m^2 or more of uncovered new or refurbished car park area including parking bays and circulation driveways; or (d) the creation of high polluting outdoor activities (including Bulk landscape supplies, Garden centres, Tourist parks, Transport depots, Warehouses and Wholesale nurseries).	For accepted development subject to requirements: **RO4, RO5** For assessable development: **PO3, PO4, PO8 – PO14**
Stormwater quantity	For residential activities, development associated with the creation of 3 or more dwellings, resulting in either: (a) an increase in the total impervious area; or (b) an alteration of upstream conveyance or change to existing discharge location or condition.	For accepted development subject to requirements: **RO3, RO6, RO7** For assessable development: **PO5 – PO14**
	For all other land uses, development that results in either: (a) an increase in the total impervious area; or (b) an alteration of upstream conveyance or change to existing discharge location or condition.	For accepted development subject to requirements: **RO4, RO6, RO7** For assessable development: **PO5 – PO14**
Woongoolba flood mitigation catchment area	Development that is code or impact assessable, on land within the 'Woongoolba flood mitigation catchment area' on the **Water catchments and dual supply system area overlay map**.	For assessable development: **PO15**

This code does not apply in the following instances:

(1) where the development involves internal works or minor building works to a lawfully established building; or

(2) a sales office.

When using this code, reference should be made to **Section 5.3.2** and, where applicable, **Section 5.3.3**, in **Part 5**.

9.4.5.2 Purpose

(1) The purpose of the Healthy waters code is to:

(a) protect the quality of the city's waters and watercourses by managing the impacts of development on quality and quantity of surface and ground water runoff; and

(b) ensure that development does not cause adverse impact on people and/or property.

(2) The purpose of the code will be achieved through the following overall outcomes:

(a) Total water cycle management and water sensitive urban design (WSUD) principles are:

(i) implemented to contribute to biodiversity areas and green space values within the city and promote co-location of assets; and

(ii) integrated into the landscape so as to maintain watercourse health, biodiversity and ecosystems.

(b) Development avoids or minimises disturbance to existing landforms, surface drainage, watercourses and groundwater.

(c) Impacts to public health and safety hazards are minimised.

(d) Adverse impacts to people and/or property are prevented and stormwater is safely managed within urban areas.

(e) Development protects existing overland flow paths and watercourses of environmental value.

(f) Development limits the quantity of key pollutants discharged in stormwater to protect the quality of receiving waters.

(g) Development avoids adverse impacts to downstream properties or environmental value from stormwater peak discharge.

(h) Development avoids or minimises adverse impacts on the environmental values of receiving waters from the release and mobilisation of nutrients and sediments.

(i) The drainage capacity of the Woongoolba Flood Mitigation Scheme Area for rainfall events up to 1 in 10 year 72 hours is maintained (contained within the Scheme drains within a 4 day period) and this capacity is not to be eroded due to cumulative impact of development.

9.4.5.3 Specific benchmarks for assessment

PART B – ASSESSABLE DEVELOPMENT BENCHMARKS

Table 9.4.5-3: Healthy waters code – for assessable development

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome	Internal use

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
Erosion and sediment control			
PO1 Stormwater discharge from a development site achieves the construction phase water quality objectives of **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**.	**AO1** No acceptable outcome provided.	**AO1- COMPLIES** A stormwater management plan has been prepared which addresses the construction phase stormwater quality management for the proposed development. Refer to Section 8 of the SBSMP, report reference 30264961-3-GA0002.	
PO2 Erosion, sediment and dust is appropriately managed during the construction phase.	**AO2** The level of risk for soil erosion and sediment pollution to the environment is determined by an erosion hazard assessment, completed by a suitably-qualified person in accordance with the criteria in **Table 9.4.5-4: Erosion hazard assessment**. Where the erosion hazard assessment has a risk score of: (a) less than or equal to 10: A deemed to comply report is prepared by a suitably qualified person for Council approval, including conceptual location and design drawings of each treatment measure in plan and section views, in accordance with the *Best Practice Erosion and Sediment Control: International Erosion Control Association, (IECA) 2008, Australasia Chapter 2008.* (b) greater than 10 or developments involving multiple stages of disturbance or more than 1.25 ha of land: (i) For material change of use or reconfiguring a lot, a conceptual erosion and sediment control plan (ESCP) is prepared by a	**AO2 – COMPLIES** Section 8 of the stormwater report prepared by Arcadis, '30264961-3-GA0002' discusses appropriate ESC techniques for the site. The erosion hazard assessment has been completed within the table of this code response, and has scored a total of 10.	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
	suitably-qualified person for Council approval in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards**, and the *Best Practice Erosion and Sediment Control: International Erosion Control Association (IECA) 2008, Australasia Chapter 2008*. (ii) For operational work, a detailed ESCP is prepared by a suitably-qualified person in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards**, and *Best Practice Erosion and Sediment Control: International Erosion Control Association (IECA) 2008, Australasia Chapter 2008*. The ESCP is to detail appropriate treatment measures for the construction phase of development, demonstrating how the minimum design objectives in **Table 9.4.5-5: Stormwater design objectives** are achieved, including: (a) measures to ensure the release of sediment-laden stormwater for the nominated design storm are minimised when the design storm is exceeded; (b) detailed design, installation, construction, monitoring and maintenance requirements of all approved proprietary products in		

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	accordance with local conditions and manufacturer's recommendations; and (c) details of how the ESCP aligns with the approved development staging plan.		
Stormwater quality			
PO3 Development appropriately manages stormwater quality to: (a) protect natural ecosystems; (b) protect water quality; (c) reduce runoff and peak flows; and (d) meet the water quality objectives and environmental values for Queensland waters. **Note: Water quality objectives and environmental values for Queensland waters are contained within *Schedule 1* of the *Environmental Protection (Water) Policy 2009*. Water quality objectives are locally specific and vary between and within river catchments.** **Note: A stormwater quality management plan prepared by a suitably qualified person in accordance with SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards, is Council's preferred method for addressing this performance outcome.**	**AO3.1** For post developed sites, the following minimum pollutant reduction targets are achieved: (a) Gross pollutants (>5mm) – 90%; (b) Total Suspended Solids (TSS) – 80%, (c) Total Phosphorus (TP) – 60%; and (d) Total Nitrogen (TN) – 45%.	**AO3.1 – COMPLIES** A stormwater management plan has been prepared which addresses the management of operational phase stormwater quality measures for the proposed development. Refer to Section 7 of the SBSMP, report reference 30264961-3-GA0002.	
	AO3.2 For development on land less than 1.25ha, a deemed to comply solution for stormwater quality is achieved in accordance with **Table 9.4.5-6: Stormwater quality deemed to comply solutions**.	**REFER ABOVE**	
	AO3.3 For development on land greater than 1.25ha, a stormwater quality management plan is to be prepared by a suitably qualified person in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**, is required.	**REFER ABOVE**	
Waterway stability			
PO4 In-stream erosion, downstream of urban	**AO4** Post-development peak 0.632 Annual	**AO4 – COMPLIES** Refer to Section 6 of the SBSMP, report reference	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
development is prevented by controlling the rate (or magnitude) and duration of sediment transporting flows.	Exceedance Probability (AEP) event discharge within receiving waterway is limited to pre-development peak 0.632 AEP event discharge and is in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards.**	30264961-3-GA0002 which addresses waterway stability requirements where applicable.	
Stormwater quantity control			
PO5 Stormwater quantity management outcomes demonstrate no adverse impact on stormwater flooding or the drainage of properties external to the subject site.	**AO5** The following is achieved external to the development site: (a) no increase in peak flood flow rate from the development site for all events up to and including the 1% AEP; (b) no increase in peak flood velocities from the development site for all events up to and including the 1% AEP; (c) no increase in peak flood level from the development site for all events up to and including the 1% AEP; and (d) stormwater outfalls or discharge is located to avoid conflict with existing usage of downstream land or impacts on existing watercourse or drainage.	**AO5 – COMPLIES** A stormwater management plan has been prepared which addresses the management of stormwater quantity for the proposed development. Refer to Section 6 of the SBSMP, report reference 30264961-3-GA0002.	
Lawful point of discharge			
PO6 Development ensures the stormwater systems are designed to not cause actionable nuisance that would adversely affect adjoining (upstream or downstream) properties.	**AO6** A lawful point of discharge must be identified and demonstrated that all discharge point/s from the development are in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and**	**AO6 – COMPLIES** Refer to Section 5 of the SBSMP, report reference 30264961-3-GA0002 which assesses the LPoD(s) relevant to the subject site.	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
	water sensitive urban design standards.		
Overland flow paths			
PO7 Development must not obstruct free open surface flow of stormwater through a site.	**AO7** Overland flowing stormwater is allowed free open surface flow between the street and any waterway at the rear or sides of a property, in accordance with the provisions of the *Building Code of Australia.*	**AO7 – COMPLIES** Provision has been made for the identified potential overland flow paths. Refer to Section 5, Section 6 and Appendix B of the SBSMP prepared by Arcadis, reference 30264961-3-GA0002.	
Whole of life costs			
PO8 Stormwater infrastructure is designed and constructed to: (a) remain fit for purpose for the life of the development and maintains full functionality in the design flood event; (b) be cost effective to maintain; and (c) ensure no structural damage to existing stormwater infrastructure.	**AO8** No acceptable outcome provided.	**AO8 – COMPIES** Private infrastructure will remain the responsibility of the body corp. All other municipal connection works have been designed to relevant standards.	
Landscape integration			
PO9 Stormwater treatment devices and stormwater infrastructure are designed to: (a) integrate with the urban design and landscape outcomes of the development; (b) complement natural environments, wetlands and watercourses; (c) protect environmental values; (d) enhance visual amenity; and (e) incorporate CPTED principles in accordance with **SC6.12 City Plan**	**AO9.1** Where stormwater treatment devices and stormwater infrastructure are integrated into public open space, a Statement of Landscape Intent is to be prepared by a suitably qualified person, for approval by Council. The plan is to demonstrate that the operation of stormwater infrastructure does not compromise the function of any co-located uses and reflect the design principles within **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards.**	**AO9.1 – COMPIES** Refer to Engineering Drawings within Appendix B of the SBSMP, report reference 30264961-3-GA0002 which demonstrates the location of stormwater treatment devices. The architect and landscape architect have integrated this within the proposed design as appropriate.	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards.	**Note: A Statement of landscape intent is to be prepared in accordance with SC6.13 City Plan policy – Landscape work.**		
	AO9.2 Stormwater treatment devices are located offline to any upstream catchment. **Note: This provision relates to the integration of stormwater treatment devices and stormwater infrastructure into the landscape. Development identified on the Environmental significance – wetlands and watercourse overlay map will still require assessment against the Environmental significance overlay code.**	**AO9.2 – COMPIES** Refer to Section 5 of the SBSMP, report reference 30264961-3-GA0002 which demonstrates flows which stormwater treatment devices receive.	
	AO9.3 All stormwater outlets that are located adjacent to watercourses, creeks and drainage paths are aligned at a maximum of 45 degrees to the downstream direction of flow, and energy dissipation measures installed to minimise scour.	**NOT APPLICABLE** No outlets to watercourses, creeks or drainage paths are proposed.	
Public safety			
PO10 Stormwater treatment devices and stormwater infrastructure minimise impacts on public health and safety.	**AO10** All stormwater quantity control measures are designed in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**.	**AO10 – COMPIES** Refer to Engineering Drawings within Appendix B of the SBSMP, report reference 30264961-3-GA0002, which details the proposed treatment system including levels and location. The proposed treatment system is not in a location or position where it would pose an abnormal risk to health and safety.	
Maintenance access			

PO11 Maintenance access is provided for all stormwater management systems and considers: (a) the type of vehicle or machinery needed to service particular assets; and (b) the need to ensure a safe working environment for maintenance personnel and the public.	**AO11.1** All weather vehicle access is to be provided to inlet zones of the stormwater treatment systems in accordance with **Table 9.4.5-7: Maintenance access requirements (slope).**	**AO11.1 – COMPIES** Refer to Engineering Drawings within Appendix B of the SBSMP, report reference 30264961-3-GA0002, which illustrates appropriate maintenance access from the site frontage. It should be noted that the proposed asset is a private asset not transferred to Council.	
	AO11.2 Maintenance access is to be provided around the perimeter of all stormwater treatment systems in accordance with **Table 9.4.5-8: Maintenance access requirements (size).**	**REFER ABOVE**	
	AO11.3 A maintenance buffer is provided around the perimeter of all stormwater treatment devices and adjoining private property equal to: (a) 1m in width; or (b) the width of a perimeter maintenance access, as delivered in AO11.2, plus 0.5m. The maintenance buffer is measured from the adjacent allotment boundary to the top of batter around the treatment measure. The maximum slope on the maintenance buffer is 1 in 10.	**REFER ABOVE**	
Fauna movement			
PO12 Stormwater conveyance structures and channels are designed to ensure the safe movement of native fauna and provide for terrestrial and aquatic passage.	**AO12.1** Stormwater drainage structures and channels minimise impacts on aquatic fauna and associated habitats and provide opportunities for beneficial habitat uses of structures in accordance with the *Department of Primary Industries and Fisheries – Fisheries guidelines for Fish-friendly structures (2006).*	**NOT APPLICABLE** The proposed stormwater infrastructure is within an urbanised area which is not occupied by native fauna / does not currently provide aquatic passage.	

	AO12.2 Stormwater drainage structures allow for the safe movement of terrestrial fauna in accordance with: (a) the Queensland Government Fauna Sensitive Road Design Manual Volume 2: Preferred Practices; and (b) the Queensland Government Koala-Sensitive Design Guidelines.	**REFER ABOVE**	

Wastewater management			
PO13 Development does not discharge wastewater to receiving waters or areas external to the site unless demonstrated to be the best-practice environmental management for that site and takes into consideration: (a) the applicable water quality objectives for the receiving waters; and (b) the potential adverse impact on ecosystem health of receiving waters.	**AO13** Where the development involves the discharge of wastewater, a Wastewater Management Plan (WWMP) is prepared, demonstrating compliance with the performance outcome, by a suitably qualified person and submitted to the Council, detailing all of the following: (a) wastewater type; (b) climatic conditions; (c) water quality objectives; (d) best-practice environmental management; (e) waste management hierarchy; and (f) the WWMP provides for the management of wastewater in accordance with a wastewater management hierarchy that: (i) avoids wastewater discharge to watercourses; or (ii) if wastewater discharge to the environment cannot practicably be avoided wastewater discharge to watercourses is minimised through re-use, recycling, recovery and treatment for disposal to sewer, surface water and groundwater.	**NOT APPLICABLE** The site doesn't propose to discharge wastewater into receiving waters.	
Dewatering management			
PO14 Dewatering occurs in accordance with an approved Dewatering management plan.	**AO14** No acceptable outcome provided.	**AO14 – COMPLIES** If relevant requirements are triggered, the proposed development will be required to provide a dewatering plan to facilitate basement construction. Standard condition wording can be provided for the development approval.	
Woongoolba flood mitigation catchment area			

PO15 In the Woongoolba flood mitigation catchment area, shown on the **Water catchments and dual supply system area overlay map**, peak outflow and its timing for Q2, Q5 and Q10 for rainfall events up to 72 hours does not change as a result of development.	**AO15** No acceptable outcome provided.	**NOT APPLICABLE** The site is not within the flood mitigation scheme area.	

State Planning Policy July 2017

Policies	Demonstrate how the proposal meets the policy?	Internal use
State interest – water quality		
ASSESSMENT BENCHMARK 4 (POLICY 4): At the construction phase, development achieves the applicable stormwater management design objectives in table A (appendix 2) of the State Planning Policy.		
ASSESSMENT BENCHMARK 5 (POLICY 5): (5) At the post-construction phase, development: a) achieves the applicable stormwater management design objectives on-site, as identified in table B (appendix 2) of the State Planning Policy; or b) achieves an alternative locally appropriate solution off-site that achieves an equivalent or improved water quality outcome to the relevant stormwater management design objectives in table B (appendix 2) of the State Planning Policy.		

Table 9.4.5-3: Erosion hazard assessment

Controlling factor	Points	Score
Average slope of the whole site prior to operational works		
Slope less than 2%	0	0
More than or equal to 2% but less than 5%	1	
More than or equal to 5% but less than 10%	2	
More than or equal to 10% but less than 15%	4	
More than or equal to 15%	5	High risk
Soil type (to be disturbed)		
Gravels and sandy soils	1	1
Sandy loam	2	
Clays on flood plains	3	
Shallow soils on slopes	4	
Clays on slopes greater than 5%/imported fill or untested fill	5	High risk
Anticipated duration of site disturbance		
Duration less than 2 weeks	0	
More than 2 weeks but less than 3 months	2	
More than 3 months but less than 6 months	4	4
More than 6 months	5	High risk
Anticipated erosive rainfall risk during site disturbance		
Low (monthly average rainfall less than 45 mm)	0	
Moderate (monthly average rainfall 46 - 100 mm)	1	
High (monthly average rainfall 101 - 225 mm)	2	2
Very high (monthly average rainfall 226 - 1500 mm)	4	
Extreme (monthly average rainfall more than 1500 mm)	5	High risk

Controlling factor	Points	Score
Off-site sediment control (down-slope of the soil disturbance)		
Score 1 point if there is no purpose-built sediment trap (e.g. sediment basin, gross pollutant trap or purpose-built wetland).	1	1
Run-off entering the site		
Score 1 point if stormwater run-off is not diverted from entering the site or away from soil disturbance.	1	
Extent of site disturbance		
Score 2 points if the building works requires reshaping of the ground surface.	2	2
Total Score **Note: High erosion risk - if score 11 or greater, or five for any factor.**		

This Erosion Hazard Assessment form is adapted from the *Best Practice Erosion and Sediment Control, International Erosion Control Association (Australasia), IECA 2008 Appendix H - Building Sites, the Brisbane City Council Erosion Hazard Assessment Form* and *Attachment 2 to the QDC Draft Part 16 Erosion and Sediment Control*.

Table 9.4.5-5: Stormwater design objectives

Construction phase stormwater design objectives	Notes
Drainage control	
Design life and design storm of temporary drainage works: (1) Disturbed area open for less than 12 months - 1 in 2 ARI. (2) Disturbed area open for 12-24 months - 1 in 5 ARI. (3) Disturbed area open for more than 24 months - 1 in 10 ARI.	• ARI = Average Recurrence Interval (see Engineers Australia document Australian Rainfall and Runoff). • Design capacity excludes minimum 150mm freeboard. • A higher drainage design objective may be required for temporary drainage structures upslope of occupied properties. • A revised drainage design storm may be required if these design objectives are found to be impracticable.
Erosion control	
(1) Stage clearing and construction works to minimise the area of exposed soil at any one time. (2) Effectively cover or stabilise exposed soils prior to predicted rainfall. (3) Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised using methods which will achieve effective short-term stabilisation. (4) Avoid or minimise large construction activities in the 'wet season'. (5) Divert water run-off from undisturbed areas around disturbed areas. (6) Use erosion risk ratings to determine appropriate erosion control measures.	• 'Wet season' means the high rainfall months, e.g. the four highest rainfall months. • For point 6, determine the erosion risk rating using local rainfall erosivity, rainfall depth, or soil loss rate or other acceptable method. A rating scale such as very low, low, moderate, high, extreme should be applied. Such ratings should reflect the local area. Example ratings may be shown in local council guidelines or detailed in best-practice guidelines.
Sediment control	
(1) Use soil loss rates to determine appropriate sediment control measures. (2) Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. (3) All exposed areas greater than 2500 metres must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual	• For point 1, surrogate determinations may be used such as monthly erosion or average monthly rainfall. • A commonly used design storm for basin sizing is 80th percentile five-day event. Depending on the settling characteristics of local soils, a higher 'operational' design storm can be achieved with chemical dosing operated in flow-through mode in a large storm with rainfall-activated auto-flocculent dosing, and advanced hydraulic efficiency features such as floating off-takes,

runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).	and a sediment forebay. • TSS = Total Suspended Solids. Turbidity measurements (e.g. 60 Nephelometric Turbidity Units (NTU)) could be used; however, for accuracy, a site-specific relationship should be developed between turbidity and TSS.

Table 9.4.5-6: Stormwater quality deemed to comply solutions

The following deemed to comply solutions are to be documented within a Stormwater quality management plan prepared by a suitably-qualified person in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**.

Development type			**Stormwater treatment train**		**Land ownership[2]**
Land use	**Scenario**	**Scale**			
Residential	>2 lots up to 20 lots	N/A	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Bio retention[3] @ 1.3% of impervious catchment area.[1]	Public and/or Private
			No Tanks	Bio retention[3] @ 1.8% of impervious catchment area.[1]	Public and/or Private
			Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Wetland @ 5% of impervious catchment area.	Public and/or Private
			No Tanks	Wetland @ 7% of impervious catchment area.[1]	Public and/or Private
	> 2 dwellings (Townhouse style up to 2 storeys	≤ 12,500m^2	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Bio retention[3] @ 1.3% of impervious catchment area.[1]	Private
			No Tanks	Bio retention[3] @ 1.8% of impervious catchment area. [1]	Private
			Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Wetland @ 5% of impervious catchment area.[1]	Private
			No Tanks	Wetland @ 7% of impervious catchment area.[1]	Private

	High density multiple dwelling apartments (flats, high-rise)*	≤ 12,500m^2	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Bio retention[3] @ 1.8% of impervious catchment area.[1]	Private
			No Tanks	Wetland @ 7% of impervious catchment area.[1]	Private
Commercial, Industrial and Retail (including retail at the bottom floors of high rise)[4]	Commercial and/or Industrial uses	≤ 12,500m^2	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Gross pollutant management (GPT) + Bio retention[3] @ 1.8% of impervious catchment area.[1]	Public and/or Private
			No Tanks	Gross pollutant management (GPT) + Wetland @ 8% of impervious catchment area.[1]	Public and/or Private

[1] For developments that results in an increase in less than 15% imperviousness (i.e. roof and ground level impervious), then stormwater management to focus on the impervious areas only.

[2] Ultimate owner of the device and responsible for maintenance.

[3] For bioretention basins larger than 800m^2, an inlet pond will be required.

[4] The City requires gross pollutant management for these land uses. It is preferred that these are located on private property, but in larger scale Reconfiguring a lot applications it is logical to have a single gross pollutant trap for the site. The City will not accept proprietary devices for nutrient management on public/City land.

Table 9.4.5-7: Maintenance access requirements (slope)

Treatment type	Access track slope	Material and width
Stormwater inflows where pipe is 450mm or greater (where there is no forebay or inlet pond)	1 in 4 or flatter	2.5m wide minimum Gravel or reinforced turf from inlet
Coarse sediment forebay	1 in 4 or flatter	2.5m minimum Reinforced concrete in accordance with *IPWEAQ standard drawing RS-051* Concrete paver (subject to City approval), cement treated gravel

		250mm thick may be accepted by the City through negotiation.
Inlet pond (wet) for retention or wetland Sediment basins	1 in 4 or flatter	3m wide Reinforced concrete in accordance with Heavy Vehicle Crossing Industrial (*refer IPWEAQ standard drawing RS-051*). Where this access crosses perpendicular to pedestrian paths, the path must be 200mm thick, double reinforced and 42MPa.
Proprietary devices	1 in 4 or flatter	Reinforced concrete in accordance with Heavy Vehicle Crossing Industrial (refer *IPWEAQ standard drawing RS-051*).

Table 9.4.5-8: Maintenance access requirements (size)

Treatment type	Size	Maintenance access requirements (all paths 1 in 10 cross fall or less and maximum 1 in 4 longitudinal grade)
Bioretention	< 500m^2	Access path to > 40% of perimeter. ≥ 0.75m wide. Grass, mulch, gravel or concrete suitable for access on foot.[1]
	≥ 500m^2	Access path to > 40% of perimeter. ≥ 2.5m wide. Reinforced grass, gravel or concrete for light vehicles.[1] Remainder of perimeter as per < 500m^2 bioretention.
Wetland	<1000m^2	Access path to > 40% of perimeter. ≥ 0.75m wide. Grass, mulch, gravel or concrete

		suitable for access on foot.
	≥ 1000m^2 to < 5000m^2	Access path minimum 40% of perimeter. ≥ 2.5m wide. Reinforced grass, gravel or concrete for light vehicles.[1] Remainder of perimeter ≥ 0.75m wide.
	≥ 5000m^2	Access path 100% of perimeter. ≥ 2.5m wide. Cement treated gravel 200mm or concrete for large vehicles.

[1] Determine access path treatment based on slope, maintenance vehicle and the surrounding landscape. For example, turf is not appropriate where the treatment system is located against conservation open space, and where revegetation for the treatment system complements the surroundings, the use of gravel or concrete is preferred.

ATTACHMENT 9

Engineering Services Report prepared by Arcadis



ENGINEERING SERVICES REPORT

122 MARINE PARADE, MIAMI

MONACO PROPERTY GROUP PTY LTD



IMPROVING QUALITY OF **LIFE**

122 MARINE PARADE, MIAMI

ENGINEERING SERVICES REPORT

Author Ben Wieser

Checker Darlan Castro

Approver James Stockwell
RPEQ20152



Project No 30264961-3

Report No GA0001

Revision 01

Date 24/04/2025

This report has been prepared for Monaco Property Group Pty Ltd in accordance with the terms and conditions of appointment. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Revision	Date	Description
01	24/04/2025	Issue for Approval

Should you require any further information, please contact our Gold Coast office and ask to speak to the report author denoted above.

Reception – Gold Coast: +61 (0) 7 5503 4800

Copyright © 2015 Arcadis. All rights reserved. arcadis.com

CONTENTS

1 EXECUTIVE SUMMARY 2
2 SITE CHARACTERISTICS 3
2.1 Location Details 3
2.2 Land Usage 3
2.3 Topography and Features 3
3 PROPOSED DEVELOPMENT 4
4 INFRASTRUCTURE SERVICES 5
4.1 Stormwater Drainage 5
4.2 Development Network Loadings 5
4.3 Water Network 6
4.4 Sewer Network 7
4.5 Other Services 8
5 ROADS AND ACCESS 9
6 COASTAL EROSION 10
7 CONCLUSION 11

APPENDICES

APPENDIX A
Survey
APPENDIX B
Engineering Drawings
APPENDIX C
Before You Dig Maps
APPENDIX D
GCWW – Network Loading
APPENDIX E
GCWW – On-Site Municipal Sewer

1 EXECUTIVE SUMMARY

Monaco Property Group Pty Ltd has commissioned Arcadis to prepare an Engineering Services Report (ESR) for a development application for the site located over the following allotment(s):

- Lot 122 on SP284713 (122 Marine Parade, Miami).

The proposed development intended for the site involves the construction of a residential apartment building.

This report addresses the municipal engineering services component of the development and the engineering planning issues associated with the development application. This report demonstrates that the proposed development can connect to the local stormwater, potable water and sewerage reticulation systems as well as transport infrastructure. Additionally, Council's objectives for coastal front developments can be achieved.

Drainage

The site will manage stormwater through the use of private infrastructure. Stormwater will be discharged to the existing lawful point of discharge, being Marine Parade. The Stormwater Management Plan '30264961-3-GA0002 - SBSMP' prepared by Arcadis should be referred to for further details of the proposed devices used to manage stormwater prior to discharging to the Lawful Point of Discharge (LPOD). Modifications to Council's drainage within the adjoining public space are also proposed to improve safety and tie-in with site works.

Network Loading

Calculations based on Equivalent Persons (EP's) illustrate that there is a decrease in loading from the Council planned demand for potable water and wastewater services for the site. GCWW has advised that no network capacity assessments are required to support this application, based on a higher EP previously advised.

Potable Water

Potable water connection for the proposed development to Gold Coast Water and Waste's (GCWW) water supply network will be provided via the existing DN100 water main within Fraser Avenue. The existing site's water meter(s) will be decommissioned, and a new master water meter assembly installed on-site. No works are proposed for the DN375 trunk water main adjacent to the western boundary of the site within lot 1 on WD6367.

Sewerage

Connection for the proposed development to GCWW's wastewater supply network will be provided via connection to the existing DN300 municipal gravity sewer network within the subject site. This sewer line is proposed to be retained on site within 3m wide easements as agreed with GCWW during early consultation. It is recommended that the existing property connection is further surveyed during detailed design to determine if of suitable condition for reuse, otherwise is to be decommissioned and replaced with a compliant connection.

Vehicular Access and Roadworks

The existing Vehicular Cross Over (VXO) will be decommissioned and a new VXO will be provided from Fraser Avenue. The municipal grate inlet within the existing VXO is to be retained. Further, it is envisaged that roadworks are to be undertaken to suit changes at the Nagal Avenue interface. Minor reshaping / improvement of the adjacent open space (3WD810476) is proposed as part of the drainage strategy, removing the steep batters and retaining structures within the open space area. No services have been identified for relocation to facilitate the above works. All Council pavement and verge areas within the area of works shall be remediated upon completion of works.

Coastal

The site is identified within the City's Coastal Erosion Overlay. City of Gold Coast Coastal Erosion Hazard Overlay Code has been completed which outlines specific requirements the development must adhere to such as but not limited to footing design and sand management.

2 SITE CHARACTERISTICS

2.1 Location Details

The subject site is located within Miami, South-East Queensland, Australia over the following allotment(s):

- Lot 122 on SP284713 (122 Marine Parade, Miami).

The site is bordered by Fraser Avenue, as well as residential, open space properties to the north, Marine Parade to the east, Lions Head Park (open space) to the west, and Nagal Avenue, as well as residential properties to the south.

The total area of the site is approximately 7,284m^2.

The City of Gold Coast is the local government authority.

2.2 Land Usage

In its current state, the project site contains a residential apartment building with associated driveways, entries, parking and planting areas. Figure 2-1 below provides a current locality plan of the site.



Figure 2-1 Site Locality Plan (Aerial Imagery Courtesy of Nearmap)

2.3 Topography and Features

The site topography grades towards Marine Parade, east of the site. The site has a high point of approximately RL 4.65m AHD and a low point of RL 3.86m AHD. Refer to the site survey within Appendix A of this report for further information.

3 PROPOSED DEVELOPMENT

The proposed development involves the construction of a residential apartment building, including:

- Residential apartments.
- Residential amenities.
- 1 level of basement parking.

A plan extract of the proposed development has been provided in Figure 3-1.

A full set of Architectural plans are provided within the development application package and should be referred to for further information.

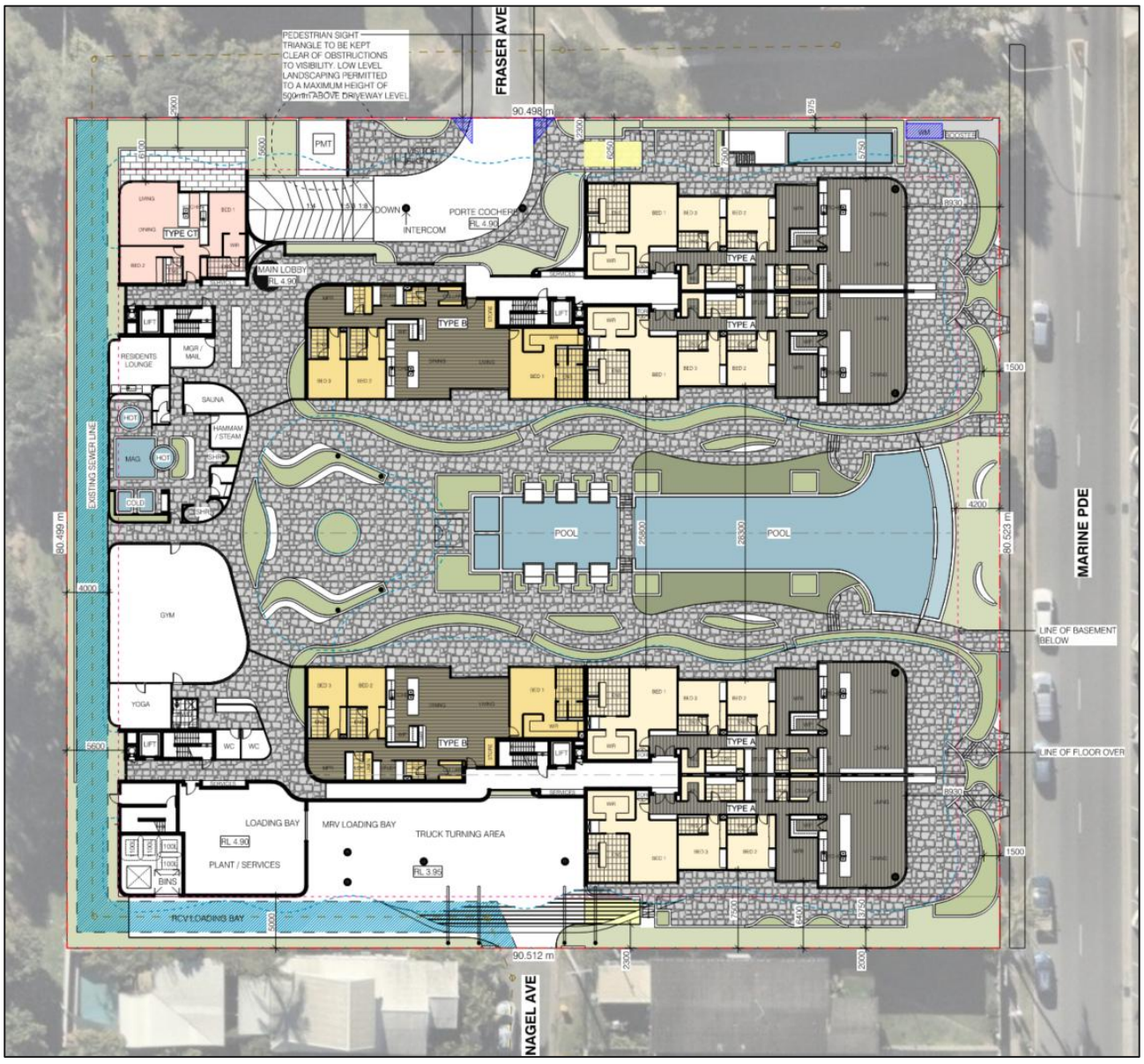


Figure 3-1 Proposed Development Ground Floor

4 INFRASTRUCTURE SERVICES

4.1 Stormwater Drainage

A Site Based Stormwater Management Plan (SBSMP) '30264961-3-GA0002 - SBSMP' has been prepared separately which addresses the stormwater management planning requirements for the development. The SBSMP should be referred to for a more in-depth analysis of prevailing stormwater constraints and opportunities, however a summary of key engineering requirements is provided herein.

4.1.1 Existing Stormwater Drainage

Stormwater runoff generated by the site is discharged to Marine Parade via connections to underground drainage and overland flow. Local runoff in Marine Parade, including runoff from the subject site, ultimately arrives in a sag ~20m south of the subject site before discharging via pipe to Miami Beach. The pipe sizes within this network range from DN300 to DN1300.

The following existing stormwater drainage and catchments have been identified adjacent to the development site from both CoGC ArcGIS mapping (online) and 1m DTM, field survey (Appendix A) and site inspection.

1. Fraser Avenue grades south towards the subject site, however, municipal drainage at the cul-de-sac adjacent the site is shown to drain north (backgrading) per Council's online mapping. There is potential for runoff (in excess of Council's drainage system capacity) to spill into the subject site for a short distance before being directed into an existing inlet pit within Lot 3 on WD810476 and out to Marine Parade.
2. Nagal Avenue grades north towards the subject site, however, municipal drainage at the site interface is shown to drain south (backgrading) per Council's online mapping. There is potential for runoff (in excess of Council's drainage system capacity) to spill into the subject site before spilling eastbound to Marine Parade. Based on site inspection, it was determined that water would also pass through the southern adjoining private property Lot 5 on RP46948 due to the existing site topography.
3. A small portion of Lions Head Park to the west grades to the southwest corner of the site before it drains into the site's private infrastructure and out to Marine Parade.

4.1.2 Proposed Stormwater Drainage

The proposed development will manage stormwater via the use of private infrastructure to achieve Council's objectives. The site will maintain its discharge location being Marine Parade via connection to underground drainage and overland flow.

Provision for conveyance of runoff from the abovementioned sources, including potential spill areas, to Marine Parade has been made. The adopted strategy is to maintain or improve conveyance of runoff to municipal infrastructure, creating an improvement to existing conditions for the site, Council land and adjacent properties.

Drainage within the subject site will remain private.

The SBSMP prepared by Arcadis should be referred to for further details on the exact methodology used to achieve Council objectives.

Refer to Engineering Drawings included in Appendix B for further details.

4.2 Development Network Loadings

The loading of the proposed development's Equivalent Persons (EP) has been estimated in accordance with City of Gold Coast's Water and Sewerage Demand Table. It should be understood that, due to the nature of the development and its location, the EP demand for both wastewater and water supply are calculated in the same manner.

The development has been assessed under two loading cases in order to better determine the anticipated impact it will have on the surrounding network. These cases are the:

- **Planned Demand** – A demand assigned to the site via the City of Gold Coast 2018 City Plan which is derived from GCWW 'Water and Sewerage Demand Table' and the property's net area.
- **Project Development Loading** – The calculated demand for the property based on proposed development yield and conversion rates from GCWW 'Water and Sewerage Demand Table'.

Table 4-1 Planned Demand

Category	Area (ha)	Conversion Rate	Planned Demand (EP)
RD6	0.7284	312EP/ha	227.26

Table 4-2 Projected Development Loading

Category	Quantity	Conversion Rate	Proposed Demand (EP)
Multi-Unit Dwelling 2 bedroom	1	1.76	1.76
Multi-Unit Dwelling 3+ bedroom	45	2.51	112.95
		Total	**114.71**

The proposed demand presents a decrease of -112.55 EP compared to the planned demand.

GCWW had previously advised that no network capacity assessments were required based on a previous concept loading of 253.60 EP. No network assessments have been completed in view of this previous confirmation. Refer to Appendix D for further information.

4.3 Water Network

4.3.1 Existing Potable Water

The following existing water mains and fittings have been identified adjacent to the development site from both CoGC ArcGIS mapping (online), field survey (Appendix A) and site inspection.

- 1 x DN100 water main within Fraser Avenue.
- 1 x DN100 water main within Nagal Avenue.
- 1 x DN375 water main adjacent the western boundary of the site within lot 1 on WD6367.

4.3.2 Planned Potable Water

The overlay within the City Plan for trunk water supply infrastructure indicates that there are no planned upgrades within the immediate vicinity of the site.

4.3.3 Proposed Potable Water

Connection for the proposed development to GCWW's supply network will be provided via connection to the DN100 main within Fraser Avenue. No works are proposed for the DN375 trunk water main adjacent the western boundary of the site within lot 1 on WD6367.

The fire and potable water meters will be located on site and above ground if larger than or including 50mm in size. Provision for a master meter arrangement, consisting of DN100 potable meter (mechanical) and DN150 fire meter (magflow/ultrasonic) has been made within development plans. A building hydraulic engineer will need to confirm the metering requirements during detailed design and where required adjustments to the master meter spatial allowance. All existing water meters will be decommissioned as part of these works, and a new master meter(s) installed.

Refer to Engineering Drawings included in Appendix B for further details.

4.3.4 Internal Water Network

The developer shall, as part of the building approval works, construct an internal water reticulation service for the proposed development in accordance with the relevant building code requirements.

A water network design will be undertaken by a qualified hydraulic engineer for the proposed development to determine adequate levels of services for all internal firefighting flows and services demands.

A qualified hydraulic engineer shall design the internal fire sprinkler service (if necessary) to cater for the fire services of the proposed development. The site is permitted to draw 15L/s for 2 hours from the municipal network, in accordance with the SEQ DSS Guidelines, unless otherwise approved by GCWW in the development approval or via supporting boundary pressure testing and request documents subsequent to the development approval.

4.4 Sewer Network

4.4.1 Existing Sewer

The following existing sewerage supply infrastructure has been identified adjacent to the development site from both CoGC ArcGIS mapping (online) and field survey (Appendix A). Sewer within and adjoining the site has been verified by field survey.

- 1 x DN150 gravity sewer property connection to the manhole adjacent the Nagal Avenue site entrance.
- 1 x DN150 gravity sewer main within lot 3 on WD810476 (open space) and Fraser Avenue, including 1 x manhole.
- 1 x DN300 gravity sewer main within lot 2 on WD810476 (open space) and Fraser Avenue, including 2 x manholes.
- 2 x DN300 gravity sewer mains within the west and south portions of the site, including 2 x manholes at the southern end.
- 2 x DN300 gravity sewer mains within Nagal Avenue, including 1 x manhole adjacent the site boundary.

4.4.2 Planned Sewer

The overlay within the City Plan for trunk sewerage infrastructure indicates that there are no planned upgrades within the immediate vicinity of the site.

4.4.3 Proposed Sewer

Connection for the proposed development to GCWW's wastewater network will be provided via connection to the DN300 gravity sewer network within the site.

The municipal sewer network within the site is to remain in place under a 3m wide easement. No modifications to the sewer alignment are proposed. This has been confirmed with GCWW, refer to Appendix E of this report for further information. A 2.4m vertical clearance is to be provided above the main, and unobstructed vertical clearance is to be provided above any maintenance structures.

It is noted that landscaping works will occur adjacent to and within the proposed sewer easement. This includes construction of a ~700mm high retaining wall and minor filling as well as landscaping. Drawings provided in Appendix B demonstrate that these works comply with QDC MP1.4, with landscaping to comply with Council's Connection Policy (i.e. no deep rooted, invasive or large plantings). The depth of the sewer does not surpass 3m and the main is DN300, therefore the 3m wide easement is suitable under the provisions of the SEQ Code.

Reuse of the existing sewer connection is recommended to be investigated in detailed design. This is subject to further survey, CCTV, condition assessment, detailed design and Council OPW approval. No CCTV is available for the existing sewer property connection at the time of this report, however has been confirmed to be DN150. Should the existing sewer connection be unsuitable for reuse, a new connection is proposed to the DN300 gravity sewer network within the site. It is envisaged that an upgraded connection would be provided to the existing connection location, if required.

Refer to Engineering Drawings included in Appendix B for further details.

4.4.4 Internal Sewer Network

The developer shall, as part of the building approval works, construct an internal sewer reticulation service for the proposed development in accordance with the relevant building code requirements.

4.5 Other Services

The following other services have been identified within the vicinity of the site:

- Communications and data cabling.
- Overhead power.
- Gas.

Refer to Appendix A and Appendix C for further information.

It is recommended that coordination and procurement of relevant approvals is undertaken with the asset owners for any necessary connection and modification works.

5 ROADS AND ACCESS

The proposed development will remove the existing Vehicular Cross Over (VXO) and install a new VXO from Fraser Avenue. This VXO will be a heavy-duty VXO generally in accordance with IPWEA DRG RSD-102. The municipal grate inlet within the existing VXO is to be retained.

Minor reshaping / improvement of the adjacent open space (3WD810476) is proposed as part of the drainage strategy, removing the steep batters and retaining structures within the open space area. This reshaping allows for improved / safer management of runoff.

Further, it is envisaged that roadworks are to be undertaken to suit changes at the Nagal Avenue interface. It should be noted that there is no formal VXO or kerb at the Nagal Avenue interface, which is acknowledged and proposed to be retained as part of the development.

No services have been identified for relocation to facilitate the above works.

All new and reinstated footpaths and other verge works must be designed in compliance with Council standards and be approved for Operational Works prior to construction. It is envisaged that verge and footpath reinstatement (including relevelling of pit lids) will need to occur to facilitate civil connections, earthworks & interfacing, standard verge grading as well as any electrical works or temporary construction VXOs.

Further details and necessary approvals are to be sought during the Operational Works Phase.

Refer to Engineering Drawings included in Appendix B for further details.

6 COASTAL EROSION

Investigations have identified that the site is within the City of Gold Coast Coastal Erosion Hazard Overlay, shown in Figure 6-1 below. A review has been undertaken of the proposed development site to determine the relationship to relevant CoGC Council requirements for its Coastal Erosion Hazard Overlay Code.

Council's coastal overlay code has been completed which outlines specific requirements the development must adhere to such as but not limited to sand management and footing design.

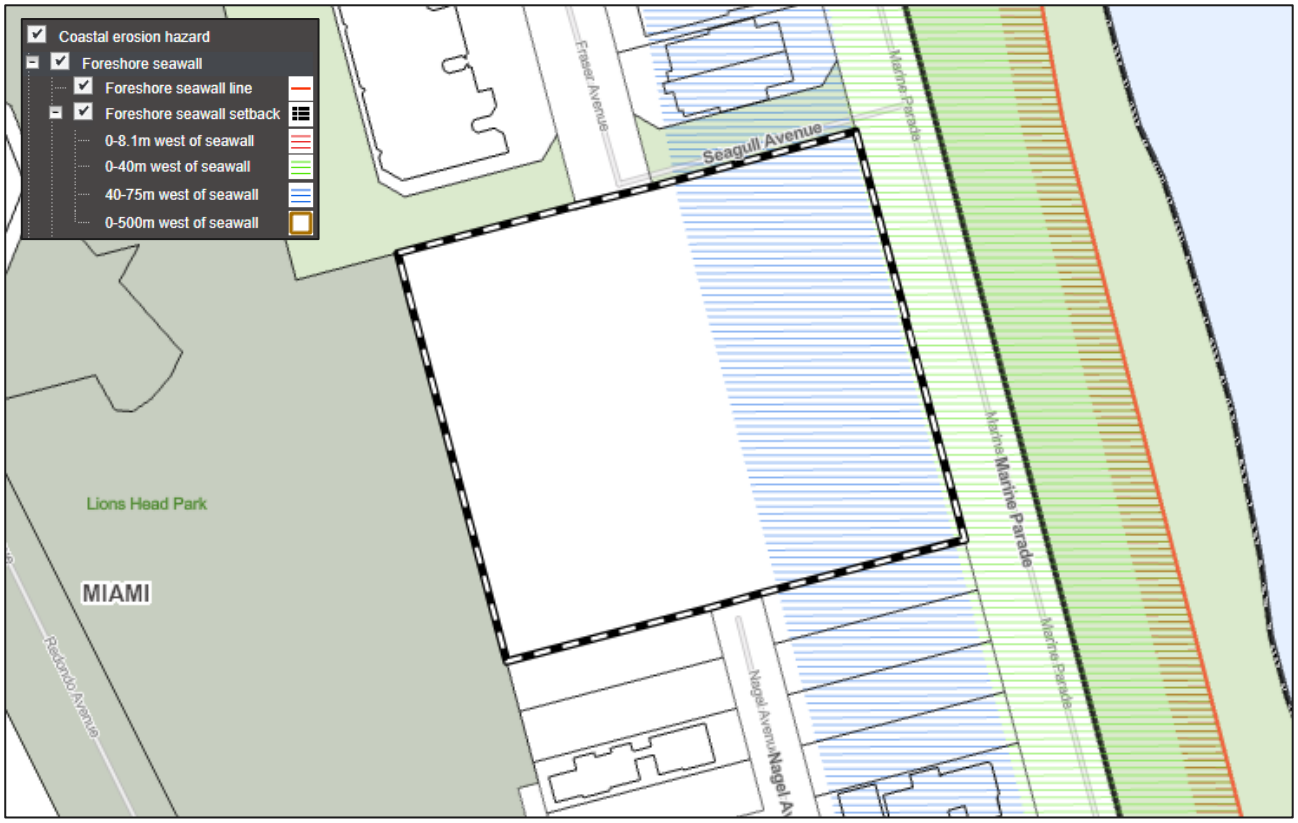


Figure 6-1 CoGC Coastal Erosion Hazard Overlay

7 CONCLUSION

This report has concluded that the site can readily connect to the existing engineering services. Future Operational Works and Building Works applications will be sought to permit the works to be undertaken.

Stormwater

- Stormwater will be managed on-site through private infrastructure.
- Stormwater will be discharged to the existing lawful point of discharge being Marine Parade.
- Conveyance of external flows to Marine Parade is to be maintained.

Potable Water

- Potable water connection for the proposed development to GCWW's water supply network will be provided via the existing DN100 water main within Fraser Avenue.

Sewer

- Sewer connection for the proposed development to GCWW's sewer network will be via the existing DN300 gravity sewer network within the site.
- The existing sewer main within the subject site is to remain within the subject site and proposed works adjacent to it compliant with relevant spatial offsets to maintain access to the infrastructure.
- It is recommended that the existing property connection is further surveyed during detailed design to determine if of suitable condition for reuse, otherwise is to be decommissioned.

Network Loading

- GCWW had advised that no network capacity assessments are required to support this application, based on a higher EP previously advised.

Roads and Footpaths

- A new VXO will be installed from Fraser Avenue.
- The municipal grate within the abovementioned VXO is to be retained.

Coastal Overlays

- The proposed works are to adhere to Council's Coastal Erosion Hazard Overlay code including but not limited to sand management and footing design.

APPENDIX A
Survey



Legend

CAG	Comms Above Ground	BH	Bore Hole
COMK	Comms Marker	BOL	Bollard
COMP	Comms Pit		Edge Garden
CUG	Comms Under Ground	//	Fence
SWD	Drainage Swug		Retaining Wall
	Drainage Centre Line	IO	Inspection Opening
SWMH	Stormwater MH	MH	Unidentified Manhole
SWGT	Stormwater Gully Trap	PO	Post
SWFI	Field Inlet Pit	SI	Sign
SWKA	Stormwater Kerb Adaptor	TBM	Temporary Bench Mark
UE	Power Line Under Ground	T	Telecom Line
	Power Line Above Ground	TEL	Telecom Pit
ELMK	Electrical Marker	TELBOX	Telecom Telbox
ELP	Electrical Pillar	TEM	Telecom Marker
ELPI	Electrical Pit	TP	Telecom Pole
GW	Guy Wire Anchor		Bottom of Bank
LAMP	Lamp Post		Top of Bank
LP	Light Pole		Change of Grade
PP #	Power Pole		Water Line
PPL	Power Pole with Light	TR 0306	Edge of Vegetation; Tree - 0.3m Dia Trunk & 6m Canopy Spread
PPLT	PP with Light & Transformer	W	Water Main
PPT	Power Pole with Transformer	HR	Fire Hose Reel
G	Gas Main	HY	Water Hydrant
GM	Gas Meter	SPR	Water Sprinkler
GV	Gas Valve	SV	Water Valve
	Road Crown	TAP	Water Tap
	Edge of Bitumen	WBE	Hydrant Booster
	Edge Track	WM	Water Meter
GP	Guide Post	WMK	Water Marker
	Guard Rail		Bitumen
	Road Kerb Invert		Concrete
S	Sewer Main		Dirt
SMH	Sewer Manhole		Garden
SMK	Sewer Marker		Gravel / Rock
SVE	Sewer Vent		Pavers
	Awning / Top of Gutter		Tiles
TOG RL	Top of Gutter		

Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale 1:750 @ A3

0 7.5 15 22.5m

1 : 750@A3 (Before Reduction)

Approved: DGB

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client

122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

Detail Survey Sheet 1 of 6

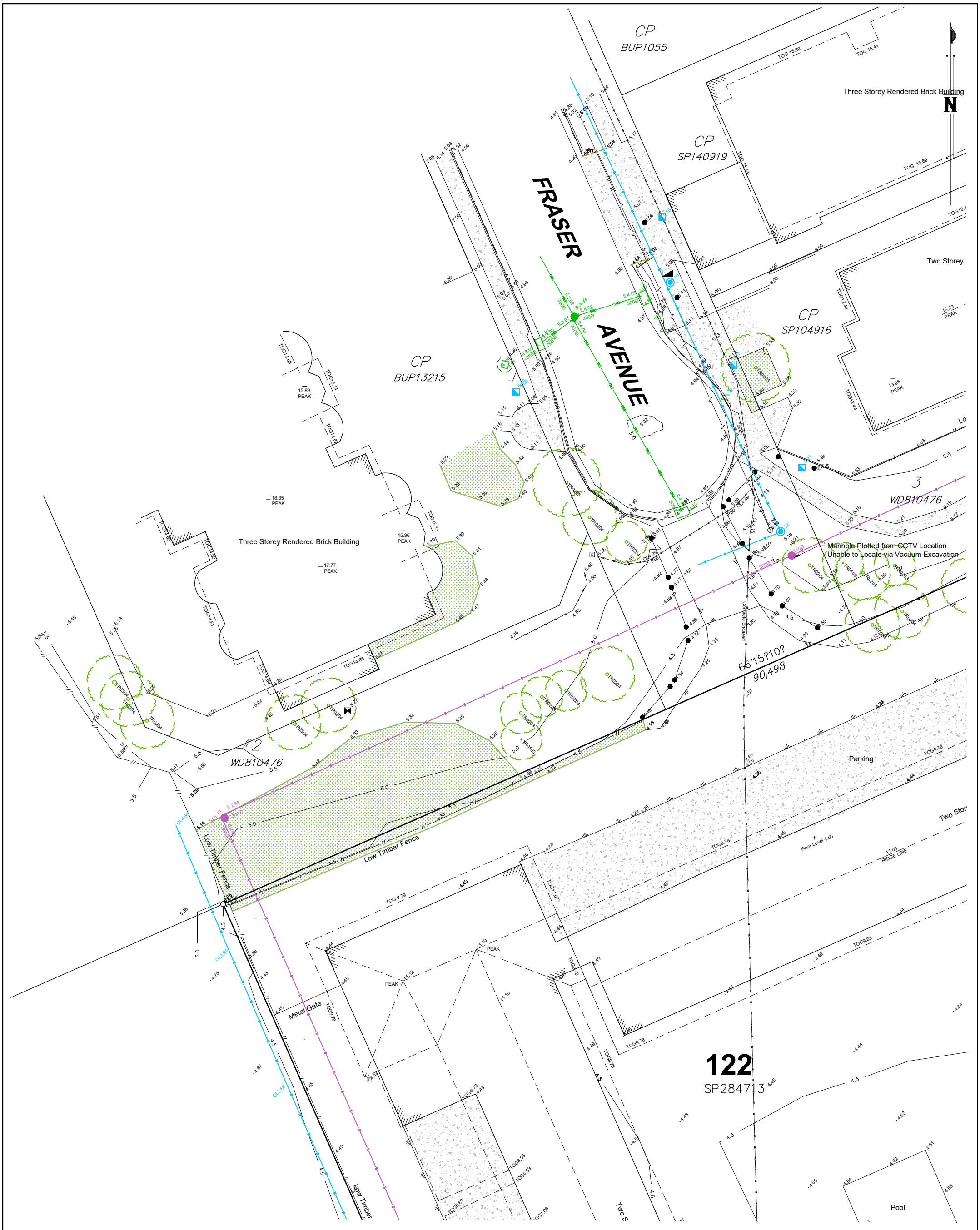
Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au

JENSEN BOWERS

Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Approved: DGB

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

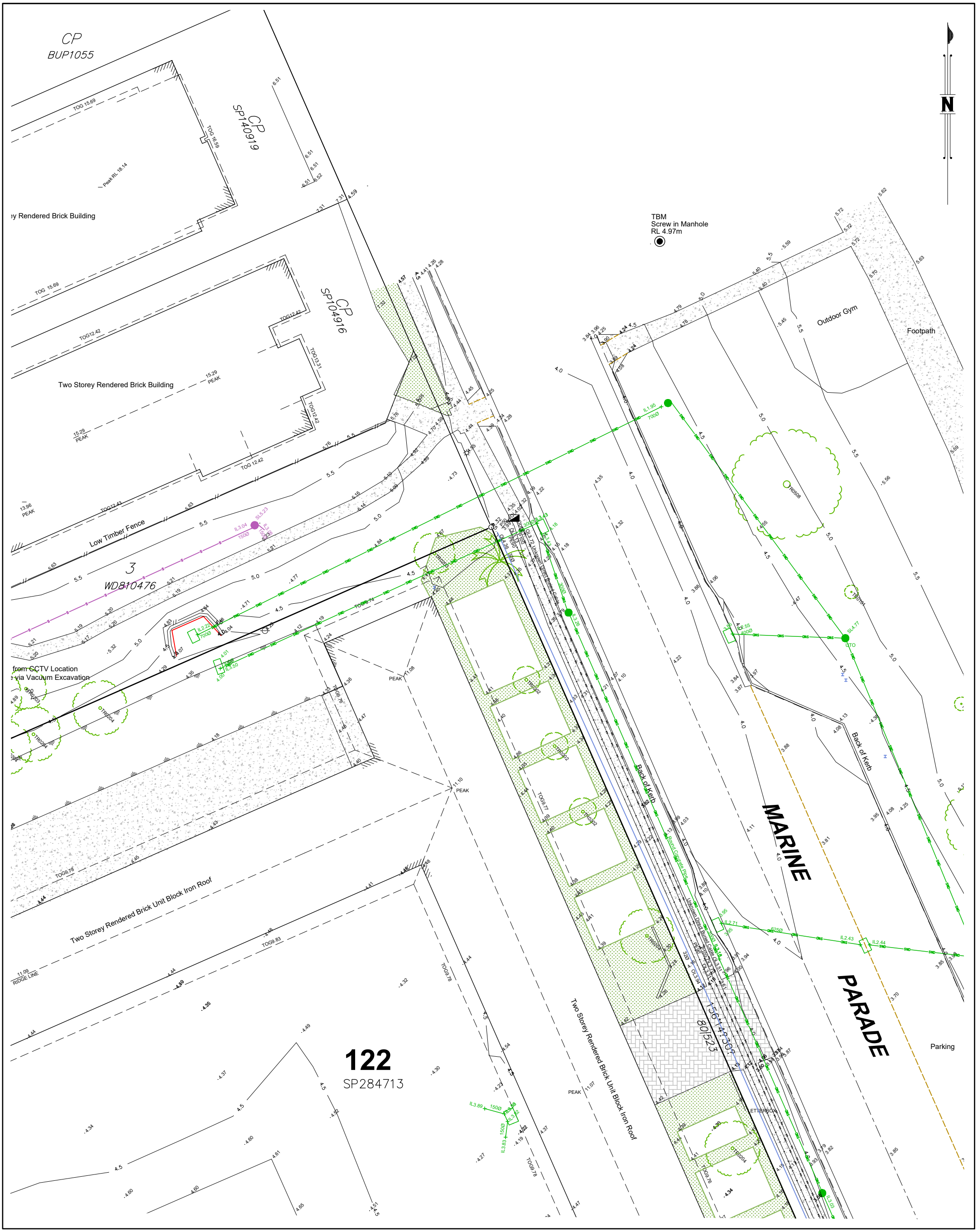
122 Marine Parade Miami

Detail Survey Sheet 2 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au
JENSEN BOWERS
Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 F (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

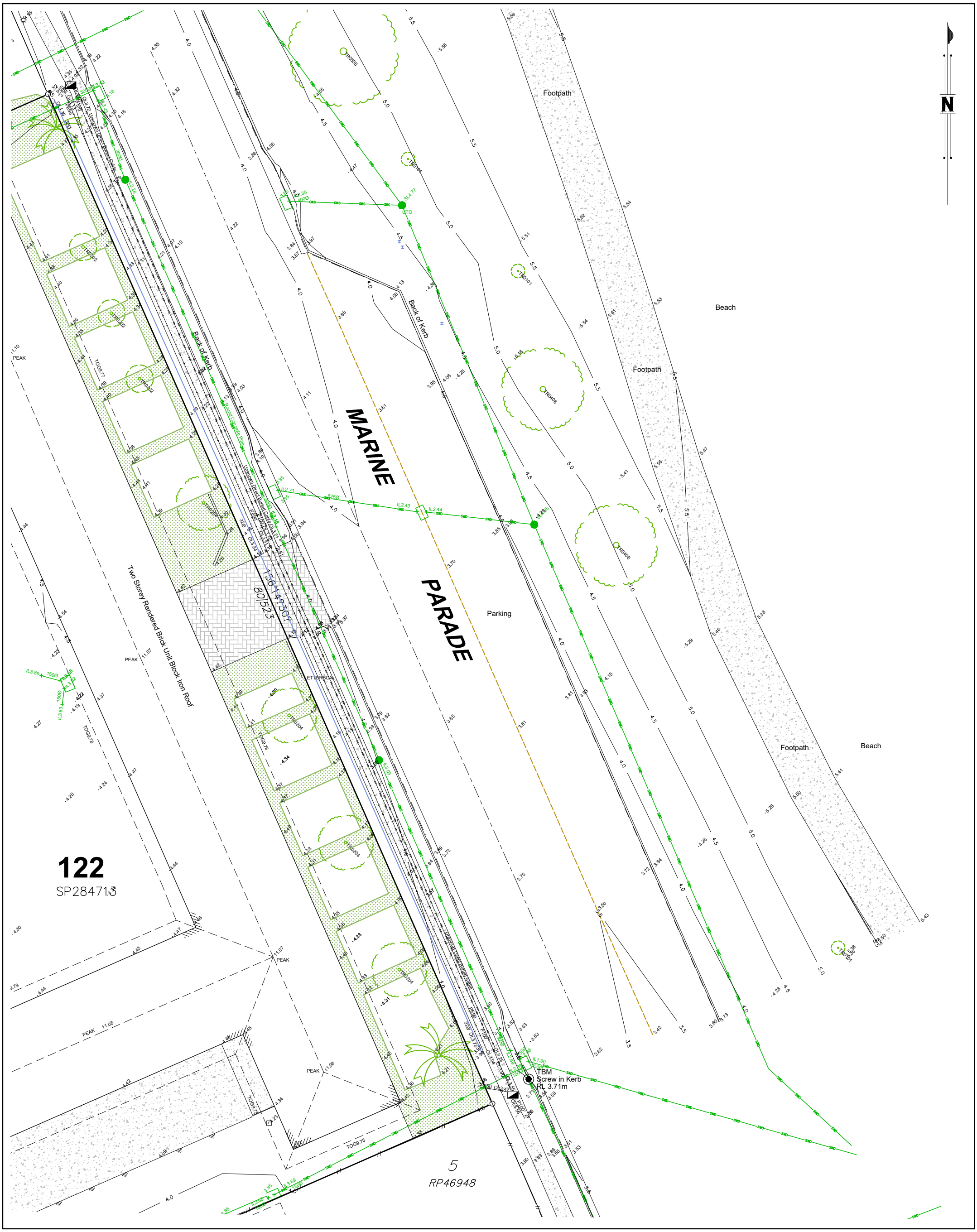
Detail Survey Sheet 3 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

JENSEN BOWERS
SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au

Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale

0 2.5 5 7.5m

1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client

122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

Detail Survey Sheet 4 of 6

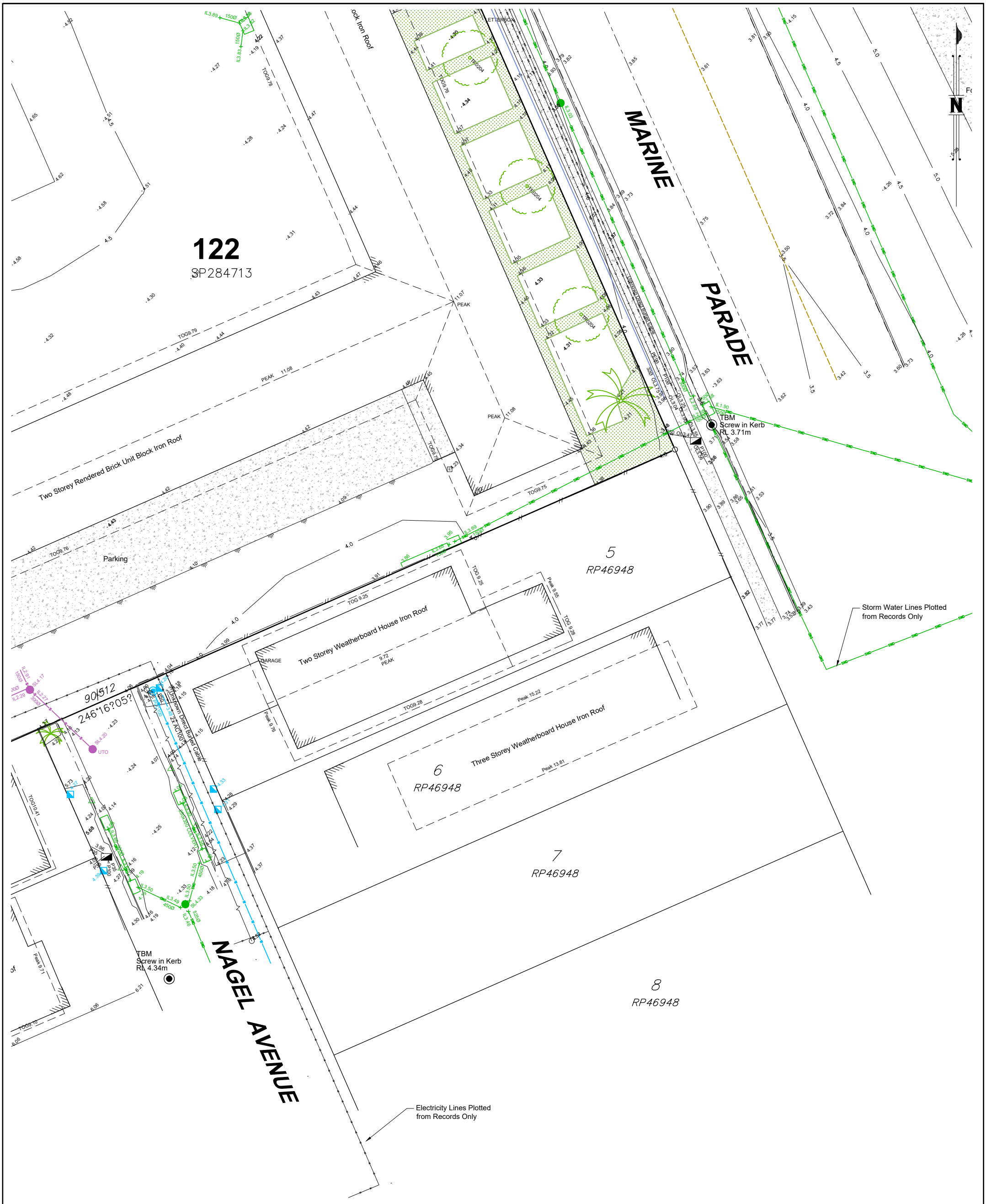
Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au

JENSEN BOWERS

Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

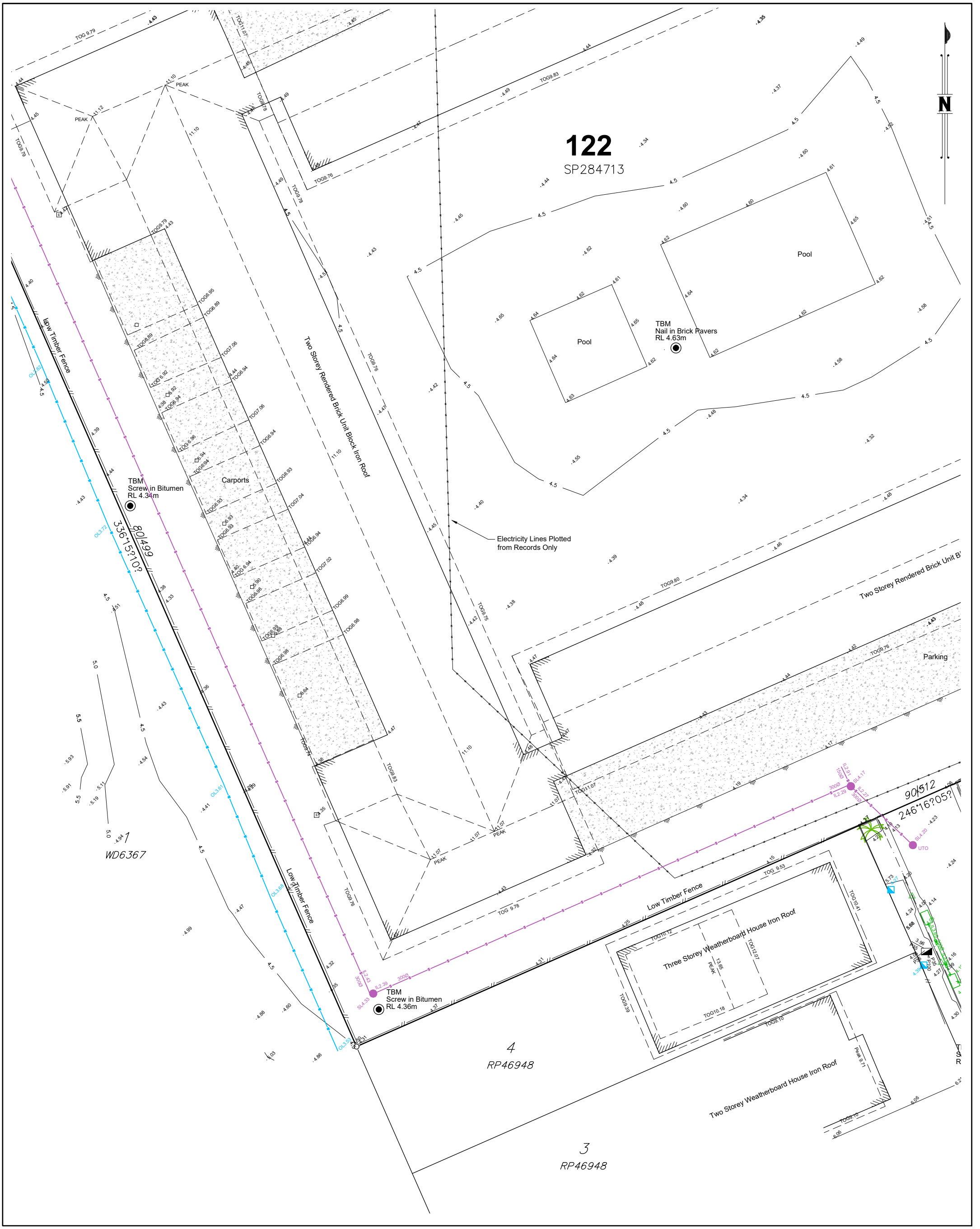
122 Marine Parade Miami

Detail Survey
Sheet 5 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au
JENSEN BOWERS
Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd



Drawn:	SS	Date:	05/12/2024
Surveyed:	AJ	Date:	28/11/2024
Checked:	DB	Date:	05/12/2024

Associated Consultants

Disclaimer

Any licence, expressed or implied, to use this document for any purpose whatsoever is restricted to the terms of the agreement or implied agreement between Jensen Bowers and the instructing party.

Local Authority: Gold Coast City Council
Authority Ref. No: .
RP Description: Lot 122 on SP284713

Locality: Miami
Date of Survey: 28/11/2024
Level Datum: AHD (der)
Origin: OPM 21031 (RL 4.82)
Level Bk / Fld Bk: Digital
Horizontal Datum: IS306901
Contour Interval: 0.5m

Scale
0 2.5 5 7.5m
1 : 250@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Approved: DGB

Issue	Description	Date	Appd.
A	Original Issue	05/12/24	DGB
B	Sewer Added	17/12/24	DGB
C	Services and Contour Updated	25/03/25	SJM

Client
122 Marine Parade P/L
ATF 122 Marine Parade Unit Trust

122 Marine Parade Miami

Detail Survey
Sheet 6 of 6

Drawing No.	Issue	Original Size
S-11287-001	C	A3

SURVEYING
3D SPATIAL SOLUTIONS
DEVELOPMENT ADVISORY
jensenbowers.com.au
JENSEN BOWERS
Brisbane (Head Office)
59 Anderson Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818
T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607
©Copyright reserved to Jensen Bowers Group Consultants Pty Ltd

APPENDIX B
Engineering Drawings

PAVEMENT TO BE REINSTATED WHERE DISTURBED BY SITE WORKS.

REINSTATEMENT OF KERB, CHANNEL AND VERGE (INCLUDING FOOTPATH) WHERE DISTURBED.

PROVISIONAL ENERGEX LEAD-IN PIT LOCATION.

DEMOLITION OF EXISTING VXO. EXISTING GRATE TO BE RETAINED / REPLACED.

NEW NON-STANDARD VXO GENERALLY IN ACCORDANCE WITH IPWEA RSD-102.

RESHAPING WORK WITHIN PARKS PROPERTY (LOT 3 ON WD810476) TO CONVEY OVERFLOW FROM COUNCIL DRAINAGE NETWORK AND REMOVE FALL RISK STRUCTURES AND STEEP BATTER SLOPES. REFER SBSMP FOR FURTHER DETAILS.

CONNECT TO EXISTING DN100 WATER MAIN.

PROVISION FOR VERTICALLY STACKED DN150 FIRE DN100 POTABLE WATER METERS, 600mm CLEAR TO COUNCIL INFRASTRUCTURE.

UPPER LEVEL OVERHANG HATCHED RED. MINIMUM 2.4m VERTICAL CLEARANCE TO BE PROVIDED.

REPOSITION VEHICLE BARRIERS TO LANDSCAPE ARCHITECT SPECIFICATION.

CONNECTION TO EXISTING FIELD INLET. REMOVE FENCING AND WALL FOLLOWING RESHAPING AND RECONSTRUCT TO STANDARD FIELD INLET. REFER SBSMP FOR FURTHER DETAILS.

LOW VOLTAGE ENERGEX CABLE WITHIN SITE. FUTURE ELECTRICAL DESIGN TO SEEK APPROVALS AS REQUIRED FOR ANY NECESSARY MODIFICATIONS.

EXISTING DN150 SEWER MAIN TO BE RETAINED IN PLACE UNDER 3m WIDE EASEMENT IN FAVOUR OF GCWW. 2.4m VERTICAL CLEARANCE, OTHERWISE UNOBSTRUCTED CLEARANCE FOR MAINTENANCE STRUCTURES.

WORKS TO AVOID EXISTING DN375 TRUNK WATER MAIN IN CLOSE PROXIMITY TO SITE BOUNDARY.

PRIVATE INTERNAL SERVICES BY FUTURE BUILDING HYDRAULICS.

EXISTING DN150 SEWER CONNECTION TO BE REUSED SUBJECT TO CCTV AND ASSESSMENT OF SUITABILITY. ALTERNATIVELY UPGRADED CONNECTION TO BE PROVIDED.

UPPER LEVEL OVERHANG HATCHED RED. MINIMUM 2.4m VERTICAL CLEARANCE TO BE PROVIDED.

PRIVATE DRAINAGE FOR CONVEYANCE OF EXTERNAL FLOWS. REFER SBSMP FOR FURTHER DETAILS.

UNOBSTRUCTED VERTICAL CLEARANCE TO BE PROVIDED FOR MAINTENANCE STRUCTURES.

CROSSING OF PRIVATE STORMWATER AND MUNICIPAL SEWER TO BE AS PER SEQ CODE.

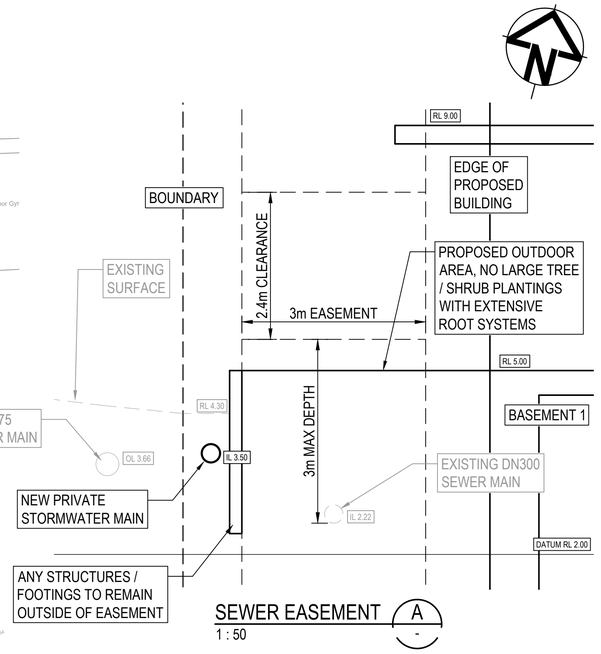
PAVEMENT TO BE REINSTATED WHERE DISTURBED BY SITE WORKS.

REINSTATEMENT OF KERB, CHANNEL AND VERGE WHERE DISTURBED.

PAVEMENT TO BE REINSTATED WHERE DISTURBED BY SITE WORKS.

REINSTATEMENT OF KERB, CHANNEL AND VERGE (INCLUDING FOOTPATH) WHERE DISTURBED.

NEW CONNECTION TO EXISTING GULLY PIT. EXISTING CONNECTION TO BE DECOMMISSIONED. REFER SBSMP FOR FURTHER DETAILS.



SEWER EASEMENT A
1 : 50

NOTES

1. PROPOSED SERVICES SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED FIELD SURVEY, DESIGN AND APPROVAL BY AUTHORITIES.
2. REFER TO PROJECT SURVEY AND OTHER ASSET INFORMATION FOR LOCATION OF EXISTING SERVICES AND ASSUMPTIONS.

LEGEND

- SITE BOUNDARY
- EXISTING SURFACE LEVEL
- EXISTING STORMWATER DRAINAGE
- EXISTING SEWERAGE RETICULATION
- EXISTING SEWER RISING MAIN
- EXISTING WATER RETICULATION
- EXISTING COMMS RETICULATION
- EXISTING ELECTRICAL
- EXISTING OVERHEAD ELECTRICAL
- EXISTING FIBRE OPTIC
- EXISTING GAS
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- PROPOSED WATER RETICULATION
- FUTURE PRIVATE STORMWATER
- FUTURE PRIVATE SEWER
- FUTURE PRIVATE WATER
- SERVICE TO BE DECOMMISSIONED
- EASEMENT
- PROPOSED VXO / FOOTPATH
- STORMWATER MANAGEMENT DEVICE REFER SBSMP FOR FURTHER DETAILS
- EDGE OF BASEMENT WALL

Issue	Description	DR	CH	VE	Date
01	ORIGINAL ISSUE	BW	DC	JS	24.04.25

100mm on Original

Scales

0 0.5 1 2 3 4 5m
1 : 50

0 5 10 15 20 25m
1 : 250

Architect: BDA ARCHITECTURE

Surveyor: JENSEN BOWERS

Client: MONACO PROPERTY GROUP PTY LTD

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

© Copyright reserved

Original Issue Signatures			
Drawn	B. WIESER	Original Size	A1
Designed	B. WIESER	Height Datum	AHD
Project Manager	J. STOCKWELL	Grid	LOCAL
Verified	J. STOCKWELL		

Project: 122 MARINE PARADE MIAMI

Title: ENGINEERING SERVICES LAYOUT PLAN

ARCADIS
Arcadis Australia Pacific Pty Limited
P O Box, 1653
Southport QLD 4215
ABN 76 104 485 289
Tel No: +61 7 5532 3933
Fax No: +61 7 5591 4778
www.arcadis.com

Project No.	Folder Prefix	Zone	Stage	Phase	Discipline	Type	Drawing No.	Issue
30264961-3	DA	-	AA01	DA	-	CV	- DRG - 0001	- 01

Date Plotted: 24 Apr 2025 - 09:38AM File Name: C:\Users\bw84462\ARCADIS\30264961 - UDR GC FY25 Projects 8 - Project\3 - 122 Marine Parade, Miami\D-DigEng\DA-DA Drawings\30264961-3 - Drawing Set.dwg V1

APPENDIX C
Before You Dig Maps

1



Scale 1: 700 map

Map Sources: Esri, Garmin, HERE, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

N

Enquiry Area

Map Key Area

Map Symbology

Pipe

- Low pressure
- Medium pressure
- High pressure
- Transmission pressure
- Critical main (behind pipe)
- Proposed (pressure by colour)
- LPG (pressure by colour)
- Abandoned
- Idle/inactive
- Sleeve
- Casing (behind pipe)

Area

- BYDA area of interest

Pipe code and material

C* (for example, C2)	Cast iron
CU	Copper
N2	Nylon
P*	Polyethylene (PE)
P6, P7, P9–P12	Medium density PE
P2, P4, P8	High density PE
S*	Steel
W2	Wrought galv iron
W3	PE coat wrought galv iron

Object

- Valve
- Buried valve
- Regulator
- Gas supplied = yes
- CP rectifier terminal
- CP test station
- CP anode
- CP bond wire
- Syphon
- Trace wire point

Abbreviation

BoK	Back of kerb	FoK	Front of kerb
C	Depth of cover	Galv	Galvanized
CP	Cathodic protection	NTI	Not tied in

Example

Pipe	
40P6 in 80C2	40 mm high pressure medium density poly in an 80 mm cast iron casing
63S8	63 mm medium pressure steel

Pipe code

Pipe diameter in millimetres is shown before pipe code.
40P6 = 40 mm nominal diameter

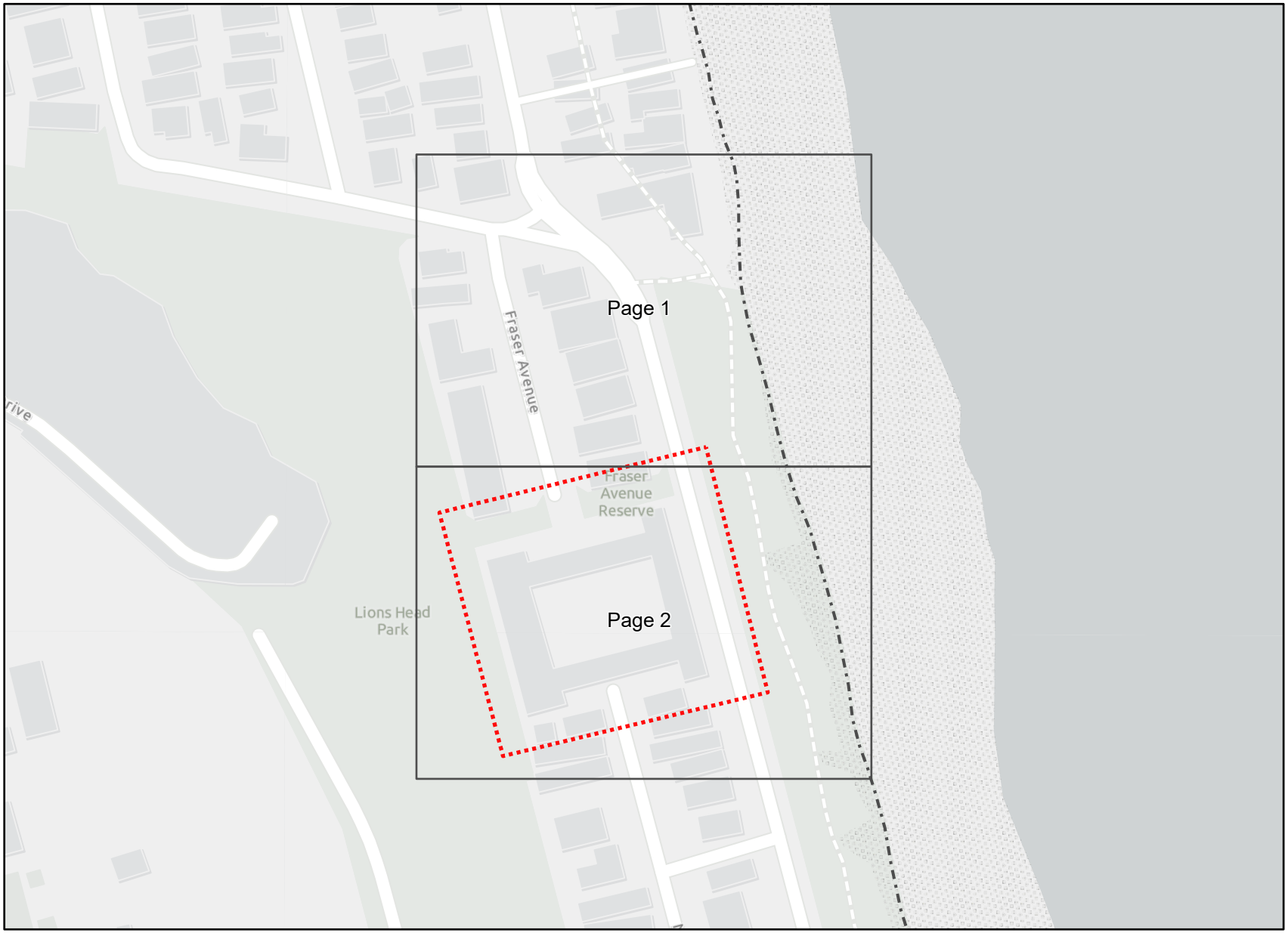
This map was created in colour and should be printed in colour

CITY OF GOLDCOAST.

Job # 38560736
Seq # 250458843

Provided by City of Gold Coast

BEFORE YOU DIG www.byda.com.au



Legend

- BYDA Enquiry
- Detailed map page

Esri Community Maps Contributors, Department of Resources, DESI, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

Disclaimer: The Plan is provided in response to a Before You Dig request. While all reasonable care has been taken to ensure the accuracy of the information on this plan, its purpose is to provide a general indication of the location of Gold Coast City Council infrastructure. The information provided may contain errors or omissions and the accuracy may not suit all users. A site inspection and investigation is recommended before commencement of any project based on this data.

In an emergency contact City of Gold Coast on 1300 465 326

Index Sheet

Plans generated by SmarterWX™ Automate

0 25 50 100 m

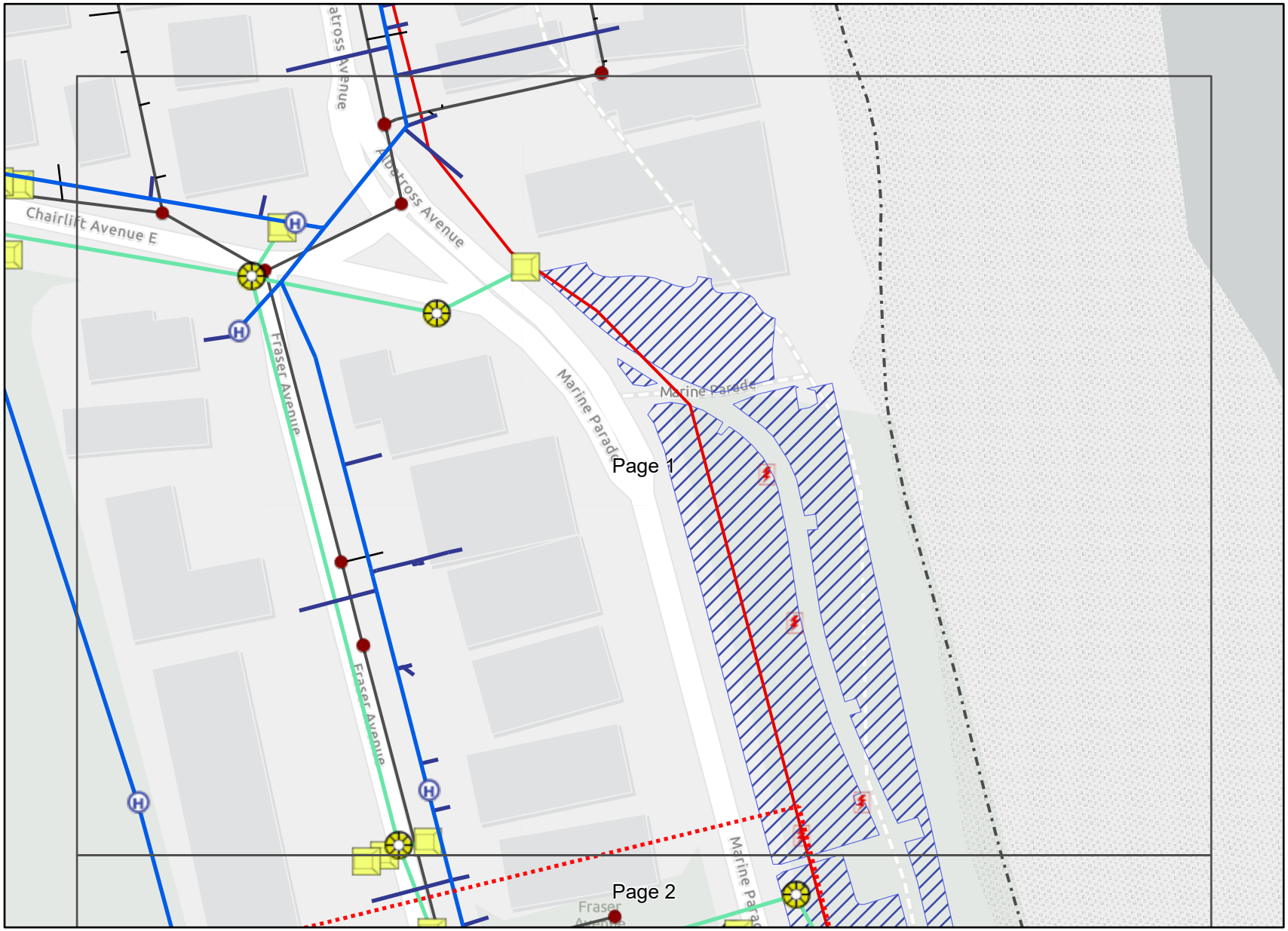
N

Scale 1:2,500

CITY OF GOLDCOAST.

Job # 38560736
Seq # 250458843
Provided by City of Gold Coast

BEFORE YOU DIG www.byda.com.au



Legend

- BYDA Enquiry
- Water Hydrant
- Water Pipe
- Potable Water Connection
- Stormwater Drainage Pipe
- Stormwater Inlet Gully
- Stormwater Manhole
- Sewer Connection
- Sewer Pipe Non Pressure
- Sewer Manhole
- Irrigation System
- Electrical and Communication Conduit
- Cabling Pit
- Fibre Optic Pit
- Fibre Optic Cable
- GCCC Boundary

Esri Community Maps Contributors, Department of Resources, DESI, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

Disclaimer: The Plan is provided in response to a Before You Dig request. While all reasonable care has been taken to ensure the accuracy of the information on this plan, its purpose is to provide a general indication of the location of Gold Coast City Council infrastructure. The information provided may contain errors or omissions and the accuracy may not suit all users. A site inspection and investigation is recommended before commencement of any project based on this data.

In an emergency contact City of Gold Coast on 1300 465 326

04/02/25 (valid for 30 days)

Plans generated by SmarterWX™ Automate

0 10 20 40 m

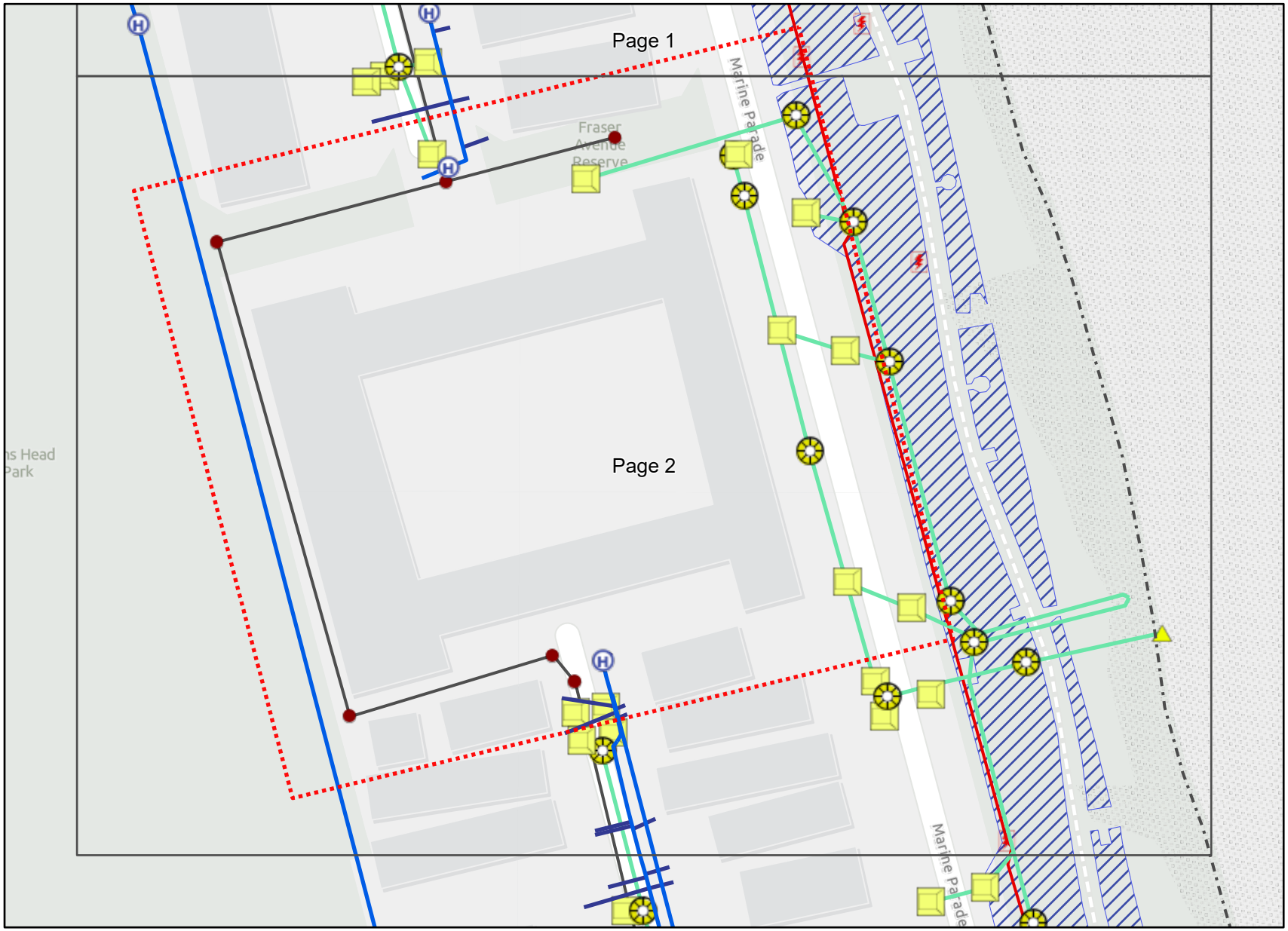
N

Scale 1:1,000

CITY OF GOLDCOAST.

Job # 38560736
Seq # 250458843
Provided by City of Gold Coast

BEFORE YOU DIG www.byda.com.au



Legend

- BYDA Enquiry
- Water Hydrant
- Water Pipe
- Potable Water Connection
- Stormwater Drainage Pipe
- Stormwater Inlet Gully
- Stormwater Manhole
- Stormwater End Structure
- Sewer Pipe Non Pressure
- Sewer Manhole
- Irrigation System
- Electrical and Communication Conduit
- Cabling Pit
- Fibre Optic Pit
- Fibre Optic Cable
- GCCC Boundary

Esri Community Maps Contributors, Department of Resources, DESI, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

Disclaimer: The Plan is provided in response to a Before You Dig request. While all reasonable care has been taken to ensure the accuracy of the information on this plan, its purpose is to provide a general indication of the location of Gold Coast City Council infrastructure. The information provided may contain errors or omissions and the accuracy may not suit all users. A site inspection and investigation is recommended before commencement of any project based on this data.

In an emergency contact City of Gold Coast on 1300 465 326

04/02/25 (valid for 30 days)

Plans generated by SmarterWX™ Automate

0 10 20 40 m

N

Scale 1:1,000

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 250458845
Date: 04/02/2025

Scale: 1:1025
Tile No: **OVERVIEW**

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

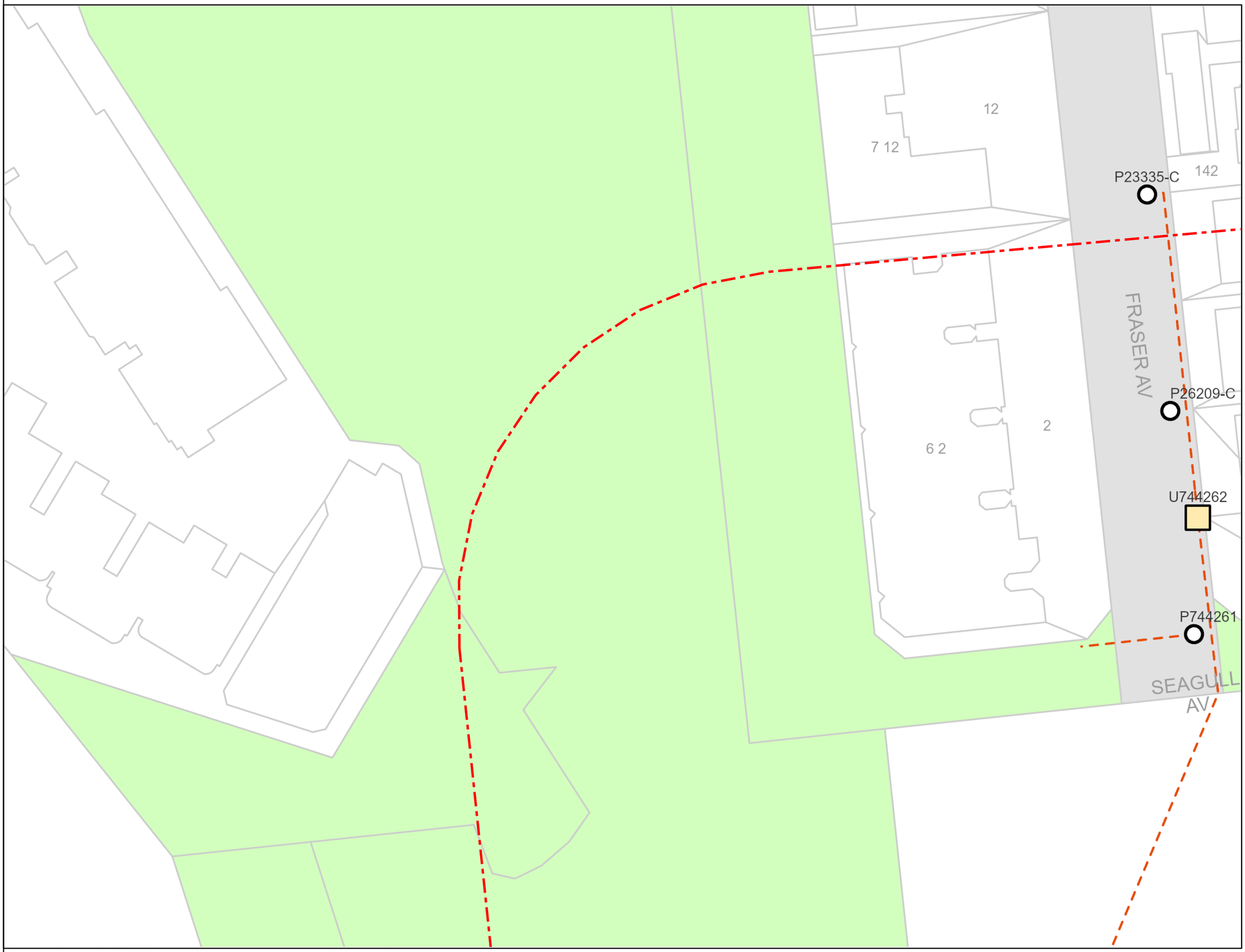
N
W E
S

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor Pelican Corp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 250458845
Date: 04/02/2025

Scale: 1:500
Tile No: **1**

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

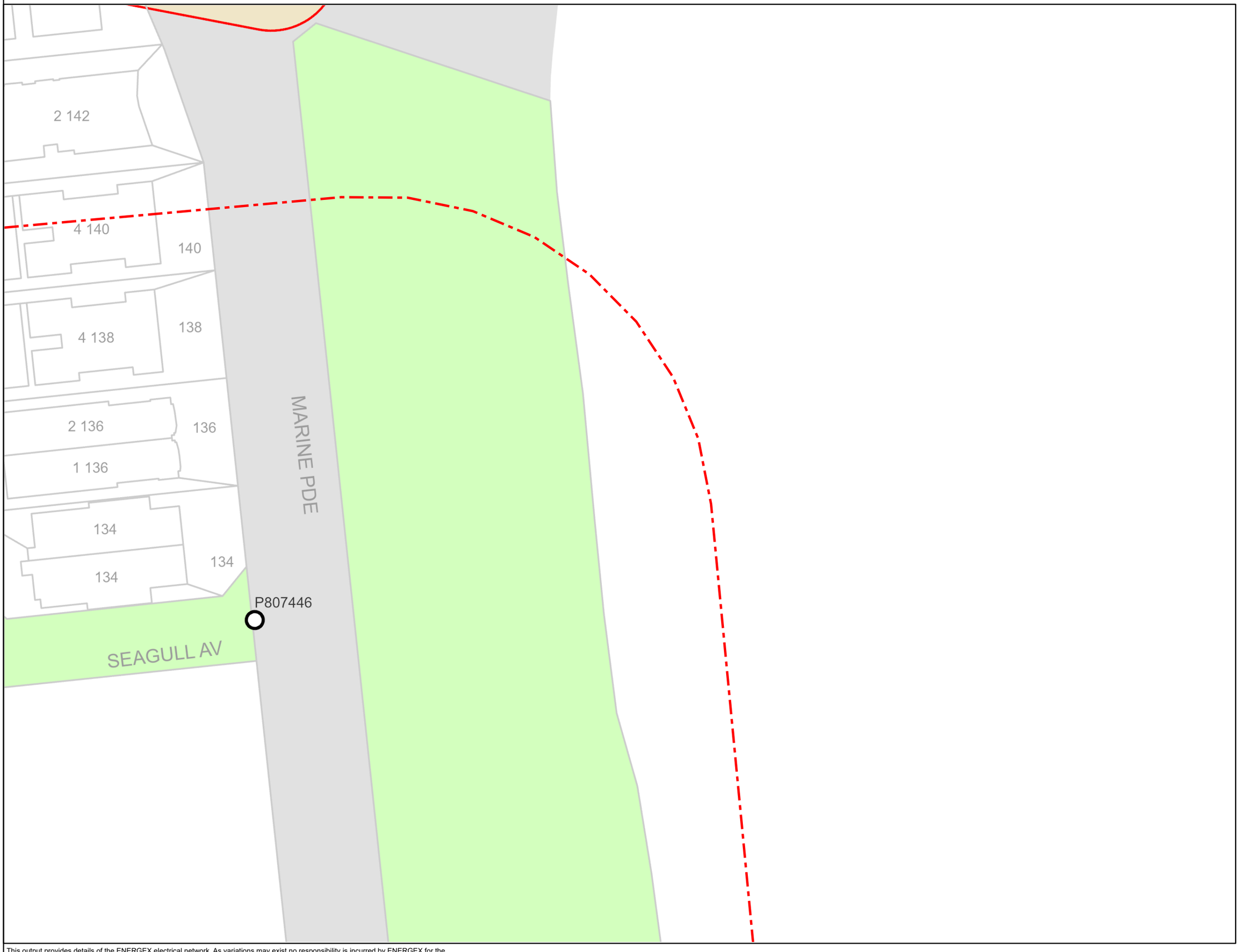
N
W E
S

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor Pelican Corp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 250458845
Date: 04/02/2025

Scale: 1:500
Tile No: **2**

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

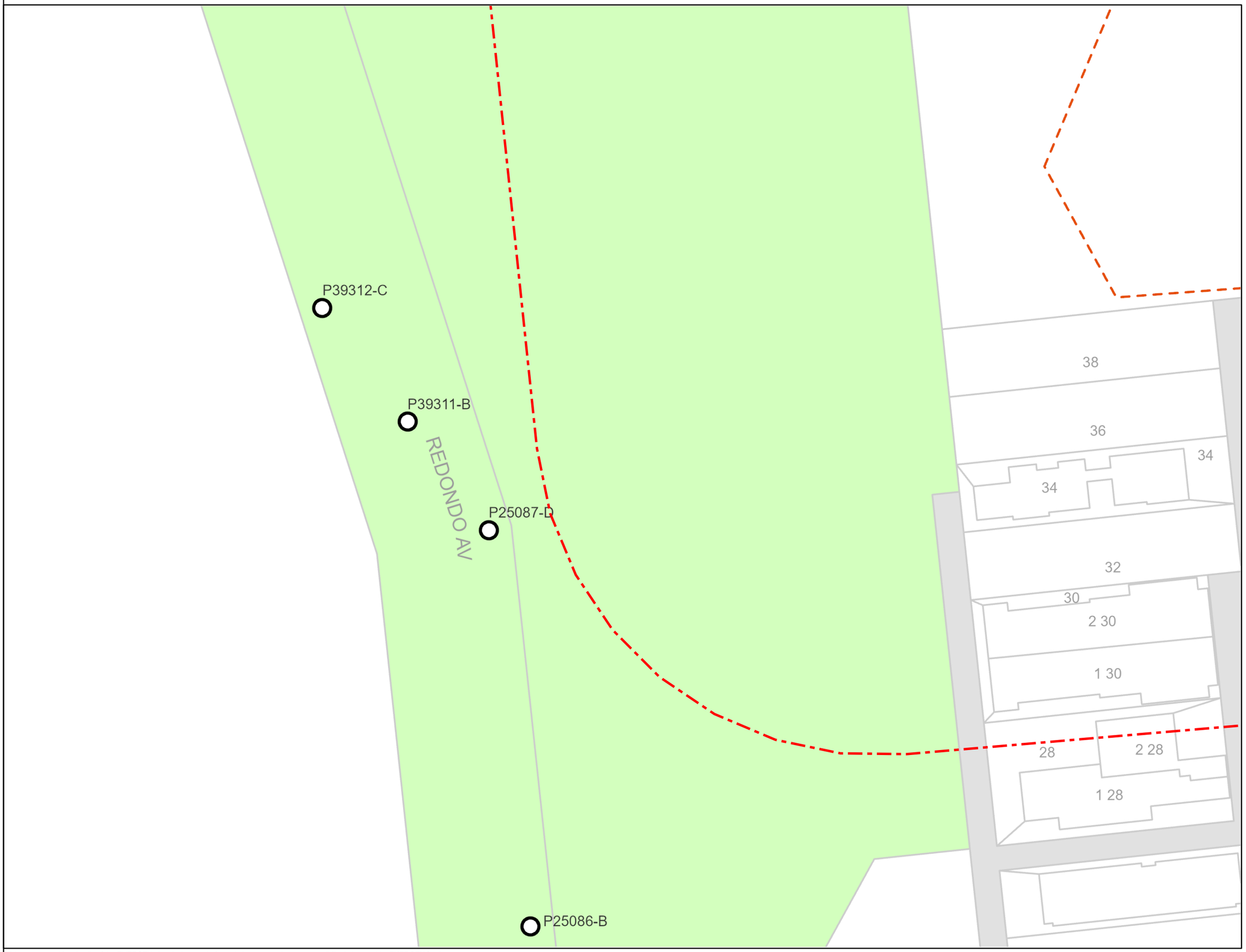
N
W E
S

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor Pelican Corp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 250458845
Date: 04/02/2025

Scale: 1:500
Tile No: **3**

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

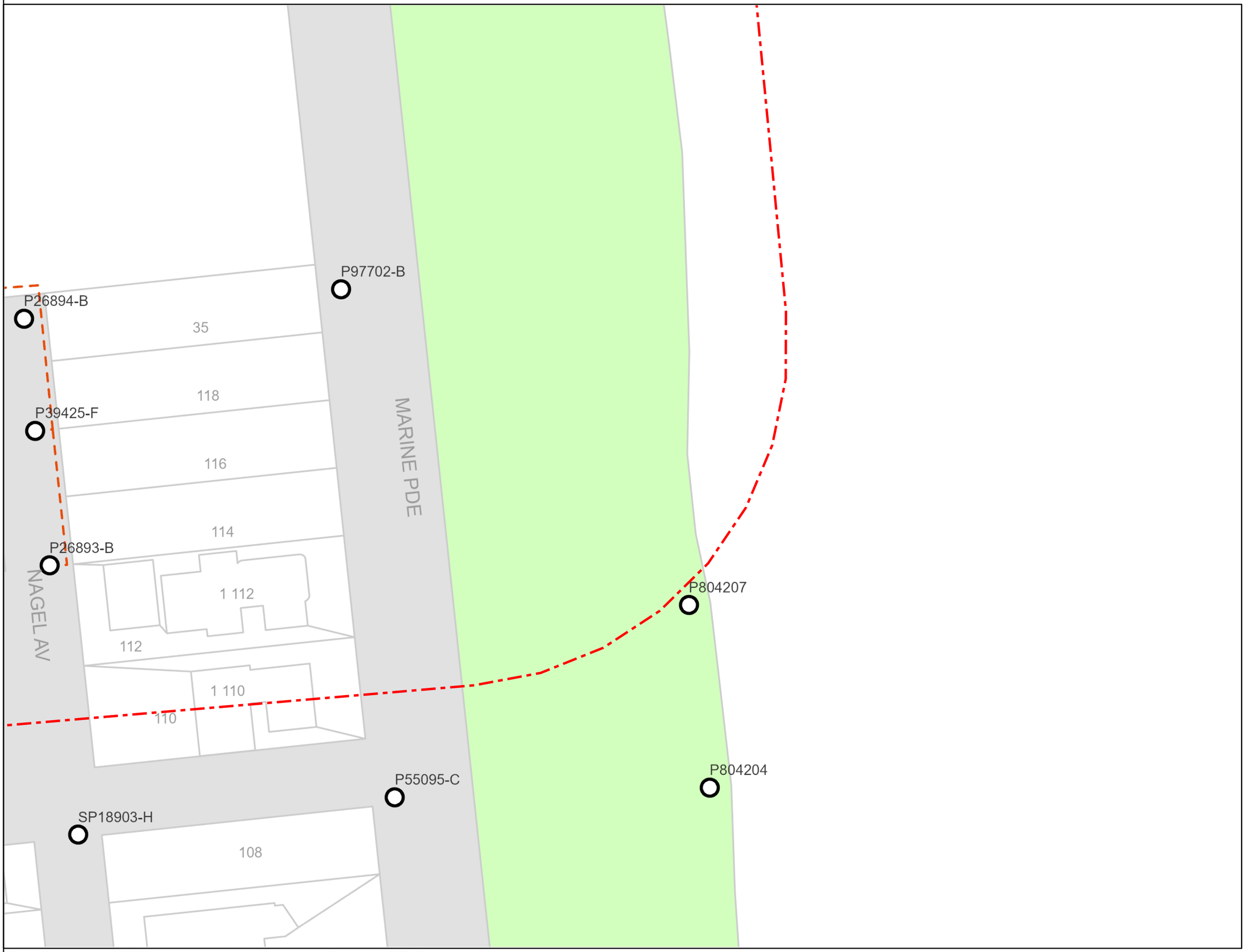
N
W E
S

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor Pelican Corp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 250458845
Date: 04/02/2025

Scale: 1:500
Tile No: **4**

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

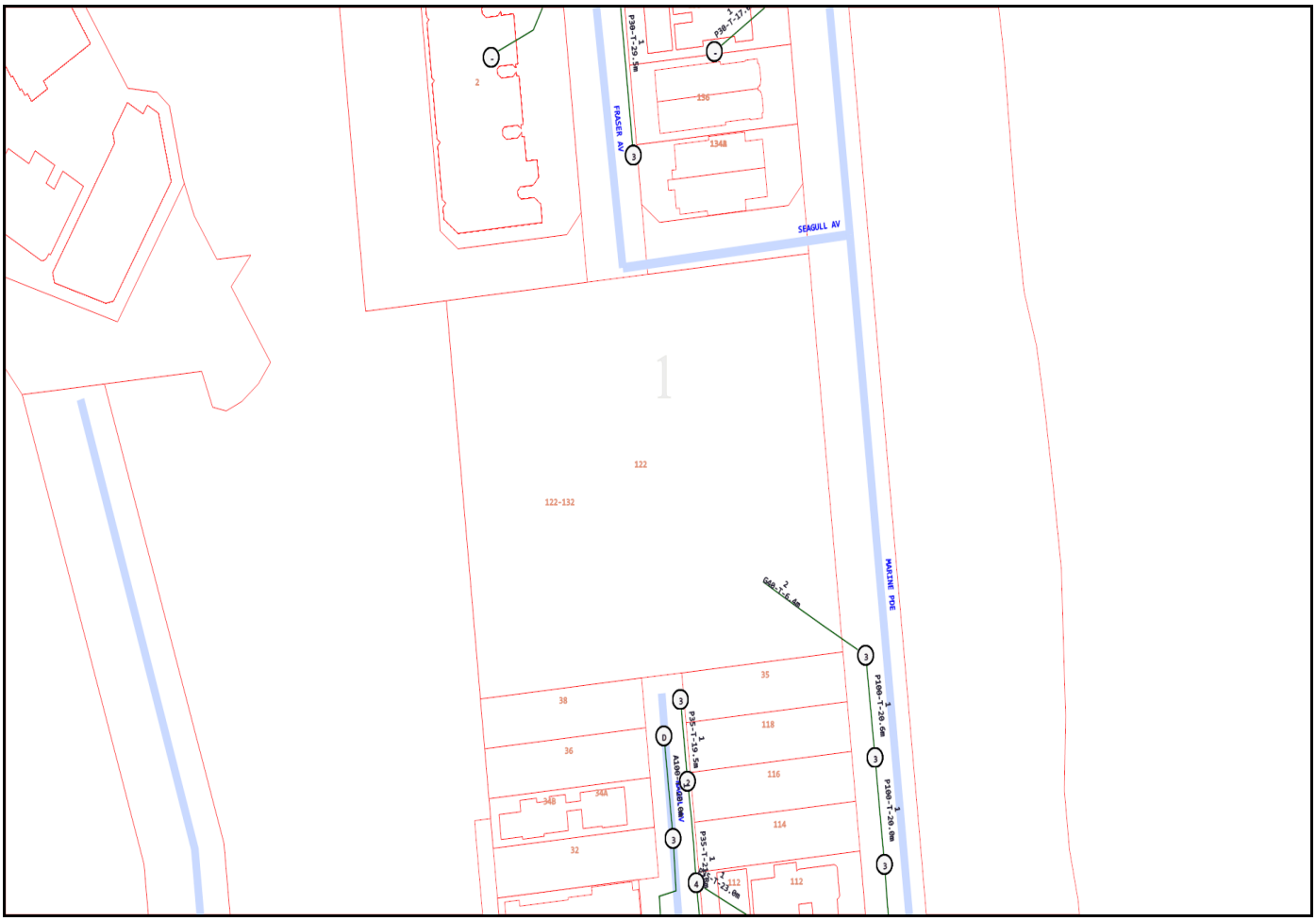
N
W E
S

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor Pelican Corp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

LEGEND

34	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
2 PO – T- 25.0m P40 – 20.0m 5 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 9	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
5 9	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

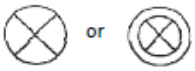
LEGEND



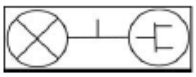
Exchange
(Major Cable Present)



Footway Access Chamber
(can vary from 1-lid to 12-lid)



Pillar / Cabinet
(above ground / free standing)



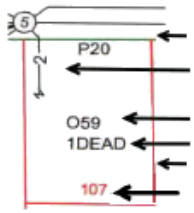
Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V Electricity

OC — Other Carrier Telecommunications Cable/Asset

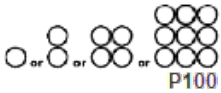
Dist — Distribution cables in Main Cable ducts

MC — Main Cable ducts on a Distribution plan

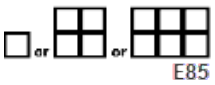
▲ — Blocked or damaged duct.



Roadside / Front Boundary
2 pair lead-in to property from pit in street 1
pair working (pair ID 059)
1 pair dead (i.e. spare, not connected)
Side / Rear Property Boundary
Property Number



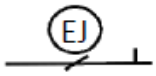
Single to multiple round conduit
Configurations 1,2,4,9 respectively
(attached text denotes conduit type and size)



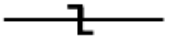
Multiple square conduit
Configurations 2, 4, 6 respectively
(attached text denotes conduit type and size)



Cable Jointing Pit
(number / Letter indicating Pit Type)



Elevated Joint
(above ground joint on buried cable)



Telstra Plant in shared Utility trench



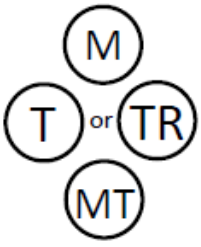
Aerial Cable



Aerial Cable
(attached to joint Use Pole eg. Power)



Direct Buried Cable



Marker Post Installed

Buried Transponder

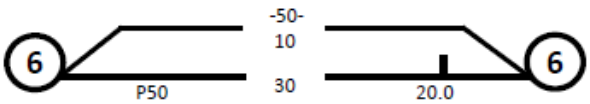
Marker Post, Transponder

Optical Fibre cable direct buried

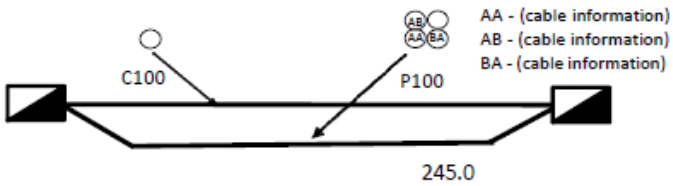
Some examples of conduit type and size:

A - Asbestos cement, P - PVC / Plastic, C - Concrete,
GI - Galanised iron, E - Earthenware
Conduit sizes *nominally* range from 20mm to 100mm
P50 50mm PVC conduit
P100 100mm PVC conduit
A100 100mm asbestos cement conduit

Some Examples of how to read Telstra Plans



One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits. approximately 20.0m apart, with a direct buried 30-pair cable along the same route



AA - (cable information)
AB - (cable information)
BA - (cable information)

Two separate conduit runs between two footway access chambers (manholes) approximately 245m apart A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along

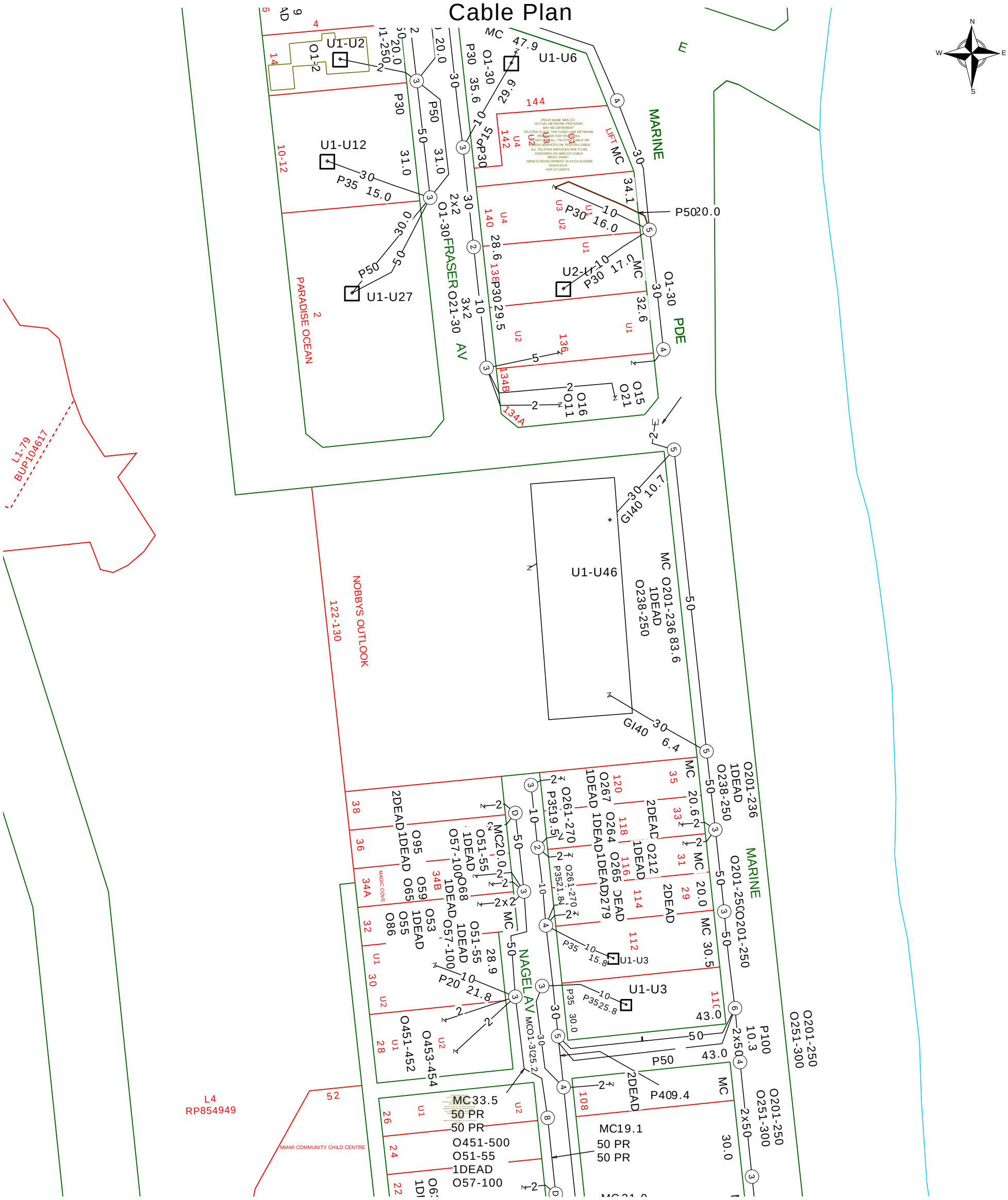
Protect our Network:

by maintaining the following distances from our assets:

- 1.0m Mechanical Excavators, Farm Ploughing, Tree Removal
- 500mmVibrating Plate or Wacker Packer Compactor
- 600mm Heavy Vehicle Traffic (over 3 tonnes) not to be driven across Telstra ducts or plant.
- 1.0mJackhammers/Pneumatic Breakers
- 2.0m Boring Equipment (in-line, horizontal and vertical)

For more info contact a CERTLOC Certified Locating Organisation (CLO) or Telstra Location Intelligence Team 1800 653 935

Cable Plan



Report Damage:https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-(
Ph - 13 22 03
Email - Telstra.Plans@team.telstra.com
Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries

TELSTRA LIMITED A.C.N. 086 174 781

Generated On 04/02/2025 10:57:23

Sequence Number: 250458846

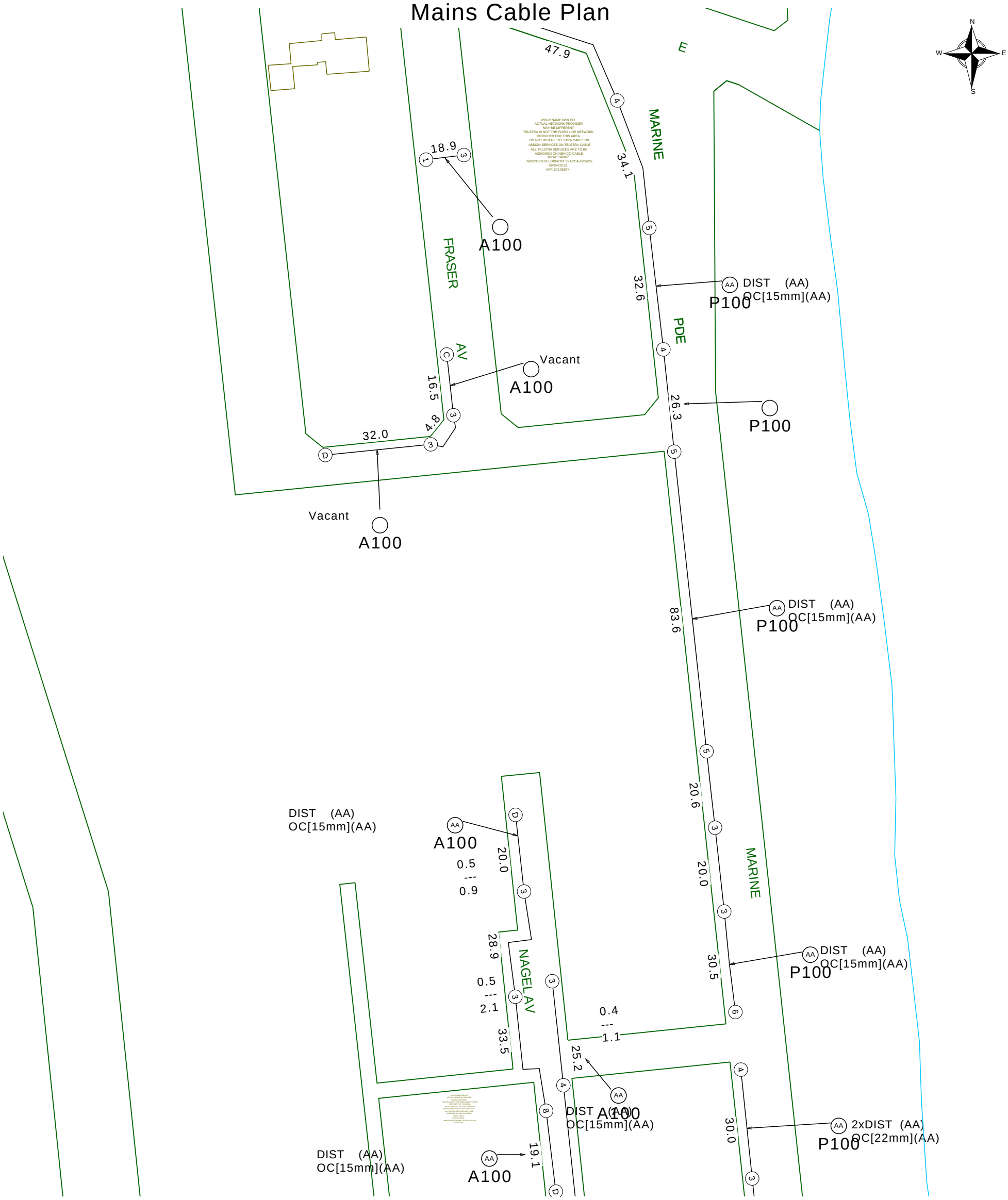
Please read Duty of Care prior to any excavating

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Mains Cable Plan



Report Damage:https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-
Ph - 13 22 03
Email - Telstra.Plans@team.telstra.com
Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries

TELSTRA LIMITED A.C.N. 086 174 781

Generated On 04/02/2025 10:57:26

Sequence Number: 250458846

Please read Duty of Care prior to any excavating

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

APPENDIX D
GCWW – Network Loading

Wieser, Ben

From: Water and Waste Assessment <GCWDA@goldcoast.qld.gov.au>
Sent: Thursday, 5 December 2024 8:06 AM
To: Wieser, Ben
Cc: Stockwell, James; Nick Ensor
Subject: RE: 122 Marine Parade, Miami - Network Capacity Assessments

Follow Up Flag: Follow up
Flag Status: Flagged

Arcadis Warning: Exercise caution with email messages from external sources such as this message. Always verify the sender and avoid clicking on links or scanning QR codes unless certain of their authenticity.

Hi Ben,

Thank you for your time on the phone earlier.

Based on the information provided below, the network teams have advised that;

Both Water and Sewer network capacity assessment <u>WOULD NOT BE</u> required,

The water network team have also advised that the pressures are better to the north; and prefer that you connect there. It is believed existing connection is to the south, However based on this either connection will work.

Please let me know if you require anything further from the network teams and I can ask if I can pass on their details as per requested. 😊

Kind regards,

Brioni Gallo
Business Administration Officer – Water and Waste Assessment
Business Services

P: 07 5582 8340
cityofgoldcoast.com.au

CITY OF
GOLDCOAST.

From: Wieser, Ben <Ben.Wieser@arcadis.com>
Sent: Monday, 2 December 2024 11:28 AM
To: Water and Waste Assessment <GCWDA@goldcoast.qld.gov.au>
Cc: Stockwell, James <James.Stockwell@arcadis.com>; Nick Ensor <nensor@eastview.com.au>
Subject: 122 Marine Parade, Miami - Network Capacity Assessments

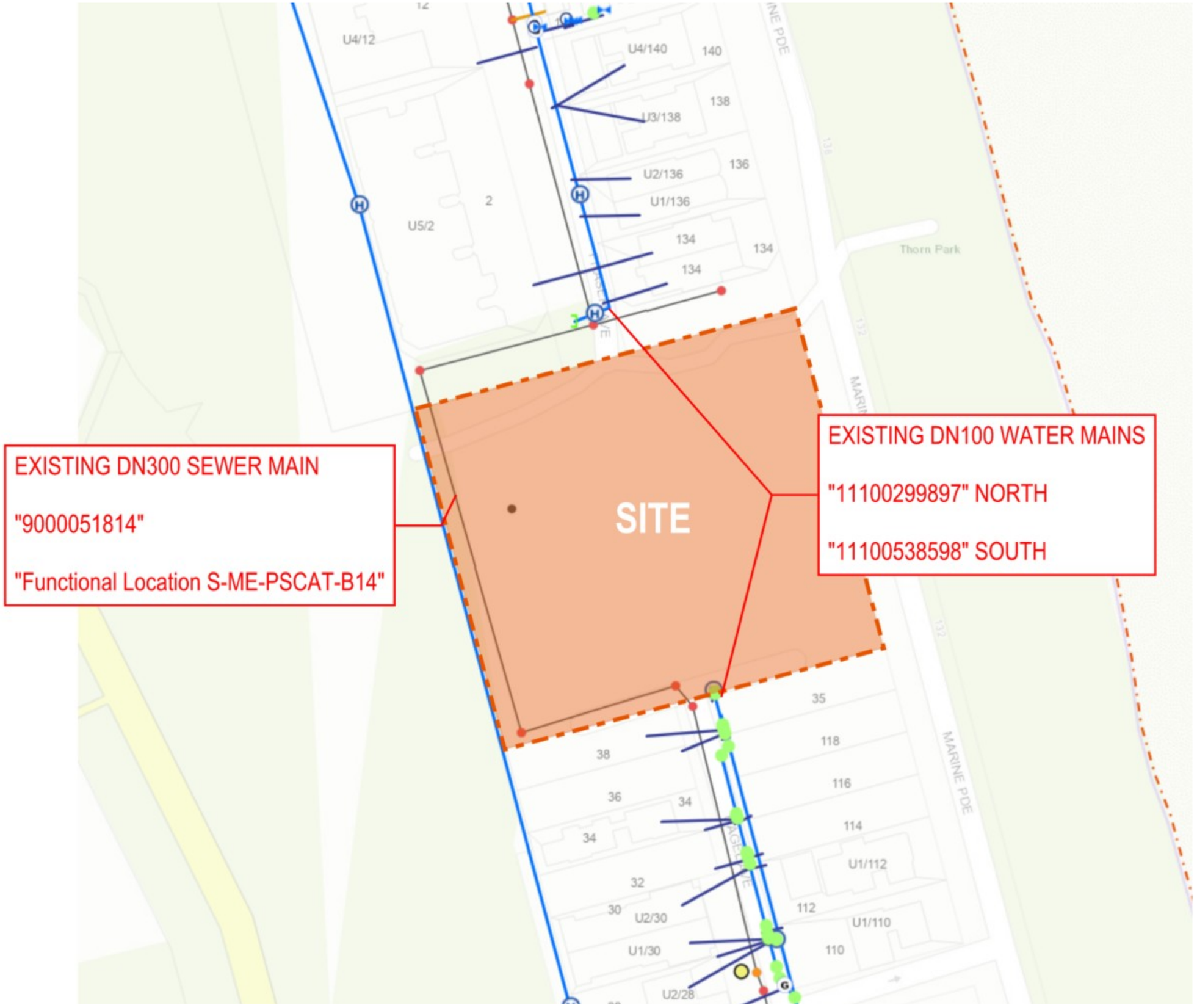
This email originates outside of the City of Gold Coast's email system. If suspicious, report it using the 'Report Email' button.

Hi GCWDA,

Our client is investigating the site "**122 Marine Parade, Miami**".

Accordingly, we are hoping to seek early input from GCWW on whether network assessment(s) would be required to support a future DA.

- From concept plans, the proposed demand is currently calculated to be **253.6 EP, comprising of 100% residential**.
- Can GCWW please confirm whether any network assessments are required?


EXISTING DN300 SEWER MAIN
"9000051814"
"Functional Location S-ME-PSCAT-B14"
EXISTING DN100 WATER MAINS
"11100299897" NORTH
"11100538598" SOUTH
SITE
U4/12
U4/140
140
138
U3/138
136
U2/136
U1/136
2
U5/2
134
134
134
Thorn Park
MARINE PDE
35
118
38
116
36
34
34
114
U1/112
32
30
U2/30
112
U1/110
U1/30
110
U2/28

APPENDIX E

GCWW – On-Site Municipal Sewer

Wieser, Ben

From: JUELFS Kyle <KJUELFS@goldcoast.qld.gov.au>
Sent: Friday, 6 December 2024 10:02 AM
To: Wieser, Ben
Cc: Stockwell, James; Nick Ensor
Subject: RE: 122 Marine Parade, Miami | Concept Sewer Relocation
Attachments: Council comments - prjno-EA0001 - Potential Sewer Relocation Options.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Arcadis Warning: Exercise caution with email messages from external sources such as this message. Always verify the sender and avoid clicking on links or scanning QR codes unless certain of their authenticity.

Hi Ben,

Please find below my preliminary comments based on the attached, once you've digested them, we can discuss further next week, pending our availability.

Option 1 – offset to west property

(a) Not supported as the 300mm sewer main would have to cross an existing 375mm water main twice and it would mean two large main parallel to each other which creates a burden for future maintenance and access
(b) Would need support from the adjacent property owner - LOT 1 Redondo Avenue (1WD6367)

Option 2 – within subject development's basement

(c) Not supported – Council doesn't support mains of this size within a basement

Option 3 – suggested by Council, last page of PDF

(d) Offset the subject site's basement by minimum of 3m from the rear property boundary (or minimum 1.5m from centreline of the existing sewer main)
(e) Provide a minimum of 2.4m from finished surface level within the 3m at the rear – if there are any structure within the site (i.e. if they are required to change the alignment of the sewer) then there must be a 1m wide access easement from the front property boundary to 'get to' the stop of the structure/s at the rear.

Kyle Juelfs
Senior Civil Engineer
City Development

T: 07 5582 9824
City of Gold Coast

CITY OF
GOLDCOAST.

From: Wieser, Ben <Ben.Wieser@arcadis.com>
Sent: Thursday, 5 December 2024 4:02 PM
To: JUELFS Kyle <KJUELFS@goldcoast.qld.gov.au>
Cc: Stockwell, James <James.Stockwell@arcadis.com>; Nick Ensor <nensor@eastview.com.au>
Subject: 122 Marine Parade, Miami | Concept Sewer Relocation

This email originates outside of the City of Gold Coast's email system. If suspicious, report it using the 'Report Email' button.

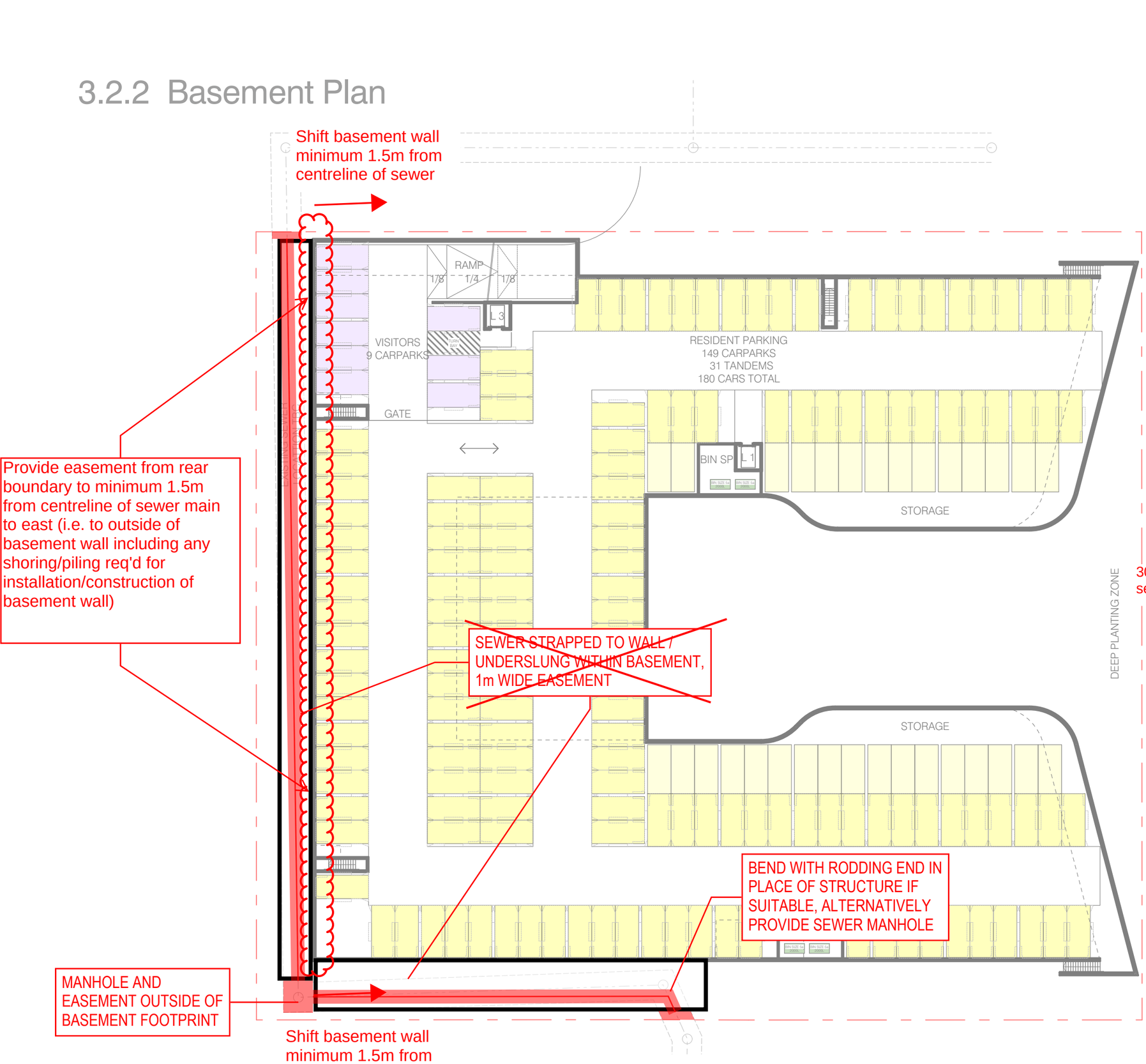
Good afternoon Kyle,

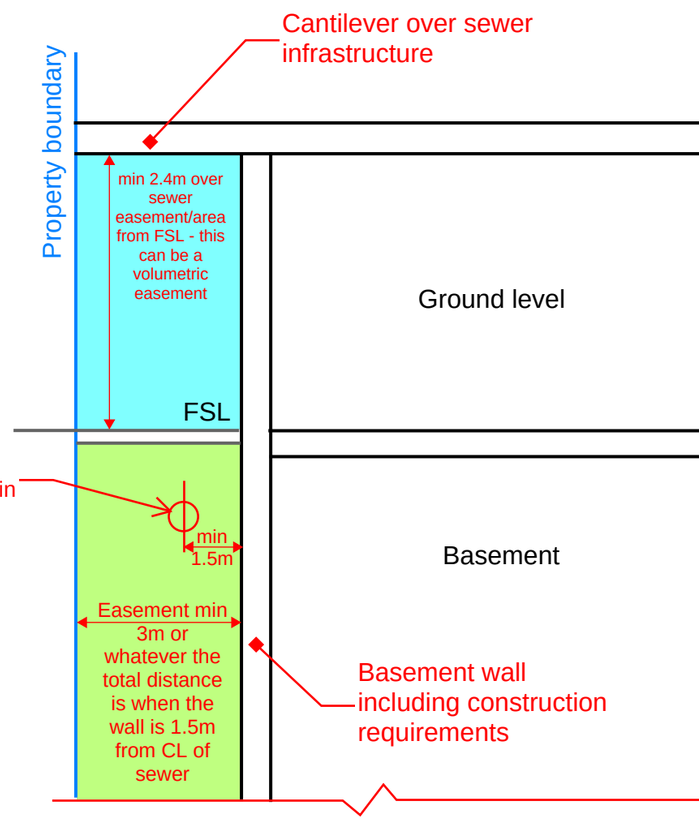
3.2.2 Basement Plan

OPTION 3 - SUPPORTED BY COUNCIL

Shift basement wall minimum 1.5m from centreline of sewer

Provide easement from rear boundary to minimum 1.5m from centreline of sewer main to east (i.e. to outside of basement wall including any shoring/piling req'd for installation/construction of basement wall)





Section looking North

ATTACHMENT 10

Waste Management Plan
prepared by MRA Environmental



MRA ENVIRONMENTAL

YOUR TRUSTED ENVIRONMENTAL PARTNER

WASTE MANAGEMENT PLAN

122 MARINE PDE
MIAMI QLD 4220



CLIENT

Monaco Property Group Pty Ltd

April 2025

DOCUMENT INFORMATION

Contact Details:

MRA Environmental
Suite 1/37 Commerce Drive
ROBINA QLD 4226
ABN: 21 082 910 218

waste@mraenvironmental.com.au

MRA Environmental
PO BOX 480
ROBINA QLD 4226

Project Manager:
Mark Rigby
P 07 5578 7040
E mrigby@mraenvironmental.com.au

Client Details:

Client:	Monaco Property Group Pty Ltd c/- Eastview
Client contact:	Nick Ensor
Client Phone:	0447 501 086

Document Details:

Title:	Waste Management Plan 122 Marine Pde Miami Qld 4220
Project Number:	MRA24-227

Revision	Date	Author	Reviewed By	Issued By
V.1	17 April 2025	M Rigby	A Reiser	M Rigby
V.2	24 April 2025	A Reiser	M Rigby	A Reiser

Destination	Draft	Final	Rev
Monaco Property Group Pty Ltd	V.1	V.2	
Eastview	V.1	V.2	
MRA Environmental	V.1	V.2	

LIMITATIONS

Mark Rigby & Associates Pty Ltd (MRA Environmental) has prepared this Waste Management Plan for the sole use of Monaco Property Group Pty Ltd, to support a Development Application for the proposed residential development located at 122 Marine Pde, Miami Qld 4220.

Specifically, this report supports the Development Application and relates to the waste storage and collection activities for the operational phase of the planned development in accordance with the City of Gold Coast *City Plan - SC6.16 City Plan Policy v.11 - Solid Waste Management*. This WMP will be submitted to Council as a component of the Development Application.

This report is for the sole use of Monaco Property Group Pty Ltd and in relation to the Development Application to be submitted to City of Gold Coast. It may not contain sufficient information for the purposes of other parties, for other uses or at other locations.

We have performed our services for this project in accordance with our current professional standards. No other warranty, expressed or implied, is made as to the professional advice included in this submission.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions. The report also contains comments and information provided by others. MRA Environmental cannot take responsibility for advice provided by any third party.

© Mark Rigby & Associates Pty Ltd.
All rights reserved. No section or element of this document may be removed from this document, reproduced, electronically stored or transmitted in any form without the written permission of Mark Rigby & Associates Pty Ltd.

TABLE OF CONTENTS

1.0 GLOSSARY OF TERMS 1

2.0 INTRODUCTION 4
2.1 BACKGROUND 4
2.2 SITE DETAILS 4
2.3 PURPOSE & SCOPE OF REPORT 4
2.4 WMP OBJECTIVES & STRUCTURE 4

3.0 WASTE QUANTITIES 9
3.1 TYPE OF WASTE 9
3.2 WASTE QUANTITIES 9
3.3 RESIDENTIAL UNITS 9
3.4 TOTAL WASTE CAPACITY 10

4.0 WASTE AND RECYCLING STORAGE 11
4.1 WASTE STORAGE ROOMS 11
4.2 WASTE CHUTES 12
4.3 WASTE HOPPER CONSTRUCTION 12
4.4 PROPOSED WASTE BINS 13
4.5 DIMENSIONS OF WASTE CONTAINERS 13
4.6 DRAINAGE AND BIN WASH 13

5.0 DETAILS OF COLLECTION 14
5.1 FREQUENCY 14
5.2 BULK BIN SERVICING POINT 14
5.3 COLLECTION VEHICLE ACCESS 15

6.0 SUMMARY 16

TABLES

Table 1: Predicted waste types to be generated 9
Table 2: Anticipated general waste quantities 9
Table 3: Anticipated recycling quantities 10
Table 4: Details of proposed bins & servicing frequency 13
Table 5: Dimensions of proposed bins 13
Table 6: Typical rear lift truck dimensions 15

FIGURES

Figure 1: Site location 5
Figure 2: Basement waste storage rooms & bin lift 6
Figure 3: Ground floor servicing point & bin lift 7
Figure 4: Typical waste chute & hopper locations 8

ATTACHMENTS

Attachment A: Solid Waste Management Code
Attachment B: Swept Path Analysis

1.0 GLOSSARY OF TERMS

Bin carting route – the proposed route to move bins between the storage point and the servicing point.

Bulk bins – bins fitted with lids and side pockets to allow them to be serviced by a front-lift truck.

Clinical or related waste – waste that has the potential to cause disease, including, for example, animal waste, discarded sharps, human tissue waste or laboratory waste.

Commercial accommodation – for the purposes of this report means commercial development that includes a domestic or residential component, such as Retirement facility, Community care centre, Rooming accommodation, Short term accommodation or Resort complex.

Commercial premises – for the purpose of this report means any of the following types of premises:

- a Hotel, Short term accommodation, Tourist park, Food and drink outlet;
- an assembly building, institutional building, Childcare centre, Educational establishment;
- premises where a sport or game is ordinarily played in public;
- an exhibition ground, show ground or racecourse; or
- an Office, Shop or other premises where business or work other than a manufacturing process is carried out.

Commercial waste – means waste, other than green waste, recyclable waste, and interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of commercial developments.

Common servicing point – a common area where more than two dwellings/tenancies stand their wheelie bins for servicing.

Common storage point – a common area where more than two dwellings/tenancies store their wheelie bins.

Constructed hardstand area – a hardstand area, for example a concrete pad which has been constructed for bin storage.

Digesters and dehydrators - machines specifically designed to reduce food waste volumes to allow for efficient disposal. Digesters typically process the material into sludge while dehydrators remove liquid from food waste generating a fertiliser as the end product. Disposal of end product can be used on either internal gardens or on external gardens/farms.

Drive-on service – where the waste collection vehicle services bulk bins on site, bins are to be positioned for direct access/servicing without the need for manual handling by the waste vehicle driver or other person.

General waste – waste, other than domestic clean-up waste, green waste, recyclable waste, interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of domestic or commercial premises.

Glass crushers - machines that can reduce the volume of glass waste by up to 75%, saving valuable space.

Hazardous waste - solid waste that is toxic or contains toxic material, for example, light bulbs, fluorescence lights, batteries.

Internal servicing roadway – is a driveway, private roadway or other path intended for use by vehicles, in which the waste collection vehicle is required to use to service a bin.

Mixed-use development – for the purpose of this report, any building or development complex used, or intended to be used, for residential purposes in combination with other commercial uses (e.g. Offices, Food and drink outlets etc).

Non-serviced area – an area within the boundaries of City of Gold Coast which is not serviced by Council's waste collection contractor.

Organic waste - is waste that comes from plants or animal that is biodegradable for example green waste and food waste.

Recycling chute - a duct in which recycling descends from one point to another.

Recyclable waste – for a local government's area, means clean and inoffensive waste that is declared by the local government to be recyclable waste for the area. In the City of Gold Coast the following wastes are deemed recyclable:

- all household plastics, bottles and containers;
- aluminium and steel cans and aerosols;
- bottles and jars made only of glass;
- clean cardboard, newspaper, loose paper, junk mail, magazines and cartons.

Related waste – means waste that constitutes, or is contaminated with, chemicals, cytotoxic drugs, human body parts, pharmaceutical products or radioactive substances.

Roll-on roll-off bin (Ro-Ro bin) – large steel open top skip bins or enclosed bins. Bins are collected by a hook-lift truck.

Solid waste – any general or recyclable waste, be it commercial or domestic. Solid waste does not include waste discharges to sewer/water or the atmosphere.

Servicing point – the designated area allocated to the temporary storage of waste bins for the period of servicing only. The point may be within or external to a development.

Storage point – the area allocated to the permanent storage of waste bins. This is the normal location of the waste bins and excludes the period where the bin is serviced. A storage point may be a common storage point or an individual bin storage point.

Waste – includes anything, other than a resource that is:

- left over, or an unwanted by-product from an industrial, commercial, domestic or other activity; or
- surplus to the industrial, commercial, domestic or other activity generating the waste.

Waste carting distance – the distance required for a person to transport their waste from the nearest point of exit of their dwelling/tenancy to a storage point (or in the case of a multi-level building, to the nearest waste disposal point).

Waste chute – a duct in which waste descends from one point/level to a collection bin.

Waste disposal point – the point where waste is disposed of into the chute, also known as waste hopper. It consists of a fixed frame and hood unit, covered with a hinged or pivoted door.

Waste storage room – the room at the base of the chute used for the storage of waste bins.

Wheelie bin – two wheeled mobile garbage bins, made from high density polyethylene (HDPE). Wheelie bins are collected by a side-lift truck

2.0 INTRODUCTION

2.1 BACKGROUND

MRA Environmental (MRA) has been commissioned by Monaco Property Group Pty Ltd to prepare a Waste Management Plan (WMP) for the proposed residential development located at 122 Marine Pde, Miami Qld 4220.

This WMP is to be submitted to the City of Gold Coast (Council) as part of the Development Application being prepared for the site and ensures that the waste storage and collection activities for the operational phase of the development are in accordance with *SC6.16 City Plan Policy v.11 - Solid Waste Management*.

2.2 SITE DETAILS

The subject site is located at 122 Marine Pde, Miami QLD on a parcel of land described as Lot 122 on SP284713 (Refer to **Figure 1**). The site has street frontage on Marine Pde and is bound by Fraser Ave to the north, Nagel Ave to the south, and Lions Head Park to the west.

The subject site is approximately 7,284m^2 and the proposed development is a 5-storey building offering 46 dwellings, comprised of one (1) x 2-bedroom unit, forty (40) x 30-bedroom units and five (5) x 5-bedrooms units. Additionally, there will be a rooftop recreation area and one (1) level of basement parking.

2.3 PURPOSE & SCOPE OF REPORT

This report represents a Waste Management Plan for the operational phase of the development, which includes:

- Details on the anticipated type and quantity of waste (**Section 3.0**);
- Details of the waste storage point requirements and waste storage bins (**Section 4.0**); and
- Details of the proposed waste collection arrangements (**Section 5.0**).

2.4 WMP OBJECTIVES & STRUCTURE

The structure of this report will be as follows:

- An introduction including the site details, summary, purpose and scope of the report along with the objectives and structure;
- Development figures including the site location and outlining the waste storage and servicing infrastructure and locations;
- Waste quantities including the type of waste, quantities of waste and the proposed development uses;
- Proposed waste storage and servicing areas including waste storage infrastructure and locations within the development; and
- Details of the waste collection including servicing frequencies, the waste servicing area and collection vehicle access.



Coomera
Hope Island
Wongawallan
Helensvale
Runaway Bay
Guanaba
Parkwood
Nerang National Park
Southport
Clagiraba
90
Surfers Paradise
Carrara
Broadbeach
Cryna
Canungra
Lower Beechmont
Worongary
Pacific Ocean
Nindooinbah
Tallai
Robina
99
2
Flying Fox
Kerry
Reedy Creek
Beechmont
Tabooba
Bonogin
N

MRA ENVIRONMENTAL | YOUR TRUSTED ENVIRONMENTAL PARTNER

Suite 1, 37 Commerce Drive, Robina
PO Box 480 Robina Qld 4226

PH (07) 5578 7040
FAX (07) 5578 7313
MOB 0417 797486

DESIGNED	RP	SCALE	NTS
DRAWN	RP	LEVEL DATUM	-
CHECKED	AR	SHEET SIZE	A4
APPROVED	AR	CAD FILE	
DATE	APRIL 2025	ISSUE	FINAL

CLIENT: **MONACO PROPERTY GROUP PTY LTD**

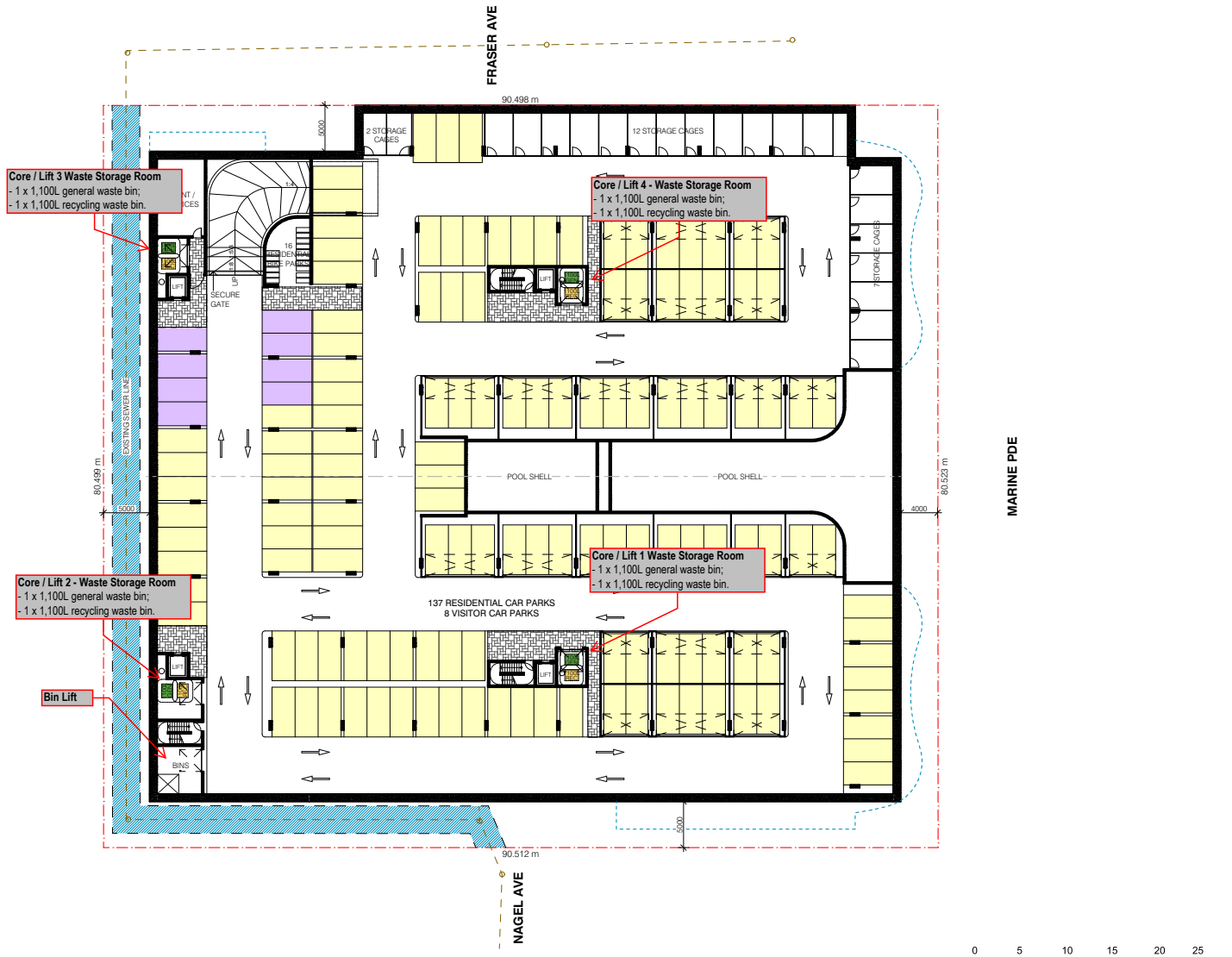
PROJECT: **WASTE MANAGEMENT PLAN**
122 MARINE PDE, MIAMI

TITLE: **SITE LOCATION**

JOB NUMBER: MRA24-227

DRAWING: Figure 1

REV: FINAL



DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI

PROJECT NO. 568100
23 APRIL 2025, ISSUE

DRAWING NO. DA2.101
BASEMENT FLOOR PLAN

PREPARED FOR
MONACO PROPERTY GROUP

SCALE:
1:400 @ A3

Kolchl Takada Architects

63 / 76

MRA ENVIRONMENTAL
YOUR TRUSTED ENVIRONMENTAL PARTNER

Suite 1, 37 Commerce Drive, Robina
PO Box 480 Robina Qld 4226

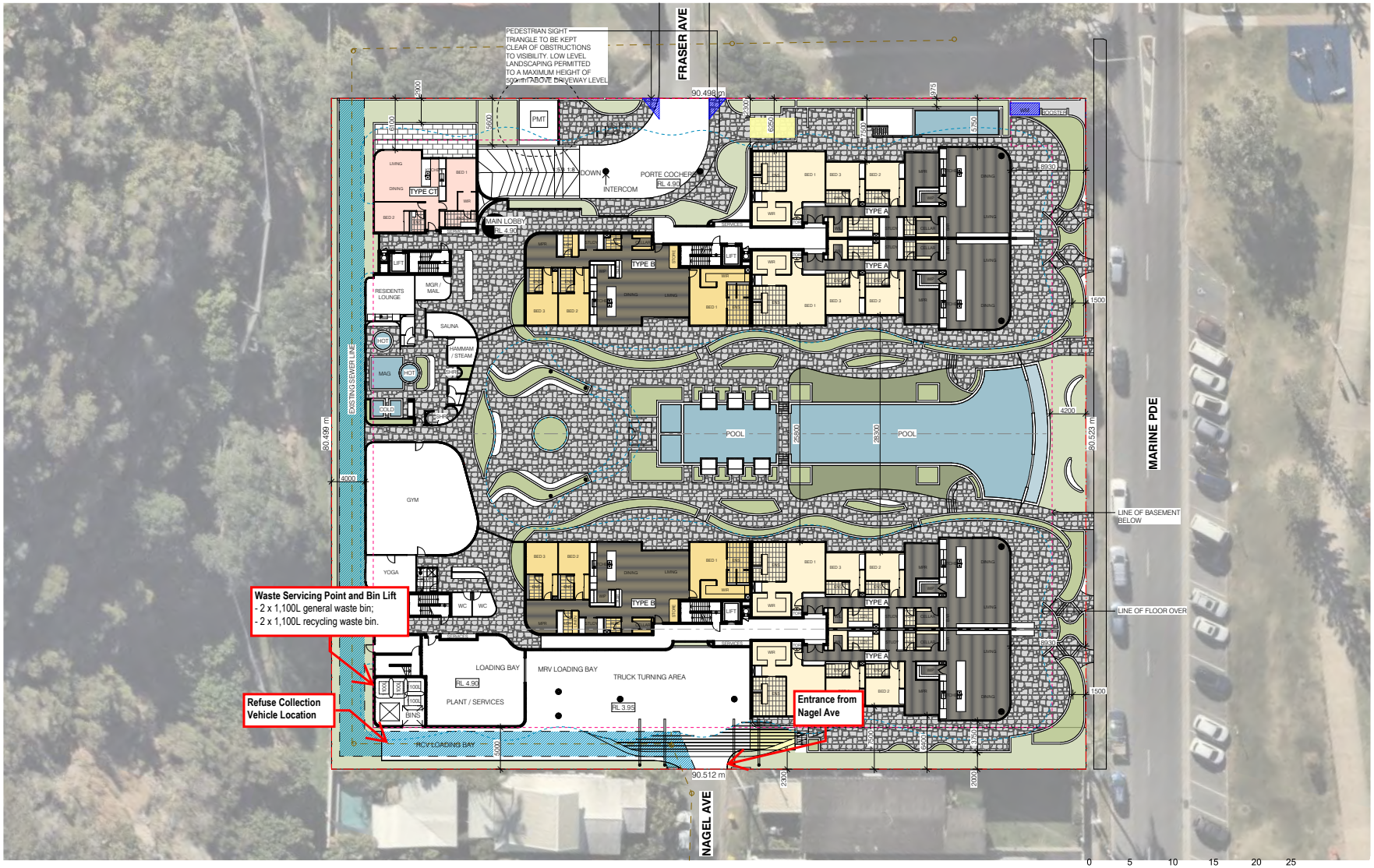
PH (07) 5578 7040
FAX (07) 5578 7313
MOB 0417 797486

DESIGNED	RP	SCALE	NTS	CLIENT	MONACO PROPERTY GROUP PTY LTD
DRAWN	RP	LEVEL DATUM	-	PROJECT	WASTE MANAGEMENT PLAN 122 MARINE PDE, MIAMI
CHECKED	AR	SHEET SIZE	A4		
APPROVED	AR	CAD FILE		TITLE	BASEMENT 1 WASTE STORAGE ROOMS AND BIN LIFT
DATE	APRIL 2025	ISSUE	FINAL		

JOB NUMBER MRA24-227

DRAWING Figure 2

REV A



DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI

PROJECT NO. 568100
23 APRIL 2025, ISSUE

DRAWING NO. DA2.102
GROUND FLOOR / LEVEL 1

PREPARED FOR
MONACO PROPERTY GROUP

SCALE:
1:400 @ A3

Kolchl Takada Architects

MRA ENVIRONMENTAL
YOUR TRUSTED ENVIRONMENTAL PARTNER

Suite 1, 37 Commerce Drive, Robina
PO Box 480 Robina Qld 4226

PH (07) 5578 7040
FAX (07) 5578 7313
MOB 0417 797486

DESIGNED	RP	SCALE	NTS	CLIENT	MONACO PROPERTY GROUP PTY LTD
DRAWN	RP	LEVEL DATUM	-	PROJECT	WASTE MANAGEMENT PLAN 122 MARINE PDE, MIAMI
CHECKED	AR	SHEET SIZE	A4		
APPROVED	AR	CAD FILE		TITLE	GROUND FLOOR SERVICING POINT AND BIN LIFT
DATE	APRIL 2025	ISSUE	FINAL		

JOB NUMBER MRA24-227
DRAWING Figure 3
REV A



DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI

PROJECT NO. 568100
23 APRIL 2025, ISSUE

DRAWING NO. DA2.104
LEVEL 3 PLAN

PREPARED FOR
MONACO PROPERTY GROUP

SCALE:
1:400 @ A3

Kolchl Takada Architects

MRA ENVIRONMENTAL
YOUR TRUSTED ENVIRONMENTAL PARTNER

Suite 1, 37 Commerce Drive, Robina
PO Box 480 Robina Qld 4226

PH (07) 5578 7040
FAX (07) 5578 7313
MOB 0417 797486

DESIGNED RP	SCALE NTS	CLIENT	JOB NUMBER MRA24-227
DRAWN RP	LEVEL DATUM -	PROJECT	DRAWING
CHECKED AR	SHEET SIZE A4	WASTE MANAGEMENT PLAN 122 MARINE PDE, MIAMI	Figure 4
APPROVED AR	CAD FILE	TITLE	REV
DATE APRIL 2025	ISSUE FINAL	TYPICAL WASTE CHUTE & HOPPER LOCATIONS	A

MONACO PROPERTY GROUP PTY LTD

3.0 WASTE QUANTITIES

3.1 TYPE OF WASTE

Table 1 outlines the predicted types of waste that are expected to be generated from the proposed development.

Table 1: Predicted waste types to be generated

Tenancy Type	Predicted Waste Types
Residential units	General waste and recycling

3.2 WASTE QUANTITIES

Calculations of the anticipated waste quantities have been separated into the general waste and recycling components. The waste calculations were performed using typical waste generation rates as provided in Appendix A of Council's *SC6.16 City Plan Policy v.11 - Solid Waste Management.*

3.3 RESIDENTIAL UNITS

Table 2 displays the general waste quantities and **Table 3** displays the recycling quantities that are anticipated for the residential units for the development.

Table 2: Anticipated general waste quantities

Core	Room Type	No.	Total Required Waste Capacity (L/week)	Estimated Waste Generation (m^3/week)	Estimated Daily Waste Generation (m^3/day)
Lift 1	3+ Bedrooms	15	1,800	1.80	0.26
	Sub-total	**15**	**1,800**	**1.80**	**0.26**
Lift 2	3+ Bedrooms	8	960	0.96	0.14
	Sub-total	**8**	**960**	**0.96**	**0.14**
Lift 3	2 Bedrooms	**1**	100	0.10	0.01
	3+ Bedrooms	7	840	0.84	0.12
	Sub-total	**8**	**940**	**0.94**	**0.13**
Lift 4	3+ Bedrooms	15	1,800	1.80	0.26
	Sub-total	**15**	**1,800**	**1.80**	**0.26**
	TOTAL	**46**	**5,500**	**5.50**	**0.79**

Table 3: Anticipated recycling quantities

Core	Room Type	No.	Total Required Waste Capacity (L/week)	Estimated Waste Generation (m^3/week)	Estimated Daily Waste Generation (m^3/day)
Lift 1	3+ Bedrooms	15	1,200	1.20	0.17
	Sub-total	**15**	**1,200**	**1.20**	**0.17**
Lift 2	3+ Bedrooms	8	640	0.64	0.09
	Sub-total	**8**	**640**	**0.64**	**0.09**
Lift 3	2 Bedrooms	**1**	60	0.06	0.01
	3+ Bedrooms	7	560	0.56	0.08
	Sub-total	**8**	**620**	**0.62**	**0.09**
Lift 4	3+ Bedrooms	15	1,200	1.20	0.17
	Sub-total	**15**	**1,200**	**1.20**	**0.17**
	TOTAL	**46**	**3,660**	**3.66**	**0.52**

3.4 TOTAL WASTE CAPACITY

The 46 residential apartments of the development are estimated to generate a total of approximately **0.79m³ per day** of general waste and **0.52m³ per day** of recycling waste.

4.0 WASTE AND RECYCLING STORAGE

This section outlines the general design criteria of the waste storage rooms, wastes chute and hoppers as required by *SC6.16 City Plan Policy v.11 - Solid Waste Management* along with a description of the proposed bins to be used.

4.1 WASTE STORAGE ROOMS

The development is built around four (4) separate lift cores with a waste chute servicing the apartments within each core. Each of the four (4) waste chutes will be fitted with a diverter and terminates within waste storage rooms located in the single combined basement carpark. Bulk bins (1,100L) for both general waste and recycling are moved via a bin lift in the southwestern corner of the basement to ground level for servicing (Refer to **Figure 2**).

The waste storage rooms containing the waste chutes will be for authorised personnel only (body corporate/site management) to ensure that the safety of residents is maintained.

The four (4) waste storage rooms will be constructed to meet the requirements listed below:

1. Designed to allow the bins to be easily transported via a bin lift to a separate servicing point at ground level (no steps or lips on bin carting route);
2. Waste carting distance generally should not exceed 60 metres and in any case be reasonable to ensure ease of use;
3. Located at least five (5) metres from any door, window or fresh air intake within the development or any adjoining site;
4. Screened to ensure bins are not visible from a public place or sensitive land use;
5. Provided with safe access to the disposal area via hoppers on each residential level;
6. Of sufficient size to accommodate the required number of bins allowing for adequate clearances surrounding each bin;
7. Provides adequate storage for recyclable waste;
8. Constructed hardstand area with a solid concrete base or acceptable equivalent;
9. Roofed and designed to prevent entry to rainwater;
10. The waste storage rooms will be graded to fall to a drainage point that is connected to sewer and provided with a hose-cock for cleaning;
11. Not be located within a building structure unless it is in purpose-built storage area which is air-locked, fly and vermin proofed and used solely for the storage of waste.
12. Insect and vermin proof;
13. Fire rated and ventilated in accordance with the *National Construction Code – Building Code of Australia*;

14. Doors must be wide enough to allow for the easy removal of the largest container to be stored;
15. The walls, ceiling, floor and equipment of the waste storage room are to be designed and constructed of impervious material with a smooth finish to allow for easy cleaning;
16. Provided with adequate artificial lighting;
17. Not located adjacent to or within any habitable portion of a building or place used in connection with food preparation (including food storage); and
18. Permit unobstructed access for removal of the containers to the service point and for positioning of the containers correctly in relation to the waste chute and diverter.

4.2 WASTE CHUTES

The four (4) waste chutes will be fitted with a diverter and will be constructed to meet the requirements listed below:

1. Adequate in strength for its purpose, including additional reinforcing where necessary at joins, bends and hopper intersections;
2. Insect and vermin proof;
3. Constructed and installed to prevent the following during use and operation of the system:
    - transmission of vibration to the structure of the premises;
    - excessive odour – there must not be a noticeable odour beyond the waste disposal and storage points;
    - excessive noise to the occupants of the building.
4. Installed in a 'fire rated' duct and ventilated in compliance with building requirements of the *National Construction Code – Building Code of Australia*.
5. Comply with the waste chute manufacturer's technical specifications and/or operational limitations, including installation design features and ancillary equipment required to prevent blockages and noise disturbances, to achieve compliance with the section; and
6. Fitted with a shutter at the base of each chute for closing off the chute manually during bin exchange and automatically in the case of fire. The manual closing mechanism must be in a safe location to protect the operator from waste discharging from the chute when activating the closure.

4.3 WASTE HOPPER CONSTRUCTION

Waste hoppers will be in dedicated compartments on each level of the development (Refer to **Figure 4**) and will be constructed to meet the requirements listed below:

1. Located on each residential floor in a position which is:
    - in a dedicated room or compartment;
    - easily accessible by the occupants of each apartment;
    - separated from any habitable portion of a building or place used in connection with food preparation or storage;

2. Located to ensure the handle of the hopper is at least 1200 millimetres above finished floor level;
3. Hopper door automatically returns to the closed position after use;
4. Designed to permit free flow of waste into the chute;
5. Constructed so that the diameter or largest dimension of the service opening (the diagonal of a rectangular opening) does not exceed three-quarters (3/4) of the diameter of the chute with which the hopper is connected; and
6. The floor adjacent to the hopper is paved with a durable impervious material with a smooth finished surface.

4.4 PROPOSED WASTE BINS

To ensure that each of the waste storage rooms are sufficiently sized, details of the type and quantity of waste and number of bins to be stored within each of the waste storage rooms is detailed in **Table 4**. Dimensions of the proposed containers are detailed in **Section 4.4**.

Table 4: Details of proposed bins & servicing frequency

Waste Type	AnticipatedWaste Quantity(m^3/week) (range across the four cores)	Bins Proposed in each of the Four Waste Storage Areas	Collection Frequency/Core
General waste	0.94 – 1.8	1 x 1,100L bulk bin / core	Once/Twice per week for each of the bins/core
Recycling	0.62 – 1.2	1 x 1,100L bulk bin / core	Once per week for each of the bins/core

4.5 DIMENSIONS OF WASTE CONTAINERS

Table 5 below provides dimensions of the bins to be used on-site. The 1,100L bulk bins will be composed of plastic with lightweight plastic lids.

Table 5: Dimensions of proposed bins

Bin Type	Volume	Length (mm)	Width/ Diameter (mm)	Height (mm)	Collection Vehicle Type
Bulk bins	1,100L	1,490	1,100	1,330	Rear lift truck

4.6 DRAINAGE AND BIN WASH

A bin wash facility (including hose cock) will be provided in the each of the four waste storage rooms, which will be graded to a drainage point that is connected to sewer in accordance with trade waste requirements. This area will be utilised as the bin washing facility for both the general waste and recycling bulk bins. It will be the responsibility of site management to wash bins and to maintain the cleanliness of the waste storage room.

5.0 DETAILS OF COLLECTION

5.1 FREQUENCY

The collection frequency for residential bulk bins is shown in **Table 4**. The residential general waste is anticipated to be serviced once or twice per week (depending on the core being serviced), and recycling once per week. Servicing will be scheduled to occur on alternate days.

5.2 BULK BIN SERVICING POINT

It is proposed that a rear lift waste collection vehicle will service the bins on-site with access from Nagel Ave. The waste collection vehicle can enter and exit the site in a forward gear to undertake waste servicing (Refer to **Attachment B** for swept path analysis).

A bulk bin servicing point is located at ground level in the southwest corner of the development. The servicing point can accommodate four (4) x 1,100L bulk bins, with general waste and recycling servicing to be scheduled to occur on alternate days. (Refer to **Figure 2**).

Site management will transfer the bulk bins to / from the servicing point when scheduled via the bin lift. Whilst the path of travel for the bins is level, if necessary, a mechanical aid could be used to assist with movement of the bulk bins from the basement to/from the servicing point. There is space available for the mechanical aid to be stored in the bin lift room.

The bulk bins will be transferred to/from the servicing point by the engaged waste contractor for servicing. This waste contractor could be the Council's contractor or, if necessary, an alternate private contractor with a rear lift waste collection vehicle could also be engaged. The applicant has commenced engagement with a private waste contractor in relation to servicing for the development. This approach for waste servicing at the development has been accepted by Council in correspondence dated 27 February 2025.

It is also understood that the kerbside wheelie bin waste collection service is provided to residents in Nagel Ave and that Council's side-lift waste collection vehicles enter the subject site in order to perform a turnaround manoeuvre. The applicant has incorporated into the proposed development provision for Council's side-lift waste collection vehicle to continue to perform this turnaround manoeuvre and exit Nagel Ave in a forward gear.

The bulk bin servicing point will be designed to meet the following requirements:

1. Provided with sufficient access and clearance for the waste and recycling collection vehicles to service the bins, including adequate unobstructed overhead space for the swinging arm action of the waste collection vehicle;

2. Bins serviced safely while minimising the impediment of traffic flow during servicing;
3. Clearly separated from car parking bays, loading bays, footpaths and pedestrian access, and any other similar areas;
4. Clear of speed control devices or similar provisions which inhibit direct access to the bins for servicing;
5. Bin carting route must allow bins to be easily manoeuvred and be devoid of steps or steep rises;
6. Bin carting route must not extend through habitable parts of a building, or a food premises, and only occur through common property or publicly accessible locations;
7. Over five metres from any door, window or fresh air intake within the development or any adjoining site;
8. Bins to be removed from and returned to the storage point;
9. Constructed hardstand with a level solid concrete base or acceptable equivalent;
10. Allow for sufficient clearance surrounding the bulk bin containers and any barrier around the location to allow for ease of movement; and
11. Screened to minimise the view of bins from neighbouring properties, or passing vehicles and pedestrian traffic external to the site.

5.3 COLLECTION VEHICLE ACCESS

Table 6 details the dimensions of the rear lift truck waste collection vehicle that will service the development. The engaged contractor will service the bulk bins from within the development as outlined in **Section 5.2**.

Table 6: Typical rear lift truck dimensions

Parameter	Rear lift truck
Height	3.39m
Width	2.48m
Length	9.84m
Working Height	3.39m*
Total Tonnage	22.5 tonne maximum
Min Turning Circle	9.7m (wall-wall)
Min Turning Circle	8.7m (kerb-kerb)

*Note that the waste collection vehicle clearance height (working height) is to be calculated according to the following formula as a minimum:

SUITABLE CLEARANCE	=	VEHICLE OPERATING DIMENSIONS	+	100mm	+	CLEARANCE FOR SERVICES	+	CALCULATION FOR ROADWAY GRADIENT

6.0 SUMMARY

Details of this Waste Management Plan are summarised below:

- The subject site is located at 122 Marine Pde, Miami QLD on a parcel of land described as Lot 122 on SP284713 (Refer to Figure 1). The site has street frontage on Marine Pde and is bound by Fraser Ave to the north, Nagel Ave to the south, and Lions Head Park to the west;
- The 46 residential apartments of the development are estimated to generate a total of approximately **0.79m^3 per day** of general waste and **0.52m^3 per day** of recycling waste;
- General waste from the residential units will be disposed of via four (4) waste chutes each fitted with a diverter terminating in the basement carpark waste storage rooms located adjacent to each of the four lift cores (Refer to **Figure 2**). The waste storage room containing the waste chute will be for authorised personnel only (body corporate/site management) to ensure that the safety of residents is maintained;
- Each waste storage room will house one (1) x 1,100L general waste bulk bin, and one (1) x 1,100L recycling waste bulk bin;
- It is proposed that the bulk bins will be serviced on-site by a rear lift waste collection vehicle with access from Nagel Ave. The bulk bin servicing point is located in the southwest corner of the development adjacent to the driveway;
- The bulk bins will be transferred to/from the servicing point by the engaged waste contractor for servicing. This waste contractor could be the Council's contractor or, if necessary, an alternate private contractor with a rear lift waste collection vehicle could also be engaged. The applicant has commenced engagement with a private waste contractor in relation to servicing for the development. This approach for waste servicing at the development has been accepted by Council in correspondence dated 27 February 2025;
- It is also understood that the kerbside wheelie bin waste collection service is provided to residents in Nagel Ave and that Council's side-lift waste collection vehicles enters the subject site in order to perform a turnaround manoeuvre. The applicant has incorporated into the proposed development provision for Council's side-lift waste collection vehicle to continue to perform this turnaround manoeuvre and exit Nagel Ave in a forward gear;
- A bin wash facility (including hose cock) will be provided in the waste storage room, which will be graded to a drainage point that is connected to sewer in accordance with trade waste requirements. This area will be utilised as the bin washing facility for both the general waste and recycling bulk bins. It will be the responsibility of site management to wash bins and to maintain the cleanliness of the waste storage room.

ATTACHMENT A

Solid Waste Management Code (9.4.12 v.11)

ASSESSABLE DEVELOPMENT CRITERIA
9.4.12-1 SOLID WASTE MANAGEMENT CODE (v.11)

Performance Outcomes	Acceptable Outcomes	Compliance Achieved	Comments
Waste and recycling storage and bin wash-down facilities			
PO1 Development provides waste and recycling storage and servicing facilities that are safe, convenient, efficient, appropriately sized for the type and volume of waste generated.	**AO1.1** Development includes waste storage points of sufficient size to accommodate the required number of waste and recyclable bins consistent with **SC6.16 City Plan policy – Solid waste management**.	✓	The Waste Management Plan confirms that the development includes waste storage points of sufficient size to accommodate the required number of waste and recyclable bins in accordance with **SC6.16 City Plan policy – Solid waste management.**
	AO1.2 Waste and recycling storage points are located, designed and sized consistent with **SC6.16 City Plan policy – Solid waste management**.	✓	The Waste Management Plan confirms that the development includes waste and recycling storage points that are located, designed and sized generally in accordance with **SC6.16 City Plan policy – Solid waste management**.
	AO1.3 Development with a dwelling above the third storey include appropriate waste removal systems which incorporate: (a) waste chutes; (b) hoppers; and (c) separate waste storage rooms. **Note: Waste removal system design is to be consistent with SC6.16 City Plan policy – Solid waste management.**	✓	The Waste Management Plan confirms that the development includes waste chutes; hoppers and separate waste storage rooms consistent with **SC6.16 City Plan policy – Solid waste management**.
	AO1.4 Developments that include a commercial kitchen or generate clinical or related waste incorporate additional waste facilities consistent with **SC6.16 City Plan policy – Solid waste management**.	N/A	The development does not include a commercial kitchen.
PO2 Development provides a bin wash-down facility that maintains appropriate environmental health and amenity standards.	**AO2** Development includes appropriately sized and located bin wash-down facilities consistent with **SC6.16 City Plan policy –Solid waste management**.	✓	The Waste Management Plan confirms that the development includes appropriately sized and located bin wash-down facilities consistent with **SC6.16 City Plan policy –Solid waste management.**

Amenity			
PO3 Waste and recycling storage and servicing points are appropriately located and designed for convenient and safe access by all users and to minimise the potential for nuisance to occupants of the development or adjoining properties.	**AO3.1** Direct unobstructed paths exist between waste and recycling storage and servicing points and road frontages.	✓	The Waste Management Plan confirms that direct unobstructed paths exist between waste and recycling storage and servicing points and road frontages.
	AO3.2 Waste and recycling storage points are screened by solid fencing or vegetation to ensure they are not visible from a public place or sensitive land use.	✓	The Waste Management Plan confirms that waste and recycling storage points are screened by solid fencing or vegetation to ensure they are not visible from a public place or sensitive land use.
Waste servicing			
PO4 Waste and recycling servicing points are appropriately located and designed to facilitate safe, unobstructed and efficient servicing of waste containers.	**AO4** Waste and recycling servicing points are located, designed and sufficiently sized consistent with **SC6.16 City Plan policy –Solid waste management**. **Note: Regulation of the access, stopping and manoeuvring of refuse collection vehicles are subject to meeting, Part 9.4.13 Transport code and associated City Plan guidelines.**	✓	The Waste Management Plan confirms that the waste and recycling servicing points are designed and sufficiently sized generally in accordance with **SC6.16 City Plan policy –Solid waste management.**
Non-serviced areas			
PO5 Developments in non-serviced areas have appropriate solid waste management measures to adequately service the development. ***Note: For Commercial developments a Waste management plan, prepared in accordance with SC6.16 City Plan policy – Solid waste management, is Council's preferred method of addressing the above outcome.***	**AO5** No acceptable outcome provided.	N/A	The development is located in a serviced area.

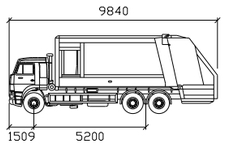
ATTACHMENT B

Waste swept path analysis (prepared by project Traffic Consultant)

Notes:

- RPEQ Signature pertains to Vehicle Swept Paths only
- Grey *landscaping* to remain at most 300mm height where orange *vehicle clearance* overhangs

Vehicle Clearance (300mm)

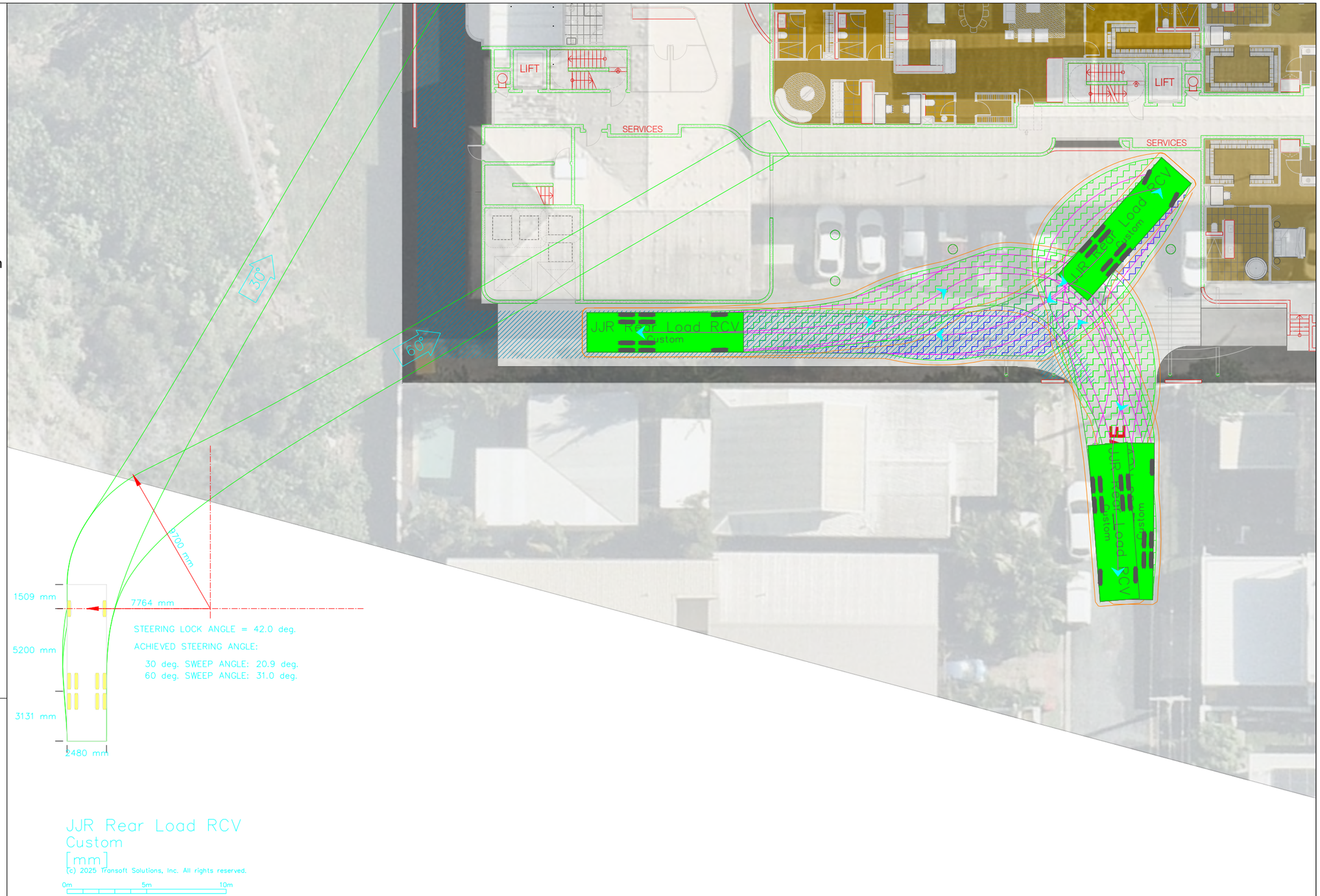


JJR Rear Load RCV

mm

Width	: 2480
Track	: 2480
Lock to Lock Time	6.0
Steering Angle	: 42.0

DESIGN VEHICLE



Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226
P: (07) 5562-5377
W: www.bitziosconsulting.com.au
Brisbane
Level 2, 428 Upper Edward Street, Spring Hill 4000
P: (07) 3831-4442
E: admin@bitziosconsulting.com.au
Sydney
Studio 203, 3 Gladstone Street, Newtown NSW 2042
P: (02) 9557 6202

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Revision 1 - Swept Paths	A.S	22.04.2025
002	Revision 2 - Swept Paths	A.S	23.04.2025

Scale @ A3 — 0 2 4 6 8 10 12 — 1:250

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date
A.EKE		19186	23.04.2025

Project: 122 Marine Parade Miami TIA

Title: RCV Swept Path

Design	Drawn	Checked
A.S	A.S	A.E

CONCEPT ONLY

Date: 23.04.2025

Project Number	Sheet Number	Issue
P6870	1	002

ATTACHMENT 11

Acoustic Assessment prepared by Acoustic Works



acousticworks

Proposed Residential Development
122 Marine Parade
Miami

ACOUSTIC REPORT






Client:
Monaco Property Group Pty Ltd
c/ Eastview QLD Pty Ltd

Reference:
2025024 R01D 122 Marine Parade, Miami ENV.docx

Date Issued:
24 April 2025

Document Information

Contact Details

Acoustic Works
Suite 17/10 Benson Street
Toowong QLD 4066
(07) 3393 2222
ABN: 56 157 965 056

PO Box 69
Toowong DC
QLD 4066

Greg Pearce
Email: gpearce@acousticworks.com.au

Mark Enersen
Email: menersen@acousticworks.com.au

Report Register

Date	Revision	Author	Manager
10/03/25	R01A (DRAFT)	Kayleigh Duce	Mark Enersen
17/04/25	R01B	Kayleigh Duce	Mark Enersen
22/04/25	R01C	Kayleigh Duce	Mark Enersen
24/04/25	R01D	Kayleigh Duce	Mark Enersen

Disclaimer

Reports produced by Acoustic Works are prepared for a particular Client's objective and are based on a specific scope, conditions and limitations, as agreed between Acoustic Works and the Client. Under no circumstances shall information and/or report(s) prepared by Acoustic Works be used by other parties other than the Client without first obtaining written permission from Acoustic Works.

TABLE OF CONTENTS

1.Introduction 4
2.Site Description 4
2.1 Site Location 4
2.2 Proposal 5
2.3 Acoustic Environment 5
3.Equipment 5
4.Receivers and Noise Monitoring 6
4.1 Receiver Locations 6
4.2 Unattended Noise Monitoring 7
5.Measured Noise Levels and Weather Conditions 8
5.1 Meteorological Conditions 8
5.2 Ambient Noise Levels 8
6.Noise Criteria 9
6.1 Environmental Noise Criteria 9
6.1.1 Acoustic Quality Objectives 9
6.1.2 Background Creep 9
1.1 Sleep Disturbance Criteria 10
7.Environmental Assessment 11
7.1 Onsite Activities 11
7.2 Acoustic Quality Objectives 11
7.3 Background Creep 12
1.2 Sleep Disturbance 13
8.Recommendations 14
8.1 Onsite Activities 14
8.2 Onsite Mechanical Plant 14
9.Conclusion 15
10. Appendices 16
10.1 Development Plans 16
10.2 Noise Monitoring Charts 20

TABLE INDEX

Table 1: Meteorological Conditions – Gold Coast Seaway 8
Table 2: Measured ambient noise levels – all time periods 8
Table 3: Acoustic Quality Objectives at Noise Sensitive Properties 9
Table 4: Background creep noise limits 9
Table 5: Acoustic quality objective noise levels, 1 hour 11
Table 6: Predicted Background Creep 15-minute compliance 12
Table 7: Maximum and average noise levels from site activities – Night-time 13

FIGURE INDEX

Figure 1: Site Location (not to scale) 4
Figure 2: Receivers and noise monitoring locations 6

1. Introduction

This report is in response to a request by Monaco Property Group Pty Ltd for an environmental noise assessment of a proposed residential development to be located at 122 Marine Parade, Miami. To facilitate the assessment, unattended noise monitoring was conducted to determine to establish the criteria for onsite activities to sensitive receivers in proximity to the development. Based on the outcomes of the assessment, recommendations for acoustic treatments are specified.

2. Site Description

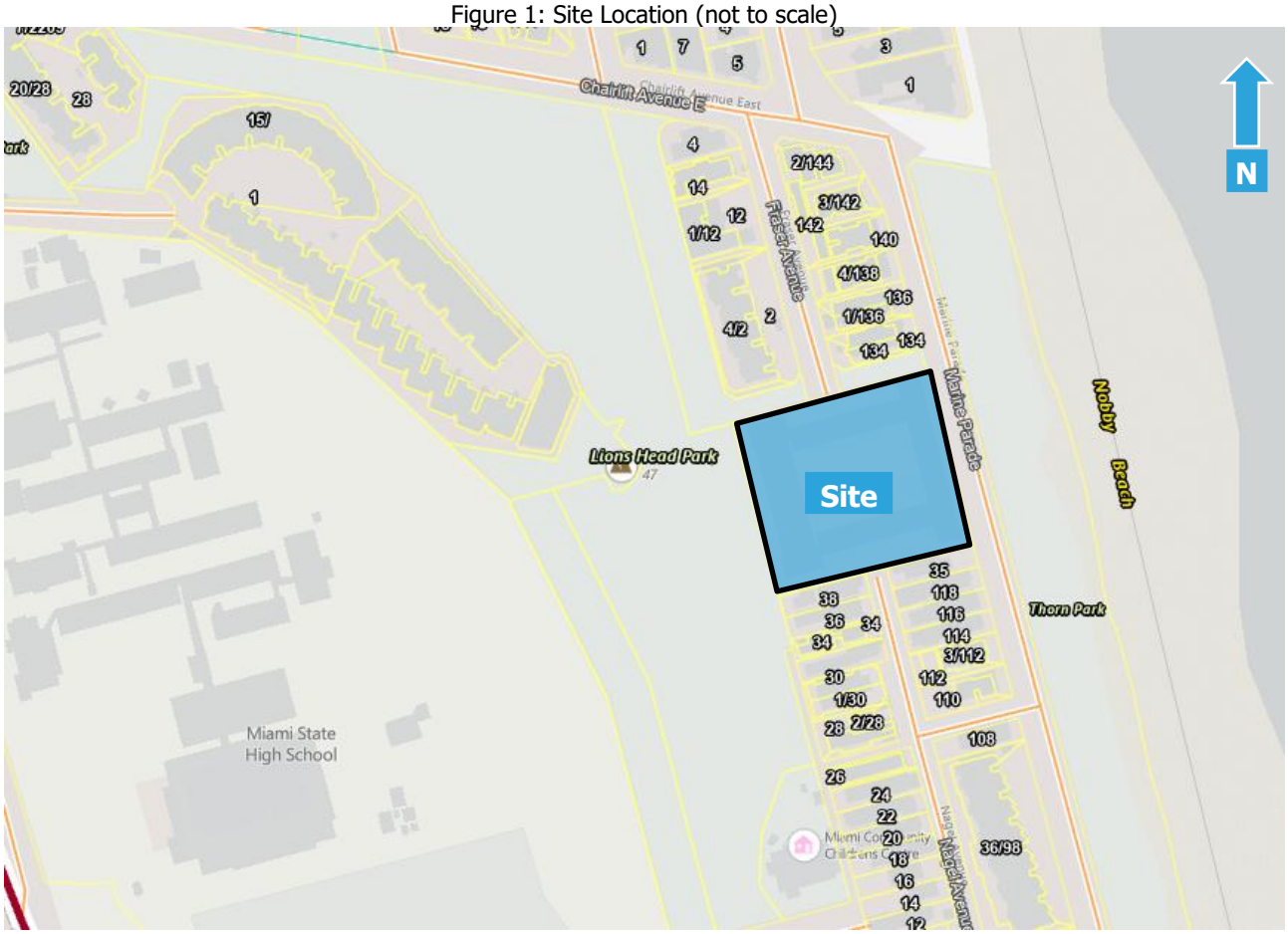
2.1 Site Location

The site is described by the following:

122 Marine Parade, Miami
Lot 122 on SP284713

Refer to Figure 1 for site location.

Figure 1: Site Location (not to scale)



A comprehensive site survey was conducted on the 30 January 2025 and identified the following:

a) The site is currently occupied by a two-storey residential building which will be demolished for the development.
b) Residential land uses bound the site to the north and south.
c) Marine Parade bounds the site to the east separating it from the beach and park lands.
d) Lions Head Park bounds the site to the west separating it from residential land uses.

2.2 Proposal

The proposal is to construct a residential development as follows:

- Site Area: 7,284m^2
- A single storey basement to house 137 residential car parks and 8 visitor car parks.
- The ground floor consists of residential lobby, pool and recreation area, gym, wellness centre and 7 residential units.
- Level 2-3 consists of 12 units on each level.
- Level 4 consists of 10 units.
- Level 5 consists of 5 units.
- Level 6 includes the 11-penthouse private open spaces.
- Access of development via Fraser Avenue.

Refer to the Appendices for development plans.

2.3 Acoustic Environment

The site and surrounding area is primarily affected by local traffic noise and surf noise.

3. Equipment

The following equipment was used to record noise levels:

- Rion NL42 Environmental Noise Monitor
- Pulsar Model 105 Sound Calibrator

The noise monitor holds current NATA Laboratory Certification and was field calibrated before and after the monitoring period, with no significant drift from the reference signal recorded.

4. Receivers and Noise Monitoring

4.1 Receiver Locations

The nearest residential receiver locations were identified as follows;

1. A three-storey residential building is located at 2 Fraser Avenue to the northwest of the site.
2. A two-storey residential building is located at 134 Marine Parade to the northeast of the site.
3. A two-storey residential building is located at 120 Marine Parade to the southwest of the site.
4. A three-storey residential building is located at 38 Nagel Avenue to the southwest of the site.
5. A three-storey residential building is located at 1 Great Hall Drive to the west of the site.

These locations were chosen as being representative of the nearest residential receivers to the proposed development. Refer to Figure 2 for these locations.

Figure 2: Receivers and noise monitoring locations



4.2 Unattended Noise Monitoring

An Rion NL42 environmental noise monitor was placed on site at 122 Marine Parade to measure ambient noise levels. This location was chosen as it considered representative at the nearest sensitive receiver. The monitor was located in a free field position with the microphone approximately 1.4 metres above ground surface level. The noise monitor was set to record noise levels between 30 January and 12 February 2025.

The environmental noise monitor was set to record noise levels in "A" Weighting, Fast response using 15-minute statistical intervals. Ambient noise monitoring was conducted generally in accordance with Australian Standard AS1055:1997 *Acoustics – Description and measurement of environmental noise* with road traffic conducted in accordance with Australian Standard *AS2702:1984 'Acoustics – Methods for the measurement of road traffic noise'*.

5. Measured Noise Levels and Weather Conditions

The following tables present the measured noise levels from the unattended noise survey and weather conditions during the monitoring period. Any periods of inclement weather or extraneous noise were omitted from the measured data prior to determining the results.

5.1 Meteorological Conditions

Meteorological observations during the unattended noise monitoring period were obtained from the Bureau of Meteorology website (http://www.bom.gov.au/climate/data), shown in Table 1 below.

Table 1: Meteorological Conditions – Gold Coast Seaway

Day	Date	Rainfall (mm)	Wind			
			9am		3pm	
			Speed (km/h)	Direction	Speed (km/h)	Direction
Thursday	30/01/25	0	15	NE	19	NE
Friday	31/01/25	0	9	E	15	E
Saturday	1/02/25	3.6	17	SE	35	SE
Sunday	2/02/25	1	22	SSE	37	SE
Monday	3/02/25	2.6	30	ESE	30	SE
Tuesday	4/02/25	6.2	24	ESE	26	E
Wednesday	5/02/25	2.6	7	SW	13	E
Thursday	6/02/25	2	19	SSE	22	SE
Friday	7/02/25	0.4	13	SSE	20	SE
Saturday	8/02/25	0	15	SSE	17	E
Sunday	9/02/25	0	17	SE	22	ESE
Monday	10/02/25	8.6	13	ENE	15	E
Tuesday	11/02/25	0	7	SE	20	ENE
Wednesday	12/02/25	0	4	E	19	ENE

5.2 Ambient Noise Levels

The ambient levels measured at the monitoring location are as follows;

Table 2: Measured ambient noise levels – all time periods

Day	Date	L90 dB(A)		
		Day	Eve	Night
Thursday	30/01/25	45	47	45
Friday	31/01/25	44	46	43
Saturday*	1/02/25	48	48	45
Sunday	2/02/25	47	47	46
Monday*	3/02/25	50	47	51
Tuesday*	4/02/25	50	50	48
Wednesday*	5/02/25	47	46	45
Thursday	6/02/25	47	49	46
Friday	7/02/25	47	48	46
Saturday	8/02/25	47	49	45
Sunday*	9/02/25	47	50	45
Monday	10/02/25	46	48	48
Tuesday	11/02/25	47	50	44
Wednesday	12/02/25	45	-	45
Overall value		47	48	45

*Note heavy rainfall recorded during the monitoring period were found to have affected the measured results, therefore the data was omitted for the affected time periods.

Refer to the Appendix for a graphical representation of the noise monitoring.

6. Noise Criteria

6.1 Environmental Noise Criteria

The noise criteria as applied by City of Gold Coast are as follows;

6.1.1 Acoustic Quality Objectives

Table 3 presents the acoustic quality objectives at noise sensitive receptors as detailed in Schedule 1 of the EPP (Noise) 2008.

Table 3: Acoustic Quality Objectives at Noise Sensitive Properties

Sensitive Receptor	Time of Day	Acoustic Quality Objectives, dB(A)		
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$
Dwelling (outdoors)	Day and Evening (7am – 10pm)	50	55	65
Dwelling (Indoors)	Day and Evening (7am – 10pm)	35	40	45
	Night (10pm – 7am)	30	35	40

6.1.2 Background Creep

The Background Creep criteria are as follows;

Time-varying noise:

$$L_{Aeq,adj,T,} \leq \text{Ambient } L_{A90,T} + 5\text{dB(A)}$$

Steady-state noise:

$$L_{A90,T} \leq \text{Ambient } L_{A90,T}$$

The time period (T) is a time interval of at least 15 minutes, or if the noise continues for less than 15 minutes, the duration of the noise source.

Based on the results of ambient noise monitoring, the project specific background creep noise limits are shown in Table 4.

Table 4: Background creep noise limits

Time Period	Noise Level Limits SPL dB(A)	
	$L_{Aeq,T}$	$L_{A90,T}$
Day 7am – 6pm	52	47
Evening 6pm – 10pm	53	48
Night 10pm – 7am	50	45

1.1 Sleep Disturbance Criteria

Criteria for sleep disturbance under the WHO Guideline is addressed is as follows:

> *"As a rule for planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) $_{LA,(Max)}$ more than 10 or 15 times per night'.*
>
> *'Where noise is continuous, the equivalent sound pressure level should not exceed 30 dB(A) indoors, if negative effects on sleep are to be avoided'."*

7. Environmental Assessment

7.1 Onsite Activities

Noise associated with the development was assessed based on previous measurements of similar activities. The calculations assume that the nominated activities are located at the closest representative point within the development site to each receiver location. Any relevant shielding, building transmission loss or recommended acoustic screens are taken into account for these activities.

7.2 Acoustic Quality Objectives

The average maximum noise source levels and predicted levels at the receiver locations are shown in Table 5. Note: L_{A10} and L_{A1} results are not shown in cases where the total duration of the events is less than the minimum time required e.g. $L_{A10(1hr)}$ requires noise events to occur for at least 360 seconds of an hour-long period. LAeq results are not shown where the calculated total is less than 0dBA.

Table 5: Acoustic quality objective noise levels, 1 hour

Receiver	Description	Source Leq@1m dB(A)	Correction dB(A)*	Corrected Leq@1m dB(A)	No. of events per 1hr Day	No. of events per 1hr Eve	No. of events per 1hr Night	Duration per event	Distance (m)	Barrier (height (m))	Barrier screening dB	Building TL or shield dB	Topo screening dB	Dist atten. @-6dB/dd	LAeq adj,1hr ext. dB(A) Day	LAeq adj,1hr int. dB(A) Day	LAeq adj,1hr ext. dB(A) Eve	LAeq adj,1hr int. dB(A) Eve	LAeq adj,1hr ext. dB(A) Night	LAeq adj,1hr int. dB(A) Night	LA10 adj,1hr ext. dB(A) Day	LA10 adj,1hr int. dB(A) Day	LA10 adj,1hr ext. dB(A) Eve	LA10 adj,1hr int. dB(A) Eve	LA10 adj,1hr ext. dB(A) Night	LA10 adj,1hr int. dB(A) Night	LA1 adj,1hr ext. dB(A) Day	LA1 adj,1hr int. dB(A) Day	LA1 adj,1hr ext. dB(A) Eve	LA1 adj,1hr int. dB(A) Eve	LA1 adj,1hr ext. dB(A) Night	LA1 adj,1hr int. dB(A) Night	Amenity LAeq Compliance			LA10 Compliance			LA1 Compliance		
	1. 2 Fraser Avenue (W) 2. 134 Marine Parade (NE) 3. 120 Marine Parade (SE) 4. Nagel Avenue (SW) 5. 1 Great Hall Drive (W)																																									
										No																									Day / eve	Day / eve indoor	Night indoor	Day / eve	Day / eve indoor	Night indoor	Day / eve	Day / eve indoor	Night indoor
1	Criteria																																	50	35	30	55	40	35	65	45	40
	Car door closure	75	2	77	80	40	20	2	20			-15		-27	21	11	18	8	15	5								26	16	26	16	26	16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	80	40	20	15	20					-26	38	28	35	25	32	22	41	31	41	31				43	33	43	33	43	33	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	80	40	20	2	20			-15		-26	20	10	17	7	14	4								25	15	25	15	25	15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp	74		74	80	40	20	10	20					-26	40	30	37	27	34	24	43	33	43	33				46	36	46	36	46	36	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool	78	2	80	4	4	4	900	60			-18		-36	26	16	26	16	26	16	31	21	31	21	31	21		38	28	38	28	38	28	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym	79	2	81	4	4	4	900	46			-25		-33	22	12	22	12	22	12	26	16	26	16	26	16	26	16	33	23	33	23	33	23	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														43	33	40	30	37	27	46	36	46	36	32	22		49	39	49	39	49	39	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
2	Criteria																																	50	35	30	55	40	35	65	45	40
	Car door closure	75	2	77	80	40	20	2	16			-30		-25	8		5		2									13	3	13	3	13	3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	80	40	20	15	21					-26	38	28	35	25	32	22	41	31	41	31				43	33	43	33	43	33	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	80	40	20	2	16			-30		-24	8		5		2									13	3	13	3	13	3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp	74		74	80	40	20	10	40					-32	35	25	32	22	29	19	38	28	38	28				41	31	41	31	41	31	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool	78	2	80	4	4	4	900	44			-22		-33	25	15	25	15	25	15	30	20	30	20	30	20		37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym	79	2	81	4	4	4	900	55			-25		-35	21	11	21	11	21	11	25	15	25	15	25	15		32	22	32	22	32	22	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														40	30	37	27	35	25	43	33	43	33	31	21		46	36	46	36	46	36	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
3	Criteria																																	50	35	30	55	40	35	65	45	40
	Car door closure	75	2	77	80	40	20	2	11			-30		-21	12	2	9		6									17	7	17	7	17	7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	80	40	20	15	11			-30		-21	13	3	10		7		16	6	16	6				18	8	18	8	18	8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	80	40	20	2	11			-30		-21	12	2	9		6									17	7	17	7	17	7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp	74		74	80	40	20	10	77			-30		-38							3		3				6		6		6		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool	78	2	80	4	4	4	900	34			-20		-31	29	19	29	19	29	19	34	24	34	24	34	24		41	31	41	31	41	31	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym	79	2	81	4	4	4	900	53			-25		-34	22	12	22	12	22	12	26	16	26	16	26	16		33	23	33	23	33	23	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														30	20	30	20	30	20	35	25	35	25	35	25		42	32	42	32	42	32	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
4	Criteria																																	50	35	30	55	40	35	65	45	40
	Car door closure	75	2	77	80	40	20	2	10			-30		-20	13	3	10		7									18	8	18	8	18	8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	80	40	20	15	10			-30		-20	14	4	11	1	8		17	7	17	7				19	9	19	9	19	9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	80	40	20	2	10			-30		-20	12	2	9		6									17	7	17	7	17	7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp	74		74	80	40	20	10	70			-30		-37							4		4					7		7		7		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool	78	2	80	4	4	4	900	42			-15		-32	33	23	33	23	33	23	38	28	38	28	38	28		45	35	45	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym	79	2	81	4	4	4	900	30			-25		-30	26	16	26	16	26	16	30	20	30	20	30	20		37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														34	24	34	24	34	24	38	28	38	28	38	28		45	35	45	35	45	35	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
5	Criteria																																	50	35	30	55	40	35	65	45	40
	Car door closure	75		75	80	40	20	2	101			-30		-41																				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	80	40	20	15	104			-30		-40																				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74		74	80	40	20	2	101			-30		-40																				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp	74		74	80	40	20	10	104			-30		-40																				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool	78	2	80	4	4	4	900	147					-43	37	27	37	27	37	27	37	27	37	27	37	27		37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym	79	2	81	4	4	4	900	120			-25		-42	14	4	14	4	14	4	14	4	14	4	14	4		14	4	14	4	14	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														37	27	37	27	37	27	37	27	37	27	37	27		37	27	37	27	37	27	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

*Correction due to tonality and impulsiveness as per AS1055:2018.

Compliance with the acoustic quality objective criteria is predicted for all time periods without the need for further acoustic treatment.

7.3 Background Creep

Based on assessment of all time periods, the noise source levels and predicted levels at the receiver locations are shown as follows;

Table 6: Predicted Background Creep 15-minute compliance

Receiver	Receivers 1. 2 Fraser Avenue (W) 2. 134 Marine Parade (NE) 3. 120 Marine Parade (SE) 4. Nagel Avenue (SW) 5. 1 Great Hall Drive (W) Description	Source Leq@1m dB(A)	Correction dB(A)*	Corrected Leq@1m dB(A)	No. of events per 15min Day	No. of events per 15min Eve	No. of events per 15min Nigl	Duration per event	Distance (m)	Barrier (height (m)) No	Barrier screening dB	Building TL or shield dB	Building screening dB	Dist atten. @-6dB/dd	LAeq adj,T ext. dB(A) Day	LAeq adj,T int. dB(A) Day	LAeq adj,T ext. dB(A) Eve	LAeq adj,T int. dB(A) Eve	LAeq adj,T ext. dB(A) Night	LAeq adj,T int. dB(A) Night	LAeq 15 min Compliance Day	Eve	Night
1	Criteria																					54	52	49
	Car door closure	75	2	77	20	10	5	2	20			-15		-27	21	11	18	8	15	5		Yes	Yes	Yes
	Car passby	69		69	20	10	5	15	20					-26	38	28	35	25	32	22		Yes	Yes	Yes
	Car start	74	2	76	20	10	5	2	20			-15		-27	20	10	17	7	14	4		Yes	Yes	Yes
	Car on ramp	74		74	20	10	5	10	20					-27	40	30	37	27	34	24		Yes	Yes	Yes
	Rec area inc pool	78	2	80	1	1	1	900	60			-18		-36	26	16	26	16	26	16		Yes	Yes	Yes
	Gym	79	2	81	1	1	1	900	46			-25		-34	22	12	22	12	22	12		Yes	Yes	Yes
	Total														43	33	40	30	37	27		**Yes**	**Yes**	**Yes**
2	Criteria																					54	52	49
	Car door closure	75	2	77	20	10	5	2	16			-30		-25	8		5		2			Yes	Yes	Yes
	Car passby	69		69	20	10	5	15	21					-26	38	28	35	25	32	22		Yes	Yes	Yes
	Car start	74	2	76	20	10	5	2	16			-30		-24	8		5		2			Yes	Yes	Yes
	Car on ramp	74		74	20	10	5	10	40					-32	35	25	32	22	29	19		Yes	Yes	Yes
	Rec area inc pool	78	2	80	1	1	1	900	44			-22		-33	25	15	25	15	25	15		Yes	Yes	Yes
	Gym	79	2	81	1	1	1	900	55			-25		-35	21	11	21	11	21	11		Yes	Yes	Yes
	Total														40	30	37	27	35	25		**Yes**	**Yes**	**Yes**
3	Criteria																					54	52	49
	Car door closure	75	2	77	20	10	5	2	11			-30		-21	12	2	9		6			Yes	Yes	Yes
	Car passby	69		69	20	10	5	15	11			-30		-21	13	3	10		7			Yes	Yes	Yes
	Car start	74	2	76	20	10	5	2	11			-30		-21	12	2	9		6			Yes	Yes	Yes
	Car on ramp	74		74	20	10	5	10	77			-30		-38								Yes	Yes	Yes
	Rec area inc pool	78	2	80	1	1	1	900	34			-20		-31	29	19	29	19	29	19		Yes	Yes	Yes
	Gym	79	2	81	1	1	1	900	53			-25		-34	22	12	22	12	22	12		Yes	Yes	Yes
	Total														30	20	30	20	30	20		**Yes**	**Yes**	**Yes**
4	Criteria																					54	52	49
	Car door closure	75	2	77	20	10	5	2	10			-30		-20	13	3	10		7			Yes	Yes	Yes
	Car passby	69		69	20	10	5	15	10			-30		-20	14	4	11	1	8			Yes	Yes	Yes
	Car start	74	2	76	20	10	5	2	10			-30		-20	12	2	9		6			Yes	Yes	Yes
	Car on ramp	74		74	20	10	5	10	70			-30		-37								Yes	Yes	Yes
	Rec area inc pool	78	2	80	1	1	1	900	42			-15		-32	33	23	33	23	33	23		Yes	Yes	Yes
	Gym	79	2	81	1	1	1	900	30			-25		-30	26	16	26	16	26	16		Yes	Yes	Yes
	Total														34	24	34	24	34	24		**Yes**	**Yes**	**Yes**
5	Criteria																					54	52	49
	Car door closure	75		75	20	10	5	2	101			-30		-41								Yes	Yes	Yes
	Car passby	69		69	20	10	5	15	104			-30		-40								Yes	Yes	Yes
	Car start	74		74	20	10	5	2	101			-30		-40								Yes	Yes	Yes
	Car on ramp	74		74	20	10	5	10	104			-30		-40								Yes	Yes	Yes
	Rec area inc pool	78	2	80	1	1	1	900	147					-43	37	27	37	27	37	27		Yes	Yes	Yes
	Gym	79	2	81	1	1	1	900	120			-25		-42	14	4	14	4	14	4		Yes	Yes	Yes
	Total														37	27	37	27	37	27		**Yes**	**Yes**	**Yes**

*Correction due to tonality and impulsiveness as per AS1055:2018.

Compliance with the background creep criteria is predicted for all time periods without the need for further acoustic treatment.

1.2 Sleep Disturbance

The noise source levels and predicted levels of noise at the receiver locations are shown in Table Table 7.

Table 7: Maximum and average noise levels from site activities – Night-time

Receiver	Receivers 1. 2 Fraser Avenue (W) 2. 134 Marine Parade (NE) 3. 120 Marine Parade (SE) 4. Nagel Avenue (SW) 5. 1 Great Hall Drive (W) Description	Source LAmax @1m dB(A)	Correction dB(A)*	Corrected dB(A)	Distance (m)	Barrier (height (m No	Barrier screening dB	Building TL or shield dB	Building screening dB	Dist atten. @-6dB/dd	LAmax adj,T int. dB(A)	Complies Night dB(A)
1	Criteria											45
	Car passby	74		74	20			-15		-26	23	Yes
	Car door closure	79	2	81	20					-26	45	Yes
	Car start	78	2	80	20			-15		-26	29	Yes
	Car on Ramp	77		77	20					-26	41	Yes
	Rec area inc pool	86	2	88	60			-18		-36	24	Yes
	Gym	89		89	46			-25		-33	21	Yes
2	Criteria											45
	Car passby	74		74	16			-30		-24	10	Yes
	Car door closure	79		79	21					-26	43	Yes
	Car start	78	2	80	16			-30		-24	16	Yes
	Car on Ramp	77	2	79	40					-32	37	Yes
	Rec area inc pool	86	2	88	44			-22		-33	23	Yes
	Gym	89		89	55			-25		-35	19	Yes
3	Criteria											45
	Car passby	74		74	11			-30		-21	13	Yes
	Car door closure	79		79	11			-30		-21	18	Yes
	Car start	78	2	80	11			-30		-21	19	Yes
	Car on Ramp	77	2	79	77			-30		-38	1	Yes
	Rec area inc pool	86	2	88	34			-20		-31	27	Yes
	Gym	89		89	53			-25		-34	20	Yes
4	Criteria											45
	Car passby	74		74	10			-30		-20	14	Yes
	Car door closure	79		79	10			-30		-20	19	Yes
	Car start	78	2	80	10			-30		-20	20	Yes
	Car on Ramp	77	2	79	70			-30		-37	2	Yes
	Rec area inc pool	86	2	88	42			-15		-32	31	Yes
	Gym	89		89	30			-25		-30	24	Yes
5	Criteria											45
	Car passby	74		74	101			-30		-40	-6	Yes
	Car door closure	79		79	104			-30		-40	-1	Yes
	Car start	78	2	80	101			-30		-40	0	Yes
	Car on Ramp	77	2	79	104			-30		-40	-1	Yes
	Rec area inc pool	86	2	88	147					-43	35	Yes
	Gym	89		89	120			-25		-42	12	Yes

*Correction due to tonality and impulsiveness as per AS1055:2018.

Compliance with the sleep disturbance criteria is predicted for all time periods without the need for further acoustic treatment.

8. Recommendations

8.1 Onsite Activities

Based on the predicted noise levels of the site and surrounds for all time periods, noise impacts at the residential receiver locations are predicted to comply on the condition the following acoustic treatments are implemented:

- We recommend waste collection be conducted in accordance with existing residential collections in the area to reduce the potential for disturbance.
- Carpark finished surfaces should consist of materials which provides low tyre squeal characteristics. Any traversable drainage grates must be securely fastened.
- The Pool and recreation areas are compliant for all time periods.

8.2 Onsite Mechanical Plant

No information regarding mechanical services was available at the time of the assessment. We recommend that any new mechanical plant is designed to comply with the noise criteria stated in Section 6.1.2 with an assessment by qualified acoustic consultant to be conducted prior to installation.

9. Conclusion

An environmental noise assessment was conducted for the proposed residential development located at 122 Marine Parade, Miami. Recommendations have been included in relation to onsite activity noise impacts to neighbouring receivers.

If you should have any queries please do not hesitate to contact us.

Report Prepared By



Kayleigh Duce
Acoustic Consultant
acousticworks)))

 © Acoustic Works 2025

10. Appendices

10.1 Development Plans







DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI

PROJECT NO. 568100
23 APRIL 2025, ISSUE

DRAWING NO. DA2.103
LEVEL 2 PLAN

PREPARED FOR
MONACO PROPERTY GROUP

SCALE:
1:400 @ A3

Koichi Takada Architects

65 / 76



DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI

PROJECT NO. 568100
23 APRIL 2025, ISSUE

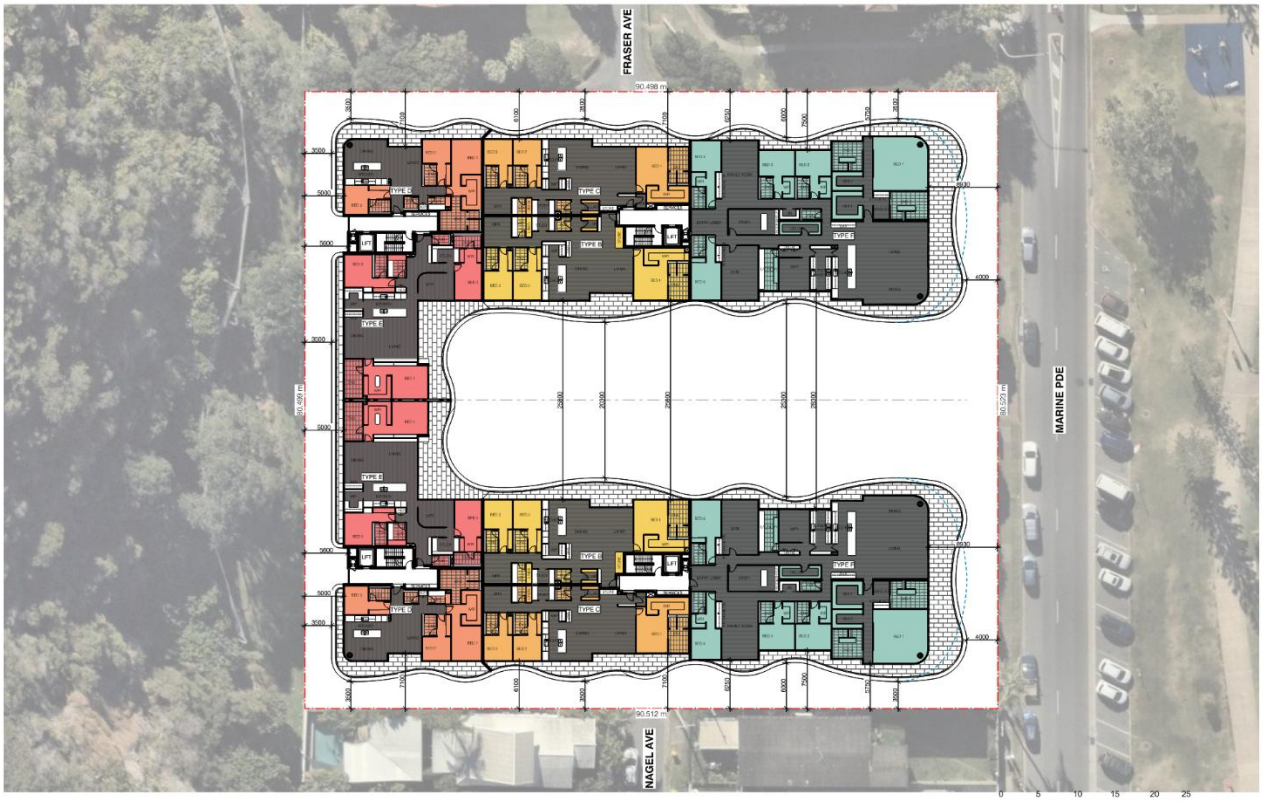
DRAWING NO. DA2.104
LEVEL 3 PLAN

PREPARED FOR
MONACO PROPERTY GROUP

SCALE:
1:400 @ A3

Koichi Takada Architects

66 / 76

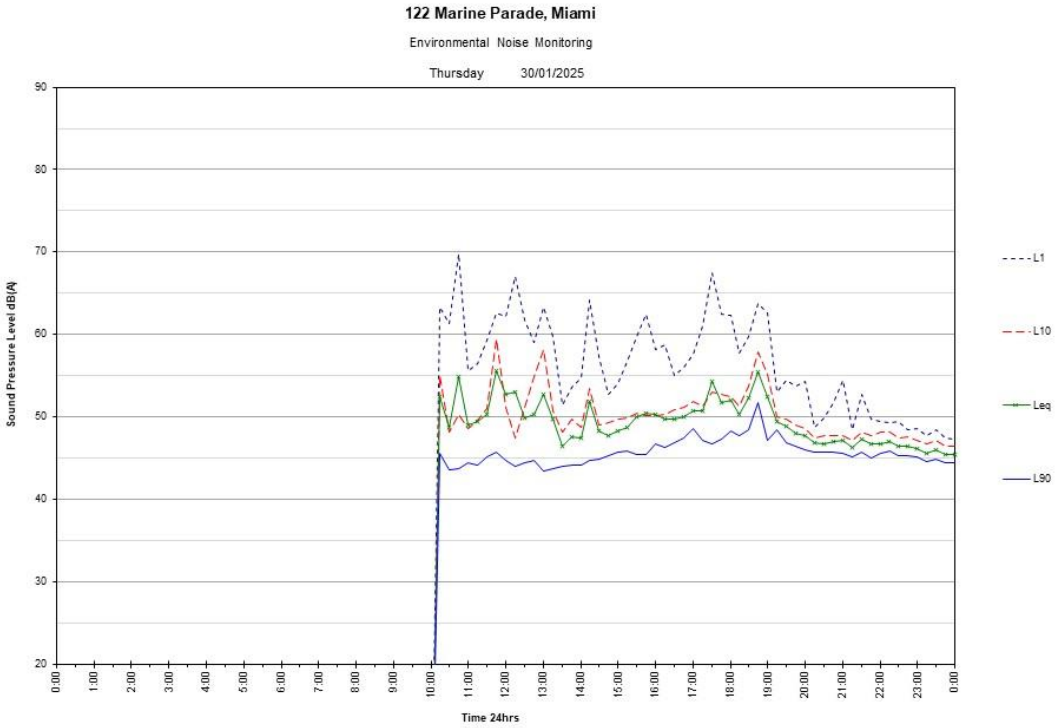

FRASER AVE
90.498 m
MARINE PDE
90.512 m
NAGEL AVE
0 5 10 15 20 25
DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI
PROJECT NO. 568100
23 APRIL 2025, ISSUE
DRAWING NO. DA2.105
LEVEL 4 PLAN
PREPARED FOR
MONACO PROPERTY GROUP
SCALE:
1:400 @ A3
Koichi Takada Architects
67 / 76

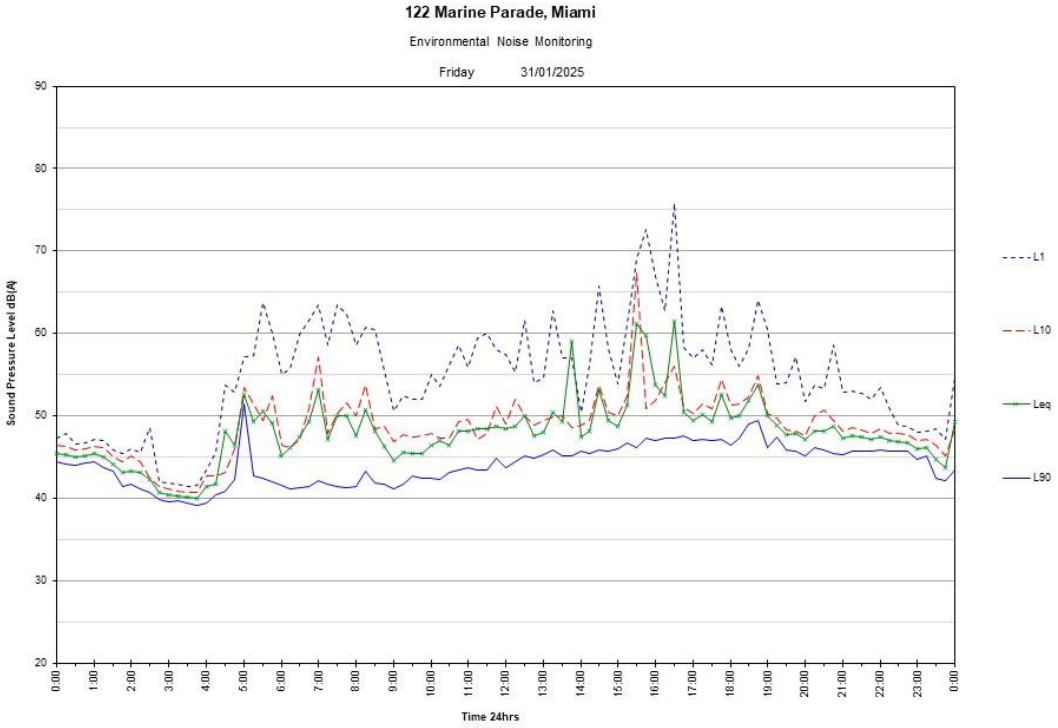

FRASER AVE
90.498 m
MARINE PDE
90.512 m
NAGEL AVE
0 5 10 15 20 25
DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI
PROJECT NO. 568100
23 APRIL 2025, ISSUE
DRAWING NO. DA2.106
LEVEL 5 PLAN
PREPARED FOR
MONACO PROPERTY GROUP
SCALE:
1:400 @ A3
Koichi Takada Architects
68 / 76

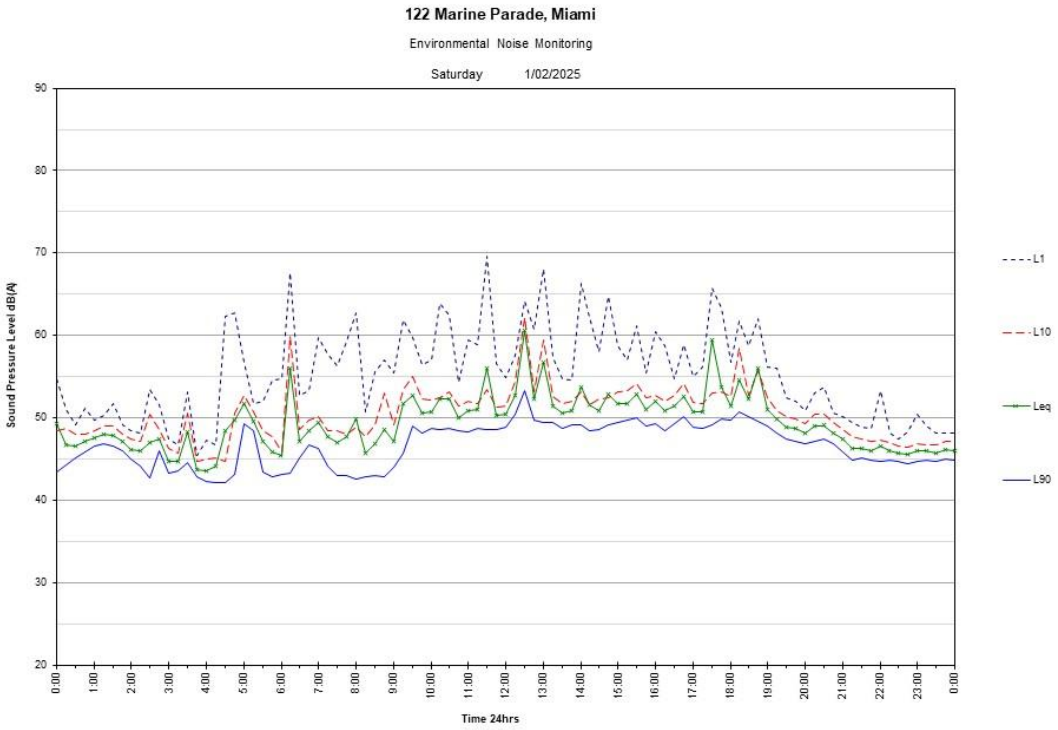

FRASER AVE
90.498 m
MARINE PDE
90.512 m
NAGEL AVE
0 5 10 15 20 25
DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI
PROJECT NO. 568100
23 APRIL 2025, ISSUE
DRAWING NO. DA2.107
ROOFTOP RECREATION LEVEL
PREPARED FOR
MONACO PROPERTY GROUP
SCALE:
1:400 @ A3
Koichi Takada Architects
69 / 76

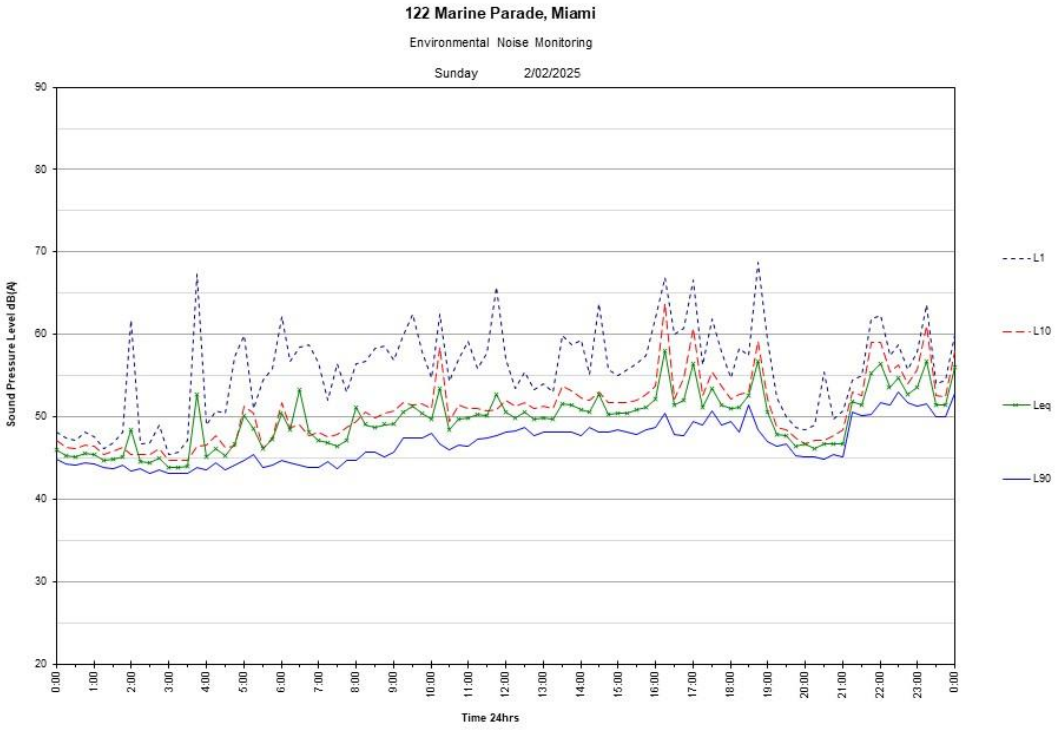

FRASER AVE
90.498 m
MARINE PDE
90.512 m
NAGEL AVE
0 5 10 15 20 25
DEVELOPMENT APPLICATION
122 MARINE PDE, MIAMI
PROJECT NO. 568100
23 APRIL 2025, ISSUE
DRAWING NO. DA2.108
ROOF PLAN
PREPARED FOR
MONACO PROPERTY GROUP
SCALE:
1:400 @ A3
Koichi Takada Architects
70 / 76

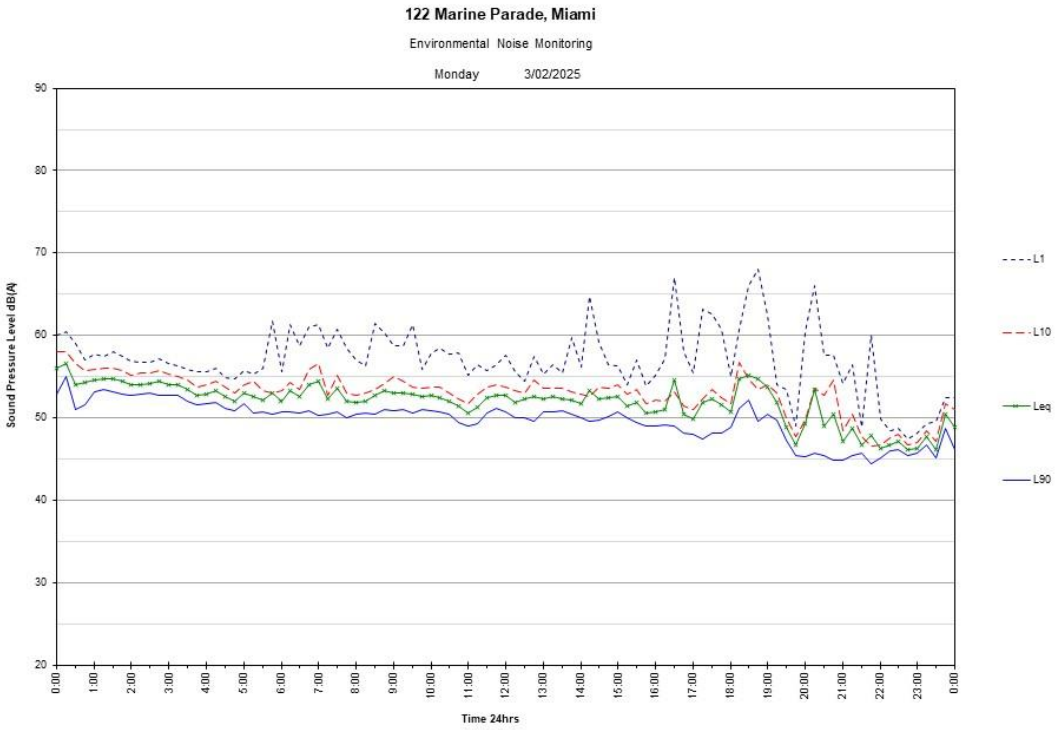
10.2 Noise Monitoring Charts

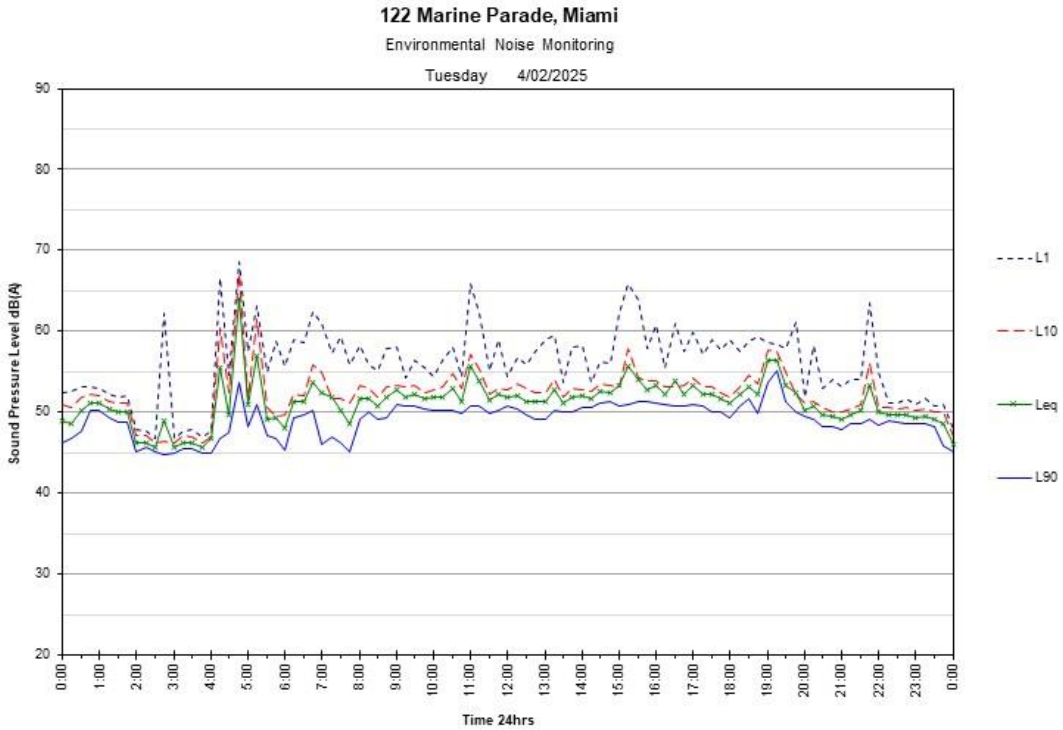


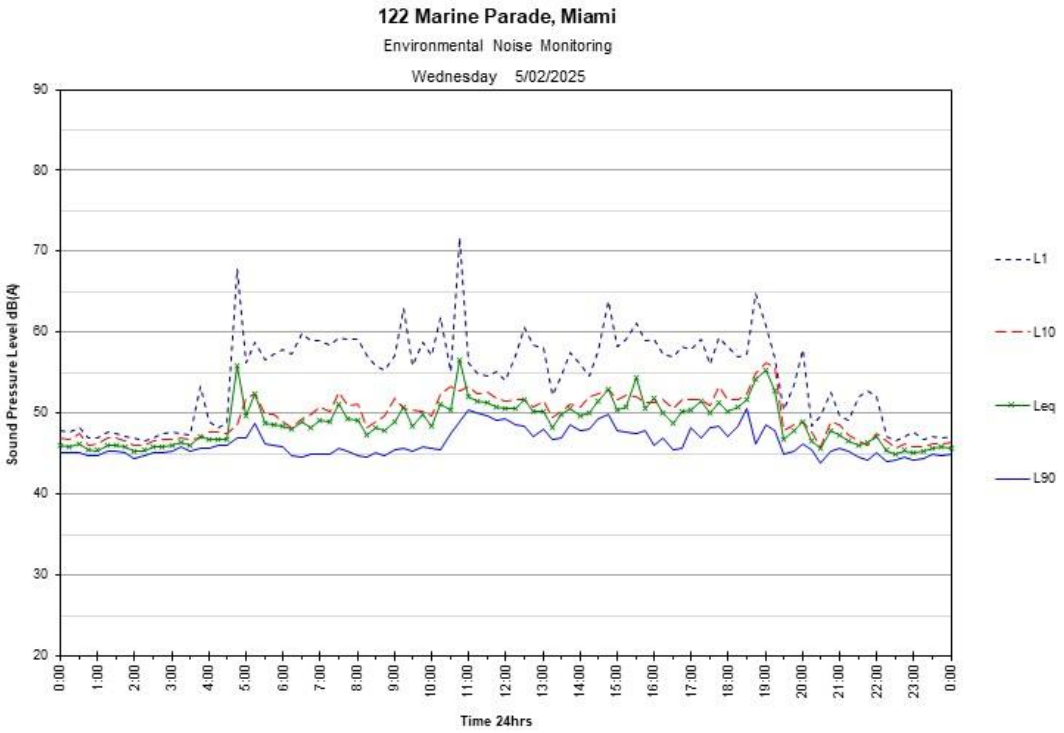


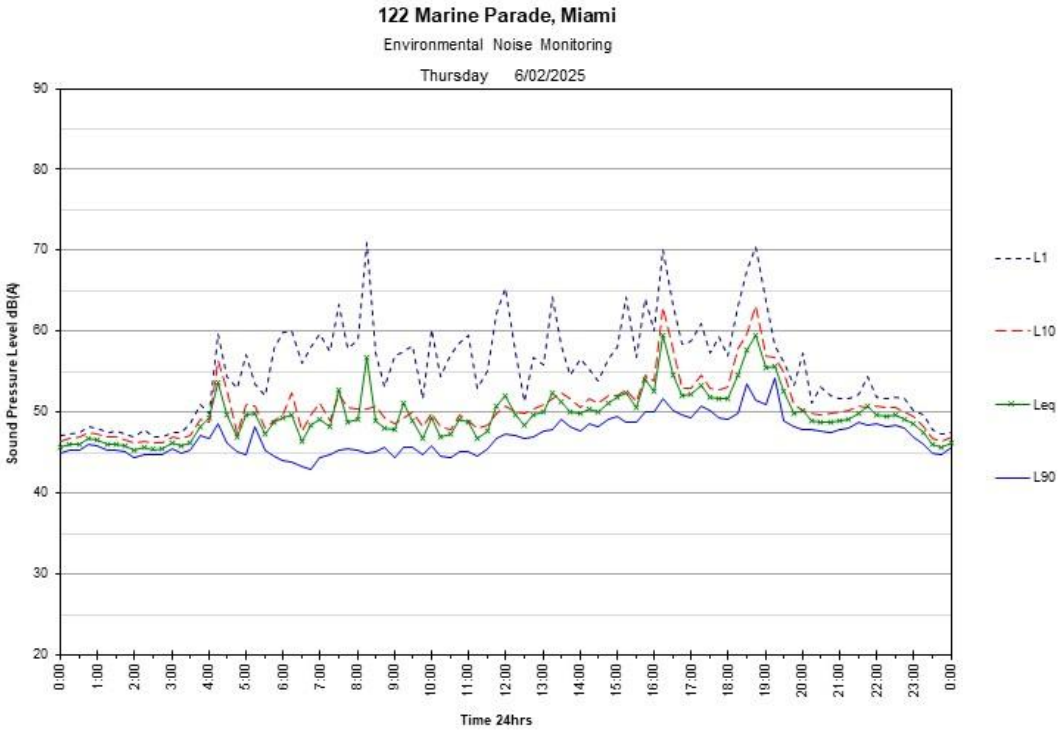

122 Marine Parade, Miami
Environmental Noise Monitoring
Saturday 1/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90

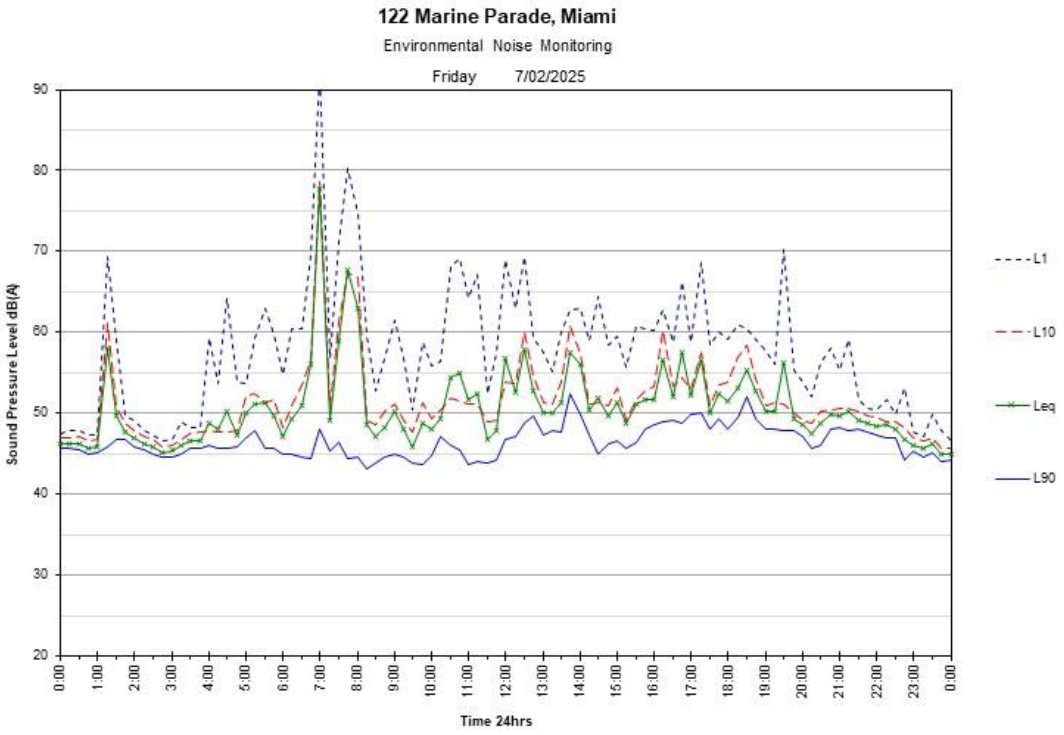

122 Marine Parade, Miami
Environmental Noise Monitoring
Sunday 2/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90

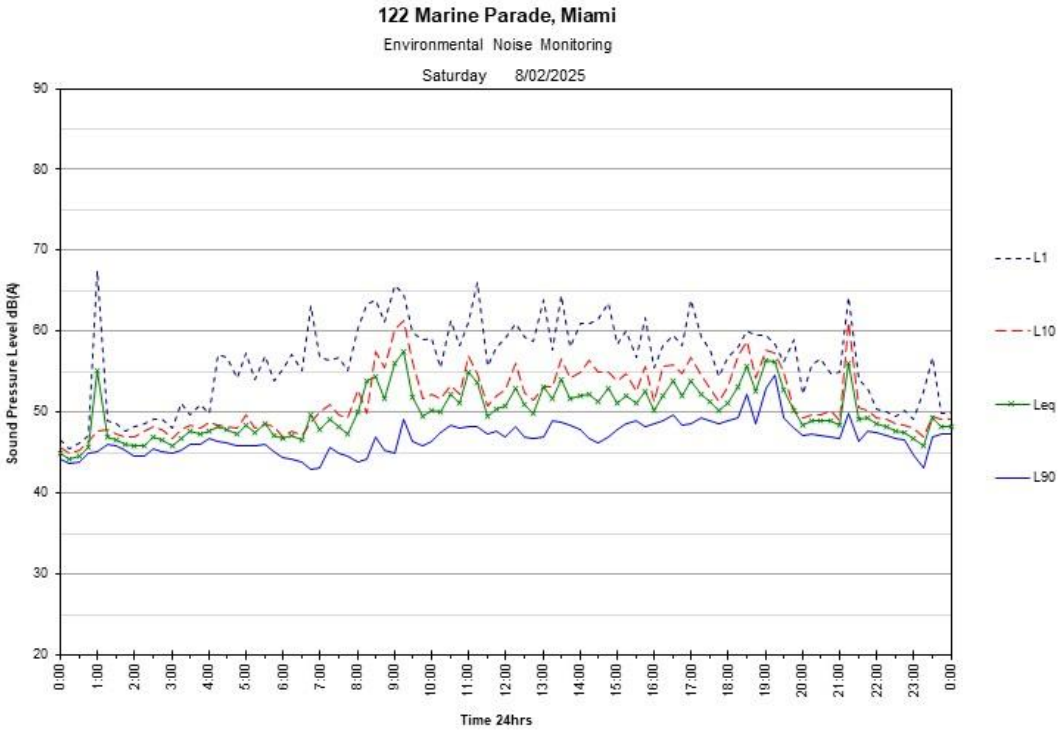

122 Marine Parade, Miami
Environmental Noise Monitoring
Monday 3/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90

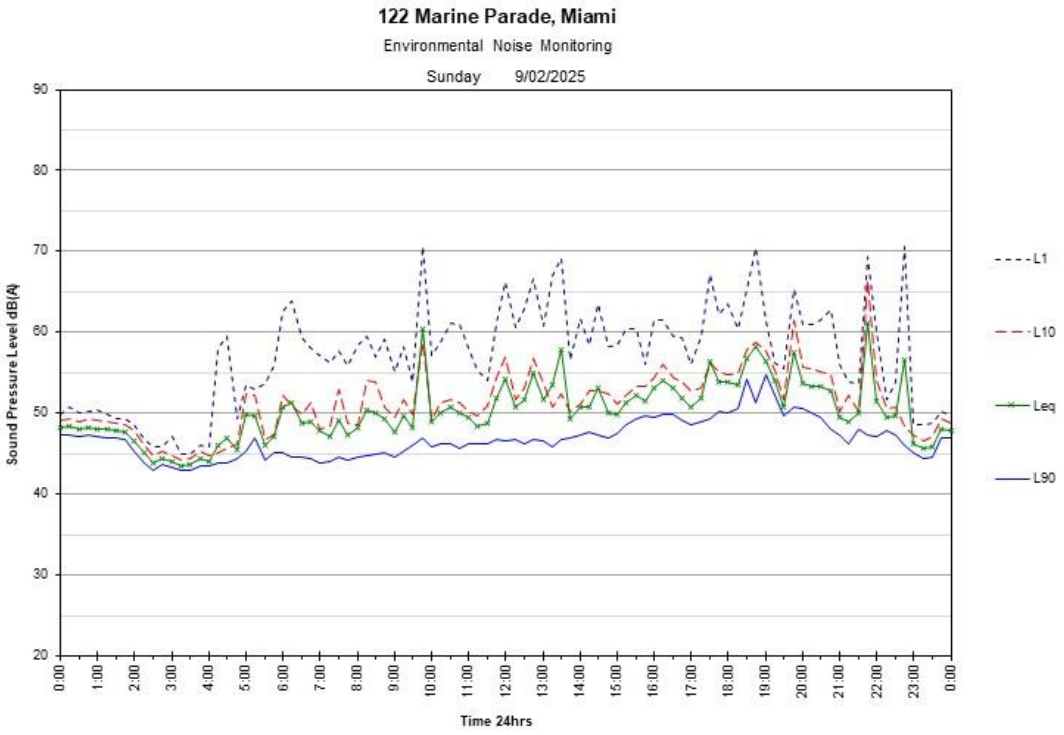

122 Marine Parade, Miami
Environmental Noise Monitoring
Tuesday 4/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90

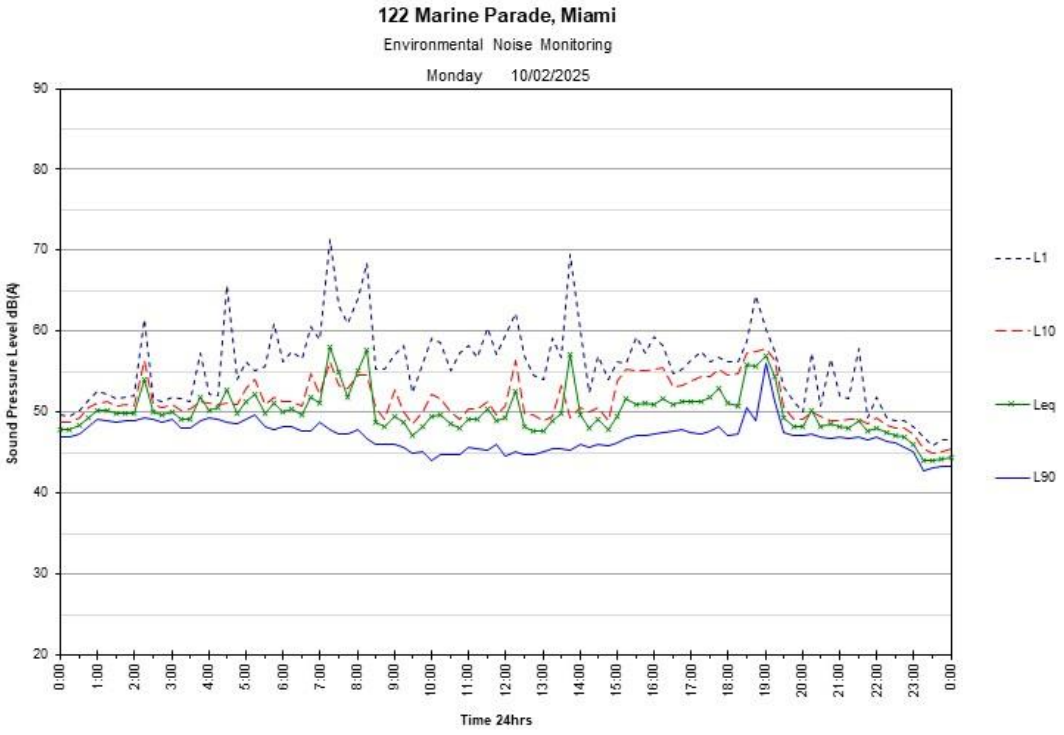

122 Marine Parade, Miami
Environmental Noise Monitoring
Wednesday 5/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90

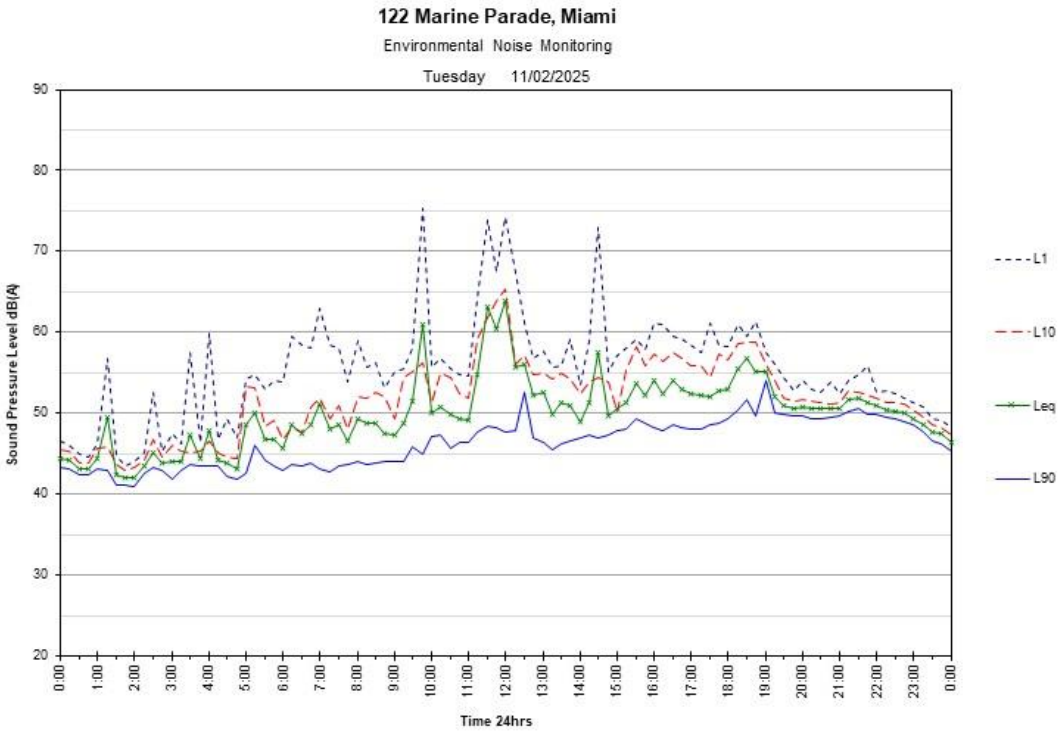

122 Marine Parade, Miami
Environmental Noise Monitoring
Thursday 6/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90

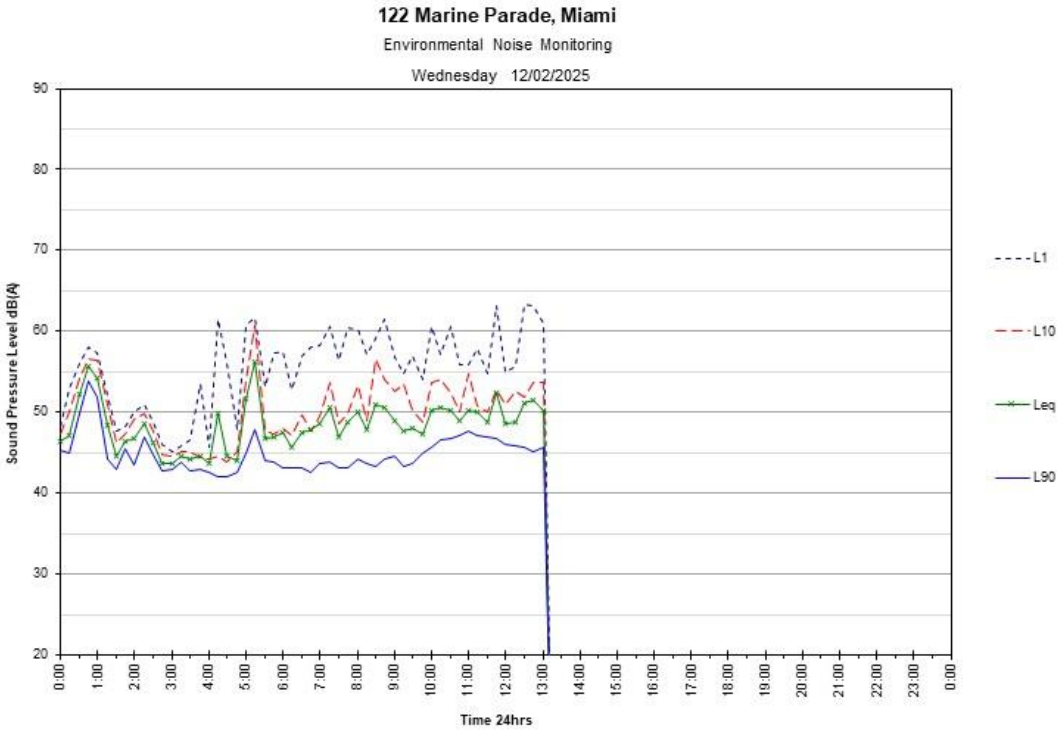

122 Marine Parade, Miami
Environmental Noise Monitoring
Friday 7/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


122 Marine Parade, Miami
Environmental Noise Monitoring
Saturday 8/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


122 Marine Parade, Miami
Environmental Noise Monitoring
Sunday 9/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


122 Marine Parade, Miami
Environmental Noise Monitoring
Monday 10/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


122 Marine Parade, Miami
Environmental Noise Monitoring
Tuesday 11/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


122 Marine Parade, Miami
Environmental Noise Monitoring
Wednesday 12/02/2025
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90

ATTACHMENT 12

Geotechnical Assessment
prepared by Pacific Geotech



Pacific Geotech
Consulting Geotechnical Engineers

PRELIMINARY GEOTECHNICAL REPORT: Proposed Residential Development

122 Marine Parade

Mermaid Beach

Eastview

April 2025

PG-12869

VERSION 4

E: info@pacgeo.com.au
www.pacgeo.com.au ABN: 62 615 248 952

Pacific Geotech
Consulting Geotechnical Engineers

Ref: PG-12869, 2024-12-10, GR VER 4
Author: Peter Elkington

24th April, 2025

Eastview
Email: nensor@eastview.com.au

ATTN: NICK ENSOR

Dear Sir,

GEOTECHNICAL INVESTIGATION –
PROPOSED RESIDENTIAL DEVELOPMENT
122 MARINE PARADE, MERMAID BEACH

Enclosed is a copy of our report for the above project dated April 2025. An electronic copy of the report has been issued.

The report includes the results of additional investigation undertaken in February and landslide stability hazard assessment of the development area.

Should you have any queries regarding this report, please do not hesitate to contact Peter Elkington at this office.

Yours faithfully,

P. ELKINGTON (RPEQ 7226)

For and on behalf of
PACIFIC GEOTECH PTY LTD

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 METHODOLOGY 2

3.0 SITE DESCRIPTION 3

4.0 GEOTECHNICAL MODEL 4

5.0 GROUNDWATER 4

6.0 POTENTIAL GROUND SURFACE MOVEMENTS 4

7.0 EARTHWORKS AND SITE PREPARATION CONSIDERATIONS 5

8.0 EARTHQUAKE CONSIDERATIONS 6

9.0 BATTERS – SHORT TERM EXCAVATION PROFILE 6

10.0 TEMPORARY BATTER SUPPORT 7

11.0 PERMANENT RETAINING WALLS 8

12.0 BUILDING FOUNDATIONS 8

13.0 CONSTRUCTON MONITORING 11

13.1 Monitoring 11

13.2 Preconstruction Survey 11

14.0 SLOPE STABILITY ASSESSMENT 12

14.1 Landslide Susceptibility Rating (City of Gold Coast) 14

14.2 Implications of Hazard Classifications 15

15.0 SITE MANAGEMENT 16

16.0 LIMITATIONS 16

Appendices

Appendix A
Notes Relating to this Report

Appendix B
Borehole Record Sheets

Appendix C
Site Plan

Appendix D
Landslide Analysis

1.0 INTRODUCTION

This report contains the results of the geotechnical investigation and provides indicative advice and recommendations relating to the following:

- Subsurface conditions in accordance with AS 1726-2017
- Groundwater conditions
- Indicative site classification in accordance with AS 2870-2011
- Earthworks considerations including:
    - Suitability of cut for reuse as fill
    - Compaction standards
    - Stripping depths
    - Trafficability
    - Excavatability
    - Safe temporary batter slopes for cuts
    - Fill batter slopes
- Retention considerations
- Retaining wall design parameters
- Earthquake/liquefaction considerations in accordance with AS 1170.4-2007
- Foundation Recommendations including:
    - High-level and deep support options
    - Bearing capacity and skin friction design values
    - Predicted settlements
- Construction Considerations
- Landslide Hazard Assessment

The building is located within the City of Gold Coast (CoGC) defined scour zone (i.e. to 40m west of seawall to 75m west of the seawall as defined by the R03 for a building with a height up to 25m in the CofGC Coastal Erosion hazard overlay code) and therefore is therefore bound by the requirements of this code. Building foundations must be designed, certified and constructed for scour to at least R.L 1.0m.

Proposed Development

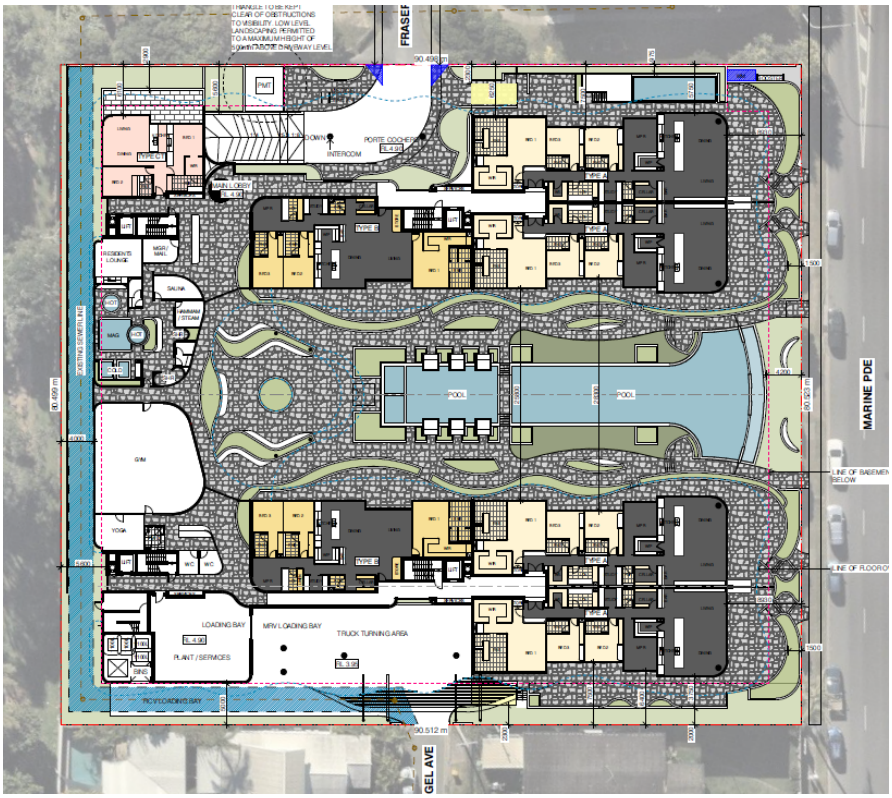
It is understood that the proposed development is to consist of the construction of a four, and partially 5, storey building with private roof terraces above a single level basement at the above site. Earthworks are expected to consist of cuts in the order of 3m for the proposed basement.

Building loads have not been provided but a footprint load in the order of 40kPa is anticipated.

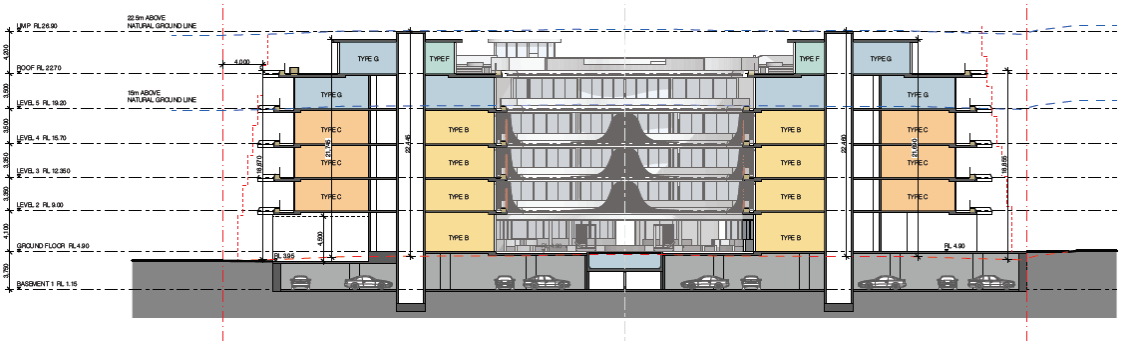
Significant from a geotechnical perspective, a 4m offset is to be maintained from the western boundary. Also, the depth of excavation is limited to one basement level only and the type of construction methodology at this sensitive (western) interface is intended to be secant piling / shoring wall which helps to minimise the extent of ground disturbance vibration.

The proposed development is indicated below.

PROPOSED LAYOUT



PROPOSED SECTION



2.0 METHODOLOGY

The preliminary geotechnical investigation comprised the drilling and sampling of 1 borehole, extending to a depth of 9.0m using a Hanjin DB8 drilling rig and a combination of 100mm solid flight augers and wash boring techniques and sampling 6 boreholes to depths of between 1.85m and 6.0m using a Compac018 drilling rig and

solid flight auger techniques. Dynamic Cone Penetrometer (DCP) testing was undertaken adjacent to the boreholes.

The soil classification descriptions and field tests were carried out in general accordance with Australian Standards.

AS 1726	Geotechnical Site Investigations
AS 1289	Methods of Testing Soils for Engineering Purposes

Borehole records and a site plan showing the test locations are appended to the report.

3.0 SITE DESCRIPTION

The site of the proposed development is located at 122 Marine Parade, Mermaid Beach. The site is bound by residential properties to the north and south, vacant bushland that forms a steep embankment rising the Magic Mountain to the west and Marine Parade to the east.

At the time of the investigation, the site was occupied by an existing double storey unit complex with a concrete driveway and carparking areas.

Vegetation comprised of small, grassed areas as well as some trees and shrubs at the road frontage of the site.

The topography of the site is near level. Drainage at the site was considered poor to fair.

Refer following aerial photograph for typical site conditions.

AERIAL IMAGE



4.0 GEOTECHNICAL MODEL

The subsurface profile encountered in the boreholes generally consisted of sand fill material at the ground surface overlying sand which is initially very loose and loose at the ground surface but becoming medium dense and dense. Weathered metasiltstone was then encountered and extended to the termination of testing.

Table 1 presents a summary of the encountered subsurface profile. Detailed borehole record sheets are appended to this report.

TABLE 1 SUBSURFACE PROFILE SUMMARY

BH No.	FILL	NATURAL				BH TD
		SAND			METASILTSTONE	
		Very Loose/ Loose	Medium Dense	Dense		
BH01	0.0-0.3	0.3-1.6	1.6-4.0	4.0-6.8	6.8-TD	9.0
BH101	0.0-0.6	0.6-1.7	1.7-5.2	5.2-TD	NE	6.0
BH102	0.0-0.3	0.3-2.9	2.9-5.3	5.3-TD	NE	6.0
BH103	0.0-0.3	NE	0.3-TD	NE	NE	1.85
BH104	0.0-0.3	1.6-2.8	0.3-1.6 2.8-5.6	5.6-TD	NE	6.0
BH105	0.0-0.3	NE	0.3-TD	NE	NE	2.25
BH106	0.0-0.4	0.4-1.8	1.8-TD	NE	NE	4.35

Notes:
1. All depths in metres below ground level at time of investigation.
2. NE - Not Encountered; TD - Termination Depth.

5.0 GROUNDWATER

Groundwater was noted at depths of between 2.1m and 4m at the time of drilling. Water levels can be expected to vary with seasonal and climatic conditions.

Typically the groundwater levels in the area are encountered at levels of approximately RL 0.5m to RL 1.0m. Fluctuations of +/- 0.5m are typically noted in the area.

Increases in the groundwater levels often occur following significant rainfall events (floods) with the groundwater levels to as much as RL 1.5m to RL 2.0m being noted in the area.

Additionally, ground water run-off from Magic Mountain may influence the groundwater table levels following periods of rainfall.

6.0 POTENTIAL GROUND SURFACE MOVEMENTS

The investigation and laboratory test results indicate that from a reactivity and settlement perspective, the development site would be classified Class 'M' in accordance with AS 2870-2011 'Residential Slabs and Footings', following appropriate ground improvement works under the footings.

It is recommended that the readers satisfy themselves that the use of AS 2870-2011 is applicable for the proposed design and the above site classification re-confirmed following the completion of the bulk earthworks operation. This classification is not recommended for structural design purposes.

7.0 EARTHWORKS AND SITE PREPARATION CONSIDERATIONS

Earthworks are expected to comprise cuts of up to 3m for the proposed basement. Some over-excavation may be required to allow for ground improvement works.

It is recommended that the following site preparation and earthworks procedures be carried out as part of the earthworks procedures during development.

- All earthworks operations should be carried out in general accordance with AS 3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments".
- Trafficability across the site at the time of the investigation was assessed to be fair to good with no difficulties encountered at the time of the investigation. Following stripping and excavation for the basement, the exposed sands will be difficult to traffic for conventional vehicles. Consideration could be given to adopting a 150mm layer of pavement gravel as a working platform across the site.
- All topsoil (i.e. soil containing organic matter) and soils containing deleterious matter should be stripped from the construction area at the commencement of the earthworks operation. Dirty sands (i.e. >5% fine content) could be difficult to manage and consideration could be given to the disposal of this material.
- The stripped surface should be proof rolled using a vibrating roller or a large vibrating plate compactor (say 300kg), to identify areas of weak surficial soils and to compact the upper level material.
- The "clean" sands on site will be suitable for re-use as structural fill, provided material is free of organic matter and deleterious material. The silty sand may prove difficult to re-use and consideration should be given to preferential disposal of this material.
- Imported fill should be of fair to good quality with a minimum Soaked CBR value of 10%, a maximum Iss=1.0% and a maximum particle size of 75mm, or a clean sand.
- All filling should be undertaken in layer thicknesses of approximately 250mm (or as appropriate for the compaction equipment being used). Fill should be compacted to a minimum dry density ratio of 98% Standard in accordance with AS1289 5.1.1 for cohesive fill and 75% Density Index for non-cohesive fill (i.e. sand).

- Field density testing should be carried out to check the standard of compaction achieved and the placement moisture content. The frequency and extent of testing should be as per guidelines in AS.3798-2007.

8.0 EARTHQUAKE CONSIDERATIONS

The design should consider the effects of an earthquake on the founding soils, as outlined in AS.1170.4-2007, Part 4.

Liquefaction occurs as a result of pore pressures increasing and reducing the effective stress to zero with consequent loss of strength.

The likelihood of liquefaction for an earthquake can be related to sand density. For an acceleration of 0.08g, the following assessments as shown in Table 2 have been made.

TABLE 2 LIQUEFACTION POTENTIAL

Liquefaction Potential	Density Index (%)
Very Likely	<35 (very loose to loose)
Likely	35 – 54 (medium dense)
Unlikely	>64 (medium dense to very dense)

Testing results indicated that sands that are likely to undergo liquefaction extended to depths in the order of 3m. These materials will require removal, or recompaction, as part of the foundation improvement works and therefore all sands likely to undergo liquefaction will be removed from site during construction.

Reference to Section 4.2 in AS1170.4-2007, it is recommended that a preliminary site classification of "Class Ce – shallow soil site" be adopted, in accordance with the definitions presented in "Section 4.2 – Class Definitions".

9.0 BATTERS – SHORT TERM EXCAVATION PROFILE

It is understood that cut batters to 3m in height will be required as part of the basement construction.

Considering the proposed maximum height of cut, the following recommendations are made for the bulk excavation of the site.

Batters < 2.0m in height

- 1V:1.5H batter with crest of batter >2m from buildings or structures.

Batters > 2.0m in height

- 1V:1.5H batter with the crest of the batter at least 2.0m inside the site boundary.
- 2.0m minimum distance from any building or structure.

If batters are to be left exposed for an extended period of time, a batter angle of 1V:2H is recommended and berm widths are to be strictly maintained. The above batter slopes assume no seepage is present in the batters and the batters are above the water table.

10.0 TEMPORARY BATTER SUPPORT

Where the excavations cannot be battered to a stable angle, they will need to be supported to prevent instability. Support systems could include:

- Secant or Contiguous Piles – whilst no vibration is associated with their installation, it is likely a more expensive solution.

Additionally, the use of the retention system to address the requirements of the CofGCC defined scour zone could be considered.

Where sands are retained, shoring pressures should be based on the lateral earth pressure coefficients given in Table 3, in conjunction with a triangular pressure distribution where the pressure can be calculated from $P=0.5ka\ \gamma\ H^2$, provided the excavation is not surcharged by adjacent buildings/services and some tolerance or movement exists.

TABLE 3 LATERAL EARTH PRESSURE COEFFICIENTS

Material	Strength	Unit Weight (t/m^3)	Lateral Earth Pressure Coefficients (K)	
			Flexible	Propped
Sands	Very loose to Loose	1.8	0.40	0.60
	Medium Dense	2.0	0.30	0.50
	Dense	2.1	0.25	0.45

Pressures for unsurcharged propped walls could be designed based on a uniform pressure distribution with depth, where the pressure $P = 0.65ka\ \gamma\ H$ (kPa) where H is the depth of the excavation. The shoring wall should also be checked for a triangular distribution calculated using the lateral earth pressure coefficients present in Table 3 for a propped wall.

The temporary support system should also take into consideration the possible needs to over-excavate the basement for ground improvement works.

It should be noted that lateral deflection of the retention system will occur, irrespective of the retention system adopted. In additional to lateral movements, vertical movement of the soils behind the retention system will result. The effects of the vertical and horizontal movements may be seen at a distance equal to 2 or 3 times the height of the excavation.

Subject to detailed design, movements as much as 1% to 2% of the depth of the excavation could occur behind a cantilevered pile wall.

11.0 PERMANENT RETAINING WALLS

Basement walls should be designed using a pressure coefficient for the at rest case of $K_0 = 0.5$.

Unit wall force P is given by:-

$$P = 0.5\ K_0\ \gamma\ H_1^2 \text{ (kN/m run of wall)}$$

Passive resistance at the base of the wall can be calculated from:-

$$P = 0.5\ K_p\ \gamma\ H_w^2$$

where K_p = 3.00 (ignores wall friction effects) for very loose/loose sand
3.25 for medium dense sands
3.39 for dense sands

H_w = front face of wall contributing to passive resistance (m)

For the sliding resistance calculation, the angle of friction for sand (ϕ) compacted to not less than 75% density index can be taken as 32° for walls with a key. For walls without a key, the angle of friction for sliding resistance should be taken as $\frac{2}{3}\phi$ or 21°.

12.0 BUILDING FOUNDATIONS

The proposed building is located within the Council defined scour zone being between 40m west of the sea wall and 75m west of the seawall for a building up to 25m in height as per Condition R03, footings for the proposed structure are required to extend below R.L 1.0m.

Considering the provided basement floor level and the requirements of the Council Erosion Hazard Overlay Code, a high-level footing system is considered to be a practical solution with suitable detailing and depending on the final design founding levels, the use of the retention system could provide suitable scour protection as required by the CofGCC policy.

Preliminary High Level Raft

Given the encountered subsurface profile, a high level raft type footing system would generally be suitable for the support of the proposed structure, with appropriate ground improvement works and due consideration of the potential hydrostatic uplift forces and the scour requirements of the CofGCC.

Assuming an excavation depth of 3m for the basement, provided the founding soils are compacted to a minimum Density Index of 75% for a minimum depth of 1m below the footings, an allowable bearing capacity of 250kPa could be adopted for the foundation design.

This compaction may require some limited over-excavation of the founding soils, compaction of the exposed material and the replacement of the excavation using "clean" sand.

It should be noted that silty sands were encountered around the raft founding levels, some difficulties in treating these sands should be expected.

It is strongly recommended that if a high level footing system is to be adopted, sufficient "clean" sand from higher in the excavation profile be stockpiled on-site, to allow for the replacement of the silty sands at the founding level.

To enable the required ground improvement works to be undertaken, the following earthworks operation is recommended:

i. Install the temporary retention system and dewatering system.

ii. Dewater the site to at least 0.9m below the excavation level.

iii. Excavate the site to the design basement level and test the base of the excavation to determine the extent of over-excavation required.

iv. Following determination of the required extent of over-excavation, excavate the site to the required level and compact the exposed sands using a large (300kg plus) vibrating plate compactor or a small smooth drum roller. It should be noted that the silty sands encountered at some test locations could be difficult to compact and manage, if not appropriately dewatered. It may be necessary to remove the silty sands and replace them with clean sands from higher in the excavation profile.

v. Replace the over-excavation with "clean" sand and compact in layers to the design founding level if required. The founding soils should be compacted to a minimum Density Index of 75% (in accordance with AS 1289 5.6.1).

Foundation Design Parameters

For footings founded 3m below the ground level, an allowable bearing capacity of 250kPa could be adopted, following confirmation that a minimum Density Index of 75% is present for a minimum depth of 750mm below the footings.

If the exposed sands are disturbed or loosened during the excavation operation, they should be recompacted. Consideration should be given to placing a 50mm thick (minimum) concrete binding layer across the footings, immediately following excavation.

Settlement Potential

Settlements from underlying improved sands and natural soils beneath a raft at a nominal founding depth of 3.0m below existing ground level at a design bearing pressure of 250kPa have been calculated to be in the order of 10 to 15mm with

anticipated differential settlements of between 25% and 50% of the calculated total settlement for pad footings founded at a similar depth.

The settlement will occur as "immediate" settlement as the building loads are applied.

Hydrostatic Uplift Forces

For a fully tanked basement, hydrostatic uplift forces should be considered in the design. It is recommended hydrostatic uplift forces in groundwater levels to at least RL1.5 to 2.0 be taken into consideration on this site and checked for the Q_{100} flood condition.

Deep Foundations

A deep foundation system founding in the underlying dense or better sands, founding below RL 1.0m, will likely be required for the support of the proposed development, to protect it from scour events.

Possible piling options which could be considered for the structures include the following:

- Grout injected piles
- Steel screw piles

However, specialist piling contractors should also be consulted for their assessment of piling alternatives and confirm the suitability of the selected piling system.

Pile Design

Piles should be designed in accordance with AS 2159-2009 'Piling - Design and Installation'. For the limit state design as outlined in the Code, both the geotechnical strength R_g^* and the structural strength R_s^* for a single pile and pile group must be greater or equal to the design action effect S*, ie $R_g^* \geq S^*$ and $R_s^* \geq S^*$.

The design of a deep foundation system should consider the following:-

- Compressional capacity
- Construction considerations

It is recommended that the deep foundation system on this project be designed in accordance with AS 2159-2009 'Piling - Design and Installation'. This code uses the limit state design method.

Compressional Capacity

The design of a single pile or a pile group must be such that both the geotechnical strength R^*_g and the structural strength R^*_s, are greater than or equal to the design action effect S*, ie.

$$R^*_g \geq S^* \text{ and } R^*_s \geq S^*$$

The design geotechnical strength (R^*_g) can be calculated as the ultimate geotechnical strength (R_{ug}) multiplied by the geotechnical strength reduction factor $Ø_g$. Ultimate geotechnical strength (R_{ug}) parameters for the materials encountered on the site are outlined in Table 4.

TABLE 4 ULTIMATE GEOTECHNICAL STRENGTH (R_{UG}) PARAMETERS

Material		Base Bearing (kPa)	Skin Friction (kPa)
Sand - above RL 1.0m - below RL 1.0m		NC 3600 (5)	NC 45
Metasiltstone	XW	3600	70
	HW	4500	100

Notes:
1. NR – Not Recommended; NC – Not Considered in skin friction calculations.
2. Recommended geotechnical strength reduction factor ($Ø_g$) = 0.48.
1. Considering limit state analysis (AS 2159-2009), the design geotechnical strength (R^*_g) is calculated by multiplying the ultimate geotechnical strength (Rug) by the geotechnical strength reduction factor $Ø_g$, ie. $R^*_g = R_{ug} \times Ø_g$.
2. Should a "working stress" approach be adopted, a minimum factor of safety of 3.0 on base and 2.0 on skin friction is recommended.
3. Potential effects of the underlying medium dense sands should be taken into consideration in the final pile design.

13.0 CONSTRUCTON MONITORING

Construction vibrations could potentially cause settlement in the loose upper level sands, thereby damaging nearby structures founded in these strata. Prior to commencement of construction on site, it is recommended that a detailed dilapidation survey be undertaken to establish the condition of all existing adjacent structures.

13.1 Monitoring

It is recommended that monitoring points should be established on the retention system to check for deflections during excavation. A suggested spacing of the monitoring points would be 10m along the walls. A regular monitoring program of these stations should be implemented.

Monitoring must commence before any excavation to establish baseline readings.

13.2 Preconstruction Survey

Prior to commencement of construction on site, it is recommended that a dilapidation survey be undertaken on the adjacent structures.

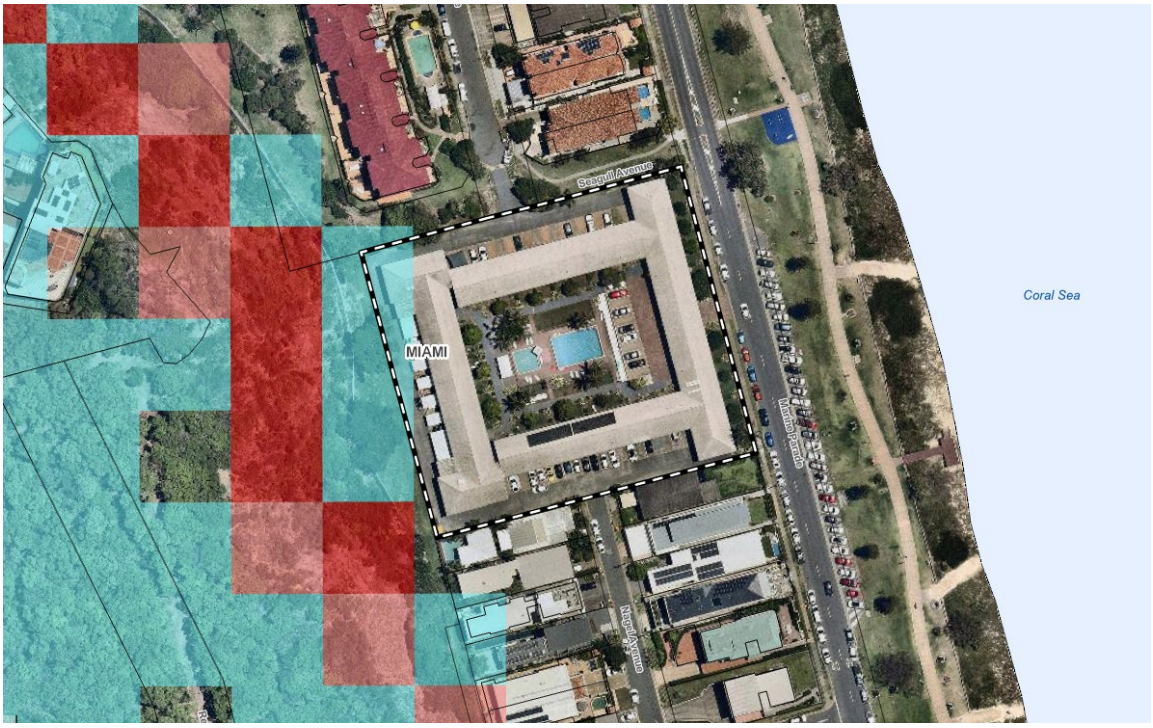
This survey should include the following:

- The extent of exiting damage (if any)
- The general condition of the property, ie. Condition of all exposed columns and beams, partition walls and cladding etc.

- Road, kerb and channel and footpath condition adjacent development site.

14.0 SLOPE STABILITY ASSESSMENT

The north western corner of the site, as indicated below, is identified on the CofGCC mapping as being a moderate risk of landslide.



In accordance with the CofGCC code requirements, a Landslide Hazard Assessment is required for the site.

Additionally, the batter slope to the west is mapped variously as moderate to high on the landslide risk mapping. This batter has been the subject of a previous investigation by SMEC, which provided recommendations to both selectively stabilise the batter and reduce the risk of landslides from impacting on the development site. The location of the development site is in the area identified by the SMEC report as requiring a catch fence at the toe of the batter.

The catch fence appears to be in place behind the subject property, as indicated below.

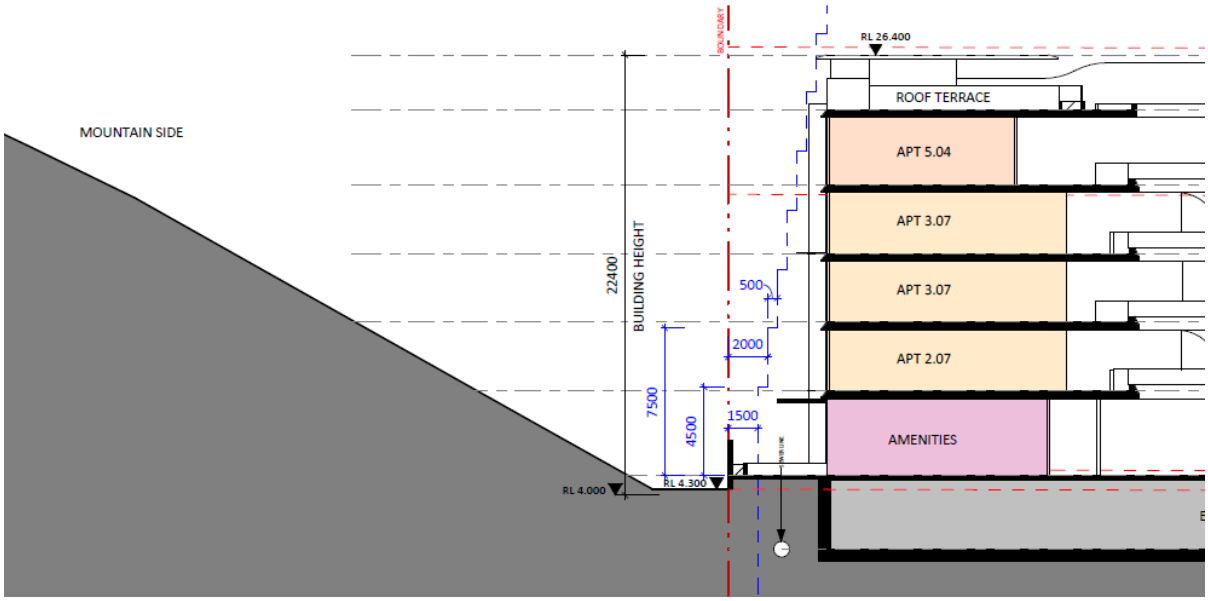
SITE PHOTOGRAPHS





Additionally to the catch fence, the proposed development is popped up above the existing ground level, at the toe of the batter and the building offset by approximately 5m from the western boundary as indicated below.

PROPOSED SECTION



There is no evidence of existing or recent past slope instability involving small scale or large scale movements of significant quantities of soil or rock in a short duration event such as a slip or landslide within the proposed building envelopes at the site as the development area is generally level. There is, however, an exposed rock face to the west of the site that does show indications of instability. This batter has been assessed and stabilised by others (SMEC / CofGCC) through the use of catch fences as outlined above. In addition to the catch fence installed by council, the applicant intends to construct a circa 1.5m high core filled and reinforced blockwork wall along the entire western boundary which will have the dual benefit of acting as another barrier device.

14.1 Landslide Susceptibility Rating (City of Gold Coast)

The slope stability assessment methodology adopted for this assessment is in accordance with the City of Gold Coast (Council) "SC6.10 City Plan Policy - Geotechnical Stability Assessment Guidelines," January 2021. These guidelines have been applied to the development site.

On this basis, it can be expected that the area of the site, to the west of the development, are at higher Levels of Risk to Property than the overall assigned rating for that area but has been managed through the installation of the existing catch fence.

The building envelope has been assigned a Landslide Risk Rating based on:-

- Ground surface slope angle and shape
- Geology

- Typical depth of soil cover
- Presence of uncontrolled fill, colluvium, erosion features, drainage features, slips or surface irregularities
- Seepage and drainage conditions as assessed during the walkover survey carried out for this study

The results of the slope stability assessment is presented in Table 5 below.

TABLE 5 – LANDSLIDE SUSCEPTIBILITY RATING

122 Marine Parade	Relative Frequency	Assessed Landslide Susceptibility Rating	Required Works to Maintain Susceptibility Rating to Low
Building Envelope	0.5715	Low	Sections 6.0 to 12.0 as reported herein

From results of the desk study, walkover survey and borehole drilling, we assess the building envelope as having a Landslide Susceptibility Rating of "Low" in its existing condition but providing the recommendations of this report are followed including foundation recommendations and retention of the vertical rock face following excavations to increase the available building platform within the downslope building envelope.

Provided the recommendations of the management of the adjacent batter are maintained, the building envelope is expected to maintain a "Low" or better Landslide Susceptibility Rating for the long term.

14.2 Implications of Hazard Classifications

The implications of Hazard Risk Ratings are presented in the City of Gold Coast Council (CofGC) publication "Guidelines for Control of Slope Instability within the City of the Gold Coast" and reproduced in Table 6.

TABLE 6 – IMPLICATIONS OF HAZARD CLASSIFICATIONS (CofGC Publication)

Hazard Rating	Implications
VH (Very High Hazard)	Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to acceptable levels.
H (High Hazard)	Detailed investigation, planning and implementation of treatment options required to reduce risk to acceptable levels.
M (Moderate Hazard)	Tolerable provided treatment plan is implemented to maintain or reduce risk. May be accepted. May require investigation and planning of treatment options.
L (Low Hazard)	Usually accepted. Treatment requirements and responsibility to be defined to maintain or reduce risk.
VL (Very Low Hazard)	Accepted. Managed by routine procedures.

15.0 SITE MANAGEMENT

To maintain the long-term performance of the structure, good management of the soil conditions and the development is vital throughout the life of the development.

The following are some specific comments with respect to site management.

- The ground surface around the perimeter of the buildings should slope away from the structure and fall to the stormwater system. Water should not be allowed to pond adjacent to the buildings.
- Founding soils should not be allowed to become saturated. Saturation of the on-site material will result in an increase in settlement potential.
- Service trenches under the buildings should be kept to a minimum.
- Footings should be poured immediately after excavation. If footings cannot be poured on the same day as excavation, a blinding layer of 50mm thickness is recommended.

16.0 LIMITATIONS

We have prepared this preliminary report for the Proposed Residential Development at 122 Marine Parade, Mermaid Beach. The report is provided for the exclusive use of Eastview, for this project only and for the purposes outlined in the report. It should not be used by, or relied upon, for other projects on the same or different sites or by a third party. In preparing this report, we have relied upon information provided by the client or their agents.

The results are indicative of the subsurface conditions on site only at the specific testing locations. Subsurface conditions can change between test locations and the design and construction should take the spacing of the testing and testing methods adopted and the potential for variation between the test locations.

It is recommended that Pacific Geotech be engaged to provide advice and ensure the development is undertaken in accordance with the assumptions made in writing this report.

This is not to reduce the level of responsibility accepted by Pacific Geotech, but rather to ensure that the parties who may rely on the information contained in this report are aware of the responsibilities they assume in doing so.

P. ELKINGTON (RPEQ 7226)

For and on behalf of
PACIFIC GEOTECH PTY LTD

APPENDICES

APPENDIX A

NOTES RELATING TO THIS REPORT

Notes Relating to this Report

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.

Every care has been taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical conditions and contains recommendations or suggestions for design and construction. However, unexpected variations in ground conditions will occur. The potential for this will depend partly on testing, spacing and sampling frequency.

If variations are identified, Pacific Geotech would be pleased to assist with additional investigations or advice to resolve the matter.

Copyright

This report is the property of Pacific Geotech Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement of proposal. Unauthorised use of this report is prohibited.

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.

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.

Description and Classification Methods

The description and classification of soils and rocks used in this report are based on AS 1726.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the percent of other particles present (e.g. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	less than 0.002mm
Silty	0.002 to 0.06mm
Sand	0.06 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density which can be correlated from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very Loose	less than 4
Loose	4 – 10
Medium Dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) and can be quantified by the Pocket Penetrometer test, Vane Shear test, laboratory testing or engineering examination. The strength terms are defined as follows:

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 - 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 - 400
Hard	greater than 400
Friable	strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc.

Planarity	
CU	Curved
DIS	Discontinuous
IR	Irregular
PR	Planar
ST	Stepped
UN	Undulose

Roughness	
POL	Polished
RJ	Rough
S	Smooth
SL	Slickened
VR	Very Rough

Defects	Type
BP	Bedding Parting
CL	Cleavage
CO	Contact
CS	Crushed Seam
CZ	Crushed Zone
DB	Drilling Break
DK	Dyke
DL	Drill Lift
DZ	Decomposed Zone
FC	Fracture
FL	Foliation
FZ	Fracture Zone
HB	Handling Break
IS	Infilled Seam
JT	Joint
H	Schistosity
SI	Sill
SM	Seam
SS	Shear Seam
SZ	Shear Zone
VN	Vein
VO	Void

Sampling

Sampling is undertaken during the fieldwork to allow examination of the soil or rock and to allow laboratory testing to be undertaken.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content and minor constituents. Bulk samples are similar but of greater volume required for some test procedures such as CBR testing.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and collecting a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

Investigation Methods

Test Pits: These are typically undertaken with a backhoe or a tracked excavator, allowing examination of the insitu soils. Limitations of test pits are the problems associated with collapse of the pits, disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of typical diameter of between 50mm to 75mm advance manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as fill, gravel, hard clays and collapse of the borehole (typically in non-cohesive soil).

Continuous Spiral flight Augers: The borehole is advanced using 65mm to 100mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. Augers of up to 300mm in diameter are used to recover larger volumes of sample. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights. Samples can be disturbed and layers may become mixed. Augering below the groundwater table can be less reliable than augering above the water table.

A Tungsten Carbide (TC) bit for auger drilling into rock can be used to indicate rock strength and continuity by variation in drilling resistance and from examination of recovered rock fragments but provides only an indication of the likely rock strength. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is advanced by a bit attached to the end of a hollow rod string, with water being pumped down the drill rods and returned up the annulus of the borehole, carrying the drill cuttings. Changes in stratification can be determined from the return, together with information from "feel" and rate of penetration.

The borehole can be stabilised through the use of drilling mud as a circulating fluid. The term 'mud' encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. This technique provides a reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel is used, which gives a core of about 50mm diameter. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a disturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposed", Test 6.3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63kg hammer, with a free fall of 760mm. The sample is driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense soils, hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of , say, 4, 6 and 7 blows, as
  N = 13
  4, 6, 7
- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as
  N > 30
  15, 30/40mm

Cone Penetrometer Testing (CPT): Cone Penetrometer Testing with or without pore pressure measurement (CPTu) is carried out using a Cone Penetrometer in general accordance with AS 1289 6.5.1, 1999.

In the tests, a 36mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the fractional resistance on a separate 135mm long sleeve, immediately behind the cone. Pore Pressure is recovered through a pore ring located either within, or more usually immediately behind the cone/tip.

As penetration occurs (at a rate of approximately 20mm per second) and data is recorded every 20mm of penetration, the results are presented graphically.

The information provided on the plot comprises:

- Cone resistance – expressed in mPa
- Sleeve friction – expressed in kPa
- Friction ratio – the ratio of sleeve friction to cone resistance expressed as a percentage.
- Pore pressure in kPa
- Tilt of probe (in degrees).

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and rising to 2% to as high as 8%, and higher in organic soils. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes, etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive.

Dynamic Cone Penetrometers:

Dynamic Cone Penetrometer (DCP) tests are carried out by driving a 16mm diameter rod into the ground with a 9kg sliding hammer dropping 510mm and counting the blows for successive 100mm increments of penetration.

Logs

The borehole or test pit logs are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of the boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line" variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

Groundwater

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be flushed from the hole and drilling mud must be washed out of the hole or 'reverted' chemically if water observations are to be made.

More reliable measurements can be made by installing standpipes from which ongoing monitoring can be undertaken.

Fill

The present of fill materials can often be determined only by the inclusion of foreign objects (e.g. bricks, steel ,etc.) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult to reliably determine the extent of the fill.

Laboratory Testing

Laboratory testing is carried out in general accordance with Australian Standard 1289 'Methods of Testing Soil for Engineering Purposes'.

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, the company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage.

Review of Design

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/constraints are quite complex, it is prudent to have a design review.

Site Inspection

Pacific Geotech would be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related:

Requirements could range from:

i. a site visit to confirm that conditions exposed are no worse than those interpreted, to
ii. a visit to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, or
iii. full time engineering present on site.

APPENDIX B

BOREHOLE RECORD SHEETS

Pacific Geotech
Consulting Geotechnical Engineers

Borehole No.
BH01
Page 1 of 1

Project No.: PG-12869

Client:	Eastview	Commenced:	05/12/2024
Project Name:	Proposed Residential Development	Logged By:	AS
Hole Location:	122 Marine Parade, Mermaid Beach	Checked By:	
Hole Position:			
Drill Model and Mounting:	Hanjin 2022	RL Surface:	No survey
Hole Diameter:		Datum:	AHD Operator: AS

Drilling Information | ***Soil Description***

Method	Casing	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional
						0.15			Concrete
						0.30		GP	FILL Sandy GRAVEL (GP) Dense, coarse sized, pale grey, coarse grained sand, dry.
AD/T								SP	NATURAL SAND (SP) Loose, fine to medium grained, yellow brown, moist.
			SPT 1.50-1.95 m 7,8,10 N=18			1.60		SP	SAND (SP) Medium dense, fine to medium grained, yellow brown, moist.
			SPT 3.00-3.45 m 10,10,13 N=23			2			
		▽				4.00		SP	SAND (SP) Dense, fine to medium grained, grey, wet.
WB			SPT 4.50-4.95 m 16,21,23 N=44			4			
			SPT 6.00-6.45 m 8,13,19 N=32			6			
						6.80			METASILTSTONE (HW) Highly weathered, very low to low strength, yellow brown.
						8			
						8.20			METASILTSTONE (HW-MW) Highly to moderately weathered, low strength, yellow brown.
			SPT 9.00-9.10 m 30/100mm			9.00			Hole Terminated at 9.00 m

Method
AS - Auger
RR - Rock Roller
WB - Washbore

Water
Level (Date)
Inflow

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
B - Bulk Sample

Remarks
1. Groundwater encountered at 4.00m.

Support
C - Casing

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

ER PACGEO 1.01.2 LIB.GLB Log PACGEO BOREHOLE PG-12869.GPJ <<DrawingFile>> 10/12/2024 15:06 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: pacgeo 1.01.2 2022-05-25 Prj: Precise 1.01 2016-11-23

Pacific Geotech
Consulting Geotechnical Engineers

Borehole No.
BH01-SP
Page 1 of 1

Project No.: PG-12869

Client:	Eastview	Commenced:	11/02/2025
Project Name:	Proposed Residential Development	Logged By:	RR
Hole Location:	122 Marine Parade, Mermaid Beach	Checked By:	
Hole Position:			
Drill Model and Mounting:	Compac 018	RL Surface:	No survey
Hole Diameter:		Datum:	AHD
		Operator:	RR

Method	Casing	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional
AD/T			ASS 0.00-0.50 m			0.10		SM	FILL Silty SAND (SM) Loose, fine to medium grained, dark grey, with fine sized gravel, with low plasticity clay, dry (with organics).
								SM	FILL Silty SAND (SM) Loose, fine to medium grained, dark grey, with fine to medium sized gravel, dry.
			ASS 0.50-1.00 m D 0.60-1.00 m			0.60		SP	NATURAL SAND (SP) Loose, fine to medium grained, pale yellow brown, moist.
			ASS 1.00-1.50 m D 1.10-1.50 m			1			
			ASS 1.50-2.00 m			1.70		SP	SAND (SP) Medium dense to dense, fine to medium grained, pale yellow brown, moist.
			ASS 2.00-2.50 m			2			
			ASS 2.50-3.00 m			2.90		SP	SAND (SP) Medium dense, fine to medium grained, pale yellow brown, moist.
			ASS 3.00-3.50 m			3			
			ASS 3.50-4.00 m			3.90		SP	SAND (SP) Medium dense to dense, fine to medium grained, pale yellow brown, wet.
		▽	ASS 4.00-4.50 m			4			
			ASS 4.50-5.00 m			5.20		SP	SAND (SP) Dense, fine to medium grained, pale yellow brown, wet.
			ASS 5.00-5.50 m			5			
			ASS 5.50-6.00 m D 5.60-6.00 m			6.00			Hole Terminated at 6.00 m

DCP TEST (AS 1289.6.3.2-1997) Blows per 100 mm
0 5 10 15 20 25

Method
AS - Auger
RR - Rock Roller
WB - Washbore

Water
Level (Date)
Inflow

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
B - Bulk Sample

Remarks
1. Groundwater encountered at 3.90m.
2. DCP refusal at 1.68m and 3.86m.
3. Standpipe installed to 5.10m.

Support
C - Casing

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

ER PACGEO 1.01.2 LIB.GLB Log PACGEO BOREHOLE PG-12869.GPJ <<DrawingFile>> 12/02/2025 12:20 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: pacgeo 1.01.2 2022-05-25 Prj: Precise 1.01 2016-11-23

Pacific Geotech
Consulting Geotechnical Engineers

Borehole No.
BH02
Page 1 of 1

Project No.: PG-12869

Client:	Eastview	Commenced:	11/02/2025
Project Name:	Proposed Residential Development	Logged By:	RR
Hole Location:	122 Marine Parade, Mermaid Beach	Checked By:	
Hole Position:			
Drill Model and Mounting:	Compac 018	RL Surface:	No survey
Hole Diameter:		Datum:	AHD Operator: RR

Drilling Information							Soil Description			DCP
Method	Casing	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	DCP TEST (AS 1289.6.3.2-1997) Blows per 100 mm
AD/T		▽	D 5.60-6.00 m			0.02		GM	Bitumen	0 5 10 15 20 25
						0.30			FILL Silty Sandy GRAVEL (GM) Dense, fine to medium sized, pale yellow brown, fine to medium grained sand, dry.	
								SP	NATURAL SAND (SP) Loose, fine to medium grained, pale yellow brown, dry.	
						1.30		SP	SAND (SP) Loose, fine to medium grained, pale yellow brown, moist.	
						2.90		SP	SAND (SP) Medium dense, fine to medium grained, pale yellow brown, wet.	
						3.30		SP	SAND (SP) Medium dense to dense, fine to medium grained, pale yellow brown, wet.	
						5.30		SP	SAND (SP) Dense, fine to medium grained, pale yellow brown, wet.	
						6.00			Hole Terminated at 6.00 m	

Method
AS - Auger
RR - Rock Roller
WB - Washbore

Water
Level (Date)
Inflow

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
B - Bulk Sample

Remarks
1. Groundwater encountered at 2.90m.
2. DCP refusal at 3.24m.

Support
C - Casing

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

ER PACGEO 1.01.2 LIB.GLB Log PACGEO BOREHOLE PG-12869.GPJ <<DrawingFile>> 12/02/2025 12:20 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: pacgeo 1.01.2 2022-05-25 Prj: Precise 1.01 2016-11-23

Pacific Geotech
Consulting Geotechnical Engineers

Borehole No.
BH03
Page 1 of 1

Project No.: PG-12869

Client:	Eastview	Commenced:	11/02/2025
Project Name:	Proposed Residential Development	Logged By:	RR
Hole Location:	122 Marine Parade, Mermaid Beach	Checked By:	
Hole Position:			
Drill Model and Mounting:	Compac 018	RL Surface:	No survey
Hole Diameter:		Datum:	AHD Operator: RR

Drilling Information						Soil Description			DCP
Method	Casing	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	DCP TEST (AS 1289.6.3.2-1997) Blows per 100 mm
AD/T						0.01		GM	Bitumen	0 5 10 15 20 25
						0.30			FILL Silty Sandy GRAVEL (GM) Medium dense to dense, fine to medium sized, pale orange brown, fine to medium grained sand, dry.	
								SP	NATURAL SAND (SP) Medium dense to dense, fine to medium grained, pale grey, moist.	
						1				
						1.10		SP	SAND (SP) Medium dense to dense, fine to medium grained, pale yellow brown, moist.	
						1.85				
						2			Hole Terminated at 1.85 m	
						3				
						4				
						5				

Method
AS - Auger
RR - Rock Roller
WB - Washbore

Water
Level (Date)
Inflow

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
B - Bulk Sample

Remarks
1. Groundwater not encountered.
2. DCP refusal at 0.64m, 1.18m and 1.72m.
3. Maximum TC refusal at 1.85m.

Support
C - Casing

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

ER PACGEO 1.01.2 LIB.GLB Log PACGEO BOREHOLE PG-12869.GPJ <<DrawingFile>> 12/02/2025 12:20 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: pacgeo 1.01.2 2022-05-25 Prj: Precise 1.01 2016-11-23

Pacific Geotech
Consulting Geotechnical Engineers

Borehole No.
BH04
Page 1 of 1

Project No.: PG-12869

Client:	Eastview	Commenced:	11/02/2025
Project Name:	Proposed Residential Development	Logged By:	RR
Hole Location:	122 Marine Parade, Mermaid Beach	Checked By:	
Hole Position:			
Drill Model and Mounting:	Compac 018	RL Surface:	No survey
Hole Diameter:		Datum:	AHD Operator: RR

Drilling Information							Soil Description			DCP
Method	Casing	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	DCP TEST (AS 1289.6.3.2-1997) Blows per 100 mm
AD/T		▽	ASS 0.00-0.50 m			0.01		GM	Bitumen	0 5 10 15 20 25
			D 0.30-0.50 m			0.30		SP	FILL Silty Sandy GRAVEL (GM) Medium dense to dense, fine to medium sized, pale yellow brown, fine to medium grained sand, dry.	
			ASS 0.50-1.00 m D 0.60-1.00 m			0.80		SP	NATURAL SAND (SP) Medium dense to dense, fine to medium grained, pale yellow brown, moist to dry.	
			ASS 1.00-1.50 m D 1.10-1.50 m			1		SP	SAND (SP) Medium dense to dense, fine to medium grained, pale yellow brown, moist.	
			ASS 1.50-2.00 m			1.60		SP	SAND (SP) Loose, fine to medium grained, pale yellow brown, moist.	
			ASS 2.00-2.50 m			2				
			ASS 2.50-3.00 m D 2.60-3.00 m			2.80		SP	SAND (SP) Medium dense, fine to medium grained, pale yellow brown, wet.	
			ASS 3.00-3.50 m			3		SP	SAND (SP) Medium dense to dense, fine to medium grained, pale yellow brown, wet.	
			ASS 3.50-4.00 m			3.10				
			ASS 4.00-4.50 m D 4.10-4.50 m			4				
			ASS 4.50-5.00 m							
			ASS 5.00-5.50 m			5				
			ASS 5.50-6.00 m			5.60		SP	SAND (SP) Dense, fine to medium grained, pale yellow brown, with fine to medium sized gravel, wet (trace of cobbles).	
						6.00			Hole Terminated at 6.00 m	

Method
AS - Auger
RR - Rock Roller
WB - Washbore

Water
Level (Date)
Inflow

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
B - Bulk Sample

Support
C - Casing

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Remarks
1. Groundwater encountered at 2.80m.
2. DCP refusal at 0.36m, 0.53m, 1.18m and 3.14m.

ER PACGEO 1.01.2 LIB.GLB Log PACGEO BOREHOLE PG-12869.GPJ <<DrawingFile>> 12/02/2025 12:20 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: pacgeo 1.01.2 2022-05-25 Prj: Precise 1.01 2016-11-23

Pacific Geotech
Consulting Geotechnical Engineers

Borehole No.
BH05
Page 1 of 1

Project No.: PG-12869

Client:	Eastview	Commenced:	11/02/2025
Project Name:	Proposed Residential Development	Logged By:	RR
Hole Location:	122 Marine Parade, Mermaid Beach	Checked By:	
Hole Position:			
Drill Model and Mounting:	Compac 018	RL Surface:	No survey
Hole Diameter:		Datum:	AHD
		Operator:	RR

Drilling Information							Soil Description			DCP
Method	Casing	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	DCP TEST (AS 1289.6.3.2-1997) Blows per 100 mm
AD/T			ASS 0.00-0.50 m			0.02		GM	Bitumen	0 5 10 15 20 25
			D 0.30-0.50 m			0.30			FILL Silty Sandy GRAVEL (GM) dense, fine to medium sized, fine to medium grained sand, pale yellow brown, dry.	
			ASS 0.50-1.00 m					SP	NATURAL SAND (SP) medium dense to dense, fine to medium grained, pale yellow brown, moist.	
			ASS 1.00-1.50 m			1				
			D 1.20-1.50 m							
			ASS 1.50-2.00 m			2				
						2.25			Hole Terminated at 2.25 m	
						3				
						4				
						5				

Method
AS - Auger
RR - Rock Roller
WB - Washbore

Water
Level (Date)
Inflow

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
B - Bulk Sample

Remarks
1. Groundwater not encountered.
2. DCP refusal at 0.54m, 1.06m and 1.53m.
3. Maximum TC refusal at 2.25m.

Support
C - Casing

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

ER PACGEO 1.01.2 LIB.GLB Log PACGEO BOREHOLE PG-12869.GPJ <<DrawingFile>> 12/02/2025 12:20 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: pacgeo 1.01.2 2022-05-25 Prj: Precise 1.01 2016-11-23

Pacific Geotech
Consulting Geotechnical Engineers

Borehole No.
BH06
Page 1 of 1

Project No.: PG-12869

Client:	Eastview	Commenced:	11/02/2025
Project Name:	Proposed Residential Development	Logged By:	RR
Hole Location:	122 Marine Parade, Mermaid Beach	Checked By:	
Hole Position:			
Drill Model and Mounting:	Compac 018	RL Surface:	No survey
Hole Diameter:		Datum:	AHD Operator: RR

Method	Casing	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional
AD/T			ASS 0.00-0.50 m			0.03		SM	FILL Silty Gravelly SAND (SM) Loose, fine to medium grained, grey brown, fine sized gravel, with low plasticity clay, moist to dry.
						0.05		GM	Bitumen
						0.40		SP	FILL Silty Sandy GRAVEL (GM) Dense, fine to medium sized, pale yellow brown, fine to medium grained sand, dry.
			ASS 0.50-1.00 m						NATURAL SAND (SP) Loose, fine to medium grained, pale yellow brown, trace fine sized gravel, moist.
			ASS 1.00-1.50 m D 1.10-1.50 m			1			
			ASS 1.50-2.00 m			1.80		SP	SAND (SP) Medium dense, fine to medium grained, pale yellow brown, trace fine sized gravel, wet to moist.
		▽	ASS 2.00-2.50 m			2 2.10		SP	SAND (SP) Medium dense, fine to medium grained, pale yellow brown, trace fine sized gravel, wet.
			ASS 2.50-3.00 m						
			ASS 3.00-3.50 m			3 3.30		SP	SAND (SP) Medium dense, fine to medium grained, pale yellow brown, trace fine sized gravel, wet (with cobbles throughout).
			ASS 3.50-4.00 m			4 4.35			
						5			Hole Terminated at 4.35 m

DCP TEST (AS 1289.6.3.2-1997) Blows per 100 mm
0 5 10 15 20 25

Method
AS - Auger
RR - Rock Roller
WB - Washbore

Water
Level (Date)
Inflow

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
B - Bulk Sample

Remarks
1. Groundwater encountered at 2.10m.
2. DCP refusal at 3.24m.
3. Maximum TC refusal at 4.35m.

Support
C - Casing

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

ER PACGEO 1.01.2 LIB.GLB Log PACGEO BOREHOLE PG-12869.GPJ <<DrawingFile>> 12/02/2025 12:20 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: pacgeo 1.01.2 2022-05-25 Prj: Precise 1.01 2016-11-23

APPENDIX C

SITE PLAN



Pacific Geotech
Consulting Geotechnical Engineers

Drawn ER	Project:	Proposed Residential Development	Drawing No. PG-12869-02 SITE PLAN	A4
Date FEB 25	Location:	122 Marine Parade, Mermaid Beach		
Checked	Client:	Eastview		

APPENDIX D

LANDSLIDE ANALYSIS

Standard Pro-forma for Geotechnical Certification

City of Gold Coast Council file reference:

PROPOSED WORKS AT (LOCATION): **122 Marine Parade, Mermaid Beach**

for (proposed development): **Proposed Residential Development**

I, Peter ELKINGTON, RPEQ No. 7226, of Pacific Geotech Pty Limited (Consulting Engineers), being duly authorised on this behalf, do certify that:-

The building envelope for the residential development at 122 Marine Parade, Mermaid Beach has achieved a Landslide Susceptibility Rating of 'Low' or better for the long term (70 years minimum) and can therefore be sustainable and not cause any adverse effects on the stability and integrity of the neighbouring buildings, properties, utility services and infrastructures providing the advice and construction recommendations made in the Pacific Geotech report "Geotechnical Investigation and Slope Stability Assessment For Proposed Residential Development – 122 Marine Parade, Mermaid Beach" dated 28th March 2025 Job No. PG-12869 have been followed and implemented and that no other development adversely affects the subject development.

I am aware that the City of Gold Coast Council will rely upon this certificate and any associated geotechnical reports, maps, graphs, tables, attachments etc. produced as a consequence of commissioning this development proposal.



Signed: **PETER ELKINGTON (RPEQ No. 7226)**

Designation: **GEOTECHNICAL ENGINEER**

Certified this: **Twenty Eighth Day of March, 2025.**

File: PG-12869 proforma

LANDSLIDE SUSCEPTIBILITY ANALYSIS FORM

1	Natural Slope Surface		
Site		Level	Factor
○	Less than 5 degrees	L	0.1
○	Between 5 and 15 degrees	M	0.5
○	Between 15 and 30 degrees	M	0.8
○	Between 30 and 45 degrees	H	1.2
○	More than 45 degrees	M	1.5
◉	Custom		0.2

2	Slope Shape		
Site		Level	Factor
○	Crest or ridge	L	0.7
◉	Planar / Convex	M	0.9
○	Rough / Irregular	H	1.2
○	Concave	H	1.5
○	Custom		1

3	Site Geology		
Site		Level	Factor
○	Volcanic Extrusive Rock	H	1.1
◉	Sedimentary Rock	M	1
○	Low Grade Metamorphic Rock	M	1
○	High Grade Metamorphic Rock	L	0.9
○	Volcanic Intrusive Rock	M	1
○	Custom		1

4	Soils		
Site		Level	Factor
○	Rock at Surface	VL	0.1
◉	Residual Soil < 1m deep	L	0.5
○	Residual Soil 1-3m deep	M	0.9
○	Residual Soil >3m deep	H	1.5
○	Colluvial Soil < 1m deep	H	1.5
○	Colluvial Soil 1-3m deep	VH	2
○	Colluvial Soil >3m deep	VH	4
○	Custom		0.5

5	Fill Height		
Site		Level	Factor
○	None	L	1
○	Less than 1m	M	1.1
○	Between 1 and 3m	M	1.3
○	Between 3 and 6m	H	1.7
○	More than 6m	VH	2.5
◉	Custom		1.2

6	Evidence of Groundwater		
Site		Level	Factor
◉	None apparent	L	0.7
○	Minor moistness	M	0.9
○	Generally wet	H	1.5
○	Surface springs	VH	3
○	Custom		0.7

7	Cut Height		
Site		Level	Factor
○	None	L	1
○	Less than 1m	M	1.1
○	Between 1 and 3m	M	1.3
○	Between 3 and 6m	H	1.7
◉	More than 6m	VH	2.5
○	Custom		2.5

8	Slope of Cut Face		
Site		Level	Factor
○	NA	NA	1
○	Less than 30 degrees	L	0.5
○	Between 30 and 45 degrees	M	1
○	Between 45 and 60 degrees	H	1.5
◉	More than 60 degrees	VH	3
○	Custom		1.5

9	Material in Cutting		
Site		Level	Factor
○	NA	NA	1
○	High Strength Rock	L	0.5
◉	Medium Strength Rock	L	1
○	Low Strength Rock	M	1.2
○	Very Low Strength Rock and Soil	V	1.5
○	Soil	VH	2
○	Custom		1

10	Cut Slope Support		
Site		Level	Factor
○	NA	NA	1
○	Concrete Wall	L	0.5
○	Crib Wall	M	0.9
○	Gabion Wall	M	1
○	Rock Wall	H	1.5
◉	Unsupported	H	2
○	Custom		1

11	Concentration of Surface Water		
Site		Level	Factor
○	Ridge	L	0.7
○	Crest	M	0.8
◉	Upper Slope	M	0.9
○	Mid Slope	H	1.2
○	Lower Slope	H	1.5
○	Custom		1

12	Wastewater Disposal		
Site		Level	Factor
◉	Fully Sewered	M	1
○	Onsite disposal - Surface	M	1.2
○	Onsite disposal - Soak Pits / Trenches	H	1.5
○	Custom		1

13	Stormwater Disposal		
Site		Level	Factor
◉	All stormwater piped into road drainage	L	0.7
○	Rain water tanks with overflows	M	1
○	Stormwater Discharge on site	H	1.5
○	Custom		1

14	Evidence of Instability		
Site		Level	Factor
◉	No sign of instability	L	0.8
○	Soil Creep	H	1.2
○	Minor irregularity	VH	2
○	Major irregularity	VH	5
○	Active instabilty	VH	10
○	Custom		1

Summary

			Factor
1	**Natural Slope Surface**	6	0.2
2	**Slope Shape**	2	0.9
3	**Site Geology**	2	1
4	**Soils**	2	0.5
5	**Fill Height**	6	1.2
6	**Evidence of Groundwater**	1	0.7
7	**Cut Height**	5	2.5
8	**Slope of Cut Face**	5	3
9	**Material in Cutting**	3	1
10	**Cut Slope Support**	6	2
11	**Concentration of Surface Water**	3	0.9
12	**Wastewater Disposal**	1	1
13	**Stormwater Disposal**	1	0.7
14	**Evidence of Instability**	1	0.8
			0.5715



UPS
URBAN PLANNING SERVICES pty ltd

urbanps.com.au